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Steady Compensation, Overconfident Executives and Overinvestment: Evidence from Chinese Corporations

Danlu Bu Homayoon Shalchian* Chenyu Zhang

Abstract

This paper is an attempt to investigate the relation between Executive's Compensation Steadiness (ECS) and firm's overinvestment in China. We measure ECS for a sample of listed companies in China in order to analyze this relation. Overall, our results show that ECS may enhance the executive's adventurous spirit and consequently result in over-investment. Our results also show that ECS seems to have a higher impact on overinvestment in state-owned companies relative to non-state-owned firms. Finally, our results suggest that ECS seems to have a higher impact on overinvestment for companies controlled by local (provincial) governments relative to those controlled by central government.

Keywords: Corporate governance, executive's compensation, overinvestment.
JEL classification: M14, G34

I. Introduction

This paper focuses on the relation between executive's compensation mechanism and overinvestment in China. During the past decade, there has been a significant growth of excessive investment within Chinese corporations due to the practice of free market and rise of corporate profit. Zhang and Song (2009) shows that, during the period 2001-2006, 39% of their Chinese sampled companies, on the average, invested approximately 100% above the optimal level. Similarly, Wang and Sun (2009) suggest that overinvestment exists among Chinese listed companies and that the problem seems also to be relatively severe in state-owned enterprises. Further, it has been also suggested that overinvestment may jeopardize company's long-term financial success. For instance, Fu (2010) argues that excessive investment deteriorates firm's operating performance and results in a decline of the assets' productivity. Consequently, overinvestment has become an important corporate governance issue in China and Chinese managers and shareholders should be concerned about the efficiency of their firms' investments.

Financial theory associates the phenomenon of overinvestment to several factors and most academic studies use agency-based explanations in their analysis. Governance problems such as divergence of objectives between executives and shareholders, executives' control over the information and their relation with overinvestment have been widely discussed in financial literature (Jensen, 1986; Hubbard, 1998; Song and Thakhor, 2006; Adams and Ferriera, 2007). Furthermore, Financial literature suggests the existence of a relation between executive's irrational behavior such as "overconfidence" and overinvestment (Malmendier and Tate, 2005; Bian and Li, 2009; Huang *et al*., 2010). It has been argued that overconfident executive, having a relatively low degree of risk aversion, tends to invest in project without necessarily a positive NPV (Goel and Thakhor, 2008). Finally, several studies argue that executive's compensation mechanism and executive's private benefits from investment are important governance issues and to some extend responsible for firm's overinvestment (Jensen and Murphy, 1990; Hirshleifer and Suh, 1992; Jensen 1993; Xin *et al*., 2007).

Concerning executive's compensation, Kato and Long (2006) find a significant sensitivity of annual cash compensation for Chinese top executives with respect to shareholders value. However, the mechanism of Chinese executive's compensation, in reality, can be described as "*Generous Reward and Gentle Penalty*". It consists of a system where executives can obtain rewards for their success while they can rather easily justify their failure and consequently avoid penalty. Such mechanism creates a relative stability of compensation for Chinese executives that we call "*Executive Compensation Steadiness" (ECS)*. It has been argued that ECS is one of the factors that could explain the executive's overconfident behavior and consequently the phenomenon of overinvestment in Chinese corporations.

The objective of this study is to investigate the relation between Executive's compensation steadiness and overinvestment in China. We, thus, measure ECS as well as the level of overinvestment for our sampled companies in order to analyze their relation among listed companies as well as state-owned enterprises (SOEs) in China. Using two enhanced regression models, we investigate whether overinvestment shows any sensitivity to the Chinese mechanism of executive's compensation.

This paper is organized as follows. Section II presents the theoretical framework and research hypotheses. Section III and IV describe respectively the data and methodology used in order to test our hypotheses. Section V presents our empirical results. Section VI presents our conclusions.

II. Theoretical Framework

Investment decision and the phenomenon of overinvestment have been attributed to different factors in finance theory. Several studies suggest that overinvestment can be explained by agency problems and firm's free cash flow (Stulz, 1990, Hubbard, 1998, Richardson, 2006). Other studies attribute overinvestment to other governance issues such as executive's control over the information, executive's compensation mechanism and executive's irrational behavior (Jensen, 1986; Malmendier and Tate, 2005; Song and Thakhor, 2006; Goel and Thakhor, 2008).

II.1. Agency theory, executive's compensation and overinvestment

Firms' investment decision and the phenomenon of overinvestment have been studied in numerous empirical researches. For instance, Hubbard (1998) suggests a positive relation between investment expenditure and firm's free cash flow. Further, It has also been argued that agency problems between managers and shareholders result in excessive investment expenditure (Stulz, 1990). More specifically, given the managers and shareholders different goals, the presence of excessive cash flows in the firm could result in an overinvestment. Similarly, Richardson (2006), using an agency-based explanation, suggests a link between firm's level of investment and internally generated cash flows. Defining overinvestment as "*investment expenditure beyond that required to maintain assets in place and to finance expected new investments in positive NPV projects"*, Richardson (2006) shows that overinvestment is more concentrated in firms with relatively high levels of free cash flows.

The literature also discusses firm's governance issues such as executive's control over the information (Gompers *et al.* 2003; Malmendier and Tate, 2005; Adams and Ferreira, 2007). It has been argued that CEO can affect the information available to the Board of Directors and

investors and consequently the investment decisions (Song and Thakhor, 2006). Similarly, Adams and Ferreira (2007) argue that executive's control over the information creates an asymmetric information between them and the owners which grants to the executive a certain control over several decisions such as the level of investment and their own compensation.

Concerning executive's compensation and its relation with the level of investment, financial literature presents a dilemma. On one hand, when executive's compensation is heavily based on firm's performance, it could extend the manager's decision horizon and, thus, promote value-increasing investment (Jensen and Murphy, 1990). On the other hand, the private benefits that executives receive from investment, encourages them to over-invest (or empire building) by accepting projects without necessarily positive net present values (Jensen, 1986 and 1993). Further, It has been argued that a rational manner to mitigate the empire-building moral hazard would be to tie executive's compensation to shareholder's wealth (Garvey, 1997). Other approaches suggest a monitoring system of the executive's compensation structure. For instance, Conyon (1997) shows that companies with compensation committees seem to have a relatively lower growth rate in CEO's compensation. Moreover, Hirshleifer and Suh (1992) suggest an "optimal profit-based" incentive compensation mechanism for the executives in order to maintain an optimal level of investment.

Finally, it has been suggested in the literature that executives' irrational behavior can affect the investment decisions of the firm. Malmendier and Tate (2005) argue that the executive's bias such as "overconfidence" may have an impact on the investment decisions. Similarly, Goel and Thakhor (2008) argue that overconfident CEOs have a relatively low degree of risk aversion, which can lead them to overinvest and consequently affect the value of the firm. They also suggest that an overconfident executive tends to under-invest in project-relevant information, which would increase the possibility of project selection errors and lead to overinvestment. On the other hand, a risk-averse executive tends to under-invest in projects relative to the optimal and value-increasing level. Consequently, Goel and Thakhor (2008) suggest an "*optimal compensation contract that could trade off incentives for an appropriate level of investment by the CEO against the cost of imposing risk to the executive*".

II.2. Executive's compensation and overinvestment in China

In China, executives' behavior with regard to corporate investment can be often described as overconfident for two reasons. First, Chinese executives, traditionally, benefit from a relative stability of their employment. More specifically, Chinese corporate culture does not attribute firm's mediocre performance to one or a few executives but to a set of social, political and economic factors. Second, Chinese executives' compensation is based on a mechanism that can be qualified as "*Generous Reward and Gentle Penalty*". In case of a rise in company's performance, executives attribute that success to their efforts and obtain additional compensations and in case of a mediocre performance, they attribute the failure to several factors such as the economic context, social pressures, rise of competition, etc. Consequently, Chinese corporations have created a certain stability of compensation for their executives or what we call *Executive Compensation Steadiness (ECS).* Given this relative stability of employment and compensation, Chinese executives tend to be overconfident, which leads them often to increase the level of company's investment, and even to invest in projects with negative net present values. Huang *et al*. (2010) argue that investment distortion due to the executives'

overconfidence may be mitigated through rigorous supervision. However, in absence of a mechanism to restrain the executives effectively plus the stability of the executive's employment and the relative steadiness of their compensation, Chinese managers seem to have an incentive to use company's free cash flow for excessive investment. These arguments and observations lead to following hypothesis:

H1: There is a positive relation between the executive's compensation steadiness and excessive investment in China.

Concerning Chinese State-owned enterprises (SOEs), executives' compensations are under government control. However, SOE executives, motivated by other factors such as social prestige and political promotions, tend also to over-invest the firm's cash flow (Chen *et al.* 2005). Moreover, SOE executives have also a certain control over the information that is released to the government and can attribute the poor performance of the company to different factors such as government policies, social pressures, etc. (Lin *et al.* 1997). In 2004, SASAC[1] issued "Interim regulations on performance evaluation for the managers of state-owned enterprises". The regulations stipulate that the executives' compensation in state-owned companies must be partly based on their performance. However, performance measures in these regulations include Net Assets, Gross profit, ROE, etc. and the information concerning these variables is to some extent under the control of the executives. Further, SASAC revised regulations in 2006, stipulates that, in case of a mediocre performance, executives' compensations growth would be relatively low, but they will not decline. In other words, SASAC regulations have created another system of Executive Compensation Steadiness for Chinese state-owned companies in which executives' rewards and penalties are rather unsymmetrical. Furthermore, in 2007, Chinese government issued new regulations on SOEs' investments limiting the level of investment in non-operating items to less than 10% of the company's earning. However, government supervision mechanisms such as external audits are not mature enough to conduct efficient supervisions on SOEs' investments. In other words, even though the Chinese government has made a few attempts to create a mechanism of supervision of the executives' compensations and the level of investments, the steadiness of executive's compensation and the phenomenon of overinvestment can not only be observed in Chinese SOEs but they also seem to be more serious relative to non-SOEs. These arguments and observations lead to the following hypothesis:

H2a: The executive's compensation steadiness has a relatively higher impact on excessive investment in Chinese SOEs relative to Chinese non-SOEs.

Finally, it has been argued that there exist a significant difference of behavior with regard to the investment between the executives of Central-government-controlled (CGC) and Local-government-controlled (LGC) companies in China (Xia and Fang, 2005; Pan *et al*., 2008; Xia *et al.,* 2008). They argue that SOEs controlled by central government have access to more financial and political resources. However, CGC executives having more incentive to follow

[1] State-owned Asset Supervision and Administration Council (SASAC) is a government agency responsible for supervision and reporting on State-owned companies and assets in China.

government's regulations in order to build their own political future, have relatively less tendency to over-invest. In the contrary, executives of SOEs controlled by local (provincial) governments, having a relatively limited space for political promotions, may have more incentive for personal promotions and consequently for overinvestment (Chen *et al*. 2009). These arguments and observations lead to the following hypothesis:

H2b: The executive's compensation steadiness has a relatively higher impact on excessive investment in SOEs controlled by local (provincial) governments comparing to SOEs controlled by central government.

III. Data

To proxy for overinvestment, we use residual values from Richardson (2006) linear regression model. Thus, we run the linear regression for the "expected level of investment" for our sampled companies and we consider the error term of this regression as the level of overinvestment. Concerning our main independent variable (Executive's Compensation Steadiness), we measure the elasticity of executives' compensations relative to the companies' operational performance (net profit). As for control variables, we use ratios *Receivables/Total Assets, Administrative expenditure/Total Assets, Free cash flows/Total Assets, Local GDP growth, Fiscal expenditures* and *Market index* as suggested by Richardson (2006), Jiang and Yue (2005), Xin *et al*. (2007) and Tang *et al*. (2010). We obtain our data from CSMAR for 967 companies for the period from 2005 to 2013.[2] Finally, we include two dummy variables (Industry and Year) as suggested by Fama and French (1997). Table 1 presents the description our variables.

Refer Table 1

IV. Method

We examine the relation between ECS on overinvestment for the period 2005-2013. Our method consists of conducting linear regressions with "overinvestment" as dependent variable. First, we proxy overinvestment by calculating the residual values of the "expected investment" in Richardson (2006) model:

$$INV_t = \alpha + \beta_1 Growth_{t-1} + \beta_2 LEV_{t-1} + \beta_3 Cash_{t-1} + \beta_4 Age_{t-1} + \beta_5 Size_{t-1} + \beta_6 RET_{t-1} + \beta_7 INV_{t-1} + \Sigma Industry + \Sigma Year + \varepsilon_t \quad (1)$$

where the dependent variable, *INV* (*Investment spending)* is the difference between cash outflow due to the purchase of long term assets and the cash inflow due to the sale of long term assets in year t, *Growth* is the growth rate of operating income in year t-1, *LEV* (*financial leverage*) is the liabilities divided by total assets in year t-1, *Cash (Cash holding*) is the cash balance divided by total assets in the beginning of period, *Age* denotes the number of years from IPO to year t-1, *Size* denotes the natural logarithm of the total assets in year t-1, *RET* denotes the annual return of the stock in year t-1, *Industry* and *Year* denote dummy variables representing respectively the industry and the year, ε_t denotes the error term of the regression.

Second, in order to measure executive's compensation steadiness (ECS), we follow four steps:

1. We calculate the average executives' compensation for each company, dividing the total executives' compensation by the number of the executives.

[2] Chinese Stock Market & Accounting Research (CSMAR) is a research agency that collects financial, accounting and governance data directly from firms' annual reports.

2. We calculate the annual variations, in percentage, of the executives' compensations for all companies.
3. We calculate the annual variations, in percentage, of the net profit for all companies.
4. We calculate the elasticity of the executives' compensation relative to the net profit by dividing the annual variation of the compensation by the annual variation of the net profit.

Further, considering the error term in equation (1) as the level of overinvestment, we perform the following regression model:

$$Over_INV_t = \alpha + \beta_1 STEAD_t + \beta_2 RECA_t + \beta_3 ADMN_t + \beta_4 OCFA_t + \beta_5 GDP_t \quad (2)$$
$$+\beta_6 FISC_t + \beta_7 Market_t + \Sigma Industry + \Sigma Year + \varepsilon_t$$

where the dependent variable, *OverINV* (*Overinvestment)* is measured by the residual values in equation (1), *STEAD (Steadiness*) indicates the steadiness of executives compensation relative the performance, *RECTA* is the ratio other receivables/total assets for year t, *ADMN (Administrative expenditure*) is the ratio administrative expenses/total assets, *OCFA* denotes the operational cash flow divided by total assets for year t, *GDP* denotes the growth rate of GDP for year t, *FISC* denotes the natural logarithm of fiscal expenditure for year t, *Market* denotes the market index, *Industry* and *Year* denote dummy variables representing respectively the industry and the year, ε_t denotes the error term of the regression. The intercept (alpha) denotes the level of overinvestment if all independent variables are equal to zero and coefficient betas indicate the degree of exposure of the dependent variable to each factor.

Wang (2009) and Zhang and Liu (2012) define excessive investment as the level of residual values in equation (1). Therefore, we consider all residual values (positive and negative) as excessive investment. Further, Xin et al., (2007) and Li and Xiao (2012) define overinvestment as the level of investment above the expected value of investment in equation 1 (positive residual values). Therefore, we also perform a robustness test by performing the regression model (2) considering only the positive error terms in equation (1) as the measure of overinvestment.

Finally, Chen *et al.* (2005) and Wang and Sun (2009) suggest that overinvestment seems to be also a severe issue in Chinese state-owned enterprises (SOEs). Moreover, Pan et al. (2008) and Xia et al. (2008) argue that executive's of SOEs controlled by central government and those controlled by local governments seem to have different motivations with regard to corporate investment. Therefore, we subdivide our sample once based on SOE and non-SOE and once based on SOEs controlled by central government (CGC) and SOEs controlled by local government (LGC) and we perform our regression model (2) in order to compare the relation between ECS and overinvestment in different category of companies.

V. Results

Table 2 summarizes descriptive statistics for our variables for the 2005-2013 period. The average overinvestment (*overINV1*) in our sample is 5.40%, the median is 4.70%, the maximum and minimum values are respectively 17.10% and -1.20% and standard deviation is 3.70%. For our second measure of overinvestment with exclusively positive values (*overINV2*), the number of observation is 4445 over a total of 4630. The result would confirm those of Pan and Jin (2003), He (2006); Guo and Jia (2006) and Li and Jiang (2007) who suggest that overinvestment seems to be a common practice among Chinese corporations.

Table 2 also shows that the average value of *STEAD* is 5.68%, the standard deviation is 6.46%, maximum value is 130.95% and minimum value is 0.04%. The results indicate that the level of ECS is relatively high and relatively volatile in China.

Refer Table 2

Table 3 presents the coefficient of correlation between different variables. The table shows that our dependent variables (*overINV1 and overINV2*) are positively correlated with *STEAD* (respectively 0.07 and 0.06) and according to *t*-statistics the coefficients are significant at 1%. The table also shows that *overINV1 and overINV2* are both positively correlated with *OCFA, GDP* and negatively with *RECA and ADMN*. According to t-statistics, the correlations are significant at 1%.

Moreover, table 3 shows that the coefficients of correlation between our main independent variable (*STEAD)* and other independent variables (control variables) are generally weak. Finally, we note relatively weak correlations among our control variables.

Refer Table 3

Table 4 presents the results of the regression model (1). According to the alpha estimate and its corresponding *t*-statistics, the abnormal level of investment is slightly negative (-0.017) and significant at 10%. Further, we note that the betas of the regression are significant at 1%, and except for the factor *LEV* and *Age*, all betas are positive. The results show that financial leverage has a negative impact on firm's level of investment. We note that the level of investment is relatively more affected by Cash holding in the beginning of period and the level of investment of the prior year. The error terms of this regression represents the level of overinvestment in our model.

Refer Table 4

Table 5 presents the overinvestment results using the regression model (2) on our Full-Sample firms. First, we notice that the alpha estimates and their corresponding t-statistics that the abnormal levels of overinvestment are not statistically significant. Further, a comparison of their betas reveals that, *overINV1* and *overINV2* are both positively correlated with *STEAD* and the results are statistically significant at 10% for *OverINV1*. We also notice that factor loading on *RECA, ADMN* and *OCFA* is mainly significant. The results show coefficients of *RECA* of -0.17 for both *overINV1* and *overINV2* and the t-statistics show that the results are statistically significant at 1%. Factor loading on *ADMN* and *OCFA* reveals that *overINV1* and *overINV2* are both negatively and significantly correlated to *ADMN* while they are positively and significantly correlated with *OCFA*. Overall, our results suggest that overinvestment tends to be positively correlated to the Executive's compensation steadiness, firm's operational cash flow and negatively correlated to the administrative expenditure and other receivables.

Further, we subdivide our sample into State-owned (SOE) and Non State-owned (Non-SOE) enterprises and we perform the regression model (2) using both *overINV1* and *overINV2* as dependent variables. First, we notice that SOEs show a higher average factor-adjusted level of overinvestment (0.04 for *overINV1* and *overINV2)*. Further, we notice that the results are not statistically significant. Second, we can assert that factor loading on *STEAD* is significant for SOEs. However, the results indicate that SOEs level of overinvestment seems to be more

sensitive to the Executive's Compensation Steadiness. The results also show that factor loading for *RECA, ADMN* and *OCFA* are mainly significant.

Refer Table 5

Finally, we subdivide our sample into Central government-controlled (CGC) and Local government-controlled (LGC) enterprises and we perform the regression model (2). Table 6 shows the results of the regression on our sub-samples. First, we note that for LGC enterprises, the average levels of overinvestment are higher than CGC enterprises. The alpha estimates for LGC enterprise are 0.06 using *overINV1* and 0.05 using *overINV2*. However, according to t-statistics, the results are not statistically significant. Moreover, the factor loading on *STEAD* reveals that ECS has a greater and statistically significant impact of overinvestment for Local government-controlled enterprises. The results show coefficients of 0.002 for both *overINV1* and *overINV2* for Local government-controlled enterprises. According to t-statistics, the results are respectively significant at 10%.

Refer Table 6

VI. Conclusion

We present evidence that in China, the executive's compensation mechanism was related to the executive behavior in terms of overinvestment. In this paper, we attempt to quantify the degree of steadiness of the executive's compensation and we show that ECS might enhance an adventurous spirit of the executives. Our results show that ECS lead to an excessive level of investment in China over the 2005-2013 period. More specifically, our results on full-sample companies suggest that the executive's compensation rises with the financial performance of the company and it decreases with the company's financial downfall. However, the results show that the rise of the executive's compensation following the company's financial success is relatively higher than its decrease following the company's downfall. Therefore, our study show that in China, there is a tendency of "Generous Reward and Gentle Penalty" for the executives which may result in overinvestment.

Subdividing our sample based on property right, we present evidence that ECS existed among State-owned and Non-State-owned companies in China over the 2005-2013 period. However, the level of overinvestment seems relatively higher among State-owned companies. Our results also show that the level of administrative expenditure may have a negative and significant impact on overinvestment among State-owned and non state-owned companies while the level of operational cash flow seems to have a positive and significant impact on overinvestment in both categories of firms in China.

Finally, we subdivide our sample into companies controlled by local government and companies controlled by central government. Our results suggest that local government-controlled companies have a relatively higher sensitivity of the level of overinvestment to ECS. Moreover, our results suggest that the levels of overinvestment in central government-controlled and local government-controlled companies are both affected negatively by the level of administrative expenditure.

References

Adams, R., and D. Ferreira, 2007, A theory of friendly boards, *Journal of Finance,* 62, 217-250.

Bian, J. and X. Li, 2009, Corporate investment decision under irrationality-A behavioral corporate finance explanation of inefficient investment, *China Industrial Economics,* 7, 152-160.

Chen, D.H. , X.Y. Chen, and H. L. Wan, 2005, Regulation and Non-pecuniary Compensation in Chinese SOEs, *Economic Research Journal,* 2, 92-101 ;

Chen, X.Y, D.H. Chen, H.L. Wan and S.K. Liang, 2009, The Disparity in Regions, the Regulation of Emolument, and the Corruption of High-ranking Managers, *Management World*, 11, 67-81;

Conyon, M. J. , 1997, Corporate governance and executive compensation, *International Journal of Industrial Organization,* 15 (4), 493-509.

Fama, E. F. and K. R. French, 1997, Industry cost of equity, *Journal of Financial Economics,* 43 (2), 153-193.

Fu, F., 2010, Overinvestment and operating performance of SOE firms, *Financial Management,* 39 (1), 249-272.

Garvey, G. T. , and G. Hanka, 1999, Capital structure and corporate control: The effect of antitakeover statutes on firm's leverage, *Journal of Finance,* 54 (2), 519-546.

Goel, A. M. , and A. V. Thakhor, 2008, Overconfidence, CEO selection, and corporate governance, *Journal of Finance,* 6, 2737-2784.

Gompers, P. , J. Ishii, and A. Metrick, 2003, Corporate governance and equity prices, *The Quarterly Journal of Economics,* 118 (1), 107-155.

Guo,X.W. and J.X. Jia, 2006, The local government behavior, investment impulse and macroeconomic stability*, Management World*, 5, 17-32.

He, J .G., and J.H. Ding, 2001,Empirical analysis of the listed company investment decision-making behavior, *Securities market offer*, 9, 44-47;

Hirshleifer, D., and Y. Suh,, 1992, Risk, managerial effort and project choice, *Journal of Financial Intermediation,* 2, 308-345.

Huang, W., F. Jiang, Z. Liu, and M. Zhang, 2010, Agency cost, top executive's overconfidence, and investment-cash flow sensitivity- Evidence from listed companies in China, *Pacific-Bassin Finance Journal,* 19, 261-277.

Hubbard, R. G., 1998, Capital-market imperfections and investment, *Journal of Economic Literature,* 36, 193-225.

Jensen, M. C., 1986, Agency costs of free cash flow, corporate finance and the market takeovers, *American Economic Review,* 76, 323-329.

Jensen, M. C., 1993, The modern industrial revolution, exit, and failure of internal control system, *Journal of Finance,* 48 (3), 831-880.

Jensen, M. C., and K. J. Murphy, 1990, Performance pay and top management incentives, *Journal of Political Economy,* 98, 225-264.

Jiang, G. H., and H. Yue, 2005, A study of the relationship between big shareholders' diverting listed companies' capital and the stock returns of these companies, *Management World,* 9, 87-98.

Kato, T., and C. Long, 2006, Executive compensation, firm performance, and corporate governance in China: Evidence from Firms listed in the Shanghai and Shenzhen stock exchange, *Economic Development and Cultural Change,* 54 (4), 945-983

Li, P.G., and M. Xiao, 2012, CEO Tenure and Firm Capital Investment, *Journal of Financial Research,* 2, 87-96;

Li, W.A., and T. Jiang, 2007, On Corporate Governance and Overinvestment of Listed Companies in China, *Finance & Trade Economics*, 12, 73-79;

Lin, Y.F., F. Cai, and Z. L., Full information and state-owned enterprise reform, Shanghai: Shanghai People's Publishing House,1997;

Malmendier, U., and G. Tate, 2005, CEO overconfidence and corporate investment, *Journal of Finance,* 60 (6), 2661-2700.

Pan, H.B., X.P. Xia, and M.G. Yu, 2008, Government Intervention, Political Connections and the Mergers of Local Government-Controlled Enterprises, *Economic Research Journal*, 4, 41-52;

Pan, M., and Y. Jin, 2003, Information Asymmetry, Equity Structure Design and the Overinvestment of Listed Enterprises, *Journal of Finance*, 1, 52-64;

Richardson, S., 2006, Over- investment of free cash-flow, *Review of Accounting Studies*, 11 (2), 159-189.

Song, F., and A. V. Thakhor, 2006, Information control, career concerns, and corporate governance, *Journal of Finance,* 61 (4), 1845-1896.

Stulz, R. M., 1990, Managerial discretion and optimal financing policies, *Journal of Financial Economics*, 26 (1), 3-27.

Tang, X. S., X. S. Zhou, and R. J. Ma, 2010, Government intervention, GDP growth and local SOE overinvestment, *Journal of Financial Research,* 8, 33-48.

Wang, Y. C., 2009, Financial constrains, cash holdings and overinvestment, 7, *Management World*, 111-119.

Wang, P., and S. X. Sun, 2009, A study of free cash flow, ownership structure and overinvestment of China's listed companies, *Journal of Contemporary Finance and Economics,* 4, 123-129.

Xia, J.J., and Y. Zhang, 2008, the Conflicts between Control Rights and Incentives: An Empirical Analysis on the Effect of Stock Incentives in China, *Economic Research Journal,* 3, 87-98;

Xia, L. J., and Y.Q. Fang, 2005, Government Control, Institutional Environment and Firm Value: Evidence from the Chinese Securities Market, *Economic Research Journal*, 5, 40-51;

Xin, Q. Q., B. Lin, and Y.C. Wang, 2007, Government Control, Executive Compensation and Capital Investment, *Economic Research Journal*, 8, 110-122.

Zhang, H. L., and Z. F. Liu, 2012, Cash distribution, corporate governance and overinvestment, *Management World,* 102-114.

Zhang, G., and X. Song, 2009, Measuring inefficient investment by listed companies in China: Overinvestment or underinvestment, *Journal of Accounting Research,* 5, 69-77.

Table 1: Description of variables

Variable		Definition
INV_t	Investment level	The difference between the cash outflow and cash inflow due to fixed assets, intangible assets and other long-term assets scaled by the total assets at the beginning of the year;
$Growth_{t-1}$	Growth rate	The growth rate of the operating revenue at year t-1.
LEV_{t-1}	Financial Leverage	Liabilities divided by total assets in the beginning of the year t.
$Cash_{t-1}$	Cash holdings	Cash balance divided by total assets in the year t-1.
Age_{t-1}	Firm's age	The number of years from company's IPO to year t-1.
$Size_{t-1}$	Assets' size	The natural logarithm of the total assets for year t-1.
RET_{t-1}	Stock Return	The company's annual stock return for year t-1.
INV_{t-1}	Investment level	The incremental investment spending for year t-1.
$OverINV_1$	Overinvestment (1)	Residual values of the regression model (1).
$OverINV_2$	Overinvestment (2)	Positive residual values of the regression model (1).
$STEAD_t$	ECS	Elasticity of executives' compensation to net profit.
$RECA_t$	Other receivable ratio	Company's other receivables divided total asset for year t;
$ADMN_t$	Administrative expense ratio	Company's administrative expenses divided by total assets for year t.
$OCFA_t$	Free Cash Flow	Cash flow from operations to total assets ratio for year t.
GDP_t	Local GDP growth rate	Local GDP growth rate for year t.
$FISC_t$	Local fiscal expenditure	The natural logarithm of the local fiscal expenditure for year t.
$Market_t$	Market index	The market index prepared by the Fangang (2007).

Table 2 Descriptive Statistics for all variables for the 2005-2013.

Variable	Obs.	Mean	Median	Max	Min	Std Dev
INV_t	4630	0.054	0.039	0.263	-0.062	0.057
$OverINV_{1t}$	4630	0.054	0.047	0.171	-0.012	0.037
$OverINV_{2t}$	4445	0.056	0.049	0.171	0.001	0.036
$STEAD_t$	1132	5.678	1.962	130.95	0.037	6.46
$Growth_{t-1}$	4630	0.253	0.149	5.171	-0.651	0.674
LEV_{t-1}	4630	0.512	0.514	1.411	0.066	0.222
$Cash_{t-1}$	4630	0.168	0.136	0.639	0.008	0.124
RET_{t-1}	4630	0.024	-0.014	0.633	-0.243	0.164
$Size_{t-1}$	4630	21.71	21.58	25.33	18.95	1.230
Age_{t-1}	4630	9.529	10	18	1	4.684
INV_{t-1}	4630	0.057	0.042	0.269	-0.058	0.060
$RECA_t$	4630	0.021	0.010	0.181	0.001	0.031
$ADMN_t$	4630	0.048	0.042	0.174	0.005	0.031
$OCFA_t$	4630	0.046	0.046	0.271	-0.210	0.083
GDP_t	4630	9.796	9.823	10.952	7.210	0.780
$FISC_t$	4630	9.311	8.254	17.447	6.365	3.060
$Market_t$	4630	8.841	8.930	11.800	3.250	1.983

Table 3: The coefficient of correlation between different variables

	$OverINV_{1t}$	$OverINV_{2t}$	$STEAD_t$	$RECA_t$	$ADMN_t$	$OCFA_t$	GDP_t	$FISC_t$	$Market_t$
$OverINV_{1t}$	1.00								
$OverINV_{2t}$	0.41***	1.00							
$STEAD_t$	0.07***	0.06***	1.00						
$RECA_t$	-0.26***	-0.25***	-0.04***	1.00					
$ADMN_t$	-0.07***	-0.07***	-0.05***	0.05***	1.00				
$OCFA_t$	0.26***	0.22***	0.03	-0.05***	0.05***	1.00			
GDP_t	0.009	0.02	0.04**	0.03**	-0.12	0.15***	1.00		
$FISC_t$	-0.06***	0.04***	0.01	0.03***	0.12***	0.01	-0.03**	1.00	
$Market_t$	-0.04**	0.04**	-0.4***	0.02	0.07***	0.07***	-0.01	0.03*	1.00

* Significant at the 10 percent level. ** Significant at the 5 percent level. *** Significant at the 1 percent level.

Table 4: Empirical results of factor regressions, January 2005-December 2013.

Table 4 presents the results from regression model (1). *T*-statistics are in parenthesis. Sample alphas are annualized percentages. The regressions use Newey-West (1987) heteroskedasticity and autocorrelation consistent standard errors, clustered at firm level, to calculate the significance levels for all coefficients.

Variable	*Alpha*	$Growth_{t-1}$	LEV_{t-1}	$Cash_{t-1}$	Age_{t-1}	$Size_{t-1}$	RET_{t-1}	INV_{t-1}	$AdjR^2$
INV	-0.017	0.002***	-0.013***	0.036***	-0.001***	0.002***	0.003	0.544***	0.44
	(-1.21)	(1.72)	(-4.24)	(5.16)	(-3.93)	(4.05)	(0.57)	(32.97)	

* Significant at the 10 percent level. ** Significant at the 5 percent level. *** Significant at the 1 percent level.

Table 5: Empirical results of regression model (2) on Full-sample, SOE and Non-SOE sub-samples, January 2005-December 2013.

T-statistics are in parenthesis. Sample alphas are annualized percentages. The regressions use Newey-West (1987) heteroskedasticity and autocorrelation consistent standard errors, clustered at firm level, to calculate the significance levels for all coefficients.

	Variable	*Alpha*	$STEAD_t$	$RECA_t$	$ADMN_t$	$OCFA_t$	GDP_t	$FISC_t$	$Market_t$	$AdjR^2$
Full	$OverINV_1$	0.05	0.001*	-0.17***	-0.17***	0.08**	-0.001	0.002	0.001	0.32
		(-0.24)	(1.73)	(-9.66)	(-6.84)	(11.61)	(-0.39)	(0.45)	(0.27)	
	$OverINV_2$	0.05	0.001	-0.18***	-0.15***	0.07***	-0.001	0.002	0.001	0.28
		(1.02)	(1.36)	(-9.41)	(-6.05)	(10.12)	(-0.36)	(0.52)	(0.06)	
SOE	$OverINV_1$	0.04	0.002***	-0.16***	-0.15***	0.09***	-0.004	0.004	-0.001	0.36
		(0.69)	(2.64)	(-6.98)	(-4.57)	(10.09)	(-1.16)	(0.68)	(-0.03)	
	$OverINV_2$	0.04	0.001**	-0.17**	-0.13***	0.08**	-0.005	0.004	0.001	0.33
		(0.59)	(2.41)	(-6.87)	(-4.20)	(9.31)	(-1.26)	(0.78)	(0.06)	
NSOE	$OverINV_1$	0.03	-0.001	-0.20***	-0.18***	0.06***	-0.002	0.004	-0.001	0.31
		(0.36)	(-0.51)	(-7.76)	(-4.75)	(5.91)	(-0.28)	(0.60)	(-0.20)	
	$OverINV_2$	0.03	-0.001	-0.21***	-0.15***	0.05***	-0.001	0.004	-0.001	0.26
		(0.41)	(-0.90)	(-7.46)	(-3.96)	(4.67)	(-0.03)	(0.49)	(-0.66)	

* Significant at the 10 percent level. ** Significant at the 5 percent level. *** Significant at the 1 percent level.

Table 6: Empirical results from the regression model (2) for Central and Local government-controlled sub-samples, January 2005-December 2013.

T-statistics are in parenthesis. Sample alphas are annualized percentages. The regressions use Newey-West (1987) heteroskedasticity and autocorrelation consistent standard errors, clustered at firm level, to calculate the significance levels for all coefficients.

	Variable	*Alpha*	$STEAD_t$	$RECA_t$	$ADMN_t$	$OCFA_t$	GDP_t	$FISC_t$	$Market_t$	$AdjR^2$
CGC	$OverINV_1$	0.03	0.001*	-0.21***	-0.15**	0.07***	-0.01	0.01	0.01	0.35
		(0.18)	(1.84)	(-4.82)	(-2.50)	(3.58)	(-0.63)	(0.37)	(1.15)	
	$OverINV_2$	0.06	0.001*	-0.20***	-0.13**	0.06***	-0.002	0.01	0.01	0.35
		(0.43)	(1.80)	(-4.62)	(-2.21)	(2.99)	(-0.31)	(0.07)	(1.10)	
LGC	$OverINV_1$	0.06	0.002*	-0.15***	-0.15***	0.01***	-0.03	0.002	-0.01	0.37
		(0.93)	(1.94)	(-5.71)	(-4.24)	(9.97)	(-0.87)	(0.37)	(-0.52)	
	$OverINV_2$	0.05	0.002*	-0.16***	-0.14***	0.01***	-0.04	0.003	-0.01	0.34
		(0.75)	(1.76)	(-5.61)	(-3.97)	(9.18)	(-1.09)	(0.58)	(-0.42)	

* Significant at the 10 percent level. ** Significant at the 5 percent level. *** Significant at the 1 percent level

Authors

Danlu Bu, Associate Professor of Accounting, School of Accounting, SouthWestern University of Finance and Economics, China, budanlu@swufe.edu.cn

Homayoon Shalchian*, Associate Professor of Finance, School of Commerce, Laurentian University, Canada, hshalchian@laurentian.ca

Chenyu Zhang, PhD candidate, Business school, University of International Business and Economics, China, chenyu890707@163.com

*corresponding author