Institutional Investors, Over-investment and Corporate Performance

Ningyue Liu
University College Dublin *

Don Bredin
University College Dublin[†]

Abstract

This paper examines the influence of institutional investors on firms' over-investment as well as the relation between over-investment and corporate performance. We employ the data in Chinese Stock Market from 2003 to 2008 and an accounting-based framework devised by Richardson (2006) to measure over-investment to examine the relation between institutional ownership and firms' over-investment. Our results to date indicate that funds and security companies decrease firms' over-investment. Furthermore, we investigate the relation between over-investment and firms' performance. We find that there is a significant negative relation between over-investment and firms' performance. Our findings to some extent indicate that shareholder activism exists in emerging countries and over-investment is an important channel for institutional investors to influence corporate performance.

Keywords: Institutional Investor, Over-investment, China Stock Market.
JEL Classification: G2; G3; M4.

*PhD Student, Graduate School of Business, University College Dublin, Blackrock, Dublin, Ireland. E-mail: ningyue.liu@ucd.ie.

[†]Graduate School of Business, University College Dublin, Blackrock, Dublin, Ireland. E-mail: don.bredin@ucd.ie.

1 Introduction

While institutional ownership of stock has increased substantially over the last few decades (Davis and Steil , 2001), their role in monitoring corporate behavior isn't quite clear. In this paper, we investigate whether institutional investors influence corporate governance by examining the relation between institutional ownership and corporate over-investment.

Outside shareholders rely on mangers to choose investment projects that enhance corporate value. If the environment is frictionless, investment opportunities should be the only determinant of firms' optimal investment decisions. However, in the presence of separation between ownership and control, agency problem is likely to exist (Berle and Means , 1932). Managers of the business may not act in the best interests of the shareholders. Jensen (1986) suggests that managers may invest in projects that are beneficial from their own perspective but costly from shareholders' perspective. Hart (1995) also believes that managers have strong motivation to build "empire". The deviation from the optimal investment level is over-investment. Over-investment is a potential consequence of the agency problem. Richardson (2006) defines over-investment as "investment expenditure beyond that required to maintain assets in place and to finance expected new investments in positive NPV projects". He devises a framework to measure over-investment based on accounting information.

Small investors have no incentive to monitor management, but institutional investors maybe play a monitoring role due to their large shareholdings and long-term investment horizons (Shleifer and Vishny, 1986). Institutions are essential to a well-functioning corporate governance mechanism because they have financial interest and independence to monitor firm management in an unbiased way. Jensen (1993) believes that some institutions like pensions funds, insurance companies, mutual funds are natural active investors. Richardson (2006) finds that some governance structures mitigate the agency costs associated with over-investment in US firms. However, Biddle, Hilary and Verdi (2009) find the institutional ownership increases investment regardless of whether a firm is more or less likely to over-invest.

Since the late 1980's, shareholder activism has played a dominate role in efforts to influence corporate governance structures and improve firm performance. Some empirical studies examine the effects of institutional investors on firms' share value and accounting performance. For example, Smith (1996) concludes that shareholder activism increases shareholder wealth. However, Karpoff, Malatesta and Walkling (1996) find that there is no persuasive evidence that shareholders' proposals increase firm values and performance. Karpoff (2001) does a survey of empirical findings and we could see it is a controversial issue. Recently, some studies emphasize the channels which are used by institutional investors to influence the firms' performance. The papers find that institutional investors influence firms' executive compensation (Hartzell and Starks , 2003), R & D investment behavior (Bushee , 1998), dividend policy (Grinstein and Michaely , 2005) and so on to improve corporate performance. In this paper, we hope to explain the black box about the way institutional investors use to influence firms' performance in a new perspective — over-investment.

Moreover, an important distinction has be drawn among different types of institutional investors by previous studies. The size of pension funds stakes renders them particularly sensitive to the performance of firms in their portfolios. Moreover, these stakes provide powerful incentives to pension funds to monitor firms. Wahal (1996) studies pension fund activism by examining all firms targeted by nine major funds from 1987 to 1993 and the paper reports there is no evidence of significant long-term improvement in either stock price or accounting measures of performance in the post-targeting period. Meanwhile, CalPERS, the California Public Employees Retirement System, has attracted attention from researchers. Some papers focus exclusively on CalPERS events (Smith , 1996). Brav, Jiang, Partnoy and Thomas (2008) research hedge fund activism in the U.S. and find target firms experience increases in payout, operating performance, and higher CEO turnover after activism. In this research, we divide the whole institutional investors into different types. This distinction is fundamental to understand the level of monitoring that different institutional investors carry out and their impact on corporate investment.

In this paper, we want to answer questions: (1) Whether institutions influence firms' over-investment or not in emerging countries? Given the short history and the difficulty of obtaining the data, there is a considerable dearth of empirical evidence about shareholder activism in emerging markets. This paper shifts the focus in an emerging economy - China. (2) What types of institutions impact over-investment? In this paper, we investigate the impact of main institutional investors in China, including investment funds, National Social Security Fund (NSSF), securities companies, insurance companies, trust companies and Qualified Foreign Institutional Investors (QFIIs). (3) What is the relation between over-investment and corporate performance? The final purpose of institutional investors is to improve corporate performance and gain benefit. Therefore, we examine the relation between over-investment and corporate performance after the investigation about the relation between institutional investors and over-investment. Therefore, we construct an integrated line form institutional investors to corporate performance with the over-investment in the middle.

The paper adopts annual Chinese stock market data for the period 2003 to 2008 and use the accounting-based framework devised by Richardson (2006) to measure the over-investment. Our results to date indicate that funds and securities companies significantly decrease firms' over-investment. Furthermore, The results indicate that over-investment damages corporate performance. Our findings to some extent indicate that shareholder activism exists in emerging countries and over-investment is an important channel for institutional investors to influence corporate governance.

The outline of the rest of the paper is as follows. In section 2, we do the literature review about shareholder activism and over-investment. In section 3, we discuss the data and the framework to measure over-investment. In section 4, we present the empirical results and do some robust tests. Finally, section 5 provides some concluding remarks.

2 Literature Review

2.1 Shareholder Activism

General speaking, institutional investors are large shareholders with an interest in monitoring firms' performance and playing as "patient" owners with a long-term interest in improving corporate governance and performance. Although many empirical studies have investigated the impact of shareholder activism on performance of companies, they didn't reach an agreement on this controversial issue. Del Guercio and Hawkins (1999) use return on assets (ROA) to measure firms' performance and find that the changes on ROA of firms receiving shareholder proposals are smaller than those of control firms matched by size, industry, and previous performance. However, in contrast, Prevost and Rao (2000); Opler and Sokobin (1997) find shareholder activism significant decreases and increases firms' ROA respectively.

Some papers want to explain the channels which are used by institutional investors to influence the firms' performance. Hartzell and Starks (2003) find that there is a positive relation between institutional ownership concentration and pay-for-performance sensitivity of managers' compensation. Institutional ownership concentration is negatively related to the level of compensation. They conclude that institutional investors play a monitoring role in mitigating the agency problem between shareholders and managers. Similar findings are reported by Khan, Dharwadkar and Brandes (2005).However, Johnson, Porter and Shackell (1997) find shareholder activism does not significantly impact on firms' CEOs compensation. Bushee (1998) examines the influence of institutional investors on R&D investment behavior and find that managers are less likely to reduce R&D to reverse earnings decline when institutional ownership is high. That implies as sophisticated investors, institutional investors monitor myopic behavior of managers. Using data of US public firms between 1980 and 1996, Grinstein and Michaely (2005) find payout policy influences institutional holdings. However, institutional holdings do not cause firms to increase dividends, repurchases, or total payout. Similar finds are presented by Smith (1996); Del Guercio and

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Hawkins (1999).

Recently, researchers divide the whole institutional investors into different classifications and want to examine the different characteristics among them. For instance, Chen, Harford and Li (2007) examine the monitoring role of independent institutions with long-term investments on post-merger performance. Bushee, Carter and Gerakos (2009) investigate the influence and characteristics of "governance-sensitive" institutions who consider companies' governance mechanisms in their portfolio choices. In this paper, we investigate the different impact of main institutional investors in Chinese mainland stock market on corporate governance separately in order to find distinctive features of different institutions on shareholder activism.

2.2 Over-investment

Over-investment is defined as investing in projects with negative net present value (NPV). Correspondingly, under-investment includes passing up investment projects that have positive NPV. In order to maximize their own benefits, managers are inclined to make investments that are not in the best interests of shareholders (Berle and Means , 1932; Jensen and Meckling , 1976). Jensen (1986) finds that managers have incentives to grow their firms beyond the optimal size. Blanchard, Lopez-de-Silanez and Shleifer (1994) provide empirical evidence to this prediction. Conyon and Murphy (2000) also find that CEO pay increases with firm size in US and UK. That indicates that managers have strong incentive to enlarge company size by over-investment.

Moreover, some papers examine the methods to mitigate over-investment. Jensen (1986) believes that debt and cash dividend can play a monitoring role to mitigate over-investment. Ferreira and Matos (2008) find that companies with higher institutional ownership have lower capital expenditures, indicating that institutional ownership mitigates over-investment. However, Biddle, Hilary and Verdi (2009) show a positive association between institutional ownership and capital investment which is inconsistent with previous studies. Richardson (2006) finds that weak evidence that governance structures are effec-

tive in mitigating the level of over-investment for US firms. In particular, the empirical analysis indicates that stock ownership by institutions doesn't have significant impact on the extent of over-investment in firms with positive free cash flow.

Finally, some studies also examine the relation between over-investment and corporate performance. Jensen (1993) finds that the capital expenditure and R & D spending decisions of a great number of firms are inefficient which have a negative impact on corporate performance. Titman, Wei and Xie (2004) document a negative relation between abnormal capital investments and stock returns which consistent with the idea that investors tend to underreact to the empire building implications of increased investment expenditures. Furthermore, they find that this negative relation tends to be stronger for firms with less debt or more cash flows which are more likely to overinvest. Yang (2005) also presents empirical evidence that both low and high investment are followed by significant decreases in corporate performance which is consistent with suboptimal value creation following inefficient investment.

2.3 Institutional Investors in China

Since the early 1980s, China has become the most rapidly growing economy, sustaining an average annual growth rate of around 10% from 1978 to 2007.[1] The combined market capitalization of China's two domestic stock exchanges[2] has grown from about 14.8 billion US dollar in 1992 to more than 3,000 billion US dollar by the end of July 2009, the third one in the world.[3] Institutional ownership in Chinese mainland stock markets has increased substantially over the past 10 years. According to the percentage of market value of listed stocks and government bonds held by total institutional funds is more than 30% by the end of October 2003.[4] The nation's institutional investors are comprised of investment funds,

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[1]From National Bureau of Statistics of China.

[2]China's two domestic stock exchanges, Shanghai Stock Exchange and Shenzhen Stock Exchange, were established in December 1990 and July 1991, respectively.

[3]From the data released by China Securities Regulatory Commission (CSRC) on 25th August 2009.

[4]From Research & Planing, Hong Kong Stock Exchange, 15th January 2004

NSSF, securities companies, insurance companies, trust companies and QFIIs.

Investment funds are the biggest institutional investors in China's capital markets with longer history compared to others. In the first half of 2007, the net asset of 347 funds hit 1.67 trillion yuan (about 219.74 billion US dollars), accounting for 31% of the tradable value of A shares.[5] 306,000 fund investment accounts were opened daily on average in the first half of 2007, sharply higher than the opening of A share accounts.[6] Investment funds have established their status in China's capital market and they could play an even bigger role.

One of the most recent initiatives for China's pension reform is the creation of NSSF in September 2000. The NSSF is built up as a reserve fund to cover potential unfunded liabilities in the old pension system resulting from an aging population. The NSSF is to be funded by budgetary transfer by Chinese central government. The value of NSSF has grown from 11 billion US dollar in December 2001 to 80 billion US dollar in December 2008.[7] According to "Provisional Regulations on the Management of Investment by Social Security Fund" issued by Ministry of Finance (MOF) and Ministry of Labor and Social Security (MOLSS), the NSSF can be invested in bank deposits, government bonds and other liquid financial instruments including equities and corporate bonds.

In 2003, Chinese government introduced QFIIs scheme, which is designed to allow the largest overseas institutions access to China's debt and equities markets. QFII is defined as "overseas fund management institutions, insurance companies, securities companies and other assets management institutions which have been approved by China Securities Regulatory Commission (CSRC) to invest in China's securities market and granted investment

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[5]From statistic released by China Securities Regulatory Commission, 27th August 2007. A shares in Shanghai and Shenzhen stock exchanges refers to those that are traded in Renminbi. Currently only mainlanders and QFIIs are allowed to trade A shares. Some shares in the two mainland Chinese stock exchanges, known as B shares, are traded in foreign currencies. In the past, only non Chinese were allowed to trade B shares. Starting from March 2001, mainlanders can trade B shares as well. However, they must trade with legal foreign currency accounts.

[6]From statistic released by China Securities Depository and Clearing Corporation Ltd, 27th August 2007

[7]From Annual Report of National Council for Social Security Fund

quota by SAFE". This definition can be found in "Provisional Measures on Administration of Domestic Securities Investments of Qualified Foreign Institutional Investors" issued by CSRC on 5th November 2002. Term 18 of the Provisional Measure states that QFIIs can invest in A shares, treasures, convertible bonds and corporate bonds listed in China's stock exchanges and other financial instruments as approved by CSRC. Up to 31st December 2008, 66 QFIIs had been approved by CSRC.[8] With robust development over the past years, the total investment quota of QFIIs has grown from 425 million US dollar in the beginning of QFII scheme in 2003 to more than 13 billion US dollar by the end of 2008.

3   Data and Methodology

This section describes data used in this paper and the methods for investigating the three questions mentioned in introduction section are then discussed.

3.1   Data

The shareholder data of all types of institutional investors are all sourced from GILDATA while financial and corporate governance data are from the China Stock Market Accounting Research (CSMAR) at GTA Research Service Center. these are annual data which cover the period between 2003 to 2008. We start in 2003 because QFII scheme begins in 2003. Consistent with previous empirical literature, financial firms (i.e., CSRC codes in I) are excluded because of the different investing and financing activities for these firms. In order to the influence of outliers, we winsorize all continuous variables at the 1% and 99% levels.

3.2   Methodology

The accounting-based framework devised by Richardson (2006) to measure over-investment is discussed first, and then the model used to examine the relation between the ownership

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[8]From Investment Quota Approval Form of QFIIs issued by State Administration of Foreign Exchange (SAFE), 10th October 2009

of institutional investors and over-investment is presented. Finally, we introduce the model to investigate the relation between over-investment and corporate performance. In order to make the results are more robust, we also perform some robust tests at the end of this paper.

3.2.1   Over-investment

We use an accounting-based framework to measure the level of over-investment (Richardson , 2006). Richardson (2006) split total investment expenditure into two parts: required investment expenditure, $I_{MAINTENANCE}$, and investment expenditure on new projects, I_{NEW}. Then, I_{NEW} is decomposed into expected investment expenditure in new positive NPV projects, I_{NEW}^*, and abnormal investment, I_{NEW}^ε. Positive (negative) I_{NEW}^ε correspond to over-(under-) investment. Based on the previous studies (Richardson , 2006; Biddle, Hilary and Verdi , 2009), we define new investment in a given firm-year is the sum of capital expenditures, acquisitions minus sales of PPE (property, plant and equipment) and depreciation, scaled by total assets at the beginning of the year.[9]

Based on previous studies (Hubbard , 1998; Richardson , 2006), the following regression is used in this paper to estimate expected investment:

$$
\begin{aligned}
I_{new,i,t} =& \alpha + \beta_1 \, TobinQ_{i,t-1} + \beta_2 Leverage_{i,t-1} + \beta_3 Cash_{i,t-1} + \beta_4 Age_{i,t-1} \\
& + \beta_5 Size_{i,t-1} + \beta_6 Stock\ Returns_{i,t-1} + \beta_7 I_{new,i,t-1} + \sum Industry \\
& + \sum Year
\end{aligned} \tag{1}
$$

The fitted value from equation 1 is the estimate of new investment. The residual is the estimate of over-investment, I_{NEW}^ε. *Tobin's Q* is a measure of growth opportunities and is the ratio of the market value of assets to the current replacement cost of those assets (Hubbard , 1998). Other independent variables include leverage, stock of cash, firm age,

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[9]R & D expenditure is not a regular term of financial reports of A share listed companies in China. Therefore, we don't include it in the definition of new investment in this paper.

firm size[10], stock returns, prior firm investment and industry[11] and year dummy variables (Richardson , 2006).

3.2.2 Institutional Ownership and Over-investment

Due to the structure of our data, we estimate panel data regressions of over-investment on ownership of institutional investors as well as corporate performance on over-investment. We select fixed effects model and random effects model according to Hausman test. The specification test devised by Hausman (1978) tests the null hypothesis that the coefficients estimated by the efficient random effects estimator are the same as the ones estimated by the consistent fixed effects estimator. If they are insignificant, then it is safe to use random effects. If you get a significant P-value, however, you should use fixed effects. Specifically, we estimate the following model to investigate whether institutional investors decrease over-investment.

$$
\begin{aligned}
\triangle Over\text{-}investment_{i,t} =& \alpha + \beta_1 SPII_{i,t-1} + \beta_2 Leverage_{i,t-1} + \beta_3 TobinQ_{i,t-1} + \beta_4 Size_{i,t-1} \\
& + \beta_5 ROA_{i,t-1} + \beta_6 OPLCS_{i,t-1} + \beta_7 Independent_{i,t-1} \\
& + \beta_8 Managers_{i,t-1} + \sum Industry
\end{aligned}
$$

(2)

where $\triangle Over\text{-}investment_{i,t}$ is changes of the residual of equation1. Previous studies usually employ the change value to research the impact of institutional investors on one of firms' features like Hartzell and Starks (2003). Therefore, we also use changes of over-investment in equation 2. $SPII_{i,t-1}$ is share percentage held by institutional investors. Ownership percentage reflects the status of institutional investors in firms' decision. General speaking, the larger the ownership percentage, institutional investors are more likely to play a monitor role to decrease over-investment. Following Cho (1998); Biddle, Hilary

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[10]We measure firm size as the logarithm of total assets.

[11]Industrial codes of CSRC are employed in this paper. There are 13 industries in CSRC codes but (i.e., CSRC codes in I) are excluded. Therefore, we include 11 industrial dummy variables in equation1.

and Verdi (2009), we control for financial indicators, like firm size, leverage, tobin's Q since these were found previously to be related to over-investment. Meanwhile, we also control for governance indicators in equation 2 because previous studies believe governance mechanisms could be associated with investment (Richardson , 2006; Biddle, Hilary and Verdi , 2009). $OPLCS_{i,t-1}$ is the ownership percentage of the largest circulating shareholder; $Independent_{i,t-1}$ is the percentage of independent directors; and $Managers_{i,t-1}$ is the share numbers held by managers. In addition, we also add industrial dummy variables in equation 2 to control industrial effect.

There is an endogenous problem, suggesting that institutions are good at investing in the firms with better corporate governance structure, leading to the observed relation between institutional presence and better-governed firms without any active participation (Chen, Harford and Li , 2007). Indeed, Leuz, Lins and Warnock (2009) find foreigners invest less in poorly governed firms. Therefore, we use lagged terms of independent variables to deal with this issue. We focus on the explanatory power of lagged ownership of institutional investors for the change of over-investment. Another reason to use lagged terms is that Lamont (2000) concludes it is important to allow for investment lags.

3.2.3 Over-investment and Corporate Performance

Next, we test whether over-investment damages corporate performance. Specifically, we estimate the following model.

$$
\begin{aligned}
\triangle\,Tobin's\ Q_{i,t} =& \alpha + \beta_1 \triangle\,Over\text{-}investment_{i,t-1} + \beta_2 Size_{i,t-1} + \beta_3 Leverage_{i,t-1} \\
& + \beta_4 OPLCS_{i,t-1} + \beta_5 Independent_{i,t-1} + \beta_6 Managers_{i,t-1} \\
& + \sum Industry
\end{aligned} \tag{3}
$$

where $\triangle\,Tobin's\ Q_{i,t}$ is the change of Tobin's Q. $\triangle\,Over\text{-}investment_{i,t}$ is change of the residual of equation 1. Following Cho (1998), we control for financial indicators, like firm size, leverage since these were found previously to be related to corporate performance.

Meanwhile, we also control for governance indicators in equation 3 because previous studies believe governance mechanisms could be associated with corporate performance (Bhagat and Bolton , 2008). $OPLCS_{i,t-1}$ is the ownership percentage of the largest circulating shareholder; $Independent_{i,t-1}$ is the percentage of independent directors; and $Managers_{i,t-1}$ is the share numbers held by managers.

4 Empirical Results

4.1 Over-investment

Table 1 presents the regression results of investment using equation 1. The results indicate that there is a significant positive relation between new investment expenditure level and prior cash holding as well as prior new investment expenditure at 1% level which is consistent with the findings of Richardson (2006). The firms with large cash holding are more likely to invest on new projects because available cash is the necessary condition of investment expenditure. New investment expenditure is increasing in prior new investment could be explained by the continuity of firm investment behavior. The relation between new investment expenditure and firm age load as expected - new investment expenditure is decreasing in firm age. New companies in the early stage of operation with high growth rate are more likely to invest on new projects. Inconsistent with Richardson (2006), there is no significant relation between new investment expenditure and growth opportunities (Tobin's Q), levelage, firm size and stock return. Based on the results on table 1, we report details on over-investment of whole sample in table 2. Table 2 presents descriptive statistic of over-investment. The mean value of over-investment is 0.0002 which is positive but not large. That means on average Chinese listed companies in over-investment condition but the degree is not serious. There are 2507 (36.9%) companies in over-investment condition while 4294 (63.1%) companies in under-investment condition.

4.2 Institutional Ownership and Over-investment

Based on the results of over-investment in Table 1, we examine the relation between ownership of different types of institutional investors and firms' over-investment in this section.

Previous study believe that institutional monitoring role is related not only to the type of institution but also the size of its ownership stake (Chen, Harford and Li , 2007). Meanwhile, Shleifer and Vishny (1986) believe that large investors are more likely to paly a monitor role compared to small investors. Therefore, table 3 presents descriptive statistics of the shareholding of different types institutions. The shareholding percentage of funds are largest both in terms of mean (4.29%) and median (2.28%). In term of maximum shareholding percentage in one single company, the values of security companies and trust companies are both over 50%. On the other hand, the shareholding percentage of QFIIs is relative small due to the investment restriction from Chinese government.

Foreign and domestic institutional investors are different in many aspects (Covirg, Lau and Ng , 2006). Furthermore, Naughton (2007) concludes special characteristics of Chinese stock markets including policy drive and insider control. Due to the different culture, policy and financial environment, the monitoring role of foreign and domestic institutions may be different. Therefore, we investigate the impact of institutional investors on over-investment between foreign institution, QFIIs and leading domestic institutions, funds before examining the role of other domestic institutions.

In table 4 we present the results of QFIIs and funds in whole sample that control for many firms' characteristics previously found to be associated with over-investment. We find that prior shareholding percentage of QFIIs doesn't decrease firms' over-investment. However, funds decrease companies' over-investment at 10% significant level. Given the earlier results (Richardson , 2006) documented that institutions are more likely to paly shareholder activism roles in firms with positive over-investment, we analysis of this issue in over-investment and under-investment subgroups respectively. From table 5, we find that shareholding percentage of funds has a great deal of explanatory power for the change of over-investment in over-investment subgroups while there is no significant result in under-

investment subgroups which is consistent with our expectation. However, QFIIs have no significant impact on firms' over-investment both in over-investment and under-investment subgroups.

Following the same analysis logic, we investigate the impact of other domestic institutions on firms' over-investment. Table 6, table 7 and table 8 present the results of estimating panel data regression both fixed effect model and random effect model in whole sample, over-investment subgroup and under-investment subgroup respectively. The shareholding percentage of security companies has a great deal of explanatory power for the change of over-investment in both whole sample and over-investment subgroup but this relation doesn't exist in under-investment subgroup. The results of funds and security companies confirm the conclusion that institutions are more likely to decrease firms' over-investment in over-investment subgroup which is consistent with previous papers (Richardson , 2006). Except for security companies, other main domestic institutions, however, do not have significant impact on firms' over-investment.

4.3 Over-investment and Corporate Performance

Firms' investment policies are crucial for shareholders because they directly impact corporate value. Moreover, the final aim of shareholder activism is to improve corporate performance through impact corporate governance. Therefore, we further examine the relation between firms' over-investment and performance after the investigation of shareholder activism in order to construct an integrated route from institutional ownership to over-investment and next to corporate performance.

Table 9 presents evidence of the effects of over-investment on firms' performance measured by Tobin's Q. The finding of significant negative effect on corporate performance for the entire sample is consistent with pervious studies (Titman, Wei and Xie , 2004; Yang , 2005). In order to obtain more robust results, we further perform two robust tests, test in subgroups and test in alternative measurement of corporate performance (ROA) in table 10 and table 11 respectively. In table 10, we divide the whole sample into two

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subgroups, over-investment and under-investment and examine the relation between over-investment and corporate performance in these two groups. The results to date indicate that over-investment damages firms' performance both in over-investment firms and under-investment firms. In table 11, we employ ROA to measure corporate performance which is also used in Del Guercio and Hawkins (1999); Prevost and Rao (2000). The evidence in table 11 reveals that over-investment decreases corporate performance no matter what measurements are adopted.

5   Conclusions

This paper employs a unique data set to investigate whether institutional investors influence corporate governance by examining the relation between institutional ownership and corporate over-investment. In the first part of the study we employ an accounting-based framework devised by Richardson (2006) to measure over-investment of Chinese listed companies. Furthermore, we examine the relation between ownership of different types of institutional investors and firms' over-investment based on the results of the first part. Finally, the relation between over-investment and corporate performance is researched to construct an integrated route from the participation of institutions to corporate performance with the over-investment in the middle.

Preliminary, results of the analysis indicate that prior cash holding, prior new investment expenditure and firm age have great deal of explanatory power for the level of new investment expenditure. Meanwhile, the descriptive statistic of over-investment reveals that Chinese listed companies in over-investment condition but the degree is not serious. Our further analysis on the impact of institutional ownership on firms' over-investment shows that funds and security companies significantly decrease over-investment especially in over-investment companies. However, other institutions including QFIIs, social security funds, insurance companies and trust companies, do not significantly influence firms' over-investment. One explanation is the longer history in Chinese stock market and rel-

ative larger size of funds and security companies compared to others. That means key drivers of shareholder activism in emerging markets are development history and institutional size rather than investment philosophy. Finally, the results suggest over-investment indeed damages corporate performance. Furthermore, robust tests give strong support to this conclusion. Our findings leads us to conclude that shareholder activism exists in emerging countries and over-investment is an important channel for institutional investors to influence corporate performance.

These empirical findings have some important implications. Although institutional ownership of stock has increased substantially over the last few decades, their role in monitoring corporate behavior isn't quite clear. Several papers have researched shareholder activism but their conclusions are inconsistent. Findings of this study provide an evidence of the existing of shareholder activism in emerging markets. Moreover, our results indicate that some institutions decrease over-investment which is an important consequence of agency problem between shareholders and managers. That means institutional investor is an effective outside corporate governance mechanism. Finally, one of key derivers of institutions playing a monitor role is size. Therefore, Chinese financial regulatory authorities should loose restrictions on investment size of institutions especially QFIIs.

The research regarding shareholder activism is by no means complete. There are still serval issues that have not been examined, or for which existing empirical results do conflict. For instance, has the impact of shareholder activism changed over time? What motivates shareholder activism? All of them might be worthwhile to be researched in the future.

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Table 1: **Over-investment**

variables	Coefficient	T test
$tobin'sq_{t-1}$	-0.0071649	-1.35
$size_{t-1}$	0.0018069	1.00
$leverage_{t-1}$	0.000913	0.19
$stockreturns_{t-1}$	0.0000595	0.03
$I_{new,t-1}$	0.2278928 ***	20.96
$cash_{t-1}$	0.0033639 ***	2.69
age_t	-0.0012828***	-3.53
intercept	-0.0690841***	-2.77
industry	control	
year	control	
R^2	0.3989	
adjusted R^2	0.3971	
F test	2224.50	
p-value of F test	0.0000	

Note: In this table, we report a model of new investment. The dependent variable is the new investment of each company. The independent variables are Tobin's Q, firm size, leverage, stock returns, previous new investment, cash, firm and age. The sample covers 8,371 firm years for the period 2003 to 2008. In order to avoid endogenous problem, we use lag one term of independent variables in this model. We also include the industrial and year dummy variables in each regression to control the industrial and year effect. For each independent variable, the table reports the coefficient in the second column and the *t*-statistic in the last column. The superscripts of coefficient denote the significance of the coefficient(***,**,* represent significance at 1%,5%, and 10% levels respectively). We report R^2, adjusted R^2, the F test and its p-value at the end of table 1.

Table 2: **Descriptive Statistic of Over-investment**

		Sample
Over-investment	Mean	0.0002
	Standard Deviation	0.0963
	Median	-0.0146
investment condition	Number of Over-investment firms	2507(36.9%)
	Number of Under-investment firms	4294(63.1%)

Note: In this table, we report descriptive statistic of over-investment. The last two rows are numbers of over- and under-investment firms and percentage in parenthesis respectively.

Table 3: **Shareholding Percentage of Institutional Investors**

Institutional Investors	Mean	Median	Max	Min	Standard Deviation
QFIIs	1.50	0.96	12.19	0.03	1.58
Funds	4.27	2.28	30.00	0.01	4.75
Security Companies	1.69	0.87	58.38	0.01	3.62
Social Security Funds	1.24	0.89	8.50	0.05	1.18
Insurance Companies	1.28	0.88	7.83	0.04	1.23
Trust Companies	2.36	0.73	59.94	0.03	5.78

Note: In this table, we report the descriptive statistic of different institutional investors.

Table 4: **QFIIs and Funds in whole sample**

variables	QFII	Funds
$shareholdingpercentage_{i,t-1}$	0.0036706	-0.002777*
	(0.94)	(-1.93)
$size_{i,t-1}$	0.005782	-0.1678882***
	(0.89)	(-9.30)
$leverage_{i,t-1}$	-0.1063537**	0.095238
	(-2.46)	(1.30)
$tobin'sq_{i,t-1}$	-0.0150506	-0.5694041***
	(-0.61)	(-25.40)
$Oplcs_{i,t-1}$	0.0007597	-0.0144836***
	(0.84)	(-5.81)
$Independent_{i,t-1}$	0.1997391	-0.285622*
	(1.24)	(-1.82)
$managersn_{i,t-1}$	-1.83e-08	-9.87e-09*
	(-0.33)	(-1.80)
$ROA_{i,t-1}$	-0.058122	0.0870895
	(-0.41)	(0.51)
industry	control	control
intercept	-0.1760917	4.081845***
	(-1.14)	(9.10)
Model	Random Effect	Fixed Effect
Hausman	7.51	215.17
p-value of hausman	0.3780	0.0000
Overall R^2 (%)	2.62%	10.27%
F or Wald chi2 test	13.88	90.99
p-value of F or Wald chi2 test	0.7366	0.0000

Note: In this table, we report the influence of QFIIs and funds on over-investment. The dependent variable is the over-investment of each company. The independent variables are the shareholder percentage of QFIIs and funds in each company and other control variables. In order to avoid endogenous problem, we use lag one term of independent variables in this model. We also include the industrial dummy variables in each regression to control the industrial effect. For each independent variable, the table reports the coefficient above and the t- or z-statistic in parenthesis below (if the model is fixed effect model, we report t-statistic, z-statistic otherwise). The superscripts of coefficient denote the significance of the coefficient(***,**,* represent significance at 1%,5%, and 10% levels respectively). We report the intercept, t- or z-statistic of the intercept in parenthesis below, the model type in this table, the hausman test value, and p-value of hausman test, the F or Wald chi2 test and its p-value at the end of table 4(if the model is fixed effect model, we report F test, Wald chi2 test otherwise). The specification test devised by Hausman (1978) tests the null hypothesis that the coefficients estimated by the efficient random effects estimator are the same as the ones estimated by the consistent fixed effects estimator. If they are insignificant, then it is safe to use random effects. If you get a significant P-value, however, you should use fixed effects.

Table 5: **QFIIs and Funds in over- and under-investment companies**

variables	QFIIs over-investment	under-investment	Funds over-investment	under-investment
$shareholdingpercentage_{i,t-1}$	-0.0132429	0.0126956	-0.0048413**	-0.0009535
	(-0.97)	(1.30)	(-2.10)	(-0.66)
$size_{i,t-1}$	0.0692694	0.0544791	-0.2191516***	-0.0531332***
	(0.72)	(0.79)	(-7.87)	(-2.71)
$leverage_{i,t-1}$	-0.7426487*	-0.4739141*	0.0757705	-0.0473466
	(-1.94)	(-1.87)	(0.64)	(-0.63)
$tobin'sq_{i,t-1}$	-0.0885977	-0.034368	-0.7833052***	-0.2067629***
	(-0.74)	(-0.53)	(-24.03)	(-7.69)
$Oplcs_{i,t-1}$	0.0230909*	0.0078197*	-0.0140684***	-0.012991***
	(1.96)	(1.83)	(-3.46)	(-5.56)
$Independent_{i,t-1}$	1.723966	0.9322422	-0.1722118	-0.2903438**
	(1.54)	(1.66)	(-0.62)	(-2.14)
$Managersn_{i,t-1}$	7.10e-08	-2.28e-07	-2.51e-09	-1.33e-08*
	(0.29)	(-1.47)	(-0.35)	(-1.72)
$ROA_{i,t-1}$	-1.435192*	1.353789*	-0.1706611	-0.0760585
	(-1.90)	(1.69)	(-0.57)	(-0.49)
industry	control	control	control	control
intercept	-1.649985	-1.468375	5.535522***	1.39698***
	(-0.86)	(-1.00)	(9.76)	(3.41)
Model	Fixed Effect	Fixed Effect	Fixed Effect	Fixed Effect
Hausman	16.09	17.62	131.02	47.30
p-value of hausman	0.0244	0.0138	0.0000	0.0000
Overall R^2 (%)	1.26%	0.40%	23.31%	4.03%
F or Wald chi2 test	2.53	2.50	98.05	13.84
p-value of F or Wald chi2 test	0.0209	0.0236	0.0000	0.0000

Note: In this table, we report the influence of QFIIs and funds on over-investment. The dependent variable is the over-investment of each company. The independent variables are the shareholder percentage of QFIIs and funds in each company and other control variables. In order to avoid endogenous problem, we use lag one term of independent variables in this model. We also include the industrial dummy variables in each regression to control the industrial effect. We divide whole companies into over-investment group and under-investment group according to their investment level. If the investment level is positive, the company is included into over-investment group, under-investment group otherwise. For each independent variable, the table reports the coefficient above and the t- or z-statistic in parenthesis below (if the model is fixed effect model, we report t-statistic, z-statistic otherwise). The superscripts of coefficient denote the significance of the coefficient(***,**,* represent significance at 1%,5%, and 10% levels respectively). We report the intercept, t- or z-statistic of the intercept in parenthesis below, the model type in this table, the hausman test value, and p-value of hausman test, the F or Wald chi2 test and its p-value at the end of table 5(if the model is fixed effect model, we report F test, Wald chi2 test otherwise). The specification test devised by Hausman (1978) tests the null hypothesis that the coefficients estimated by the efficient random effects estimator are the same as the ones estimated by the consistent fixed effects estimator. If they are insignificant, then it is safe to use random effects. If you get a significant P-value, however, you should use fixed effects.

Table 6: **Other domestic institutions in whole sample**

variables	security companies	social security funds	insurance companies	trust companies
$shareholdingpercentage_{i,t-1}$	-0.0064331**	0.0031869	-0.0063186	-0.0064322
	(-2.06)	(0.36)	(-1.09)	(-0.93)
$size_{i,t-1}$	-0.0541707***	-0.0653591*	-0.0015318	-0.1803887***
	(-2.76)	(-1.94)	(-0.22)	(-3.61)
$leverage_{i,t-1}$	-0.2502143***	-0.1873419	-0.0650723	-0.2169634
	(-3.23)	(-1.37)	(-1.30)	(-1.43)
$tobin'sq_{i,t-1}$	0.0204894	-0.0087159	0.001645	-0.0157436
	(0.84)	(-0.22)	(0.07)	(-0.27)
$Oplcs_{i,t-1}$	0.0054179*	0.0085346*	-0.0010708	-0.0025187
	(1.67)	(1.75)	(-0.72)	(-0.39)
$Independent_{i,t-1}$	0.1661453	-0.1453957	0.0427123	0.0594919
	(1.10)	(-0.44)	(0.25)	(0.13)
$Managersn_{i,t-1}$	4.84e-08	8.67e-09	-1.70e-08	6.18e-07
	(0.88)	(0.41)	(-1.62)	(1.50)
$ROA_{i,t-1}$	-0.0909054	0.4627896	-0.0580667	-0.4169936
	(-0.62)	(1.32)	(-0.37)	(-1.32)
industry	control	control	control	control
intercept	1.205777***	1.508382**	0.0178899	3.971114***
	(3.00)	(2.15)	(0.11)	(3.79)
Model	Fixed Effect	Fixed Effect	Random Effect	Fixed Effect
Hausman	35.49	19.96	10.02	34.80
p-value of hausman	0.0000	0.0057	0.1875	0.0001
Overall R^2 (%)	0.33%	0.58%	2.57%	0.69%
F or Wald chi2 test	3.64	2.06	12.06	2.81
p-value of F or Wald chi2 test	0.0002	0.0400	0.8439	0.0031

Note: In this table, we report the influence of security companies, social security funds, insurance companies and trust companies on over-investment. The dependent variable is the over-investment of each company. The independent variables are the shareholder percentage of these four institutions in each company and other control variables. In order to avoid endogenous problem, we use lag one term of independent variables in this model. We also include the industrial dummy variables in each regression to control the industrial effect. For each independent variable, the table reports the coefficient above and the t- or z-statistic in parenthesis below (if the model is fixed effect model, we report t-statistic, z-statistic otherwise). The superscripts of coefficient denote the significance of the coefficient(***,**,* represent significance at 1%,5%, and 10% levels respectively). We report the intercept, t- or z-statistic of the intercept in parenthesis below, the model type in this table, the hausman test value, and p-value of hausman test, the F or Wald chi2 test and its p-value at the end of table 6(if the model is fixed effect model, we report F test, Wald chi2 test otherwise). The specification test devised by Hausman (1978) tests the null hypothesis that the coefficients estimated by the efficient random effects estimator are the same as the ones estimated by the consistent fixed effects estimator. If they are insignificant, then it is safe to use random effects. If you get a significant P-value, however, you should use fixed effects.

Table 7: **Other domestic institutions in over-investment companies**

variables	security companies	social security funds	insurance companies	trust companies
$shareholding percentage_{i,t-1}$	-0.0128987*	0.0226327	-0.0040719	0.0120463
	(-1.95)	(1.23)	(-0.53)	(0.53)
$size_{i,t-1}$	-0.0398909	-0.0033373	0.0020547	0.0091198
	(-1.50)	(-0.04)	(0.22)	(0.10)
$leverage_{i,t-1}$	-0.2777819*	-1.100743***	-0.201962***	-0.595049*
	(-1.89)	(-2.98)	(-2.70)	(-1.85)
$tobin's q_{i,t-1}$	-0.2116708***	0.1347271	0.0765622**	-0.4610053**
	(-3.01)	(1.26)	(2.01)	(-2.06)
$Oplcs_{i,t-1}$	0.0020213	0.0055965	-0.0015526	-0.0042858
	(0.31)	(0.45)	(-0.81)	(-0.27)
$Independent_{i,t-1}$	-0.1607102	-1.026898	-0.1594764	-0.4941913
	(-0.41)	(-0.86)	(-0.70)	(-0.56)
$Managersn_{i,t-1}$	-1.06e-07	-2.74e-07	-4.79e-08***	5.10e-07
	(-0.60)	(-0.34)	(-3.19)	(0.21)
$ROA_{i,t-1}$	-0.0909385	-0.4698938	-0.7498972***	-0.1707134
	(-0.26)	(-0.48)	(-3.24)	(-0.16)
industry	control	control	control	control
intercept	1.364057*	0.9451832	0.1471793	0.6569516
	(1.73)	(0.54)	(0.65)	(0.36)
Model	Fixed Effect	Fixed Effect	Random Effect	Fixed Effect
Hausman	18.71	29.68	12.86	25.88
p-value of hausman	0.0165	0.0001	0.0756	0.0005
Overall R^2 (%)	0.83%	0.39%	22.72%	3.72%
F or Wald chi2 test	2.42	2.80	55.28	3.95
p-value of F or Wald chi2 test	0.0131	0.0112	0.0000	0.0035

Note: In this table, we report the influence of security companies, social security funds, insurance companies and trust companies on over-investment in over-investment companies. If the investment level is positive, the company is included into over-investment group. The dependent variable is the over-investment of each company. The independent variables are the shareholder percentage of these four institutions in each company and other control variables. In order to avoid endogenous problem, we use lag one term of independent variables in this model. We also include the industrial dummy variables in each regression to control the industrial effect. For each independent variable, the table reports the coefficient above and the t- or z-statistic in parenthesis below (if the model is fixed effect model, we report t-statistic, z-statistic otherwise). The superscripts of coefficient denote the significance of the coefficient(***,**,* represent significance at 1%,5%, and 10% levels respectively). We report the intercept, t- or z-statistic of the intercept in parenthesis below, the model type in this table, the hausman test value, and p-value of hausman test, the F or Wald chi2 test and its p-value at the end of table 7(if the model is fixed effect model, we report F test, Wald chi2 test otherwise). The specification test devised by Hausman (1978) tests the null hypothesis that the coefficients estimated by the efficient random effects estimator are the same as the ones estimated by the consistent fixed effects estimator. If they are insignificant, then it is safe to use random effects. If you get a significant P-value, however, you should use fixed effects.

Table 8: **Other domestic institutions in under-investment companies**

variables	security companies	social security funds	insurance companies	trust companies
$shareholdingpercentage_{i,t-1}$	-0.0042041	-0.0145013*	-0.0070776	-0.0005749
	(-1.28)	(-1.80)	(-1.13)	(-0.54)
$size_{i,t-1}$	0.0002616	-0.0996049***	-0.0074013	0.0004146
	(0.01)	(-3.52)	(-0.95)	(0.06)
$leverage_{i,t-1}$	-0.3618491***	0.0553367	-0.0534209	0.0013803
	(-3.90)	(0.46)	(-1.06)	(0.04)
$tobin'sq_{i,t-1}$	0.0094531	-0.0372235	-0.060328**	-0.0311889
	(0.39)	(-0.91)	(-2.39)	(-1.46)
$Oplcs_{i,t-1}$	0.0049509	0.0022998	0.0003765	-0.0009789
	(1.25)	(0.48)	(0.22)	(-0.64)
$Independent_{i,t-1}$	0.1953256	0.175501	0.0869013	0.0867572
	(1.28)	(0.54)	(0.45)	(0.77)
$Managersn_{i,t-1}$	7.47e-08	2.28e-08	1.66e-09	-3.27e-08
	(1.26)	(1.40)	(0.15)	(-0.34)
$ROA_{i,t-1}$	-0.1974473	0.5861192*	-0.0344951	-0.1705513
	(-1.31)	(1.80)	(-0.21)	(-1.52)
industry	control	control	control	control
intercept	0.0967698	2.032372***	0.1197528	-0.0576723
	(0.20)	(3.35)	(0.64)	(-0.39)
Model	Fixed Effect	Fixed Effect	Random Effect	Random Effect
Hausman	19.39	14.29	9.91	2.88
p-value of hausman	0.0129	0.0462	0.1939	0.8960
Overall R^2 (%)	0.08%	2.65%	14.46%	5.46%
F or Wald chi2 test	2.48	2.91	42.26	16.18
p-value of F or Wald chi2 test	0.0097	0.0054	0.0010	0.5797

Note: In this table, we report the influence of security companies, social security funds, insurance companies and trust companies on over-investment in under-investment companies. If the investment level is negative, the company is included into under-investment group. The dependent variable is the over-investment of each company. The independent variables are the shareholder percentage of these four institutions in each company and other control variables. In order to avoid endogenous problem, we use lag one term of independent variables in this model. We also include the industrial dummy variables in each regression to control the industrial effect. For each independent variable, the table reports the coefficient above and the t- or z-statistic in parenthesis below (if the model is fixed effect model, we report t-statistic, z-statistic otherwise). The superscripts of coefficient denote the significance of the coefficient(***,**,* represent significance at 1%,5%, and 10% levels respectively). We report the intercept, t- or z-statistic of the intercept in parenthesis below, the model type in this table, the hausman test value, and p-value of hausman test, the F or Wald chi2 test and its p-value at the end of table 8(if the model is fixed effect model, we report F test, Wald chi2 test otherwise). The specification test devised by Hausman (1978) tests the null hypothesis that the coefficients estimated by the efficient random effects estimator are the same as the ones estimated by the consistent fixed effects estimator. If they are insignificant, then it is safe to use random effects. If you get a significant P-value, however, you should use fixed effects.

Table 9: **Over-investment and Corporate Performance**

variables	Coefficient	T test
$\triangle Overinvt_{i,t-1}$	-0.6769246***	-5.92
$size_{i,t-1}$	-0.831922***	-8.55
$leverage_{i,t-1}$	1.790062***	4.84
$Oplcs_{i,t-1}$	-0.0619067***	-5.37
$Independent_{i,t-1}$	0.4394246	0.75
$Managersn_{i,t-1}$	5.77e-08**	-2.25
industry	control	
intercept	16.99537***	
	(0.73)	
Model	Fixed Effect	
Hausman	158.21	
p-value of hausman	0.0000	
Overall R^2 (%)	0.27%	
F test	25.54	
p-value of F test	0.0000	

Note: In this table, we report a model of the impact of over-investment on corporate performance. The dependent variable is change value of Tobin's Q of each company to measure corporate performance. The independent variables are change value of over-investment, firm size, leverage, ownership percentage of the largest circulating shareholder, percentage of independent directors and shareholding number of managers. In order to avoid endogenous problem, we use lag one term of independent variables in this model. We also include the industrial dummy variables in each regression to control the industrial effect. For each independent variable, the table reports the coefficient in the second column and the *t*-statistic in the last column. The superscripts of coefficient denote the significance of the coefficient(***,**,* represent significance at 1%,5%, and 10% levels respectively). We report the intercept, *t*-statistic of the intercept in parenthesis below, the model type in this table, the hausman test value, and p-value of hausman test, the F test and its p-value at the end of table 9. The specification test devised by Hausman (1978) tests the null hypothesis that the coefficients estimated by the efficient random effects estimator are the same as the ones estimated by the consistent fixed effects estimator. If they are insignificant, then it is safe to use random effects. If you get a significant P-value, however, you should use fixed effects.

Table 10: **Over-investment and Corporate Performance in subgroups**

variables	over-investment	under-investment
$\triangle Overinvt_{i,t-1}$	-0.42535***	-1.11561***
	(-3.51)	(-2.66)
$size_{i,t-1}$	-0.8095588***	-0.4738048***
	(-6.74)	(-2.06)
$leverage_{i,t-1}$	1.625905***	1.959292***
	(3.18)	(2.97)
$Oplcs_{i,t-1}$	-0.0658633***	-0.0324282
	(-4.07)	(-1.39)
$Independent_{i,t-1}$	0.3957572	-0.2153169
	(0.49)	(-0.21)
$Managersn_{i,t-1}$	-6.84e-08***	-3.51e-09
	(-2.72)	(-0.04)
industry	control	control
intercept	16.70716***	9.579389**
	(0.73)	(1.98)
Model	Fixed Effect	Fixed Effect
Hausman	95.08	24.37
p-value of hausman	0.0000	0.0002
Overall R^2 (%)	0.03%	0.01%
F test	16.47	3.39
p-value of F test	0.0000	0.0027

Note: In this table, we report the influence of QFIIs and funds on over-investment in different subgroups. We divide whole companies into over-investment group and under-investment group according to their investment level. If the investment level is positive, the company is included into over-investment group, under-investment group otherwise. The dependent variable is change value of Tobin's Q of each company to measure corporate performance. The independent variables are change value of over-investment, firm size, leverage, ownership percentage of the largest circulating shareholder, percentage of independent directors and shareholding number of managers. In order to avoid endogenous problem, we use lag one term of independent variables in this model. We also include the industrial dummy variables in each regression to control the industrial effect. For each independent variable, the table reports the coefficient above and the *t*-statistic in parenthesis below. The superscripts of coefficient denote the significance of the coefficient(***,**,* represent significance at 1%,5%, and 10% levels respectively). We report the intercept, *t*-statistic of the intercept in parenthesis below, the model type in this table, the hausman test value, and p-value of hausman test, the F test and its p-value at the end of table 10. The specification test devised by Hausman (1978) tests the null hypothesis that the coefficients estimated by the efficient random effects estimator are the same as the ones estimated by the consistent fixed effects estimator. If they are insignificant, then it is safe to use random effects. If you get a significant P-value, however, you should use fixed effects.

Table 11: **Over-investment and Corporate Performance: Robust Test**

variables	Coefficient	T test
$\triangle Overinvt_{i,t-1}$	-0.0256085***	-4.45
$size_{i,t-1}$	-0.0598069***	-12.20
$leverage_{i,t-1}$	0.2375886***	12.76
$Oplcs_{i,t-1}$	0.0000703	0.12
$Independent_{i,t-1}$	0.050916*	1.73
$Managersn_{i,t-1}$	2.39e-09*	1.85
industry	control	
intercept	1.168712***	
	(10.55)	
Model	Fixed Effect	
Hausman	194.56	
p-value of hausman	0.0000	
Overall R^2 (%)	1.07%	
F test	37.64	
p-value of F test	0.0000	

Note: In this table, we report a robust test model of the impact of over-investment on corporate performance. The dependent variable is change value of ROA of each company to measure corporate performance. The independent variables are change value of over-investment, firm size, leverage, ownership percentage of the largest circulating shareholder, percentage of independent directors and shareholding number of managers. In order to avoid endogenous problem, we use lag one term of independent variables in this model. We also include the industrial dummy variables in each regression to control the industrial effect. For each independent variable, the table reports the coefficient in the second column and the t-statistic in the last column. The superscripts of coefficient denote the significance of the coefficient(***,**,* represent significance at 1%,5%, and 10% levels respectively). We report the intercept, t-statistic of the intercept in parenthesis below, the model type in this table, the hausman test value, and p-value of hausman test, the F test and its p-value at the end of table 11. The specification test devised by Hausman (1978) tests the null hypothesis that the coefficients estimated by the efficient random effects estimator are the same as the ones estimated by the consistent fixed effects estimator. If they are insignificant, then it is safe to use random effects. If you get a significant P-value, however, you should use fixed effects.