The Effect of Product Market Competition on the Relationship between Capital Structure and Financial Performance of Companies

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ABSTRACT

Investors and stakeholders are the two groups to which information about the company's financial performance is important. Given the importance of good financial performance of the companies to investors and stakeholders for maximizing their wealth, it is essential to identify and study the factors affecting financial performance. Therefore, the present study aims to examine the effect of product market competition on the relationship between capital structure and financial performance of the companies listed in Tehran stock exchange during 2009-2013. Panel data model and Eviews software were used for data analysis and hypotheses test. General conclusion of the research hypotheses shows that financial leverage, level of competition, and mutual effect of financial leverage have significant effect on the sample companies' financial performance. Thus, all research hypotheses are confirmed.

Keywords: Financial Leverage, The Level of Competition, Financial Performance
JEL Classifications: G2, G31

1. INTRODUCTION

A large body of the capital structure literature reveals that not only financial decisions are affected by the representation conflict between manager and owner, but the outside groups, consumers and other competitors also affect these decisions. Two ideas play essential role in how financing constraints affect the firm's product market decisions (Campello, 2003). First, the company that plans to borrow takes the bankruptcy risk and cost into account and this causes the firm to take action in the product market with more caution. The second idea stresses that the debt will change the firm's incentive to invest. For example, transferring the risk to the creditors may be increased due to the limited liability of the firm (shareholders) (Campello, 2006). In other words, the shareholders are regarded as remaining claims when a large income is achieved, while the creditors are regarded as remaining claims in undesirable and loss conditions. Simply saying, the bankruptcy costs motivate the firm to adopt strategies which generate cash and reduce the risk of bankruptcy. Some of these impacts leads to aggressive behavior (for example, large-scale production or lower prices) in the product

market (Izadi et al., 2013). The relevant literature provides some basic insights about the relationship between product market restrictions and financing decisions (Grullon and Michaely, 2008). Brander and Lewis (1986), who are regarded as the pioneers in this field, examined the effects of capital structure on the product market behavior. In this regard, they considered a two-stage bipolar model of monopoly. At the first stage, the companies choose their level of financial leverage and then competed in the amount of the products. Due to the limited liability of debt, these companies showed more aggressive behavior comparing with those firms with no debt (He, 2009). Boltown and Oscarfestein (1990) and Dasgupta and Titman (1998) stated that the effect of financial leverage on performance depends on the degree of competition in the capital market. Hence, while examining the effect of capital structure on the form's financial performance, the product market and the effect of competition shouldn't be ignored in this regard (Hoberg et al., 2010). Therefore, the present study aims to examine the effect of product market competition on the relationship between capital structure and financial performance of the companies listed in Tehran stock exchange. In other words,

the present study aims to answer the question that does competition in the product market affect the relationship between financial leverage and performance?

2. RESEARCH METHODOLOGY

The methodology is a set of rules, tools and reliable and organized ways to study the realities, discover the unknowns and reach the solutions of problems. There are different classifications of methods in humanities which are explained in the following. This study is an applied research based on the nature and objectives. It is among correlational research in terms of methodology. In terms of data collection, it is a documentation research. The present is a library study that gathered necessary information using books, journals, publications, and articles. Since the research subject is about the companies listed in Tehran stock exchange, the sample also consists of the same companies and selects them from all active industries in the stock. This sample has the potential to generalize the results to the entire population (all the companies listed in Tehran stock exchange). The research method is divided into three categories in terms of results: Applied, fundamental and developmental research. The present research is an applied study in terms of the results. Applied research is an attempt to find a solution for a practical problem in the real world. The present study enjoys the results of fundamental research to improve the behavior, methods, tools, equipment, products, structures and patterns used by human communities. The research methodology can be descriptive, analytical or clinical based on the research variables' role. This research is an analytical one which is regarded as experimental or causal study in terms of the variables' role. Analytical research is officially designed to test the hypothesis. This type of study is highly valuable, because the researchers intervene in a process to examine the cause and effect relationship.

Data analysis method: First, Kolmogorov-Smirnov test is used for testing the normal distribution of data, then Durbin-Watson test is used to examine whether the samples (observations) are independent and random or not. If the value of Durbin-Watson statistic is close to 2 (approximately 2.05), it means that the sample is random and reflects its lack of self-correlation. Pearson correlation coefficient is also checked between the variables. Coefficients of the regression models' variables are tested using student t-test. In this study, the test statistic Fisher (F) at 95% confidence level is used to test the overall significance of the fitted regression model. Also, Durbin-Watson is used to test the lack of correlation between the errors of the model. Finally, the error components curve in regression model has been drawn to examine the normality of the error components. The hypotheses are tested using linear regression. In this study, multivariate regression method was used as the statistical method. In regression analysis, the main purpose is to investigate whether there is a relationship between the dependent variables and the independent variables or not. Data analysis in descriptive statistics begins with calculating the central indices, including mean, median, dispersion indices, standard deviation (SD), skewness and kurtosis. These indices will be investigated by different industries. The data collected using Excel were imported to Eviews software after necessary modification and classification based on the variables. Final

analyses were carried out and then the hypotheses are confirmed or rejected using the software results.

3. RESULTS

3.1. Descriptive Statistics of the Research Data
The first step in any statistical information analysis is the calculation of descriptive statistics. So to enter the stage of data analysis, descriptive statistics of the data including central indices, dispersion and deviation from symmetry as well as Jarque-Bera test, that checks the normal distribution of the residuals are calculated and the results are shown in Table 1.

According to the possibility estimated by Jarque-Bera test and the error calculated for all variables is smaller than 0.05, the distribution of the variables is abnormal. In this study, the Central Limit Theorem was used for the normality of the variables. According to the Central Limit Theorem, the sum and values of a sample with n members selected from a statistical population approximately tend to symmetrical sampling distribution. According to the Central Limit Theorem, if a sample with n members is selected from an abnormal population with the mean of μx and SD of $\overline{X}$, the distribution of the sample mean $\overline{X}$ is close to normal distribution when n is a large number. As the amount of n increases, the approximation will be closer to normal. According to a rule of thumb, many believe that regardless of the population distribution, at least a sample of 30 subjects is required to claim that the distribution of $\overline{X}$ is normal. Therefore, since the sample size in this study consists of 100 companies for 5 years, the variables will have an approximate normal distribution.

3.2. Unit Root test
The data used in econometric studies can be divided into three categories: Time series data, cross-sectional data, and panel data. Except cross-sectional data, unit root test should be done in the rest of the data.

Traditional econometric methods to estimate the coefficients of a pattern are based on stationary time series. A time series variable is stationary when its mean, variance, covariance and correlation coefficient are constant over time and it does not matter that we are calculating these indicators at which point of time. But on the other hand, studies conducted from 1990 onwards have shown that "many of time series variables in the economy are not stationary." In other words, the mean and variance of the series vary over time and their covariance is not stationary in exchange for specified intervals; this feature is called non-stationary time series. If the time series used to estimate the coefficients of pattern are non-stationary, estimation of the model with such variables may lead to spurious regression; which means that the coefficient of determination R^2 obtained from the estimation model may be very high, but there is no significant relationship between the model variables. Lack of attention to this point misleads the researcher and causes false inferences about the relationship between the variables. Therefore, it is necessary to ensure the stationary or non-stationary of the variables before use.

Table 1: Descriptive statistics of the research data

Variables	Mean	Median	Max.	Min.	SD	Jarque-Bera	
						Prob.	Statistic
ROA	0.140	0.12	0.832170	6.45E-06	0.095233	1419.53	0.000
Levi	0.6238	0.637198	1.480098	0.096415	0.177282	34.05963	0.000
Com	1.59E-05	8.48E-07	0.001350	6.27E-09	8.43E-05	566711.9	0.000
Levi*Com	1.16E-05	4.70E-07	0.001130	5.10E-09	6.64E-05	714371.1	0.000

SD: Standard deviation, ROA: Return on assets

As noted, one way to avoid spurious regression is ensuring the stationary of data. Thus, before estimating the model, the statistical properties of panel data are investigated in terms of stationary or existence of unit root. The results of the unit root test for the variables of the model are as follows in Table 2. As we can see, all variables are stationary at zero level.

3.3. Model Estimation Steps
3.3.1. L imer test
In this study, panel data model is used to examine the effect of product market competition on the relationship between capital structure and financial performance of companies. Hence, the implicit function is as follows.

4. RESEARCH MODEL

ROAi, t=α+β$_1$Levi, t+β$_2$Comi, t+β$_3$Levi, t×Comi, t+ε$_i$, t

Where, (ROA) is performance, (Levi) is leverage and (Com) is the level of competition.

First, we must examine the Limer test and then choose among the accumulated and non-accumulated data (fixed effects or random effects). The null hypothesis H$_0$ is the equality of intercepts (hybrid approach) and the hypothesis H$_1$ is about the inequality of intercepts (panel method). After performing the Limer test in the software, if the output prob < 0.05, then the panel method is accepted at 95% confidence level and above; while if it is >0.05, then the hybrid approach is accepted; this has been shown in Table 3.

As it can be seen, prob < 0.05, so the regression result has different intercepts. Now, the question arises that different intercepts of cross-sectional units are in the form of fixed effects or random effects? Hausman test is used to select the fixed effects model $E\left(\frac{U_{it}}{X_{it}}\right)=0$ and the random effects model $E\left(\frac{U_{it}}{X_{it}}\right)\neq 0$. The Chi-square test statistic with two degrees of freedom is equal to the number of independent variables:

$\begin{cases} H_0 : \text{Random effect} \\ H_1 : \text{Fixed effect} \end{cases}$

If we perform the Hausman test and prob < 0.05, then the fixed effects model is accepted at 95% confidence level and above; while if it is >0.05, then the random effects model is accepted; this has been shown in Table 4.

According to Hausman test, the null hypothesis is rejected, because its prob > 0.05. Therefore, the model should be estimated with

Table 2: Stationary test

Variable	Test	Statistic	P value	Result
ROA	Levin, Lin, Chu	−25.64	0.000	Stationary at zero
Levi	Levin, Lin, Chu	−76.49	0.000	Stationary at zero
Com	Levin, Lin, Chu	−3.91	0.000	Stationary at zero
Levi*Coin	Levin, Lin, Chu	−21.39	0.000	Stationary at zero

ROA: Return on assets

Table 3: Fixed effects test output

Test summary	Statistic	d.f.	Prob.
Cross-section F	8.29	99.38	0.000
Cross-section Chi-square	556.34	99	0.000

Table 4: Hausman test result

Test summary	Chi-square statistic	Chi-square statistic d.f.	Prob.
Cross-section random	2.41	3	0.49

random effects; i.e., the approval of fixed effects versus random effects. Thus, according to the Limer and Hausman test results, a random hybrid model should be chosen to estimate the model.

4.1. The Results of the Model Estimation
After explaining the model and choosing the best method, the estimation results for selected companies are as follows, shown in Table 5.

According to the estimated probability (prob < 0.05), it can be said that there is a significant relationship between the independent variables and the dependent variable for the selected companies during the years 2009-2013.

$\bar{R}^2$ indicates what percentage of changes in the dependent variable can be explained by the independent variable. This value is 72% in the present model; it means that 72% of changes in the dependent variable can be explained by the independent variables.

The Durbin-Watson statistic is 1.94 which is not too far from 2 and the model health is confirmed.

5. INTERPRETATION OF RESULTS AND ANALYSIS OF HYPOTHESES

The model estimation results are shown in Table 5.

Table 5: The model estimation results

Variable	Random		
	Coefficient	t-statistic	Prob.
Com	0.69	2.50	0.002
Levi	−0.216	−8.58	0.000
Levi*Com	0.055	3.40	0.000
C	0.27	16.08	0.000
$R^2 = 0.72$	$R^2 = 0.73$		
D.W=1.94			

Accordingly, the hypotheses are analyzed as follow:

Capital structure (financial leverage) has a significant effect on the financial performance of companies.

According to the probability statistic (prob) obtained which is equal to 0.00, the significant effect of financial leverage on the firm's performance is confirmed. The coefficient −0.216 reflects the negative effect of financial leverage on the firm's performance.

Product market competition has a significant effect on the financial performance of companies.

According to the probability statistic (prob) obtained which is equal to 0.02, the significant effect of level of competition on the firm's performance is confirmed. The coefficient 0.69 reflects the positive effect of the level of competition on the firm's performance.

The effect of financial leverage on performance gets worse or better depending on the level of competition.

Product market competition has a significant effect on the relationship between capital structure and financial performance of companies.

According to the probability statistic (prob) obtained which is equal to 0.00, the significant effect of financial leverage on the firm's performance depending on the level of competition is confirmed. The coefficient 0.55 reflects the positive effect of financial leverage on the firm's performance regarding the level of competition.

6. CONCLUSION

The model function estimation results show that the level of competition coefficient (com) has a significant positive effect on the firm's performance. This coefficient of this variable was estimated 0.69, as with all other variables constant, if the level of competition increases by one unit, then the performance will increase 0.69 unit.

The financial leverage results show negative significant effect of this variable on the firm's performance; so as with all other variables constant, if the financial leverage increases by one unit, then the firm's performance will decrease by 0.216 unit. The same result has been confirmed in a study by Izadi et al. (2013) in a way that increasing financial leverage will decrease opportunistic behavior of the manager and increase the conflicts between creditors and stakeholders, and consequently increase the representative costs and thus lead to a weaker performance.

Levi*Com is an expression that shows the interaction between financial leverage and the level of competition on the performance. If the market is competitive and the competitors are leveraged, the performance will be improved by increasing the leverage. It is while, if the market is concentrated and the competitors are less leveraged, then the company with high leverage will have weaker performance and even it may experience bankruptcy. Therefore, if the level of competition is reduced (more competitive market), the performance will be improved with increasing financial leverage. The overall hypotheses test and conclusion show that, financial leverage, the level of competition and the interaction between the level of competition and financial leverage have significant effect on the firm's performance and all hypotheses are confirmed.

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