

Ultimate Controlling Shareholders, Institutional Ownership and Corporation Resources Allocation Efficiency: Evidence from China*

Tang Songlian, Lin Shengyue
(East China University of Science and Technology)

Abstract: How does the ownership structure affect the corporate governance, is always a hot topic which researcher pay attention in the field of capital structure. Recent years, institutional investors have rapid development in china. Whether they can affect corporation resources allocation efficiency (CRAE)? Using institutional investor ownership data of listed firms over the period 2005-2011 in China, we investigate whether institutional investors can optimize corporate resource allocation efficiency. And the degree of optimization varies with different with Ultimate Controlling Shareholders or institutional investment style? We find that institution ownership really can promote corporate resource allocation efficiency. While fund and dedicated fund can cut down over-investment and alleviate under-investment, Transient fund and Quasi-indexer Fund cannot affect corporate resource allocation efficiency. Further, we find that ultimate controlling shareholders of listed companies will affect institutional investor ownership and corporate resource allocation efficiency. And this kind of influence mainly reflect in company which controlled by local governments.

Keywords: Corporate resource allocation efficiency, Over-investment, Under-investment, Institutional investors, Ultimate controlling shareholders

1. Introduction

Shleifer and Vishny (1986) argue that in some degree institutional ownership can strengthen the company internal supervision mechanism. as an important external governance, Institutional investors provide a new way to improve the governance mechanism for listed Corporation in China. For example, In August 2006, in the face of force against by institutional investors, Wuliangye Corporation gives up to buy Pashtoon Group Corporation .Instead of only acquisition alcohol-related assets in Pashtoon group. The reason is that Wuliangye Group Corporation has rare success case in diversification strategy since 1997(What's more, Wuliangye Corporation has endeavored in diversification strategy since 1997, but with little success, which in turn led to the worries of its main business). We can see that in the face of management over-investment, institutional investors do not choose silence or withdraw from the company, but the force against,

* Corresponding author. TEL:13482449633.E-mail addresses: tangsonglian@ecust.edu.cn. (Songlian Tang)
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act active shareholders, then lead to the acquisition of downsizing and rationalization in finally.

In recent years, researcher repeatedly verified that the feasibility of institutional investors participate in corporation resources allocation. Cella (2012) found that as the increasing long-term institutional shareholders, the degree of over-investment may be reduced. The degree of under-investment may be reduced in under-investment Company. But the short-term institutional shareholders can not affect the corporation's investment decisions. Najah and Attig (2011), Elyasiani (2010) show that institutional investors are more incentive to encourage and supervise investment expenditure. Huddart (1993), Vishny (1996), Gasparetal (2005), Noe (2002) found that the larger institutional shareholding brought the right to access to investment decision, which prompted institutional investors to influence on corporate investment decisions through participation in the supervision and control the company affairs. In China, Wang and Xiao (2005), Yuan (2009), Bo and Wu (2009), Pan (2010), Yang (2010) the empirical results show that institutional investors are helpful to inhibit the inefficiency investment behavior.

Previous research has opened a very good perspective for us, but there are some issues worth further studying. Such as whether institutional investment style and ultimate controlling shareholder can influence the relationship between institutional shareholders and resource allocation efficiency. In this paper, using 2005-2011 Listing Corporation in China as a sample, we investigate whether institutional investors can optimize corporate resource allocation efficiency. And whether the degree of optimization varies with different ownership property or different institution behavior style? We find that institution ownership really can promote corporate resource allocation efficiency. While Fund and Dedicated Fund can curb over-investment and alleviate under-investment, Transient Fund and Quasi-indexer Fund cannot affect corporate resource allocation efficiency. Further more, we find that ultimate controlling shareholders in listed companies will affect the relationship between institutional investor ownership and corporate resource allocation efficiency. And this kind of influence mainly reflect in company which controlled by local governments. The results of empirical research indicated that institutional shareholders can control the over-investment and alleviate the under-investment. But the mechanism that different investment styles effects on the efficiency resource allocation is totally different.

The innovation in this paper is that: (1) considering the heterogeneity of institutional investors, research on different institutional investment styles effect on the corporation governance. (2) Research on different ultimate controller shareholder may influence institutional investors' governance function. From the state-owned ultimate ownership and private ultimate property, studies on different types of institutional ownership effect on resource allocation efficiency, furthermore, the state-owned ultimate property may be divided into the central government and local government.

The remaining part is as follows: the second part is the literature review and put forward the hypothesis; the third part introduces the research design; the fourth part is the empirical testing and analysis; the fifth part is the robust test; the last part is the conclusion and some suggestions.

2 Literature Review and Hypothesis Development

2.1 Institutional ownership and Company Resource Allocation Efficiency

The existing research focused on the asymmetric information and agency problems will make the company deviates from the optimal investment level, lead to over-investment or under-investment problem, which affects resource allocation efficiency (Hubbard, 1998). Gomes and Novas (2005) points out, ownership control can not only reduce the managers' private interests, but also can prevent the major shareholder transfer resources from the company.

Compared to the minority shareholders, the characterizers of institutional investors is capital strength, high professional quality, strong ability of information discovery and excavation, It can supervise the management, reduce the agency cost, ease conflict between major shareholders and minority shareholders, that is the role of "shareholder activism". Shleifer and Vishny (1986) put forward that institutional investors are helpful to inhibit the company's inefficient investment. Najah et al. (2011) study confirmed the long-term investment institutional investors have the power and the ability to supervise, alleviate the information asymmetry and agency problems, and reduce over-investment. Liu and Bredin (2012) study found that funds and securities companies can significantly reduce the over-investment, active shareholder behavior exist in emerging countries, and the control of excessive investment is an important channel for institutional investors affect company performance.

In China, some empirical research the perspective of institutional investors in corporate governance effect from inefficient investment(Wang Kun and Xiao Xing (2005), Xiongyuan(2009), Bo Xianhui and Wu Liansheng (2009), Pan Lisheng (2010), Yang Qingxiang (2010) ,Jifang and Liuxing(2011)), the results show, institutional investors can supervise and restrain the over-investment, under-investment. The empirical results show that institutional investors are helpful to inhibit the inefficiency investment behavior. Based on the above research; this paper put forward the following hypotheses 1:

Hypothesis 1: Institutional investors can improve resource allocation efficiency.

Graham et al. (2005) think that should focus on what kind of institutional investors may make the manager to choose long-term projects which have good gain prospects, rather than to meet short-term gains. The foreign scholars made a thorough study on the institutional investors' heterogeneity. Bushee (1998, 2001) divided institutional investors into three categories according to investment style, the transient institutional investors focus on short-term targets; dedicated institutional investors and indexed institutional investors have incentives to influence corporate governance. Matsumoto (2002) demonstrated that transient institutional shareholders is positively related to managers tend to avoid negative earnings. Liu and Peng (2006) found that company with more transient institutions shareholders has low earnings quality.

In addition, some study also found that the horizon of institutional shareholders can directly or indirectly affect company investment strategy, compared to short-time institutional shareholders; long-time institutional shareholders are more sensitive to the company announced news. Long-time institutional shareholders will continue to participate in the company's supervision and governance (Hotchkiss & Strickland, 2003, Yan & Zhang 2009, Elyasiani & Jia, 2010). Cella (2012) found that long-term institutional investors can affect the management decision-making, reduce the agency conflict of investment decision-making, reduces investment in Over-invest-

ment Company, increase investment in Over-investment Company; but the short-term investment shareholders can not affect the company's investment decisions.

Yin Chunhong (2006) think institutional shareholders participate in corporate governance influence by fiduciary duties, holding time, the cost of supervision and so on. Tang Songlian and Yuan Chunsheng (2012) empirical research found that high proportion of institutional ownership and long-term institutional ownership helps to enhance the company performance, as investors' role. Fan Haifeng (2009) found that social security fund have a negative impact on the listing corporation market value because of political and social pressure; the mutual fund will increase the possibility to supervise listing Corporation as its shareholder, thereby increasing the market value of listing Corporation. Ding Fangfei (2013) divided institutional investors into the pressure-resisting institutional investors and pressure-sensitive institutional investors; institutional investors react on the stock price reflects the future incremental earnings due to the pressure-resisting institutional investors. Li Yingzhao and Xiao Weina (2012) found mutual fund and QFII ownership has Significant positive correlation on the dividend distribution policy in listing Corporation; brokerage and insurance holding is not significantly affected; but the social security fund holdings can produce positive effect on dividend distribution tendency, but no significant relationship with dividend distribution intensity. Based on the above research, we propose the hypothesis 2.

Hypothesis 2: Investment styles institutional investor has different influence on corporate resource allocation efficiency.

2.2 Ultimate Controller, Institutional investor holdings and corporate resource allocation efficiency

The different system environment, the interference level is not the same (Ma Lianfu, Cao Chunfang 2010). The ultimate controller is divided into two levels according to difference of the system environment, that is two levels: state-owned and non-state-owned holding; owned holding is divided into the central government control of the state-owned enterprises, local government control of the state-owned enterprises. The difference of the system environment has an important influence on the listing Corporation act, would further influence of institutional investors on corporate governance.

Ji fang and Liu Xing (2011) studies show that institutional investors can play active shareholders, institutional investors' ownership have significantly negative correlation with overinvestment or underinvestment; But the effect of this oversight is restricted in the state-controlled listed companies. Wang Yan, Yu Xuehua (2010) research on the relationship between the ultimate control rights, debt financing and corporate investment behavior, found that although debt financing can inhibit the over-investment behavior both the state-owned listing Corporation and Private Corporation, but compared to the state-owned listing Corporation, the role of debt financing to reduce conflict and improve governance role is better Private Corporation. Du Xiaohan (2012) studies, corporate bond issuance influence over-investment in different nature property right. The results show that: corporate bonds can play more effectively on over-investment in private listing Corporation.

Based on the above empirical results, we can induce that the higher mercerization de-

gree, enterprises with private property pursues enterprise value maximization, having more domination than state-owned enterprises. State-owned enterprises have multiple goals, heavy policy-type burden and long control chain, all of these will cause the monitor inefficiency and the influence from the external stakeholder will be weakened. Through the above analysis, this paper put forward the hypothesis 3:

Hypothesis 3: Compared with private listing Corporation, institutional investors can play more significantly role on Corporation resource allocation efficiency in stated owned enterprises.

In accordance to administrative level, this paper further divided into state-owned enterprises into the central government control enterprises and local government control enterprises. Xu Xiaonian (2000), Sun Zheng (2005) thinks that the reason of over-investment in state-owned enterprises is not enterprises irrational, but is the institution. The central government control enterprise mainly engaged industry that is beneficial to the people's livelihood. Mainly based on the consideration of national political and strategic management; other shareholders can hardly affect their decision. The China Economic Research Center of Peking University (2004) thinks that the reason of Chinese state-owned enterprises over-investment and investment inefficiency is the property right and the local government performance oriented. Xia Lijun and Fang Yiqiang (2005) also pointed out that, although the state-owned enterprises through initial opening offer. Its structure and regulatory environment has undergone great changes, but they still controlled by the government, the local governments at all levels have motivation and ability to their social or political target internal to the listing Corporation. So we can infer that, institutional investors in the state-owned enterprises, the "discourse right" can be reduced greatly, which is not good for resource allocation. Thus, we put forward the research hypothesis4:

Hypothesis 4: Compared with the central government Corporation, institutional shareholder in local government Corporation can enhance the resource allocation efficiency more significant.

3 Research Design

3.1 The sample and Dataset

As table 1 show, our data covers Chinese companies that issue A-share stocks on either listing in the Shanghai or the Shenzhen Stock Exchange during the period 2005-2011. We exclude observations: (1) they are Special Treatment Stock (ST) (2) they are financial institutions (3) contain missing values. Further, we winsorize variables at the 1st and 99th percentile to reduce the influence of extreme observations and possible data errors. Our final samples contain 8569 firm-year observations.

In this paper, the financial data mainly comes from CSMAR Database and Institutional data mainly comes from Wind Database.

Table1. Sample selection

	2005	2006	2007	2008	2009	2010	2011	合计
Total sample	1341	1421	1549	1601	1748	2105	2341	12106
financial institutions (-)	104	177	219	162	262	466	354	1744
missing value (-)	133	34	119	199	120	193	449	1247
Investment sample	1058	1141	1109	1169	1284	1354	1454	8569
overinvestment sample	410	470	437	436	545	536	529	3363
underinvestment sample	648	671	672	733	739	818	925	5206

Table 2. Results of the Fund classification

Name	Number	Concentration	Turnover	Sensitivity	Institutional Investor Characteristic
TFUND	2333	-0.341	0.682	0.896	low concentration, high turnover, high earnings sensitivity
QFUND	2088	-0.016	0.442	-1.134	Mid- concentration, mid-turnover, low earnings sensitivity
DFUND	2851	0.292	-0.882	0.097	high concentration, low turnover, low earnings sensitivity

When classify institutional investors, we exclude Social security funds, Insurance companies, fund management companies, QFII etc., only maintain Securities Investment Fund. We select semi-annual and annual report data to measure Institutional Ownership Variables.

This paper refers to Bushee (1998) method, constructing seven variables that describe the past investment behavior of institutional investors. Then use factor analysis and cluster analysis to assign institutions into groups based on their past investment behavior. Table 2 demonstrates the results of the classification.

3.2 Variable design

As shown in Table 3, we define the variables in this paper:

(1) Institutional shareholders

We make two ways to measure Institutional investors' shareholding: The first method ,which is the same to prior study ,for example,Wu Liansheng and Bo Xianhui, 2009; Tang Songlian and Hu Yiming, 2011; Yang Haiyan and Wei Dehong, 2012), the proportion institutional shareholding (IVPER) measure institutional investors shareholdings accounted for the total shares of the company.

The second method, first, the institutional investors can classify mutual fund shareholding (FUND) and no-mutual Fund shareholding (IFUND), then the FUND can further divided into transient fund (TFUND), Index Fund (QFUND) and dediacted Fund (DFUND); IFUND as the proportion of institutional shareholding minus fund ownership. Non funds including QFII, social

security funds, pension funds, insurance funds, corporate ownership, finance company ownership and bank holding etc.

(2) Corporate resource allocation efficiency

Proxy variables of resource allocation efficiency of the overinvestment and underinvestment (OVERIV) (UNDERIV) (Li Qingyuan and Zhang Tianxi 2009, Xu Xiaodong 2009, your flowers such as 2010), In recent years, scholars generally use the Richardson (2006) of the residual measurement model to measure, if the residual >0 is confirmed as excessive investment; if the residual <0 indicates that the shortage of the investment company.

In order to get more accurate results, we measure investment inefficiency based on both Richardson's (2006) accounting-based framework and Titman et al. (2004) methodology. We follow Richardson (2006), using Eq.(1) to estimate the level of expected investments I_{new}^* :

$$I_{new, it} = a_0 + a_1 Growth_{it-1} + a_2 Lev_{it-1} + a_3 Cash_{it-1} + a_4 Age_{it-1} + a_5 Size_{it-1} + a_6 Return_{it-1} + a_7 I_{new, it-1} + \Sigma year + \Sigma industry + \varepsilon_{it} \quad \text{Eq. (1)}$$

I_{new}^e represent abnormal investment, the residuals from the expectation model, over-investment firms are those who have positive abnormal investment ($I_{new}^e > 0$); On the contrary, under-investment firms are characterized by negative abnormal investment ($I_{new}^e < 0$). Recent years, most scholars profit from this model, but this model itself has some problems: under the influence of explanatory variables, the measure of the expected new investment will be inaccurate, further will have the error to the measure of inefficiency investment.

Titman et al. (2004) compare a firm's current investment with its average investment in the previous three years. Specifically, a firm's capital investment (CI_t) in year t is measured as follows Eq.(2):

$$CI_t = \frac{Investment_{t,1}}{(Investment_{t,1} + Investment_{t,2} + Investment_{t,3}) / 3} - 1 \quad \text{Eq. (2)}$$

By this definition, a CI value equal to 0 indicates that the current year's capital investment is the same as the prior three years average. Thus such a proxy can be viewed as a measure of abnormal investment with respect to the firm's past trend in investment. Hence, a firm that over-invests has positive abnormal capital investment (CI >0) and a firm that under-invests has negative abnormal capital investment (CI <0).

This paper make sure a firm over-investment if $I_{new}^e > 0$ and CI >0 ; a firm under-investment if $I_{new}^e < 0$ and CI <0 .

(3) The nature of ultimate controller

Using Sun Pei and Liu Naiquan, Shaojia reference Liu (2003) method, According to CSMAR the listing Corporation "shareholder notice" confirmation, chain map compiled in 2004. If the ultimate controller belongs to the government, the Gov value is 1, if the ultimate controller belongs to the private, the Gov value is 0; If the listing Corporation ultimate controller belongs to the central government, the Centralgov value is 1, if the ultimate controlling the local govern-

ment (Localgov), the Centralgov value is 0.

(4) Control variables

Literature (Xin Qingquan 2007, Yang Qingxiang 2010 and Aggarwal & Samwick 2006) show that the growth rate of income, free cash flow, leverage, the proportion of top three shareholders, the ratio of first shareholders to the second shareholders, company age and auditor opinion affect the resource allocation efficiency.

The operating income growth rate (GROWTH); the Tobin Q value may not represent China's listing Corporation growth opportunities, so we use the operating income growth rate as a proxy for growth opportunities. Generally speaking, the higher growth of operating income growth, the more possibility of over-investment.

The enterprise free cash flow (FCF); the corporate invest in condition of its necessity free cash flow. It means that over-investment behavior occur in sufficient free cash flow frequency.

The leverage (Lev); it reflect the enterprise the ability to against financial risk. Generally speaking, the higher leverage the less possibility of over-investment.

The percent of top three shareholders (Top-three); the index is higher, the agency conflict is more possible, it may cause the inefficient investment behavior.

The proportion ratio of the first shareholders holding to the second shareholders holding (RATIO); when the company equity balance degree is better, is expected to inhibit the investment inefficiency, so the expected negative sign.

Auditor opinion (Audit); it means information transparency and reliability, when the company investment is reasonable; it is easy to accept a standard audit opinion, so the expected negative sign.

The time from IPO (Age), the longer time of listing, the more prone to inefficient investment behavior, so the expected positive sign.

3.3 Models design

Using Eq. (3) to verify the research hypothesis 1:

$$\begin{aligned} OVERIV_t (UNDERIV_t) = & b_0 + b_1 IVPER_{t-1} + b_2 Growth_{t-1} + b_3 FCF_{t-1} + b_4 Lev_{t-1} \\ & + b_5 Top3_{t-1} + b_6 Shr1/2_{t-1} + b_7 Audit_{t-1} + b_8 Age_{t-1} + \Sigma year + \varepsilon \end{aligned} \quad Eq.(3)$$

In order to study on the correlation between institutional ownership and the resource allocation efficiency, in Eq(3), the dependent variable is OVERIV and UNDERIV, the independent variable is the institutional ownership. Considering the endogenous problem, so the explanatory variables are lagged data in the model.

Using Eq. (4) to verify the research hypothesis 2:

$$\begin{aligned} OVERIV_t (UNDERIV_t) = & b_0 + b_1 TypeIV_{t-1} + b_2 Growth_{t-1} + b_3 FCF_{t-1} + b_4 Lev_{t-1} \\ & + b_5 Top3_{t-1} + b_6 Shr1/2_{t-1} + b_7 Audit_{t-1} + b_8 Age_{t-1} + \Sigma year + \varepsilon \end{aligned} \quad Eq. (4)$$

Table 3. Variables and Definition

	variable	Definition and calculation	expected sign	
DV	OVER-IV	According to Richardson(2006) ,If $I_{new}^E > 0$ & $CI > 0$ means overinvestment;		
	UNDER-IV	According to Richardson(2006) , If $I_{new}^E < 0$ & $CI < 0$, means underinvestment;		
IV	IVPER	Percentage ownership by Institutional Investors	-	
	FUND	Percentage ownership by fund	-	
	FUND	TFUND	Percentage ownership by TFUND	
		QFUND	Percentage ownership by QFUND	
		DFUND	Percentage ownership by DFUND	-
IFUND	Percentage ownership by Institutional Investors minus Percentage ownership by fund			
CV	Gov	1 if the ultimate shareholder is state-owned ;0 if not;		
	Centralgov	1 if the ultimate shareholder is central-government, 0 if not;		
	growth	growth rate of operating income	+/-	
	FCF	free cash flow divided by total assets	+/-	
	Lev	the ratio of its short-term and long-term debts to total assets	-	
	Top-three	the percentage of top three shareholders holding	?	
	ratio	The proportion ratio of the first shareholders holding to the second shareholders holding	-	
	Audit	Auditor opinion, 1 if received standard audit opinion and 0 otherwise.	-	
	Age	The time from IPO to now	+	
	Year	From 2005 to 2011, we set 6 dummy variables		

In Eq. (4), Type IV can refer to FUND, TFUND, QFUND, DFUND and IFUND, then, can regress with OVERIV and UNDERIV respectively.

In order to verify hypothesis 3: according to the characteristic of ultimate controller, the sample can divide into the state-owned enterprises and private enterprises. packet inspection of equations (3) and the equation (4), effect of governance of institutional investors on different institutional environment.

In order to verify hypothesis 4: the state control of the central government control enterprises and local government control enterprises two sub-samples, packet inspection of equations (3) and the equation (4), effect of different governance role of state control of the institutional investors.

4. Empirical Results

4.1 Descriptive Statistics

Table 4 reports the descriptive statistics of the sample. The number of over-investment sam-

ple is less than under-investment (3288 less than 5092). In the over-investment sample, the mean of institutional investors is 3.65 percent, the maximum is 69.5 percent. In the under-investment sample, the mean of institutional investors is 2.26 percent, the maximum is 39.98 percent. This suggests that over-investment problem is more common and serious in China.

Moreover, the average percentage of institutional investors is 28.66%, it shows that about a quarter stocks of listed companies are hold by institutional investors. The mean of FUND shareholding is 13.30%, accounting for almost half of institutional shareholders. In contrast to Fan Haifeng, Hu Yuming, Shi shuiping(2009) study: the mean of institutional investors shareholding was 13.8%, the mean of fund shareholding proportion is 11.9%. It can see that in recent year institutional investors has been rapid development in China.

The average percentage of dedicated fund, indexed fund and Transient fund are respectively 10.39%, 0.77% and 4.51%. It is to say that DFUND has become the main body of the fund, it may become active shareholders in the corporate governance.

The sample of ultimate controlling is State-owned enterprise is 5409, the sample of ultimate controlling is private control enterprise is 2955. Compared to Liu Shaojia, Sun Pei and Liu Naiquan (2003) found that 84% of the listed Corporation is controlled by the government directly or indirectly. it shows us most of listed Corporation of ultimate controlling is the government, but the proportion is declining year by year.

Mean and median of Size, Cash and Lev have little difference; they are almost in line with the normal distribution. In contrast, Growth and FCF are very different among the companies. The mean top-three reaches 38.16%, illustrates the ownership concentration of listed companies in China is high.

Table 4. Descriptive Statistics

NAME	N	mean	med	sd	min	max
OVERIV	3288	3.65	9.09	0.01	1.16	69.50
UNDERIV	5092	2.26	5.31	0.02	0.95	39.98
IVPER	8380	28.66	24.09	0.01	23.45	100
FUND	5548	13.30	16.56	0.01	6.15	100
TFUND	4069	4.51	5.23	0.01	2.60	42.61
QFUND	1683	0.77	1.06	0.01	0.36	9.24
DFUND	5211	10.39	13.32	0.01	4.71	75.94
IFUND	5548	17.42	19.67	0.00	9.35	100
Gov	5409	0.33	0.47	0	0	1
Centralgov	8380	0.65	0.48	0	1	1
growth	8380	0.18	0.33	-0.98	0.15	1.98
FCF	8380	0.05	0.21	-5.61	0.07	2.14
Lev	8380	0.49	0.19	0.01	0.51	1.00
Top-three	8380	13.26	16.91	0.11	6.10	97.60
RATIO	8380	8.07	30.24	1.00	1.70	694.14
Audit	8380	0.96	0.20	0	1	1
Age	8380	9.29	4.27	1.00	9.00	21.00

4.2 T-test

T-test has been used to test Institutional investors holding and corporate capital allocation efficiency in different situation. First, we divide the samples into two groups by whether the listed companies hold by institutional investors. Then, we divide the samples into two groups by the mean of institutional ownership. It is clear from the Panel A in Table 5 that the over-investment level is relatively significant low when firms hold by institutional investors. From Panel B in **Table 5**, we can see that the higher of IVPER, the company over-investment and under-investment levels were significantly lower. The same to the FUND shareholders, with the shareholders of fund is higher; the over-investment and under-investment levels were significantly lower. But the trend is different among funds: with the shareholders of DFUND is higher, the level of over-investment and under-investment levels were significantly lower; TFUND and QFUND shareholding level were not significantly different in over-investment or under-investment. IFUND is the same.

These T-test results illustrate whether institutional investors holdings or not and the level ownership of institutional investors could have an impact on resource allocation efficiency. And there are differences between different institutional investors, Hypotheses 1 and 2 have been initially verified, which also laid the foundation for further regression analysis.

The **Table 6** lists the average of over-investment (under-investment) in different ultimate controller. Compared to private enterprise, over-investment level is obviously lower in the state-owned enterprises. However, under-investment level do not exist significant differences between state-owned enterprises and private enterprises. Over-investment level is no significant difference between central-government-control firms and local-government-control firms. However, compared with local-government-control firms, average of under-investment level in central-government-control firms is significantly higher.

We can find that excessive investment in State-owned enterprises received more attention and governance; and underinvestment in local-government-control enterprises received more attention and governance.

4.3 Correlations

The lower half of **Table 7** is correlation efficient between OVERIV and all major variables; the upper half of Table 7 is correlation efficient between UNDERIV and all major correlation.

Seeing from the lower half of Table 7, UNDERIV has 1% level significantly negatively correlated with FUND and DFUND; With IVPER and TRAN has 5% level significantly negatively correlated; and has no relevant with other types of institutional investors holding. In the upper half of Table 7, OVERIV has 1% level significantly negatively correlated with IVPER, FUND and DFUND; With IFUND has 5% level significantly negatively correlated; and has no relevant with other types of institutional investors holding.

Correlation test results are according with our hypothesis 1 and hypothesis 2, institutional investors holding improves resource allocation efficiency, moreover, different institutional investors' shareholding has different impact on resource allocation efficiency.

Table 5. Test of differences between Institutional investor groups

Panel A						
hold by IV or not	OVERIV		T-test	UNDERIV		T-test
	Y	N		Y	N	
IVPER	3.85	7.87	-4.17***	2.46	5.25	-4.87***
FUND	3.04	8.08	-5.94***	2.03	5.08	-6.12***
TFUND	2.41	7.07	-5.79***	1.54	4.48	-6.24***
QFUND	1.96	5.52	-3.62***	1.29	3.48	-3.68***
DFUND	3.01	7.64	-5.59***	1.99	4.82	-5.84***
IFUND	3.04	8.08	-5.94***	2.03	5.08	-6.12***

Panel B						
Prop of IV holding	OVERIV		T-test	UNDERIV		T-test
	High	low		High	low	
IVPER	2.56	5.41	-4.04***	1.81	3.16	-3.19***
FUND	2.58	3.54	-2.06**	1.32	2.69	-3.74***
TFUND	2.36	2.47	-0.24	1.32	1.72	-1.61
QFUND	2.11	1.82	0.72	1.36	1.21	0.43
DFUND	2.33	3.76	-2.93***	1.27	2.67	-3.72***
IFUND	2.82	3.33	-1.08	1.90	2.19	-0.77

Table 6. Test of investment efficiency differences among different ultimate controller

	state-owned	private	T-test	Cen-gov	Loc-gov	T-test
Over-investment	0.54	0.58	-2.05**	0.54	0.54	-0.23
Under-investment	0.85	0.87	-0.54	0.96	0.79	2.73***

4.4 regression analysis

4.4.1 Institutional shareholders and Capital Allocation Efficiency

From **Table 8**, all the regression model F value and AD-R2 view, the model is valid. Panel A Table 8 shows that institutional investors Ownership and OVERIV regression, Panel B for institutional investors holding and UNDERIV return.

From Panel A and Panel B regression (1) in Table 8, we can see that IVPER with OVERIV and UNDERIV at the 1% significantly negatively correlated in control of the company's characteristics, operating conditions, ownership structure, cash flow and so on. Coefficients were respectively -0.068 and -0.038. This shows that institutional ownership is higher, it can inhibit over-investment and mitigation under-investment, optimize resource allocation efficiency. Thus, Hypothesis 1 has been verified.

From regression (2) - (6) in Panel A and Panel B Table 8, we can see that FUND and DFUND with OVERIV and UNDERIV at the 5% significantly negatively correlated in control of the company's characteristics, operating conditions, ownership structure, cash flow and so on; And TFUND, QFUND and IFUND with OVERIV or UNDERIV are not significant. It is say that dif-

ferent institutional investors holding the company's impact on the resource allocation efficiency is different, FUND can improve the resource allocation efficiency DFUND mainly due to the existence, TFUND and QFUND had no effect on resource allocation efficiency, Hypothesis 2 t has been verified.

4.4.2 Ultimate controller, Institutional Investors and recourses Allocation Efficiency

To verify the hypothesis 3, **Table 9** gives the regression result of institutional shareholding and resource allocation efficiency in state-owned and non-state-owned enterprises. To verify the hypothesis 4, **Table 10** gives the regression result of institutional shareholding and resource allocation efficiency in the central government and local government-owned companies.

Panel A in Table 9, regression(1) and (4) shows that IVPER has 1% level significant negative correlation with OVERIV in state-owned enterprises, IVPER has 10% level significant negative correlation with OVERIV in private enterprises; by contrast of the regression (2) and regression (5), FUND has 5% level significant negative correlation with OVERIV in state-owned enterprises, FUND has no significant negative correlation with OVERIV in private enterprises; From the regression (3) and regression (6), The contrast can be seen, DFUND has 1% level significant negative correlation with OVERIV in state-owned enterprises, DFUND has irrelevant correlation with OVERIV in private enterprises;

Panel B in Table 9, regression(1) and (4) shows that IVPER has 1% level significant negative correlation with UNDERIV in state-owned enterprises, IVPER has 10% level significant negative correlation with UNDERIV in private enterprises; by contrast of the regression (2) and regression (5), FUND has 5% level significant negative correlation with UNDERIV in state-owned enterprises, FUND has no significant negative correlation with UNDERIV in private enterprises; From the regression (3) and regression (6), The contrast can be seen, DFUND has 10% level significant negative correlation with UNDERIV in state-owned enterprises, DFUND has irrelevant correlation with UDERIV in private enterprises;

The result in table 9 shows that IVPER, FUND and DFUNF can play a governance role, control the degree of the over-investment and under-investment in state ownership enterprise. But in private company, IVPER can control the degree of the over-investment and under-investment, both FUND and DFUNF can not impact on recourses allocation efficiency.

Table 10 Panel A regression (1) and regression (4) shows that IVPER has no correlation with OVERIV in the central government holding company, but it has 1% level significant negative correlation with OVERIV in the local government holding company; contrast the result of Table 10 Panel A regression (2) and regression (5), it can be seen that FUND has no correlation with OVERIV in the central government holding company, but it has 10% level significant negative correlation with OVERIV in the local government holding company; contrast the result of Table 10 Panel A regression (3) and regression (6), it can be seen that DFUND has no correlation with OVERIV in the central government holding company, but it has 10% level significant negative correlation with OVERIV in the local government holding company;

Table 7 Person correlation results between variables

	OVERIV	IVPER	FUND	TFUND	QFUND	DFUND	IFUND	growth	Lev	FCF	Top3	Shr1/2	Age	Audit
UNDERIV														
IVPER	-0.08***	1	0.61***	0.35***	0.09***	0.60***	0.74***	0.07***	0.04***	-0.02	0.69***	0.18***	0.15***	0.09***
FUND	-0.07***	0.61***	1	0.68***	0.26***	0.96***	-0.09***	0.13***	-0.04***	-0.05***	-0.03***	-0.10***	-0.05***	0.07***
TFUND	-0.04	0.35***	0.68***	1	0.22**	0.42***	-0.19***	0.10***	-0.06***	-0.06***	-0.14***	-0.13***	-0.15***	0.05***
QFUND	0.02	0.09***	0.26***	0.22***	1	0.17***	-0.14***	0.04	0.02	-0.12***	-0.13***	-0.12***	-0.06***	-0.07***
DFUND	-0.07***	0.60***	0.96***	0.42***	0.17***	1	-0.07***	0.12***	-0.02	-0.03**	-0.02	-0.09***	-0.01	0.07***
IFUND	-0.05**	0.74***	-0.09***	-0.19***	-0.14***	-0.07***	1	-0.01	0.12***	0.01	0.87***	0.29***	0.26***	0.06***
growth	-0.04**	0.07***	0.13***	0.10***	0.04	0.12***	-0.01	1	-0.01	-0.11***	-0.01	-0.03***	-0.02	0.10***
Lev	-0.01	0.04***	-0.04***	-0.06***	0.02	-0.02	0.12***	-0.01	1	0.018*	0.01	0.01	0.30***	-0.34***
FCF	-0.02	-0.02	-0.05***	-0.06***	-0.12***	-0.03**	0.01	-0.11***	0.02*	1	0.03**	0.02*	-0.02**	0.03***
Top3	-0.04**	0.69***	-0.03***	-0.14***	-0.13***	-0.02	0.87***	-0.01	0.01	0.03**	1	0.50***	0.23***	0.09***
Shr1/2	-0.01	0.18***	-0.10***	-0.13***	-0.12**	-0.09***	0.29***	-0.03***	0.01	0.02*	0.50***	1	0.12***	0.02**
Age	0.04**	0.15***	-0.05***	-0.15***	-0.06***	-0.01	0.26***	-0.02	0.30***	-0.02**	0.23***	0.12***	1	-0.07***
Audit	-0.03**	0.09***	0.07***	0.05***	-0.07***	0.07***	0.06***	0.10***	-0.34***	0.03***	0.09***	0.02**	-0.07***	1

Table 8. Impact of institutional shareholding on corporate resources allocation efficiency

VARIABLES	Panel A OVERIV						Panel B UNDERIV					
	(1)	(2)	(3)	(4)	(5)	(6)	(1)	(2)	(3)	(4)	(5)	(6)
IVPER	-0.068 -3.19						-0.038 -2.97					
FUND		-0.034 -2.36						-0.029 (-2.49)				
TFUND			-0.048 -1.03						-0.028 -1.13			
QFUND				0.133 0.68						-0.078 -0.45		
DFUND					-0.04 (-2.16)						-0.033 (-2.20)	
IFUND												-0.011 (-0.57)
GROWTH	-0.533 (-0.43)	-2.881 (-3.47)	-2.939 -3.59	-2.071 -2.97	-2.753 (-3.16)	-3.312 (-4.08)	-2.373 (-3.51)	-2.117 (-3.58)	-1.004 (-2.50)	-0.900 (-1.58)	-2.236 (-3.68)	-2.31 (-3.94)
Lev	0.751 (0.35)	-0.628 (-0.45)	0.893 (0.63)	2.512 (2.00)	-0.675 (-0.46)	-0.407 (-0.29)	-0.483 (-0.41)	-0.421 (-0.41)	-0.051 (-0.07)	-0.707 (-0.73)	-1.048 (-0.99)	-0.342 (-0.33)
FCF	-1.466 (-0.82)	-0.381 (-0.33)	0.090 (0.09)	0.274 (0.30)	-0.283 (-0.24)	-0.334 (-0.29)	0.760 (0.70)	1.031 (1.11)	0.011 (0.02)	0.080 (0.10)	1.134 (1.20)	1.142 (1.22)

Top-Three	0.008	-0.043	-0.04	-0.021	-0.043	-0.042	0.031	-0.001	-0.004	-0.008	-0.005	0.010
	0.28	-3.03	-2.92	-1.92	(-2.94)	(-1.44)	(1.72)	(-0.11)	(-0.60)	(-0.86)	(-0.40)	(0.47)
RATIO	-0.001	0.003	0.001	0.003	0.003	0.004	-0.001	-0.001	0.006	-0.002	0.001	0.000
	(-0.11)	(0.34)	(0.16)	(0.44)	(0.30)	(0.47)	(-0.13)	(-0.12)	(1.10)	(-0.20)	(0.18)	(0.01)
Age	0.247	0.111	0.103	0.024	0.112	0.114	0.232	0.192	0.126	0.095	0.192	0.196
	(2.76)	(1.89)	(1.79)	(0.47)	(1.83)	(1.94)	(4.53)	(4.39)	(4.19)	(2.24)	(4.30)	(4.47)
Audit	-4.219	-6.543	1.389	1.619	-6.683	-6.673	-0.203	-0.154	-0.646	0.837	-0.250	-0.332
	(-1.55)	(-3.37)	(0.58)	(0.78)	(-3.35)	(-3.43)	(-0.14)	(-0.12)	(-0.61)	(0.36)	(-0.19)	(-0.26)
Year	CONTROL						CONTROL					
N	2544	2167	1623	697	2045	2167	3989	3381	2446	986	3166	3381
AD-R ²	0.009	0.020	0.012	0.012	0.019	0.018	0.010	0.012	0.010	0.002	0.012	0.010
F-VALUE	3.938	6.552	3.499	2.088	5.831	5.841	6.267	5.943	4.149	1.281	5.706	5.198

Note: The upper number is the correlation coefficients between the variables, and the lower number indicates the value of t , $t > 1.65$, $t > 1.96$, $t > 2.58$, respectively, 10%, 5% and 1% levels significantly.

Table 9. Impact of institutional shareholder on capital allocation efficiency under different ownership Property (1)

	Panel A OVERIV						Panel B UNDERIV						
	GOV			PRIVATE			GOV			PRIVATE			
	(1)	(2)	(3)	(4)	(5)	(6)	(1)	(2)	(3)	(4)	(5)	(6)	
IVPER	-0.054 (-2.88)			-0.09 (-1.72)			-0.042 (-2.51)				-0.03 (-1.74)		
FUND		-0.037 (-1.96)			-0.03 (-1.37)			-0.029 (-2.15)			-0.03 (-1.41)		
DFUND			-0.045 (-1.87)			-0.03 (-1.10)			-0.029 (-1.76)			-0.04 (-1.41)	
Growth	-2.087 (-1.80)	-3.742 (-3.15)	-3.597 (-2.89)	2.28 (0.83)	-1.75 (-1.89)	-1.64 (-1.69)	-2.089 (-2.28)	-1.689 (-2.41)	-1.745 (-2.50)	-2.94 (-3.14)	-2.92 (-2.66)	-3.19 (-2.69)	
FCF	-0.038 (-0.02)	-0.706 (-0.37)	-0.915 (-0.46)	1.00 (0.19)	-1.06 (-0.60)	-1.08 (-0.59)	0.092 (0.08)	0.163 (0.14)	-0.671 (-0.56)	-1.48 (-0.86)	-1.52 (-0.76)	-1.75 (-0.81)	
Lev	-2.110 (-1.18)	-0.619 (-0.36)	-0.497 (-0.28)	0.24 (0.07)	0.12 (0.10)	0.17 (0.14)	0.135 (0.08)	0.658 (0.53)	0.846 (0.70)	1.32 (1.01)	1.46 (0.97)	1.49 (0.94)	
Top3	-0.006 (-0.24)	-0.05 (-2.70)	-0.048 (-2.48)	0.03 (0.42)	-0.02 (-0.84)	-0.02 (-1.13)	0.028 (1.21)	-0.002 (-0.15)	-0.006 (-0.52)	0.04 (1.55)	-0.00 (-0.01)	0.00 (0.02)	
Shr1/2	-0.003 (-0.26)	0.004 (0.38)	0.003 (0.31)	0.04 (0.51)	-0.02 (-0.74)	-0.02 (-0.70)	0.001 (0.14)	-0.000 (-0.04)	0.002 (0.32)	-0.02 (-0.99)	-0.02 (-0.36)	-0.01 (-0.25)	
Audit	0.084 (1.02)	0.071 (0.87)	0.065 (0.76)	0.56 (2.64)	0.15 (2.15)	0.18 (2.38)	0.248 (3.50)	0.21 (3.94)	0.207 (3.95)	0.2 (2.80)	0.17 (2.03)	0.17 (1.95)	

Age	-8.247	-12.518	-13.10	1.70	0.16	0.11	-0.399	-0.224	-0.359	0.14	0.02	0.07
	(-3.06)	(-4.27)	(-4.29)	(0.30)	(0.08)	(0.06)	(-0.21)	(-0.15)	(-0.25)	(0.07)	(0.01)	(0.02)
Year	CONTROL						CONTROL					
N	1672	1458	1379	863	701	658	2617	2254	2119	1365	1120	1040
AD-R ²	0.018	0.027	0.025	0.01	0.01	0.01	0.007	0.010	0.010	0.01	0.01	0.01
F-VAL	4.909	6.022	5.496	1.64	1.82	1.74	3.415	3.796	3.615	3.49	2.24	2.18
UE												

Table 10. institutional shareholding on recourses allocation efficiency under different State-owned right (2)

	Panel A OVERIV						Panel B UNDERIV					
	Centralgov			Localgov			Centralgov			Localgov		
	(1)	(2)	(3)	(4)	(5)	(6)	(1)	(2)	(3)	(4)	(5)	(6)
IVPER	-0.04			-0.06			-0.07				-0.03	
	(-1.28)			(-2.73)			(-1.75)				(-1.92)	
FUND		-0.02			-0.05			-0.04			-0.02	
		(-0.69)			(-1.86)			(-1.53)			(-2.00)	
DFUND			-0.02			-0.06			-0.05			-0.02
			(-0.68)			(-1.80)			(-1.38)			(-1.05)
Growth	-2.95	-4.42	-4.65	-1.77	-3.63	-3.3	-2.95	-2.50	-2.71	-1.72	-1.25*	-1.22
	(-1.45)	(-2.52)	(-2.50)	(-1.24)	(-2.32)	(-2.02)	(-1.25)	(-1.54)	(-1.58)	(-2.50)	(-1.87)	(-2.05)

Table 10 Panel B regression (1) and regression (4) shows that IVPER has 10% level significant negative with UNDERIV in the central government holding company, but it has 1% level significant negative correlation with UNDERIV in the local government holding company; contrast the result of Table 10 Panel B regression (2) and regression (5), it can be seen that FUND has no correlation with UNDERIV in the central government holding company, but it has 5% level significant negative correlation with UNDERIV in the local government holding company; contrast the result of Table 10 Panel B regression (3) and regression (6), it can be seen that DFUND has no correlation with UNDERIV in the central government holding company and the local government holding company;

To sum up, Institutional shareholding, funds and dedicated funds can play a governance role, inhibit over-investment and mitigate over-investment in local government holding company; However, in the central government holding company, Institutional shareholding only is at 10% level significance alleviate underinvestment, dedicated and fund can not suppress corporate non-efficient investment behavior. Hypothesis H4 is verified: compared with the central government listed companies, institutional investors improve resource allocation efficiency more pronounced in local government controlled companies.

Conclusion the regression result of tables 9 and table 10, can be seen that institutional investors improve on corporate resource allocation efficiency is mainly manifested in the local government control company, it only a little effect to improve resource allocation efficiency in the central government and the private enterprises.

5. Robustness Tests

5.1 Estimation of Residual Ownership by Different Types of Institutions

The results above point to a negative relation between institutional investors ownership and inefficiency of capital allocation. This finding is consistent with institutional investors can monitor and govern listed company. However, it may be the case that firms with efficient capital allocation attract investment by institution.

Prior research finds that institutional ownership is endogenously determined by firm characteristics such as firm size, information environment, investment opportunity sets, and firm age (Gompers and Metrick, 2001). Such endogenous can confound our tests.

To mitigate this concern, we follow prior research (eg., Gompers and Metrick, 2001; Ramalingegowda and Yu, 2012) and perform our analyses using a measure of residual ownership in the Chinese context. Here, residual ownership is the residual from estimating an expected ownership model that expresses ownership as a function of economic determinants. Our expected institutional ownership model is as follows:

$$\begin{aligned} \text{TypeOwn}_t = & \beta_0 + \beta_1 \text{BM}_{t-1} + \beta_2 \text{MV}_t + \beta_3 \text{Volatility}_{t-2,t} + \beta_4 \text{Turnover}_{-3} + \beta_5 \text{Price}_t + \beta_6 \text{HS300} \\ & + \beta_7 \text{Momentum}_{-2\text{B}} + \beta_8 \text{Momentum}_{-12\text{E} \rightarrow 3} + \beta_9 \text{Age}_t + \beta_{10} \text{Yield}_{t-1} + \beta_{11} \text{TobinQ}_{t-1} + \varepsilon_t \end{aligned}$$

Eq. (6)

The analysis includes several control variables. First, in accordance with the principle of

prudence, we control for firm age, dividend yield, stock price volatility, and HS300 membership. Second, while institutions prefer firms that have high liquidity and low transaction costs, we control for firm size, stock price, and share turnover. Finally, institutions prefer to invest in firms based on historical return patterns. So we control for book-to-market ratio, Market value of equity, momentum and Tobin's Q.

We extract regression residuals for each type of the institutions' ownership variables (total institutional investors, dedicated fund, transacted fund) as our residual ownership measure. Thus, by construction, the residual ownership measure captures the component of ownership unexplained by the economic determinants included in Eq. (6).

Regression results of estimated coefficient and statistical significance level do not seem to be driving the results, indicating that the conclusion of this article is robust.

5.2 Capital Allocation Efficiency Measure

The measure of overinvestment and underinvestment will have great influence to the result. When we only use the method of Richardson (2006) to measure overinvestment and underinvestment, the result still supports the original conclusion. Hence, we conclude that the endogeneity issues do not affect the conclusions.

6. Discussion and Conclusions

Using institutional investor ownership data of Chinese listed firms over the period 2005-2011, we investigate whether institutional investors can optimize corporate resource allocation efficiency. And whether the degree of optimization varies with different ownership property or different behavior style of institution? We find that institution ownership really can promote corporate resource allocation efficiency. While Fund and Dedicated Fund can cut down over-investment and alleviate under-investment, Transient Fund and Quasi-indexer Fund cannot affect corporate resource allocation efficiency. Further, we find that ultimate controlling shareholders of listed companies will affect institutional investor ownership and corporate resource allocation efficiency. And this kind of influence mainly reflect in company which controlled by local governments.

According to the empirical results, we put forward three suggestions as follows: First, improve the ownership structure of listing Corporation; continue to decrease the state-owned shareholding, creating a good environment for institutional investors to participate in corporate governance. Second, enhance the institutional investors' topic right. Through the capital market development, institutional investors development and listing Corporation governances, constantly improve the regulatory role of institutional investors in corporate governance, to adapt to capital market demand.

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