



Study on the Motives of Inefficient Investment of Listed Companies

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Abstract

Based on the fundamental theory of value effects of investment, this paper investigates the motives of inefficient investment of listed company in China. Regression results using 3155 Shanghai and Shenzhen listed company observations in 2003-2005 show that investment is sensitive to cash flows when we control the growth opportunity, suggesting that some degree of inefficient investment of listed companies exists. Moreover these relationships are much stronger for state-owned listed companies. The motive test show that investment is positively correlated to future operational performance significantly for both state-owned and non-state-owned listed companies, which means the reason why listed companies engaged in inefficient investments lies in agent conflicts between shareholders and managers, therefore the main form of inefficient investment of listed companies is overinvestment.

Key words: Financial constraints; Agent conflicts; inefficient investment; Investment-cash flow sensitivity

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INTRODUCTION

Under assumptions of perfect information and no

transaction costs, Modigliani and Miller (1958) confirmed that corporate investment decisions has nothing to do with the financing decision, the enterprise value only depends on the future profitability, capital costs of investment projects, and achieves maximum at the optimal investment. However, perfect capital market assumptions does not exist in the reality, asymmetric information and transaction costs in the capital markets will lead to credit rationing, which causes the external financing required to bear the additional cost premium, making the enterprise face financial constraints and show obvious internal financing preference resulting in internal cash flow as an important determinant of investment. When companies have good investment opportunities without enough internal financing, given the higher cost of external financing, or capital rationing phenomenon, financing constraints would force companies to give up some investment projects with positive NPV. This result means that the investment expenditure of financing constrained companies should be sensitive to its net worth. By examining sensitivity between enterprise investment expenditure and cash flow, we can determine the issues of financing constraints of investment decisions. Because different companies subject to the financing constraints are quite different, and its sensitivity to internal cash flows should also be different. Typically, the higher financing constraints, the greater effect of internal cash flow on corporate investment is. Based on the theory above, using 421 U.S. manufacturing panel data of listed companies in 1970-1982, Fazzari, Hubbard and Petersen (1988) first studied the relationship between corporate investment and the availability of internal funds. After controlling for investment opportunities, the results showed that the company's investment expenditure is very sensitive to its internal cash flow and more significant for high financing constraint companies, which support the financing constraints hypothesis. Then, based on the pioneering research of Fazzari, Hubbard and Petersen, using different classification criteria from a different perspective, many

scholars studied the relationship between financing constraints and investment-cash flow sensitivity and obtained study conclusions similar to Fazzari, Hubbard and Petersen (Hoshi, Kashyap & Scharfstein, 1991; Oliner & Rudebusch, 1992; Gilchrest & Himmelberg, 1995).

However, the drawbacks of financing constraints hypothesis under asymmetric information theory don't consider the private interests of management or other agent, that is, an important prerequisite for the financial constraints are that the interests of company managers should be consistent with that existing shareholders, that is, manager act in the interests of existing shareholders (Myers and Majluf, 1984), which is obviously a strong assumption. As we all know, the modern company's separation of ownership and management makes the composition of a principal-agent relations between shareholders and managers. Absent of appropriate incentives and constraints, to obtain the monetary and non-monetary benefits associated with larger company scale, the managers will make investment decisions departing from the enterprise value maximum (Jensen, 1986). Since managers will be more monitored and disciplined from external capital market, managers prefer to use internal funds in inefficient investment, which also makes the company's investment expenditure significantly positively correlated with its internally generated cash flow. This test results are very similar to financial constraints hypothesis, but this time investment-cash flow sensitivity reflects the overinvestment, rather than underinvestment. So, in an imperfect capital market, although the forming reasons of underinvestment and overinvestment are different, but as an inefficient investment, both investment and expenditure will increase with the company's internal generated cash flow, making the investment very sensitive to internal cash flow. Thus, while the finance constraint model represented by Fazzari, Hubbard and Petersen is a very attractive intuitively, and relevant empirical research has also made great progress, some scholars challenged their universality of the conclusions. Using qualitative and quantitative information related to enterprise financial constraints as classification standards, Kaplan and Zinglas (1997) further divided the sample of the most serious financial constraints companies of Fazzari, Hubbard and Petersen (1988) into three sub-samples and retested their results, but obtained the conclusion completely contrary to that of Fazzari, Hubbard and Petersen: it is the lower financial constraints companies that exhibit higher investment-cash flow sensitivity, and concluded that higher investment-cash flow sensitivity cannot be used as evidence of financial constraints. Clear (1999), using 1317 U.S. public company in 1987-1994, and a multivariate discriminant analysis index as the classification standard of financial constraints, studied investment-cash flow sensitivity, its conclusions were more consistent with that of Kaplan and Zinglas. The reasons of such results can be explained by the free cash flow agent costs hypothesis, and

financial constraint is not the only reason for explaining investment-cash flow sensitivity. Pawlina and Renneboog (2005) investigated investment-cash flow sensitivity of the UK listed companies. The results show that the relationship between investment-cash flow sensitivity and the management stakes was S-type curve; the major shareholders can reduce investment-cash flow sensitivity through effective supervision. Vogt (1994) confirmed that there were obvious under-investment for firms with small-scale, high-growth opportunities, low dividend payout ratio, and overinvestment obviously existed for firms with large-scale, low-growth opportunities, low dividend payout.

In China, some scholars have showed that investment-cash flow sensitivity also existed in China's listed companies, but the theoretical causes and manifestations are controversial. Feng Wei (1999), Zheng Jiangzhun, He Xuqiang and Wang Hua (2001), Wei Feng, and Liu Xing(2004), argued that the investment-cash flow sensitivity is mainly caused by the financial constraints, which showed that company was underinvesting. He Jin'geng, and Ding Jiahua (2001), Zhang Yi, and Li Chen (2005) found that investment-cash flow sensitivity in Chinese listed companies was primarily caused by agency problems, and overinvestment was their main manifestations. Lian Yujun and Cheng Jian (2007) argued that investment-cash flow sensitivity of listed companies in China was the common result made by financial constraints and agency problems. Low financial constraint companies tended to overinvest; high financial constraint company took on underinvestment.

There is a methodological error in the researches above. The usual practice is, according to some a priori criteria (dividend payout ratio, firm size, group members, ownership concentration, etc.), to divide the sample companies into financial constraints group and non-financing constraint group. If investment-cash flow sensitivity for financial constraint companies was significantly higher than that of nonfinancial constraint companies, it shows that the companies are facing financial constraints, and regards investment-cash flow sensitivity as evidence of the company underinvestment. On the contrary, if investment-cash flow sensitivity for nonfinancial constraint companies was significantly higher than that of financial constraint companies, it shows that there is a free cash flow agency problem within company, and then investment-cash flow sensitivity reflects overinvestment. Obviously, this is an indirectly method studying causes and manifestations of firm inefficient investment. Because that different companies suffer financial constraints or agent conflict is only relative, and will vary over time, therefore, that the companies are divided into the financial constraint group and non-financial constraint group according to priori criteria is too simplistic and absolute, and it is difficult to draw a convincing and consistent conclusions, and endogenous

problems for some priori criteria still exist (dividend payout ratio, firm size). This is the underlying reason why researches on corporate inefficiency investment are though very rich, yet don't attain unanimous conclusions. Therefore, it is necessary to incorporate relevant elements of corporate inefficiency investment into an organic whole, and introduce new ideas and methods to study on causes and forms of the enterprise inefficient investment deeply.

There are two purposes for this paper: (1) whether corporate investment is lack of efficiency? (2) If exists, what is its motives and forms for corporate inefficiency investment? The analysis above shows that both financial constraints and agency conflicts will lead to corporate investment distortion, lack of efficiency, but the consequences are completely different. Financial constraints may cause the company underinvestment, and agency conflicts cause the company overinvestment. As different theoretical perspectives on how to eliminate inefficient investment have different policy conclusions, therefore, it is particularly important to find out its real cause of specific forms for corporate inefficient investments.

The research thoughts are as follows: First, we use investment-cash flow sensitivity to test if the inefficient investment exists in Chinese listed companies. After controlling the corporate investment opportunities, if the sensitivity coefficient of investment to cash flow is significantly positive, it indicates that enterprise investments in China have been distorted and inefficient. Then, based on the results above, we examine the reasons and forms for corporate inefficiency investment. Given that the company value usually achieve the maximum at the optimal scale of investment, underinvestment and overinvestment both indicate that the company's actual investment expenditures deviate from the optimal level of investment, therefore, whether underinvestment or overinvestment will result in a suboptimal allocation of corporate capital, making capital and production factors idle or waste, and thus adversely affect the future profitability of enterprises investment. However, due to different attributes of underinvestment and overinvestment, from perspectives of the effect on the company's future profitability, if there is underinvestment in corporate, an additional investment will boost the company's future operating performance; to the contrary, if overinvestment, the additional investment will reduce the company's future operating performance. Therefore, if the relationship between investment and the company's future operating performance was monotonically positive, it indicates that there is underinvestment; financial constraints are the main cause of corporate inefficient investment. If the investment and the company's future operating performance showed a monotonic negative relationship, it indicates that there is overinvestment; agency conflict is the incentive for its formation. If

the investment and the company's future operating performance was an inverted U-curve relationship, that additional investment in a certain range will help improve the company's future operating performance, beyond a range, further additional investment will reduce the company's future operating performance, in other words, the enterprise optimal scale of investment exist, then the corporate inefficient investment include not only the underinvestment, but also overinvestment, financial constraints and agents conflicts are both reason that lead to corporate investment lack of efficiency.

1. DATA AND SAMPLE SELECTION

1.1 Sample Selection and Data Sources

This paper selects all A-share listed companies in Shanghai and Shenzhen Security Exchange from 2003 year to 2005 year as the initial sample. To ensure the validity of the data collected and minimize the effect of other factors on the data, we screened the initial sample based the following criteria: (1) Exclude the current IPO. Many researches show that the listed companies in China 3 years before and IPO year have obvious earnings management, which make financial data poor quality; (2) taking into account effect of extreme value on the negative impact on the result, we eliminate companies with absolute value of sales growth greater than 1 and omitted data; (3) financial listed companies are excluded because their investing, operating and financing activities may be not clearly demarcated. After screening based on the above criteria, the full sample consists of 3155 firm-year observations. All firm's financial statement data used in this paper are obtained from the *WIND* financial research databases.

1.2 Model Selection and Variable Description

1.2.1 The Test of Existence of Corporate Inefficient Investment

To compare the research with that of existing scholars results conventionally, we construct the following basic regression model to analyze the corporate investment efficiency:

$$I_{i,t} = \beta_0 + \beta_1 G_{i,t-1} + \beta_2 CF_{i,t} + \eta_i + \gamma_t + \varepsilon_{i,t} \quad (1)$$

Where I_{it} is the ratio of investment expenditure of company i in year t to beginning-of-year book assets, G_{it-1} is growth opportunities of company i in year $t-1$, measured by the ratio of sale growth. CF is firm's net operating cash flow, scaled by beginning-of-year book assets. Theoretical and empirical evidences show that when the company investment occurs distortion and becomes inefficient, the company's investment expenditure will be very sensitive to its internally generated cash flow. Therefore, if there is obvious inefficient investment in the listed company

in China, we expect the regression coefficients of CF should be significantly positive. η_i and γ_t are dummy variable reflecting corporate firm effect and time effect respectively, ε_{it} is error term.

$$EBIT_{i,t+1} = \alpha_0 + \alpha_1 EBIT_{i,t} + \alpha_2 I_{i,t} + \alpha_3 I_{i,t}^2 + \alpha_4 G_{i,t} + \alpha_5 CF_{i,t} + \alpha_6 D_{i,t} + \eta_i + \gamma_t + \varepsilon_{i,t} \quad (2)$$

Where $EBIT_{i,t+1}$ and $EBIT_{i,t}$ are the ratio of profit before interest and tax for company i at year $t + 1$ and year t to the beginning total assets respectively, proxying the company's operating performance. $G_{i,t}$ and $D_{i,t}$ are the company's growth opportunities and asset-liability ratio company i at year t respectively. According to analysis above, the test idea of model (2) can be summarized as follows: if α_2 is significantly positive, α_3 not significant, which indicate that the additional investment can improve the company's future operating performance, the company underinvested, and financial constraints is the reasons leading to company investment inefficient; if α_2 is significantly negative, α_3 not significant, that additional investment not only failed to improve the company's future operating performance, but lead to decline in the company's future operating performance, agency conflicts are main reason caused by inefficient investment; if α_2 is significantly positive, α_3 significantly negative, that is, within a certain range, additional investment will help improve the company's future operating performance, beyond a certain range, to further additional investment will reduce the company's future operating performance, then the corporate inefficient investment include not only the underinvestment, but also overinvestment, financial constraints and agents conflicts are both reason that lead

1.2.2 Motivation Test of Corporate Inefficient Investment

In order to investigate corporate inefficient investment arising from financial constraints or agency conflicts, we specify the following regression models:

to corporate investment lack of efficiency.

1.2.3 Descriptive Statistics

Table 2 presents the descriptive statistics for the main variables used to estimate empirical equation (1) and (2). The mean (median) investment across all firm-years is equal to 0.07291 (0.04417) of prior year's assets. These values are consistent with prior research. The mean (median) firm in the sample has a CF of 0.05421 (0.05339), which is much greater than the median of investment expenditure, showing that internally generated cash flow of most companies can meet the needs of the theirs investment expenditure. The mean and median values are 0.15515 and 0.15925 respectively for current growth opportunity, which are lower than previous growth opportunity, taking on a clear downward trend. The mean (median) future one period corporate operational performance is 0.04369 (0.04536), which doesn't improve significantly relative to the current corporate operational performance, indicating that the future one period corporate operational performance is still low and loss of some companies are even more serious than the current period corporate operational performance (the minimum value of the future one period corporate operational performance is -1.3996, which is much smaller than that of the current period corporate operational performance).

Table 1
Summary Statistics (n=3155)

Variables	Means	Median	Minimum	Maximum	Std. Dev
I	0.0729099	0.0441748	-0.2922736	1.483412	0.0962415
CF	0.0542124	0.0533995	-1.2651825	0.680583	0.0971751
G_{t-1}	0.1753304	0.1646005	-0.9958862	0.997071	0.2914075
G_t	0.1551501	0.1592518	-0.9999941	0.991110	0.2998556
$EBIT_t$	0.0389475	0.0450514	-1.0957789	0.369265	0.0978301
$EBIT_{t+1}$	0.0436962	0.0453637	-1.3996601	3.498912	0.1196728

2. EMPIRICAL RESULTS AND ANALYSIS

2.1 The Test of Existence of Listed Corporate Inefficient Investment: Analyzing Based on Investment – Cash Flows Sensitivity

Table 2 reports the multiple regression results of the model (1). Where the equation 1 is the all sample regression results, equations 2 and 3 are the multiple regression

results that the sample are divided into state-owned controlling and non-state controlling listed companies respectively, to test the effect of controlling shareholder on the corporate investment efficiency. The coefficient of CF is significantly positive in equation 1, and keeping other factors unchanged, the company investment expenditure will increase in 0.250% for every 1% cash flow on average, which indicates that the company

investment is very sensitive to its internally generated cash flow, showing that there is some distortion and low efficiency for the listed company investment behavior. By comparing equations 2 and 3, we can find, although the coefficients of CF in the state-owned controlling and non-state controlling listed companies are all significantly positive, indicating that investment expenditure of controlling and non-state controlling listed companies are all inefficient. However, the sensitivity coefficient of investment to cash flow of state controlling listed companies is 0.262, significantly higher than that of non-state controlling listed companies, which means that the degree of investment distortion of state controlling listed companies is more serious. According to the analysis above, the reasons resulting in enterprise investment lack

of efficiency has two: the first is financial constraint, and second is agency conflicts, however, there are different inefficient investment results between the financial constraint and agency conflicts: the results of financial constraints is underinvestment, the result of agency conflicts is overinvestment. Related to this issue, what are the specific reasons resulting in state-owned controlling and non-state controlling listed company investment inefficient. This requires us to make motivation test. Coefficients of *G* in all regression equations are significantly positive, indicating that the higher the company's growth opportunities are, the greater their investment needs, which means that growth opportunities of listed companies in China is still an important driver of investment expenditure.

Table2
The Test Result of Existence of Listed Corporate Inefficient Investment

Equation	All sample		State-owned company		Non-state-owned company	
Variable	Equation 1		Equation 2		Equation 3	
	Coefficient	t	Coefficient	t	Coefficient	t
Concept	0.050	24.309***	0.047	19.624***	0.055	14.002***
<i>G</i>	0.055	9.855***	0.056	8.541***	0.056	5.096***
<i>CF</i>	0.250	14.781***	0.262	13.545***	0.202	6.322***
Observations	3155		2381		774	
<i>AdjR</i> ²	0.104		0.107		0.097	
<i>F</i>	183.891***		143.075***		42.750***	

Note:depend variable is the ratio of investment expenditure; *** indicate the significance levels at 1%.

2.2 The Motivation Test of Inefficient Investment in Listed Companies: Analyzing Based on Value Effects of Investment

The multiple regression results of model (2) are reported in Table 3. Where the equation 4 is the all sample regression results, equations 5 and 6 are the multiple regression results that the sample are divided into state-owned controlling and non-state controlling listed companies respectively, in order to test if there are the different reasons between state-owned controlling and non-state controlling listed companies' inefficient investment. In equation 4, the coefficient of *I* is significantly negative, and although the coefficient of *I*² is negative but not significant, the company future operating performance is significantly negatively correlated with investment, that is, the more companies

invest, the lower its future profitability is. In accordance with the theoretical analysis above, the result means that the main form of listed company inefficient investment is overinvestment, therefore, it is the agency problem that leads to its generation. By comparing equations 5 and 6, the coefficient of *I* and *I*² in the state-owned controlling and non-state controlling listed companies are all negative, although the latter is not significant, indicating that, for both state-owned controlling and non-state controlling listed companies, their investment expenditures are a misuse of funds. However, the higher coefficient (absolute value) of *I* for the state-owned controlling company indicate that, relative to non-state controlling listed companies, state-owned controlling company may have more serious overinvestment problem.

Table3
The Test Result of Motivation of Listed Corporate Inefficient Investment

Equation	All sample		State-owned company		Non-state-owned company	
Variable	Equation 4		Equation 5		Equation 6	
	Coefficient	t	Coefficient	t	Coefficient	t
Concept	-0.037	-11.051***	-0.080	-9.159***	0.011	3.170***
<i>EBIT</i>	0.539	23.532***	0.558	11.041***	0.483	21.164***

To be continued

Continued

Equation	All sample		State-owned company		Non-state-owned company	
Variable	Equation 4		Equation 5		Equation 6	
	Coefficient	t	Coefficient	t	Coefficient	t
<i>I</i>	-0.103	-3.296***	-0.297	-2.850***	-0.054	-2.137**
\hat{I}	-0.135	-1.317	-0.380	-1.212	-0.066	-1.175
<i>G</i>	0.022	3.249***	0.023	1.329	0.024	4.205***
<i>CF</i>	0.169	8.386***	0.222	3.810***	0.125	7.317***
<i>D</i>	0.079	20.390***	0.054	0.871	0.110	15.540***
observations	3155		2381		774	
<i>AdjR</i> ²	0.288		0.332		0.310	
<i>F</i>	255.832***		179.624***		76.720***	

Note: depend variable is ratio of profit before interest and tax; **, *** indicate the significance levels at 1% respectively.

CONCLUSIONS

In this paper, we use the basic principles of investment value effect to reexamine the reason and forms of listed company inefficient investment. After controlling the investment opportunities of companies, Regression results using 3155 Shanghai and Shenzhen listed company observations in 2003-2005 show that investment is sensitive to cash flows when we control the growth opportunity, suggesting that some degree of inefficient investment of listed companies exists. Moreover these relationships are much stronger for state-owned listed companies. The motive test show that investment is positively correlated to future operational performance significantly for both state-owned and non-state-owned listed companies, which means the reason why listed companies engaged in inefficient investments lies in agent conflicts between shareholders and managers, therefore the main form of inefficient investment of listed companies is overinvestment.

In summary, although the problems of overinvestment in non-state-owned controlling companies are lower than that of state-owned controlling companies, but non-state-owned controlling companies also take on not the characteristics of overinvestment similar to that of state-owned controlling companies. This result suggests that the inefficient problems of state-owned property rights and the resulting agency conflicts are not bound to be automatically eliminated with the state-owned enterprise property rights reform. Under the premise that bad institutional environments have not been fundamentally improved, the inherent design defect of state-owned property rights system does not mean the superiority of private property rights. The effectiveness of private property rights depends on the degree of market competition. So, completely contrary to the theoretical expectation that privatization of state-owned controlling company will ease the agency problem, in the institutional environment with the relative softening of constraints, the actual controller of any type companies with property rights have incentive to expropriate the interests of

external investors by means of the company's control. In other words, the agency problems of non-state-owned controlling companies are not necessarily lower than that of state-owned controlling companies. Therefore, to solve the over investment problem of listed companies in China, and eliminate the negative impact on investors, in addition to restricting the control rights over free cash flow of managers (or controlling shareholders), we should fundamentally change our country's unreasonable market institutions and environments.

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