



# Impact of Long-term Debt on Overinvestment Problem of Agency

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## ABSTRACT

Business units are always faced with investment opportunities and need to make logical decisions on an optimal investment. Indeed, the investment of each business unit should be done with regard to the resource constraints and its effectiveness through the criteria for evaluating the projects including the net present value (NPV). The paper aims to investigate the effect of long-term debt on the overinvestment of agency problem. The present research is applied in terms of its purpose and it is descriptive and correlation in terms of nature. The statistical population of the study was the financial information related to the performance of 540 companies listed in Tehran Stock Exchange during 2011 and 2015. 152 companies were selected by the systematic elimination sampling. The data collection was carried out using the Tadbir Pardaz and Rahavard-e-Novin software as well as the Research Management, Islamic Studies and Development of Stock Exchange Organization and Stock Exchange Organization websites. The research data are hybrid. The data were analyzed using the F-Limer and Hausman tests using Eviews9 software. Based on the results, the pre-investment declined by 36% at a significant level less than 0.05% while increasing long-term debt by 1%, and the overinvestment reduces 69% by a one-percent increase in the financial leverage.

## 1 Introduction

Business units are always faced with investment opportunities and need to make logical decisions about an optimal investment. Indeed, the investment of each business unit should be done with regard to the resource constraints and its effectiveness through the criteria for evaluating the projects including the net present value (NPV). According to this method, investing in one or more projects would be

projects with a negative net present value leads to overinvestment and consequently, the investment will not be optimal. The excessive investment is called overinvestment [5]. The overinvestment process can occur due to the conflict of interest between managers and shareholders. When there is an information asymmetry, managers may use the free cash flows and use projects with the negative net present value to increase their benefits, which will result to overinvestment. One of the effective factors in creating overinvestment is the free flow of cash in the business unit. Managers who work in business units

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with high free cash may invest in some projects that are the lack of a proper return; thus, it leads to overinvestment phenomena. Given the developments that have taken place in the world so far, especially in developing countries facing many threats, these countries need to find solutions for solving their economic problems to utilize their wealth and resources better. In this regard, one of the important solutions is the expansion of investment due to resource constraints; in addition to the issue of investment development, increasing the investment efficiency is also one of the most important issues.

On one hand, there is a need to prevent from the use of the resources in the activities in which the investment is made too much (avoiding over investment) and on the other hand, the resources should be directed towards activities that require more invest (to prevent from underinvestment). There are at least two theoretical criteria for determining investment efficiency. First, a company needs to collect resources in terms of financing and investment opportunities. In an efficient market, all projects with a positive present net value need to be financed. However, much of the literature in the financial field has shown that financial constraints limit the ability of directors to finance [16]. Management can spoil the interests of shareholders and debtors with overinvestment by its decision-making power and carrying out the unprofitable and highly risky projects. When applying management policies, the resources that are considered desirable and optimal and the problems related to managerial overinvestment and overinvestment can be increased in the hazardous projects. Beyond the goal of increasing shareholder value, managers consider the company as a source of economic profit and as a tool to increase their human capital; on one hand, the investment efficiency requires to prohibit the use of resources in activities that investing in them become more than the desirable extent (avoidance of overinvestment). On the other hand, resources are directed to activities that require more investment (to prevent from the underinvestment). There are at least two theoretical criteria for determining investment efficiency. A company needs to collect resources for financing (first) and investment opportunities (second) in an efficient market; all projects should be funded with positive net present value. However, much of the literature in the financial field has shown that financial constraints limit the ability of managers to finance [13].

Those managers of companies that have not faced with the supervisory role of debts would like to increase the investments because they tend to increase the size of the company even if it leads to adopt the weak projects (projects with a negative net present value negative) and reduce the profits of shareholders; given that the overinvestment can maximize the personal benefits of managers, it also reduces the value of the company. A potential solution to the problem of overinvestment is the debt issuance [12]. Long-term debt refers to a debt that has a long time maturity and usually, it is longer than one year. If the maturity of a long-term debt is reduced to one year or less, it becomes into the current debt. Financial strategy in companies is one of the important issues for the financial and accounting scientists. One of the important goals of financing is to invest in companies for more profitability. Borrowing or withdrawing cash with a preset way in a regular mode leads to reduce the free cash flows, which reduces the possibility of investing such funds in projects with negative net present value and consequently, the price of representation of free cash flows decreases by the increased borrowing [11]. The purpose of this study is to investigate the impact of long-term debt on the issue of over investment of companies in the stock market. In this research, the information was collected from the companies listed in Tehran Stock Exchange during 2011-2015. The ratio of liquidity and the ratio of capital expenditures are considered as a measurement indicator of the overinvestment. The research findings will show whether the long-term debt only causes the liquidity, and also a reduction in the amount of overinvestment and adjusted cash leads to increase the value of the company or not.

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## 2 Literature Review

Savaedi and Ahmadi [1] investigated the impact of overinvestment and underinvestment on the return index of assets of the companies in Tehran Stock Exchange. Inefficient markets have deficiencies that can affect the company optimal investment level and lead to an overinvestment process or underinvestment one. To collect the required data, financial statements of 77 active companies were used in Tehran Stock Exchange (TSE) during 2009-2013. According to the results, overinvestment has a positive significant impact and underinvestment has a negative significant impact on the company performance from the perspective of ROA. Khardyar and Askari [3] investigated the quality of financial report and investment efficiency. According to the resource constraints, in addition to the development of investment issue, the increased efficiency of investment is also one of the most important issues. An effective business unit is defined in an investment when it selects all projects that have a positive net present value. Therefore, in a situation that there is not any friction, such as inappropriate selection or agency costs, the inefficient investment is to withhold the investment opportunities with the positive net present value (underinvestment); in addition, the inefficient investment includes the selection of projects with the negative net present value (overinvestment).

In this study, the quality of financial reporting and its impact on investment efficiency were examined. The result showed that when the financial reporting has a high quality, the efficiency of investment becomes stronger. Sadeghzadeh [4] investigated the greater impact of investment on investor response to the cost of holding cash. The present study was conducted during 2006-2014 in Tehran Stock Exchange. The results have shown that cash flow changes have a positive impact on the market value of companies. Also, the results of this study showed that there is an inverse relation between the over investment and final value of cash. Hasani and Meysami [6] studied the effect of debt maturity and the quality of financial reporting on underinvestment and overinvestment. The statistical sample includes 219 companies listed in Tehran Stock Exchange during 2009-2013. The results showed that the maturity of debt and the quality of financial reporting have a significant negative effect on the financial inefficiency. The test was conducted separately in the control group that had faced with the overinvestment and also in the control group that had encountered with the underinvestment. Evidences indicated that financial reporting quality has a significant negative impact on overinvestment while it has no significant effect on underinvestment. Also, the short-term maturity of the debt does not have a significant effect on underinvestment and overinvestment. Other results showed that operating cash flow, real asset ability and the fluctuation of operating cash flow have a significant positive effect on overinvestment while the sale fluctuation has a significant negative effect on overinvestment. In addition, such variables as life, growth opportunities, loss reporting and the firm size have no significant relationship with overinvestment. Also, the size has a significant positive effect on underinvestment while the growth opportunities and real asset ability have a significant negative effect on underinvestment. In addition, such variables as life, operating cash flow, loss reporting, sales volatility and fluctuation of operating cash flows of the company have no significant relationship with underinvestment. Richardson [12] examined the free cash overinvestment, and the amount of overinvestment at the company level. Research results suggest that overinvestment is being made in companies with the highest levels of liquidity; it means the higher the company cash flow, the greater the cash investment.

Mello and Miranda [15] investigated the leverage effect on investing in the new markets. He has argued that the leverage effect on investment is important. However, the managers don't seek that the investment is financed by the debt; even when the director may not make the appropriate investments, increasing the debt ratio leads to a reduction in the company value. The theory is arising from the relationship between the leverage and investment from the conflict of interests between shareholders and managers and they prefer to increase the size of company; they can increase their power in the company even if it leads to lose the wealth of shareholders and company value reduction due to poor project acceptance. Li [17] examined the relationship between financing through the debt and corporate investment behavior. The results showed that there is a significant negative relationship between financial leverage and investment in high growth companies and low growth ones but there is a positive relationship between companies and moderate growth. Their argument was that moderate growth companies could easily obtain external financing and use investment opportunities. Therefore, financing through the debt would enhance their investment.

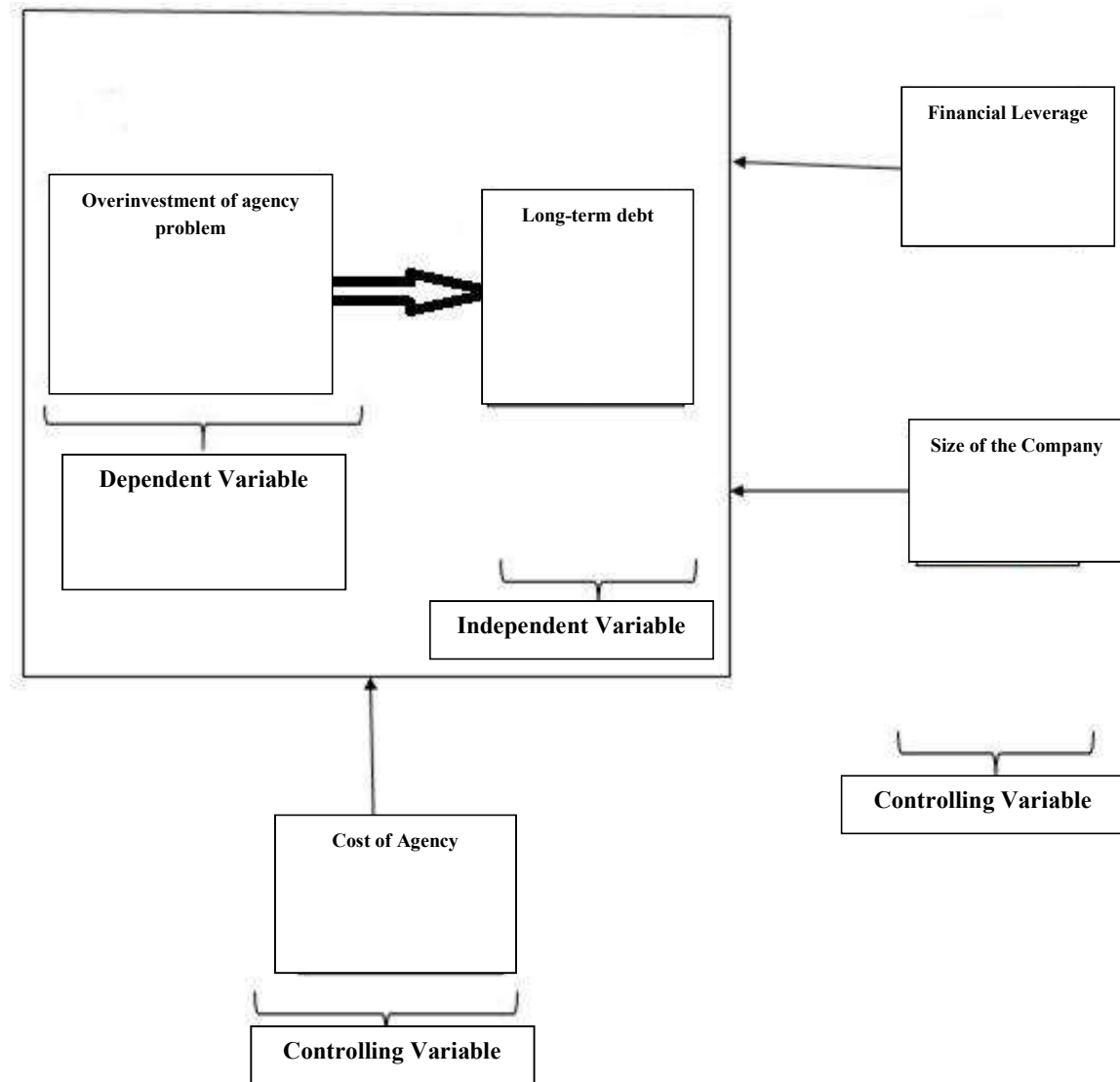
Also, the relationship between these two variables was positive for institutional companies and negative for non-institutional ones. They also found that the return on the assets and cash flow had a positive impact on the company investment. Huang et al. [14] investigated the elasticity of investment-cash flow and agency costs. They found that excessive confidence of managers would increase the elasticity of investment-cash flow and also documented that the costs of representation impact on the relationships between the excessive confidence of managers and the elasticity of investment-cash flow; the distortion of investment reduces due to the excessive confidence behavior of managers by the reduced cost of representation.

### 3 Research Methodologies

The present research is applied in terms of its purpose and is descriptive and correlation in terms of nature. Fig. 1 illustrates the applied conceptual methodology. The territory area of the research includes companies listed in Tehran Stock Exchange (540 companies). The research time range is the financial information related to the performance of between 2011 and 2015 on the listed companies in Tehran Stock Exchange. The sampling method in this research is the systematic elimination sampling method that is selected based on the following conditions:

1. The end of the fiscal year is March 29th (97 companies are excluded).
2. Companies will be active on the stock exchange from 2011 until the end of 2015 (25 companies are excluded).
3. The companies should not have the financial year changes during 2011 and 2015 (32 companies are excluded)
4. Companies' fiscal year has not been changed during the research period (83 companies are excluded).
5. Companies have a trading interruption by a maximum of 6 months in Tehran Stock Exchange (29 companies are excluded).
6. The investment companies, monetary, banking and insurance institutions are not included (122 companies are excluded)

Finally, according to the above items, the sample size of this research is 152 companies. The data collection was carried out using the Tadbir Pardaz and Rahavard-e-Novin software as well as the Research Management, Islamic Studies and Development of the Stock Exchange Organization and the Stock Exchange Organization websites.



**Fig 1: Conceptual Model [2]**

The research data are hybrid. Before estimating models, it is necessary to determine the estimation method (consolidation or panel). For this purpose, the F-Limer test was used. For the observations that have a test probability more than 5% or in other words, when their test statistic is less than the table statistic, the consolidation method is used for the estimation and for the observations that have a probability less than 5%, the panel method is used.

The panel method can be done using two models of random effects and fixed effects. The Hausman test was used to determine which model was used. The fixed effects are used for the observations with test probability less than 5%, and the random effects are used for the observations with test probability more than 5%. The Eviews9 software is used to analyze the data.

#### 4 Statistical Models of Hypotheses

The main hypothesis: Long-term debt affects the overinvestment of representation.

$$IN_{it} = B_0 + B_1DE_{it} + B_2FL_{it} + B_3SIZE_{it} + B_4PR_{it} + \varepsilon_{it}$$

$IN_{it}$  = Overinvestment: The cash ratio difference of the company (cash + short-term investments divided by current debt) is the median of ratio in the industry [8]. In other words, the investor sacrifices a certain value at the present time to obtain the value that is valuable in the future called overinvestment with the available cash and investments.

$DE_{it}$  = long-term debt: long-term debt / total assets - current year long-term debt

Long-term debt includes loans and financial commitments that last for more than a year. A long-term debt for a company can include any financial or lease commitment that its deadline will be expired after 12 months. The long-term debt can be called long-term loans.

$FL_{it}$  = Financial Leverage: Debt divided by the company's assets

A financial leverage is the use of a variety of financial or debt instruments to increase the potential return rate of the investment.

$SIZE_{it}$  = Company size (SIZE) = Company asset logarithm

The total value of the Rial (currency of Iran) for all stocks of a company in stock exchange is the size of company.

$PR_{it}$  = Price of Representation: Comparing the ratio of annual capital expenditures with the ratio of capital expenditures average in a company for 2 years. This ratio is 1 for the price of representation; otherwise, they are expenditures that owners should undertake for monitoring the performance to make sure from the activities and actions of managers to maximize their benefits.

$$H_0: B_1 = 0$$

$$H_0: B_1 \neq 0$$

Sub-hypothesis: The impact of long-term debt on overinvestment in companies with high financial leverage is different from companies with low financial leverage.

High financial leverage companies:

$$IN_{it} = B_0 + B_1DE_{it} + B_2FL_{it} + B_3SIZE_{it} + B_4PR_{it} + \varepsilon_{it}$$

Low financial leverage companies:

$$IN_{it} = B_0 + B_1DE_{it} + B_2FL_{it} + B_3SIZE_{it} + B_4PR_{it} + \varepsilon_{it}$$

$IN_{it}$  = Overinvestment

$DE_{it}$  = Long-term debt

$FL_{it}$  = Financial Leverage = Debt divided by the company's assets

$SIZE_{it}$  = Company size = Company asset logarithm

$PR_{it}$  = Price of Representation: Comparing the ratio of annual capital expenditures with the ratio of capital expenditures average in a company for 2 years. This ratio is 1 for the price of representation; otherwise, it will be 0.

$$H_0: R^2 = R^2$$

$$H_0: R^2 > R^2, \text{ High Financial Leverage} > \text{ Low Financial Leverage}$$

## 5 Research Findings

Some of the concepts of descriptive statistics of variables including mean, median, minimum observations, maximum observations and standard deviations have been presented in Table 1. The main central indicator is one which represents the equilibrium point and center of gravity distribution, and it is a good indicator to show the centrality of data.

### 5.1 Correlation Coefficient Test of Research Variables

The correlation test examines the initial relationship between variables and according to the results presented in Table 2, it can be said that there is a relationship between the variables and a more detailed examination of these relationships can be made. If the correlation coefficient becomes closer to 1, the dependence rate of two variables gets increased.

### 5.2 Investigating Linear Regression Model Assumptions

1. The constancy of variance of error sentence (residues): In this study, the assumption of variance homoscedasticity of residuals was investigated through the Breusch-Pagan-Godfrey test. The results from Table 3 show that the  $H_0$  based on the heteroscedasticity of variance is rejected in both research models. Therefore, in order to eliminate the variance homoscedasticity, the generalized least squares (GLS) regression is used.

### 5.3 Durability Study of Research Variables

Based on the Levin Lin and Chu test presented in Table 4, since the P-VALUE of all variables is less than 0.05, all independent, dependent and controlling variables have been at a durable level in the research period.

**Table 1:** Descriptive Statistics of Research Variables

	LDE	LIN	LFL	SIZE	PR
	Long-term debt	Overinvestment	Financial Leverage	Company Size	Price of Representation
Mean	3.293	10.182	-0.541	6.08	0.46
Median	3.209	10.07	-0.476	6.019	0
Maximum	9.563	17.20	1.118	1	8.842
Minimum	-0.267	-2.72	4.415	8.29	1
Standard deviation	1.421	1.88	0.462	0.666	1.499
Skewness	0.393	0.408	-0.771	0.780	0.126
Kurtosis	3.60	3.99	4.190	4.075	1.016
Jarque-Bera	31.35	52.31	227.42	113.70	126.67
Probability	0.5511	0.3256	0.1254	0.3256	0.2014

**Table 2:** Correlation coefficient test of research variables

		LDE	LIN	LFL	SIZE	PR
		Long-term debt	Overinvestment	Financial Leverage	Company Size	Price of Representation
LDE	Long-term debt	1				
LIN	Overinvestment	-0.0336	1			
LFL	Financial leverage	0.001	-0.147	1		
SIZEE	Company Size	-0.002	0.760	0.030	1	
LPR	Price of representation	0.022	-0.031	0.026	-0.070	1

**Table 3:** Constancy of variance of error sentence results using the Breusch-Pagan-Godfrey test

Research Models	Statistics Type	Statistics Amount	Probability
First Model	F Statistics	237.83	0.0000
Second Model	F Statistics	273.8	0.0000



**Table 4:** Results from examination of durability test of research variables

Variable	Variable	Coefficient	Probability	Acceptance level
LDE	Long-term debt	-29.16	0.0000	I (0)
LIN	Overinvestment	-27.84	0.0000	I (0)
LFL	Financial leverage	-19.41	0.0000	I (0)
SIZE	Company Size	-37.66	0.0000	I (0)
PR	Price of representation	-15.85	0.0000	I (0)

Durability means that the mean and variance of research variables over time and covariance of variables have been constant in different years.

**Table 5:** Results from F-Limer-Hausman test

Model	Test	Statistics	Probability	Result
First	F-Limer	6.867	0.0000	Panel Method
	Housman	25.939	0.0000	Fixed effects
Second	F-Limer	6.867	0.0000	Panel Method
	Housman	25.939	0.0000	Fixed effects

#### 5.4 F-Limer-Housman Test

As shown in Table 5, the F-Limer probability of all three models is less than 5%. Therefore, the panel method is used for estimating both models, and given that the probability of Hausman test is less than 5% for both models, the constant effect model has been used to estimate two models.

#### 5.5 Research Hypotheses Test

Main hypothesis: Long-term debt affects the overinvestment of representation.

- 1-1- The long-term debt affects the overinvestment in the companies with high financial leverage
- 1-2- The long-term debt affects the overinvestment in the companies with low financial leverage

The coefficient of determination must be between 0 and 1, which is 0.60 in this study. The Watson-Durbin test is 1.98, which must be between 1.5 and 2.5; thus, we find that the impact of long-term debt on overinvestment in the companies with high financial leverage differs from those with low financial leverage.

Main hypothesis: Long-term debt affects the overinvestment of the agency.

$$IN_{it} = B_0 + B_1 DE_{it} + B_2 FL_{it} + B_3 SIZE_{it} + B_4 PR_{it} + \varepsilon_{it}$$

$$H_0: B_1 = 0$$

$$H_0: B_1 \neq 0$$

Final Model:

$$IN_{it} = B_0 + B_1 - 0.368 + B_2 0.6915 + B_3 2.152 + B_4 0.069 + \varepsilon_{it}$$

First Sub-Hypothesis: The impact of long-term debt on overinvestment on the companies with high financial leverage differs from those with low financial leverage.

Companies with high financial leverage:

$$IN_{it} = B_0 + B_1 DE_{it} + B_2 FL_{it} + B_3 SIZE_{it} + B_4 PR_{it} + \varepsilon_{it}$$

Companies with low financial leverage:

$$IN_{it} = B_0 + B_1 DE_{it} + B_2 FL_{it} + B_3 SIZE_{it} + B_4 PR_{it} + \varepsilon_{it}$$

$$H_0: R^2 = R^2$$

$$H_0: R^2 > R^2, \text{High financial leverage} > \text{Low financial leverage}$$

**Table 6:** Results from the research hypothesis test

Variable		Coefficient	t-test	Probability
C	Width from origin	-2.51	-4.81	0.0000
LDE	Long-term debt	-0.36	-14.69	0.0032
LFL	High financial leverage	0.69	7.47	00.000
LFL	Low financial leverage	-0.109	-1.82	0.0008
SIZE	Company size	2.15	33.27	0.0000
PR	Price of Representation	0.06	0.807	0.4169
Coefficient of determination	0.619	Durbin & Watson		1.98
Adjusted coefficient of determination	0.609			
Fisher statistics	237.83			
Fisher statistics	0.0000			

The long-term debt variable has a coefficient of -0.36 indicating the company's value will increase by 36% with a one-percent increase in the long-term debt. Here (sig<0.05), long-term debt has the probability of 0.0032. The financial leverage is above 0.69 indicating that with an increase of 1% in the financial leverage, pre-investment increases by 69%. Here, sig<0.05 is the long-term debt with a probability of 0.0000. The financial leverage is -0.109 indicating that with an increase of 1% in the financial leverage, and the pre-investment is reduced by 0.95%. Here (sig <0.05), the financial leverage has a probability of 0.0008. Therefore, it can be concluded that the long-term debt has a positive impact on the overinvestment in the companies with a high financial leverage and also the long-term debt has a negative impact on the value of company in the companies with a low financial leverage.

**Table 7:** Summary of Results of Research Hypotheses

	Hypotheses	The coefficient of determination	Durbin-Watson	Approve/ Reject
Main Hypotheses	Long-term debt affects the overinvestment of agency	0.322	2.16	Approve
Sub- Hypotheses	The impact of long-term debt on overinvestment in the companies with high financial leverage differs from companies with low financial leverage.	0.322	2.16	Approve

## 6 Conclusions

The study aims to investigate the effect of long-term debt on the overinvestment of agency in the listed companies in Tehran Stock Exchange during 2009-2015. The results showed that the long-term debt variable has a coefficient of -0.36 indicating that with a one-percent increase in long-term debt, the pre-investment will increase by 36%. Here (sig <0.05), long-term debt has the probability of 0.0032. The coefficient of determination must be between 0 and 1, which is 0.60 in this study. The Watson- Durbin test is 2.16, which must be between 1.5 and 2.5; therefore, it can be concluded that long-term debt affects the overinvestment of agency. The findings of this research are consistent with the results of Pakizeh's research [7] on the decisions of the agency with the companies listed in Tehran Stock Exchange. The value of company's stock in the capital market of Tehran provides information for the managers related to the investment decisions. Managers consider higher prices of the company stock as positive expectation signs of the firm agency investment in relation to investment decisions. And it is not consistent with the results of Valipour's research [9] regarding the assumption that there is a relationship between the debt ratios of firms and agency costs. The long-term debt variable has a coefficient of -0.36 indicating that with a one-percent increase in long-term debt, the pre-investment will increase by 36%. Here (sig <0.05), long-term debt has the probability of 0.0032. The financial leverage is 0.69 indicating that with a one-percent increase in the financial leverage, the pre-investment will increase by 69%. Here (sig <0.05), long-term debt has the probability of 0.0000. The coefficient of determination must be between 0 and 1, which is 0.60 in this study. The Watson- Durbin test is 2.16, which must be between 1.5 and 2.5; therefore, it can be concluded that long-term debt effect on the overinvestment in the companies with high financial leverage differs from those with low financial leverage. These results are also consistent with the study of Arab Mazar [10] who examined the combination of asset-debt and the liquidity risk. The liquidity risk is influenced by the combination of asset-debt with the role of financial leverage of banks, and the research hypothesis was proved that there is a relationship between the two collections of variables. The creation of debt and finance leverage in companies has a significant relationship with the overinvestment. These results indicate that received loans may not be consumed in the correct place for various reasons such as lack of proper supervision by the lender while increasing the liquidity and investment ratios.

Based on the results and studies, bank managers should set up the risk and capital management committees to interact with each other and to create an optimal combination of assets with the lowest possible risk and in addition to preparing annual financial reports, they also should provide other managerial reports to measure the risks associated with banking activities.

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