



# Investigation of The Impact of the Relationship Between Firm Growth and Investment in Fixed Assets On Financing in Companies Listed on Tehran Stock Exchange

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**Abstract:** *The principal objective of this study is to explore the relationship between firm growth, investment in fixed assets and financial leverage in companies listed on Tehran Stock Exchange (TSE). The independent variables of this research are investment in fixed assets and firm growth and the dependent variable is financial leverage. The sample size of this study consists of 95 companies listed on Tehran Stock Exchange during the years 2010 to 2015 and multivariate regression has been used for testing the hypotheses of this study. Finally, EXCEL and E-views software are used to test the hypotheses of research. The results of this study indicate the ineffectiveness of firm growth on financial leverage. These results also show a positive and significant relationship between investment in fixed assets and financial leverage in companies listed on Tehran Stock Exchange.*

**Keywords:** *Financing, Financial leverage, Fixed assets, Growth.*

## INTRODUCTION

There is no consensus with regard to the effects of the investments in fixed assets. According to Brealey and Myers (Brealey et al, 1984), investment in fixed assets, which is most often obtained through the distribution of fixed assets over all assets or sales, indicates the operating leverage of the company. It should be noted that more investment in fixed assets increases the company risk. On the contrary, some other researchers argue that heavy investment in fixed assets reduces the company risk (Lubatkin et al, 1994). It should also be noted that the repercussions of financial leverage are usually heavier than its benefits, and by increasing the investment in fixed assets, these repercussions can be reduced. For example, the increase of the investment in fixed assets may reduce the costs of creating or increasing the debt level, because added fixed assets are used as collateral in debt financing. Also with regard to the increase of debt level due to the increase of investment in fixed assets, Lowe et al. (Lowe, 1994) stated that companies with more fixed assets increase their debt level more easily because of the advantage of applying heavy investment in fixed assets as collateral. In addition to this, Tang and Jang Tang et al, 2007) inferred the positive effect of the investment in fixed assets on financial leverage in US industrial and mining sector companies.

The capital structure is the amount of debt and ordinary shares utilization for financing assets; in other words, it means how much stock and how much debt the company has in its capital structure (Khodamipour et al, 2011). However, many arguments exist regarding the relationship between financial leverage and fixed assets investment. Modigliani and Miller (Modigliani et al, 1985) explored in their study the subject of capital structure for the first time. They conducted a study entitled "The cost of capital, company financing, and its future performance are irrelevant". In 1963, Modigliani and Miller reconsidered their initial view by taking income tax agent into account. They stated that since borrowing creates a tax advantage for companies, so they could expect to use borrowing for financing; because it ultimately increases the company value. The applied purpose of this research is to respond to the information requirements of

investors in the shares of companies, managers of companies and institutions, the stock exchange, securities and exchange brokers, students and researchers.

## **2-Theoretical foundations and research background**

### **2-1-Financial leverage and firm growth**

Myers (Myers, 1977) argued that a part of company value is in the result of future investment opportunities. For example, regarding the current value of future growth opportunities and including these investments in the element of choice, the realization of the value depends on if the investments are carried out. The leverage contains a warning from the managers' information about investment opportunities. Capital structure theories state that managers of companies with proper growth opportunities should choose a lower leverage, because if they increase their foreign debt, they cannot use the benefits of their investment opportunities; consequently, a negative relationship will be created between the growth and leverage because the managers of companies with high growth will choose a low leverage. This type of results can exist in regressions that control the growth (Nourvash et al, 2010). Ogden and Wu (Ogden et al, 2013) conducted a study entitled "Re-evaluation of the impact of growth opportunities on financial leverage".

### **2-2-Financial leverage and the investment in fixed assets**

Matemilola & Ahmad (2015) conducted a study entitled "The investigation of the relationship between fixed assets and intangible assets on financing in African countries" using the multivariate regression. The major goal of their paper was to investigate the relationship between fixed assets and intangible assets on financing in Johannesburg companies. In this study, the researchers started their investigation with a sample of 100 companies listed on the Johannesburg Stock Exchange and by using agent information during the years 2004 to 2009. The results showed that fixed assets and intangible assets have positive and significant relationship with long-term and total debt ratio.

Richard & Oluwatosin (Richars et al, 2014), performed a study entitled "Determination of the capital structure in small and medium companies in Nigeria between 2006 and 2011". Regression analysis was used to investigate the relationship between the capital structure in small and medium companies. In this study, selected companies were divided into two categories based on the feature of asset size. Initially, companies were classified into small and medium sized enterprises based on the size of the assets. In this research, in addition to descriptive statistics such as mean and standard deviation, regression has also been used. The findings of this research indicated a negative and significant relationship between tangible assets and debt (total debt and long-term debt).

Qiu and La (Qiu et al, 2010) investigated the relationship between company features and capital structure in Australian companies. They analyzed the data of Australian companies between the years 1992 and 2006 and showed that there was a direct and significant relationship between capital structure and tangible assets; they also showed that there was a reverse and significant relationship between capital structure, growth opportunities, profitability and business risk. They did not find a meaningful relationship between the capital structure and company size. These results are in consistent with hierarchical theories and the theory of agency costs, but they are in contradiction with the theory of static balancing.

Karadeniz et al. (Karadeniz et al, 2009) conducted a study entitled "The determinants of capital structure". They investigated the relationship of capital structure criteria with tax rates, tangible fixed assets and their profitability in a sample of 70 companies listed on Istanbul Stock Exchange during the years 1994 to 2005. By using multivariate regression model, they concluded that tax rate, tangible fixed assets, and profitability have a negative relationship with the capital structure (Debt to total assets ratio and long-term debt to total assets ratio), but free cash flow, sales growth, and company size have no relationship with the capital structure.

Baghoumian & Azizzadeh Moghadam (Baghoumian et al, 2014) performed a research entitled "The relationship between company features and capital structure in companies listed on Tehran Stock Exchange". The major goal of this study was to investigate the relationship between company features and capital structure in companies listed on Tehran Stock Exchange (TSE). For this purpose, the data related to 157 companies from 2004 to 2010 were considered for testing the research hypotheses and the statistical method of "combined data" was used to perform the test. The results of this study indicate that size indices, tangible assets and company risk have direct and significant relationship with capital structure and company growth opportunities have a reverse and significant relationship with it. In addition to this, in this study, there was no significant relationship between the company's life and industry with capital structure. Based on the aforementioned foundations, the following hypotheses are formulated and tested in order to achieve the main goal of the research:

**First hypothesis:** There is a significant relationship between firm growth and financial leverage.

**Second hypothesis:** There is a significant relationship between the investment in fixed assets and financial leverage.

### **3-Research methodology**

#### ***Statistical population and sample***

The statistical population of the present study included all companies listed on Tehran Stock Exchange during 2010 to 2015 (6 years period) with the following conditions:

1-The companies should be approved by Tehran Stock Exchange by the end of March 2009 and their fiscal year should end on 20 March.

2-These companies should not have changed their fiscal year during this period.

3-These companies have had continuous activities during the research period and their shares have been traded.

4-They should have fully submitted the financial information required for conducting the research during the period of 2010 to 2015.

5-They should not be investment companies

#### ***Data collection***

In this study, data collection was conducted in two stages. During the first stage, the library method was used to formulate the theoretical foundations of the research, and in the second stage, the required data for calculating the research variables extracted from Rahavard-e-Novin database. In case of incomplete data in this database, we had recourse to the archives in the Stock Exchange Library and the website of the research management, development and Islamic studies of the Stock Exchange (<http://rdis.ir>).

#### ***Data analysis***

In this study, linear and correlation (individual and combination) regression tests were used to validate outputs. This was a correlation, regression and applied study. Eviews software was used in this research to test hypotheses and analyze the data. Also in this research, panel data method was used. Based on this method, for testing the reliability of independent and dependent variables, Lewin's and Lynn Chu statistics were used. If the results of this test shown that all independent and dependent variables were valid, then there was no need for a co-integration test. In this method, there were three methods for estimating regression coefficients: 1) common effects; 2) fixed effects; and 3) random effects. To select between common effect and fixed effect, F test was used. In case of insignificance of the F-test statistic, common effect model was used; and otherwise, one of fixed effect model or random effect model was chosen. For this purpose and based on previous studies, Hausman test was used. If the statistic of Hausman test was significant, fixed effect model would be used; and otherwise, random effect model should be chosen.

#### ***Measurement of variables***

In the present study, the following multivariate regression model was used:

$$LEV_{it} = \beta_1 + \beta_2 Growth_{it} + \beta_3 FA_{it} + \beta_4 Size + \varepsilon_{it}$$

The financial leverage as a dependent variable was equal to the ratio of debt to equity (lee et al, 2011). The financial leverage was the amount of fixed costs, such as the interest or fixed interest of loans in the company. One of the most important scales of leverage was the ratio of debt that came from dividing debt into assets. In this study, financial leverage was considered and measured as the division of debt into assets: The ratio of the company debts to its assets. Companies using financial leverage were less able to pay dividends because they were under the strict supervision of creditors. Hamedan et al. (2012) concluded that companies with lower debt levels in Jordan were more conservative.

"Growth opportunities" was an independent variable, a kind of asset, that increased the value of the company but did not have the ability to bail, and therefore the existence of a negative relationship between growth opportunities and debt ratios was expected. In other words, the greater the growth opportunities of a company, the greater its risk; and consequently, the cost of financial distress is higher. The firm growth is defined as the increase of the size and the activities of a company (Pandey et al, 1994). For measuring firm growth, the criterion of sales growth was used. The sales growth index was calculated using the following formula:

$$(\text{Sales growth index}) = (\text{Sales of the year in question} - \text{Sales of the previous year}) / (\text{Sales of the previous year})$$

For calculating the investment in fixed assets as an independent variable, the ratio of fixed assets to total assets of the company was used (Lubatkin et al, 1994). Assets: Assets are defined as rights to future

economic benefits or other legitimate means of obtaining these benefits. Assets have been controlled by the business unit as a result of transactions or other past events (Accounting Standards of Iran).

#### 4-Research findings

##### 4-1-Descriptive statistics

According to the results of descriptive statistics in table 1, the most important central indicator is the mean that represents the equilibrium point and center of gravity of the distribution; this is a proper indicator for showing the centrality of the data. For example, the mean of the variable of financial leverage is 0.611, which indicates that most data related to this variable are centered around this point. The median shows that 50% of the data are less than the middle number of the set and 50% of the data are greater than this middle number. The median of the financial leverage variable is equal to 0.637, which indicates that half of the data are less than this amount and the other half of the data are more than this amount. Standard deviation and variance show the dispersion of data. Among the research variables, the variable of fixed assets has had the least dispersion and consequently, it has the highest stability during the research period.

**Table 1: Descriptive statistics**

Variable	Symbol	Mean	Median	Maximum	Minimum	Standard deviation
Financial leverage	LEV	0.611	0.637	0.991	0.012	0.197
Firm growth	Growth	0.058	0.039	0.46	0.0005	0.064
Fixed assets	FA	0.010	0.002	0.345	0.000	0.039
Company size	Size	13.234	13.245	14.825	10.756	0.735

##### 4-2-Chow test

In panel data method, for determining whether model estimation is based on combined data model (pool) or panel data, the Chow test is used. This test is computed in the form of F statistics. Since the significance level in this table is less than 0.05, so the hypothesis of the existence of pool data is rejected in favor of panel data.

**Table 2: The results of Chow test**

Computational F Limer	P-value	Result
2.126811	0.0000	The H0 based on the existence of pool data is rejected

##### 4-3- Hausman test

After we have determined that our data are panel data, the Hausman test is used to estimate the method of fixed effects against the method of random effects. If the significance of the test is less than 0.05, fixed effects method is used and if the significance of the test is more than 0.05, random effects method will be used. In our case, since the significance of Hausman test is less than 0.05, the fixed effects method has been used.

**Table 3: Results of Hausman test**

Computational F Limer	P-value	Result
18.707045	0.0009	The H1 based on the use of fixed effects method is confirmed

##### 4-4-Hypotheses testing

The growth coefficient of the company (-0.045) with t statistic of -0.234 has a significance level of more than 5%, it means that the variable of firm growth does not have a significant impact on the financial leverage. Thus, the first hypothesis is rejected at the error level of 5%. In table 4, the coefficient of fixed assets (0.0001) with t statistic of 2.1403 has a significance level of just under 5%, it means that the variable of fixed assets has a significant impact on the financial leverage. Therefore, the first hypothesis is confirmed at the error level of 5%. Given the fact that the t statistic mark related to the variable of fixed assets is positive, so it shows that the relationship between the two variables of fixed assets and the financial leverage is significant and positive. It means that when fixed assets are added to total assets in stock companies, the debt ratio increases.

The F statistic shows if the whole regression is well fitted. Also, Durbin-Watson statistic shows the correlation between the components of the disorder. If this amount is between 1.5 and 2.5, that is, the components of the disorder are not correlated. The results related to F statistic indicate that this model is significant in general and the study of Durbin-Watson statistic indicates that there is no autocorrelation

between components of model disorder, because this amount is 2.0983, near to 2. The adjusted coefficient of determination indicates how much percent of dependent variables are described by independent variables. The results related to the adjusted coefficient of determination show that during the research period, approximately 47% of financial leverage is described by the independent and controlled variables. Among control variables, the variable of company size has a positive and significant relationship with the financial leverage.

**Table 4: Results of the combined regression model**

Variable	Coefficient	t statistic	Significance
y-intercept	-0.6206	-4.0879	0.0001
Firm growth	-0.045	-0.234	0.815
Fixed assets	0.0001	2.1403	0.0328
Company size	0.0550	5.0443	0.0000
Adjusted coefficient of determination	0.4717		
Durbin-Watson	2.0983		
(Significance level) F statistic	(0.000) 5.0938		

### Conclusion

For investigating the issue, two main hypotheses were formulated and then, panel and combined data methods were used to test the hypotheses related to companies listed on Tehran Stock Exchange during the years 2009 to 2015. In the first hypothesis, we want to know if there is a significant relationship between firm growth and financial leverage. The relationship between firm growth and financial leverage is not significant, so the first hypothesis is rejected. In previous studies, few internal and foreign studies have explored the impact of firm growth and financial leverage and the results of the present study are in contradiction with the results of most previous internal and foreign studies. For example, studies by Myers (1977) show that companies with more risky debt and in line with the interests of their shareholders, they use different decision-making rules in comparison with the companies that have safe debts or are not indebted at all. A company that has been funded through risky debt will neglect valuable investment opportunities: these opportunities that can play a significant and positive role in the market value of the company. One of the things that can be inferred is that companies facing financial constraints may deny to accept and execute projects with current net positive value, this is called the inadequate investment problem and its value will increase with more growth options in the company's investment opportunities set. Consequently, companies with a high leverage (in comparison with companies with lower leverage) will have less growth opportunities.

The leverage contains a warning from the managers' information regarding investment opportunities. Capital structure theories state that managers of companies with proper growth opportunities should choose a lower leverage, because if they increase their foreign debt level, they cannot use the benefits of their investment opportunities, and consequently, a negative relationship will be created between the growth and leverage; because the managers of companies with high growth will choose a low leverage. This type of results can exist in regressions that control the growth (Nourvash et al, 2010).

Ogden & Wu (Ogden et al, 2013) conducted a study entitled «Re-evaluating the impact of growth opportunities on leverage». According to the existing literature, especially the theory of equilibrium, they consider profitable growth opportunities as an important factor in explaining the financial leverage of companies. The results of their investigations show that there is a nonlinear relationship between firm growth opportunities and financial leverage. The results of this study are consistent with the study results of Karadeniz et al. (Karadeniz et al, 2009) and in contradiction with the results of Qiu & La Qiu et al, 2010). In the second hypothesis, we want to test if there is a significant relationship between tangible assets and the debt to equity ratio. More investment in fixed assets increases the company risk. On the contrary, some other researchers argue that heavy investment in fixed assets reduces the company risk. It should also be noted that the repercussions of financial leverage are usually heavier than its benefits, and by increasing the investment in fixed assets, these repercussions can be reduced. For example, the increase of the investment in fixed assets may reduce the costs of creating or increasing the debt level, because added fixed assets are used as collateral in debt financing (Lowe, 1994). In addition to Long and Malitz (1983) who considered heavy investment in fixed as the reason of the increase of financial leverage, regarding the increase in debt levels due to increased investment in fixed assets, Andersen (1990) stated that companies

with more fixed assets increase their debt level more easily, because of the advantage of applying heavy investment in fixed assets as collateral. It is argued that the presence of fixed assets increases the volatility (fluctuations) of future earnings of the company. Therefore, it can be assumed that there is a negative relationship between operating leverage and financial leverage. The results of this study are in line with the results of conducted studies by Baghoumian & Azizzadeh Moghadam (Baghoumian et al, 2014), Ahmad & Matemilola (2015) and Richard & Oluwatosin (Richard et al, 2014).

### Applied suggestions

Based on theories and conducted studies, it has been proven that a reverse relationship should exist between the growth and the degree of financial leverage of companies. In the present study, a reverse relationship was not found between the growth and leverage of companies listed on the Tehran Stock Exchange. Therefore, it is recommended to these companies to choose a lower leverage. Because according to the capital structure theories, managers of companies with appropriate growth opportunities should choose a lower leverage. If they increase their foreign debt, they will not be able to take benefit from their investment opportunities, and consequently, a negative relationship will be created between the growth and leverage. The investors of the Tehran Stock Exchange are recommended not to use less or more ratios of finance leverage of business companies as a criterion for the growth and development of these companies.

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