Government Intervention and Corporate Investment Efficiency: Evidence from China

Yi Huang

School of Economic, Jinan University, Guangzhou, China
Email: huangyi0759@163.com

Abstract

Apart from agency conflicts and information asymmetry between managers and shareholders, potential investors or creditors, which prevent companies from making optimal investment decisions, government intervention is another form of friction, especially common in the economic transitional settings, distorts corporate investment behavior and leads to investment inefficiency. Chinese investment system reform in 2004 aims to restrict government intervention on corporate investment and causes an exogenous shock to firm's investment environment. In the quasi-natural experiment, difference-in-differences analysis shows that investment efficiency promotes after the investment system reform and the result is robust to an alternative model specification and placebo test. Further analysis shows that the improvement of investment efficiency concentrates among non-SOEs. The findings indicate that the investment system reform in China has alleviated the government intervention in corporate investment and improved the firm's investment efficiency as well.

Keywords

Government Intervention, Corporate Investment Efficiency, Investment System Reform

1. Introduction

Market frictions such as agency conflicts and information asymmetry have long recognized as the suspects causing firms to deviate from their optimal investment level [1]. A large literature expands on these frictions, of which empirical evidence supportive is extensive [2] [3]. Yet, there still exist other frictions, such as government intervention that can lead to suboptimal corporate investment [4] [5].

Although government intervention in business is not unique in China, the Chinese setting is particularly interesting for the following reasons. Firstly, the Chinese government can play a vital role in the domestic business activities through its majority ownership in state-owned enterprises (SOEs). The goal of these enterprises is not only to maximize their shareholders' wealth, but contains lots of political purposes. Although private companies and foreign-invested firms (non-SOEs) are growing in number and have pulled a large part of Chinese economic growth after the Economic Reform and Opening Up in 1978 [6], SOEs still dominate the country's business activities. Furthermore, the government can also maintain its control on both SOEs and non-SOEs through appointing political connected executives. Firms with political connections usually have to adjust their business decisions to cater to the government's goals.

Chen *et al.* (2011) [4] used government ownership and political background of the firm's top executives (political connections) as the proxies of government intervention and found that SOEs, especially those with political connected executives, have lower investment efficiency. While Deng *et al.* (2017) [5] focused on the economic stimulus package (ESP) led by China's government during the 2008 global financial crisis period, which provides positive shock to the supply of external finance, together with the government intervention, leading to government-intervened firms overinvested and their investment efficiency declined after the ESP. Both the empirical findings suggest that government intervention plays a negative role in the corporate investment efficiency. This paper aims to extend the empirical research on government intervention in corporate investment from the opposite site, basing on an event that is likely to have alleviated the impact of government intervention in corporate investment, namely "the Decision of the State Council on Investment System Reform" ("Decision") in China in 2004.

Before the Economic Reform and Opening Up in 1978, when Chinese economy was primarily centrally planned, the government largely controlled the country's economic output by allocating resources and determining market prices. SOEs and quasi-SOEs (collective enterprises) occupied in almost every sector, while private enterprises and foreign-invested firms were nearly nonexistent [7]. Simply put, the enterprises in China before 1978 were merely the appendage to the Chinese government, and the investment policies they made just reflected the will of the government.

From 1978 to 2004, with the continuous deepening of the economic reform, non-SOEs had become involved in sectors that had previously been monopolized by SOEs, and the government had been trying to implement a series of market-oriented investment reform policies. Unfortunately, these policies had little effect on the restriction for the government intervention in corporate investment decision.

The investment system reform or the "Decision" announced in 2004 clearly pointed out for the first time that companies should be the primary investment-decision-makers, which meant that the government should return the in-

vestment-decision rights to the market and should not interfere in the corporate investment process. The investment system reform had changed the investment behavior of Chinese firms that was used to be determined by the government regardless of the source of the funds, the size of the investment and the goal of the projects. The reform provided an exogenous shock to firm's investment environment. By alleviating the government intervention in corporate investment, the reform can probably promote the firms' investment efficiency and remedy the suboptimal corporate investment policy.

Using the data of Chinese listed manufacture firms from 2002q1 to 2007q3, this paper aims to examine the impact of the "Decision" on the corporate investment efficiency and how it varies across SOEs and non-SOEs. It is worth noting that all the firms in China were affected by the "Decision", so the matched firms that were not affected should be non-Chinese firms. This paper uses American listed manufacture firms from 2002q1 to 2007q3 as the matched firms. However, there exists a problem in this sample that cannot be ignored: the reduction of government intervention is not random for firms, which will raise possible endogeneity problem. In order to mitigate the endogeneity issue, this paper conducts propensity score matching (PSM) before the difference-in-differences (DiD) test. The measure for the corporate investment efficiency is based on the Richardson (2006) [8] residual model and the main findings of the paper are summarized below.

First, after the investment system reform, the corporate investment efficiency promotes. The reform can remedy the distortion of investment behavior regardless of overinvestment or underinvestment, through restricting the "grabbing hand" of the government [9]. Moreover, the effect of the reform on the firm's investment efficiency varies across SOEs and non-SOEs. I find that the promotion of the corporate investment efficiency concentrates among non-SOEs, and I postulate that even if returning the investment-decision rights to the market, SOEs still have burden of catering to the political purposes. Thus, the investment system reform has little impact on SOEs.

This paper makes two contributions to the literature. First, this paper provides empirical evidence to the research on corporate investment efficiency. Previous studies in this area are mainly focused on the agency conflicts and information asymmetry between managers and shareholders or potential investors in the mature markets. However, in a transitional economy, the government intervention is another vital friction that leads to firm's suboptimal investment policy. Chen *et al.* (2011) [4] and Deng *et al.* (2017) [5] have provided evidence to this strand of literature. This paper extends the strand of literature by standing on the opposite site: if the removal of the government intervention in corporate investment can promotes the firm's investment efficiency, it means the government intervention has negative impact on the firm's investment efficiency. This paper finds the similar evidence to Chen *et al.* (2011) [4] or Deng *et al.* (2017) [5]. Second, this paper enriches the extant literature on the Chinese Economic

Reform and Opening Up. The investment system reform in 2004 is a part of Economic Reform, actually. This paper identifies government intervention as another friction to explain the distortion of the corporate investment behavior and how the investment system reform can reverse it, which in fact illustrates the effect of Chinese Economic Reform as well.

The remainder of this paper proceeds as follows. Section 2 provides theoretical framework and hypothesis development. Section 3 describes the research design. Section 4 reports the empirical results, robustness tests and heterogeneity test. Section 5 concludes this paper.

2. Theoretical Framework and Hypothesis Development

When we talk about what drives the firms' deviate from its optimal investment level, agency conflicts and information asymmetry are always the top two factors that come to our minds [1]. Chen *et al.* (2011) [4] opened a new chapter that government intervention is also a vital friction that leads to the firm's suboptimal investment behavior. They used government ownership and political connections as the proxies of government intervention to figure out that this kind of friction play a negative role in the corporate investment efficiency. Deng *et al.* (2017) [5] used economic stimulus package (ESP) led by China's government during the 2008 global financial crisis period as the quasi-natural experiment and found out that government-intervened firm overinvested after the ESP.

Nevertheless, Chen *et al.* (2011) [4] are not the first one who bring forward the impact of government intervention in corporate investment. We can trace back to the "grabbing hand" theory, established in a famous book, "*The grabbing hand: government pathologies and their cures*", wrote by Shleifer and Vishny (1998) [9]. They used the "grabbing hand" to describe the government intervention in the firm's business activities and their model established in *chapter* 9 shows that the politicians tend to convince of the managers to overinvest because they can obtain political benefits from the overinvestment, while the managers dislike overinvestment for it hurts the benefits of the shareholders. Therefore, the equilibrium of the firm's investment level depends on the bargain ability between the politicians and managers. In this sense, the "grabbing hand" of the government, which interfere in the business activities, usually distorts the corporate behavior and leads to suboptimal decision.

If there is a policy that is designed to restrict the "grabbing hand" on the business activities, the distortion of the corporate investment can be mitigated. Investment system reform announced in 2004 in China, clearly points out for the first time that companies should be the primary investment-decision-makers and proclaimed that the government should not interfere in the corporate investment process. Thus, after the announcement of the reform, we should observe promotion of corporate investment efficiency. So I conduct an empirical test of the following hypothesis:

H1. Corporate investment efficiency promotes after the investment system

reform.

Meanwhile, SOEs in China usually have the mission to help the government to accomplish social and political goals such as employment, regional development, social stability, etc., which distorts corporate investment behavior and leads to investment inefficiency. Even after the investment system reform, SOEs still have to cater to government's goals. Thus, I propose another hypothesis:

H2. The promotion of investment efficiency mainly concentrates among non-SOEs after the investment system reform.

3. Research Design

3.1. Methodology and Model

Unlike the existent empirical research on the impacts of government intervention in corporate investment efficiency, which examine the relationship directly, this paper stands at the opposite site to find out whether the corporate investment efficiency has improved when restricting or removing the government intervention. If the restriction or the removal can help to promote the corporate investment efficiency, it means the government intervention does play a negative role in the firm's investment efficiency. This paper uses the reform of investment system in China in 2004 as a quasi-natural experiment setting to examine the relationship between government intervention and corporate investment efficiency. The difference-in-differences (DiD) regression model is illustrated as:

$$
\begin{aligned}
Inv\_effi_{i,j,t} = \alpha_0 &+ \alpha_1 Reform_{i,j,t} + \alpha_2 * Time_t \\
&+ \alpha_3 Reform_{i,j,t} * Time_t + \alpha_4 * X_{i,j,t-1} + \mu_{i,j,t}
\end{aligned}
\tag{1}
$$

Subscripts i, j, and t represent the firm, industry, and the quarter, respectively. The dependent variable $Inv\_effi_{i,j,t}$ is measured by the residual model developed by Richardson (2006) [8]. $Time_t$ is a dummy variable, which equals to 1 after 2004q3 (when the investment system reform was announced) and equals to 0 before 2004q3. $Reform_{i,j,t}$ is also a dummy variable, which equals to 1 when affected by the investment system reform, and otherwise, equals to 0. α_3 is the DiD coefficient which is my primary interest and measures the effect of the reform. The vector $X_{i,j,t-1}$ includes control variables. I use firm size (Size), leverage (Leverage) and cash equivalents (Cash) to control the financial characteristics of the firms. All the controls are a quarter prior to the investment starting date and cluster the error term $\mu_{i,j,t}$ at the two-digit industry level following the China Securities Regulatory Commission industry codes[1]. **Table 1** reports the variable definitions.

3.2. Sample and Data

The investment system reform was proposed on July 16th, 2004, thus the sample period in this paper starts from 2002q1 to 2007q3, ten quarters before the reform (2002q1~2004q2) and thirteen quarters after the reform (2004q3-2007q3). The

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[1]http://www.csrc.gov.cn/pub/zjhpublic/G00306201/201211/t20121116_216990.htm.

Table 1. Variable definitions.

Variable	Definition
Inv_effi	Residual calculated from the Richardson (2006) [8] model. If the residual > 0, it means the firm over-invests; if the residual < 0, it means the firm under-invests; if the residual = 0, it means the firm reaches it optimal investment level
Reform	Dummy variable = 1 if affected by the investment system reform
Time	Dummy variable = 1 after the investment system reform
Size	Natural log of the total asset
Lev	Ratio of total liability to total asset
Cash	Cash and cash equivalents

length of the sample avoids the compounding effect of other events such as China accession to the WTO at the end of 2001 or the global financial crisis in 2008.

Because all the firms in China would be affected by the reform, I use the manufacture firms listed in China as the treated firms. As for the matched firms, I use the manufacture firms listed in America, which was not affected by the Chinese investment system reform. The financial data of Chinese firms comes from the China Stock Market and Accounting Research database (CSMAR), while the financial data of American firms comes from the COMPUSTAT database. I exclude firm-quarter observations for which information is not available and winsorize all the continuous variables at the 1% in each tail. Moreover, I exclude observations with negative assets, capital expenditures (which use to calculate the firm's investment efficiency) and cash, as well as observations with leverage larger than one.

Before PSM, I have to unify the currency units between CHY and USD. The exchange rate data also comes from CSMAR. In addition, it is necessary to match the four-digit SIC industry code with the two-digit China Securities Regulatory Commission industry codes before merging the listed manufacturing firm's data from CSMAR with listed manufacturing firm's data from COMPUSTAT.

4. Empirical Results

4.1. Main Results

I study the government intervention in corporate investment efficiency by estimating Equation (1) and Table 2 presents the coefficient estimates. Column (1) and (2) have tested how the reform affected firm's overinvestment while column (3) and (4) have tested the impact of the reform on firm's underinvestment.

In overinvestment situation, if the DiD coefficient is positive, it means the reform cannot alleviate the investment distortion and the corporate investment efficiency even lowers after the reform; if the DiD coefficient is negative, the reform does restrict the government intervention in corporate investment and the investment efficiency promotes. In underinvestment situation, the positive

Table 2. DiD regression results.

	Overinvestment		Underinvestment	
	(1)	(2)	(3)	(4)
Reform	0.036**	0.054*	0.009***	0.006**
	(0.049)	(0.062)	(0.004)	(0.033)
Time	−0.001	0.003	−0.003*	−0.004**
	(0.928)	(0.701)	(0.071)	(0.025)
Reform*Time	−0.045**	−0.047**	0.016***	0.017***
	(0.022)	(0.018)	(0.000)	(0.000)
Leverage		0.010		0.008*
		(0.599)		(0.077)
Cash		−0.056***		0.037***
		(0.005)		(0.000)
Size		−0.008**		0.002*
		(0.000)		(0.077)
cons	0.156***	0.201***	−0.097***	−0.139***
	(0.000)	(0.006)	(0.000)	(0.000)
Std. Err	clustered	clustered	clustered	clustered
N	9656	9656	14,933	14,933
Adj. R^2	0.045	0.072	0.057	0.066

This table presents the DiD regression results of Equation (1) after the PSM. The dependent variable is the investment residual calculated from Richardson (2006), which is the proxy of the firm's investment efficiency. The key explanatory that examine the impact of the reform on the firm's investment efficiency is Reform*Time. Reform*Time is a dummy equal to 1 when firm affected by the reform. Column (1) and (2) reports the results in overinvestment situation while column (3) and (4) reports the results in underinvestment situation. I report p-value in parentheses. The standard errors are clustered at two-digit industry level. *, ** and *** denote statistical significance at 10%, 5% and 1% levels, respectively.

DiD coefficient means the reform does work while the negative DiD coefficient means the reform fails. The main result shows that when restricting or removing the government intervention, the corporate investment efficiency promote regardless of overinvestment or underinvestment, which illustrates that the government intervention does play a negative role in the firm's investment efficiency.

Moreover, I present the trend of average investment efficiency from 2003q1 to 2007q3 in **Figure 1**. It is clearly demonstrated in the **Figure 1** that regardless of overinvestment or underinvestment, the investment residuals are becoming close to the zero after 2004q3, which means the average investment efficiency increase after the investment reform.

4.2. Robustness Test

1) In the robustness test, I use a panel model instead of the standard DiD model to estimate the DiD coefficient and the model is presented as:

$$Inv\_effi_{i,j,t} = \beta_0 + \beta_1 Reform_{i,j,t} * Time_t + \beta_2 * X_{i,j,t-1} + \gamma_i + \delta_t + \mu_{i,j,t} \qquad (2)$$
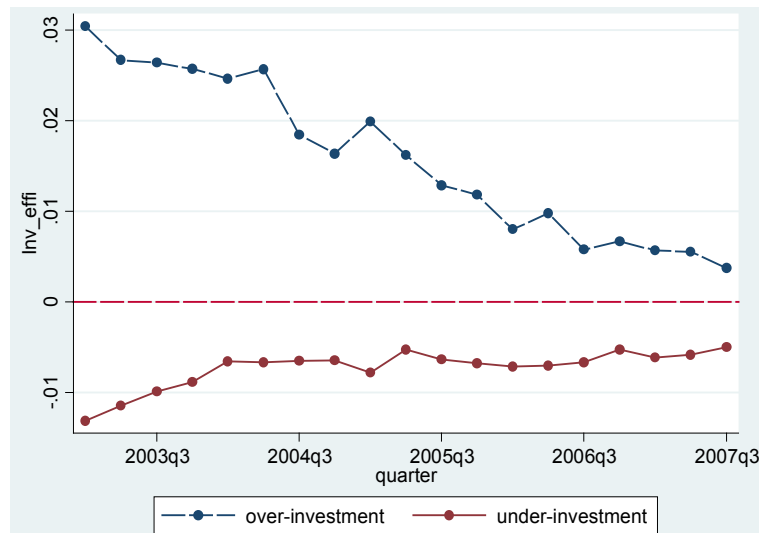
Figure 1. The trend of the average investment efficiency.

2) I include firm fixed effects (γ_i) and time fixed effects (δ_t) instead of the dummy variables $Reform_{i,j,t}$ and $Time_t$. Moreover, I also conduct a placebo test to ensure that the result is driven by the investment system reform rather than unobservable characteristics. As an illustration, I use the quarter from 2002q1 to 2004 q2 as the sample in the placebo test and redo the analysis, for which the Equation (1) is done five quarters before the actual reform (2003q2). The results are reported in Table 3. The sign of DiD coefficients calculated from panel model are similar to the standard DiD model, while this pattern is not significant in the placebot test.

4.3. Heterogeneity Effect of the Reform between SOEs and Non-SOEs

Even if affected by the reform, SOEs still have burden of catering to the political purposes, which may lead to insignificant result among SOEs. I separated the treated firm based on the nature of firm ownership. A firm is classified as an SOE if it is controlled by the government or government institutions, while A firm is classified as a non-SOE if it is controlled by the shareholders that are unrelated to the government or government institutions. The data of ownership structure comes from CSMAR. The indicator variable D_{SOE} equals to 1 when the firm is SOE, and $D_{Non\text{-}SOE}$ equals to 1 when the firm is non-SOE. The results of heterogeneity effect test are reported in Table 4.

5. Conclusion

This paper investigates the relationship between government intervention and corporate investment efficiency. In the quasi-natural experiment settings that provide an exogenous shock to firm's investment environment and restrict government intervention, the difference-in-differences analysis shows that the investment efficiency promotes after the investment system reform. The result is

Table 3. Robustness test.

	Overinvestment		Underinvestment	
	Alternative model	Placebo test	Alternative model	Placebo test
	(1)	(2)	(3)	(4)
Reform		0.039		0.012
		(0.106)		(0.143)
Time		−0.006		−0.003
		(0.450)		(0.596)
Reform*Time	−0.038*	−0.002	0.014***	0.0002
	(0.065)	(0.908)	(0.000)	(0.352)
Controls	Yes	Yes	Yes	Yes
Year FE	Yes	No	Yes	No
Firm FE	Yes	No	Yes	No
Std. Err	clustered	clustered	clustered	clustered
N	9656	5557	14,933	6784
R^2_within	0.012	–	0.027	–
Adj. R^2	–	0.059	–	0.044

This table presents the robustness tests. The dependent variable is also the investment residual calculated from Richardson (2006) [8]. The key explanatory that examine the impact of the reform on the firm's investment efficiency is also Reform*Time. Reform*Time is a dummy equal to 1 when firm affected by the reform. Column (1) and (3) are the regression results of Equation (2), while Column (2) and (4) are the regression results of Equation (1) using the sample from 2002q1 to 2004q2. Column (1) and (3) include year and firm fixed effect, while Column (2) and (4) include dummy variables reform and time. All specification include size, leverage and cash. I report p-value in parentheses. The standard errors are clustered at two-digit industry level. *, ** and *** denote statistical significance at 10%, 5% and 1% levels, respectively.

Table 4. Heterogeneity effect test.

	Overinvestment	Underinvestment
	(1)	(2)
Reform*Time*D_{SOE}	−0.003	0.010
	(0.332)	(0.476)
Reform*Time*$D_{Non\text{-}SOE}$	−0.067***	0.028***
	(0.007)	(0.000)
Controls	Yes	Yes
Std. Err	clustered	clustered
N	9656	14,933
Adj. R^2	0.038	0.046

This table presents the heterogeneity effect results test using the standard DiD model or Equation (1). The dependent variable is investment residual calculated from Richardson (2006) [8]. The key explanatory that examine the impact of the reform on the firm's investment efficiency is Reform*Time. Reform*Time is a dummy equal to 1 when firm affected by the reform. In Column (1), I separate treated firm based on their ownership structure in overinvestment situation, while column (2) reports the results in underinvestment situation. All specification includes reform, time, size, leverage and cash. I report p-value in parentheses. The standard errors are clustered at two-digit industry level. *, ** and *** denote statistical significance at 10%, 5% and 1% levels, respectively.

robust to the alternative model and placebo test. Moreover, the effect of the reform on the firm's investment efficiency varies between SOEs and non-SOEs. The promotion of the corporate investment efficiency mainly concentrates among non-SOEs. The findings show that government intervention plays a negative role in corporate investment efficiency, especially common among SOEs.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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