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## Decentralization and firm investment: Evidence from China

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## Decentralization and firm investment: Evidence from China

### Abstract

Taking advantage of decentralization reform that enlarges the authority of county government in China, we construct a quasi-experiment. Using a large sample of Chinese firms, we show that after the implementation of decentralization reform, firms located in decentralized counties experienced a significant increase in investment expenditure compared with other firms. We also find that after the decentralization reform, state owned enterprises (SOEs) experienced greater increase in investment expenditure on average compared with non-SOEs, and that, within non-SOEs, collective firms have an even larger increase in investments, followed by foreign firms and private firms. Further analysis shows that the influence of decentralization reform was more significant in more developed markets, and that the increased investment was associated with improved productivity, which was more pronounced in SOEs. These results are robust to an alternative sample and endogeneity issues. Overall, these findings support the view that decentralization reform improves government efficiency and creates positive externalities, thereby encouraging firms to invest.

### Keywords

china, evidence, firm, investment:, decentralization

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## **Decentralization and corporate investment: Evidence from China**

**Abstract:** Taking advantage of the decentralization reform that enlarges the authority of county governments in China, we construct a quasi-experiment. Using a large sample of Chinese firms, we show that after the decentralization reform, firms located in decentralized counties experienced a significant increase in investment expenditure compared with other firms. We also find that after the decentralization reform, SOEs experienced greater increase in investment expenditure on average compared with non-SOEs, and that, within non-SOEs, collective firms had an even larger increase in investments, followed by foreign firms and private firms. Further analysis shows that the influence of the decentralization reform was more significant in more developed markets, and that the increased investment was associated with improved productivity, which was more pronounced in SOEs. These results are robust to using alternative samples by excluding either non-decentralized counties or counties with other reforms. Overall, these findings support the view that the decentralization reform improves government efficiency and creates positive externalities, thereby encouraging firms to invest.

### **1. Introduction**

Decentralization involves the devolution of authorities and responsibilities from the central government to local governments. Recent studies on decentralization and its economic implications present two conflicting views. The first argues that decentralization reduces government hierarchy, can improve government efficiency and promotes economic growth

(Xie et al., 1999; Akai and Sakata, 2002; Zhang, 2006; Enikolopov and Zhuravskaya, 2007). The second, however, contends that decentralization enlarges the autonomy of local governments, which could impede coordination and lead to government inefficiency (Treisman, 2000).

Existing studies almost exclusively focus on developed markets, while the extent to which decentralization affects the real economy in emerging markets is still unclear. The effectiveness of decentralization is perhaps more important in emerging markets, where business is known to be heavily influenced by government intervention. Moreover, existing literature on the economic implications of decentralization mainly focuses on its effect on the macro-economy, such as regional economic growth and government quality (Treisman, 2002). Whether and how the micro-economy is influenced by decentralization is still a controversial issue, particularly as there is still no systematic empirical evidence as to whether and how the decentralization influences corporate investment decisions and, in turn, firm profitability. This issue is crucial in gaining an understanding of the influence of decentralization and the associated change of political environments because the political environment usually affects firms' investment policies. Thus, whether the decentralization is important and how it affects firms' investment policies are particularly relevant for emerging markets.

To investigate this issue, this study investigates the largest emerging market in the world: China. More importantly, some provinces in China introduced devolution of political and fiscal responsibilities to local governments at the county level to various extents and did so at different times<sup>1</sup>. The timing of this decentralization was largely independent from the characteristics and economic growth opportunities of the local firms in the county. Thus, the introduction of the decentralization reforms led to an exogenous shock of government policy

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<sup>1</sup> The Chinese political system consists of five layers of government administration, namely state, province, prefecture, county and township. This wave of decentralization mainly involves devolution from the prefecture level to the county level and enlarges the responsibilities of the government at the county level.

for the firms headquartered in those counties. This enabled the design of a quasi-natural experiment and the application of the difference-in-difference method for empirical analysis.

This study explicitly examines whether decentralization affects the investment decisions of firms within the decentralized regions in China, which fit our theoretical analysis quite well. First, the Chinese economy is a hybrid of central planning and market-based activities in which the government controls the key resources essential to the corporate sector. By directly controlling the activity of SOEs through government ownership and indirectly controlling the behaviour of non-SOEs through soft channels (such as regulation, license, and social and political networks), governments can explicitly and implicitly shape the incentives and decisions of economic entities (Piotroski and Zhang, 2014). This heavy government intervention in business creates reasonable incentives for decentralization and provides an excellent environment for our theoretical analysis. Second, it is well documented that China possesses an underdeveloped institutional environment. On the one hand, in the presence of a weak legal system, enlarged fiscal responsibilities for the local governments may trigger corruption. On the other hand, the career concerns of local politicians may encourage them to emphasize regional economic growth and create positive externality (Li and Zhou, 2005). As such, the relative costs and benefits of decentralization become less straightforward, and the examination of decentralization in China is able to advance our understanding of this issue in emerging markets.

Using a large sample of firms from China, this study documents the following key findings. First, the decentralization reform in China encourages firms' incentive to invest. Economically, firms' average investment expenditure to fixed assets ratio increased by 1.929 percentage points after the decentralization reform. Second, investment expenditure increased more in SOEs than in non-SOEs after the decentralization reform. Specifically, after the decentralization reform, the investment increased by 3.102 and 1.292 percentage points in

SOEs and non-SOEs, respectively. Among non-SOEs, collective firms and private firms experienced an increase in investments by 4.727 and 2.490 percentage points. Finally, the decentralization reform improved firm productivity more in SOEs than that in non-SOEs, and among non-SOEs the productivity of collective firms also improved. The results show that increased investments due to the decentralization reform were associated with improved productivity in the SOE sector, relative to non-SOE sector.

Our study contributes to the existing literature in several ways. First, extant studies on the influence of decentralization have typically focused on its influence at the country level (such as economic growth and government quality), while our study provides evidence of its influence at the individual firm level, adding additional and useful evidence to the existing studies. We argue that decentralization encourages firms' incentives for investments and in turn improves regional economic growth. Our evidence corroborates the findings of previous studies and in this sense we present a complementary perspective to existing studies.

Our study also contributes evidence regarding the influence of government intervention on corporate investment policy. Existing studies typically have examined government intervention from two perspectives, namely, state ownership and firm political connections, and have shown that government intervention substantially shapes firms' investment policies (Chen et al., 2011; Firth et al., 2012). We complement these studies by considering the decentralization reform as an exogenous shock, and revealing a dynamic change of firms' investment policy in the face of the easing of government intervention as a result of decentralization. Our evidence also presents useful implications for investigating corporate financing and other relevant policies.

Additionally, in a departure from previous studies of cross-sectional comparisons that suffer from severe endogeneity, our empirical design uses a quasi-natural experiment. This

is able to address the endogeneity issue to a large extent, thereby providing unbiased and consistent results.

The remainder of the paper is organised as follows. Section 2 describes the decentralization reform introduced by provincial governments and develops our hypotheses. Section 3 describes the sample and methodology. Section 4 presents the empirical results and discussions. Section 5 concludes our findings.

## **2. Background of decentralization and hypothesis development**

### **2.1 The “counties power expansion” (CPE) decentralization and the motivation for it**

Since the economic reforms of 1978, China has established a political system consisting of five layers of state administration: the central, provinces, municipalities, counties and townships levels, and this system is different from those applied in developed countries. This multi-layer administration system runs the risk that the authorities at the higher levels are less likely to collect sufficient information from those beneath them, reducing the efficiency of public goods and services provision and specific policy implementations. Thus, during the early stage of economic reform, the authorities at the municipal level played important coordinating roles in lubricating this system and promoting regional economic growth.

This system also has additional intrinsic disadvantages that further reduce efficiencies. First, under this system county-level authorities are at the forefront of, and take the responsibility for, promoting regional economic growth, even though they have limited discretion as political and fiscal powers are controlled by the municipal governments. This information asymmetry between the governments at the county and municipal levels discourages county governments from properly implementing policies or efficiently providing public goods and services. Second, municipal governments are not equally developed across regions, and the driving functions of some underdeveloped municipal governments are limited. Instead, these municipal governments are supported by governments at the lower

levels, resulting in the “small horse cart” (*xiaoma la dache*) phenomenon. This complicates the interactions between the various government levels and reduces their effectiveness in performing governmental duties. Third, career concerns may motivate politicians from municipal governments to behave dishonestly. In particular, they may expropriate resources from, or hold back resources allocated to, the county governments to concentrate on the development of their own jurisdictions. This may reinforce the conflicts of interest between these governments and reduce the effectiveness of governments at lower levels.

The type of decentralization relevant to this study involves the devolution of decision-making and fiscal autonomy to county level from the municipal level and the reducing of political hierarchies to correct prior inefficiency and further expand the authority of the county governments. In practice, the Chinese central government has implemented a series of reforms to achieve these goals at the local government level. In particular, on August 17, 2002, the government of Zhejiang province approved the ‘*expansion of economic management authority in some counties*,’ which urged the decentralization of authority to county governments<sup>2</sup>. These reforms included reducing the number of items requiring approval, shortening the procedure for doing so, and shifting economic and management power to counties from cities. As a result, the administratively decentralized counties now possess the same power over fiscal settlement, capital allocation, project approval, public services and politician evaluation that the municipalities in charge of them previously had. Since 2002, the central government initiated the decentralization reform in 17 pilot counties in Zhejiang province. Later on, in 2003, Guangdong, Henan and Hubei provinces also implemented the decentralization reform. By 2007, 489 counties had implemented the decentralization, accounting for 27.29% of all counties in China (see Table 1 for details)<sup>3</sup>.

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<sup>2</sup>See the following link for details: [http://www.110.com/fagui/law\\_250065.html](http://www.110.com/fagui/law_250065.html).

<sup>3</sup>We exclude counties of municipalities including Beijing, Tianjin, Shanghai and Chongqing.



As a result of the implementation of decentralization at the county government level, the efficiency of government has been increased. Other anecdotal evidence also suggests that this is the case. Moreover, after decentralization, county governments had closer connections with provincial governments in the areas of tax returns and capital transferring, which reduced the severe information asymmetry between the different tiers of government. Additionally, Oates (1985) argued that local governments have informational advantages of local conditions and preferences, so that they are better off in designing investment decisions that are more appropriate and suitable for regional economic growth.

[Insert Table 1 here]

## **2.2 Hypothesis development**

Administrative decentralization has direct and substantial effects on firms' investment decisions in China through at least three channels. First, decentralization creates a positive externality and an efficient environment in which firms are encouraged to be involved in investment activities. Moreover, the devolution of economic and management powers from municipal to county governments awards more autonomy to county governments to support local economic growth, and inspires their ability and incentives to support local firms' investment activities by designing specific policies. Second, career concerns might motivate officials in a decentralized county to behave honestly. As regional economic growth is a key measure of politicians' performance (Li and Zhou, 2005), the hope of rising to higher office may cause these officials to cultivate a reputation for integrity (Myerson, 2006), and put further emphasis on attracting and supporting firms' investment activities. Third, the decentralization reform removes the intermediary function of municipal governments between provincial and county governments. Thus, government subsidies and tax returns from the provincial governments are unlikely to be held back by the municipal governments,

which increase the internal funds at the firm level in decentralized counties. The increased available funds ensure the feasibility of firms' investment activities.

Based on existing theories, administrative decentralization reduces the layers of political hierarchy and government intervention, improves government efficiency, and thus has direct relevance for firm investment efficiency. According to the neoclassical view, government intervention is an important friction leading to higher agency costs, and existing theory predicts that investment efficiency decreases with the level of government intervention (Chen et al., 2011; Firth et al., 2012). As decentralization is seen as a means to reduce government intervention and associated agency costs, it is expected that decentralization leads to more efficient investments at the individual firm level. However, according to the Keynesian view that emphasizes the role of government, reduced government intervention will cause capital misallocation resulting in market failure. Thus, decentralization is associated with less efficient investments by economic units. These two theoretical predictions are the focus of our empirical work, and we form our hypothesis as follows:

*H1: After the decentralization reform, the investment expenditure of firms located in decentralized counties will increase more than that of firms located in other counties.*

Generally, based on the types of ultimate owners, firms operating in China can be initially divided into state owned enterprises (SOEs) and non-SOEs, while non-SOEs can be further divided into private firms, collective firms and foreign firms (Nee, 1992; Guariglia et al., 2011; Ding et al., 2013). In this section, we discuss the variation in investment activities after the decentralization reform across firms with different types of owners. The basic rationale is that some specific types of firms may be more influenced by the decentralization reform, or are more likely to engage in investment activities due to positive externalities.

Existing studies have documented that Chinese corporate sector and banking system are significantly controlled by the governments. Governments shape the environments in which

firms operate, and SOEs are used by them to achieve both social and political objectives rather than value maximization. Due to the various multiple objectives placed by the governments, SOEs are more likely to be favoured or supported by government-owned banks in terms of financing, especially when they face financial distress (Cull and Xu, 2003; Firth et al., 2008). This soft budget constraint further mitigates SOEs' concerns about insolvency problems and encourages them to invest more, including in suboptimal but politically favoured projects. Thus, after the decentralization reform, it is a natural expectation that politicians are likely to encourage SOE investments to promote regional economy relative to non-SOE investment activities, and we form our hypothesis as follows:

*H2: After the decentralization reform, the average investment expenditure will increase more for SOEs located in the decentralized counties compared to the average increasing for non-SOEs located in decentralized counties.*

Next, we discuss the variation in investment activities among different types of non-SOEs. In China, private firms account for the majority portion of the corporate sector and are considered as major engine of the local economy since the economic reforms. However, due to their short history on the markets and information asymmetry, these private firms have been long discriminated by government-owned banks (Firth et al., 2009), and thus face a lack of capital for investment (Xu et al., 2011). Although their available internal funds increased due to greater government subsidies and tax returns after the decentralization reform, unlike SOEs who also invest in unprofitable but politically favoured projects, private firms are likely to invest more efficiently to maximize their firm's value. Thus, we conjecture that the increased investment by private firms after the decentralization reform is lower than that of SOEs.

Collective firms emerged as a typical and hybrid form of ownership in China as a consequence of the ownership reform in the corporate sector. These firms are independent and

legal economic organizations and their property belongs to the public. They are owned by collective investors representing communities in urban or rural areas and are managed by local governments (Guariglia et al., 2011; Ding et al., 2013)<sup>4</sup>. Thus, compared to private firms, collective firms are more closely connected with the government and have better access to external financing and investment projects that are still controlled and regulated by the government. We thus conjecture that after the decentralization reform, the increased investment expenditure of collective firms will be higher than that of private firms. However, whether the effect of the decentralization reform on corporate investment is different between collective firms and SOEs is less straightforward. On the one hand, compared to SOEs, collective firms enjoy more autonomy, faceless political pressure from the governments, and set value maximization as their ultimate objective. Thus, it is plausible that collective firms have strong incentives to compete with SOEs for scarce resources, and to choose those profitable investment projects while leaving the unprofitable but politically favoured projects to SOEs. In this case, the influence of the decentralization reform on firms' investment activities between SOEs and collective firms could be insignificant. On the other hand, an alternative explanation is also possible. Although collective firms are also supported by the local governments, these firms do not enjoy as many privileges as SOEs in terms of receiving key resources. After the decentralization reform, when more investment projects became available, it was expected that collective firms would have experienced greater increases in investment activities compared to SOEs. Thus, the question of whether the difference in increase in investment expenditure after the decentralization reform between collective firms and SOEs becomes an empirical one of particular interest.

Foreign firms are another major form of economic organization that has emerged in China as a consequence of the Chinese government's efforts to attract foreign investments. Foreign

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<sup>4</sup> Collective firms are different from SOEs in counties, as their founders are township and village enterprises.

firms have specialized knowledge and skills to analyse the markets and are able to recognize profitable investment projects. It is plausible that foreign firms increased their investment expenditure after the decentralization reform due to positive externalities and greater investment opportunities, or that they reduced their investment expenditure due to their uncertainty about the policy. Thus, the influence of the decentralization reform on corporate investment is less clear for foreign firms, and the question of whether the influence of the decentralization reform on foreign firms is significantly different from the influence on other firms remains an empirical one. Based on this discussion, we form the following hypothesis:

*H3: After the decentralization reform, the increase in investment expenditure will be larger for collective firms than for private firms, while SOEs will remain between the two.*

### **3. Sample and methodology**

#### **3.1 Sample**

To conduct empirical analyses, we collect a sample of firms from the database filed by the National Bureau of Statistics (NBS) between 1999 and 2007. This database includes all types of firms in China with annual sales of RMB5 million (equal to USD\$775,000) or more, which mainly operate in the manufacturing and mining sectors and are located across 31 Chinese provinces or province-equivalent municipal cities. Initially, we are able to collect 462,272 firm-year observations corresponding to 155,234 firms headquartered in counties. Following the common rules applied by most existing studies, we drop 6,410 observations with negative sales, 3,876 observations with negative equity and 4,622 observations with negative total assets minus total fixed assets. Our final sample includes 447,364 firm-year observations corresponding to 154,973 firms. This is an unbalanced data set, with the number of observations ranging from a minimum of 34,252 in 2001 to a maximum of 82,364 in

2007. To eliminate the influence of outliers, we winsorize all of the continuous variables in our analyses at the 1% level.

The NBS data contains information on the fraction of paid-in capital contributed by the state investor, legal entity investors, domestic individual investors, collective investors, investors from Hong Kong, Macao, and Taiwan, and foreign investors. Legal entities include both state legal entities and private legal entities. Based on the types of owners with the largest capital contribution, we first classify our sample firms into SOEs and non-SOEs. A firm is classified as an SOE if the state investor or the state legal entity investor makes the largest capital contribution. Similarly, we further classify non-SOEs into 3 groups of firms in which the largest capital is contributed by collective investors (Collective), private investors (this group include both domestic individual investors and private legal entities) (Private) and foreign investors (this group include investors from Hong Kong, Macao, Taiwan, and other countries) (Foreign). Our firm classification is consistent with existing studies (Guariglia et al., 2011; Ding et al., 2013).

### 3.2 Methodology and estimation

To empirically test how the decentralization reform affects firms' investment activities, we develop the following baseline investment equation:

$$(I/K)_{it} = \alpha_1 Reform_{it} + \alpha_2 (I/K)_{it-1} + \beta Control_{it} + Industry_i + Region_i + Year_t + \varepsilon_{it} \quad (1)$$

where  $I_{it}$  is firm fixed investment in the current year. Following Perotti and Vesnaver (2004), Firth et al. (2012) and Ding et al. (2013), we measure firm fixed investment as the change in fixed assets (the difference between the book value of fixed assets of the current and previous year) plus the current year depreciation. We scale the firm fixed investment by fixed assets that are entered into equation (1). *Reform* is a dummy variable that represents the introduction of the decentralization. Its value equals 1 for post-reform observations of firms located in counties that have implemented the CPE decentralization reform, and 0 otherwise.

Lagged investment is also included to control for any dynamic effect of the past investment policy. In the equation (1),  $i$  represents firms and  $t$  represents years.

To be consistent with the existing literature (e.g., Lang et al., 1996; Richardson, 2006), we also include several control variables in the equation (1), including *Assets*, *Sale Growth*, *CF*, *Leverage* and *Age*. *Assets* is a firm's size and *Sale Growth* is the growth rate of sales. We expect a positive coefficient for larger firms and firms with higher sales growth rate, which may have more resources for investment, resulting in positive coefficients for *Assets* and *Sale Growth*. A negative relation is also possible if smaller firms are in their expansion stages. *CF* is a firm's cash flows. As larger cash flows provide a firm with more financial resources for investment, we expect a positive coefficient for *CF*. *Leverage* is calculated as the ratio of total debt to total assets which also affects firms' investment behaviours. On the one hand, a firm with higher leverage pays more interest and is less likely to obtain additional debt financing, both of which constrain its ability to invest. On the other hand, higher leverage could indicate that firms are able to obtain more external finance, facing less financial constraints, and thus invest more. In this sense, we do not have any prediction about the effect of leverage on corporate investment which becomes an empirical question. We also control for a firm's age (*Age*). The longer the firm has existed, the more likely it is to be in the mature or declining stage of the business life cycle, suggesting reduced investment activity and thus a negative coefficient for the variable.

Our sample is comprised of firms located in counties that have and have not implemented the CPE decentralization reform. This allows us to investigate the consequence of CPE reform using a differences-in-difference (DID) methodology that controls for industry, region and year fixed effects, which are represented by *Industry*, *Region* and *Year* in equation (1). The inclusion of these three fixed effects controls for unobserved heterogeneity at the firm level, which remains constant over time, and any unobserved time-variant characteristics that

affect investment activities. Thus, our coefficient of interest is  $\alpha_1$ , which captures the DID effect. This method can remove any biases from comparisons that may result from (1) permanent differences between firms and (2) trends over time. In addition, as the decentralization reform happens at different times in different counties, our DID research design can also help us control for unobserved time-series changes in the economic environment commensurate with the CPE decentralization reform, and more precisely distinguish the effects of the decentralization reform on corporate investment from other state level or industry level confounding factors. This method has also been discussed and applied by Lennox and Li (2012) and Liu et al. (2015).

Our empirical design may suffer some potential endogeneity issues. First, control variables on the right hand side of the equation may not be strictly exogenous, which introduces the endogeneity. Second, both firm investment and right-hand side variables could be simultaneously determined by unobservable firm-specific factors, which introduce the simultaneity. Third, firm investment policy could be determined by the investment policy in the past, which introduce the dynamic endogeneity. To address these endogeneity issues, we use the system generalized method of moments (GMM) for estimation, which can overcome the unobserved heteroscedasticity, simultaneity and dynamic endogeneity, and produce unbiased and consistent estimates (Blundell and Bond, 1998; Schultz et al., 2010). In our system GMM, we assume that all explanatory variables, except *Reform*, *Age*, and industry/region/year dummies, are potentially endogenous, and we used variables lagged three and four years as instruments for all the endogenous variables.

To test our main hypothesis, we examine the experimental variable of *Reform*, and expect the coefficient of *Reform* to be significantly positive. We are also interested in investigating whether the influences of CPE reform on firms' investment activities are different across firms that are of different owner types. When comparing SOEs and



non-SOEs, we include an interaction term  $Reform*SOEs$  in equation (1), where  $SOEs$  equals to 1 for SOEs and 0 for non-SOEs. To test our hypothesis, we expect the coefficient of  $Reform*SOEs$  to be significantly positive. When partitioning non-SOEs into three groups and comparing these types of non-SOEs, we choose SOEs as the control group and include three interaction terms  $Reform*Collective$ ,  $Reform*Private$  and  $Reform*Foreign$  in equation (1), where  $Collective$ ,  $Private$  and  $Foreign$  represent each type of non-SOE investors discussed before, respectively. According to our main hypothesis, we expect the coefficient of  $Reform*Collective$  to be significantly positive, while the coefficient of  $Reform*Private$  to be significantly negative, and we do not have any prediction about the sign of the coefficient of  $Reform*Foreign$ . The definitions of the variables used in our study are reported in Table 2.

#### **4. Empirical results**

##### **4.1 Summary statistics**

As we use variables lagged three and four years as instruments for all the endogenous variables in the system GMM estimations, the number of observations included in the regressions reduces to 261,176, therefore, we report the summary statistics for this sample which consists of 261,176 observations. Table 3 presents the sample distribution by owner types. The results show that 29,208 firm-year observations are SOEs, 86,838 are collective firms, 98,006 are private firms, and 47,064 are foreign firms. Table 4 reports the summary statistics of our main variables and Table 5 reports the mean and standard deviation for these main variables by firm type. For the full sample in Table 4, we observe that the average investment expenditure to fixed assets ratio is 13.54%, which is close to that reported by Ding et al. (2013).  $Reform$  has a mean of 0.291, indicating that 29.1% of firm-year observations are from the decentralized counties. In Table 5, we find that SOEs have a lower mean investment to fixed assets ratio than other types of non-SOEs. These types of firms also differ in other variables, suggesting the need to control for these variables in

analyzing investment decisions. The SOEs also have a higher leverage, tend to be larger and have a longer history than the non-SOEs.

[Insert Table 3 here]

[Insert Table 4 here]

[Insert Table 5 here]

#### **4.2 The effect of decentralization on corporate investment: SOEs vs. non-SOEs**

Table 6 presents the test results of the effect of the decentralization reform on corporate investment expenditure by estimating equation (1). It is noted that as we use the system GMM for estimation and include lagged dependent variable as an independent variable, the sample size drops to 261,176 firm-year observations. Column 1 presents the baseline equation estimation in which we only include the *Reform* dummy, and column 2 presents the results in which we include *SOEs* dummy and *Reform\*SOEs* interaction. From the results in column 1, we find that the *Reform* dummy, which is our primary variable of interest, has a positive and statistically significant coefficient at the 1% level, indicating that the decentralization reform motivates firms to invest more. Economically, the estimated coefficient suggests that the investment expenditure to fixed assets ratio increased by 1.929 percentage points after the decentralization reform for firms located in decentralized counties compared to firms located in other counties. This result is consistent with our hypothesis that the decentralization reform encourages firms' incentives for investments through deregulation in investment licence and approval procedure.

Furthermore, we examine the different effects of the decentralization reform on corporate investment between SOEs and non-SOEs, and report the results in column 2. Column 2 of Table 6 presents the test results of the effect of the interaction between the decentralization reform and SOEs on firms' investment expenditure, which predicts that the decentralization

reform incentivizes SOEs to invest more than non-SOEs. We find that the increase of investment expenditure after the decentralization reform becomes significantly higher for SOEs relative to non-SOEs, as reflected by the significantly positive coefficient on the interaction term of *Reform\*SOEs*. Specifically, after controlling for other variables, the average investment expenditure to fixed assets ratio significantly increased by 3.102 (=1.292+1.810) percentage points after the decentralization reform in the SOE sector. This result is consistent with the conventional wisdom that SOEs are usually the vehicle through which politicians intervene in the real economy in China, and recent anecdotal evidence that private investment is crowded out by SOE investment. Faced with incentives stemming from the decentralization reform, SOEs can acquire more key resources under government control, such as deregulation in investment activities, and thus are more encouraged to invest. Local governments also rely on SOEs to promote economic growth.

Column 3 presents the test results of the effect of the decentralization reform on investment expenditure between different types of non-SOEs and SOEs. To test our hypothesis, we choose SOEs as the control group and included dummies representing each type of non-SOEs and their interactions with *Reform* dummy, and report the results in column 3 in Table 6. Based on the estimation results in Column (3), we find that the estimated coefficients of *Reform\*Collective* and *Reform\*Private* are 1.450 and -0.787, which are statistically significant at both 5% and 1% levels. These results suggest that compared to SOEs, collective firms experienced a higher increase in investment expenditure after the decentralization reform, while private firms experienced a lower increase in investment expenditure. Consistent with the results in the first two columns, the *Reform* dummy has a positively significant coefficient at the 1% level. Economically, after the decentralization reform, the investment expenditure to fixed assets ratio increased by 4.727 (=3.277+1.450) percentage points for collective firms, and by 2.490 (=3.277-0.787) percentage points for

private firms. These results are consistent with our main hypotheses and, in particular, the significantly higher increase in investment in collective firms also supports the view that such firms are likely to take advantage of the decentralization reform to compete with SOEs in terms of investment projects and to increase their investment activities. We also find that the decentralization reform does not affect foreign firms' investment, which is also reasonable according to our arguments. On the one hand, foreign firms do not depend on local governments to acquire scarce resource, thus they may defer investments due to uncertainty about the decentralization policy. On the other hand, foreign firms are more professional at analysing investment projects and can more efficiently take advantage of positive externalities to increase their investments. Thus, the insignificant influence of reform is due to the net results of the above two opposite effects.

In Table 6, we also report the p-values of the Hansen tests, AR (1) and AR (2). In particular, the p-values of Hansen tests are all larger than 0.1, indicating that we cannot reject the null hypothesis and the instruments we use are exogenous. Moreover, the p-values of AR (1) which are the test for the first order serial correlation of the differenced residuals are all less than 0.1, indicating that there is first-order serial correlation, and the p-values of AR (2) which are the test for the second order serial correlation of the differenced residuals are all larger than 0.1, indicating that there is no second-order serial correlation. These tests indicate the validity of our system GMM method. Some of the results for the control variables are also consistent with our expectations. The significantly positive coefficients on *CF*, *Sale Growth* and *Assets* simply show that larger cash flows from operating and financing activities lead to larger investments, and that larger firms spend more on investments as indicated by the significantly positive coefficient on *Assets*. Investment expenditure is negatively related to *Age*, suggesting that older firms invest less than younger firms.

[Insert Table 6 here]

### 4.3 Identification

The credibility of using DID estimation is subject to the key assumption that CPE reform in a county, though not random, was uncorrelated with pre-existing differences incorporate investment trends across counties. There are no clear relations between corporate investment and determinants in selecting pilot counties to implement decentralization. Moreover, it is hard to believe that a province will select counties which tend to invest more than others to be free from monitor from local governments. As a result, even if differentiated trends between treated and control counties existed, the only plausible direction is to bias our results downwards, which will strengthen our conclusion.

To assess the plausibility of this assumption formally, we borrow the method applied by La Ferrara et al. (2012), and exploit the exact timing of CPE reform to test whether the increase in investment occurs in correspondence with the introduction of CPE reform in a county. For this purpose, we estimate a flexible difference-in-differences model that allows coefficients to vary year by year. Specifically, we substitute the treatment dummy  $Reform_{it}$  in equation (1) with a full set of dummies going from four years before to four years after the introduction of CPE reform. In particular, we estimate

$$(I/K)_{it} = \alpha_{-4}D_{-4} + \dots + \alpha_0D_0 + \dots + \alpha_4D_4 + \beta Control_{it} + Firm_i + Year_t + \varepsilon_{it} \quad (2)$$

Where  $D_0$  is a dummy for the year of CPE reform in a specific county;  $D_{-s}$  is a dummy for  $s$  years before CPE reform; and  $D_{+s}$  is a dummy for  $s$  years after CPE reform. The estimated coefficients of this set of newly entered dummy variables are plotted in Figure 1 together with 99 percent confidence interval.

From Figure 1, we can find that the increase in corporate investment does not occur before CPE reform. Neither of the coefficients for the years preceding CPE reform, nor the coefficients for the year of CPE reform itself, are significantly different from zero. The positive effect of CPE reform on corporate investment is realized one year after its

implementation, and persists at similar levels in subsequent years after the CPE reform. This result further validates our identification strategy and confirms the reliability of our main results.

[Insert Figure 1 here]

#### **4.4 Robustness tests**

During our sample period, along with the decentralization reform, there are some counties that experience another reform to promote their independent positions. This is called “Annexation of suburban counties by municipals” reform (*chexian she qu*). Under this reform, some counties became the districts of municipalities that are in charge of them. The motivation for this is that as these counties are better developed than others, municipalities have incentives to incorporate these counties under their control to promote regional economic growth at the municipal level. To eliminate the potential contamination effects of this alternative reform, we repeat our previous regression estimation, this time focusing on the firms headquartered in counties that have only experienced the decentralization reform. The results are reported in Table 7.

[Insert Table 7 here]

In our previous analysis, we use the DID analysis to derive the main findings. Although the DID approach could help us to control for unobserved time-series changes in the economic environment commensurate with the decentralization reform, a concern raised from this method is that the decentralization reform may have also caused significant variations in the investment behavior of the control firms (those headquartered in non-decentralized counties). If this is the case, the observed significant DID effects could be partially attributable to the change in investment behavior of the control firms. Thus, to validate our main argument that the decentralization reform positively affects the investment expenditure of firms headquartered in decentralized counties, we repeat our regression analysis, this time

only focusing on the firms located in the decentralized counties. The results are reported in Table 8.

[Insert Table 8 here]

The results in Tables 7 and 8 are very similar to our previous findings. The coefficients of *Reform* dummy remain positive and statistically significant in all models. Consistent with our previous findings, *Reform\*SOEs* are positively and significantly associated with investment, suggesting that SOEs increased investment more than non-SOEs after the decentralization reform. The coefficient of the interaction term of *Reform\*Collective* is positive and statistically significant, and the coefficient of the interaction term of *Reform\*Private* is negative and statistically significant. Overall, our results are robust to alternative sample selection when dealing with alternative explanations.

#### 4.5 Additional evidence

The basic rationale of our main findings is that the decentralization reform promotes firms' investment activities to induce higher regional economic growth. The assumption on which this argument rests is that increased investment is associated with high efficiency and higher productivity. To provide additional evidence regarding this assumption, we repeat our main regression estimations and replace the dependent variable with firm productivity. In particular, we use the total factor productivity (TFP) as the proxy for firm productivity, which is estimated as the deviation between the observed output and predicted output using the Cobb-Douglas production function, following Olley and Pakes (1996)<sup>5</sup>. This measure has also been used by Brandt et al. (2012). The results are reported in Table 9. We find that the decentralization reform improves firm productivity more in SOEs compared with non-SOEs. Interestingly, in non-SOE groups we find that the increase in firm productivity is higher for collective firms than that of SOEs, reflected by positive and significant coefficients on

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<sup>5</sup>Please refer to Olley and Pakes (1996) for detailed calculation of TFP.

interaction term of *Reform\*Collective* in column 3. This is also consistent with our expectations that collective firms increase investment more than SOEs which leads to higher productivity. What we argue here is that after the decentralization reform, local governments have more autonomy and can manage SOEs more efficiently, because they are closer to these SOEs and have more complete information about these SOEs and the environments in which these SOEs operate. In other words, the documented low efficiency of SOEs in previous studies could be due to the incomplete information possessed by the governments at the higher tiers.

[Insert Table 9 here]

We next provide additional evidence about instances in which the influence of the decentralization is more significant to firms' investment activities. We argue that as the decentralization is a typical policy implemented at the local government level, a more developed institutional environment and a more efficient government should ensure the effectiveness of implementing this policy. It is thus expected that our main findings hold for the sample of firms located in a more developed institutional environment. To provide empirical evidence, we collect the market development index filed by Fan et al. (2011) and divide all sample firms into two groups located in provinces with a market development index above and below the median level. We then repeat the previous regressions for each sample, and report the results in Table 10. Consistent with our expectation, we find that the effects of decentralization on firms' investment expenditure and the variations in investment expenditure across firms with different owners hold in the sample of firms from more developed markets.

[Insert Table 10 here]

Our main findings suggest that the decentralization reform awards more power to local governments, which in turn encourage regional investment activities to promote local



economic growth. However, it could be also argued that in regions with overinvestment activities, the local government may have the incentives to reduce the investment activities after the decentralization reform to avoid the inefficiency resulted from overinvestment activities. We present the following argument and empirical analysis to rule out this possibility. First, under the current Chinese political personnel system, the regional GDP growth is used as the criteria to evaluate local politicians, thus politicians have strong incentives to promote regional GDP growth. Meanwhile, according to the report by the National Bureau of Statistics of China, more than 90% of national GDP growth in 2009 is attributed to the investment activities<sup>6</sup>, thus we argue that politicians have stronger incentives to encourage regional investment activities which lead to higher GDP growth regardless of existing investment levels. Moreover, the recent reported overcapacity in China, especially after the economic stimulus package, also echoes the incentives of local politicians to encourage investment activities regardless of existing investment levels. Second, we conduct subsample estimation to address this issue empirically, by partitioning our sample based on the median value of investment levels for each year separately. Specifically, we aggregate the firm level data from the same counties and calculate the county-level fixed investment. Then, according to the median value of fixed investment at county-level in each year, we group the samples into overinvestment (equal to or above the median) and underinvestment (below the median) counties. We then re-estimate the main equation for each subsample and report the results in Table 11. From the results in Table 11, we find that the positive coefficients of the decentralization reform hold in both sub-samples, suggesting that the effect of the decentralization reform on corporate investment is not influenced by the existing levels of investment across regions.

[Insert Table 11 here]

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<sup>6</sup>Source: [http://www.china.org.cn/business/2010-02/02/content\\_19356083.htm](http://www.china.org.cn/business/2010-02/02/content_19356083.htm)

## 5. Conclusion

In this study, we examine the influence of the administrative decentralization on corporate investment activities using a large and representative sample of Chinese firms between 1999 and 2007. We use the reform of “county power expansion” to measure the decentralization, and we find that the decentralization reform has significantly increased firms’ investment expenditure. This is consistent with our hypothesis that the decentralization reduces political hierarchy, improves government efficiency and creates positive externalities for firms’ investment activities. We also examine how this effect varies across firms with different types of owners. The empirical results show that the effect of the decentralization on firms’ investment activities is stronger for SOEs than for non-SOEs. This is consistent with the view that government influences markets and fuels economic growth through SOEs. Turning to non-SOEs, we also find that the influence of the decentralization reform is stronger for collective firms, compared with that in private firms and foreign firms. Further investigation reveals that the observed increased investment expenditure after the decentralization reform is more efficient for SOEs than non-SOEs, reflected by the higher total factor productivity. Our main results are robust to alternative sample construction and consideration of the endogeneity issue.

From a dynamic perspective, our findings provide fresh and new evidence of how the decentralization reform affects the real economy by influencing the investment activities of the corporate sector. This effect is underexplored so far. Our findings have important implications for policymakers. As the decentralization reform is shown to be beneficial for corporate investment activities as well as the whole economy, policymakers should strengthen the implementation of this reform to restore and fuel economic growth, especially after the recent global financial crisis. Policymakers should also improve institutional environments and property protection to ensure the success of the decentralization reform.



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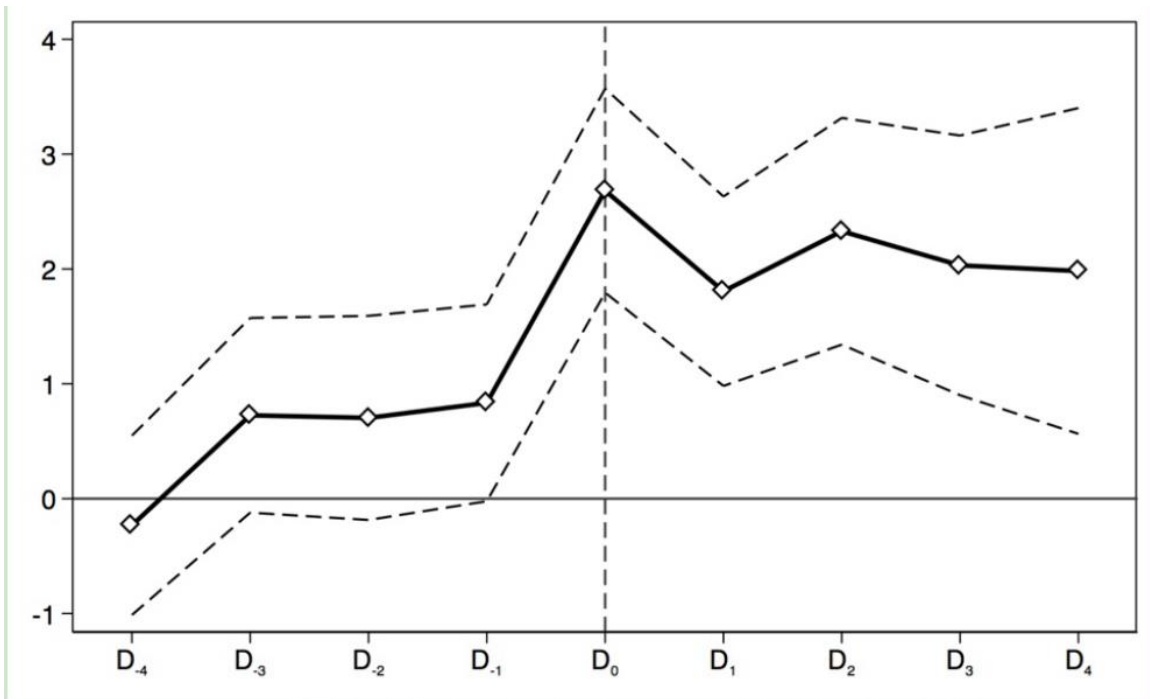


Figure 1. Timing of Firm Investment Change around Year of “counties power expansion” (CPE) Reform

Note: Estimated coefficients and 99 percent confidence interval from a regression of the firm investment on a set of dummies from  $t - 4$  to  $t + 4$ , where  $t = 0$  is the year of introduction of CPE reform.

**Table 1. Summary of decentralized counties during our sample**

This table shows the number of counties that have adopted the “counties power expansion” (CPE) decentralization reform in each province from 1999 to 2007.

Province/Year	1999	2000	2001	2002	2003	2004	2005	2006	2007
Hebei	0	0	0	0	0	0	22	22	22
Shanxi	0	0	0	0	0	0	0	0	0
Inner Mongolia	0	0	0	0	0	0	0	0	0
Liaoning	0	0	0	0	0	0	0	14	14
Jilin	0	0	0	0	0	0	33	33	33
Heilongjiang	0	0	0	0	0	7	7	7	7
Jiangsu	0	0	0	0	0	0	0	0	0
Zhejiang	0	0	0	17	17	17	17	17	17
Anhui	0	0	0	0	0	0	0	12	12
Fujian	0	0	0	0	58	58	58	58	58
Jiangxi	0	0	0	0	0	0	0	0	0
Shandong	0	0	0	0	30	30	30	30	30
Henan	0	0	0	0	0	35	35	35	36
Hubei	0	0	0	0	17	17	29	39	39
Hunan	0	0	0	0	0	0	88	88	88
Guangdong	0	0	0	0	0	78	78	78	78
Guangxi	0	0	0	0	0	0	0	0	0
Hainan	0	0	0	0	0	0	0	0	0
Sichuan	0	0	0	0	0	0	0	0	27
Guizhou	0	0	0	0	0	0	0	0	0
Yunnan	0	0	0	0	0	0	0	0	0
Tibet	0	0	0	0	0	0	0	0	0
Shannxi	0	0	0	0	0	0	0	0	15
Gansu	0	0	0	0	0	0	13	13	13
Qinghai	0	0	0	0	0	0	0	0	0
Ningxia	0	0	0	0	0	0	0	0	0
Xinjiang	0	0	0	0	0	0	0	0	0
Total	0	0	0	17	122	242	410	446	489

**Table 2. Variable definitions**

This table shows the definitions of the variables used in our study.

Variable	Description
I/K	The ratio of the difference between the book value of tangible fixed assets at the end of year t and the end of year t -1, plus the depreciation in year t, to the book value of tangible fixed assets at the beginning of year t (which include land and buildings; fixtures and fittings; and plant and vehicles).
TFP	The total factor productivity, calculated following the method by Olley and Pakes (1996)
Reform	A dummy variable that takes the value of 1 for the post-reform observations of firms located in counties that have implemented the decentralization reform, and 0 otherwise.
Assets	Logarithm of the sum of a firm's fixed and current assets, where fixed assets include tangible fixed assets, intangible fixed assets, and other fixed assets; and current assets include inventories, accounts receivable, and other current assets.
Leverage	The ratio of total debt to total assets.
Sales growth	Annual growth rate of sales in the current year.
Age	Logarithm of number of years the firm has been incorporated.
CF	The ratio of net income plus the depreciation to tangible fixed assets
SOEs	A dummy variable equal to 1 for SOEs and 0 for non-SOEs.
Collective	A dummy variable equal to 1 for collective firms, and 0 otherwise.
Private	A dummy variable equal to 1 for private firms, and 0 otherwise.
Foreign	A dummy variable equal to 1 for foreign firms, and 0 otherwise

**Table 3. Distribution of firms by ownership across our sample years**

This table shows the sample distribution from 1999 to 2007 by owner types.

Number of firms by ownership					
Year	Total	SOEs	Collective	Private	Foreign
2000	26,049	6,189	12,817	3,428	3,615
2001	23,960	5,263	10,885	3,869	3,943
2002	24,003	4,204	10,159	5,357	4,283
2003	27,972	3,786	10,657	8,746	4,783
2004	26,680	2,861	8,662	9,967	5,190
2005	31,308	2,520	9,266	13,344	6,178
2006	47,004	2,421	11,649	23,933	9,001
2007	54,200	1,964	12,743	29,422	10,071
Total	261,176	29,208	86,838	98,066	47,064



**Table 4. Summary statistics**

This table reports the summary statistics of the main variables in our study. *I/K* is corporate investment, which is measured as the ratio of the difference between the book value of tangible fixed assets at the end of year *t* and the end of year *t*-1, plus the depreciation in year *t*, to the book value of tangible fixed assets at the beginning of year *t*. *Reform* is a dummy variable that takes the value of 1 for the post-reform observations of firms located in counties that have implemented the decentralization reform, and 0 otherwise. *TFP* is firm total factor productivity. *Assets* is measured as the sum of a firm's fixed and current assets. *Leverage* is the ratio of total debt to total assets. *Sales growth* is measured as annual growth rate of sales in the current year. *Age* is the number of years the firm has been incorporated. *CF* is the ratio of net income plus the depreciation to tangible fixed assets.

Variable	Mean	Std Dev	Min	Max	25%	50%	75%	Obs
<i>I/K</i> (%)	13.54	16.88	-17.79	62.36	0.641	8.149	22.71	261,176
<i>Reform</i>	0.291	0.454	0	1	0	0	1	261,176
<i>TFP</i>	2.674	1.071	0.103	5.079	2.001	2.674	3.356	261,176
<i>Assets</i> (thousands)	52,121	99,160	885	652,505	8,000	17,530	45,915	261,176
<i>Leverage</i>	0.556	0.241	0.0238	0.985	0.384	0.579	0.747	261,176
<i>Sales growth</i>	0.119	0.407	-1.503	1.731	-0.0430	0.122	0.315	261,176
<i>Age</i>	12.43	10.834	1	48	5	8	15	261,176
<i>CF</i>	0.253	0.497	-0.238	3.250	0.0126	0.0869	0.273	261,176

**Table 5. Summary statistics according to owner types**

This table reports the mean and standard deviation of the main variables in our study according to owner types. *I/K* is corporate investment, which is measured as the ratio of the difference between the book value of tangible fixed assets at the end of year *t* and the end of year *t* -1, plus the depreciation in year *t*, to the book value of tangible fixed assets at the beginning of year *t*. *Reform* is a dummy variable that takes the value of 1 for the post-reform observations of firms located in counties that have implemented the decentralization reform, and 0 otherwise. *Assets* is measured as the sum of a firm's fixed and current assets. *Leverage* is the ratio of total debt to total assets. *Sales growth* is measured as annual growth rate of sales in the current year. *Age* is the number of years the firm has been incorporated. *CF* is the ratio of net income plus the depreciation to tangible fixed assets.

	SOE		Collective		Private		Foreign	
	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
<i>I/K</i>	8.360	13.858	13.245	16.713	15.479	17.782	13.248	16.226
<i>Reform</i>	0.131	0.337	0.238	0.426	0.348	0.476	0.372	0.483
<i>TFP</i>	2.412	1.329	2.745	1.097	2.654	0.986	2.732	0.995
<i>Assets</i>	77719	127638	59068	111605	32119	68134	65091	101501
<i>Leverage</i>	0.583	0.246	0.573	0.233	0.559	0.245	0.502	0.237
<i>Sale Growth</i>	0.068	0.429	0.101	0.402	0.159	0.401	0.100	0.410
<i>Age</i>	26.590	13.724	13.914	11.163	8.997	7.331	8.060	4.513
<i>CF</i>	0.027	0.158	0.261	0.493	0.325	0.555	0.231	0.470
<i>Obs</i>	29,208		86,838		98,066		47,064	

**Table 6. The effect of the decentralization reform on firm investment**

This table reports the results of the effect of decentralization reform on firm investment expenditure. The dependent variable is firm investment. *Reform* is a dummy variable that takes the value of 1 for the post-reform observations of firms located in counties that have implemented the decentralization reform, and 0 otherwise. *Assets* is measured as logarithm of the sum of a firm's fixed and current assets. *Leverage* is the ratio of total debt to total assets. *Sales growth* is measured as annual growth rate of sales in the current year. *Age* is the logarithm of number of years the firm has been incorporated. *CF* is the ratio of net income plus the depreciation to tangible fixed assets. *SOEs* is a dummy variable equal to 1 for SOEs and 0 for non-SOEs. *Collective* is a dummy variable equal to 1 for collective firms, and 0 otherwise. *Private* is a dummy variable equal to 1 for private firms, and 0 otherwise. *Foreign* is a dummy variable equal to 1 for private firms, and 0 otherwise. Robust standard errors clustered at the firm level are in brackets. \*, \*\* and \*\*\* indicate statistical significance at the 10%, 5% and 1% levels. Hansen test are tests for the exogeneity of instruments. AR(1) and AR(2) are tests for the first and second order serial correlation of the differenced residuals.

	(1)	(2)	(3)
Reform	1.929*** (0.405)	1.292* (0.670)	3.277*** (1.028)
L.I/K	0.008 (0.006)	-0.320 (0.239)	0.030*** (0.007)
SOEs		2.467* (1.412)	
Reform*SOEs		1.810*** (0.611)	
Collective			0.234 (0.729)
Reform*Collective			1.450** (0.568)
Private			2.483*** (0.535)
Reform*Private			-0.787*** (0.304)
Foreign			2.327** (1.119)
Reform*Foreign			0.207 (0.381)
Assets	0.396 (0.289)	1.192** (0.569)	0.756** (0.369)
Leverage	30.320*** (10.280)	40.910** (19.240)	35.020 (21.790)
Sales Growth	22.650*** (2.275)	34.460*** (10.420)	2.944 (7.986)
Age	-0.793*** (0.252)	0.006 (0.423)	-1.149*** (0.301)
CF	8.411* (4.967)	29.170*** (10.100)	8.389 (6.813)
Constant	-10.240* (6.044)	0.00 (0.00)	0.00 (0.00)
Industry & Region & Year	Yes	Yes	Yes
Hansen test (p-value)	0.20	0.61	0.63
AR (1) (p-value)	0.00	0.00	0.00
AR (2) (p-value)	0.15	0.23	0.14
Obs.	261,176	261,176	261,176

**Table 7. The effect of the decentralization reform on firm investment (excluding counties with alternative reforms)**

This table reports the results of the effect of decentralization reform on firm investment expenditure, excluding those counties that have implemented other reforms. The dependent variable is firm investment. *Reform* is a dummy variable that takes the value of 1 for the post-reform observations of firms located in counties that have implemented the decentralization reform, and 0 otherwise. *Assets* is measured as logarithm of the sum of a firm's fixed and current assets. *Leverage* is the ratio of total debt to total assets. *Sales growth* is measured as annual growth rate of sales in the current year. *Age* is the logarithm of number of years the firm has been incorporated. *CF* is the ratio of net income plus the depreciation to tangible fixed assets. *SOEs* is a dummy variable equal to 1 for SOEs and 0 for non-SOEs. *Collective* is a dummy variable equal to 1 for collective firms, and 0 otherwise. *Private* is a dummy variable equal to 1 for private firms, and 0 otherwise. *Foreign* is a dummy variable equal to 1 for private firms, and 0 otherwise. Robust standard errors clustered at the firm level are in brackets. \*, \*\* and \*\*\* indicate statistical significance at the 10%, 5% and 1% levels, respectively. Hansen test are tests for the exogeneity of instruments. AR(1) and AR(2) are tests for the first and second order serial correlation of the differenced residuals.

	(1)	(2)	(3)
Reform	1.848*** (0.416)	1.248* (0.656)	2.935*** (0.922)
L.I/K	0.008 (0.006)	-0.315 (0.245)	0.028*** (0.007)
SOEs		2.252 (1.381)	
Reform*SOEs		1.794*** (0.626)	
Collective			0.446 (0.669)
Reform*Collective			1.330** (0.532)
Private			2.581*** (0.516)
Reform*Private			-0.781*** (0.297)
Foreign			2.028** (1.022)
Reform*Foreign			0.217 (0.373)
Assets	0.395 (0.289)	1.181** (0.562)	0.771** (0.366)
Leverage	26.990** (10.680)	37.820** (18.960)	28.470 (20.010)
Sale Growth	23.360*** (2.332)	35.340*** (10.780)	5.749 (7.481)
Age	-0.786*** (0.253)	0.001 (0.423)	-1.064*** (0.284)
CF	7.119 (4.920)	27.610*** (10.120)	6.580 (6.283)
Constant	-8.163 (6.148)	0.000 (0.000)	-13.540 (10.850)
Industry & Region&Year	Yes	Yes	Yes
Hansen test (p-value)	0.23	0.58	0.39
AR (1) (p-value)	0.00	0.00	0.00
AR (2) (p-value)	0.11	0.25	0.11

Obs.	258,947	258,947	258,947
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**Table 8. The effect of the decentralization reform on firm investment (excluding non-decentralized counties)**

This table reports the results of the effect of decentralization reform on firm investment expenditure, excluding those counties that have not implemented decentralization reform. The dependent variable is firm investment. *Reform* is a dummy variable that takes the value of 1 for the post-reform observations of firms located in counties that have implemented the decentralization reform, and 0 otherwise. *Assets* is measured as logarithm of the sum of a firm's fixed and current assets. *Leverage* is the ratio of total debt to total assets. *Sales growth* is measured as annual growth rate of sales in the current year. *Age* is the logarithm of number of years the firm has been incorporated. *CF* is the ratio of net income plus the depreciation to tangible fixed assets. *SOEs* is a dummy variable equal to 1 for SOEs and 0 for non-SOEs. *Collective* is a dummy variable equal to 1 for collective firms, and 0 otherwise. *Private* is a dummy variable equal to 1 for private firms, and 0 otherwise. *Foreign* is a dummy variable equal to 1 for private firms, and 0 otherwise. Robust standard errors clustered at the firm level are in brackets. \*, \*\* and \*\*\* indicate statistical significance at the 10%, 5% and 1% levels, respectively. Hansen test are tests for the exogeneity of instruments. AR(1) and AR(2) are tests for the first and second order serial correlation of the differenced residuals.

	(1)	(2)	(3)
Reform	2.107*** (0.295)	1.995*** (0.296)	1.677*** (0.426)
L.I/K	0.016* (0.009)	0.021*** (0.008)	0.190 (0.138)
SOEs		-2.447* (1.250)	
Reform*SOEs		0.653* (0.390)	
Collective			0.844 (0.522)
Reform*Collective			1.415** (0.586)
Private			2.799*** (0.521)
Reform*Private			-0.809* (0.424)
Foreign			-0.157 (1.591)
Reform*Foreign			0.424 (0.585)
Assets	1.120*** (0.323)	1.316*** (0.354)	0.789 (0.534)
Leverage	-15.970 (14.620)	-17.640 (14.03)	-2.246 (21.300)
Sale Growth	19.840*** (4.574)	16.280*** (3.807)	7.933 (7.837)
Age	-0.652*** (0.206)	-0.857*** (0.208)	-0.690*** (0.235)
CF	1.438 (4.147)	2.006 (3.789)	-2.136 (5.087)
Constant	0.000 (0.000)	7.427 (5.882)	0.000 (0.000)
Industry & Region & Year	Yes	Yes	Yes
Hansen test (p-value)	0.11	0.12	0.13
AR (1) (p-value)	0.00	0.00	0.00
AR (2) (p-value)	0.39	0.40	0.59
Obs.	100,684	100,684	100,684

**Table 9. The effect of the decentralization reform on firm TFP**

This table reports the results of the effect of decentralization reform on firm total factor productivity. The dependent variable is firm total factor productivity (TFP), following Olley and Pakes (1996) and Brandt et al. (2012). *Reform* is a dummy variable that takes the value of 1 for the post-reform observations of firms located in counties that have implemented the decentralization reform, and 0 otherwise. *Assets* is measured as logarithm of the sum of a firm's fixed and current assets. *Leverage* is the ratio of total debt to total assets. *Sales growth* is measured as annual growth rate of sales in the current year. *Age* is the logarithm of number of years the firm has been incorporated. *CF* is the ratio of net income plus the depreciation to tangible fixed assets. *SOEs* is a dummy variable equal to 1 for SOEs and 0 for non-SOEs. *Collective* is a dummy variable equal to 1 for collective firms and 0 otherwise. *Private* is a dummy variable equal to 1 for private firms, and 0 otherwise. *Foreign* is a dummy variable equal to 1 for private firms, and 0 otherwise. Robust standard errors clustered at the firm level are in brackets. \*, \*\* and \*\*\* indicate statistical significance at the 10%, 5% and 1% levels, respectively. Hansen test are tests for the exogeneity of instruments. AR(1) and AR(2) are tests for the first and second order serial correlation of the differenced residuals.

	(1)	(2)	(3)
Reform	0.243*** (0.089)	-1.525* (0.868)	-2.475 (1.733)
L.TFP	0.547*** (0.075)	0.604*** (0.067)	0.462*** (0.044)
SOEs		-1.493*** (0.429)	
Reform*SOEs		2.189** (1.083)	
Collective			-1.868 (1.256)
Reform*Collective			3.003* (1.539)
Private			1.226* (0.659)
Reform*Private			-0.304 (0.990)
Foreign			4.473*** (0.676)
Reform*Foreign			-0.715 (1.368)
Assets	0.038 (0.417)	-0.418 (0.421)	-0.057 (0.089)
Leverage	6.139** (2.849)	5.895** (2.540)	0.802 (2.227)
Sale Growth	2.069*** (0.474)	2.240*** (0.386)	0.210 (0.409)
Age	0.058 (0.343)	0.390 (0.325)	0.185* (0.097)
CF	-0.154 (0.872)	-0.586 (0.763)	-0.193 (0.559)
Constant	-2.315 (4.330)	0.000 (0.000)	2.191** (0.872)
Industry & Region & Year	Yes	Yes	Yes
Hansen test (p-value)	0.25	0.54	0.18
AR (1) (p-value)	0.00	0.00	0.00
AR (2) (p-value)	0.99	0.78	0.27
Obs.	151,565	151,565	151,565

**Table 10. The effect of the decentralization reform on firm investment under different institutional environments**

This table reports the results of the effect of decentralization reform on firm investment under institutional environments with different levels of development. Specifically, we divide our total sample into two subsamples with more and less developed institutional environments based on the median value of the marketization index filed by Fan et al. (2011). Dependent variable is firm investment. All the other variables are defined the same as those in previous tables. Robust standard errors clustered at the firm level are in brackets. \*, \*\* and \*\*\* indicate statistical significance at the 10%, 5% and 1% levels, respectively. Hansen test are tests for the exogeneity of instruments. AR(1) and AR(2) are tests for the first and second order serial correlation of the differenced residuals.

	Good institutional environment			Bad institutional environment		
	(1)	(2)	(3)	(4)	(5)	(6)
Reform	2.938*** (1.216)	0.735* (0.464)	1.652* (1.032)	-0.101 (2.526)	-0.545 (0.591)	-0.959 (1.150)
L.I/K	0.023*** (0.008)	0.007 (0.009)	0.020*** (0.008)	-0.108 (0.293)	0.018 (0.011)	0.022 (0.011)
SOEs		-0.988** (0.387)			-1.461** (0.635)	
Reform*SOEs		0.985*** (0.369)			0.481 (1.115)	
Collective			0.613 (0.565)			3.862** (1.672)
Reform*Collective			0.975* (0.591)			-2.078 (1.713)
Private			3.016*** (0.525)			2.886** (1.165)
Reform*Private			-0.862*** (0.312)			-1.039 (0.840)
Foreign			0.364 (1.157)			-0.411 (0.515)
Reform*Foreign			0.370 (0.343)			-0.165 (1.231)
Assets	0.929*** (0.316)	1.132*** (0.395)	1.115*** (0.312)	2.552 (1.909)	0.262 (0.587)	0.690 (0.783)
Leverage	34.940 (23.980)	4.091* (2.102)	2.487 (19.810)	-4.129 (30.980)	8.553 (13.000)	-8.925 (15.360)
Sale Growth	4.542 (8.293)	18.170** (8.506)	11.980 (7.415)	0.269 (9.717)	9.543* (5.202)	11.320 (7.703)
Age	-1.425*** (0.351)	-0.675* (0.366)	-0.824*** (0.268)	-0.586 (0.904)	-1.202** (0.507)	-0.488 (0.441)
CF	12.540 (8.065)	10.580 (6.848)	3.772 (6.960)	11.460 (14.190)	-6.002 (7.794)	-10.020 (9.276)
Constant	-17.810 (15.360)	-4.212 (7.010)	-2.179 (12.020)	0.901 (21.720)	0.000 (0.000)	0.000 (0.000)
Industry & Region&Year	Yes	Yes	Yes	Yes	Yes	Yes
Hansen test (p-value)	0.31	0.45	0.16	0.61	0.29	0.69
AR (1) (p-value)	0.00	0.00	0.00	0.18	0.00	0.00
AR (2) (p-value)	0.16	0.10	0.63	0.62	0.75	0.96
Obs	215,658	215,658	215,658	45,518	45,518	45,518

**Table 11. The effect of the decentralization reform on firm investment according to county investment level**

This table reports the results of the effect of decentralization reform on firm investment according to county investment level. Specifically, we divide our total sample into two subsamples based on the median value of the county investment level. Dependent variable is firm investment. All the other variables are defined the same as those in previous tables. Robust standard errors clustered at the firm level are in brackets. \*\*\* indicates statistical significance 1% level. Hansen test are tests for the exogeneity of instruments. AR(1) and AR(2) are tests for the first and second order serial correlation of the differenced residuals.

	High investment			Low investment		
	(1)	(2)	(3)	(4)	(5)	(6)
Reform	1.847*** (0.699)	1.556** (0.717)	1.100 (1.193)	1.444*** (0.401)	1.826*** (0.664)	1.755*** (0.655)
L.I/K	-0.162 (0.140)	-0.057 (0.272)	0.080 (0.137)	0.008 (0.008)	-0.095 (0.172)	0.009 (0.152)
SOEs		2.288 (1.587)			1.966 (1.560)	
Reform*SOEs		1.169** (0.584)			0.931 (0.574)	
Collective			1.147 (1.277)			1.377 (0.954)
Reform*Collective			2.340** (1.128)			0.132 (0.653)
Private			3.026*** (0.795)			2.552*** (0.719)
Reform*Private			-0.612 (0.488)			-0.535 (0.406)
Foreign			-1.124 (1.159)			2.450** (1.061)
Reform*Foreign			-0.140 (0.729)			0.678 (0.592)
Assets	0.842*** (0.424)	0.498 (0.492)	1.300 (0.966)	0.129 (0.403)	0.263 (0.625)	0.384 (0.517)
Leverage	37.610* (19.300)	42.950** (21.340)	-12.750 (19.310)	0.929 (11.370)	31.040 (21.330)	16.980 (17.650)
Sale Growth	24.890*** (6.967)	28.470*** (10.980)	-3.775 (8.642)	25.010*** (3.757)	25.220*** (9.385)	25.430*** (8.235)
Age	-0.531* (0.319)	-0.071 (0.422)	-1.106 (0.642)	-1.398*** (0.387)	-1.006** (0.481)	-0.596 (0.383)
CF	18.790** (8.594)	19.740** (9.042)	-3.771 (15.040)	-9.781 (7.595)	6.604 (9.698)	1.400 (8.693)
Constant	-20.410* (12.250)	-23.900* (12.940)	0.000 (0.000)	0.000 (0.000)	-9.774 (11.850)	-5.969 (9.495)
Industry&Region&Year	Yes	Yes	Yes	Yes	Yes	Yes
Hansen test (p-value)	0.66	0.81	0.37	0.27	0.96	0.38
AR (1) (p-value)	0.00	0.00	0.00	0.00	0.00	0.00
AR (2) (p-value)	0.39	0.98	0.53	0.87	0.60	0.96
Obs	250,235	250,235	250,235	191,313	191,313	191,313