

# Investigating the Over- and Under-Sensitivity of Investment to Firms' Free Cash Flows

## (With Emphasis on Agency Costs and Financial Constraints)

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### ABSTRACT

Free cash flow leads to investment inefficiency (over- or under-investment) which is rooted in information asymmetry between managers and shareholders, agency issues and financial constraints. This study examines the sensitivity of over- and under-investment to free cash flow. The dependent variable is investment inefficiency (over- or under-investment) and the independent variable is the firm's free cash flow. Control variables include growth, size, age, return on assets and financial leverage. Agency costs and financial constraints are also considered as moderator variables. The statistical sample included 260 companies listed on the Tehran Stock Exchange during the period 2006-2013. Using multivariate panel data regression models, the results showed that investment inefficiency has a significant and positive sensitivity to free cash flow. This sensitivity is significant and positive in observations that are associated with less investment and negative free cash flow due to financial constraints. Also, in observations that are associated with higher investment and positive free cash flow due to agency costs, this sensitivity is significant and positive.

## **Introduction**

The existence of an agency relationship creates problems for the company that increase the risk of shareholders investing in the company. The agency relationship makes management actions less visible and exposes the company to a more uncertain environment (Dennis and Dennis, 1994). As a result, management freedom due to the diversity of accepted accounting methods reduces transparency in the company's information environment, creating an uncertain environment for investors. Increased uncertainty in the company's information environment causes the intrinsic value of the company to differ from the value that investors in the market place for the shares in question. As a result, the actual value of the company's shares differs from the expected value, leading to increased investment risk in relation to the company's shares. In addition, the agency relationship causes managers to have better access to internal information, which creates information asymmetry in the market (Namazi, 2005; Jensen, 1998).

The amount of cash flows of a company has a great impact on the amount of investments of a company due to the lower cost of capital compared to external financing and also the greater control of managers over it. Research shows that the sensitivity of investment to cash flows is influenced by the individual characteristics of managers in addition to the characteristics of the company and market conditions. In recent years, many studies have been conducted in this field, which show that managers do not always behave completely rationally and, under the influence of overconfidence and excessive optimism, may make irrational decisions that have a significant impact on the financial activities of the company, especially the investment issue. Also, the issue of financial constraints is one of the important and fundamental issues facing all companies in investment discussions. The term financial constraint means that there is an obstacle in financing all desirable investments.

This study examines the sensitivities of over- and under-investment to free cash flows. Accordingly, on the one hand, the presence of free cash flows leads to over-investment due to the lack of information asymmetry between managers and shareholders, and on the other hand, the presence of constraints in financing leads to under-investment.

One of the important points about stock exchanges, the discussion of market efficiency, is the problems of information asymmetry between management and financial markets, agency mismatches between management and shareholders, as well as between controlling shareholders and minority investors, which are significantly affected by the investment decisions of the company. Such problems are particularly severe in emerging markets. Given that capital market imperfections characterize these problems and weak corporate governance mechanisms, this study provides a basis for studying the investment decisions of companies and their relationship with free cash flows despite financial constraints and agency problems.

### **Statement of the Problem**

The objectives of financial reporting arise from the information needs and demands of external users. The main objective is to express the economic effects of financial events and transactions on the condition and performance of a business entity, to assist external parties in making financial decisions. According to the Accounting Standards Board, financial reporting includes not only financial statements, but also tools and methods of communication. This information should be such that it helps investors and other user groups to identify the financial strengths and weaknesses of the entity and provides a basis for evaluating the entity's performance during a financial period.

However, in practice, the existence of an agency relationship between managers and

shareholders creates problems that can affect the quality of financial reporting and the efficiency of companies' investment. Jensen (1986) states in his famous theory of free cash flow agency costs that free cash flows in excess of the company's investment needs can lead to inefficient investment due to the conflict of interests between managers and shareholders. According to this theory, managers tend to spend excess financial resources on projects that not only do not increase the value of the company, but may also decrease it (Jensen, 1986). Also, Fama and Jensen (1983) argue that the separation of ownership from management gives rise to agency problems and suboptimal decision-making by managers. On the other hand, financial constraints are one of the fundamental issues facing companies in investment discussions. Financial constraints mean that companies face obstacles in financing all desirable investments and cannot easily secure the financial resources they need. Recent research has shown that both financial constraints and agency costs have a significant impact on investment efficiency (Hassanzadeh Brothers et al., 2014). Also, Chen (2007) showed that cash flow-investment sensitivity cannot be a good measure of financial constraints and other factors should be considered.

Research shows that investment sensitivity to cash flows, in addition to company characteristics and market conditions, is also affected by individual characteristics of managers. In recent years, several studies have shown that managers do not always behave completely rationally and, under the influence of overconfidence and excessive optimism, may make irrational decisions that have a significant impact on the company's financial activities, especially investment (Malmandar and Tate, 2005; Goel and Thakur, 2008). Ebrahimi et al. (1402) showed that overconfidence of managers has a negative impact on the efficiency of investment and financing decisions. Also, Mohammadi et al. (1398) confirmed that overconfidence of managers affects financing policies and investment efficiency.

CEO power is also an important factor that affects companies' investment decisions. Choudhury et al. (2023) showed that powerful managers can affect investment efficiency. Lu and Shiah-Hu (2022) also confirmed that CEO power is related to overcapitalization. Khajoui and Veisi-Hesar (1402) also found that CEO power affects the probability of dividend payment. In addition, Bonabi Ghadim and Majidi (1401) showed that narcissism and CEO power affect investment efficiency and sustainable profit growth. The quality of financial reporting also plays an important role in reducing information asymmetry problems and improving investment efficiency. Beadle and Hilary (2006) and Beadle et al. (2009) showed that higher quality financial reporting leads to improved investment efficiency. Thaqafi et al. (2011) also found that the quality of accounting information has a significant effect on the relationship between overinvestment and free cash flow.

Considering the above discussions, the main question of the present study is:

Is the sensitivity of investment to free cash flow affected by agency problems and financial constraints? More precisely, do companies with high free cash flow tend to overinvest due to information asymmetry and agency costs, and conversely, do companies with low free cash flow face underinvestment due to financial constraints?

This study examines how free cash flow leads to overinvestment on the one hand through information asymmetry and agency costs, and on the other hand, through financial constraints, leads to underinvestment. Specifically, this research seeks to answer the question of whether the sensitivity of abnormal investment to free cash flow is due to agency problems and financial constraints.

The aim of this study is to investigate the role of agency costs and financial constraints as

moderating variables in the relationship between free cash flows and inefficient investment in companies listed on the Tehran Stock Exchange.

Theoretical foundations and research background

**Free cash flows**

Free cash flow is a measure of company performance that indicates the remaining cash after making necessary expenditures to maintain or develop assets. Jensen (1986) defines free cash flow as the remaining cash flows after financing projects with positive net present value. The presence of high free cash flow can lead to managers misusing resources (Jensen's free cash flow theory) or, in conditions of financial constraints, to a lack of investment (underinvestment).

**Agency theory**

The agency relationship creates a conflict of interest between managers and shareholders due to the separation of ownership from management. Managers may seek to maximize their own personal interests (such as increasing the size of the firm), even if these actions are detrimental to shareholders. This conflict of interest leads to agency costs (including owner monitoring costs, commitment costs, and residual losses) and information asymmetries that can make the investment process inefficient.

**Financial constraints**

Financial constraints refer to the inability to secure funds for all desirable investments. Firms may face financial constraints due to unfavorable credit conditions, inability to obtain loans, or inability to issue new shares. These constraints cause firms to rely more on internal funds rather than expensive external sources of financing, and may abandon profitable projects due to lack of resources. Various theories, including traditional theory, Modigliani and Miller, agency theory, static equilibrium, and the hierarchy of financing options, attempt to explain this phenomenon.

**Research Background**

A review of the research background is presented in a structured manner. The aim of doing this is to create a deep connection between the existing theoretical literature and the data of the ongoing research.

Table (1-1) Research background

Key Finding	Year	Author	Row
Very powerful CEOs reduce investment efficiency.	2023	Chaudhari et al.	1
Liquid assets are negatively affected by market competition, firm innovation partially mediates this effect, and financial constraint shows full mediation.	2022	Zhang and Zhou	2
Organizations tend to underinvest and prefer excess liquidity due to difficulty in obtaining credit.	2022	Alice et al.	3
There is a negative relationship between CEO power and overinvestment.	2022	Lu and Xiaohu	4
CEO membership on the board can improve investment efficiency.	2021	Liu et al.	5
CEOs with higher capabilities consider investment decisions more seriously.	2019	Gan	6
Powerful CEOs are more risk-averse.	2016	Gormeli and Matsa	7

More powerful CEOs gain more credit and invest more.	2013	Glaser et al.	8
CEOs with higher professional skills can use the minimum amount of capital for efficient investment.	2012	Demarjian et al.	9
CEOs distort growth expectations through earnings management.	2008	McNichols and Steubin	10
The company's diversification policy does not affect cash holdings, but it does affect product market competitiveness and agency costs.	1405	Mohammadzadeh Sote et al.	11
There is a negative and significant relationship between CEO power and investment inefficiency (overinvestment).	1404	Khajoui and Veisi Hesar	12
The persistence of abnormal negative changes in cash balances is greater than the persistence of abnormal positive changes.	1403	Jamei	13
Managerial overconfidence has a negative effect on the efficiency of investment and financing decisions	1402	Ebrahimi et al.	14
Managerial overconfidence affects financing policies and investment efficiency	1402	Mohammadi et al.	15
CEO power has a negative and significant effect on investment sensitivity to cash.	1400	Marani et al.	16
Board of directors' compensation and its size have a positive and significant effect on investment in research and development	1397	Barzegari Khanaghsheh and Ghaedi	17
There is a significant negative relationship between financial constraints and underinvestment and overinvestment.	1396	Khorshidzadeh Haghghi	18
Financial constraints and agency costs have a significant effect on investment efficiency	1393	Hassanzadeh Brothers et al.	19
The quality of accounting information has a significant effect on the relationship between overinvestment and free cash flow	1390	Saghafi et al.	20

Considering the studies related to the investigation of the relationship between free cash flow, financial constraints, agency costs, and investment efficiency, there is still a research gap regarding the simultaneous investigation of the moderating role of agency costs and financial constraints on the relationship between free cash flow and investment sensitivities (overinvestment and underinvestment). The present study has taken steps to fill this research gap.

## Research Methodology

### Statistical Population and Research Sample

The statistical population includes all companies active in the Tehran Stock Exchange.

Time range: 2006 to 2013.

Statistical sample: 260 companies listed on the Tehran Stock Exchange, after applying screening conditions (including entry into the exchange before 2006, presence in all years of the time period, and no change in fiscal year), which constitute a total of 1820 company-year observations.



Figure (1-1) Research model

$$I^{new}_{i,t} = \alpha + \beta_1 I^{new}_{i,t-1} + \beta_2 CASH_{i,t-1} + \beta_3 Q_{i,t-1} + \beta_4 SIZE_{i,t-1} + \beta_5 AGE_{i,t-1} + \beta_6 ROA_{i,t-1} + \beta_7 LEV_{i,t-1} + \varepsilon_{i,t}$$

$I^{new}_{i,t}$ : New investment expenditure, the ratio of new investment expenditure to the book value of assets

$CASH_{i,t-1}$ : Cash holdings; the ratio of cash to the book value of assets

$Q_{i,t-1}$ : Tobin's Q; the ratio of the sum of the market value of stocks and the book value of liabilities to the book value of assets

$SIZE_{i,t-1}$ : Size; the natural logarithm of the book value of assets

$AGE_{i,t-1}$ : Age; the natural logarithm of the number of years since the company was founded

$ROA_{i,t-1}$ : Return on assets; the ratio of after-tax operating profit to the book value of assets

$LEV_{i,t-1}$ : Leverage; the ratio of the book value of liabilities to the book value of assets

$\varepsilon_{i,t}$ : Error or residuals of the model; After testing the model, the investment inefficiency is extracted from the residuals of the regression model in the form of positive and negative numbers. Positive numbers indicate overinvestment and negative numbers indicate

underinvestment.

$$I_{i,t}^{\text{unexpnew}} = \alpha + \beta_1 FCF_{i,t} + \beta_2 GROWTH_{i,t} + \beta_3 SIZE_{i,t} + \beta_4 AGE_{i,t} + \beta_5 PROF_{i,t} + \beta_6 LEV_{i,t} + \varepsilon_{i,t}$$

$$I_{i,t}^{\text{unexpnew}} = \alpha + \beta_1 FCF_{i,t} + \beta_2 AGC_{i,t} + \beta_3 FCF_{i,t} * AGC_{i,t} + \beta_4 GROWTH_{i,t} + \beta_5 SIZE_{i,t} + \beta_6 AGE_{i,t} + \beta_7 PROF_{i,t} + \beta_8 LEV_{i,t} + \varepsilon_{i,t}$$

$$I_{i,t}^{\text{unexpnew}} = \alpha + \beta_1 FCF_{i,t} + \beta_2 FINCONS_{i,t} + \beta_3 FCF_{i,t} * FINCONS_{i,t} + \beta_4 GROWTH_{i,t} + \beta_5 SIZE_{i,t} + \beta_6 AGE_{i,t} + \beta_7 PROF_{i,t} + \beta_8 LEV_{i,t} + \varepsilon_{i,t}$$

$I_{i,t}^{\text{unexpnew}}$ : Unexpected investment or the difference between actual investment and expected optimal investment

Research variables

Dependent variable

- Investment inefficiency (INEFF)
- Cash holdings (CASH)
- Tobin's Q (Q)
- Size (SIZE)
- Age (AGE)
- Return on assets (ROA)
- Financial leverage (LEV)

Positive values indicate overinvestment and negative values indicate underinvestment.

Independent variable

• The firm's free cash flow (FCF), which is the ratio of the difference between operating cash flow and investing cash flow to the book value of assets.

Moderator variables

- Agency costs (AGC): The ratio of operating costs to the book value of assets.
- Financial constraints (FINCONS): A composite measure based on the decimal rank of variables such as operating cash flow, dividends, size, sales growth, and debt ratio.

Control variables

- Growth (GROWTH)
- Size (SIZE)
- Age (AGE)
- Return on assets (PROF)
- Leverage (LEV).

Data analysis method

A mixed data multivariate regression model with fixed effects was used to test the hypotheses. Chow and Hausman tests were used to select the appropriate model (combined or combined). Also, tests of the reliability of the variables (generalized Dickey Fuller unit root), model significance, coefficient significance, lack of autocorrelation of residuals (Camera-Watson) and normality of residuals (Jarko-Bera) were examined.

### **Research findings**

Results of the investment inefficiency model test

The results of the investment inefficiency model test showed that the regression model is generally significant (F statistic with a probability of less than 0.05). The adjusted coefficient of determination explains about 65% of the variation in investment inefficiency. The Durbin-Watson statistic was within the appropriate range (1.73), indicating no autocorrelation of the residuals.

The general relationship between investment inefficiency and free cash flow (Hypothesis 1)

The results showed that there is a significant and positive relationship between investment inefficiency and free cash flow. This means that with an increase (decrease) in free cash flow, investment inefficiency also increases (decreases).

The relationship between investment inefficiency and free cash flow with a focus on financial constraints (Hypothesis 2)

Negative free cash flow and underinvestment: In companies with high financial constraints, negative free cash flow has a significant and positive relationship with underinvestment. That is, the occurrence of high financial constraints leads to an increase in underinvestment. This finding confirms the second hypothesis of the study.

Positive free cash flow and overinvestment: In companies with high financial constraints, positive free cash flow does not have a significant relationship with overinvestment.

The relationship between investment inefficiency and free cash flow with a focus on agency costs (Hypothesis 3)

Positive free cash flow and overinvestment: In companies with high agency costs, positive free cash flow has a significant and positive relationship with overinvestment. That is, the occurrence of high agency costs leads to an increase in overinvestment. This finding confirms the third hypothesis of the study.

Negative free cash flow and underinvestment: In companies with high agency costs, negative free cash flow has no significant relationship with underinvestment..

### Control Variable Results

Size (SIZE): Has a significant and positive relationship with investment inefficiency. (Larger companies have more inefficiency.)

Profitability (PROF): Has a significant and negative relationship with investment inefficiency. (Companies with more profitability have less inefficiency.)

Growth (GROWTH), Age (AGE), Financial Leverage (LEV): Does not have a significant relationship with investment inefficiency.

Table (1-2) General results of testing models of the relationship between investment inefficiency and free cash flow with a focus on agency costs and financial constraints

INEFF <sub>i,t</sub> .Dependent variable		
Interpretation (in terms of variable significance)	Relationship	Research variables
Decrease (increase) in the firm's free cash flow; decrease (increase) in investment inefficiency	Positively significant	FCF <sub>i,t</sub>
Decrease (increase) in free cash flow and financial constraints; decrease (increase) in investment inefficiency	Positively significant	FCF <sub>i,t</sub> *FINCONS <sub>i,t</sub>
Decrease (increase) in free cash flow and agency costs; decrease (increase) in investment inefficiency	Positively significant	FCF <sub>i,t</sub> *AGC <sub>i,t</sub>
Decrease (increase) in firm growth; no change in investment inefficiency	Non-significant	GROWTH <sub>i,t</sub>
Decrease (increase) in firm size; decrease (increase) in investment inefficiency	Positively significant	SIZE <sub>i,t</sub>
Decrease (increase) in firm age; no change in investment inefficiency	Non-significant	AGE <sub>i,t</sub>
Decrease (increase) in firm profitability; increase (decrease) in investment inefficiency	Negatively significant	PROF <sub>i,t</sub>
Decrease (increase) in firm leverage; increase (decrease) in investment inefficiency	Negatively significant	LEV <sub>i,t</sub>

Table (1-3) Results of testing sub-models of the relationship between investment inefficiency and free cash flow

Interpretation (in terms of variable significance)	Relationship	Independent variable	Dependent variable
Decrease (increase) in negative free cash flow; decrease (increase) in underinvestment	Positively significant	NEGFCF <sub>i,t</sub>	UNDERINV <sub>i,t</sub>
Decrease (increase) in positive free cash flow; decrease (increase) in overinvestment	Positively significant	POSFCF <sub>i,t</sub>	OVERINV <sub>i,t</sub>
Decrease (increase) in negative free cash flow in an observation with high financial constraints; decrease (increase) in underinvestment	Positively significant	NEGFCF <sub>i,t</sub>	UNDERINV <sub>i,t</sub> (HIGH FINCONS <sub>i,t</sub> )
Decrease (increase) in positive free cash flow in an observation with high agency costs; decrease (increase) in overinvestment	Positively significant	POSFCF <sub>i,t</sub>	OVERINV <sub>i,t</sub> (HIGH AGC <sub>i,t</sub> )

Other results showed that in the models under study, the growth and age variables do not have a significant relationship with investment inefficiency. Thus, in the companies under study, no evidence of changes in inefficiency in managers' investment decisions was obtained with respect to the level of growth and age of the companies. Also, the variables of size, profitability, and financial leverage have a significant relationship with investment inefficiency. In the case of size, the relationship was positive, and in the case of profitability and financial leverage, the relationship was negative. Thus, in smaller (larger) companies, higher (lower) profitability and a higher (lower) degree of leveraged financing, managers' investment decisions are associated with less (higher) inefficiency. Finally, the overall results of testing the research hypotheses are presented in Figure 5-3.

## **Conclusions and Suggestions**

### **Conclusions**

The results of this study showed that in companies listed on the Tehran Stock Exchange, investment inefficiency (over- and under-investment) has a significant and positive sensitivity to free cash flow. This sensitivity was confirmed in companies with underinvestment and negative free cash flow (due to financial constraints) as well as in companies with overinvestment and positive free cash flow (due to agency costs). These findings are consistent with the theoretical views of Jensen, Fazari et al., Stolz, Hubbard, Verdi, Beadle, and Hillary and Richardson .

### **Practical Suggestions**

- For managers: Avoid self-interest and opportunistic behaviors, and make efficient investment decisions to increase shareholder wealth and the growth of the business unit.

- For supervisory and controlling organizations: Implement a strong corporate governance structure to reduce conflicts of interest between managers and shareholders, as well as between managers and creditors.

- For banks and credit institutions: Granting loans and credit to companies that have the real capacity to use funds optimally.

Suggestions for future research

- Investigating the supervisory effect of corporate governance on the relationship between investment inefficiency and free cash flow.

- Investigating the effect of information asymmetry on over and underinvestment.

- Investigating the effect of agency problems on the relationship between financial reporting quality and investment efficiency.

- Investigating the relationship between investment inefficiency and free cash flow by company size levels (small, medium and large) and company growth levels (low, medium and high).

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