



Surveying the relationship between investment efficiency and financial constraints and corporate governance applying structural equations modeling

Zahra Tahmooresi

Ph.D. candidate, Department of Accounting, Kish international branch, Islamic Azad University, Kish Island, Iran.

Rasoul Baradaran Hassanzadeh

Associate Prof, in accounting Tabriz Branch, Islamic Azad University, Tabriz, Iran.(corresponding author)

Ghodrat Allah Talebnia

Associate Prof. in accounting, Science and *Research* Branch, Islamic Azad University, Tehran, Iran.

Nemat Allah Mousavi

Associate Prof, in accounting Marvdasht Branch, Islamic Azad University, Fars, Iran

Hamidreza vakilifard

Associate Prof. in accounting, Science and *Research* Branch, Islamic Azad university, Tehran, Iran

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ABSTRACT

Regarding constrained resources and consequently the developing significance of growing funding performance, on this research, the connection among funding performance and economic constraints and company governance has been investigated. In order to attain this goal, 3 hypotheses were advanced and structural equations were used to check the studies hypotheses.

In this research, OLS regression became used to degree funding performance and economic constraints. The type used on this study for the financial constraint variable became supplied with the aid of using Dr. Baradaran Hassanzadeh according with the Iranian marketplace and the funding performance version is supplied with the aid of using the researchers of this article. Also, the degree of company governance is the awareness of ownership, institutional ownership, board independence and authority ownership. This studies became performed in 129 businesses indexed at the Tehran Stock Exchange, primarily based on facts contained the economic reviews of businesses indexed at the Tehran Stock Exchange among 2007 and 2017. The consequences confirmed that funding performance has a widespread courting with company governance and financial constraints.

Keywords:

financial constraints, investment efficiency, corporate governance.



1. Introduction

The primary cause of for-income companies is to perform sports that boom the price of the organization and the wealth of the owners. Many variables can have an effect on this goal. Given what has been said, funding performance way much less funding in tasks with a bad internet gift price and extra funding in tasks with a high quality internet gift price, each of which look like the case. The stated can enhance the overall performance of the organization. In agencies with economic constraints, there are funding possibilities with a high quality internet gift price, which because of economic constraints, it isn't feasible for the organization to make investments in, this institution of agencies, they're probably to stand underinvestment. The organization's profitability is predicted to boom if those tasks are financed and performance is increased. Jensen and McLean (1976), co-founders of enterprise theory, argue that because of the separation of possession from management, managers might also additionally abandon the pursuit of shareholder pursuits so long as they pursue their very own pursuits. Investment fees are one of the maximum critical choices of the enterprise and generally a massive amount of money is concerned in such choices. However, illustration troubles rise up whilst managers make funding choices and like their very own pursuits to the pursuits of shareholders in place of pursuing their very own pursuits (Chen, 2013). As lengthy because the managers constantly expand the enterprise's operations, in preference to maximizing the shareholders' wealth, they pursue their private pursuits consisting of social reputation, better salaries and bonuses, etc., the hassle of over-funding arises. If there is lots of free cash flow in the enterprise, managers are much more likely to be concerned in tasks with a terrible internet gift price and the phenomenon of over-funding can be formed, so as to bring about devaluation of the enterprise and lack of shareholder pursuits (Jensen, 1986; Chen et al., 2013). Theoretically, company governance has high quality consequences at the price of the enterprise and the nice of managers' choices. The set of motivational and regulatory mechanisms of company governance have the capability to slight the consequences of enterprise troubles. Numerous empirical research have specific conclusions approximately the consequences of company governance at the nice of managers' funding choices. Companies with higher company governance

are greater profitable (Masulis & et al., 2007). Corporate governance oversight mechanisms can make certain that managers make higher funding choices and keep away from the hassle of over-funding (Huang & Chang, 2011). Weak company governance outcomes in underinvestment (Giroud, X., & H. M. Mueller, 2010) and but Richardson (2006) states that best a small a part of the company governance mechanism is capable of effectively slight over-investment.

In this study, we plan to survey the impact of investment efficiency on financial constraints and corporate governance. Four governance determinants were used to measure corporate governance. The survey includes organizational ownership, board size, ownership and state-owned concentration. Investment efficiency and financial constraints are measured based on a regression model. The regression model used for financial constraints was developed by Dr. Baradaran in line with the economic conditions of other markets, a regression model of investment efficiency in line with economic conditions was presented by the authors of this article.

2. Theoretical foundations

There are at least two determinants of investment efficiency. First, companies need to raise capital to fund investment opportunities. In a complete market, all projects need to be funded with a positive net present value, but investment texts face funding constraints that limit the ability of managers to fund potential projects. (Hubbard, 1998). As a result of this concept, underfunded companies will abandon projects with positive present value due to the high cost of financing, resulting in a shortage of investment. The second factor in investment efficiency is that even if a company decides to raise funds, there is no guarantee that a proper investment will be made. Most research shows that poor choice of a project leads the company to invest too much (Stein, 2003). Little research indicates that the company may be underinvesting (Bertrand & Mullainathan, 2003).

Generally, investment efficiency means accepting projects with a positive NPV, and investment inefficiency means choosing projects with a negative NPV (overinvestment or non-investment). The investment opportunity is (underinvestment). Thus, measuring investment efficiency is very significant for the investors and stakeholders.

Problems such as the theoretical basis and mechanism of investment inefficiency, typical manager theory and information economics theory, followed by information asymmetry and moral hazard and wrong choice (Yang and Jiang, 2008; Saghafi et al., Quoted from 2011). Representation theory concludes that it leads to overinvestment. On the other hand, information economics theory regards the asymmetry of information between external investors and companies in the capital market as an important factor in the emergence of the phenomenon of overinvestment. From the perspective of agency theory, the proxy relationship between shareholders and creditors with management that "supports the interests of shareholders", and the proxy relationship between old and new shareholders with more management that "supports the interests of old shareholders" is the formation of the deep investment phenomenon. When a company has high-risk debt, managers who act in the interests of shareholders to finance investment projects and avoid risky debt are profitable with a positive NPV, which is a low investment phenomenon. We may make a decision to decline the investment. From an information economics perspective, if there is no information asymmetry between the creditor and the directors of the company, the creditor can increase profits, prevent opportunity from management and shareholders, and make profitable investments. It is not acceptable due to capital structure and high borrowing costs (quoted from Roka et al., 2007; Mohammadian et al., 2010). In this case, the company uses new shareholders in place of untrustworthy creditors to raise funds. In this way, there is a conflict of interest between old and new shareholders, who do not know the true quality of the company's investment and seek added value to protect themselves from later opportunistic behavior. Such actions will neutralize the return on investment with a net present value, reduce the value of the company and rejecting desirable investments.

3. Background research

3.1. External background

In a 1957 article, Farrell pointed out a problem in measuring the efficiency of a unit with multiple inputs and outputs. Farrell considers a measure of relative efficiency when there are a large number of unmatched data and results, and proposes to build a virtual

efficient unit based on the weighted average of the efficient units used as the basis for unit comparison (Farrell, 1957).

Barbedo et al. (2007) investigated the relationship between corporate governance mechanisms and liquidity levels using data from 55 buy and sell orders listed on the Sao Paulo Stock Exchange in Brazil. They found that companies with tighter governance were much less likely to trade confidential information, and more liquidity relied on reducing transactions involving sensitive information.

Chung et al. (2008) investigated the relationship between corporate governance and market liquidity in a research study applying indicators of leadership characteristics which affect financial and operational transparency. The index is based on 24 governance standards chosen from the Institute's Shareholder Services Institute's standards and is most closely related to the company's operational and financial transparency. They also assess liquidity using indicators such as price gaps, price effects, and information-based trading potential, with better governance, lower price gaps, larger market quality indexes, lower price effects and found a company with a trading volume. It reduces the chances of a transaction based on confidential information.

Kalatzis et al. (2010) directly addressed the issue of the impact of corporate governance on financial constraints in their research. Using data from 532 Brazilian listed companies from 1997 to 2002, we concluded that increasing concentration of ownership and control would increase financial constraints.

Dinge et al. (2011) in a research entitled "Investment and Fiscal Constrains in China", we investigated the relationship between fixed asset investment and working capital with financial constraints. They found that working capital companies that invest in working capital are very sensitive to fluctuations in cash flow. In these companies, investments in property, plant and equipment are less sensitive to changes in cash flow. They suggested that managers could use working capital performance and proper management to reduce the impact of financial constraints on fixed asset investment.

Clary et al. (2013) investigated the effect of internal and external monetary constraints on funding sensitivity to cash flows. They expected a version that suggests this sensitivity via way of means of the

interplay among earnings and fee. According to the fee impact, better tiers of funding require extra debt, extra costs, and consequently better risk, which shows a fantastic courting among cash go with the drift and funding. On the opposite hand, in step with the earnings impact, a better stage of funding will generate extra earnings for the business enterprise and consequently lessen the business enterprise's risk. This impact suggests a poor courting among cash flow and investment.

Frankis etc. (2013) in a study on corporate governance and investment sensitivity to cash flow, investigated the impact of corporate governance on financial constraints. They conducted a survey using data from 14 countries and concluded that better corporate governance reduces a company's reliance on domestic cash flow and reduces financial constraints.

Hood (2013) notes that much of the existing financial literature indicates that financial constraints limit managers' ability to fund. One of the implications is that companies facing financial constraints may refuse to accept and carry out NPV-positive studies due to high funding costs and low investment.

According to Chen and Zolotoy's (2014) research, raising stock liquidity increases managers' investment decision-making through corporate governance. The introduction of institutional investors into the firm is facilitated by high stock liquidity, which promotes management performance via supervision. Furthermore, when managers' remuneration is linked to stock prices, and there is a greater risk of significant shareholders exiting, stock liquidity leads to enhanced management discipline.

Job failures, shareholder monitoring, and investment efficiency were all investigated by Van et al. (2015). They discovered that, compared to other periods, the efficiency of investment declined considerably in the run-up to the CEO's retirement, and that the degree of this reduction in efficiency reduced with increased shareholder scrutiny. They also recognized the significance of the CEO's detection and supervision systems.

In their study "Accounting Conservatism and Corporate Investment Efficiency," Lara, Osma, and Penalva (2016) found that more conservative firms invest more and have greater debt vs investment. They consume less, and these consequences are especially obvious in firms where there are information gaps. They also discovered that over-investment caution was

warranted, even for nebulous investments like research and development.

In their study, Benlemlih & Bitar (2016) investigated at the corporate social responsibility and investment efficiency of 3,000 American corporations from 1998 to 2012. According to the findings of this study, more social responsibility boosts investment efficiency.

During the years 1990-2010, Gariglia and Yang (2016) investigated the impact of financial restrictions and agency costs on investment inefficiency in Chinese firms. Due to financial restrictions, organizations with low cash flows tend to spend less, whereas companies with large free cash flows prefer to invest more.

Chen, Sun, and X (2016) surveyed at how free cash flows and corporate governance affected investment levels in 865 Chinese firms. Over-investment is more susceptible to current free cash flows, according to the findings. Over-investment is associated with substantial government ownership, whereas over-investment is associated with big boards, a high share of tradable stocks, and high leverage in corporations with large boards.

The influence of investment efficiency on the cost of capital in Chinese enterprises was explored by Majeed, Zhang & Umar (2018). The findings revealed that investment efficiency is negatively proportional to capital cost. For state-owned enterprises, there is also a substantial association between investment efficiency and the cost of capital, however this relationship is not significant. Furthermore, over-investment is strongly linked to the cost of capital.

He, Chen, and Hu (2019) surveyed the impact of managerial overconfidence on domestic financing and investment efficiency in China. Their results indicated that domestic financing expands investment in business and decreases investment inefficiency, hence enhancing investment efficiency. They note that in-house financing can make investment opportunities and reduce investment shortages, but it can result in over-investment, especially in companies with over-management confidence. Furthermore, the problem of investing too much in terms of overconfidence of managers is more in state-owned companies in comparison with non-governmental companies.

3.2. Internal background

Safaei, Qadiklaei et al. (2007) surveyed the measurement of the efficiency of investment companies applying data coverage analysis in the Tehran Stock Exchange. Applying a nonparametric method, they firstly classify investment firms into efficient and inefficient, then utilizing the Anderson and Peterson model; Cross-performance matrix and data hierarchical analysis model ranked effective companies.

Bidgoli et al. (2008) in a paper entitled: Portfolio Selection Using the three criteria of average return, standard deviation and liquidity in the Tehran Stock Exchange, concluded that high-level liquidity on the decisions of investors is efficient and thus influences the boundaries of efficiency. They noted that liquidity is one of the most significant criteria regarded by investors when forming a portfolio and attempted to integrate this criterion in the proposed Markowitz model applying two methods of filtering and limiting liquidity in the Iranian capital market. At last, a model can be applied by investors to make a portfolio which is optimal in terms of return, risk and liquidity.

Tayebnia and Mohammadi (2008) in a research surveyed the comparison of investment efficiency in the private and public sectors in Iran, an approach to privatization. The findings of their study indicated that the implementation of privatization policy, by increasing the effectiveness of investments made via the country will accelerate economic growth in the country. Thus, by determining obstacles to effective private sector activity, the required grounds must be obtained to enhance the performance and increase the efficiency of private sector investments, and applying the experience of successful countries, to privatize and divest activities. The government turned to the private sector. Moreover, the final productivity of capital in the public and private sectors is not statistically significantly different from each other, which shows that without structural reforms in the country's economic areas and deleting obstacles to private sector investment, the implementation of private policy, the construction and transfer of government economic activities to the non-governmental sector does not gain the expected findings of the implementation of this policy and does not accelerate economic growth in the country.

Kashanipour and Naghinejad (2009) chose a sample of 78 companies listed on the Tehran Stock

Exchange during the period 2001-2006 to survey the impact of financial constraints on the cash flow sensitivity of cash. Applying firm size, firm life, and dividend ratio and business group as the indicators of financial constraints, they indicated that cash flows did not have a considerable impact on cash holding levels, and that there was a considerable difference between the cash flow sensitivity of companies and also there are no financial limitations and companies without financial restrictions.

Tehrani and Hesarzadeh (2009) surveyed the impact of free cash flows and financing constraints on overinvestment and underinvestment in 120 companies listed on the Tehran Stock Exchange from 2000 to 2006. The findings of their study indicate that the relation between free cash flow and direct overinvestment is statistically considerable. There is no considerable relation between financing restrictions and low investment in companies listed on the Tehran Stock Exchange.

Kashanipour et al. (2010) in a research surveyed the relation between some mechanisms of corporate governance system and market liquidity. The findings of their study indicated that companies with more independent board structure and more efficient board method have more market liquidity than other companies. In reality, the companies which scored higher due to corporate governance quality had lower spreads and higher supply-demand gaps.

Saghafi and Motamedi Fazel (2011) surveyed the relation between audit quality and investment effectiveness in the companies with higher investment facilities. Their results indicate that the firms with greater investment opportunities will apply higher quality auditors to experience a higher level for investment efficiency.

Baradaran Hassanzadeh et al. (2013) surveyed the impact of financial constraints and agency costs on investment efficiency in 95 companies listed on the Tehran Stock Exchange in the financial from 1381 to 1390. In this research, financial limitations were measured applying two models, White, Wu and Kaplan. The findings indicated that financial constraints with White and Wu model have no impact on investment efficiency and financial constraints with Kaplan model have a considerable and positive impact on investment efficiency and agency costs have a negative impact on investment efficiency.

Rahimian and Jan Fada (2014) surveyed the relation between corporate governance and financial constraints. A better management system can decrease the extent to which monitoring shareholders could have a role in the acquisition (ownership) and hence decrease the company's financial constraints. If management is committed to focusing shareholder value and financial order, the company will have a more transparent information environment, and also the board highly relies on controlling shareholders, controlling minority ownership by controlling shareholders becomes harder. The major objective of this research is to survey the impact of corporate governance system mechanisms on the financial constraints of companies listed on the Tehran Stock Exchange. The sample applied in this research involves 102 companies listed on the Tehran Stock Exchange from 2007 to 2011 and linear regression and clustering methods were applied to test the hypotheses. The findings indicate that the number of main shareholders and the independence of the board of directors have an increasing and considerable impact on the financial limitations of companies listed on the Tehran Stock Exchange.

Moradzadeh Fard et al. (2014) in a research investigated the relation between conservatism and investment effectiveness regarding financing status and ultimate ownership in companies listed on the Tehran Stock Exchange. For this objective, 103 companies listed on the Tehran Stock Exchange from 1391-1387 were investigated. Their findings indicate that in companies that do not require foreign financing, the conservatism is negatively due to investment, and in companies which require foreign financing, this relationship is positive. A negative relation is present between conservatism and investment in state-owned and quasi-publicly owned companies.

Khadem Alizadeh et al. (2015) in a research investigated the relation between stock liquidity and tax avoidance by regarding the two limitations of corporate governance and financial constraints. Regarding the data of 120 companies active in the Tehran Stock Exchange from 2007 to 2012 were chosen as a research sample. The statistical method of this research is multivariate regression. For testing the study hypotheses, the data panel model and the generalized least squares method were applied. (GLS) Research results indicate that there is a considerable relationship among stock liquidity and tax avoidance

in companies listed on the Tehran Stock Exchange. The link among stock liquidity and tax avoidance is higher in companies with more financial limitations than in the companies with lower financial constraints. The impact of stock liquidity on tax avoidance is enhanced in companies at lower levels of corporate governance. The cause to include variables in the model is defined as follows: Increased investment diversification increases organizational complexity. It results in the information asymmetry among applying financial statement holders and managers.

4. Methodology

After gathering the data and handling the relevant calculations, the results provided from the sample can be generalized to the study community (the entire Tehran Stock Exchange) (moving from the component to the whole). The method of this study is inductive. Regarding the time, it is a post-event; since the data of previous years are investigated. Considering the objective, the study is utilized. Furthermore; this study is a causal correlation due to data analysis method which investigates cause and effect and measures the effect. To survey the statistical models in this research, structural equation modeling is one of the major and novel approaches to solve complex models with cause and effect relations of independent and interdependent variables by emphasizing on the role of measurement errors. Since the variables in this research are all latent (measurable by other variables), we apply the structural equation technique. In brief, this approach investigates measurement errors (lack of variance) for every item. This approach can be done in Smart PLS statistical software.

4.1. Hypothesis

- 1) There is a considerable relation between financial constraints and investment efficiency.
- 2) There is a considerable relation between corporate governance and investment efficiency.
- 3) There is a relation between corporate governance and investment efficiency via financial constraints

4.2. Scope of research

This study's data are based on real stock market figures and information and financial statements of

companies, which by regarding to the financial statements, the database of the Stock Exchange Organization and applying the management software and new findings of Kadal website are gathered. Hence, in every step, from all present companies, the companies which do not meet any following conditions should be deleted and at last all rest companies must be chosen to do the test.

- 1) The sample does not involve the companies like financiers, investors and insurers.
- 2) Sample companies will have a fiscal year at the end of the calendar year (March 19)
- 3) The data of the study variables must be accessible for the companies. Regarding these constraints, the companies which have the conditions to be present in the statistical community must be determined from all these companies to measure the study hypothesis.

Therefore, a study sample of 129 companies active in the Tehran Stock Exchange from 2007 to 2017 was formed.

4.3. Theoretical and operational definition of research concepts and variables

4.3.1. Investment efficiency

One of the most significant roles of accounting is the effectiveness allocation of capital (Kothari, Ramanna & Skinner 2010). Hence, it is not bizarre that this literature concentrates on the role of accounting in capital allocation decisions (e.g., Richardson, 2006; McNichols & Stubben, 2008; Biddle et al., 2009; Chen et al., 2011; and Goodman et al., 2014). Thus, one of the usual challenges of these research is how to determine and measure the effectiveness of investment. Theoretically, effective allocation of capital means the turnover of capital for its optimal and valuable utilization. Hence, it is hard to see capital flows and identify between high and low investment values (Naeem and Lee, 2019). Moreover, researchers in the fields of finance and accounting developed multiple methods to determine and measure investment efficiency in the advanced economies.

Investment efficiency (dependent variable) is gained when the company just invests in the whole projects by a positive net present value. In reality, several capital market shortcomings, like information asymmetry and agency costs, could result in over-investment or under-investment. The major issue, then,

is that embracing projects with a negative net present value results in over-investment and abandoning projects with a positive net present value results in under-investing, which inefficiency of investment will follow. (Biddle and Hillary, 2006).

Besides, on the one hand, the efficiency of investing or investing optimally needs to inhibit the consumption of resources in the activities in which the investment was performed more than desired; on the other hand, the resources must be directed to activities which need more investment (Modares and Hesarzadeh). For this purpose, an economic unit to invest in multiple projects, must regard the amount of investment in terms of constrained resources.

Investment efficiency measurement model

In this research, to measure the investment efficiency, we applied the model presented by the researchers of this paper (1398), which is as follows:

$$Ineff_{i,n} = -0.202 + 0.039size - .0369Lev - 0.0076age + 0.01Qtubin + .0054SG - .552ROA + .406\frac{op}{ta} + .132\frac{cfo}{ta} - 6.3LR - 0.179\frac{sd}{cfo} + .298CR + \varepsilon$$

Equation 1

Ineff Investment Performance Recognition Index Based on Cash Flow from Investment Activity to compute this index, the number of cash flow from investment activities every year will be divided by the total assets of company and the number provided shows the amount of investment of the company in the present year.

Size (size of company): The natural logarithm of the total assets of company

Age (age of company): The number of years the company was in the operation.

Lev (financial leverage): The ratio of total debt to total assets

Q-tubin: The ratio of the total market value of the assets to the book value of total assets

SG (Sales Growth): This year's sales minus last year's sales divided by the previous year's sales

ROA: Net profit (loss) on total assets of the company

OP / ta (profit before interest and tax on total assets): the ratio of the operating profit to total assets

Cfo / ta is the ratio of the cash flow from operations to total assets of company

LR (Stock Liquidity): The liquidity rating of this variable is extracted from Rahvard Novin software.

SD Cfo (standard operating cash flow deviation) Standard cash flow standard deviation over the past three years (Dicho and Dichev model)

CR (Cash Ratio): The ratio of the sum of the short-term investment and cash to total assets.

ϵ : (remaining); The positive balance shows over-investment and the negative balance indicates under-investment.

4.3.2. Financial constraints

Financial constraints (independent variables) are the limitations which inhibit providing all funds needed for the optimal investment of companies. In reality, a restrained enterprise is one in which a high cost or lack of access to external financing avoids creating an optimal investment decision, while if there are enough internal resources in the company, it can be capitalized. Companies are confined in financing when they face a gap among local and foreign costs of allocated funds, where information asymmetry and representation issues are the major causes for the difference between local and foreign financing costs. It is known that Bond & Van Reenen (2007) defines a confined financial firm as follows: If, without any information about potential profitability, an unforeseen increase in the firm's internal resources results in an increase in investment, in this firm's statement is regarded financially restricted.

Financial constraint measurement model

In this research, to measure financial limitations, we apply the model presented by Dr. Baradaran Hassanzadeh (1396). This model is as follows:

$$\begin{aligned} bnpo = & 1.773771 - 1.831414 \times Roa - \\ & .212055 \times size + 0.071841 \times Q + 4.036668 \times \\ & cash - 0.191792 \times sg - 0.544125 \times wc + \\ & 4.522426 \times op + 0.395674 \times sal + 2.307683 \times \\ & int \end{aligned}$$

Equation 2

The following are the model symbols:

Bnpo Financial Restriction Detection Index

RoA (Return on Assets): Net profit to average total assets

Size: The natural logarithm of the total assets of the company

Q (Q Tobin): The ratio of the total market value of equity and the book value of liabilities to the book value of assets.

Cash (Cash to Total Assets): The total cash and assets of banks to total assets

SG (Company Sales Growth): The difference among this year's sales and the previous year to last year's sales

WC (Working Capital to Total Assets): Current assets minus current liabilities to total assets

OP (Profit before interest and tax on total assets): Operating profit to total assets.

SAL (Total Asset Sales): The sum of net sales and service revenue of total assets

INT (Financial Expenses to Total Debts): Financial expenses to total liabilities.

4.3.3. Corporate governance

Corporate governance (independent variable) is a collection of rules and methods which define the relation among the shareholders, management and board members and impact how the company operates. Corporate governance at the grassroots level encounters the problems which arise from separating the ownership and management of the company, but present concept goes beyond merely establishing a clear relation among managers and shareholders. Corporate governance involves a collection of relations between the company's management, the board of directors, shareholders and other stakeholders. Besides, it obtains a structure via which the company's purposes, the means to achieve it, the purposes, and the controlling the company's performance are identified.

How to measure corporate governance

There are multiple criteria to measure corporate governance, but we intend in this research based on the study of González et al. (2014), Fernández-Gago et al. (2016), Bushee et al. (2013), Aggarwal et al. (2011), Chen et al. 2006), Cheng et al. (2006) apply the variables of board composition, ownership concentration and institutional ownership as corporate governance mechanisms.

The composition of the Board of Directors: The composition of the Board of Directors refers to the number of non-executive members of the Board of Directors in comparison with the amount of its executive members. The independence of the board of directors, its capability to independently make

decisions of executive director, is identified by the composition of the board of directors, and consequently, as the number of non-executive directors increases, hence does the independence of the board of directors. Thus, the composition of the board of directors is measured by the ratio of non-executive members to the total number of board members.

Ownership Concentration: In this research, based on Gonzalez et al. (2014), Chen et al. (2006), Firth et al. (2007) and Demsetz & Lehn (1985), Herfindahl index was applied to measure ownership concentration. This index is computed as follows:

Equation 3

$$HI = \sum_{i=1}^N S_i^2$$

Hence, $S_i (i = 1, \dots, N)$ is the percentage of shares owned by shareholder i . The larger the index, the more likely it is to show control power in the hands of the largest shareholder, and the lower the index, the more distributed the ownership, leading to a balance of control power among the main shareholders. Demst and Lane (1985) apply the Herfindahl index to compute the concentration of ownership among all stakeholders, but considering the constraints of

gathering ownership information, the approach of measuring this index changes among the researchers. Thus, in this research, a percentage of ownership higher than or equal to 5% was applied to compute the Herfindahl index.

Institutional Ownership: Institutional investors involve banks, insurance companies, pension funds, investment firms, and other institutions which purchase buy and sell large volumes of securities. Regarding the constraints of collecting stock ownership information, in this research, institutional ownership is measured via the percentage of shares owned by institutional shareholders with more than or equal to 5% ownership.

Research models

This research concentrates on the relation between financial constraints measured via the regression model (fc) and investment efficiency (ineff) and corporate governance that is a latent variable and the measure of which is institutional ownership (io). Ownership (co), board independence (ib) and government ownership (gp) are discussed. The conceptual model of this study is as follows

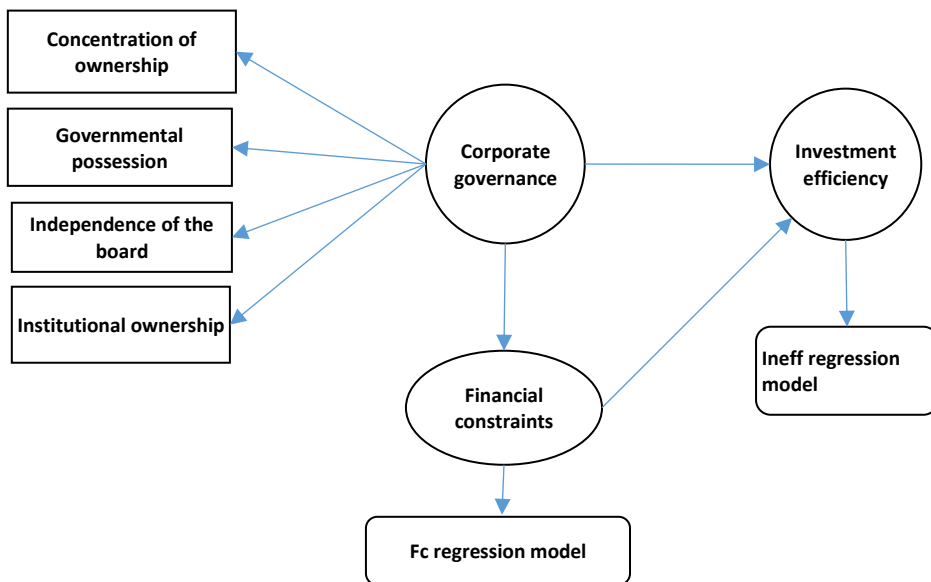


Figure 1: Research model diagram

4.5. Research method

In the part of data analysis, structural equation modeling approach by partial least squares (PLS) approach and applying Smart PLS 2 software was utilized for a comprehensive research of conceptual model. Because the statistical population is 129 companies listed on the stock exchange, this approach is the best instrument to analyze the research in which the sample size is small (Diamantopoulos et al. 2012). Structural equation modeling includes three sections: measurement model, structural model and at last studying the general study model and the model variables are divided into two groups of hidden and explicit variables. The measurement model part involves the questions (indicators) of every dimension, along with that dimension, and the relations among the questions and the dimensions are analyzed in this part. The structural model part involves all structures in the major study model and the degree of correlation of structures and the relations among them are assessed at this step (Kline, 2010). After determining the offered model and entering the related data into the software, the researcher to model the fit of the model with the data gathered from the research population, structural equation modeling which is a general and very powerful multivariate analysis technique from the multivariate regression family. To be more precise, it developing a general linear model which permits the

researcher to simultaneously survey the relations among various variables (Hoyle, 2012).

The structural model is measured by the following factors:

A) Significant numbers t: The cause and effect relation between investment effectiveness, financial limitations and corporate governance in the structural model was measured applying Smart PLS software. At first, to approve the study hypotheses, Bootstrapping command of Smart PLS software was applied, the output of which indicates the T-coefficients (Figure 1). If the t-values are in the range more than +1.96, it reveals the significance of relevant variable and subsequently approves the study hypotheses (Vinzi, Trinchra and Amato, 2010).

B) Coefficient of determination R²: R square shows the impact of an exogenous variable on an endogenous and dependent variable which is computed only for the dependent variable. Chin (1988) regards values close to 0.67 to be suitable, close to 0.33 to be normal, and close to 0.90 to be weak. In Figure 1, the number inside the circle for the endogenous variable, i.e. investment efficiency, represents R². Regarding its value is 0.41, its value is strong means that independent variables (financial constraints and corporate governance) have a considerable effect on investment efficiency.

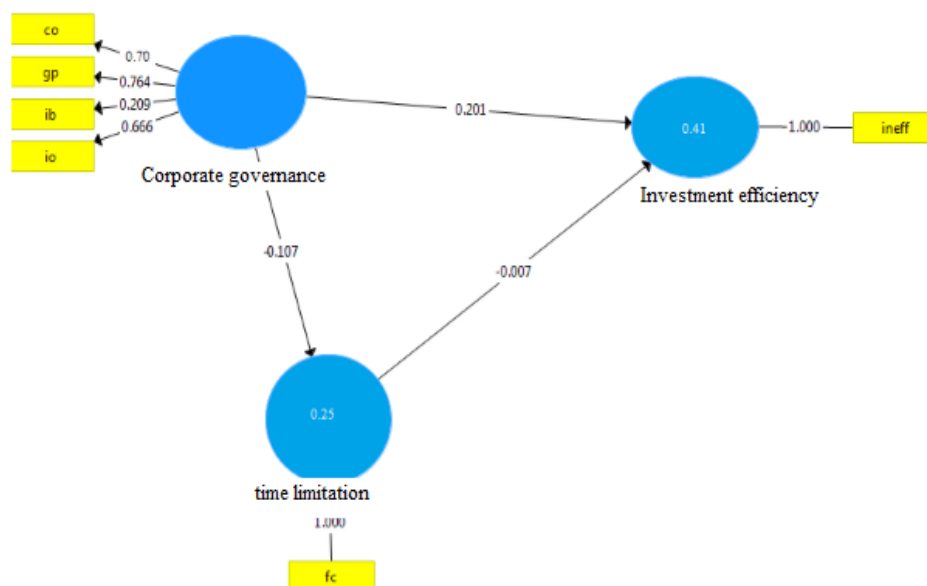


Figure 2- Effect coefficients and values R² for the structural equation model

4.5.2. Model confirmation

Fitting the general research model; GOF criterion is due to the general section of the samples of structural equations. By this criterion, the researcher can, after investigating the fit of the measurement section and the structural section of the general sample of his research, monitor and control the fit of the general section. Wetzels et al. introduced three values of 0.01, 0.25 and 0.36 as weak, medium and strong values to measure the goodness of fit (Davari and Rezazadeh, 2013). The total fit of sample is computed from following formula. Criterion $(Communalities)^{\bar{}}$ is provided from the mean of usual values of latent variables (AVE) and applying the following equation, GOF value computed for this research model is 0.486, which shows a strong fit of the model. Thus, the findings of the previous stages can be cited.

Equation 1

$$GOF = \sqrt{Communalities * R^2} = \sqrt{0.578 \times 0.41} = 0.486$$

4.5.3. Testing research hypotheses

Figure 3 shows the descriptive statistics of research variables. According to the results of the descriptive statistics table, the mean is presented as the most important central parameter and the standard deviation is presented as the most important scattering parameter along with the minimum and maximum indices in this table. The results obtained from the mean in the research variables indicate the point of equilibrium and the center of gravity. In probability and statistics, standard deviation is a measure of scatter for a probability distribution or random variable.

After surveying the fit of measurement sample, structural sample and general sample, based on the data analysis algorithm in PLS method, the researcher is permitted to review and measure the research hypotheses. After the descriptions given in the above parts, as indicated in Figure 4.

The path coefficient among investment efficiency and financial constraint was higher than +1.96 (2.901), which shows there is a considerable relation between investment efficiency and corporate governance. Moreover, the first hypothesis of the study is accepted. Based on second hypothesis of this study, investigating the relationship between corporate governance and investment efficiency, The findings indicate that the considerable level of corporate governance and investment efficiency are (5.63) that shows a considerable relation among these factors. Hence, the second hypotheses of the study are approved. As you can see in Figure 1, the coefficients of the constructs' latent variable of corporate governance indicate that governmental possession, concentration of ownership, and institutional ownership, respectively, are the most appropriate criteria for measuring corporate governance because the coefficients is closer to 1. for the last hypothesis the main goal is determining the relation between corporate governance and investment efficiency via financial constraints coefficient is 2.45, This indicates a significant relationship between investment efficiency and corporate governance and financial constraints, so the third hypothesis is also proved.

A brief of the findings is indicated in Figure 4.

Figure3: Descriptive statistics of research variables

variables	Variable name	min	max	mean	Standard deviation	skewness
Ineff	investment efficiency	5.928	3489	1,344.239	752.751	0.250
Co	ownership concentration	0.00	100	32.757	20.712	0.900
Io	Institutional ownership	0.00	100	64.140	28.242	-1.035
Gp	Governmental possession	0.00	1.00	0.033	0.18	5.206
Ib	Independence of board	0.00	1.00	0.666	0.204	-0.450
fc	Financial constraint	0.00	16.826	0.561	0.615	14.747

Figure 4: Test results of study hypotheses

Result	p-value	t statistics	Coefficient	Hypothesis
Confirmed	0.014	2.451	0.65	Sovereignty and financial constraints
Confirmed	0.000	5.631	0.61	Governance and efficiency of investment
Confirmed	0.004	2.901	0.78	Investment efficiency and financial constraints

In figure 5 we try to examine Validation of constructs used in this research for latent variables. In PLS, the Average Variance Extracted (AVE) whenever it is

more than 0.5 indicates the suitability of the tools for measuring latent variables. As you can see in the diagram, all the structures were used properly.

Figure 5: Construct Reliability and Validity

	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
Corporate governance	0.721	-0.718	0.780	0.746
Financial constraints	1.000	1.000	1.000	1.000
Investment efficiency	1.000	1.000	1.000	1.000

5. Conclusions and suggestions

The initial hypothesis about the relation between investment efficiency and financial constraints was tested and offered. The findings of this test indicate that a negative relation is present among investment efficiency and financial limitations. Investment in multiple matters by companies was regarded as one of the significant ways to enhance companies and prevent recession and backwardness. Hence, restricted resources resulted in increasing the capital efficiency due to the investment development. The transition is of high importance. One of the things which could be inferred is that the companies encountering financing limitations might refuse to accept and handle the projects by a positive net present value in terms of the high financing costs that results in a reduction in investment. The findings of this hypothesis with the study of Havakimian, 2011 and Bernanke and Blinder, 1988; Bernanke and Gretler, 1995; Bernanke et al., 1996 believe that the greater the financial constraints on companies, the more conservative investment in the projects.

The second hypothesis about the relation between efficiency, investment and corporate governance was measured. The findings of this test show a positive and considerable relation among efficiency, investment and corporate governance. The companies with better corporate governance are more beneficial, so corporate governance oversight mechanisms could ensure that managers make better investment decisions and avoid the issues of over-investment. In present research, four criteria were regarded to show corporate governance, and the independence of the board of directors is not considerable and thus its relation with performance was not measured based on the study of Kian 1392 and Richardson 2006. Hence, the concentration of ownership, state ownership and institutional ownership

have a positive and considerable relation with investment efficiency, The results indicate that some components of governance

Component of corporate governance Companies such as ownership concentration and institutional ownership have a significant positive relationship with investment efficiency. In fact, major owners can use regulatory mechanisms to influence the performance of the company's investments by controlling the actions of managers and increase investment efficiency. Accordingly, the greater the share of

Ownership is owned by a smaller number of owners. They have more control and can prevent the increase of agency costs by managers as a result of their wrong decisions. Therefore, with the concentration of ownership, we can expect the efficiency of investments to increase. This results with the results as the findings of study by Jin Chen (2015), Richardson (2006) Mohammadi Bahrasman (2013), it can be explained that the investment efficiency of companies is more than the cash flow situation and The company's liquidity is related to the ownership structure and decisions of major shareholders and owners, and the quality of oversight of investment activities..

In the final hypothesis of this study, we follow to survey the relation among corporate governance and investment effectiveness via the financial concentrate. When a company has high-risk debt, the managers who act in the interests of shareholders and avoid risky debt to finance investment projects might make decisions to reject the beneficial investments by positive net present value that is a low-investment phenomenon. Therefore, when the interests of managers are in the interests of investors, the managers do not require to cover high investment costs to make investment decisions that finally results in

investing in the stocks by positive current value or stocks and they become beneficial based on the Research Results Consistent with Roca et al., 2007; Mohammadian et al., (2010).

According to the results of this study, managers, analysts and investors can be suggested to pay attention to governance components such as the composition of shareholders when reviewing the financial statements of companies. Because the type of ownership and the percentage of shareholders affect the quality of companies' investment decisions.

The directors of the stock exchange organization are also advised to provide analysts and users with information about the ownership structure of companies and this group of shareholders, as the presence of major and institutional shareholders leads to changes in companies' investment decisions. .

Suggestions for future research:

- 1) In this research, we applied the regression model of investment efficiency and financial constraints that was consistent with the conditions and information of Iran, and tested the research hypotheses. Dear researchers, you can apply non-Iranian models and handle the hypotheses and compare the findings to assess the performance of Iranian models.
- 2) For measuring the corporate governance, we applied four variables: concentration of ownership, government ownership, board independence, and institutional ownership. Researchers can apply other indicators to measure the corporate governance.

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