<u>**Review Article**</u>

INTERNAL FINANCING AND INVESTMENT EFFICIENCY RELATIONSHIP IN TEHRAN STOCK EXCHANGE COMPANIES

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ABSTRACT

Investment efficiency is a key element in any country's economic policies. This study examines the relationship between internal financing and investment efficiency in listed companies in Tehran Stock Exchange during 2013-2017. This is a retrospective applied research that collects data in a descriptive and correlational manner.146 companies were selected as the statistical sample. The relationship between the variables was examined through regression analysis. The results revealed no positive relationship between internal financing and commercial investment; no positive relationship between internal financing and investment efficiency; and no negative relationship between internal financing and under-investment.

Keywords: Internal Financing, Efficiency, Investment and Stock Exchange

INTRODUCTION

Investment efficiency is a key element in any country's economic policies. Investors rely on information and reports expected to be credible, understandable, and manageable. Reports provided by a company executives is one of the most reputable sources for investors and other users of the corporate information. However, some financial scandals in a number of large companies around the world in recent years led to a decline in public confidence in companies financial reports. Therefore, the need for more qualified information increased and led to more demand about improving the performance of companies.

Due to resource constraints, both investment development and enforcing investment efficiency should be attended. Investment efficiency requires two conditions: a) not allocating resources to activities which are invested more than needed, and 2) directing resources to activities that need more investment. (Modarres & Hesarzadeh, 2008). Modigliani and Miller (1958) argue that in perfect markets, investment decisions and corporate financing are independent of each other. In other words, companies can always determine external financing at a cost equivalent to the cost of their own capital. However, the assumption of lack of any deficit in market is unrealistic. In the case of capital market deficits, internal and external resources cannot be completely substituted. (Arsalan et al., 2006).

Problem Statement

The separation of ownership from management has brought about disagreements among managers and shareholders; now, many managers desire to divert shareholders from their primary purpose of maximizing value for their own benefit. Any investment comes primarily from internal and external financing. With increasing investment in each area of the company's activities, the priority order of financing had been from internal financing to debt financing, and the risk of the business unit first decreases and then increases. Therefore studying the relationship between internal financing and investment efficiency will be very fruitful. Because the core feature of companies acting in the business unit market is sustainable innovation, this relationship may become more prominent in these companies. In the process of investment efficiency of growing business units,

inappropriate fundraising and irrational use of capital leads to financial risks, loss of business credit, loss of market share and even the company destruction. Investigating the internal financing and investment efficiency helps managers to prevent financial risk problems. It also aids them to benefit from sustainable innovation because these problems arise due to mismatches in internal financing and capacity spending.

THEORETICAL FRAMEWORK

Internal Financing

Companies generally provide their needed funds in a variety of ways, but various factors including company size, management status, sales volume, raw material resources, and access to finance markets as well as their economic and political environments make them cautious about making optimal decisions (Myers, 1986).

Deciding about the company financing is one of the most important financial decisions in any organization. financing for performing profitable projects plays a vital role in the company development. Therefore, the company ability to identify internal and external financing sources to invest and prepare financial plans greatly aids the company growth (Rahmani, 1995).

Investment Efficiency

Most economists have concluded that effective investment in the country, either on physical assets or on financial assets (including equity and equity investments) facilitates sustainable development is. Investors are interested in knowing the economic results of their investments and comparing their returns with those of other investments. Transition from an underdeveloped to a developed economy requires capital and investment. A successful transition requires equipment of capital resources and proper them (Tehrani & Shirazian, 2005)

In economic terms, investment is introduced as the engine of development. Investment means converting financial assets into one or more types of assets that are held for some time in the future. The term "investment" covers a wide range of activities, including investment in equity securities, common stocks, stock options and stock options,

convertible securities, and tangible assets (e.g., gold, valuable objects, land) (Shourvarzi and Azadvar, 2010).

Research literature
Hi et al. (2019) found that internal financing could either reduce business opportunities and investment shortages, or lead to overinvestment, especially in companies with managerial overconfidence.

Hollie et al. (2016) examined the impact of CEO overconfidence on ownership choice in decision about entering to foreign markets. The results of this study showed that the CEO overconfidence increases the desire for full co-ownership. The positive relationship between these two variables is more pronounced when companies are exposed to asymmetric information or environmental uncertainty based on the host country's institutional and cultural distances, higher host country risks, and lack of experience in local markets.

Wang et al. (2016) studied the relationships between sources of financing, investment in research and development, and business unit risk. They reported that the relationship between internal financing rate and R&D investment was significantly positive, and the asset-debt rate had a significant negative impact on R&D investment.

Lin and Chin (2012) showed that most CEOs are optimistic and investment is higher in companies with a more optimistic CEO.

Wei et al. (2011) confirmed that overconfident managers usually overestimate the profitability of investment projects, and underestimate its associated risks

Asadi Ravari, (2018) examined the effect of managerial overconfidence on tax planning in the top 50 listed companies in Tehran Stock Exchange. He found a significant relationship between managerial overconfidence and the tax planning of these companies.

Talati Sabeq et al. (2018) examined the relationship between managers' overconfidence and overinvestment (with emphasis on authority of board of directors). They concluded that although managers 'overconfidence did not lead to excess investment, interaction of managers' overconfidence and authority of board of directors had a significant negative effect on overconfidence.

Hemmat Zadeh and Nekoui Zadeh (2017) studied the relationship between managers' overconfidence and audit fees (with emphasis on authority of board of directors). Using the virtual variable method of overinvestment, they discovered a significant relationship between these two variables.

Saru Kalayi and Dezhkam (2017) examined the impact of managers' overconfidence on business and financial risks (with emphasis on corporate governance mechanisms). They observed no significant relationship between managers' overconfidence and business risk.

Hosni Kelvani (2015) studied the relationship between managerial overconfidence and conditional conservatism. The suggested model in this study revealed a significant negative relationship between conditional conservatism and managerial overconfidence.

Mottaqi (2014) studied factors affecting account balance and financing costs in the preferred investment of Maskan Bank. A significant and positive relationship was found between the dependent variable of the preferred account balance and the changes in the price of the certificate of priority and the interest rate on the short-term deposits; however, at 95% confidence level, there was no significant relationship between the allocation coefficient of bank instrument and the ceiling of housing facilities with the account balance in the preferred account resources.

METHODOLOGY

This is a retrospective applied research that collects data in a descriptive and correlational manner. The statistical population includes all companies listed in Tehran Stock Exchange, which were active in the stock market from the beginning of 2013 until the end of 2016. The sample was randomly selected to be a homogeneous representative of the statistical population. The required information was obtained from the library method. In this method, the research background and the overall structure of the research are identified through searching the Internet, information networks, books, journals and dissertations .The information required to test the hypotheses will be collected by analyzing the data of the companies listed in Tehran Stock Exchange using Rahavard 3 software and the official website of the Tehran Stock Exchange.

Research hypotheses
1- There is a positive relationship between internal financing and commercial investment.
2- There is a positive relationship between internal financing and investment efficiency.
3- There is a negative relationship between internal financing and investment.

- **Research Model**

$$Investment_{i,t} = \alpha_0 + \beta_1 Internal\ financing_{i,t} + \beta_2 Company\ size_{i,t} + \beta_3 Investment\ opportunities_{i,t} + \beta_4 Financial\ leverage_{i,t} + \beta_5 Operating\ results_{i,t} + \beta_6 Profitability_{i,t} + \beta_7 Cash\ holdings_{i,t} + \beta_8 Ownership\ concentration_{i,t} + \varepsilon_{i,t}$$

$$Overinvestment_{i,t} = \alpha_0 + \beta_1 Internal\ financing_{i,t} + \beta_2 Company\ size_{i,t} + \beta_3 Investment\ opportunities_{i,t} + \beta_4 Financial\ leverage_{i,t} + \beta_5 Operating\ results_{i,t} + \beta_6 Profitability_{i,t} + \beta_7 Cash\ holdings_{i,t} + \beta_8 Ownership\ concentration_{i,t} + \varepsilon_{i,t}$$

$$Underinvestment_{i,t} = \alpha_0 + \beta_1 Internal\ financing_{i,t} + \beta_2 Company\ size_{i,t} + \beta_3 Investment\ opportunities_{i,t} + \beta_4 Financial\ leverage_{i,t} + \beta_5 Operating\ results_{i,t} + \beta_6 Profitability_{i,t} + \beta_7 Cash\ holdings_{i,t} + \beta_8 Ownership\ concentration_{i,t} + \varepsilon_{i,t}$$

RESEARCH FINDINGS

Descriptive statistics of the studied variables are summarized in Table (1).

Table 1: Descriptive statistics

	INVESTMENT	OVER-INV	UNDER-INV	INT_FIN	COMP_SIZE
Median	2304519.	1027223.	1149529.	0.185380	14.15081
Mean	71222.50	0.000000	55920.39	0.128651	13.97305
Maximum	1.40E+08	1.07E+08	1.47E+08	26.66153	19.39502
Minimum	0.000000	-706427.0	0.000000	-1.920051	9.993237
SD	10943969	6976003.	8188116.	1.295787	1.591817
Total observations	730	730	730	730	730

	INV_OPPOR	FIN_LEV	OPE_RES	PROFIT	CASH_HOLD	OWN_CON
Median	0.458529	0.540023	0.099359	687.7007	0.055184	72.14932
Mean	0.414459	0.585182	0.076751	329.9322	0.024981	79.71500
Maximum	7.024722	1.804797	1.996393	9276.455	1.776341	99.80000
Minimum	-0.804797	-6.024722	-0.370215	-2516.279	0.000266	0.000000
SD	0.517005	0.517015	0.156719	1168.580	0.124754	24.88743
Total observations	730	730	730	730	730	730

- **Kolmogorov-Smirnov test (normality of dependent variable)**

In order to estimate the final model of the research, information about independent and dependent variables is used and then the final model regression is estimated. The null and the counter hypotheses in this test are written as follows.

H_0: The data for the dependent variable follows the normal distribution
H_1: The data for the dependent variable does not follow the normal distribution

Table 2: **Kolmogorov Smirnov test**

	Investment	Over-investment	Under-investment
	After normalization	After normalization	After normalization
Test Statistics	1.536	0.693	**0.782**
Sig.	0.0.18	0.723	**0.674**

For the studied years, values of significance level of the dependent variables are greater than 0.05. The null hypothesis is rejected when the significance level is less than 5%; therefore, the dependent variables have normal distribution in different years.

- **Variances Homogeneity**

The variance homogeneity of other models is investigated using the Breusch-Pagan test. The results are presented in Table 3.

Table 3: **Results of the Breusch-Pagan test for the models variance homogeneity**

Characteristic of the regression model	Breusch–Pagan *test*	Sig.	Homogeneity of variance
First hypothesis regression model	9.656332	0.0000	No
Second hypothesis regression model	4.811550	0.0000	No
Third hypothesis regression model	5.353262	0.0000	No

According to Table 3, since the significance levels of the studied models are less than 5%, the null hypothesis regarding the variance homogeneity is rejected. Thus, there is no autocorrelation between the variables and one of the basic conditions of the regression is confirmed. Therefore, the generalized least squares (GLS) method should be used in all three models to solve these problems.

- **Durbin-Watson Test**

Since the results of the Durbin-Watson test are between 1.5 and 2.5, there is no autocorrelation between the variables.

Table 4: **Results of Durbin-Watson test**

Hypotheses	Dependent variables	Results of Durbin-Watson Test
First	Amount of commercial investment	**1.737291**
Second	investment performance	**1.635876**
Third	Under-investment	1.587532

- **Collinearity tests**

As reported in Table 5, values close to 1 indicate the absence of strong collinearity between the independent variables.

- **Correlation Test**

In this study, the collinearity relationship between independent variables is investigated through Pearson correlation coefficient.

Table 5: Correlation test between variables

Correlation	INVESTMENT	OVERINV	UNDERINV	INTER_FI	CO_SIZE
INVESTMENT	1.000000				
OVERINV	0.692304	1.000000			
UNDERINV	0.685218	-0.020701	1.000000		
INTERNAL_FIN	0.001620	0.001628	0.002834	1.000000	
COMPANY_SIZE	0.516729	0.359496	0.325502	-0.111911	1.000000
INVESTMENT_OPPO	0.073195	0.116761	0.009224	0.067773	-0.067677
FINANCIAL_LEV	-0.077333	-0.117433	-0.008830	-0.067327	0.059919
OPERATING_RES	0.031762	0.032169	0.032239	0.106184	0.056094
PROFITABILITY	-0.017958	-0.013534	-0.000556	0.091780	0.116470
CASH_HOLDINGS	-0.049069	-0.043644	-0.021527	0.344360	-0.223811
OWNERSHIP_CON	0.043135	0.052089	0.011500	0.026571	0.153718

Correlation	INV_OPPO	FIN_LEV	OPER_RES	PROFIT	CASH_HOLD	OWN_CON
INVESTMENT						
OVERINV						
UNDERINV						
INTERNAL_FIN						
COMPANY_SIZE						
INVESTMENT_OPPO	1.000000					
FINANCIAL_LEV	-0.997430	1.000000				
OPERATING_RES	0.434268	-0.431163	1.000000			
PROFITABILITY	0.048228	-0.046366	0.524004	1.000000		
CASH_HOLDINGS	0.152427	-0.151656	0.024261	0.022383	1.000000	
OWNERSHIP_CON	-0.075896	0.075402	0.082919	0.183972	0.039286	1.000000

As it can be seen in Table 5, there is a positive but not significant correlation between the research variables, which is almost weak between the two variables. Due to lack of collinearity between these two variables, their simultaneous entrance into the model. The other variables can also enter to the model simultaneously since their correlations are not strong and will not cause a collinearity problem.

Research Hypothesis Test
- **Testing the first hypothesis**

- There is a positive relationship between internal financing and commercial investment.

H_0: There is no positive relationship between internal financing and commercial investment. H_0: $\beta i = 0$

H_1: There is a positive relationship between internal financing and the amount of commercial investment H_1: $\beta i \neq 0$

To determine the usefulness of panel data method in estimating the suggested model, and the preferred method (fixed effects or random effects) for calculation, the Chau test and Hausman test were used, respectively. The results of these tests are presented in Table 6.

Table 6: Results of the Chau and Hasman Tests

Test	Statistics	Value	Freedom degree	P-Value
Chau	F	3153.654879	(145,576)	0.0000
Hasman	χ^2	57.403260	8	0.0000

Given the results of Chau test (P= 0.0000), the test hypothesis is rejected at 95% confidence level and panel data method can be used. Also, given the results of Hasman test (P= 0.0000) which is less than 0.05, the test hypothesis is rejected at 95% confidence level and H_1 is accepted. Therefore, it is necessary to estimate the model through the fixed effects method.

Table 7: Examining the combined model of the first hypothesis

Dependent variable: Amount of commercial investment Views: 730 year-company					
Variable	Coefficient	SD	t	P-Value	Relation
Internal financing	-0.001297	0.009850	-0.131632	0.8953	Not-Sig.
Company size	0.012073	0.020563	0.587110	0.5574	Not-Sig.
Investment opportunities	0.725155	0.535023	1.355371	0.1758	Not-Sig.
Financial leverage	0.620135	0.534018	1.161261	0.2460	Not-Sig.
Return on assets	-0.035231	0.084045	-0.419191	0.6752	Not-Sig.

Profitability	-3.88E-06	1.43E-05	-0.271637	0.7860	**Not-Sig.**
Maintenance of cash	-0.139914	0.180436	-0.775422	0.4384	**Not-Sig.**
Major shareholders	0.000767	0.000764	1.003946	0.3158	**Not-Sig.**
Fixed component	10.01907	0.627058	15.97788	0.0000	**Positive**
Adjusted determination coefficient of the model					**0.999188**
Durbin-Watson test					**1.737291**
F					**5865.732**

As manifested above, the P-value of Prob (F-statistic), which indicates the significance of the whole regression, is 0.000000. Therefore, the model is significant at the confidence level of 99%. Also, the Durbin-Watson Test of the above relationship is between 1.5 and 2.5, which is appropriate and confirms lack of autocorrelation. Consequently, there is no positive relationship between internal financing and commercial investment.

- **Testing the Second Hypothesis**

- There is a positive relationship between internal financing and investment efficiency.

H_0: There is no positive relationship between internal financing and investment efficiency. H_0: $\beta i = 0$

H_1: There is a positive relationship between internal financing and investment efficiency. H_1: $\beta i \neq 0$

Table 8: Results of Chau and Hasman Tests

Test	Statistics	Statistics value	Freedom degree	P-value
Chau	F	13527.395948	(145,576)	**0.0000**
Hasman	χ^2	**18.990373**	**8**	**0.0149**

Given the results of Chau test (P= 0.0000), the test hypothesis is rejected at 95% confidence level and panel data method can be used. Also, given the results of Hasman test (P= 0.0149) which is less than 0.05, the test hypothesis is rejected at 95% confidence level and H_1 is accepted. Therefore, it is necessary to estimate the model through the fixed effects method.

Table 9: **Examining the combined model of the second hypothesis**

Dependent variable: Company Investment Efficiency Views: 730 Year - Company					
Variable	**coefficient**	**SD**	**t**	**P-Value**	**Relation**
Internal financing	0.000284	0.004896	0.057948	0.9538	**Not-Sig.**
Company Size	0.005486	0.005450	1.006648	0.3145	**Not-Sig.**
investment opportunities	1.762474	0.539092	3.269338	0.0011	**Positive**
Financial Leverage	1.754440	0.539056	3.254656	0.0012	**Positive**
Return on assets	-0.016647	0.018429	-0.903315	0.3667	**Not-Sig.**
Profitability	1.04E-06	1.63E-06	0.636387	0.5248	**Not-Sig.**
Maintenance of cash	-0.008140	0.030631	-0.265740	0.7905	**Not-Sig.**
Major shareholders	-0.000524	0.000352	-1.488408	0.1372	**Not-Sig.**
Fixed component	2.125817	0.544331	3.905378	0.0001	**Positive**
Adjusted determination coefficient of the model					**0.999635**
Durbin-Watson Test					**1.635876**
F					**13048.89**

As manifested above, the P-value of Prob (F-statistic), which indicates the significance of the whole regression, is 0.000000. Therefore, the model is significant at the confidence level of 99%. Also, the Durbin-Watson Test of the above relationship is between 1.5 and 2.5, which is appropriate and confirms lack of autocorrelation. Consequently, there is no positive relationship between internal financing and investment efficiency.

- **Testing the third hypothesis**

- There is a negative relationship between internal financing and under-investment.

H_0: There is no negative relationship between internal financing and under-investment. H_0: $\beta i = 0$

H_1: There is a negative relationship between internal financing and under-investment H_1: $\beta i \neq 0$

Results of the Chau and Hasman tests are presented in Table 10.

Table 10. Results of the Chau and Hasman tests

Test	Statistics	Value	Freedom degree	P-value
Cahu	F	24184.338038	(145,576)	**0.0000**
Hasman	χ^2	**16.326600**	**8**	**0.0379**

Given the results of Chau test (P= 0.0000), the test hypothesis is rejected at 95% confidence level and panel data method can be used. Also, given the results of Hasman test (P= 0.0379) which is less than 0.05, the test hypothesis is rejected at 95% confidence level and H_1 is accepted. Therefore, it is necessary to estimate the model through the fixed effects method.

Table 11. Examining the combined model of the third hypothesis

Relation	P-Value	t	SD	Coefficient	Variable
		Dependent Variable: Company Under-investment			
		Views: 730 Year-Company			
Not-Sig.	0.7775	-0.282763	0.009431	-0.002667	**Internal financing**
Positive	0.0000	4.830940	0.012655	0.061135	**Company size**
Not-Sig.	0.8160	0.232858	0.039448	0.009186	**Investment opportunities**
Not-Sig.	0.8228	-0.224086	0.037591	-0.008424	**Financial leverage**
Not-Sig.	0.2761	1.090263	0.034606	0.037729	**Return on assets**
Not-Sig.	0.0811	-1.747616	7.77E-06	-1.36E-05	**Profitability**
Not-Sig.	0.8449	-0.195706	0.056824	-0.011121	**Maintenance of cash**
Not-Sig.	0.3229	0.989283	0.000220	0.000218	**Major shareholders**
Positive	0.0000	38.41734	0.187806	7.215026	**Fixed component**
0.999801					**Adjusted determination coefficient of the model**
1.587532					**Durbin-Watson Test**
23885.90					**F**

As manifested above, the P-value of Prob (F-statistic), which indicates the significance of the whole regression, is 0.000000. Therefore, the model is significant at the confidence level of 99%. Also, the Durbin-Watson Test of the above relationship is between 1.5 and 2.5, which is appropriate and confirms lack of autocorrelation. Consequently, there is no negative relationship between internal financing and under-investment.

Table 12. Summary of the hypothesis results

Hypothesis	Relation	Hypothesis state
There is a positive relationship between internal financing and commercial investment	No	Rejected
There is a positive relationship between internal financing and investment efficiency	No	Rejected
There is a negative relationship between internal financing and investment	No	Rejected

DISCUSSION AND CONCLUSION

The results of this study was not in line with those of Hi et al. (2019), Hemmat Zadeh and Nekoui Zadeh (2018), Hollay et al. (2016), Wang et al. (2016), Wei Qing et al. (2016), Hosni Kelvani (2015), Hosni Kalvani and Mahfouzi (2015), and Mottaqi (2014) Lin and Chin (2012), and Wei et al (2011).

- **There is no positive relationship between internal financing and amount of commercial investment.**

As manifested above, the P-value of Prob (F-statistic), which indicates the significance of the whole regression, is 0.000000. Therefore, the model is significant at the confidence level of 99%. Also, the Durbin-Watson Test of the above relationship is between 1.5 and 2.5, which is appropriate and confirms lack of autocorrelation. Consequently, there is no positive relationship between internal financing and amount of commercial investment.

- **There is no positive relationship between internal financing and investment efficacy.**

As manifested above, the P-value of Prob (F-statistic), which indicates the significance of the whole regression, is 0.000000. Therefore, the model is significant at the confidence level of 99%. Also, the Durbin-Watson Test of the above relationship is between 1.5 and 2.5, which is appropriate and confirms lack of autocorrelation. Consequently, there

is no positive relationship between internal financing and commercial efficiency.

- **There is no negative relationship between internal financing and under-investment.**

As manifested above, the P-value of Prob (F-statistic), which indicates the significance of the whole regression, is 0.000000. Therefore, the model is significant at the confidence level of 99%. Also, the Durbin-Watson Test of the above relationship is between 1.5 and 2.5, which is appropriate and confirms lack of autocorrelation. Consequently, there is no negative relationship between internal financing and under-investment.

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