

Investor Protections, Financial Development and Corporate Investment Efficiency

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Abstract

This paper theoretically and empirically investigates the micro-mechanism and economic consequences of legal protections of investor rights and financial development regulating firm inefficient investment based on a broad cross-sectional sample of 8548 firm-year observations of companies listed on Shanghai and Shenzhen stock exchanges in China over the period 2003 to 2011. By following the creative approach to measure a firm's underinvestment and overinvestment put forward by Richardson (2006), I find that the magnitude of underinvestment of the private enterprises is much higher than that of state-owned enterprises, however, there is no significant difference in overinvestment between private enterprises and state-owned enterprises. Further analysis reveals that firms with positive free cash flow are more likely to engage in overinvestment. In contrast, firms with negative free cash flow more easily suffer from underinvestment. The improvement in the level of the legal protection of investor rights of a region in China can significantly relax the underinvestment of private enterprises, yet further aggravates rather than mitigates state-owned enterprises' underinvestment. Although financial development of a region in China can also reduce the underinvestment of private enterprises, it has no impact on the reduction in the magnitude of the underinvestment of state-owned enterprises. Furthermore, contrary to the theoretical expectation, there is no evidence indicating that the improvement in the level of the investor protections and financial development of a region in China could effectively restrain the possibility of overinvestment of private and state-owned enterprises, which suggests that the role of the rule of law and financial development in alleviating the enterprises' inefficient investment is still relatively limited in China. These findings above together mean that unless the institutional environments of the lack of effective legal protection of private property rights as well as the underdeveloped formal financial system have been fundamentally improved, the inefficient problems of state-owned property rights and the resulting firm investment inefficiency and distortion may not automatically disappear with the reform of property rights of Chinese state-owned enterprises.

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1 Introduction

In a world of perfect capital markets where there exist no informational asymmetries and transaction costs in the economy, and debt financing is free risk, Modigliani and Miller (1958) have showed that a firm's financing sources are irrelevant to its value. In this case, firms are indifferent to financing their investment programs from internal or external funds, and a firm should engage in all investment projects with positive net present value as long as the cost of capital to firm is equal to or lower than the returns of the investment, and the market value of the firm will be determined only by the future profitability and cost of capital of its investment projects, which will achieve the maximum market value at the optimal level of investment. However, there is a growing body of literature documenting that in practice, there don't exist such conditions that could meet the creation of perfect capital markets (Stiglitz and Weiss, 1981; Myers and Majluf, 1984). Informational asymmetries and transaction costs in the capital markets may give rise to either agency conflicts or contract enforcement problems between external investors and managers of firms, which results in the deviation of the actual investment expenditures of a firm from its optimal level of investment, and thus causes the firm's investment to be inefficient and distorted. The forms of investment inefficiency and distortion include underinvestment and overinvestment. The former shows that the actual investment expenditures of a firm are less than its optimal investment level, and some investment opportunities that would have positive net present value in the absence of adverse selection and could increase the firm value are forced to forsake or postpone (Biddle, Hilary and Verdi, 2009). On the contrary, the latter indicates that a firm may undertake some projects with negative net present value, which thus causes that actual investment expenditures of a firm are more than its optimal investment level. On one hand, underinvestment makes large quantity social funds fail to effectively use and idle. On the other hand, overinvestment causes a firm's capitals sunk in the field of surplus production capacity, which wastes the firm's limited resources and production inputs. Since the firms' objective is to maximize the value of the investment, both underinvestment and overinvestment bring about a distorted investment behavior and therefore reduce the firm value. As a result, in theory, both underinvestment and overinvestment will have a negative impact on the firm's future profitability, and beget the function of resource allocation of capital markets invalid, which will hinder a country's economy sustainable and healthy development.

In the imperfect capital markets, the primary cause of why financing constraints or agency conflicts give rise to a firm's investment behavior distorted and inefficient is that there exists a conflict of interest among shareholders, creditors and managers. When the legal systems of a country are imperfect and thus lack of effective protection for investors' rights, and there exist financial frictions, such as informational asymmetries and transaction costs, in the capital markets, to obtain control private benefits, the firms' managers and controlling shareholders have a much stronger incentive to utilize inefficient investment to expropriate the interests of external investors. In order to protect their own interests from expropriation implemented by self-interested managers and controlling shareholders, the rational response of external investors who are in a weak

position in terms of corporate governance is to reduce or even reject the supply of funds, and claim a much higher premium as compensation when they are to provide a firm with financing. The results above will inevitably lead to a firm's financing sources sluggish, and thus have a negative impact on the firms' future investment because of lack of capital. The orderly market economy is both legal and moral economy, and the completeness of laws and their enforcement efficiency exogenously determine the extent of external investors' rights being protected and effectively implemented. The improvement in legal protection of the rights and interests of external investors not only restrains expropriation by managers and controlling shareholders, and alleviates the conflict of interests between firm insiders and external investors, but also raises the willingness of the potential shareholders and creditors to supply funds in exchange for securities, which hence expands the scope of capital markets (La Porta, Lopez-De-Silanes, Shleifer, and Vishny, 1997), and reduces the financing constraints encountered by firms (largely due to much better legal protections, potential shareholders and creditors are more willing to sponsor firms), and promotes the formation and development of financial systems of a country. On one hand, financial development will provide adequate external funds for the expansion of firms, and reduces firms' financing pressure. On the other hand, the monitor function of financial systems can also effectively prevent managers and controlling shareholders from misusing firm resources, and decrease the costs of firm expansion, and therefore promote a firm better growth. In recent years, an increasing strand of literature on law and finance has found that, in a country where legal systems are relatively complete, and stock markets are very active, and the size of banks is much larger, firms are more likely to obtain external funds, and the agency problem between external investors and insiders of the company is relatively low (La Porta, Lopez-De-Silanes, Shleifer, and Vishny, 2000; Claessens, and Fan, 2002). Consequently, both the improvement in legal protection of investors' rights and interests and the enhancement of the level of financial development of a country will help firms overcome the problems of financing constraints and agency conflicts, and reduce the magnitude of the deviation of investment expenditures of a firm from its optimal level of investment, which can thus facilitate more rapid economic growth of a country via this micro conduct mechanism. Meanwhile the rule of law picking up the level of investor protections is the sine qua non for setting economic forces and energies free (Casper, 2004).

Since reforming and opening up in 1978, on the whole, the construction of the rule of law of China has made considerable progress, and legal environments of each region of China have been significantly improved, and the quantity and quality of legislation in the financial sector is also rising (Li and Liu, 2005). However, as a transitional economy, many institutional factors, such as differences in economic geography and culture of each region, and the impact of non-balanced regional development strategy under the auspices of Chinese central government coupled with dysfunctional behavior of local government officials at all levels caused by promotion system based on relative economic performance under the current decentralization system, have resulted in that there does exist significant variation in the legal level of investor protections across regions of China. As regards investors, although they enjoy the same national legal systems, differences in conception of the rule of law and judicial efficiency and enforcement capacity in each region of China result in that the enforcement effectiveness of the same legal provisions is completely different in each regions of China, which hence gives rise to systematic discrepancies in the level of legal protections of investors' rights and interests across regions in China. Moreover, during the process of Chinese economy transition, due to

lack of market-supporting institutions, its financial systems have the representative features of financial repression (Lu and Yao, 2004). Interest rates are usually determined by the central bank rather than the relationship of fund supply and demand, and far below the actual market interest rate. Financial repression has seriously hindered the capital accumulation, technological progress and economic growth. At the same time, in order to satisfy the fund demand of state-owned enterprises to realize the stability and sustainable growth of state-owned economies, Chinese government adopts powerful financial control policy characterized by credit rationing and ownership discrimination (Xin, 2005). Credit rationing and ownership discrimination under powerful financial control policy have resulted in that the ability of private enterprises to raise external funds is generally weaker than that of state-owned enterprises, which makes private enterprises facing much more severely financing constraints in the capital markets. In order to obtain the funds required for investment externally, private enterprises are forced to pay very high cost premium for external financing. This distorted institutional arrangement has become one of the decisive factors that restrict the sustainable development of private enterprises.

The purposes of this paper aim to delve into the following questions: (1) Under the special institutional background of China's transitional economy where financial repression exists in formal financial markets and the level of legal protection of investors' rights and interests is still relatively weak on average, could the improvement in the rule of law and the enhancement of the level of financial development relieve financing constraints and agency conflicts encountered by firms based on the fact that the process of financial deepening is in essence the process of moderating financing constraints, and thus reduce firms' inefficient investment? (2) Whether the influence of the legal protections of investor rights and financial development of a region in China on the investment inefficiency and distortion (underinvestment and overinvestment) is significantly different between state-owned and private enterprises. In other words, If the rule of law and financial development can significantly control firms' inefficient investment, then relative to the state-owned enterprises, do the rule of law and financial development play an even more important role in the reduction of the inefficient investment of private enterprises based on the fact that private enterprises face more serious financing constraints and credit discrimination in formal financial markets? The answer to the first question constitutes the base for further studying the second question. Whether this expectation is correct still remains an empirical issue that I wish to address in this paper.

The principal tests of this paper suggest that the magnitude of underinvestment of the private enterprises is much higher than that of state-owned enterprises, however, there is no significant difference in overinvestment between private enterprises and state-owned enterprises. Further analysis reveals that firms with high free cash flow are more likely to engage in overinvestment. On the contrary, firms with negative free cash flows (one manifestation of shortage of funds) more easily suffer from underinvestment. I also find that the improvement in the level of the investors' legal protections of a region in China can significantly moderate the underinvestment of private enterprises, but has a negative impact on the underinvestment of state-owned enterprises. Although financial development of a region in China can also reduce the underinvestment of private enterprises, the negative relationship between underinvestment and financial development does not occur in state-owned enterprises. Furthermore, contrary to the theoretical expectation, the results of this paper do not provide evidence that the improvement in the level of the investors' legal protection and financial development of a region in China could effectively restrain the likelihood of overinvestment of both private enterprises and

state-owned enterprises, which suggests that the function of the rule by law and financial development in alleviating the firms' inefficient investment is still relatively limited in China. The research results of this paper have important policy implications which mean that unless the institutional environments of the lack of effective legal protection of private property rights as well as the relative backwardness of the formal financial system has been fundamentally improved, the inefficient problems of state-owned property rights and the resulting corporate inefficient investment may not automatically disappear with reform of property rights (privatization) of Chinese state-owned enterprises.

The remainder of this paper is organized as follows. Section 2 is literature review. The theoretical analysis and associated hypotheses which are put forward based on the institutional background of Chinese transitional economy are presented in section 3. In section 4 I provide a brief description of the sample selection, the variables definition and methodology specification. It also discusses the measurements of overinvestment and underinvestment by following the investment expectation model creatively suggested by Richardson (2006). The main results are reported in section 5. The final section summarizes findings of this paper and discusses some policy implications.

2 Literature Review

Based on the rationale that financial development can effectively reduce the costs of external finance that firms pay, Rajan and Zingales (1998) have demonstrated that industrial sectors that are relatively more dependent on external finance develop disproportionately faster in countries with more developed financial markets. Using 65 countries-years of data, Wurgler (2002) directly tests the relation between financial markets and the allocation of capital, and finds that those with developed financial markets increase investment more in growing industries, and decrease investment more in declining industries, than financially underdeveloped countries. The efficiency of capital allocation is also negatively associated with the extent of state ownership in the economy, and positively correlated with the degree of firm-specific movement in domestic stock returns and the legal protection of investors. Based on a broad cross-sectional sample of 48132 firm-year observations across 36 countries over the period 1988 to 1998 while taking advantage of the cross-country variation in financial market development, Love (2003) investigates the role of financial development in the reduction of financing constraints that would otherwise distort efficient allocation of investment and finds that there exists a significantly strong negative relationship between the sensitivity of a firm's investment to the availability of its internal cash flow and an index of financial development. This result implies that financial development can reduce informational asymmetries in financial markets and thus effectively mitigate the negative effect of financing constraints on investment. Using annual panel data on 394 listed firms in 13 developing countries over the period 1988 to 1998, Laeven (2003) examines whether financial liberalization relaxes financing constraints of firms and finds that financial liberalization affects small and large firms differently. Small firms are more financially constrained before the start of the liberalization process than large firms, but become less so after financial liberalization. Financing constraints of large firms, however, are low before financial liberalization, but become higher as financial liberalization proceeds. This finding suggests that only small firms in developing countries benefit from financial liberalization. After separating the 'fundamental factors' (such as marginal profitability of

investment) from the ‘financial factors’ (such as availability of internal finance) that influence the level of investment by using orthogonalized impulse-response functions, Love and Zicchino (2006) study the dynamic relationship between firms’ financial conditions and investment and find that the effect of financial factors on investment is significantly larger in countries with less developed financial systems, which confirms the role of financial development in improving capital allocation and growth. Khurana, Martin and Pereira (2006), using 12,782 firm-level data for 35 countries over the years 1994-2002, examine the impact of financial development on the demand for liquidity by focusing on how financial development affects the sensitivity of firms’ cash holdings to their cash flows and find the sensitivity of cash holdings to cash flows decreases with financial development. Becker and Sivadasan (2006), using a large cross-country data set covering most of the European economy, directly test for whether financial development reduces financing constraints at the firm level and find that cash flow sensitivity of investment is lower in countries with better-developed financial markets. Their research results suggest that financial development may mitigate financing constraints and reduce the dependence of firms’ investment on internal resources.

In the context of China, some scholars have also explored the role of financial development in reducing financing constraints of the firm. Li and Jiang (2006) finds that the improvement in the level of financial development of each region of China can significantly mitigate firms’ financing constraints and facilitate the growth of firms which are highly dependent on external financing. Zhu, He, and Chen (2006) find that financial development can alleviate the financing constraints, and reduce the sensitivity of the investment of the firm to internal cash flows. However, the presence of soft budget constraints distorts and weakens the positive role of financial development in the reduction of financing constraints of state owned enterprises, which results in “leakage effect”. Rao (2009) finds that there exist financing constraints among Chinese listed companies by using Euler equation and that financial development can reduce financing constraints, and this effect is much stronger in private enterprises, which are less likely to have access to formal financial markets, rather than state-owned enterprises. At the same time, his evidence also indicates that the role of financial intermediation development in relieving financing constraints is much larger than that of stock market development. Shen, Kou and Zhang (2010) test the effect of financial development on financial constraints. Their main finding is that investment of Chinese listed companies is highly sensitive to internal cash flows and that financial development is conducive to the mitigation of financing constraints. Moreover, further research reveals that though financial constraints encountered by state-owned enterprises is much lower than that of private enterprises, the role of financial development in reducing the financing constraints is much more obvious in private enterprises. Wang, Qi and Zou (2012) find that Chinese listed companies generally suffer from the problem of financing constraints in formal financial markets and exhibit very high cash flow sensitivity of cash. Financial development can effectively relieve financing constraints and reduce firms’ sensitivity of cash to cash flows. However, the effect of financial development on the private and state-owned enterprises’ financing constraints and sensitivity of cash holdings to cash flows is significantly different. Cai (2013) examines how difference in the level of the rule of law of each region in China influences firms’ investment efficiency and finds that the sensitivity of investment of a firm to its availability of internal cash flows is significantly lower in regions with better legal systems. The effect above is much stronger in private enterprises, which are more likely to suffer from credit ration and ownership

discrimination in the formal financial markets and expropriated by governments at all levels. However, the improved investment efficiency resulting from the better legal systems is not ultimately transferred to the increase in the firms' future operational performances, suggesting that the role of the rule of law in controlling firm inefficient investments is relatively limited.

Through the systematical analysis of these available literature above, I find that most of studies mainly focus on how financial development reduces firms' financing constraints. However, relatively few papers have directly studied the role of financial development in controlling firm inefficient investment. Furthermore, when a majority of the scholars investigate the effect of financial development on financing constraints, they often use the sensitivity of firms' investment or cash to internal cash flows as a proxy for financing constraints faced by a firm and ignore the fact that the relationship between investment-cash flow sensitivities and the degree of financing constraints is nonmonotonic and higher sensitivities of investment to cash flow can't be generally interpreted as evidence that firms are more financially constrained (Kaplan and Zingales, 1997). Consequently, the above scholars' findings can't infer that financial development has a positive impact on the investment efficiency of firms, and the prior research results regarding the impact of financial development on firms' investment inefficiency and distortion still remain inconclusive. At the same time, with the exception of Cai's (2013) research (though he also uses the sensitivities of investment to cash flow to measure the magnitude of investment inefficiency and distortion and thus there exists limitation of research approach in his paper), relatively few papers have yet directly explored how the level of investor protections of a country affects a firms' investment efficiency (underinvestment and overinvestment). Based on the analysis above, I argue that whether the legal protection of investors' rights and financial development can really mitigate firms' investment inefficiency and distortion (underinvestment and overinvestment) ultimately still remains an empirical question which needs normative positive research approach to further study. The focus of this paper is designed to address this question empirically. Overall, I will provide new empirical evidence on the role of investor protections and financial development of a region in China in ameliorating the firms' investment efficiency (underinvestment and overinvestment).

3 Institutional Background, Theoretical Analysis and Research Hypotheses

Whether private property rights are legally protected constitutes the premise under which external investors are willing to provide funds to firms and is also the key to improve the level of corporate governance of a country and protect external investors' interests against expropriation by insiders. The main reasons why financing constraints and agency conflicts give rise to firms' investment distortion and inefficiency are largely associated with the absence of effective legal protections of external investors' rights and capital market imperfections. In a market economy, the legal systems are one of the most important source of the protections of investors' rights. Through the regulation and coordination of constraint mechanism, incentive mechanism and information mechanism on the behavior of economic entities, legal systems try to provide all the external investors a stable expectations regarding economic justice, which thus eliminates external investors'

concern about expropriation imposed by managers of the firms and controlling shareholders and enhances investors' confidence in firms. The legal provisions protecting investors' rights and their quality of enforcement dynamically determine the level of investor protections of a country. As a result, empowering investors' rights more legal protections not only can enhance the willingness of investors to offer funds to firms, and reduce firms external financing obstacles, but also promote financial development of a country, and thus ease credit rationing and discrimination encountered by firms in the formal financial markets, which will mitigate the problems of financing constraints or agency conflicts of firms, and make the rectification of the investment decision rules of past deviation from the value maximization of enterprises and therefore improve firms' investment efficiency. Furthermore, countries with better investor protections would have more external finance in the form of both higher valued and broader capital markets (La Porta, Lopez-De-Silanes, Shleifer, and Vishny, 1997). On the other hand, the incentive and constraint functions of the rule of law can control corporate agency problems, and eliminate the expropriation imposed by insiders on external investors' interests, and moderate the agency conflicts between shareholders and managers. If this effect of the rule of law is reflected in investment fields, then it means that external investors can exert considerable influence on the firm efficiency of investment by virtue of rights granted by the laws, and therefore prevent firms' managers and controlling shareholders from overinvesting in inefficient projects or industries. Lu and Yao (2004) find that strengthening the rule of law helps facilitate bank loans to private sectors and stimulate competitions in banking industry in China. As a result, based on the theoretical analysis above, I can reasonably infer that when the legal systems of a region of China become even more effective, the degree of distortion and inefficiency of investment of the firm will eventually reduce. Given that the extent of legal protections of investors' rights of a country is usually determined by its level of the rule of law, i.e., legal rules and their quality of enforcement (La Porta, Lopez-De-Silanes, Shleifer, and Vishny, 1997), thus, my first hypothesis could be stated as follows:

H1: the level of the rule of law of a region in China is significantly positively associated with firm investment efficiency.

In addition to the rule of law, financial development also helps reduce inefficient investment of a firm. Financial systems of a country are mainly made up of financial intermediaries and financial markets. Financial intermediaries are one of the most important participants in the financial markets, whereas financial markets provide a necessary site for financial intermediaries engaging in financial activities. Financial development generally refers to a comprehensive process of dynamic change of financial systems, and it thus continuously improves the operational efficiency of financial intermediaries and financial markets through the increase in financial assets, the optimization of financial structure and the innovation of financial instruments. It is generally believed that well-developed financial systems have the following basic functions, such as collecting and processing information, facilitating the trading, hedging, diversifying, and pooling of risk, allocating resources, monitoring managers and exerting corporate control, mobilizing savings, and promoting the exchange of goods, services and financial contracts (Levine, 1997). Firstly, the function of collecting and processing information of financial systems could economize on information acquisition costs which effectively reduce financing frictions, such as adverse selection and moral hazard, in the formal financial markets arising from informational asymmetries and contract incompleteness, and hence improve operational efficiency of financial markets. The

improvement in operational efficiency of financial markets, on one hand, can stimulate the production of information about investment opportunities, which will provide external investors with necessary information regarding helping form the correct asset pricing and investment decisions, and thereby reduce the loss caused by the wrong pricing or decision-making, and offer important information support to the operation of other functions of financial systems. On the other hand, it will provide a measure of reflecting the diligence degree of firms' managers and the corresponding feedback mechanism, which is conducive to contracting and supervising the fulfillment of the contracts, and thus lower the information and incentive costs of external investors constraining managerial dysfunctional behavior. The reduction in informational asymmetries can in turn mitigate external financing constraints (Levine, 1997). Secondly, the function of mobilizing savings of financial systems can aggregate a large quantity of social idle funds by changing the level of residents' savings, and increase the potential supply of capital of a country, and resorts to interest rate and exchange rate to stimulate the transformation of savings into a higher proportion of real investment, which will thus more fully expand firm s' funds used in investment and ease their financing constraints. Thirdly, the resource allocation function of financial systems will allocate resources of different space or point of time among projects according to its return on investment, and guide firms to engage in investment much more rationally, which therefore improves the quality and efficiency of capital investment of a country. Fourthly, the functions of diversifying risk and facilitating the exchange of goods and services of financial systems provide investors with a number of financial instruments characterized by strong liquidity, high security, and stable income, which will ultimately improve savings structure, and reduce the holdings of current assets of the whole society, and therefore help investment expansion and capital formation of the firm. Finally, the governance function of monitoring firm managers and exerting corporate control of financial systems (overseeing the progress of the investment and implementing corporate governance after financing investment) could overcome the "free rider" problems of the medium and small investors participating in corporate governance, and facilitate external investors to carry out control on the firm. This effect is reflected in two aspects: One is that a transparent and highly efficiently operational stock market is conducive to corporate governance. Efficient stock markets not only can allow shareholders to link managerial compensation to the company's share performance (stock price and trading volume) in the capital markets so that it will help align managers' interests with those of shareholders, which will be conducive to alleviating agency problems between two due to satisfying the incentive conditions of managers' participation constraints, but also make use of proxy contest or takeover mechanisms to strengthen control on the firms, which thus offer firm owners who don't manage firms on a day-to-day basis a possibility of compelling managers to run the firm in the best interests of the owners (Levine, 1997). Moreover, proxy contest or takeover threat in the stock markets will restrict managerial opportunism behavior, and encourage managers to use firm funds more efficiently to realize the maximization of firm value. The other is that hard constraint attribute of payment of principals and interests of debt as well as its liquidation function in the event of default causes that debt contracts in the financial markets may also help improve corporate governance. Through the use of governance function of financial systems, external investors can efficiently reduce the opacity of the choice of investment projects, and prevent insiders from the abuses of firm resources, and eliminate opportunistic behavior in the process of investment, and prohibit firms from overinvesting inefficient projects. In summary, with the aid of the functions of financial

systems, financial development can play a major role in enhancing the firm investment efficiency, and therefore improve the resource allocation and promote economic growth of a country through this role. Rajan and Zingales (1998) posit that well-developed financial markets and intermediaries will help a firm overcome problems of moral hazard and adverse selection, thus reducing the firm's costs of raising money from external investors. La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1997), using a sample of 49 countries, have confirmed that countries with poorer investor protections, measured by both the character of legal rules and the quality of law enforcement, have smaller and narrower capital (equity and debt) markets. Although there exist large differences in the patterns of economic development and the degree of marketization across countries and point of time, the fundamental principles of financial development improving the firms' investment efficiency are the same and universal, and its basic functions remain constant over time and across countries (Levine, 1997). Accordingly, based on the theoretic analysis above, I can put forward the second hypothesis below:

H2: the degree of financial development of a region in China is significantly negatively associated with firm inefficient investment (underinvestment and overinvestment).

Since Chinese government launched the market-oriented reform of economic systems in 1978, private enterprises have developed rapidly, and at the same time their own strength is also continuously being augmented through the creation of new growths, which causes that private enterprises have now become one of the most important forces spurring the economic growth and a major contributor to GDP in China. However, during the process of economic transition in China, in order to satisfy the fund demand of state-owned enterprises to realize the stability and sustainable growth of state-owned economies, Chinese government implements strong financial control policy characterized by financial repression and ownership discrimination in the formal financial fields (Xin, 2006), which has resulted in the ability of private enterprises to raise funds externally in the formal financial markets generally weaker than that of state-controlled enterprises, and thus made private enterprises facing much more severe financing constraints in the formal financial markets (Cai, 2013). In order to obtain the funds required for investment, private enterprises are usually forced to pay much higher cost premium to state-owned banks. On the contrary, because of the policy loans of the state-owned banks and the expectation of soft budget constraint of bailing out from the governments at all levels when falling into financial distress, as well as institutional arrangements and function orientation of the stock markets servicing the resolution of problems of the fund difficulties of the state-owned enterprises in China, state-owned enterprises generally have a much higher ability to obtain capitals in the formal financial markets and thus face even lower financing constraints than those of private enterprises. Moreover, under the conditions of existing institutional arrangements, managers of state-owned enterprises are more prone to generate self-interested opportunistic behaviors, and less likely to use firm funds efficiently, and therefore giving rise to even higher agency problems between external investors and insiders. In order to grab much more monetary and non-monetary benefits related to a larger firm size, managers of state-owned enterprises have relatively more strong incentives to engage in unprofitable but empire-building investments, which thus inevitably erodes the investment efficiency of firms (Cai, 2013). Given the fact that the financing constraints faced by private enterprises are generally higher than state-owned enterprises, the improvement in the level of the rule of law and financial development of a region in China may bring in a much higher marginal effect of mitigating financing constraints of private enterprises, which will also play a certain role in the reduction of the

problems of inefficient investment caused by the agency conflicts between insiders and external investors. As a result, based on the analysis above, this can lead to the following hypotheses:

H3: *Ceteris paribus*, compared with state-owned enterprises, the negative relationship between the rule of law and financial development and inefficient investment (underinvestment and overinvestment) is much more profound for private enterprises.

4 Sample Selection and Research Design

4.1 An Accounting-based Framework to measure the Inefficient Investment (Underinvestment and Overinvestment) and Free Cash Flow

The current extant of literature indicates that there are two main methods common used by scholars to measure inefficient investment. The first method is to use the sensitivities of investment to availability of internal cash flows as a proxy for firm inefficient investment, which is based on the informational asymmetry theory or agency theory. In other word, whenever the firm investment behaviors are distorted and inefficient due to capital market imperfections or agency problems, investment expenditures of the firm would be much more sensitive to the availability of its internal cash flows. However, cash flow sensitivity of investment only confirms whether a firm's investment is distorted or inefficient, yet it can't identify the specific forms of the inefficient investment; that is to say, cash flow sensitivity of investment doesn't indicate whether the specific form of the inefficient investment is underinvestment or overinvestment, and is also difficult to quantitatively estimate the magnitude of the firm inefficient investment caused by both financing constraints in the capital markets and agency conflicts between insiders and external investors. The second method is to use Richardson's (2006) investment expectation model to decompose actual investment expenditures of a firm into the expected and unexpected investment. The expected investment represents the desirable level of investment of a firm, but the unexpected investment reflects the degree of the deviation of actual investment expenditures of a firm from its expected investment expenditures. An overinvestment occurs whenever the unexpected investment expenditures are greater than zero. When the opposite occurs, an underinvestment is obtained. Since the second method not only can identify whether firm investment occurs in underinvestment or overinvestment, but also effectively estimate the level of both underinvestment and overinvestment, which will thus satisfy the needs for measuring the magnitude of underinvestment and overinvestment of a firm in inefficient investment research. As a result, I will choose to use the second method to estimate the level of firms' investment inefficiency and distortion.

In order to construct measures of underinvestment and overinvestment, I follow the approach suggested by Richardson (2006) and first estimate a model that predict expected investment of a firm and then use residuals from this model as a proxy for inefficient investment. The model that has been modified is as follows:

$$I_{i,t} = \alpha_0 + \alpha_1 Gr_{i,t-1} + \alpha_2 Cash_{i,t-1} + \alpha_3 LnTA_{i,t-1} + \alpha_4 Roa_{i,t-1} + \alpha_5 Debt_{i,t-1} + \alpha_6 I_{i,t-1} + \alpha_7 LnAge_{i,t} + \Sigma Ind + \Sigma Year + \varepsilon_{i,t} \quad (1)$$

Where i is the sample firm and t indicates the year in the sample period, respectively; I is the firm's capital expenditures and measured as cash paid to acquire fixed assets, intangible assets and other long term assets minus net cash received from the sale of fixed assets, intangible assets and other long term assets in period t scaled by the book value of total assets as of the end of year $t-1$. The prior period's firm-level (lagged) investment is also included in model to capture non-modeled firm characteristics that affect investing decisions (Richardson, 2006) and the acceleration effect of investment. Gr is the firm's investment opportunities as of year $t-1$. In empirical studies, the variables commonly used to measure the firms' investment opportunities are Tobin's q and growth ratio of sales, respectively. Tobin's q is usually defined as the ratio of the market value of the firm's assets to their the replacement cost at the start of the fiscal year. The market value of the firm's assets is the sum of the market value of the equity, the book value of short term debt and the book value of long term debt. The replacement cost of assets is measured as the book value of total assets. Tobin's q is a poorer proxy for the firms' investment opportunities because it is an average value rather than marginal value (Hayashi, 1982; Lang, Stulz and Walking, 1991).¹ Furthermore, marginal q itself is unobservable and difficult to measure and the computation of Tobin's q will use stock prices. Due to the inefficiency and functional fixation problems of stock markets in China, utilizing Tobin's q to measure the firm's investment opportunities is problematic and will inevitably give rise to measurement errors. In addition, Altı (2003) has also confirmed that, since Tobin's q mainly reflects option value relating to firm long term growth potential but doesn't provide information about investment opportunities in the near-term, Tobin's q performs as a noisy measure of short-term investment expectations. Thus, to control possible measurement error in Tobin's q as a proxy for investment opportunities, I use growth ratio of sales as a proxy for a firm's investment opportunities to estimate the regression. $Cash$ is the firm's cash and cash equivalent divided by the book value of total assets as of year $t-1$. $LnTA$ is the natural logarithm transformation of book value of total assets as of year $t-1$, used to control the effect of firm size on the investment. RoA is return on assets as of year $t-1$, equal to the ratio of the profit after tax to the book value of total assets. Prior period's returns are included as an additional variable to capture growth opportunities not reflected in Gr . $Debt$ is debt-to-asset ratio and measured as the book value of total debt (the sum of short-term debt and long-term debt) divided by the book value of total assets as of end of year $t-1$. $LnAge$ is the natural logarithm of the number of years the firm has been listed on the stock exchanges in China since IPO. I take logarithms to reduce the skewness in the distribution of the number of years listed on the stock exchanges. Firm level investment will be relatively lower when it is more difficult to raise additional cash to finance the new investment as captured by leverage, firm size, firm maturity and level of cash (Richardson, 2006). Finally, I include industry indicators, Ind , and year indicators, $Year$, since firm-level investment patterns may systematically vary with differences in industry and are affected by fluctuation in macro economic conditions. For the purpose of industry classification, the Standard Industry Classification Code of

¹Hayashi (1982) has showed that only under certain strong assumptions, marginal q equals average q . Such assumptions or necessary and sufficient conditions that marginal q and average q are essentially the same include that the firm is a price-taker with constant returns to scale in both production and installation, and the production function and the installation function are both linearly homogeneous.

China Securities Regulatory Commission (CSRC) is adopted. Based on Standard Industry Classification Code of China Securities Regulatory Commission (CSRC), I constructed 20 separate industry dummy variables, consistent with prior research, such as Xia and Fang (2005). ε is random error term.

The fitted values from the regression Model (1) is the estimate of the expected level of investment, EI . The unexplained portion (or the error term) is the estimate of the unexpected investment, UI , which captures the degree of a firm's investment inefficiency or distortion in year t . I measure investment inefficiency taking advantage of the regression residual from the Model (1). If the regression residual is greater than 0, it indicates that firm occurs in overinvestment. On the contrary, if the regression residual is less than 0, it means that firm suffers from underinvestment. Both overinvestment and underinvestment are decreasing in investment efficiency (Biddle, Hilary and Verdi, 2009). Free cash flow can be defined as cash flow beyond what is necessary to maintain assets in place and to finance expected new investment (Richardson, 2006). According to the definition above, after calculating firm's expected investment for a particular firm, free cash flow can be computed as the difference between the firm's net cash flows from operation and its expected level of investment (EI), as estimated with regression Model (1), and thus obtained as follows:

$$FCF_{i,t} = OCF_{i,t} - EI_{i,t} \quad (2)$$

Where $FCF_{i,t}$, $OCF_{i,t}$ and $EI_{i,t}$ is the firm's free cash flow; net cash flows from operating activities and the expected level of investment in period t of a firm and scaled by beginning-of-year book value of total assets, respectively.

4.2 Sample Selection and Data Sources

As far as the study of this paper is concerned, the initial sample are selected from all non-financial companies listed on Shanghai or Shenzhen stock exchanges in China during the period 2003 to 2011. To ensure the validity of the data gathered and simultaneously minimize the effect of other factors on the research results, I first exclude from my initial sample those companies whose main operational business has ever experienced substantial change. Also excluded are firms which have extreme outliers and those whose financial information is seriously inadequate or obviously misreported. At the same time, the privatized enterprises whose controlling private ownership came into being through the block transfer of state shares after IPO are also excluded. After these exclusion are made, I then obtain a pooled sample with 8548 firm-year observations in total over 9 years. Either micro-level financial data or non-financial data used in this paper, such as investment expenditures, growth opportunities, return on assets, the book value of asset and equity, debt-to-asset ratio (total leverage), ownership of the largest shareholder, net cash flows from operating activities, cash and cash equivalent, age (the number of years listed on stock exchanges since IPO), and the identity of a firm's ultimate controlling shareholder et al., are all obtained from disclosure made in annual report of listed companies published by Shanghai Wind Information Co., Ltd. of China, a leading Bloomberg-style data provider in China, as well as the China Securities Markets and Accounting Research (CSMAR) database prepared by Shenzhen GTA Information

Technology Company Limited, another major data provider in China. However, the data used to compute the level of the rule of law and financial development of each region (referred to Chinese provinces, autonomous regions and municipalities directly under the central government) of China are all manually selected from “China Statistical Yearbook” and “Law Yearbook of China” as well as “China Financial Yearbook” over the years.

Table 1 reports the distribution of full sample for both underinvestment and overinvestment coupled with their corresponding subsamples of state-owned enterprises and private enterprises by year and industry, respectively. It is evident from the year distribution outlined Panel A of Table 1 that, among 8548 firm-year observations, state-owned enterprises and private enterprises in turn account for 6365 and 2183 of observations in my sample. However, in this sample, there are 5108 firm-year observations classified as underinvestment subgroups, and 3440 firm-year observations are treated as overinvestment subgroups. This result suggests that the occurrence of underinvestment is much higher than overinvestment. The similar distribution pattern between underinvestment and overinvestment also occurs in state-owned enterprises and private enterprises subgroups. Moreover, in each year, the observations of both underinvestment and overinvestment of state-owned enterprises are all greater than those of private enterprises, indicating that the probability of engaging in inefficient investment (underinvestment and overinvestment) is more likely to occur in state-owned enterprises rather than private enterprises. Nevertheless, the number of underinvestment (overinvestment) of private enterprises increases steadily from 48 (42) in 2003 to 317 (227) in 2011, suggesting that, with the increase in the number of listed companies controlled by private entities, the likelihood of private enterprises to undertake inefficient investment (underinvestment and overinvestment) is also gradually increasing.

Panel B of Table 1 reports the industry distribution of full sample of both underinvestment and overinvestment and their corresponding subsamples of state-owned enterprises and private enterprises. As with Panel A, in every industry, the observations of underinvestment are more than overinvestment. Meantime, except a few industries, such as lumber and furniture, and other manufacturing industry, in each industry, the number of observations of underinvestment and overinvestment of state-owned enterprises are also much more than those of private enterprises, showing a higher possibility of state-owned enterprises to engage in inefficient investment (underinvestment and overinvestment). However, private enterprises operating in the industries of machinery and equipment, petroleum and chemical, medical and biological product, and textile and clothing sectors tend to have a higher number of underinvestment and overinvestment.

This panel outlines the distribution of full sample for both underinvestment and overinvestment and their corresponding subsamples of state-owned enterprises and private enterprises by year.

Table 1: Distribution of Sample

Panel A: By year

Year	Underinvestment			Overinvestment		
	Full sample	State-owned enterprises	Private enterprises	Full sample	State-owned enterprises	Private enterprises
2003	434	386	48	281	239	42
2004	481	417	64	276	227	49
2005	504	413	91	357	285	72
2006	498	393	105	343	284	59
2007	530	417	113	340	262	78
2008	577	425	152	402	298	104
2009	608	414	194	459	335	124
2010	651	461	190	432	278	154
2011	825	508	317	550	323	227
Total	5108	3834	1274	3440	2531	909

Panel B: By industry

This panel presents the distribution of full sample for both underinvestment and overinvestment and their corresponding subsamples of state-owned enterprises and private enterprises by industry.

Industries	Underinvestment			Overinvestment		
	Full sample	State-owned enterprises	Private enterprises	Full sample	State-owned enterprises	Private enterprises
Mining	97	94	3	84	82	2
Culture, Sport and Entertainment	35	35	0	27	27	0
Electricity, Gas, and Water	238	237	1	179	173	6
Real Estate	195	159	36	100	80	20
Construction	128	86	42	56	43	13
Transportation and Warehouse	232	227	5	154	141	13
Agriculture, Forestry and Fishing	92	69	23	76	57	19
Wholes and Retail trade	326	294	32	193	170	23
Public Utility	128	105	23	91	78	13
Information Technology	285	158	127	201	115	86
Electron	236	169	67	142	68	74
Textile and Clothing	202	108	94	158	82	76
Machinery and Equipment	868	635	233	615	420	195
Metal and Nonmetal	507	400	107	336	266	70
Lumber and Furniture	16	0	16	9	0	9
Other Manufacturing	38	18	20	25	5	20
Petroleum and Chemical	607	448	159	416	338	78
Food and Beverage	246	195	51	164	126	38
Medical and Biological Products	361	221	140	241	154	87
Papermaking and Printing	109	70	39	77	47	30
Conglomerate	162	106	56	96	59	37
Total	5108	3834	1274	3440	2531	909

4.3 Model Specification and Variable Definitions

According to research design and theoretic analysis of this paper, the basic regression equations used to examine the hypotheses developed in this paper take two forms as

follows.

$$\begin{aligned} |UI_{i,t}|(OverI_{i,t}|UnderI_{i,t}|) = & \alpha_0 + \alpha_1 Law_{t-1} + \alpha_2 FD_{t-1} + \alpha_3 Pos_FCF_{i,t} + \alpha_4 Neg_FCF_{i,t} \\ & + \alpha_5 L arg_{i,t} + \alpha_6 Roa_{i,t-1} + \alpha_7 Asset_turn_{i,t} + \alpha_8 LnAge_{i,t} + \Sigma Ind + \Sigma Year + \varepsilon_{i,t} \end{aligned} \quad (3)$$

$$\begin{aligned} |UI_{i,t}|(OverI_{i,t}|UnderI_{i,t}|) = & \alpha_0 + \alpha_1 Pr iv_{i,t} + \alpha_2 Law_{t-1} + \alpha_3 FD_{t-1} + \alpha_4 Pr iv_{i,t} \times Law_{t-1} \\ & + \alpha_5 Pr iv_{i,t} \times FD_{t-1} + \alpha_6 Pos_FCF_{i,t} + \alpha_7 Neg_FCF_{i,t} + \alpha_8 L arg_{i,t} \\ & + \alpha_9 Roa_{i,t-1} + \alpha_{10} LnAge_{i,t} + \alpha_{11} Asset_turn_{i,t} + \Sigma Ind + \Sigma Year + \varepsilon_{i,t} \end{aligned} \quad (4)$$

In Model (3) and (4), where subscript *i* and *t* denote the sample firm and the year in the sample period, respectively; $|UI|$, $OverI$ and $|UnderI|$ are in turn the absolute value of the residuals, the positive residuals, and the absolute value of the negative residuals, which are all estimated from regression Model (1), and used as a proxy for the firm's level of inefficient investment, overinvestment and underinvestment. *Law* is the proportion of the number of lawyers of each region to local population in China, reflecting the level of rule of law of a region (at the province level). *FD* is the financial development index of a region, as measured by the ratio of loans provided by financial institutions to private enterprises to total loans of financial institutions in this region, which is used to measure the degree of market allocation of credit funds of financial institutions in each region. According to theoretical analysis earlier, I expect both *Law* and *FD* to be negatively associated with the dependent variables. *Pos_FCF* (*Neg_FCF*) is equal to *FCF* if the values of *FCF* are greater (less) than zero, and zero otherwise. *FCF* is free cash flow that a firm holds and measured as the difference between net cash flows from operating activities and the expected level of investment estimated from regression Model (1) scaled by book value of total assets as of the end of year *t*-1. *Larg* is the proportion of shares held by the first largest shareholder as of the end of year *t*. *Asset_turn* is the firm's ratio of total asset turnover as of the end of year *t*, which equals the net sales divided by the book value of total assets, indicating a firm's assets utilization efficiency. *Priv* is a dummy variable that takes the value of 1 if the ultimate controlling shareholder is private entities or individuals at the time of the firm's IPO, such as private entrepreneurs, family, townships and villages, and foreign companies, and zero otherwise. other remaining variables are all as previously defined.

In Model (4), The interaction terms, $Priv \times Law$ and $Priv \times FD$, are used to further examine how ownership identity of a firm, or the motivate (incentive) of the governments at all levels influences the governance role of the level of the rule of law and financial development in reducing the magnitude of the inefficient investment (underinvestment and overinvestment), namely whether there is a significant difference in effect of the level of the rule of law and financial development on the inefficient investment (underinvestment and overinvestment) between state-owned enterprises and private enterprises. Based on hypothesis 3 that the negative relationship between the rule of law, financial development and inefficient investment (underinvestment and overinvestment) is much stronger for private enterprises relative to state-owned enterprises, I expect the coefficients of both $Priv \times Law$ and $Priv \times FD$ should be significant and negative. When the firm's ultimate controlling shareholder is the government departments at all levels, such as the bureaus of state assets management, finance bureaus and bureaus in charge of different industries or other government agencies et al., I regard it as a

state-controlled company, otherwise it is correspondingly treated as a private-controlled company. Ultimate controlling shareholder's identity of a firm is identified through reviewing its annual report open published in one of the three main securities newspapers in China, namely China Securities News, Shanghai Securities News, and Securities Times.

5 Results

5.1 Analysis of Investment Expectation Model

Table 2 provides the descriptive statistics for the variables used to estimate the investment expectation Model (1). The mean (median) firm in the period t engages in investment activities equal to 0.064 (0.048) of total assets as of the end of year $t-1$, with the highest and lowest investment expenditures at 0.602 and -0.406 of total assets as of the end of year $t-1$, respectively, which are all significantly less than investment expenditures in terms of absolute values in the period $t-1$. $Gr_{i,t-1}$ has an average (median) equal to 0.178 (0.163) and ranges from -0.973 to 0.999, indicating that there are major differences in growth opportunities among firms. The mean (median) value of the firm operating performance is 0.036 (0.035), showing that, on the whole, majority of firms performed poorly during sample period and some firms have suffered from an even more serious loss (the lowest operating performance is at -98.3 percent of total asset). The mean (median) cash and cash equivalent across all firm-years stands at 0.181 (0.143) with the smallest at 0.001 and largest at 0.869 of total assets as of the end of year $t-1$. The natural log transformation of sample firms average (median) size (total assets as of the end of year $t-1$) is 21.582 (21.426) with the smallest at 18.601 and largest at 28.135. The average (median) firm has reported debt-to-asset ratio of 0.472 (0.482), and the highest debt-to-asset ratio is 0.996, indicating that this firm has fallen into serious financial distress during the study period. On average, sample firms have been listed 7.60 years on the stock exchanges in China since IPO.

Table 2: Descriptive Statistics for the Investment Expectation Model (1)

Variables	Mean	Median	Min	25% percentile	75% percentile	Max	Std
$I_{i,t}$	0.064	0.048	-0.406	0.019	0.092	0.602	0.065
$I_{i,t-1}$	0.085	0.057	-0.421	0.022	0.116	0.938	0.097
$Gr_{i,t-1}$	0.178	0.163	-0.973	0.028	0.321	0.999	0.257
$Roa_{i,t-1}$	0.036	0.035	-0.983	0.014	0.061	0.457	0.062
$Cash_{i,t-1}$	0.181	0.143	0.001	0.085	0.236	0.869	0.137
$LnTA_{i,t-1}$	21.582	21.426	18.601	20.776	22.176	28.135	1.153
$Debt_{i,t-1}$	0.468	0.477	0.011	0.333	0.612	0.996	0.187
$Age_{i,t}$	7.83	8.00	1	4	11	21	4.507

Note: The sample period for investment expectation Model (1) is 2003-2011. For each variable, I report the number of firm-year observations, mean, median, minimum (min), 25% percentile, 75% percentile, maximum (max) and standard error (std), where $I_{i,t}$ ($I_{i,t-1}$) is the firm's investment expenditures and measured as cash paid to acquire fixed assets, intangible assets and other long term assets minus net cash received from the sale of fixed assets, intangible assets and other long term assets in period t ($t-1$) scaled by book

value of total assets as of the end of year t-1 (t-2). $Gr_{i,t-1}$ is the firm's investment opportunities in the period t-1 and as measured by growth ratio of sales. $Roa_{i,t-1}$ is return on assets for firm i in year t-1, measured as the ratio of the profit after tax to the book value of total assets. $Cash_{i,t-1}$ is the firm's cash and cash equivalent divided by the book value of total assets as of the end of year t-1. $LnTA_{i,t-1}$ is the natural logarithm transformation of the book value of total assets as of the end of year t-1, used to control the effect of the size of the firm on its investment expenditures. $Debt_{i,t-1}$ is debt-to-asset ratio and equal to the book value of total debts (the sum of short-term debt and long-term debt) divided by the book value of total assets as of the end of year t-1. $Age_{i,t}$ is the number of years that a firm has been listed on the stock exchanges in China since IPO.

Table 3 reports the multivariate regression results for the investment expectation Model (1) based on the data of 8548 firm-year observations over the period 2003-2011, in which the dependent variable is the firm's capital expenditures in the period t. This model is utilized to determine both the expected level of investment and inefficient investment (underinvestment and overinvestment) of a firm. The expected level of investment is the fitted values ($EI_{i,t}$) and inefficient investment ($UI_{i,t}$) is the regression residuals estimated from the Model (1), while underinvestment and overinvestment are respectively negative residuals and positive residuals. The model of investment expenditures in the column (1) of Table 3 only includes investment opportunities which are measured as growth ratio of sales in period t-1 and industry and period fixed effects as independent variables. The estimated coefficient on $Gr_{i,t-1}$ is 0.039 and statistically significant and positive at 1 percent level, suggesting that investment demand is an increasing function of growth opportunities that a firm possesses, and this model explains 13.1% of the variation in investment expenditures. The model of investment expenditures in the column (2) of Table 3 that includes all control variables, such as cash and cash equivalent, firm size, debt-to-asset ratio, the natural logarithm transformation of the number of years listed on the stock exchanges in China, operating performance and prior period's investment expenditures, explains 37.5% of the variation in investment expenditures. However, when I include growth opportunities and all other control variables together to regress the model of investment expenditures in the column (3) of Table 3 (Model (3)), it doesn't significantly increase explanatory power (the adjusted R-square of Model (3) is 37.6%) and the estimated coefficient on $Gr_{i,t-1}$ has become much smaller, though the signs of all variables are the same as predicted. Nevertheless, in subsequent analysis I still rely on the Model (3) in Table 3 as the baseline to decompose investment expenditures of a firm into expected investment and unexpected investment.

Table 3: the Multivariate Regression Results of the Investment Expectation Model (1)

Variables	Predicted sign	Model		
		(1)	(2)	(3)
Intercept	?	0.043*** 9.939	-0.007 -0.576	-0.006 -0.445
$Gr_{i,t-1}$	+	0.039*** 14.584		0.008*** 3.214
$Cash_{i,t-1}$	+		0.022*** 4.198	0.022*** 4.118
$LnTA_{i,t-1}$	+		0.002*** 3.727	0.002*** 3.625
$Roa_{i,t-1}$	+		0.106*** 10.182	0.096*** 8.854
$Debt_{i,t-1}$	-		-0.012*** -3.034	-0.014*** -3.577
$I_{i,t-1}$	+		0.319*** 48.480	0.317*** 47.884
$LnAge_{i,t-1}$	-		-0.005*** -5.064	-0.004*** -4.840
<i>Ind</i>		Included	Included	Included
<i>Year</i>		Included	Included	Included
$AdjR^2$		0.131	0.375	0.376
<i>F</i>		45.384***	152.130***	148.241***
No. of obs		8548	8548	8548

Note: This table provides the regression results for the investment expectation Model (1):

$$I_{i,t} = \alpha_0 + \alpha_1 Gr_{i,t-1} + \alpha_2 Cash_{i,t-1} + \alpha_3 LnTA_{i,t-1} + \alpha_4 Roa_{i,t-1} + \alpha_5 Debt_{i,t-1} + \alpha_6 I_{i,t-1} + \alpha_7 LnAge_{i,t} + \Sigma Ind + \Sigma Year + \varepsilon_{i,t}$$

where $I_{i,t}$ ($I_{i,t-1}$) is the firm's investment expenditures and measured as cash paid to acquire fixed assets, intangible assets and other long term assets minus net cash received from the sale of fixed assets, intangible assets and other long term assets in period t (t-1) scaled by book value of total assets as of the end of year t-1 (t-2). $Gr_{i,t-1}$ is the firm's investment opportunities and as measured by growth ratio of sales. $Cash_{i,t-1}$ is the firm's cash and cash equivalent divided by the book value of total assets as of the end of year t-1. $LnTA_{i,t-1}$ is the natural logarithm of book value of total assets as of the end of year t-1, used to control the effect of the size of firm on the investment. $Roa_{i,t-1}$ is return on assets as of the end of year t-1, equal to the ratio of the profit after tax to the book value of total assets. Prior period's profitability is included as an additional variable to capture growth opportunities not reflected in $Gr_{i,t-1}$. $Debt_{i,t-1}$ is debt-to-asset ratio and equals total debts (the sum of short-term debt and long-term debt) divided by the total assets as of the end of year t-1. $LnAge_{i,t}$ is the natural logarithm transformation of the number of years the firm has been listed on the stock exchanges in China since IPO. *Ind* and *Year* are a vector of industry and year indicator variables, respectively, which are

used to control year and industry fixed effect. According to Standard Industry Classification Code of China Securities Regulatory Commission (CSRC), there are 20 industry dummy variables in the regression. ε is error term. Industry and year fixed effect are controlled for but not reported for the sake of space. T-statistics are presented below the estimated coefficients; ***, **, and * indicate two-tailed statistical significance at the 1%, 5%, and 10% level, respectively.

5.2 Analysis of the Relationship between the Rule of Law and Financial Development and Firm Inefficient Investment (Underinvestment and Overinvestment)

5.2.1 Descriptive statistics for the variables and univariate test

Table 4 provides descriptive statistic information on the main variables used to estimate Model (3) and (4). The mean (median) of $|UI_{i,t}|$ is 0.035 (0.024) of book value total assets as of the end of year t-1 with the standard deviation at 0.038, showing that there is a significant variation in inefficient investment among firms during sample period. $|UnderI_{i,t}|$ and $OverI_{i,t}$ have an average (median) of 0.029 (0.023) and 0.043 (0.028) of book value total assets as of the end of year t-1, respectively. The absolute value of the highest underinvestment is at 0.421 while overinvestment is, at the maximum, 0.518 of book value total assets as of the end of year t-1, indicating that although the occurrence of underinvestment is much higher than that of overinvestment, the magnitude of the underinvestment is far below the overinvestment. The mean (median) firm in the sample has a free cash flow of -0.004 (-0.004), suggesting that majority of firms are lack of surplus funds and thus more likely to be financially constrained. $Pos_FCF_{i,t}$ and $Neg_FCF_{i,t}$ have an average (median) of 0.066 (0.048) and -0.068 (-0.049), respectively. The highest positive free cash flow stands at 0.663, while the lowest negative free cash flow is at -0.818. The mean (median) ratio of net sales to total assets ($Asset_turn_{i,t}$) is 0.722 (0.598) with the smallest at 0.012 and highest at 8.924. The ownership of the first largest shareholder averages 40.9 percent and ranges from 2.2 percent to 89.4 percent of total shares outstanding. Given the variations in above firm characteristics, controlling for the effects of these attributes is very important in the following multivariate regression analyses. The mean (median) proportion of the number of lawyers of each region to local population is 0.030 (0.018) with the minimum at 0.001 and maximum at 0.096, showing that, taken as a whole, the level of the rule of law of each region in China is still low and difficult to effectively restrict the intervention of governments at all levels in the operational activities of the firm. The mean (median) ratio of loans provided by financial institutions to private enterprises to total loans of financial institutions of each region in China is 0.079 (0.079), with the minimum at 0.024 and maximum only at 0.114. This result indicates that, in China, formal financial institutions dominated by state-owned banks have provided most of their loans to state-owned sectors, which thus causes private enterprises to face credit rationing and ownership discrimination in the formal financial markets.

Table 4: Descriptive Statistics for Main Variables Used to Estimate Model (3) and (4)

Variables	No. of obs	Mean	Median	Min	25% percentile	75% percentile	Max	Std
$ UI_{i,t} $	8548	0.035	0.024	0.000	0.012	0.044	0.518	0.038
$ UnderI_{i,t} $	5108	0.029	0.023	0.000	0.012	0.038	0.421	0.028
$OverI_{i,t}$	3440	0.043	0.028	0.000	0.011	0.058	0.518	0.048
$FCF_{i,t}$	8548	-0.004	-0.004	-0.818	-0.052	0.045	0.663	0.095
$Pos_FCF_{i,t}$	4077	0.066	0.048	0.000	0.022	0.090	0.663	0.066
$Neg_FCF_{i,t}$	4471	-0.068	-0.049	-0.818	-0.091	-0.022	-0.000	0.068
$Asset_turn_{i,t}$	8548	0.722	0.598	0.012	0.389	0.889	8.924	0.548
$Larg_{i,t}$	8548	0.409	0.403	0.022	0.285	0.528	0.894	0.158
Law_{t-1}	279	0.030	0.018	0.001	0.011	0.029	0.096	0.030
FD_{t-1}	279	0.079	0.079	0.024	0.063	0.101	0.114	0.023

Note: $|UI_{i,t}|$, $OverI_{i,t}$ and $|UnderI_{i,t}|$ are the absolute value of the residuals, the positive residuals, and the absolute value of the negative residuals, respectively, which are all estimated from regression model (1), and used as a proxy for the firm's level of inefficient investment, overinvestment and underinvestment. Law_{t-1} is the proportion of the number of lawyers of each region to local population in China in period t-1, reflecting the level of the rule of law of a region. FD_{t-1} is the financial development index, as measured by the ratio of loans provided by financial institutions to private enterprises to total loans of financial institutions in each region, which is used to measure the degree of market allocation of credit funds of financial institutions. $Pos_FCF_{i,t}$ ($Neg_FCF_{i,t}$) is equal to $FCF_{i,t}$ if the values of $FCF_{i,t}$ are greater (less) than zero, and zero otherwise.

$FCF_{i,t}$ is free cash flow that a firm holds and is measured as the difference between net cash flows from operating activities and the expected level of investment expenditures estimated from regression Model (1) scaled by book value of total assets as of the end of year t-1. $Larg_{i,t}$ is the proportion of shares held by the first largest shareholder as of the end of year t. $Asset_turn_{i,t}$ is the firm's ratio of total assets turnover as of the end of year t, equal to the net sales divided by total assets, indicating a firm's assets utilization efficiency.

Table 5 tabulates the results for the univariate tests of differences in means for all regression variables used in Model (3) and (4) between state-owned enterprises and private enterprises partitioned by the underinvestment and overinvestment. The univariate analysis finds that the mean values of underinvestment and overinvestment for private enterprises are respectively 0.031 and 0.045, while the corresponding statistics for state-owned enterprises are 0.028 and 0.042 in turn, indicating that, whether underinvestment or overinvestment, private enterprises both exhibit higher level of inefficient investment than state-owned enterprises. It seems that the results above are not consistent with theoretical expectation of the inefficient investment. However, only the difference in underinvestment between private enterprises and state-owned enterprises is statistically significant at conventional levels, whereas difference in overinvestment between private enterprises and state-owned enterprises is statistically insignificant, suggesting that private enterprises are more likely to be suffer from underinvestment due

to shortage of funds. Further analysis reveals that state-owned enterprises both have more free cash flows than private enterprises in either underinvestment or overinvestment subgroup, and these differences are statistically significant at 1 percent level. This finding is not surprising since state-owned enterprises are more easily acquire funds in Chinese formal financial markets and encounter relatively lower financing constraints as evidenced below by their longer number of years listed on the stock exchanges. Moreover, in underinvestment and overinvestment subgroups, on average, state-owned enterprises have much higher ownership of ultimate controlling shareholder and longer time listed on the stock exchanges, but have poorer operating performance compared to private enterprises. What is more interesting is that, although the degree of market allocation of financial resources of the regions where private enterprises are located is far higher than the regions where state-owned enterprises operate, their level of the rule of law measured as the proportion of the number of lawyers of each region to local population is significantly lower. In a nutshell, though the univariate analysis above provide partial supports to the hypotheses developed in this paper, they only show binary correlations without controlling for other potential determinants. In the next section, I attempt to extend my analysis by more rigorously examining whether the evidence on these hypotheses holds in a multivariate regression framework.

Table 5: Univariate analysis of Differences in Means for Variables between State-owned and Private Enterprises Partitioned by Underinvestment and Overinvestment

Variables	Underinvestment			Overinvestment		
	State-owned enterprises	Private enterprises	t-value	State-owned enterprises	Private enterprises	t-value
$ UI_{i,t} $	0.028	0.031	-2.926***	0.042	0.045	-1.386
$FCF_{i,t}$	-0.005	-0.027	6.781***	0.013	-0.010	6.341***
$Asset_turn_{i,t}$	0.749	0.683	3.827***	0.718	0.676	2.082**
$Roa_{i,t-1}$	0.033	0.051	-9.335***	0.030	0.044	-5.141***
$Larg_{i,t}$	0.425	0.375	10.031***	0.421	0.362	10.120***
$Age_{i,t}$	8.65	5.59	21.534***	8.63	5.28	20.315***
Law_{t-1}	0.032	0.028	4.192***	0.030	0.025	4.913***
FD_{t-1}	0.076	0.091	-19.686***	0.075	0.092	-20.076***

Note: This table presents the results for univariate tests for all regression variables used in Model (3) and (4) between state-owned and private enterprises subgroup partitioned by underinvestment and overinvestment. Among 5108 (3440) firm-year observations of underinvestment (overinvestment), state-owned enterprises and private enterprises account for 3834 (2531) and 1274 (909) of observations, respectively. For each variable, I report the variable means for state-owned and private enterprises, and t-statistics for differences in means in turn by underinvestment and overinvestment subgroups. A enterprise is treated as state-owned one if its ultimate controlling shareholder is the governments at all levels, such as the bureaus of state assets management, finance bureaus and bureaus in charge of different industries or other government agencies et al., and private enterprises otherwise. For the definitions of $|UI_{i,t}|$, $OverI_{i,t}$, $UnderI_{i,t}$, Law_{t-1} , FD_{t-1} , $Pos_FCF_{i,t}$, $Neg_FCF_{i,t}$, $Larg_{i,t}$, $Asset_turn_{i,t}$, $Roa_{i,t-1}$, and $Age_{i,t}$, please refer to the note to Table 2 or 4.

5.2.2 Analysis of correlation coefficients

Table 6 reports Pearson correlation coefficients between the variables used in regression Model (3) and (4). Pearson correlation coefficients for underinvestment and overinvestment subgroups are respectively presented below and above the main diagonal. In terms of overinvestment subgroup, It is worthwhile to note that there is a significant and negative relation between $OverI_{i,t}$ and Law_{t-1} (Pearson correlation coefficient between two variables equals -0.045, and is statistically significant at 1 percent level), indicating that the improvement in the rule of law of a region in China could effectively reduce the overinvestment of the firm. However, though Pearson correlation coefficient between $OverI_{i,t}$ and FD_{t-1} is also negative, it is statistically insignificant at conventional level, suggesting that financial development of a region doesn't play a major role in controlling the overinvestment of the firm. In addition, I also find that the overinvestment variable ($OverI_{i,t}$) is positively correlated with free cash flow ($FCF_{i,t}$), prior period's profitability ($Roa_{i,t-1}$), and significantly negatively associated with the ratio of total assets turnover ($Asset_turn_{i,t}$), the natural logarithm of the number of years listed on stock exchanges in China after IPO ($LnAge_{i,t}$), shedding light on the importance of explicitly controlling for these firm's attributes in the multivariate regressions. On the contrary, as regards underinvestment subgroup, Pearson correlation coefficients between $|UnderI_{i,t}|$ and Law_{t-1} or FD_{t-1} are both statistically insignificant at conventional level, showing that both the progress of the rule of law and financial development of a region of China doesn't relieve the underinvestment of the firm. Pearson correlation coefficient between $|UnderI_{i,t}|$ and $FCF_{i,t}$ is equal to -0.171, and significant at 1 percent level, suggesting that firms with higher free cash flow are less likely to suffer from underinvestment. The Pearson correlation coefficients between $|UnderI_{i,t}|$ and $Roa_{i,t-1}$, $Larg_{i,t}$ are respectively significantly positive at 1 and 10 percent level, but the relationship between $|UnderI_{i,t}|$ and $Asset_turn_{i,t}$, $LnAge_{i,t}$ are significantly negative. Finally, I find that the Pearson correlation coefficients between independent variables are generally small, which thus eliminates my concerns that multicollinearity is possible spuriously responsible for the evidence on the hypotheses developed in this paper.

Table 6: Correlation Matrix between the Regression Variables (p -value, two tailed)

Variables	$ UnderI_{i,t} $	$FCF_{i,t}$	$Asset_turn_{i,t}$	$Roa_{i,t-1}$	$Larg_{i,t}$	$LnAge_{i,t}$	Law_{t-1}	FD_{t-1}
$OverI_{i,t}$	(-)	0.062*** (0.000)	-0.107*** (0.000)	0.095** (0.000)	0.019 (0.263)	-0.114*** (0.000)	-0.045*** (0.008)	-0.001 (0.938)
$FCF_{i,t}$	-0.171*** (0.000)	(-)	0.126** (0.000)	0.017 (0.322)	-0.002 (0.914)	0.195*** (0.000)	0.034** (0.049)	-0.047*** (0.005)
$Asset_turn_{i,t}$	-0.069*** (0.000)	0.110*** (0.000)	(-)	0.093*** (0.000)	0.054*** (0.002)	0.028* (0.098)	0.073*** (0.000)	0.035** (0.042)
$Roa_{i,t-1}$	0.067*** (0.000)	0.122*** (0.000)	0.086*** (0.000)	(-)	0.121*** (0.000)	-0.181*** (0.000)	0.033* (0.056)	0.097*** (0.000)
$Larg_{i,t}$	0.024* (0.083)	0.011 (0.429)	0.062*** (0.000)	0.133*** (0.000)	(-)	-0.197*** (0.000)	0.124*** (0.000)	-0.039** (0.023)
$LnAge_{i,t}$	-0.177*** (0.000)	0.181*** (0.000)	0.052*** (0.000)	-0.166*** (0.000)	-0.199*** (0.000)	(-)	0.105*** (0.000)	-0.110*** (0.000)
Law_{t-1}	-0.016 (0.243)	0.040*** (0.004)	0.063*** (0.000)	0.041*** (0.000)	0.083*** (0.000)	0.093*** (0.000)	(-)	0.153*** (0.000)
FD_{t-1}	-0.015 (0.294)	-0.021 (0.133)	0.088*** (0.000)	0.080*** (0.000)	-0.066*** (0.000)	-0.042*** (0.003)	0.150*** (0.000)	(-)

Note: This table presents Pearson correlation coefficients for the variables used in regression Model (3) and (4). Pearson correlation coefficients between variables for underinvestment and overinvestment subgroups are respectively presented below and above the main diagonal. P-values are outlined in the parenthesis below the correlation coefficients between the regression variables. ***, **, and * denote two-tailed statistical significance at the 1%, 5%, and 10% level, respectively. All variables are defined in Table 2 or 4.

5.2.3 Multivariate Analysis

(1) The rule of law, financial development, and investment efficiency: tests of hypothesis 1 and 2

Table 7 presents the multiple regression results for the Model (3). The estimated model is a regression of inefficient investment on the rule of law, financial development, firm characteristics, and industry (based on Standard Industry Classification Code of China Securities Regulatory Commission (2001)) and year fixed effects. In column (1), (2) and (3), the dependent variables are respectively $|UI_{i,t}|$, $OverI_{i,t}$, and $|UnderI_{i,t}|$ in year t .

As seen from F-statistics, all models are statistically significant at the 1 percent level, which suggests that there is a significant relationship between the dependent variable and independent variables. The adjusted R-square of model ranges from 7.3% to 12%, indicating that variables used in Model (3) respectively explain about 7.3, 7.5, and 12 percent of the variations in inefficient investment, overinvestment and underinvestment for the sample firms.

Column (1) of Table 7 presents the regression results for full sample and uses $|UI_{i,t}|$ as dependent variable. After controlling for other variables that may affect investment efficiency, such as free cash flow, ownership of ultimate controlling shareholder, prior period's profitability, the natural logarithm of the number of years listed on stock exchanges, as well as industries and years effect, I find that the coefficients of Law_{t-1} and FD_{t-1} are respectively 0.008 and -0.012, but neither of them is statistically

significant at conventional level, suggesting that on average, the improvement in the rule of law and financial development of a region in China don't obviously mitigate inefficient investment of the firm. In addition, the estimated coefficients for the control variables in Table 7 are largely consistent with prior research. As theoretically expected, the estimated coefficients on $Pos_FCF_{i,t}$ and $Neg_FCF_{i,t}$ are respectively positive and negative, and both of them are statistically significant at 1 percent level. The results above suggest that a firm's investment is inclined to be inefficient and distorted when its free cash flow is positive. Therefore, reducing free cash flow that a firm holds could effectively raise investment efficiency. The statistically significantly negative coefficient on $Larg_{i,t}$ indicates that with the increase in ownership of the first largest shareholder, it will reduce the degree of inefficient investment of a firm, showing that the governance role of the first largest shareholder is valid. Furthermore, I find that the coefficient on $Asset_turn_{i,t}$ is also negative and statistically significant at 1 percent level. This result means that the enhancement of asset utilization efficiency of a firm can significantly decrease its inefficient investment. However, what is more surprising is that $Roa_{i,t-1}$ has a statistically significantly positive coefficient, which indicates that the investment expenditures of firms with a higher prior period's operating performance are more likely to be inefficient and distorted in the subsequent year. Finally, $LnAge_{i,t}$ is significantly negatively related to $|UI_{i,t}|$, suggesting that as the number of years (time) listed on stock exchanges increases, a firm's investment behavior gradually becomes much more rational. In order to deeply investigate how the rule of law and financial development of a region of China influence overinvestment and underinvestment, namely whether the effect of the rule of law and financial development of a region in China on overinvestment is significantly different from underinvestment, I further subdivide the inefficient investment into overinvestment and underinvestment categories (subgroup) and the corresponding regression results for each subgroup are respectively presented in column (2) and (3) of Table 7. If the regression residual estimated from investment expectation Model (1) is positive in any given year, it is classified as overinvestment subsample, and as underinvestment subsample otherwise. In column (2), namely overinvestment model, although the estimated coefficients of Law_{t-1} and FD_{t-1} are both negative as theoretically expected, neither of them is statistically significant at conventional level, which means that both the rule of law and financial development could not reduce the overinvestment of a firm. However, in column (3) underinvestment model, surprisingly, I find that the estimated coefficient of Law_{t-1} has become positive and is statistically significant at 1 percent level, but the estimated coefficient of FD_{t-1} is still negative and statistically insignificant at conventional level. This result suggests that the rule of law not only fails to effectively relieve the underinvestment, but also further aggravate the problems of underinvestment. Furthermore, there is no evidence that financial development of a regional could effectively reduce a firm's underinvestment. Given the above results, I am unable to conclude that hypothesis 1 and 2 that the improved rule of law and financial development of a region in China are both significantly negatively associated with inefficient investment (overinvestment and underinvestment) are supported empirically. The estimated coefficient on $Pos_FCF_{i,t}$ remains statistically

significant and positive at 1 percent level in column (2) overinvestment subgroup, however, in column (3) underinvestment model it has become insignificantly negative. The estimated coefficient of $Neg_FCF_{i,t}$ is exactly the opposite. It has become insignificantly positive in column (2) overinvestment subgroup, but is still statistically significant and negative at 1 percent level in column (3) underinvestment model. These results are consistent with prior studies which find that firms with more free cash flow are motivated to engage in overinvestment (Jensen, 1986; Richardson, 2006; Cai, 2013) and less likely to occur in underinvestment (Richardson, 2006). In column (2) overinvestment model, the estimated coefficient of $Larg_{i,t}$ is no longer statistically significant at the conventional level, while it remains significantly negative at 1 percent level, indicating that earlier finding on the governance role of the first largest shareholder in mitigating inefficient investment only exists in underinvestment subsample, namely the higher the proportion of shares outstanding the first largest shareholder holds, the lower the level of underinvestment that a firm experiences is. The remaining variables, such as $Asset_turn_{i,t}$, $RoA_{i,t-1}$ and $LnAge_{i,t}$, show similar regression results and significant levels to those presented in column 1 of Table 7.

Table 7: Multivariate Results for Investor Protection, Financial Development and Investment Efficiency: Tests of Hypothesis 1 and 2

Variables	Expected Direction	UI (1)	OverI (2)	UnderI (3)
Intercept	?	0.049*** 13.792	0.068*** 9.434	0.035*** 10.699
Law_{t-1}	-	0.008 0.566	-0.022 -0.750	0.036*** 2.805
FD_{t-1}	-	-0.012 -0.661	-0.014 -0.373	-0.016 -0.931
$Pos_FCF_{i,t}$	+	0.049*** 6.304	0.105*** 6.877	-0.008 -1.082
$Neg_FCF_{i,t}$	-	-0.045*** -6.193	0.002 0.093	-0.078*** -12.337
$Larg_{i,t}$?	-0.008*** -2.814	-0.007 -1.227	-0.005** -1.994
$Asset_Turn_{i,t}$		-0.007*** -8.039	-0.011*** -6.668	-0.003*** -3.844
$RoA_{i,t-1}$	+	0.034*** 5.032	0.050*** 4.217	0.033*** 4.477
$LnAge_{i,t}$?	-0.006*** -9.894	-0.006*** -5.682	-0.005*** -8.505
<i>Ind</i>		Included	Included	Included
<i>Year</i>		Included	Included	Included
$AdjR^2$		0.073	0.075	0.120
<i>F</i>		19.811***	8.728***	20.364**
No. of obs		8548	3440	5108

Note: This table provides the main empirical results of the relationship between inefficient investment (overinvestment and underinvestment) and the rule of law and financial development of a region of China. The corresponding regression equation is specified as follows:

$$\begin{aligned} |UI_{i,t}|(OverI_{i,t}, UnderI_{i,t}) = & \alpha_0 + \alpha_1 Law_{t-1} + \alpha_2 FD_{t-1} + \alpha_3 Pos_FCF_{i,t} + \alpha_4 Neg_FCF_{i,t} \\ & + \alpha_5 L arg_{i,t} + \alpha_6 Roa_{i,t-1} + \alpha_7 Asset_turn_{i,t} + \alpha_8 LnAge_{i,t} + \Sigma Ind + \Sigma Year + \varepsilon_{i,t} \end{aligned}$$

$|UI_{i,t}|$, $OverI_{i,t}$, $|UnderI_{i,t}|$ are the absolute value of the residuals, the positive residuals, and the absolute value of the negative residuals, respectively, which are all estimated from regression Model (1), and used as a proxy for the firm's level of inefficient investment, overinvestment and underinvestment. Law_{t-1} is the proportion of the number of lawyers of each region to local population in China at time t-1, reflecting the level of the rule of law of a region. FD_{t-1} is the financial development index of a region at time t-1, as measured by the ratio of loans provided by financial institutions to private enterprises to total loans of financial institutions in this region, which is used to measure the degree of market allocation of credit funds of financial institutions. $Pos_FCF_{i,t}$ ($Neg_FCF_{i,t}$) is equal to $FCF_{i,t}$ if the values of $FCF_{i,t}$ are greater (less) than zero, and zero otherwise. $FCF_{i,t}$ is free cash flow that a firm holds and is measured as the difference between net cash flows from operating activities and the expected level of investment estimated from regression Model (1) scaled by book value of total assets as of the end of year t-1. $L arg_{i,t}$ is the proportion of shares outstanding held by the first largest shareholder as of the end of year t. $Roa_{i,t-1}$ is return on assets as of year t-1, measured as the profit after tax divided by the book value of total assets. $Asset_turn_{i,t}$ is the firm's ratio of total assets turnover as of the end of year t, equal to the net sales divided by the book value of total assets, indicating a firm's assets utilization efficiency. $LnAge_{i,t}$ is the natural logarithm transformation of the number of years that a firm has been listed on the stock exchanges in China since IPO. Ind and $Year$, are respectively industry and year indicators. ε is error term. Industry and year fixed effects are controlled for but not reported for the sake of space. A firm is classified as overinvestment subsample if the regression residual estimated from investment expectation Model (1) is positive in any given year, and as underinvestment subgroup otherwise. T-statistics are reported below the estimated coefficients; ***, **, and * denote two-tailed statistical significance at the 1%, 5%, and 10% level, respectively.

(2) The ownership nature of the firm, the rule of law, financial development, and investment efficiency: test of hypothesis 3

Table 8 tabulates the multivariate regression results for Model (4) which is used to formally test hypothesis 3. In this model I add $Priv_{i,t}$ and its interaction items with Law_{t-1} and FD_{t-1} , i.e., $Priv_{i,t} * Law_{t-1}$ and $Priv_{i,t} * FD_{t-1}$, to further examine how ownership identity of a firm, or the motivate (incentive) of the governments at all levels influences the governance role of the rule of law and financial development in reduction of the degree of the inefficient investment (underinvestment and overinvestment), namely whether the effect of the rule of law and financial development on the inefficient investment (underinvestment and overinvestment) is significantly different between state-owned and private enterprises. Column (1) in Table 8 reports regression results of

full sample which uses $|UI_{i,t}|$ as dependent variable. The statistically significant and positive estimated coefficient for $Priv_{i,t}$ variable suggests that on average, the magnitude of inefficient investment of private enterprises is much higher than that of state-owned enterprises. The estimated coefficient on Law_{t-1} is statistically insignificant at conventional level and positive, whereas the estimated coefficient for the interaction term, $Priv_{i,t} * Law_{t-1}$, equals -0.079 and is statistically significant at 5 percent level, indicating that the improvement in the rule of law of a region in China can effectively reduce private enterprises' inefficient investment, but has no effect on the inefficient investment of state-owned enterprises. Although the directions of the estimated coefficients for FD_{t-1} and its interaction term, $Priv_{i,t} * FD_{t-1}$, are negative and thus consistent with the theoretical expectation, neither of them is statistically insignificant at conventional level, suggesting that financial development of a region in China fails to effectively mitigate inefficient investment, regardless of ownership status of a firm. Finally, as seen previously, the significant levels and effects of the remaining variables on the inefficient investment are highly similar to those reported in column (1) in Table 7.

Column (2) and (3) of Table 8 respectively present the regression results for overinvestment and underinvestment subgroup. By comparison, I do find that there exist some differences in the impact of the rule of law and financial development between two after controlling for the effect of the firm's ownership nature. Firstly, in column (2) of Table 8, namely the overinvestment model, while the estimated coefficient for $Priv_{i,t}$ variable is still positive, but it has become statistically insignificant at conventional level. However, in column (3) of Table 8 underinvestment model, the estimated coefficient for $Priv_{i,t}$ remains statistically significant and positive at 1 percent level, indicating that the degree of underinvestment of private enterprises is much higher than that of state-owned enterprises. This result suggests that the finding in column (1) of Table 8 that compared to state-owned enterprises, private enterprises experience significantly higher inefficient investment only occurs in underinvestment, whereas there is no such significant difference in the magnitude of overinvestment between state-owned enterprises and private enterprises. In other words, it is underinvestment that causes the systematical difference in inefficient investment between state-owned and private enterprises. Secondly, although the directions of estimated coefficients for Law_{t-1} , $Priv_{i,t} * Law_{t-1}$, FD_{t-1} , and $Priv_{i,t} * FD_{t-1}$ are all negative and thus consistent with the theoretical expectation earlier, none of them is statistically insignificant at conventional level in column (2) of Table 8, indicating that neither the rule of law or financial development of a region in China is conducive to controlling the overinvestment of a firm regardless of its ownership nature. However, in column (3) of Table 8, the estimated coefficient of Law_{t-1} is 0.047 and statistically significant at 1 percent level, yet its interaction item with $Priv_{i,t}$, $Priv_{i,t} * Law_{t-1}$, has a negative estimated coefficient of -0.069 and statistically significant at 5 percent level. These findings mean that the improvement in the rule of law of a region in China further aggravates rather than mitigates state-owned enterprises' underinvestment. On the contrary, the improvement in the level of the rule of law of a

region in China has a positive impact on private enterprises' underinvestment and could relieve their underinvestment (for private enterprises underinvestment subgroup, the estimated coefficient of Law_{t-1} is the sum of $(-0.069+0.047)$ and equals -0.022 , which is statistically significant at 10 percent level). At the same time, in column (3), despite that the estimated coefficient of FD_{t-1} is statistically insignificant and positive at conventional level, the estimated coefficient of the interaction item, $Priv_{i,t} * FD_{t-1}$, is negative and statistically significant at 5 percent level, which shows that there is a much stronger negative relationship between financial development and underinvestment for private enterprises. The results above suggest that financial development of a region in China, which is measured as the degree of market allocation of credit funds of formal financial institutions, can play a major role in mitigating private enterprises' underinvestment, yet it has no impact on the underinvestment of state-owned enterprises. These findings mean that the rule of law and financial development influence state-owned and private enterprises' underinvestment differently. To summarize, the multivariate regression results presented in Table 8 indicate that hypotheses 3 that ceteris paribus, the improvement in the rule of law and financial development a region in China can play a much more important role in reducing inefficient investment of private enterprises than do in state-owned enterprises is partially supported empirically.

Table 8: Multivariate Results for the Ownership Nature of the Firm, Investor Protections, Financial Development and Investment Efficiency: Test of Hypothesis 3

Variables	Expected Direction	UI (1)	OverI (2)	[UnderI] (3)
Intercept	?	0.047*** 12.683	0.067*** 8.866	0.032*** 9.483
$Priv_{i,t}$?	0.009** 2.251	0.005 0.664	0.011*** 3.232
Law_{t-1}	-	0.020 1.303	-0.012 -0.396	0.047*** 3.316
$Priv_{i,t} * Law_{t-1}$	-	-0.079** -2.110	-0.069 -0.857	-0.069** -2.051
FD_{t-1}	-	-0.002 -0.107	-0.012 -0.266	0.005 0.257
$Priv_{i,t} * FD_{t-1}$	-	-0.060 -1.423	-0.026 -0.305	-0.098** -2.517
$Pos_FCF_{i,t}$	+	0.049*** 6.320	0.105*** 6.872	-0.008 -1.056
$Neg_FCF_{i,t}$	-	-0.045*** -6.078	0.002 0.119	-0.077*** -12.153
$Larg_{i,t}$?	-0.007*** -2.620	-0.006 -1.114	-0.005* -1.860
$Asset_Turn_{i,t}$		-0.007*** -7.995	-0.011*** -6.647	-0.003*** -3.782
$Roa_{i,t-1}$	+	0.035*** 5.082	0.051*** 4.235	0.033*** 4.512
$LnAge_{i,t}$?	-0.005*** -8.806	-0.006*** -5.047	-0.004*** -7.734
<i>Ind</i>		Included	Included	Included
<i>Year</i>		Included	Included	Included
$AdjR^2$		0.074	0.074	0.122
<i>F</i>		18.517***	8.081***	19.161**
No. of obs		8548	3440	5108

Note: This table provides the main empirical results of difference between the effect of

the rule of law and financial development of a region of China on the inefficient investment (overinvestment and underinvestment) of state-owned and private enterprises. The corresponding regression equation is specified as follows:

$$\begin{aligned} |UI_{i,t}|(OverI_{i,t}, UnderI_{i,t}) = & \alpha_0 + \alpha_1 Priv_{i,t} + \alpha_2 Law_{t-1} + \alpha_3 FD_{t-1} + \alpha_4 Priv_{i,t} \times Law_{t-1} \\ & + \alpha_5 Priv_{i,t} \times FD_{t-1} + \alpha_6 Pos_FCF_{i,t} + \alpha_7 Neg_FCF_{i,t} + \alpha_8 Larg_{i,t} \\ & + \alpha_9 Roa_{i,t-1} + \alpha_{10} LnAge_{i,t} + \alpha_{11} Asset_turn_{i,t} + \Sigma Ind + \Sigma Year + \varepsilon_{i,t} \end{aligned}$$

$Priv_{i,t}$ is an indicator variable which takes the value of 1 if the ultimate controlling shareholder for firm i in year t is private entities or individuals at the time of IPO, such as private entrepreneurs, family, townships and villages, and foreign companies, and equals zero otherwise. For the definitions of $|UI_{i,t}|$, $OverI_{i,t}$, $UnderI_{i,t}$, Law_{t-1} , FD_{t-1} , $Pos_FCF_{i,t}$, $Neg_FCF_{i,t}$, $Larg_{i,t}$, $Asset_turn_{i,t}$, $Roa_{i,t-1}$, and $LnAge_{i,t}$, please refer to the note to Table 7. T-statistics are reported below the estimated coefficients; ***, **, and * indicate two-tailed statistical significance at the 1%, 5%, and 10% level, respectively.

5.2.4 Sensitivity tests

In order to ensure the reliability of research conclusions of this paper, I conducted the following robustness tests. Firstly, since Richardson's (2006) investment expectation model is usually based on the assumptions that on the whole, a firm's capital expenditure behavior is normal, and there is no systematic phenomenon of overinvestment or underinvestment. However, if the above assumptions are not satisfied, employing regression residuals estimated from Richardson's (2006) investment expectation model to measure overinvestment and underinvestment is likely to classify some firms with better growth opportunities as firms with poor growth opportunities, and such errors will potentially bias the regression results against the hypotheses developed in this paper (Lang, Stulz and Walking, 1991). In order to mitigate this concern, through following Xin, Lin and Wang's (2007) research method, I further divide the regression residuals estimated from Model (1) into three equal subgroups according to the magnitude of each residual, namely ranking from the largest residual to the smallest one, and treated the subgroup with the largest (smallest) residuals as overinvestment (underinvestment) subsample, and re-estimated Model (3) and (4). Secondly, in prior studies, in addition to the proportion of the number of lawyers of each region to local population and the ratio of loans provided by financial institutions to private enterprises to total loans of financial institutions of a region in China used in this paper, some researchers also employ other indicators, such as the rate of economic cases settled by the Courts of each region in China every year (namely the number of cases closed divided by the corresponding number of cases placed on file by the Courts of each region) and banking industry competitiveness (other banks' share of credit except for Big Four state-owned banks) in each region (Lu and Yao, 2004), as a proxy for the level of the rule of law and financial development of a region, respectively. Therefore, by following their study, I use these indicators above to rerun multivariate analysis in Tables 7 and 8. Thirdly, I explore whether the results of this paper are robust to an alternative measure of free cash flow. Free cash flow is a concept innovatively put forward by Jensen (1986) to study the market

for corporate control. Unlike other cash flow definition, Jensen's free cash flow cannot be calculated directly using information from the financial statements, and thus it is difficult to be measured and used in empirical research (Shen and Shen, 2004). In order to overcome above weaknesses, Lang, Stulz and Walkling (1991) employ an earnings-based framework to measure free cash flow, in which they define free cash flow as the difference between operating income before depreciation and interest expense, taxes, preferred dividends, and dividends for the fiscal year scaled by the book value of total assets as of the end of year $t-1$. I used this alternative definition of free cash flow and re-estimated Model (3) and (4). Finally, In practice, in addition to the return on total assets used in this paper, other indicators that can be used to measure a company's profitability also include sales profit margin and return on equity. In order to further investigate the effect of different profitability indicators on the research results of this paper, I replace return on total assets with sales profit margin and return on equity, respectively, and re-estimate Model (1), (3) and (4). The regression results above remain qualitatively the same as the original results and suggest that research conclusions of this paper are statistically robust. For space reason, these sensitivity test results are not tabulated.

5 Conclusions

This paper, based on China's transitional economy background where the allocation of credit resources in the formal financial markets is still subject to the influence of governments at all levels, empirically investigates the role of investor protections and financial development of a region in reducing the inefficient investment such as overinvestment and underinvestment using a broad cross-sectional sample of 8548 firm-year observations of listed companies on Shanghai and Shenzhen Stock Exchanges in China during the period 2003 to 2011. By following the creative approach put forward by Richardson (2006) to measure the underinvestment, overinvestment and free cash flow of a firm, my research results show that the magnitude of underinvestment of the private enterprises is significantly higher than that of state owned enterprises. However, there doesn't exist significant difference in overinvestment between private enterprises and state-owned enterprises. Further analyses reveal that firms with positive free cash flow are more likely to engage in overinvestment. On the contrary, firms with negative free cash flows (a manifestation of shortage of funds) are more vulnerable to suffer from underinvestment. The improvement in the level of the investors' legal protections of a region in China can significantly mitigate the underinvestment of private enterprises, but further aggravates rather than mitigates state-owned enterprises' underinvestment. Although financial development of a region in China can also reduce the underinvestment of private enterprises, it does play a relatively limited role in reducing the magnitude of the underinvestment of state-owned enterprises. Furthermore, contrary to the theoretical expectation, there is no evidence indicating that the improvement in the level of the investor protections and financial development of a region in China could effectively control the magnitude of overinvestment of private and state-owned enterprises. This result suggests that the role of rule of law and financial development in alleviating the enterprises' investment inefficiency and distortion is still relatively limited in China. These findings together mean that unless the institutional environments of the lack of effective legal protections of private property rights and the underdeveloped formal financial systems of each region in China have been fundamentally improved, the

inefficient problems of state-owned property rights and the resultant firm inefficient investment could not automatically disappear with reform of property rights of state-owned enterprises. Given that Chinese government is vigorously promoting the strategic adjustment of economic structure and the radical change of the pattern of economic growth, this paper has an important policy implications for regulators and practitioners. That is, in order to fundamentally solve the problem of inefficient investment of Chinese enterprises and radically eliminate the negative effects of inefficient investment on firms' operational performance and investors' interests, in addition to further improving the corporate governance mechanisms to regulate the dysfunctional investment behavior of the firm as well as selling off state shares in enterprises to mitigate the impact of governments at all levels on the firm's investment activities, Chinese government should rethink profoundly and seek the reasons for inefficient investment from outside the company, and fundamentally reform unreasonable and unfair legal institutions and formal financial systems during the period of economic transition of China, and strive to make the market mechanisms play a decisive role in the allocation of resources.

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