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Property Rights, Political Connections, and Corporate Investment

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Abstract

Despite the literature on rural land property rights, studies on urban land property rights are rare. This paper studies the impact of an urban land titling program on firm investment. It finds that the program leads to increased investment rate for titling firms, and the positive effect holds only for politically connected firms. The effects are

likely causal, because they are more pronounced for firms that are more likely to benefit from strengthened property rights. Connected titling firms experienced fewer disputes than nonconnected titling firms after the program, and the results remain robust when using instrumental variable estimation.

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Property Rights, Political Connections, and Corporate Investment*

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1. Introduction

From its inception, the property rights paradigm has emphasized that the emergence and the effect of property rights of an asset depend on the evolution of its value over time. Indeed, the seminal Demsetz (1967) suggests that property rights become more well-defined when technological and environmental changes result in significant rises in the value of the asset. His example is the emergence of private land ownership after the development of commercial fur trade among American Indians, which skyrocketed the value of the land.

The subsequent historical and empirical literature has often found positive effects of strengthening property rights (Besley 1995; Acemoglu et al. 2001; Banerjee, Gertler and Ghatak 2002; Jacoby, Roselle, and Li 2002; and McMillan et al. 2002). A puzzle is that reforms in property rights often do not work (North 1993, Goldstein and Udry 2008). Some scholars attribute this lack of positive effects of (presumably) beneficial institutional changes to counteractions of powerful interest groups, who attempt to neutralize or reverse these changes' effects to maintain their economic and political dominance (Rajan and Zingales 2003, Acemoglu, Ticchi and Vindigni 2011, and Puga and Trefler 2014). Goldstein and Udry (2008) offer solid evidence that the effects of better property rights in rural Ghana depend on whether a farmer has access to power in the local community. Is this important insight that the effects of property rights depend on access to power or political connections general? Does it apply in the context of urban land rights? How do reforms in urban land property rights affect firm behavior? And how does access to power by firms affect the effects of strengthening urban land property rights? These are important questions since power figures prominently in developing countries due partly to the lack of political competition (relative to the developed world).¹ Moreover, rural Ghana, the context of Goldstein and Udry (2008), differs greatly from many other developing countries in the importance of tribes in local governance, its relatively low

¹ Power also figures prominently even in developed democratic countries such as the United States, as in the case of Robert Moses, who had never been elected in any positions, wielded as much power as any mayors and/or governors (Caro, 1974).

income, among others. In this paper, we examine the effects of property rights of *urban* land in the most dynamic city in China (and possibly in the world as well), Shenzhen, and how the effects of urban land property rights vary by political connections. China is unique in that it is the most populous country in the world, with a much higher income than Africa, and political power remains crucially important (McGregor 2010).

Shenzhen is an ideal place to test how rapid appreciation in asset value shapes property rights. Being designated as the first Special Economic Zone in China when it was a town of 30,000 people in 1980, Shenzhen has since grown into the third largest Chinese city (behind Beijing and Shanghai), surpassing the economic size (in terms of total GDP) of Hong Kong SAR, China, and countries such as Vietnam and Portugal. Its population has grown slightly less than 700-fold to about 20 million residents (including non-registered migrants). While the average land price has doubled between 2005 to 2017 for cities other than the four mega-cities (i.e., Beijing, Shanghai, Guangzhou, and Shenzhen), it has increased seven-fold in Shenzhen (see Figure 1). With urban land price skyrocketing, the costs of misallocating urban land rise drastically. Yet before 2012, there was a land category called allocated land (Allocated land hereafter) that could not be traded by its owner: The user had user rights but did not have formal ownership, and neither could they use the land as collateral. On the other hand, entitled land, the prevalent form of land, has been associated with full tradability, formal ownership and pledgeability as collateral. Table 1 compares the differences between Allocated land and entitled land. For Allocated land, the costs of land misuses were not internalized by its occupiers, and with skyrocketing land prices, it became efficient to alter its land rights and to make it tradable. This need for change in property rights when experiencing significant changes in underlying asset value is emphasized by Demsetz (1967), “It is my thesis ... that the emergence of new property rights takes place in response to the desires of the interacting persons for adjustment to new benefit-cost possibilities” (p. 350, Demsetz 1967). Shenzhen is also an ideal place to study the interaction between property rights reform and political

connections. Built from scratch since the reform began, the city has been perhaps the least subject to traditional institutional and social constraints, which makes Shenzhen the most likely place to implement radical reforms and succeed. Many scholars have worried that externally imposed institutions are unlikely to succeed due to the lack of compatibility between the existing and the newly imposed institutions (Hayek 1960; Acemoglu, Cantoni, Johnson, and Robinson 2011). Given the fresh start of Shenzhen, the effects of urban property rights reform should constitute the upper bound of the property rights effects in China.

Understanding the evolution of private property rights in urban China is of critical importance for understanding the future of China's economy. After four decades of economic and institutional reforms, private entrepreneurs still do not feel secure about private property rights, as illustrated by a recent well-known event. On 12th September 2018, an article named "the private sector's job is done, and it is time for its exit," written by an entrepreneur of online business named Wu Xiaoping, was widely circulated on the internet. He suggested that the private sector had finished the job of assisting the development of the state sector and should exit the economic arena in China. Given the widespread exposure of this article under the non-trivial control of the media by the government (Qin et al. 2018), and the perception of insecurity of private property rights, it is not surprising that the private corporate sector panicked in China. On 1st November 2018, President Xi Jinping publicly announced that the private entrepreneurs were "one of us" when he attended a symposium on the development of private enterprises. On the next trading day, the Shanghai Stock Index went up 2.7%, reflecting relief from the anxiety over the security of private property rights protection in China.

The urban land reform we consider is an *Urban Renewal Program* implemented in Shenzhen. Under this program, all firms occupying Allocated land, a type of untitled land with weak property rights protection, could obtain land titles to strengthen the protection of their property rights. Two features of this program make it particularly suitable for studying urban land property rights, and the interactions between political connections and property rights

protection. First, under this program, the statuses of the treatment and the control groups are pre-determined. The participation in the treatment group (i.e., those firms that obtained land titles for their Allocated land) was determined many years prior to the reform and was not driven by investment opportunities. This feature mitigates concerns regarding endogeneity of participating in the property rights reforms with respect to investment, our outcome variable. Second, due to its legacy of a planned economy, China features an institutional setting with clearly identified groups having access to power and political connections. Notably, state-owned enterprises (SOEs) and other connected firms in China receive substantially more favorable treatment from the government in various forms than privately owned firms.²

From the universe of publicly listed firms on the Chinese stock market, we identify titling firms, our treatment group, as those Shenzhen firms that occupied Allocated land and that were qualified to receive land titles under the *Urban Renewal Program*. Based on the law, all holders of Allocated lands in Shenzhen at the time of the reform could obtain land titles after due application procedures and government approval. The rest of the listed firms, who either operate on entitled lands or are listed firms with Allocated Land in cities other than Shenzhen, constitute the control group as their land rights are intact throughout the reform.³ We then examine whether and how much the urban land titling program promotes firm investment. Given China's severe resource misallocation problem brought about by the weak property rights protection (Cull and Xu, 2005) and state interventions (Bailey, Huang, and Yang, 2011), we expect that urban land titling would incentivize firms to invest.

Our basic empirical strategy is difference in difference (DID). That is, we allow the before-after changes in the investment rate to depend on the treatment status (i.e., land titling for urban firms in Shenzhen), conditional on key covariates. The identifying assumption is that conditional on firm fixed effects and the controlled covariates, the treatment status of Titling

² See Lin, Cai and Li (1998); and Cull et al. (2015).

³ The owner of the collectively owned land, the other type of untitled land, may not receive land titles in the Urban Renewal Program. However, this is irrelevant for our empirical setting, as no listed firm in Shenzhen holds collectively owned land. All collectively owned land is held by peasants.

Firm is exogenous. We extensively examine the robustness of our results. We show that titling firms (i.e., the treatment) and non-titling firms do not differ in key pre-treatment characteristics and performance. We document that the treatment status was determined by *initial* state ownership but not current characteristics. We also conduct the instrumental variable estimation exploiting the fact that the titling status was determined by *initial* state ownership when the firm was founded (or being relocated to Shenzhen), and obtain qualitatively and quantitatively similar estimates.

We obtained many robust findings. The first is that these titling firms on average see their investment rates higher by 30 percentage points than otherwise similar firms during the five-year period following the announcement of the *Urban Renewal Program*, whether we use the DID or the instrumental variable estimation. The result is unchanged if we limit our sample to listed firms in Shenzhen. This finding is consistent with the conventional wisdom that strengthening property rights protection increases corporate investment. Second, we find that the effect of the urban land titling program becomes more pronounced as time goes by and as firms become more aware of the procedure of this policy reform, consistent with the notion of property rights capital, which is similar to the notion of democratic capital (i.e., the effects of democracy become more positive over time as a result of learning, building trust in the system, among others, see Tabellini 2008; Persson and Tabellini 2009). Third, we find that those titling firms with weaker prior property rights protection, as measured by either expired tenure or contested land usages at the time of the reform, are associated with higher investment effect. It thus confirms that land titling is indeed the resource of additional investments. Fourth, and perhaps most importantly, although the reform applies to all firms with Allocated land in Shenzhen, we find that only politically connected firms, or those “insiders”—as measured by either their ownership affiliation with the state or previous state-related experience of their executives—benefit from the reform. Those “outsider” titling firms did not significantly increase their investment rates at all.

We offer further evidence that, indeed, unconnected firms faced extra obstacles from exploiting benefits from the titling program. Relative to connected titling firms, unconnected titling firms encounter more obstacles in the application and titling process—they were more often dragged into disputes over the land use rights that require arbitration. Moreover, their applications for new construction were routinely returned for revisions, prolonging the process.⁴ And the difference in post-treatment obstacles could not be explained by *ex ante* differences in firm characteristics: Connected treatment firms and the rest of the sample firms do not differ significantly in other firm characteristics such as their land holdings, cost of capital and the extent of their financial constraints and corporate governance.

Why do politically connected firms react more positively in investment to *de jure* formalization of land property rights? Even before the *de jure* property rights reform, the government had weaker incentives to expropriate the SOEs, which it partially owned and controlled; similarly, the government also benefit more from protecting other politically connected firms. SOEs and other firms with political connections thus tend to face lower expropriation risks and have stronger *de facto* property rights. Land titling then formalizes and strengthens this protection and lengthens the horizon of protection of property rights. Political connections, after all, are transient and thus can hardly be a full substitution of property rights (Acemoglu et al. 2005), which provide long-term protection against expropriation. This is especially true in China where the turnover of politicians is frequent.⁵ SOEs, even as beneficiaries of government favoritism, may be victims of political struggles and rivalry among local government agencies, or of changes in faction composition in the government over time (Shih et al. 2012). The government's holding agents of SOEs, State Assets Administration Committee (SAAC), may have conflicts of interest with the government's holding agents of

⁴ Those are not unusual practices in China, see, e.g., Li, Meng, Wang, and Zhou (2008). Lu, Pan, and Zhang (2015) show that SOEs in China have higher chances of winning lawsuits than non-SOEs.

⁵ The average tenure of city mayors is around 2-3 years, and besides normal retirement, the key reasons for turnover are either being reassigned to another position or being removed because of corruption.

land resource, Ministry of Land and Resources (MLR), with the latter being more eager to take back the unentitled land for other uses. A land title of SOEs would make the Ministry of Land and Resources much less likely to meddle. Thus, making *de facto* property rights *de jure* for connected firms may have strong positive effects on investment. In contrast, unconnected firms do not have essential protection from the government both before and after land titling. While it is obvious that nonconnected firms do not have the protection of their land rights before the reform, why do they not enjoy protection after the *de jure* property rights reform? The first reason is that non-connected firms are not “one of us” from the government’s point of view—similar to the Yiddish word “mishpokhe”, indicating widespread demarcation of insiders and outsiders in most societies (Burt 1998)—their leaders do not have the trust, the access to power, the right ideology, among others, to be “one of us”, and thus they could be on the wrong end of government enforcement. The second reason is that there is evidence that the legal system tends to protect the SOEs (or the connected firms) more. Lu et al. (2015), for instance, provide evidence that SOEs have better chances of winning lawsuits than non-SOEs in China. Both factors contribute to the ineffectiveness of the titling program in spurring investment for non-connected firms.

The implications of our findings are likely not China-specific. The disadvantages of unconnected firms are ubiquitous, as self-interest-motivated officials and the absence of the rule of law and accountable media supervision exist in many parts of the world (Fukuyama 2014). Our findings and the pioneering study of Goldstein and Udry (2008), spanning the opposite spectrums of poor rural areas in Africa to the most dynamic city of Shenzhen in China, suggest that where the insider-outsider chasm is large, reforms could have unintended consequences to further strengthen insiders, resulting in greater inequality and inefficiency.

Our study contributes to understanding on how property rights changes affect *corporate* investment. China enacted its first property rights law in 2007, which was welcomed by the stock market (Berkowitz, Lin, and Ma, 2015). However, according to an international index,

actual property rights protection has improved very little.⁶ Consistent with this ranking, we provide evidence that how laws are *enforced* plays a more important role than *de jure* laws. Our paper is thus related to the literature of the role of *de facto* property rights protection on firms' investment, R&D, and corporate risk management (Johnson, McMillan and Woodruff 2002, Cull and Xu 2005, Lin, Lin and Song 2010, Lin, Lin and Zou 2012). We differ by focusing on the effect of *de jure* land property rights and showing how the effects of *de jure* property rights depend on a firm's political connection, and how the property rights effects accumulate over time, very much like "democracy capital" (Persson and Tabellini 2009).

Our paper also contributes to the microeconomic literature on the effects of property rights. This literature has focused on the effects of *rural* land titling on investment and access to credit in rural areas (Besley 1995; Alston et al. 1996; Banerjee et al. 2002; Jacoby et al. 2002; Field 2005; Deininger and Jin 2006; Hornbeck 2010; Yi et al. 2014), or on transaction costs of land (Libecap and Lueck 2011). The much more limited literature on *urban* land titling focuses on the effects on household outcomes such as asset value (Jimenez 1984, Friedman et al. 1988; Lanjouw and Levy 2002), responses in labor supply (Field 2007), changes in beliefs toward being pro-market and pro-individual-effort (De Tella et al. 2007), and increases in physical and human investment (Galiani and Schargrodskey 2010). We differ in offering evidence on the effects on urban *firms*. Indeed, industrial and commercial lands are of great importance as it provides greater value added to the land as reflected in the value of industrial/commercial land compared with agricultural land. The minimum price of industrial land per mu of 0.5 million RMB (i.e., 1.07 million USD per hectare) is 25-fold of the price of agricultural land of 20,000 RMB (i.e., 42,000 USD per hectare). Moreover, since non-agriculture accounts for an ever-increasing share of the economy--the average scale of output from the non-agricultural sector of OECD countries is around 98% of their total GDP—it becomes increasingly important to

⁶ See the data from <http://internationalpropertyrightsindex.org/country?c=CHINA>

understand the value of property rights in an urban setting, and how its working depends on the underlying institutional context.

Relatedly, studies on how land property rights interact with local institutional context are rare. An exception is Goldstein and Udry (2008), which documents how rural land property rights are subject to influence of power in the local political hierarchy in Ghana. Our paper complements Goldstein and Udry (2008) in showing the complementarity of *de jure* property rights and *de facto* political power in the context of the urban land market in the most dynamic Chinese city of Shenzhen. Ours is the first paper to demonstrate the importance of enforcement in determining the effects of property rights for firm investment in the context of urban land markets.

Our paper is finally related to the literature of political connections of firms. Political connections are found to be widespread among firms in the world but especially in developing countries, and are important resources for those firms.⁷ For instance, politically-connected firms have better access to loans (Claessens et al., 2008; Cull et al. 2015; Fan et al., 2008; Li et al., 2008), favorable access to equity markets (Boubakri et al., 2012; Francis et al., 2009), more confidence in the legal system in transitional countries (Li et al., 2008), enjoy more subsidies and tax benefits (Wu et al., 2012b; Lin et al., 2015; Shi et al., 2018), and are more likely to be bailed out when facing financial stress (Faccio et al., 2006). Moreover, politically connected firms tend to be less efficient than unconnected firms (Boubakri et al., 2008; Faccio, 2010; Fan et al., 2007; Hsieh and Klenow 2009; Luez and Oberholzer-Gee, 2006), and are less innovative (Akcigit et al. 2018; Shi et al. 2018). Perhaps due to their advantages in access to special resources, they tend to grow faster and survive longer (Akcigit et al. 2018; Shi et al. 2018). We add to this literature by offering novel evidence that political connections alter the enforcement of property rights in favor of connected firms.

⁷ See Fisman (2001), Johnson and Mitton (2003), and Faccio (2006).

The remainder of this paper proceeds as follows. In section 2, we describe the land titling program and firm-level political connections, and we derive the hypotheses. In Section 3, we discuss our data and the samples of the treated and the control firms. In Section 4 we present our findings about the effects of land titling on investment. In section 5, we present and discuss evidence of how the titling effects differ by ownership and political connections. In Section 6 we conclude.

2. Institutional Background and Hypotheses

We now provide relevant institutional background, including property rights protection in China, the role played by political connections, and the 2009 *Urban Renewal Program* in Shenzhen. We then offer hypotheses on the effects of property rights reform on investment and the role of political connections in shaping such effects.

2.A Property Rights in China

A prominent feature of the Chinese economy is weak property rights. Large-scale property expropriations have happened before, such as the land reform movement and the formation of collective units or “the People’s Commune” in the 1950s, during which privately owned land was massively expropriated via nationalization (Xu 2011). Since the economic reform began in 1978, efforts have been, and continue to be, made to overcome the adverse consequence of weak property protections. Particularly notable is the passage of China’s first property law in 2007 (Berkowitz, Lin and Ma 2015). However, violations of property rights and the expropriation of private assets remain common in China. According to the International Property Rights Association, China ranked 55th of the 128 surveyed countries in property rights protection, and there have been no major improvements in its property rights protection in recent years. The lack of property rights protection, especially that of land, has led to social unrest. More than 60% of rural petitions to the central government for administrative and legal

assistance were related to property expropriation without fair compensation.⁸

Frequent violations of property rights are no doubt largely attributable to the ambiguity of the legal status of the land. For instance, users of Allocated land, a form of land that was allocated to a user during the central planning regime, neither have formal ownership nor have the rights to sell or use their land as collateral.⁹ Table 1 describes the differences in the legal status between entitled land and Allocated land. Compared to fully titled land, Allocated land is exposed to a higher risk of expropriation by the government. Indeed, Allocated land is designed as state-owned land for temporary, free-of-charge usage by firms via an administrative order, and the government retains the legal right to reclaim the Allocated land without compensation to the current users.¹⁰ Although many local governments, such as the Shenzhen government, stipulated a 30-year tenure for all Allocated land when the city was established,¹¹ the land tenure for these lands had either expired or was approaching their expiration dates by 2009. Cases of local governments expropriating Allocated land are common. For instance, the Shenzhen government reclaimed 12 plots of Allocated land without compensation to current land users in one campaign aimed at improving land-use efficiency during 2012.¹² The serious concern before the 2009 *Urban Renewal Program* in Shenzhen is that there were no formal procedures to negotiate and to extend the tenure of Allocated land. In other words, the negotiation costs incurred by users of Allocated land to sell their land to more efficient users of their land were prohibitive, inducing the pressure for reforming the land rights system (Demsetz 1967).

⁸ See http://www.ce.cn/cysc/fdc/fc/201401/22/t20140122_2176546.shtml.

⁹ The Allocated land is a legacy of the centrally planned economic system that dominated China prior to the 1990s. In the centrally planned economy – in which all market-based land transactions were forbidden – the direct distribution from the government to SOEs was the only method of conveying land to its users. The legal status of Allocated land and corresponding weak property rights protections remained largely unchanged during the progressive land system reforms from the 1990s to the 2000s.

¹⁰ See article 47 of the “Interim Regulations of the People’s Republic of China Concerning the Assignment and Transfer of the Right to the Use of the State-owned Land in Urban Areas”.

¹¹ See “Provisional Regulations of Land Management for the Shenzhen Special Economic Zone” from the Shenzhen government in 1981.

¹² See *Huaxia News*, March 16, 2013, <http://sh.house.sina.com.cn/news/2013-03-16/08552392170.shtml>.

2.B Political Connections in China

A legacy from the centrally planned economy in China is the importance of the SOE sector, which comprised the entire economy before the reform beginning in 1978. SOEs remain powerful and influential even after many rounds of reforms (Huang et al. 2017). An important distinction between SOEs and non-SOEs is their political connections. Each SOE has an administrative ranking (*xingzhengjibie*) to indicate its importance in the political hierarchy. More prominent or strategically important SOEs are powerful entities in the economic and political system (McGregor 2010; Chen and Kung 2018).¹³

Two features associated with SOEs play important roles in maintaining their political connections. First, there is a “revolving door” for SOE managers and government officials. The appointment of government officials and SOE executives of the same administrative ranking are frequently decided by the same committee (i.e., the Organization Department of the Communist Party). Many government officials are subsequently appointed as executives of SOEs, and top managers of SOEs are also often appointed as government officials. Second, top executives of SOEs are frequently representatives of the People’s Congress and regularly attend the same meetings with government officials of similar administrative rankings. Their direct communications provide opportunities and advantages in terms of information and access for SOEs. SOEs’ political connections lead to preferential treatment in many areas, including in tax treatment, access to finance by state-controlled banks, licenses and government procurements (see, e.g., Calomiris, Fisman and Wang 2010; Cull et al., 2015).

The expropriation risk of land for SOEs is likely lower than that for none-SOEs, but it remains significant. SOEs’ Allocated land could be expropriated out of political rivalry and struggles between government agencies. Indeed, all SOEs are controlled by the State Assets Administration Committee (SAAC), which pursues the long-run profits of SOEs as its main target, while all the land is controlled by the Ministry of Land and Resources (MLR), which

¹³ For example, the CITIC Group is a ministerial-level firm founded by a former vice president of China.

focuses more on city landscape planning and profits from auctioning city land. The conflicts between the two agencies could lead to land expropriation. Moreover, competition and shift in power among SOEs may also lead to expropriation and re-distribution of Allocated land, as demonstrated by ample anecdotal evidence.¹⁴

2.C The 2009 Shenzhen Urban Renewal Program

Our study exploits a unique policy change in the city of Shenzhen, the youngest metropolis with the highest GDP per capita in China. Largely agricultural in 1979, the area now known as Shenzhen was converted into a city as China's first special economic zone for experimenting with market-oriented reforms. Its subsequently spectacular growth led to a skyrocketing increase in the value of properties, which makes the old property rights arrangements inefficient. Farmers built constructions over their unentitled and collectively-owned land to accommodate rapidly rising housing need of workers and factories, while existing firms built new factories over Allocated land. By the end of 2009, of the 918 square kilometers of total construction area of Shenzhen, 40 percent was illegally occupied by squatters, and another 24 percent was Allocated land, mostly used by SOEs or privatized SOEs.

The urban land titling program aimed to address the urgent need of land resources faced by Shenzhen firms. Economic expansion led to quintupling of its construction area. However, the total supply of land in Shenzhen has been limited. Shenzhen's geographical boundary was fixed by the central government in 1980, making it hard to expand by absorbing neighboring farmland, as other Chinese cities do.¹⁵

To relieve land scarcity, on November 13, 2009, the Shenzhen government initiated the *Urban Renewal Plan*. This program allowed all current users of untitled land who had been operating on their land for many years to obtain the land title after paying a fee based on the

¹⁴ For instance, one listed SOE, the Yingli Corp, was forced to move one of its factories out of Baoding city due to the redistribution of Allocated land.

¹⁵ As a result, Shenzhen city has the highest land utilization ratio (i.e., the built-up land as a percentage of the total land) among cities, more than 50%. In comparison, the utilization ratio of Hong Kong SAR, China, is merely 20%.

land appraisal value.¹⁶ The primary target of the program was rural land property, which accounted for most of the untitled land. However, Allocated Land was also included in the titling program. Figure 2 describes the timing of events related to the land titling reform.

Although the reform started by the end of 2009, the land titling policy was not implementable until the middle of 2012.¹⁷ The first draft of the reform did not have the necessary details about the regulatory authority and qualifications for titling. It also lacked explicit procedures on dispute resolution when multiple users lay claim to the same piece of land. The problem was gradually resolved by the policy documents released in the subsequent two years, especially the two guidelines on implementation released in 2012.

Several measures were taken to ensure that newly entitled land had better property rights protections. The Shenzhen government established a registration system that ensured the exclusive rights for its users. The registration bureau created a new file with user rights and a history of transactions (including leasing) and related collateralization records to ensure exclusivity. The new 30-year tenure was endorsed by a legal contract between the government and land users rather than by a fiat order in the case of the Allocated land. The contract made it more difficult to expropriate a piece of titled land before its tenure expires, and in case of land appropriation, a large amount of compensation based on the market price of the land was required. These measures greatly alleviated land users' concerns regarding expropriation. With less concern for the expropriation of the land of the firm, the firm with Allocated land should have more confidence that their investment would have higher returns in the future, and the firm would therefore increase their investment rate. We thus propose *the property rights*

¹⁶ Some requirements must be met by the land user to obtain the approval of the government. These requirements include the following: first, the land owner must submit a proposal for the renovation of the buildings above ground, which must be approved by the government; and second, approximately 15% of the total area of the land should be given to the government for public use.

¹⁷ For instance, a report by Shenzhen government suggests that the documents released in the middle of 2012 greatly accelerate the urban land titling program. More details are in <http://zwgk.gz.gov.cn/550590033/5.0/201701/28ab055ec59f42f4aa8274b2bd30d4c7.shtml>.

hypothesis: the land titling of Allocated land should increase the investment rate of those firms being affected by the land titling program.

Whether a firm had Allocated land was determined by its history. In the 1980s, most SOEs in the manufacturing sectors were granted with a piece of Allocated land. However, Allocated land could have been sold, leased or confiscated in subsequent years of fast development in this dynamic city, where industry upgrades, privatization and restructuring had drastically changed its industrial landscape. The *current* ownership and industry affiliations of firms therefore had little predictive power for whether a firm was in the land titling program. Table 2 illustrates that the differences between the firms in the land titling sample and other firms in their industry and ownership affiliations are statistically insignificant by the end of 2011.

The procedures to apply for land titles were time-consuming and non-trivial. The applicants had to submit their land development proposals for evaluations and approvals to several government departments, including the Urban Planning, Land and Resources Commission (UPLRC), the Construction Commission, the Environmental Agency, and even the local fire station. A third-party evaluation agency was required to assess land value before the corresponding transfer fees were paid to the government in exchange for the title. Public opinions were also solicited to ensure fairness among all stakeholders. The approval of UPLRC normally required one year, and the entire procedures of approvals could take more than two years, after which it could be further prolonged by disputes over the original ownership of the land. The first batch of applicants submitted their proposals in early 2010. There are several batches of applicants every year.

2.D. Property Rights Enforcement

All qualified firms would likely apply for land titles because the cost of doing so was limited, and the benefits could be large. Indeed, the market was enthusiastic about this reform, and stock prices for listed firms reacted positively, as we show later. Presumably stronger confidence

about their land property rights, higher collateral value of their land, and rising stock prices in response to the titling program should encourage titling firms to invest more. However, several factors might have weakened the linkage between property rights protection and firm investments.

First, there was policy uncertainty associated with the titling reform. Historically many policies instituted by the Chinese government had been proven to be unenforceable. For instance, during an ambitious plan of privatization intended to sell some fractions of the government's remaining SOE share to non-state investors in 2001, the Chinese government cancelled and reversed most transactions of state share sales after negative reactions of the stock market and criticisms of selling state ownership too cheaply (Calomiris, Fisman and Wang, 2010). Moreover, major institutional reforms typically need an extended period to establish confidence among observers. It takes time for citizens and firm managers to establish trust and confidence that the government and the legal system could be trusted in upholding the respect for urban land property rights, much as the accumulation of "democracy capital" requiring time (Tabellini 2008; Persson and Tabellini 2009). These considerations lead us to propose *the property rights capital hypothesis*: the effect of the urban land property rights reform would become more pronounced over time in the first few years.

Second, the prolonged and complicated procedures of title application provided a role for political connections in the titling program. In many developing countries, (politically) connected firms enjoy favorable enforcement for regulations (Cai *et al.* 2011, Hallward-Driemeier and Pritchett 2015), and spend lower monetary and/or time costs for the same permits and procedures. The laws could also be applied selectively. Perhaps due to these reasons, political connections have been prevalent in China, and firms spend a large amount of resources to establish relationships with government officials (Cai *et al.* 2011). We thus propose *the connection-rights complementarity hypothesis*: politically-connected firms have stronger property rights effect on investment rates than non-connected firms. For non-connected firms,

we are not sure whether the effect would be positive and pronounced or non-existent, and we shall let the empirical results inform us.

3. Data and Sample Description

We first discuss how the sample is constructed, and how we define the titling and the non-titling groups based on their land titling status. We then compare titling firms with non-titling firms in pre-treatment characteristics, and their post-treatment difference in investment rates.

3A. Sample and Titling Firms

We employ two measures to identify whether a listed firm has Allocated land eligible for titling under the land-titling program in Shenzhen. We first manually checked *all* self-disclosure reports released within 15 trading days before and after the announcement of the land titling program in search of disclosure of landholding status. We presume that since the land titling program should have a major impact over an affected firm's investment and future cash flows, the announcement should have caused a stock market fluctuation that forces the firm to issue self-disclosure report releasing relevant information.¹⁸ We find 17 listed firms disclosed their land holdings status via special disclosure reports.

Although the regulatory authority did not require mandatory disclosure of firms' landholding status, most firms provided enough details. Indeed, we largely find key details about listed firms' landholding: their location, area, the purpose of use (as an office, factory, warehouse, and so on), and whether it was shared with other users. For example, Shenzhen Seg (000058.SZ) disclosed that their firm had two pieces of land:¹⁹

¹⁸ Chinese financial regulations require that any listed company whose share price experiences more than 20% fluctuation within 3 trading days to issue a disclosure report clarifying the reason for the price fluctuation. See Regulations on Stock Listings on the Shenzhen Stock Exchange.

¹⁹ To ensure the accuracy of land titling information, we cross-checked our information with other resources on the land-holding status. For instance, Hua Chuang Securities, one of the top investment banks in China, released a special report on this land-titling program in Shenzhen and listed all potential beneficiaries. Most firms on our list overlap with Hua Chuang Securities' list of beneficiaries of the land-titling program.

“... The first piece is located in Bagua Industry Park. It is a three-floor factory with a construction area of 1,593 square meters. The tenure is from 1985 to 2015. Currently it is leased out with an annual rent of 600,000 RMB... The second piece is controlled by our subsidiary Sege Baohua. It is in Huaqiangbei Industry Park. The total area is 2,213 square meters with a construction area of 10,509 square meters. The tenure is from 1982 to 2012. Currently it is leased out with an annual rent of 25 million RMB...”

The assumption that titling for firms should always be associated with a sharp fluctuation in their share prices need not be satisfied: the market might lack relevant landholding information of these firms, or the impact of titling could be viewed as trivial. To ensure that we fully capture titling firms, we also used two other methods. First, we checked all post-2009 annual reports of listed companies that either were headquartered in Shenzhen or had branches located in Shenzhen, in search of any mentioning of constructions related to the land titling program. We further explore the name lists of listed firms whose construction applications on land titling were approved by the government. We find another 26 firms that mentioned their participation in the land titling program. The total number of treatment firms is thus 43. As a comparison, the number of listed firms headquartered in Shenzhen when the titling program was officially carried out in 2012 was 70.

Our empirical analysis starts with all domestically listed companies except those in the financial industry in light of their difference in business nature. We obtain financial data, including stock prices and information from financial statements, from the China Securities Market and Accounting Research (CSMAR) database, the most comprehensive database of its type that contains all trading prices and financial statement data for listed firms trading on both the Shanghai and the Shenzhen exchanges. We also rely on land price in Shenzhen to estimate the value of titling when Allocated land was converted.²⁰

²⁰ These land prices are found on the website of the “Urban Planning Land and Resources Commission of Shenzhen Municipality”, the government land agency, and “Soufan.com”, the largest online source of land

3B. Pre-Treatment Characteristics of Titling and Non-Titling Listed Firms

A concern is the selectivity of the treatment firms--the difference in the performance of those titling firms relative to the non-titling firms may not be the result of the treatment, but from pre-treatment differences in firm characteristics and/or momentum. To address this concern, we compare the various pre-treatment (i.e., one year before the treatment year of 2012) characteristics between the titling and the non-titling firms in Table 2. The pre-treatment characteristics include firm size, the leverage ratio, profitability, the cash ratio, share of state ownership, and industry affiliation. The differences in these observable characteristics are always statistically insignificant, and the titling firms perform no better and/or worse than other listed firms in China or in Shenzhen before the treatment. The similarity in pre-treatment characteristics and performance should mitigate the concern that the titling effect merely reflects selectivity.

3C. Post-Treatment Difference in Performance

To shed light on the post-treatment differences in the investment rate, Panel A of Figure 3 depicts the investment rate patterns of titling and non-titling firms between 2008 and 2017, a ten-year period surrounding the event year of 2012. The average investment rate is measured as the investment level as a percentage of PP&E. Before 2012 the investment rate of the titling firms is roughly identical to that of the non-titling firms. After 2012, however, the investment rate of the titling firms began to surpass that of the non-titling firms, especially from 2014 on. The pattern is consistent with the conjecture that land titling improves firms' investment. Panel B of Figure 3 compares the investment rates over time among titling firms by ownership (i.e., SOEs vs non-SOEs). The rise in investment rate by SOEs is much more pronounced than that by non-SOEs.

The real effect of the titling program is also reflected in its impact on stock market prices. Because land titling induces investment – and these investments should be value-enhancing

information in China.

since otherwise firms would not have made them – the value of the stocks of these titling firms should rise in response to the announcement of the titling program. Figure 4 presents the Cumulative Abnormal Returns (CARs) of SOE and non-SOE titling firms for the 60 trading days around the announcement of the policy. The CAR is estimated using the Fama-French (1992) three-factor model with a beta estimation window of between 250 to 40 trading days prior to the event. All titling firms, regardless of their ownership, experienced sharp increases in their stock market values that were as high as 10%. This finding suggests that the market anticipated that the titling program would benefit all firms with Allocated land, regardless of their ownership. The effect was also long-lasting: the market value appreciation of titling firms remained high, even 30 days after the event.

4. Property Rights Changes and Firm Investments

We now provide further evidence of the impact of the titling program on investment rates for the titling firms. We first show that there is a significant difference between the titling and the non-titling firms in their before-after difference in the investment rate. We then show that the investment rate of titling firms started to accelerate after 2015 when firms became more aware of the details and the results of the implementation of the reform. We provide evidence that firms facing higher risks of expropriation and uncertainty of user rights before the titling program are associated with more pronounced reactions after the titling program.

4A. Baseline Regression Results and Sensitivity Checks

Our basic empirical strategy is difference in difference, that is, allowing the before-after changes in the investment rate to depend on the treatment status (i.e., land titling for urban firms in Shenzhen), conditional on the key covariates. The key identifying assumption of this study is that conditional on firm fixed effects and the controlled covariates, the treatment status of Titling Firm is exogenous. We consider endogeneity of the treatment status soon.

To implement the empirical strategy, we follow Bertrand et al. (2004) by collapsing the year dimension into two periods to overcome the serial correlation in the error terms and to

avoid overstating estimation precision. The first period covers the years before 2012 (i.e., 2008-2012), and the other covers the other years (i.e., 2013-2017). To explore the impact of titling on the investment rate, we estimate the following baseline cross-sectional regression:

$$\Delta Investment_i = \alpha + \beta Titling Firm_i + \gamma X_i + \varepsilon_i \quad (1)$$

The dependent variable is the difference in the average investment rate (i.e., capital expenditure divided by PP&E) before and after the titling program. *Titling Firm* is 1 for firms that obtained land titles in the *Urban Renewal Program* in Shenzhen, and 0 for the other firms. The control variables include the pre-treatment firm characteristics that may be related to investment, including ROA and Tobin's *Q* by the end of 2012. As firm-level investment rates could be affected by technology and average capital intensity, we control for the industry fixed effect. We also control for the Stock Exchange fixed effect (i.e., being affiliated with Shenzhen or Shanghai Stock Exchange) to exclude the impact from Exchange-specific changes in regulations. The parameter of interest is β .

Here, the before-after change in the outcome net of the effects of the vector of X is attributed to the treatment. The identifying assumption is that conditional on firm fixed effects (implicit in taking the first difference for the outcome) and on the controlled covariates, the treatment status of *Titling Firm* is exogenous. Our earlier evidence that the treatment status is not correlated with pre-treatment characteristics is consistent with this presumption. However, we cannot fully rule out the potential of endogeneity of *Titling Firm* conditional on the firm fixed effect and the covariates X , and we shall adopt the instrumental variable strategy later to examine the robustness of our key results.

The results without (in column (1)) and with the industry and the Exchange fixed effects (column (2)) are in Table 3. Based on column (1), the titling firms, compared to other firms, are associated with a significant increase in the investment rate by 35 percentage point for the five years after titling. This is a considerable increase as it is roughly 0.8 standard deviation of

the investment rate, which was 43 percent. Adding the industry and the exchange FE in column (2) does not change the results much: the effect changes from 0.35 to 0.30.

A concern is that our dependent variable, the before-after-treatment difference in the investment rate, is sensitive to the choice of the benchmark of the pre-treatment investment rate (against which the additional investment rate is calculated). Indeed, the firms' investment from the period between 2008 and 2012 might have been affected by many factors. For instance, firms' investment rates before 2012 could be affected by other regulatory changes, such as the share-splitting reform,²¹ the legal reforms such as the passage of property rights in 2007, or the large-scale quantitative easing by the end of 2009. These reforms could have different impacts over the treatment and the control firms, especially when a long time window from 2008 to 2012 is considered.

To mitigate this concern, we experiment with multiple time windows for the pre-treatment period. In column (3) of Table 3, we apply a median time window of 2010-2012 to measure the pre-treatment investment rate. In column (4), we adopt a short time window of the single year of 2012. The results from the median and the short time windows are similar to that from the default of the five-year window. Our baseline regression is thus not subject to the alternative interpretation that the increases in the investment rate are due to other policy changes during the pre-treatment years.

A further concern with using the years 2010-2012 as the benchmark period is that the investment in 2010 and 2012 may partially reflect the reform effect due to anticipation. Indeed, if firms are expecting better investment opportunities later, they would hold their investment temporarily right after the announcement of the reform in 2009, causing a higher jump in 2012 once the reform is implementable. To mitigate this concern, we delete firm-year observations during the period of 2010-2012 (i.e., the years of potential anticipation) and use those in 2008-

²¹ The split-share reform began in April 2005 and lasted for more than 10 years (Li et al. 2011).

2009 as the pre-treatment period. The result is in Column (5) of Table 3. Our main result on titling firms is still similar, with the coefficient reduced slightly to 0.26.

4B. Instrumental Variable Estimation

The DID estimation strategy assumes conditional exogeneity of *Titling Firm*, an assumption that could be invalid. The treatment group may differ systematically from the control group in unobserved dimensions, which may explain the different reactions in investments. To overcome this concern, we conduct the instrumental variable regression.

The instrument we adopt is whether the firm was *initially* established as an SOE being affiliated with the Shenzhen government. Firms originated as SOEs being affiliated with the Shenzhen government were much more likely to hold Allocated land before the titling reform. On the other hand, the firms affiliated to the Shenzhen government may not differ much when compared with SOEs affiliated to other local government (such as non-Shenzhen city government, or the provincial government) or the central government. It is not plausible that the affiliation to Shenzhen government in the 1980s would affect the investment behavior of firms in 2010s in channels other than holding Allocated lands, especially after we have controlled for more updated pre-treatment characteristics such as profitability, Tobin's Q, and industry affiliations. As our instrumental variable, we use two measures related to the affiliation of the firm to the Shenzhen government. The first is whether the Shenzhen government is the controlling shareholder of the firm. The second is the share of ownership by the Shenzhen government in the total share outstanding of the firm.

The instrumental variable estimation yields reassuring results. First, both of our instruments are strong. The F-statistics for the excluded instrument is 91.3 and 110.4, far surpassing the rule-of-thumb threshold value for weak instruments (i.e., around 10). Consistent with our priors, both instrumental variables are positively correlated with the holding status of allocated land. For instance, listed firms initially owned by the Shenzhen government are 69 percentage points more likely to be *Titling Firm*. Second, the second stage regression results

in columns (3) and (4) yield estimates of the effect of Titling Firm around 0.32, almost identical to the previous estimates based on conditional exogeneity. The qualitative results based on the DID are thus robust. Since the DID and the IV results are similar, and the DID estimates have significant advantage than those based on IV estimation when the treatment is interacted with other variables by reducing the influence of a few outliers (Young 2018), in the rest of the paper we adopt the DID as the basic specification.

4C. Further Sensitivity Checks

Another concern is that the choice of the control group may be inappropriate. Indeed, all our treatment firms are in Shenzhen, while the vast majority of our control firms are non-Shenzhen firms. Shenzhen, as the Special Economic Zones of China, has been granted with favorable policies that could not be enjoyed by firms elsewhere. The control firms could therefore differ from the treatment firms (in Shenzhen) in aspects we have not controlled for.

We address this concern in four ways. First, we use the sample of only firms in Shenzhen city to ensure that we only use firms in the same city and facing similar policy shocks over time. Second, we use the sample of the firms from the top four metropolitan cities, Beijing, Shanghai, Guangzhou, and Shenzhen. Third, we still use the whole sample but include the city dummy variables, which would capture the fixed effect of cities. Finally, we employ propensity score matching based on the size, age, leverage and ownership to ensure that the treatment and the control firms are similar. The results are presented in columns (1) - (4) in Table 5. The four methods yield remarkably similar conclusion to what our baseline results imply. The coefficient of Titling Firms ranges from 0.41 (when using Shenzhen firms only) to around 0.30 (when using four megacity firms only, and with the full sample using propensity score matching). These robustness checks suggest that the difference between Shenzhen and other cities is not the driver of our result. The robust nature of the key parameter is again suggestive of the relatively exogenous nature of the land titling program.

A further concern is whether the changes in investment rates merely stem from organizational changes such as mergers and acquisitions. The investment rate could increase if the titling firms take over a firm with a high investment rate. To eliminate this concern, we control for the relative size of takeover, as measured by the size of firms that were acquired divided by the size of the list firms.²² A firm's size is measured by its total book asset. The results, in Column (5) in Table 5, show that the coefficient of *Titling Firm* is largely unchanged, and our key conclusion is not driven by firm takeovers.

To ensure that our results are not driven by our cross-sectional specification, which in essence is DID since we allow the before-after change to depend on the treatment (and other covariates), we also experiment with panel data regressions based on annual observations. Although Bertrand et al. (2004) argue convincingly that the time-series autocorrelation may generate overstatement of precision in the panel data regression, it may still be useful to check whether the panel-based results yield similar estimates as those from the baseline regressions. The panel specification allows for better control of time-varying covariates that may affect investment rates. The panel fixed-effect specification is as follows:

$$Investment_{it} = \alpha + \theta_i + \beta_2 Post_{it} + \beta_3 (Titling\ Firm_i * Post_{it}) + \gamma X_{it} + \varepsilon_{it} \quad (2)$$

The dependent variable is the time-varying annual investment rate. *Titling Firm* is a dummy variable with a value of one for firms that obtained land titles under the *Urban Renewal Program* and 0 for the other firms. *Post* is a dummy variable with a value of one for observations after 2012 and 0 otherwise. Two time-varying factors related to firms' investments are controlled: firms' Tobin's *Q* and annual cash flows. We also control for firm fixed effects. The results are in Column (6) of Table 5. The coefficient of the interaction term of *Titling Firm* and *Post* suggest that participation in the titling program is associated with an increase in the investment rate by 28 percentage points after 2012 compared with non-titling firms, a magnitude similar to what we found earlier.

²² The relative size of the takeover is 0 if the listed firm did not engage in any takeover in the sample period between 2008 and 2017.

One may worry that the estimate of the titling effect may reflect pre-existing trends that differ among the treatment and the control groups (Heckman and Hotz 1989). This is possible considering that the Chinese government launched a four-trillion fiscal stimulus, which may result in divergent reactions among firms of different types. To eliminate this concern, we implemented a pre-trend test by interacting *Titling Firm* with all pre- and post-treatment year dummies. The result in Column (7) of Table 5 suggest that titling firms did not have distinct pre-trend before the titling. Starting from the year 2013, the first year after the implementation of the land titling program, the titling firms begin to exhibit higher investment rates over time, with significant coefficients of 29 and 48 percentage points in the years 2016 and 2017.

The dynamic pattern observed in this pre-trend test induces us to examine the property rights capital hypothesis. We revert to the baseline cross-sectional analysis, but we allow the titling effects to differ over time. In particular, we partition our post-scheme sample period into three sub-periods: 2013-2014, 2015-2016, and 2017. The results in Table 6 imply a trend of increasing investment rate overtime: the investment rate rose by 13 percentage points (significant at the 10 percent level) in the first two years, doubles to 26 percentage points after two years, and this trend continues in the fifth year (i.e., 2017) with a coefficient of 30.4 percentage points. This pattern is consistent with the property rights capital hypothesis.

4D. Heterogeneity in the Original Property Rights Protection

To further validate that the titling effect reflects changes in underlying property rights, we take advantage of variations in expropriation risks at the time of the reform. Among Shenzhen firms in the titling program, two types faced particularly severe threat of land expropriation: those with expired land tenure for their Allocated land at the time of the reform (i.e., around 2012), and those whose previous rights to use the land were contested. For these vulnerable firms, the land titling program should imply a greater change in the protection of land property rights, and the effects on investment should be particularly large.

We obtain the indicators of expropriation vulnerability as follows. First, we construct a dummy variable indicating whether a treatment firm's previous land tenure had expired at the time of the reform.²³ We obtain the maturity of the tenures of the lands from the special report or annual report of the listed companies. Second, we construct a dummy variable indicating whether the usage rights of the land at the time of the reform were contested (i.e., whether the firm illegally sold or rented their Allocated land to other firms).²⁴ Those illegitimate transactions could result in multiple stakeholders with claim over the land and large compensations for current users of the land to vacate. We obtained relevant information from the annual reports and the self-disclosure reports of the titling firms.

In columns (1) and (2) of Table 7, we include the dummy variable indicating tenure expiration interacting with *Titling Firm*.²⁵ The results render support to the property right hypothesis: according to the preferred column (2), titling firms whose land tenure was not expired do not have significant titling effects, but titling firms with expired land tenure had a titling effect on the investment rate of 42 percentage points. In columns (3) and (4) of Table 7, we include the interaction term of *Titling Firm* and the dummy of contested land rights. Relatively to other program participants, the titling effect on investment rates for titling firms facing contested land rights around the time of the reform almost sextuples (i.e., from 0.08 to 0.47), again supporting the property rights hypothesis.

5. Political Connections and the Differential Impact of the Reform

We now allow distinct effects of titling for firms with various degree of political connections.

5A. Titling Effects by Ownership

²³ In 1981, the Shenzhen government allowed tenures of 20 or 30 years to Allocated land. Many of those pieces of land expired or approached expiration in 2012.

²⁴ The illegal way to sell allocated land was to sign a rent contract that had a length equal to the tenure length of the land.

²⁵ We do not include the dummy indicating tenure expiration directly because this variable is available only for titled firms.

We now explore whether the impact of land titling depends on the linkage to the government based on firm ownership. SOEs have a natural connection to the government, while non-SOEs owned by private individuals and other non-state entities likely do not have such connections.²⁶ We estimate the land titling effects either separately for SOEs and non-SOEs (columns (1) and (2) of Table 8) or applying the interaction of the SOE dummy and *Titling Firm* in the pooled sample (Column (3)). Both methods yield similar results.

The land titling effect is statistically significant and pronounced only for SOEs, but not for non-SOEs. The magnitude of the titling effect is several times larger for SOEs than non-SOEs, and the effect is positive and significant only for SOEs. The results suggest that the benefits of urban land titling apply only to politically connected SOEs but not to non-SOEs, which are still vulnerable to government expropriation (of land) even after land titling. The results support the connection-rights complementarity hypothesis.

5B. Comparing SOEs and non-SOEs

The more pronounced effects of titling on SOEs relative to non-SOEs could reflect SOEs' advantages over non-SOEs in many aspects rather than favorable property-rights enforcement. We could exclude certain channels by showing that titling SOEs and titling non-SOEs do not differ significantly in the characteristics related to those channels. Toward this end, we compare the size of the land, the cost of the capital of equity, the extent of the financial constraints, and the quality of corporate governance. For all these aspects, as shown below, the differences between the titling SOEs and their non-SOE counterparts are not statistically significant.

Since a firm's land size could affect profitability and investment, we first investigate whether the scale of the land held by titling SOEs and titling non-SOEs differ. We first look at the total area of the land, available from the Urban Planning, Land and Resource Commission of Shenzhen. The first row of Table 9 shows that the size of the land held by titling SOEs is

²⁶ Privatized non-SOEs could have natural connections with the government. Our test of titling effects by board composition likely would capture this possibility of political connections by non-SOEs to the government.

almost identical to that held by titling non-SOEs, suggesting that land size is not a driving factor in the extra investment associated with titling SOEs. Second, we compare the absolute and relative *value* of the land, rather the *size* of the land. The relative value of the land is calculated by having the value of land normalized by the market value of the equity of the titling firm. We find that both the absolute and the relative values of lands held by titling SOEs and titling non-SOEs are almost identical. Third, the benefit of the land could be affected by location because lands located near the city center are more likely to be associated with higher value once developed. We have examined the geographic distribution of all lands of titling firms, and found that lands from titling SOEs and non-SOEs are evenly distributed across the districts of Shenzhen, suggesting that the difference in the potential of the lands held by titling SOEs and non-SOEs is not a key factor behind investment rate difference between these two types of firms.

The extra investment made by titling SOEs could be due to their lower costs of capital, so they are likely to invest more even with similar returns for their investment projects. Therefore, we look at the cost of equity of all titling firms, SOEs or non-SOEs. We obtained relevant information and calculated the average annual stock market return from 2008 to 2012 as the historical cost of equity. We also calculate the changes in the cost of equity for a period of 2013-2017 compared to the benchmark period of 2008-2012. Another measure of the cost of capital, the distribution of dividend, also does not show any difference between titling SOEs and titling non-SOE firms. The results thus do not support the hypothesis that the titling SOEs had a lower cost of capital than titling non-SOEs.

Another concern is that SOEs could be less financially constrained than non-SOEs (Cull et al. 2015), and this could explain their differences in the investment rate. But this aspect is unlikely to explain our results. In the last column of Table 8 we have already controlled for the SOE dummy, which captures the average difference in access to finance. Moreover, land titling should relieve financial constraints to a greater extent for non-SOEs due to the possibility of

collateralizing land after land titling (Besley and Ghatak 2010). If land titling relieves financial constraints to titling non-SOEs more than titling SOEs, the prediction would be a more positive effect of titling on titling non-SOEs than on titling SOEs. This prediction is the opposite to our findings. We have also tried to shed light on this concern empirically. We use two measures of financial constraint, the size-age measure (Hadlock and Pierce, 2010), and the external-finance reliance measure (Rajan and Zingales, 1998).²⁷ On both measures, we do not find any differences between titling SOEs and titling non-SOEs (see Panel C). Recall that Allocated land originated from *initial* state ownership but not necessarily current state ownership, our finding here that titling SOEs and titling non-SOEs do not differ in financial constraints are consistent with Harrison et al. (2019), which suggests that former SOEs that are private now -- and our titling non-SOEs would fit this category -- tend to still enjoy benefits of access to finance.

We also examine whether the quality of corporate governance could drive our result. SOEs with the state as the largest shareholders are associated with severe corporate governance problems (Megginson and Netter 2001). However, the corporate government of those listed non-SOEs should resemble that of those listed SOEs because non-SOEs in our sample were largely SOEs a decade ago but privatized later. To check empirically, we use three measures of corporate governance, the scale of the incentive package, the chairman-CEO duality, and the number of the independent board member.²⁸ For all three measures, there are no significant differences between the SOEs and non-SOEs.

5C. Impact of Political Connections

²⁷As a robustness check, we also explore other measures of financial constraints, notably, the dividend measure (Fazzari, Hubbard and Petersen, 1988) and cash flow-investment sensitivity measures (Cummins, Hassett and Oliner, 2006). We do not find any significant difference between the SOEs and non-SOEs using those measures.

²⁸The scale of the incentive package is the ratio of the shares granted and controlled by the top management to the total share outstanding. The top management includes CEO, CFO, CTO and other top executives in sales and marketing, administration or human capital departments.

Since the titling premium in investment rate of SOEs relative to non-SOEs is unlikely to be explained by the usual suspects we have just discussed, what other factors could be the source? Here we consider political connections with the government. We use two measures to characterize the political connections of titling firms. The first is the number of board members with working experience in the city or in higher-level government leadership roles. Having retired government officials on the board is a strong indicator of a firm's political connections because all the political ties of these officials would be available to the firm (Fan et al. 2007). Note that this measure may not be strongly correlated with the ownership status of firms: officials do work for a private or privatized firm upon retirement from their government positions. Our second measure of political connection is the ratio of communist party members as a percentage of the total number of employees (Fan et al. 2007). The advantage of this measure lies in its relative stability because employee turnovers tend to be less frequent than turnovers of board members.

The results from the OLS regression reported in Column (1) of Table 10 suggest that the titling effects are much more pronounced for connected (vs non-connected) firms. Titling firms with retired bureaucrats on their boards are associated with an investment rate that is 50 percentage points higher compared to those without such connections. This finding indicates that the difference between SOE and non-SOEs is mainly driven by their connection with the government. This result is not surprising because the government, even after implementing the titling program, still retains significant power over the firms, who must rely on the government to approve their applications and enforce the property law. In the regressions in columns (3), we adopt the alternative measure of political connections based on employee party membership. The critical importance of political connections remains true.

How do political connections affect the titling effect *within* SOEs and non-SOEs? Political connections might work differently on property rights protection for SOEs and non-SOEs. Columns (2) and (4) add additional terms: Titling SOE, titling SOE * political

connection; titling non-SOE, titling non-SOE * political connection. Here “political connection” is either *bureaucrats on board* or *the party member ratio*. The results are consistent. For SOEs, the titling effect does not hinge on further political connections—that is, state ownership is enough. For non-SOEs, the titling effect highly hinges on the existence of political connections.

What are the *channels* through which political connections help connected firms to take advantage of the titling program while effectively prevent the non-connected ones from doing so? We search for evidence on the roots of the lack of responses of non-SOEs directly from the annual reports of those titling firms. We checked their annual reports for information on their progress in the land titling program. When non-SOEs explain the slow progress of their application for titles, they do not mention financial constraints and investment opportunities. In contrast, they frequently cite dealing with legal and administrative barriers. Firms usually state that the slow progress of their application for land title is due either to their disputes with the government (or the court) or to the disputes with other firms. This is consistent with international evidence that government discretion in enforcing rules is substantial, and that the government’s treatments of regulatory rules differ greatly within countries among firms (Hallward-Driemeier and Pritchett 2015).

We therefore explain whether the titling firm has a dispute with the government or other firms over its land. We estimate the linear probability model with the dependent variable being the dummy variable of the firm having a dispute with government or other firms over the land, using the sample of titling firms. The result is in Table 11. In Column (1), the probability of having disputes with either the government or other firms are presented. The negative and large coefficient of the SOE dummy suggests that those SOEs are much (i.e., 37 percent) less likely to have a dispute with either government or other firms, rendering them a significant advantage to implement the titling program quickly. The results remain robust when we consider only the disputes with the government (column (2)) or the disputes with other firms (column (3)). Thus,

the connection with the government helps mitigate disputes with both the government and other firms.

5D. Stock Market Reaction

We have established that the titling firms—and only those state-owned and politically connected ones—have higher investment rates compared to non-titling firms. We now examine whether the stock market anticipated this pattern when the program was announced.

We construct two measures on stock market reactions to the titling program. The first is based on the short-term market reaction around the announcement date of the titling program. In particular, we use the abnormal returns of a two-day window (i.e., the 25th and 26th of November 2009), which is calculated using the daily stock market return net of the predicted stock market return using a Fama-French three-factor model with an estimation window of [-150, -10].

We regress the two-day stock market reaction on the titling program and measures of state ownership and political connections. The results are in columns (1) - (4) of Table 12. The positive and significant coefficient for the titling program indicates that the information about titling is instantaneously incorporated into prices after the announcement, and that the market is efficient in differentiating firms with and without Allocated land. However, we do not find significant difference in stock market reactions between SOEs and non-SOE titling firms, or between politically connected and non-connected titling firms.

The market may gradually update its information and change its attitude over time. We thus construct the second measure of the stock market reaction, the changes of Tobin's Q, to capture the extent that the market price reflects information on the titling program. The dependent variable now is the average Tobin's *Q* from 2013 to 2017, net of the average Tobin's *Q* from 2010 to 2012. The results are in columns (5)-(8) of Table 12. Now long-term stock market reactions reflect better how the titling effects hinge on ownership: Tobin's *Q* is significantly higher in titling SOEs relatively to titling non-SOEs; similarly, Tobin's *Q* is

significantly higher in titling firms with political connections (as measured by *bureaucrats on board* or *party member ratio*) relatively to titling firms without political connections.

6. Conclusions

While studies on rural land property rights abound, the impact of urban land property rights on firm behavior is rarely studied. In this paper we use a policy experiment of urban land titling in Shenzhen, China's most dynamic city, to examine the impact of property rights protection on corporate investments.²⁹ Consistent with the fundamental economic insight that secure property rights promote investment, we find that firms that obtain land titles do have much higher investment rates than firms without land titles over the five years after the urban titling policy. Using a plausible instrument for titling, and in light of the similarity of the IV and the DID estimates, we believe the titling effect is causal. We provide further evidence to verify that the positive effect of land titling on investment reflects property rights strengthening: those firms facing higher expropriation risks (i.e., contested land rights and expired land lease) have more pronounced titling effects.

Equally importantly, we provide evidence that the investment effect of land titling depends critically on political connections and government enforcement. We find that state-owned enterprises (SOEs) and those listed firms with stronger political connections experience substantial increases in their investment, while non-SOEs and non-politically-connected firms have almost no increase in investment at all. Further explorations suggest that political connections are likely the key reasons behind SOEs' positive and non-SOEs lack of reactions in investment. Among non-state firms, those connected ones do increase their investment after titling, but those non-connected ones do not. Overall, in light of evidence of resource misallocation in favor of the state sector in China and the relative inefficiency of the state sector around the world (Megginson and Netter 2001; Brandt, Tombe and Zhu 2013; Cull et al. 2015),

²⁹ A caveat of this research is that the treatment sample is relatively small, though in terms of the share of listed firms in Shenzhen, it is reasonably high.

our findings suggest that, the discriminatory enforcement of property rights by the government in favor of connected firms will adversely affect the development of the private sector and the economy as a whole.³⁰

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³⁰ There is an intriguing possibility that the positive investment response of connected firms may reflect coordinated response of local governments and connected firms—for instance, the local government may know that these connected firms would carry out their side of the bargain when the local government needs something done. This is an area that needs further research in the future.

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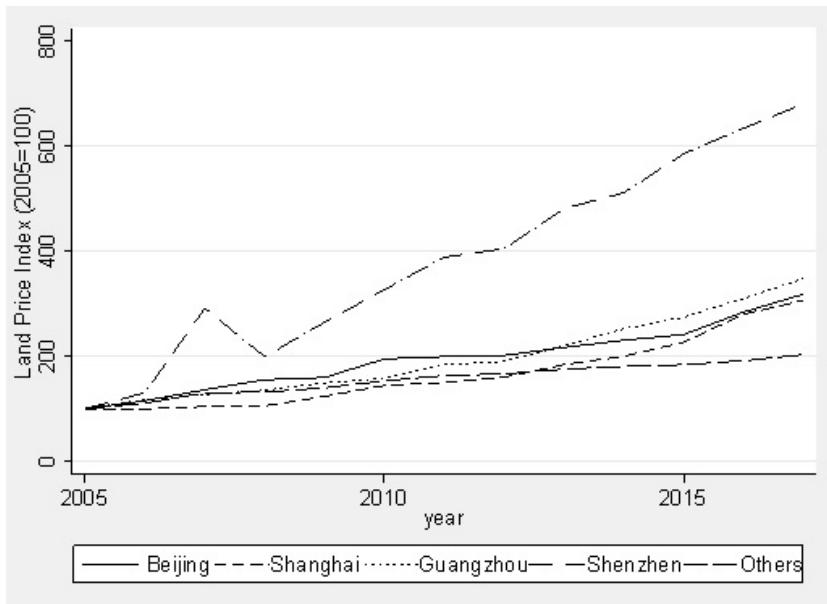


Figure 1. The increases in the land price index in Chinese cities.

Source: <http://www.landvalue.com.cn/Lvmonitor/Index>

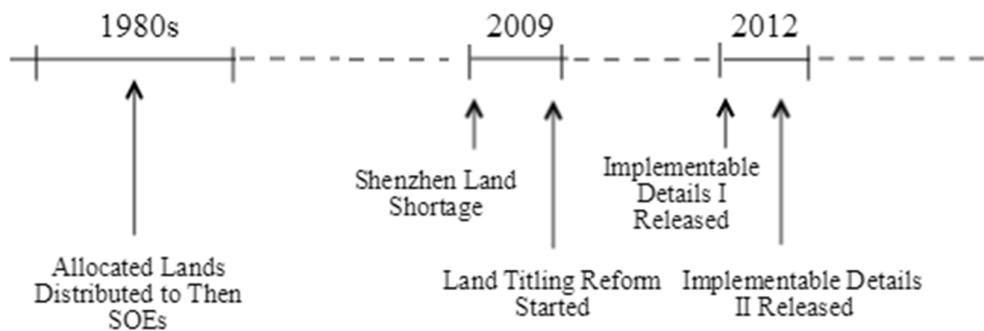


Figure 2. timeline of the evolvement of the local land market of Shenzhen.

The figure illustrates the evolvement of Shenzhen's land market since the 1980s when the allocated land was distributed to then SOEs. The shortage of land resource was aggravated at the end of 2008 and the land titling program was announced by the end of 2009. It is until 2012 that the scheme was truly implementable.
Resource: <http://pnr.sz.gov.cn/>

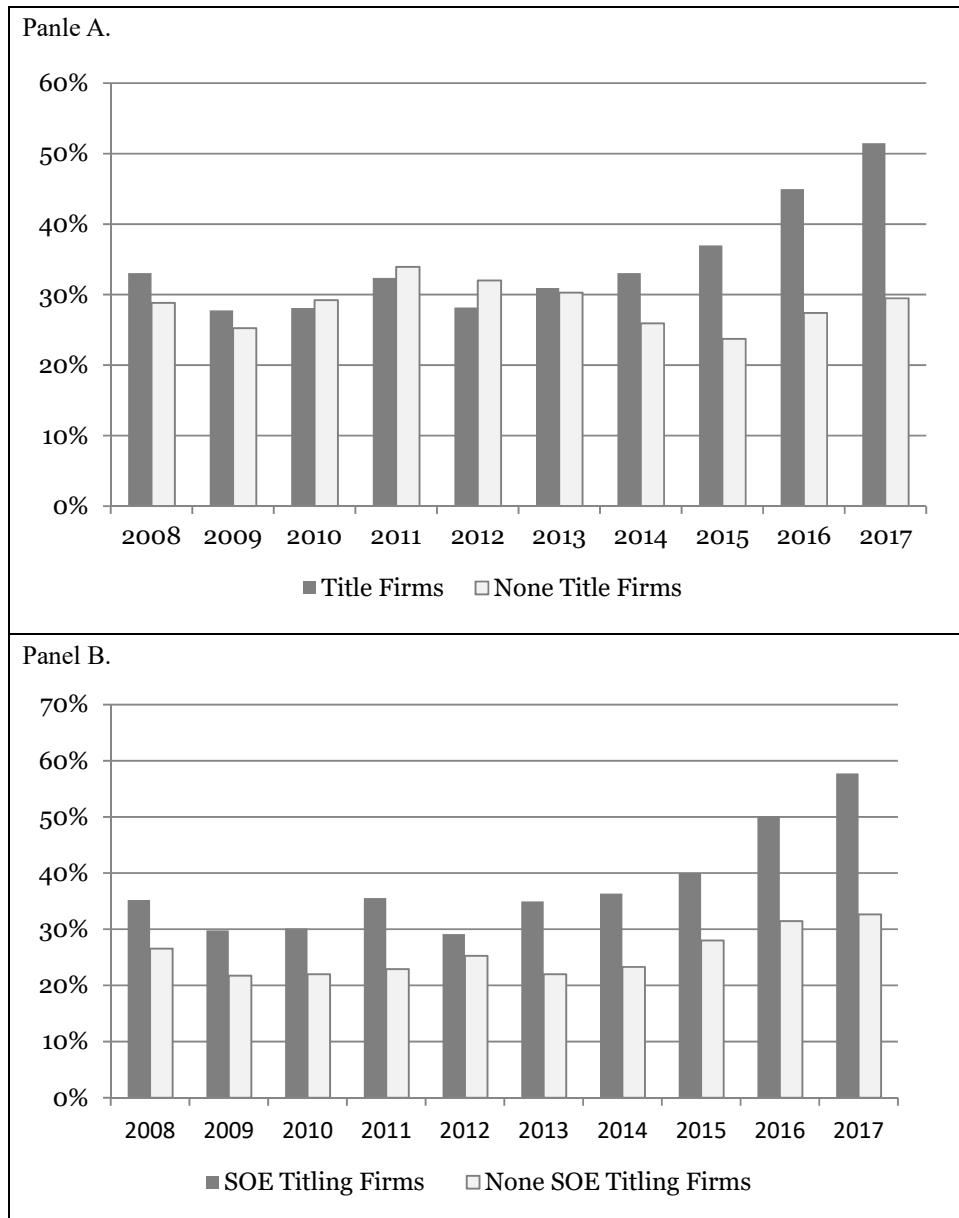


Figure 3. Firm Investment over time.

In **Panel A**, the sample of titling firms (grey bars) includes all 43 listed firms that receive land titles in the land titling program in Shenzhen. The sample of non-titling firms (white bars) includes all listed companies that are located in Shenzhen and that do not receive land titles in the land titling program. The figure presents the average investment (annual capital expenditure divided by PP&E) between 2008 and 2017.

In **Panel B**, the sample of SOE titling firms (grey bars) includes 30 listed SOEs that receive land titles in the land titling program occurred in Shenzhen in 2009. The sample of none SOEs (white bars) includes 13 listed non-SOEs that receive land titles in the land titling program in Shenzhen. The figure presents the average investment (annual capital expenditure divided by PP&E) between 2008 and 2017.

Resource: CSMAR

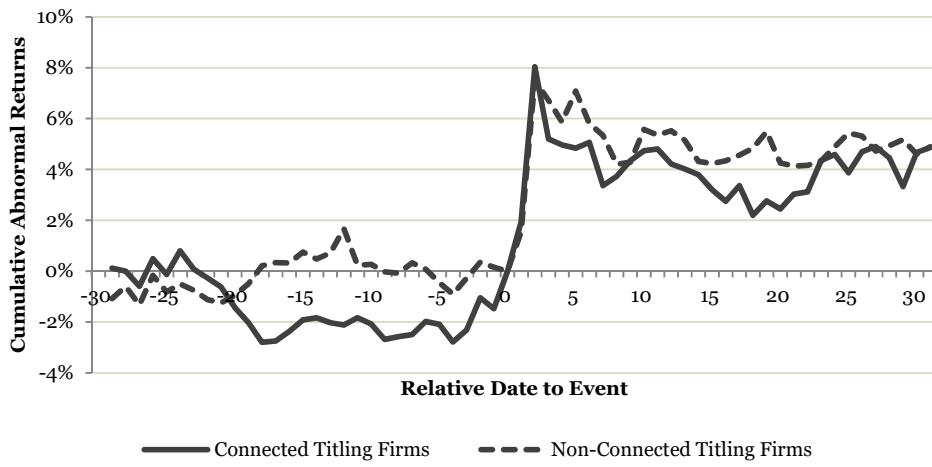


Figure 4. Stock market reactions of politically connected and non-connected titling firms in the event time of land titling program.

The sample of SOE titling firms (grey bars) includes politically connected listed firms that receive land titles in the land titling program in Shenzhen. The sample of none SOEs (white bars) includes non-politically connected listed firms that receive land titles in the land titling program occurred in Shenzhen in 2009. The figure presents the cumulative abnormal returns of both types of titling firms in a period window between 30 days before and 30 days after the announcement day of the 2009 land titling program.

Resource: CSMAR

Table 1. The Difference in Legal Status between Allocated and Entitled Lands

The table presents the differences in legal status between allocated and entitled lands that co-exists in Shenzhen China before 2009 when the land titling program was initiated.

	Allocated land	Entitled Land
Distribution Method	Gov't allocation	Market purchase
Distribution Time	Before land market reform in the 1990s	After land market reform in the 1990s
Enforcement of Tenure	Incomplete	Yes
Tenure Length	Max 30 Years	40-70
Certificate	Fiat Order	Contract
Registration	No	Yes
Probability of expropriation	High	Rare
Compensation	No	Yes, usually higher than the market price
Accepted as Collateral	No	Yes
Allowed to sell	No	Yes

Table 2. Pre-Treatment Summary Statistics

The sample consists of all nonfinancial listed firms in the CSMAR database. The table presents variable average and standard deviation (in the bracket below) for the entire sample, as well as a subsample of firms that receive land titles in the land titling program (*Titling firms*) and firms that do not (*Non Titling firms*). The difference between the values for Titling firms and Non Titling firms are presented in Column (4). The statistics are calculated based on the financial reports of firms **in 2011**, the last year before the title reform was implemented in 2012. The t-statistics in brackets of column (4) are for the null hypothesis that there is no difference between *Titling firms* and *Non-Titling firms*. *, **, *** indicates significance at the 1%, 5% and 10% level respectively.

	Whole Sample	Titling firm	Non-titling firm	Difference
	N=1250	N=43	N=1207	
Sales (Billion RMB)	5.315 (8.237)	5.317 (8.231)	5.266 (8.507)	-0.055 (-0.043)
Total asset (Billion RMB)	8.342 (11.017)	8.323 (10.998)	8.879 (11.650)	0.576 (0.338)
Employment (Thousand)	4.576 (5.708)	4.569 (5.668)	4.786 (6.803)	0.206 (0.232)
Book leverage ratio	53.965 (19.503)	53.850 (19.605)	57.171 (16.261)	3.250 (1.072)
Book to market ratio	0.364 (0.235)	0.365 (0.235)	0.350 (0.239)	-0.015 (-0.424)
ROA	5.564 (5.179)	5.569 (5.213)	5.410 (4.151)	-0.147 (-0.182)
Cash ratio	0.580 (0.539)	0.585 (0.541)	0.453 (0.470)	-0.131 (-1.569)
Dividend (Million RMB)	56.642 (96.953)	55.845 (95.808)	78.849 (124.079)	23.295 (1.553)
% of SOE	0.688 (0.463)	0.687 (0.464)	0.721 (0.454)	0.034 (0.468)
Industry: Material	0.176 (0.381)	0.179 (0.384)	0.070 (0.258)	-0.111 (-1.873)
Industry: Manufacture	0.225 (0.418)	0.223 (0.416)	0.279 (0.454)	0.058 (0.895)
Industry: Nondurable goods	0.173 (0.378)	0.175 (0.380)	0.116 (0.324)	-0.059 (-1.010)

Table 3. The Effect of Land Title on Investment

The sample consists of all nonfinancial listed firms in the CSMAR database from 2008 to 2017. This table presents parameter estimates from OLS regression of investment on Titling Firm dummy variable for various specifications. The dependent variable is the averaged investment (capital expenditure divided by PP&E) between 2013 and 2017 net of various benchmark levels. That is,

$$\Delta\text{Investment}_i = \frac{1}{5} \sum_{2013}^{2017} \text{Investment}_{it} - \frac{1}{5} \sum_{2008}^{2012} \text{Investment}_{it}$$

In column (1) and (2) the benchmark level is calculated using the average investment between 2008 and 2012. In column (3) the benchmark level is calculated using the average investment between 2010 and 2012. In column (4) the investment in 2012 is used as the benchmark level. In Column (5) the investment in 2008-2009 is used as the benchmark level. *Titling Firm* is a dummy variable that is 1 if the firm has allocated land before the land title scheme starting from 2012 and 0 if otherwise. All variables are winsorised at the upper and lower 1-percentile. Industry FE denotes whether the industry of the listed firms (categorized according to industry categorization from CSMAR database) is considered in the specification. Exchange FE denotes whether the effect of exchange (Shanghai or Shenzhen Exchange) in which the firms are listed is considered in the specification. The *t-statistics* are computed using standard errors that are White-corrected. *, **, *** indicate significance at the 1%, 5% and 10% level respectively.

	Δ(Investment/Total Fixed Asset)				
	Long Period		Median Period	Short Period	Using 2009
	(1)	(2)	(3)	(4)	(5)
Titling Firm	0.345*** (3.726)	0.301*** (3.137)	0.317*** (3.393)	0.317*** (4.174)	0.258** (1.987)
ROA	0.002* (1.817)	0.002* (1.879)	0.002 (1.367)	0.001 (0.924)	-0.003* (-1.939)
Tobin's Q	0.007* (1.651)	0.007 (1.603)	0.007 (1.643)	0.006 (1.641)	-0.000* (-1.940)
Constant	-0.042** (-2.360)	-0.013 (-0.279)	0.038 (0.868)	0.105*** (2.878)	0.097** (1.979)
Industry FE	No	Yes	Yes	Yes	Yes
Exchange FE	No	Yes	Yes	Yes	Yes
Adj. R ²	0.034	0.044	0.046	0.060	0.035
# of Obs.	1250	1250	1250	1250	1250

Table 4. The Effect of Land Title on Investment: Instrumental Variable Regressions

The sample consists of all nonfinancial listed firms in the CSMAR database from 2008 to 2017. This table presents parameter estimates from the first and second stage of instrumental variable regression of investment on Titling Firm dummy variable. In Column (1) and (2), the results of the first stage estimate are presented. In Column (3) and (4), the results of the second stage estimate are presented. The instrument we use in (3) is whether the Shenzhen government was the controlling shareholder of the firm when it was first established. The instrument we used in (4) were the shares of Shenzhen government as the percentage of total shares of the firm when the firm was first established. All variables are winsorised at the upper and lower 1-percentile. Industry FE denotes whether the industry of the listed firms (categorized according to industry categorization from CSMAR database) is considered in the specification. Exchange FE denotes whether the effect of exchange (Shanghai or Shenzhen Exchange) in which the firms are listed is considered in the specification. The *t-statistics* are computed using standard errors that is White-corrected. The *, **, *** indicates significance at the 1%, 5% and 10% level respectively.

	Titling Firm		$\Delta(\text{Investment}/\text{PP\&E})$	
	First stage OLS		IV: Shenzhen government as controlling shareholder when established	IV: Shareholding percentage of Shenzhen government when established
	(1)	(2)	(3)	(4)
Shenzhen gov't as controlling shareholder when established	0.694*** (9.032)			
Shareholding percentage of Shenzhen gov't when established		0.808*** (9.603)		
Titling Firm			0.322*** (2.771)	0.315*** (2.964)
ROA			0.001 (1.442)	0.001 (1.442)
Tobin's Q			0.003 (1.581)	0.003 (1.579)
Industry FE	Yes	Yes	Yes	Yes
Exchange FE	Yes	Yes	Yes	Yes
Adj. R ²	0.424	0.471	0.028	0.028
# of Obs.	1250	1250	1250	1250
First stage F-test	91.327	110.383		

Table 5. The Robustness Check

The sample consists of all nonfinancial listed firms in the CSMAR database from 2008 to 2017. This table presents estimates from OLS regressions of investment on Titling Firm dummy variable. For columns (1)-(5), cross-sectional OLS regressions are implemented. The independent variable is the averaged investment rate (capital expenditure divided by PP&E) between 2013 and 2017 net of various benchmark levels. In Column (1), only firms headquartered in Shenzhen are included in the regression sample. In Column (2), only firms headquartered in Beijing, Shanghai, Shenzhen and Guangzhou, four metropolitans are included. In Column (3), city dummies are included. In Column (4), the propensity score matching method is implemented. Four characteristics, size, age, leverage and ownership are used to find the most similar firms in the universe of the control firms. In Column (5), the size of the takeover is controlled. The relative size of the takeover is calculated by the size of firms acquired by the listed firm normalized by the size of the listed firm. In Column (6), the panel data regression (regression 2) is implemented. For each firm, observations from 2008 to 2017 are included. The dependent variable for Column (6) is the annual investment normalized by PP&E. *Post* is a dummy variable that is 1 if the year is after 2012 and 0 if not. In Column (7), the pre-trend test is implemented. For each year between 2008 and 2017, its interaction with the Titling Firm dummy is added in the panel data regression 2. All variables are winsorized at the upper and lower 1-percentile. Industry FE denotes whether the industry of the listed firms (categorized according to industry categorization from CSMAR database) is considered in the specification. Exchange FE denotes whether the effect of exchange (Shanghai or Shenzhen Exchange) in which the firms are listed is considered in the specification. The *t*-statistics are computed using standard errors that are White-corrected. The *, **, *** indicates significance at the 1%, 5% and 10% level respectively.

	$\Delta(\text{Investment}/\text{Total Fixed Asset})$					Investment/Total Fixed	
	Shenzhen firms only (1)	Firms in Metropolitan (2)	City dummy (3)	Propensity score matching (4)	Takeover (5)	Panel data regression (6)	Pre-Trend Test (7)
Titling Firm	0.411** (2.313)	0.341*** (2.662)	0.352*** (2.867)	0.295* (1.706)	0.297*** (3.114)		
Takeover					0.000*** (3.156)		
Titling Firm * Takeover					0.000 (1.004)		
Post Dummy						0.004 (0.153)	
Titling Firm * Post dummy						0.276*** (3.427)	
Titling Firm * Year 2008							-0.057 (-0.377)
Titling Firm * Year 2009							-0.094 (-1.377)
Titling Firm * Year 2010							-0.172 (-0.878)
Titling Firm * Year 2011							-0.120 (-1.064)
Titling Firm * Year 2012							-0.178 (-1.475)

Table 5. The Robustness Check (Continued)

	Δ(Investment/Total Fixed Asset)					Investment/Total Fixed Asset	
	Shenzhen firms only	Firms in metropolitans	City dummy	Propensity score matching	Takeover	Panel data regression	Pre-Trend Test
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Titling Firm * Year 2013						0.128	
						(0.922)	
Titling Firm * Year 2014						0.195	
						(0.922)	
Titling Firm * Year 2015						0.142	
						(0.930)	
Titling Firm * Year 2016						0.292**	
						(2.210)	
Titling Firm * Year 2017						0.481***	
						(2.667)	
ROA	-0.007*** (-3.493)	-0.005 (-1.307)	0.001 (0.575)	-0.012 (-1.578)	0.002 (1.503)	0.000 (0.641)	0.000* (1.914)
Tobin's Q	0.007 (0.835)	0.015 (1.207)	0.009* (1.816)	0.109*** (6.357)	0.007* (1.660)	0.000 (0.419)	0.000 (1.047)
Constant	0.438 (1.446)	0.089 (0.941)	0.195 (0.875)	0.129 (0.817)	0.011 (0.245)	-0.001 (-0.198)	0.027 (1.234)
Firm FE	No	No	No	No	No	Yes	Yes
City FE	No	No	Yes	No	No	No	No
Time FE	No	No	No	No	No	No	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Exchange FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R ²	0.218	0.112	0.296	0.346	0.072	0.001	0.005
# of Obs.	70	208	1250	86	1250	12500	12500

Table 6. The Investment Dynamics

The sample consists of all nonfinancial listed firms in the CSMAR database from 2008 to 2017. This table presents parameter estimates from OLS regression of investment on Titling Firm dummy variable for various post-event periods. The independent variable is the averaged investment (capital expenditure divided by PP&E) for a sub-sample period between 2013 and 2017 net of investment between 2010 and 2012. Column (1) presents parameter estimates associated with the average investment between 2013 and 2014. Column (2) presents parameter estimates associated with the average investment between 2015 and 2016. Column (3) presents parameter estimates associated with the average investment of 2017. Titling Firm is a dummy variable that is 1 if the firm has allocated land before the land title scheme in 2012 and 0 if otherwise. All variables are winsorised at the upper and lower 1-percentile. Industry FE denotes whether the industry of the listed firms (categorized according to industry categorization from CSMAR database) is considered in the specification. Exchange FE denotes whether the effect of exchange (Shanghai or Shenzhen Exchange) in which the firms are listed is considered in the specification. The *t-statistics* are computed using standard errors that are White-corrected. The *, **, *** indicates significance at the 1%, 5% and 10% level respectively.

	Δ(Investment/PP&E)		
	Year 2013/2014		Year 2015/2016
	(1)	(2)	(3)
Titling Firm	0.130*	0.262***	0.304***
	(1.888)	(3.395)	(3.443)
ROA	0.002**	0.001	0.002*
	(1.997)	(1.441)	(1.722)
Tobin's Q	0.005	0.003	0.003***
	(1.561)	(1.568)	(2.701)
Constant	-0.098**	-0.103**	-0.114**
	(-2.516)	(-2.426)	(-2.559)
Industry FE	Yes	Yes	Yes
Exchange FE	Yes	Yes	Yes
Adj. R ²	0.019	0.019	0.023
# of Obs.	1250	1250	1250

Table 7. The Effect of Characteristics of Land Title on Investment

The sample consists of all nonfinancial listed firms in the CSMAR database from 2008 to 2017. This table presents parameter estimates from OLS regression of investment on Titling Firm dummy variable and two land title characteristics, whether the previous tenure has expired and whether the land's user rights is in contention. The independent variable is the averaged investment (capital expenditure divided by PP&E) between 2010 and 2014 net of investment between 2010 and 2012. *Titling Firm* is a dummy variable that is 1 if the firm has allocated land before the land title scheme starting from 2012 and 0 if otherwise. *Tenure Expired* is a dummy variable that is 1 if the tenure of land controlled by the firm has expired and 0 if otherwise. *Rights contended* is a dummy variable that is 1 if the user rights of the land were fragmented in terms of land was being leased to other users or subject to rights contention from multiple claims and 0 if otherwise. All variables are winsorised at the upper and lower 1-percentile. Industry FE denotes whether the industry of the listed firms (categorized according to industry categorization from CSMAR database) is considered in the specification. Exchange FE denotes whether the effect of exchange (Shanghai or Shenzhen Exchange) in which the firms are listed is considered in the specification. The *t-statistics* are computed using standard errors that are White-corrected. The *, **, *** indicates significance at the 1%, 5% and 10% level respectively.

	$\Delta(\text{Investment}/\text{PP&E})$			
	(1)	(2)	(3)	(4)
Titling Firm	0.046 (0.305)	0.013 (0.091)	0.100 (0.707)	0.081 (0.601)
Tenure expired * Titling Firm	0.435** (2.379)	0.423** (2.377)		
Rights contested * Titling Firm			0.430** (2.453)	0.393** (2.267)
ROA	0.002 (1.285)	0.002 (1.364)	0.002 (1.285)	0.002 (1.353)
Tobin's Q	0.007* (1.658)	0.007 (1.640)	0.007* (1.658)	0.007 (1.640)
Constant	-0.034* (-1.910)	0.035 (0.789)	-0.034* (-1.911)	0.038 (0.859)
Industry FE	No	Yes	No	Yes
Exchange FE	No	Yes	No	Yes
Adj. R ²	0.039	0.05	0.040	0.051
# of Obs.	1250	1250	1250	1250

Table 8. The Effect of Titling firms' Ownership on Investment

The sample consists of all nonfinancial listed firms in the CSMAR database from 2008 to 2017. This table presents parameter estimates from OLS regression of investment on Titling Firm dummy variable and firm ownership, i.e., whether the firms are SOE or not. The independent variable is the averaged investment (capital expenditure divided by PP&E) between 2013 and 2017 net of investment between 2010 and 2012. Columns (1) and Columns (2) presents parameter estimates associated with SOE subsample and non-SOE subsample, respectively. *Titling Firm* is a dummy variable that is 1 if the firm has allocated land before the land title scheme starting from 2012 and 0 if otherwise. *SOE* is a dummy variable that is 1 if the firm is affiliated to the government and 0 if otherwise. All variables are winsorised at the upper and lower 1-percentile. Industry FE denotes whether the industry of the listed firms (categorized according to industry categorization from CSMAR database) is considered in the specification. Exchange FE denotes whether the effect of exchange (Shanghai or Shenzhen Exchange) in which the firms are listed is considered in the specification. The *t-statistics* are computed using standard errors that are White-corrected. The *, **, *** indicates significance at the 1%, 5% and 10% level respectively.

	$\Delta(\text{Investment}/\text{PP&E})$		
	SOE Subsample		None SOE Subsample
	(1)	(2)	(3)
Titling Firm	0.424*** (4.812)	0.075 (0.528)	0.090 (0.648)
SOE			-0.064** (-2.126)
Titling Firm * SOE			0.323** (1.980)
ROA	-0.003 (-0.793)	0.002** (2.344)	0.001 (0.858)
Tobin's Q	0.003 (1.199)	0.011*** (3.607)	0.006* (1.658)
Constant	0.111*** (2.603)	0.109 (1.398)	0.151*** (3.434)
Industry FE	Yes	Yes	Yes
Exchange FE	Yes	Yes	Yes
Adj. R ²	0.075	0.063	0.065
# of Obs.	855	395	1250

Table 9. Characteristics of Land Titling firms

The sample consists of all nonfinancial listed firms that have allocated land before 2012. The table presents variable average and standard deviation (in the bracket below) for the entire sample, as well as a subsample of firms that are affiliated to the government (*SOE*) and firms that do not (*Non-SOE*). The difference between the values for *SOE* and *None SOE* are presented in Column (4). The t-statistics in brackets of column (4) are for the null hypothesis that there is no difference between *Titling firms* and *Non Titling firms*. *Historical Annual Stock Market Return* is the annualized average stock market return between 2008 and 20012. Δ *Historical Annual Stock Market Return* is the difference in annualized average stock market return between 2008/2012 and 2013/2017. *SA Measure* is calculated using the formula of firm size and age. *External Finance Reliance* is constructed using the index of US industries' averaged reliance on external finance. *Incentive Package* is averaged quantity of shares held by management as an incentive package between 2008 and 2017. *CAR in QE announcement* is the Cumulative Abnormal Returns (CARs) between 5th and 11th Nov, 2008, when the “4 Trillion” fiscal stimulus plan was released. *, **, *** indicates significance at the 1%, 5% and 10% level respectively.

	(1) All Titling firms	(2) SOE	(3) Non-SOE	(4) Difference
<u>Panel A: Land Characteristics</u>				
Land Area (Hectare)	4.986 (4.210)	4.775 (3.390)	5.358 (5.458)	-0.583 (0.012)
Land Value (Billion RMB)	1.307 (1.172)	1.328 (1.074)	1.286 (0.956)	0.042 (0.113)
Land Value (% of Market Capitalization)	0.573 (0.377)	0.579 (0.345)	0.583 (0.447)	-0.004 (-0.057)
<u>Panel B: Cost of Equity</u>				
Historical Annual Stock Market Return	-0.350 (0.130)	-0.321 (0.134)	-0.423 (0.085)	-0.102 (-1.460)
Δ Historical Annual Stock Market Return	0.032 (0.220)	-0.029 (0.203)	0.190 (0.188)	0.219 (1.241)
Dividend / Total sales	0.038 (0.161)	0.049 (0.189)	0.009 (0.019)	0.0406 (0.74)
<u>Panel C: Financial Constraints</u>				
Size-Age Measure	1.019 (3.808)	0.779 (1.691)	1.43 (6.001)	-0.651 (-0.54)
External Finance Reliance	0.334 (0.245)	0.351 (0.256)	0.308 (0.225)	0.043 (0.440)
<u>Panel D: Corporate Governance</u>				
Incentive Package	2.223 (5.015)	2.146 (4.999)	2.421 (5.274)	-0.275 (-0.16)
Chairman-CEO duality	0.837 (0.374)	0.839 (0.374)	0.833 (0.389)	0.00538 (0.04)
% of Independent board	0.358 (0.050)	0.350 (0.042)	0.379 (0.061)	-0.0290 (-1.23)

Table 10. The Effect of Titling Firms' Political Connections on Investment

The sample consists of all nonfinancial listed firms in the CSMAR database from 2008 to 2017. This table presents parameter estimates from OLS regression of investment on Titling Firm dummy variable and firms' political connections, measured by either the total number of local bureaucrats on the firms' boards or the ratio of Communist Party members as the percentage of total employees. The independent variable is the averaged investment between 2013 and 2017 net of investment between 2010 and 2012. *Bureaucrats on Boards* is the total number of board members of the firms with experience of serving in the government. The *Party Member Ratio* is the ratio of the total number of employees with communist party membership divided by the number of total employees. All variables are winsorised at the upper and lower 1-percentile. Industry FE denotes whether the industry of the listed firms (categorized according to industry categorization from CSMAR database) is considered in the specification. Exchange FE denotes whether the effect of exchange (Shanghai or Shenzhen Exchange) in which the firms are listed is considered in the specification. The *t-statistics* are computed using standard errors that are White-corrected. The *, **, *** indicates significance at the 1%, 5% and 10% level respectively.

	$\Delta(\text{Investment}/\text{PP\&E})$			
	Bureaucrats on boards		Party Member Ratio	
	(1)	(2)	(3)	(4)
Titling Firm	0.186*** (2.682)		0.211*** (3.093)	
Bureaucrats on boards	-0.035 (-1.251)	-0.035 (-1.254)		
Titling Firm * Bureaucrats on board	0.500*** (2.808)			
Party Member			-0.016 (-1.043)	-0.016 (-1.033)
Titling Firm * Party Member			1.663*** (5.227)	
Titling Firm * SOE		0.271*** (3.376)		0.254*** (3.530)
Titling Firm * Non-SOE		0.031 (0.282)		0.149 (0.970)
Titling Firm * SOE * Bureaucrats on board		0.064 (0.932)		
Titling Firm * Non-SOE * Bureaucrats on board		1.216*** (10.706)		
Titling Firm * SOE * Party Member				-0.679 (-0.107)
Titling Firm * Non-SOE * Party Member				1.594*** (5.185)
Control Variables	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Exchange FE	Yes	Yes	Yes	Yes
Adj. R ²	0.067	0.069	0.073	0.072
# of Obs.	1250	1250	1250	1250

Table 11. The Effect of Titling Firms' Ownership on preferential treatments

The sample consists of all firms in the CSMAR database that has Allocated land before the land titling program starting from 2012. This table presents parameter estimates from OLS regression of title firms' ownership on the preferential treatment received by the firm. In Column (1), the dependent variable is a dummy variable that is 1 if the firm has disputes either with the government or with other firms and 0 if otherwise. In Column (2), the dependent variable is a dummy variable that is 1 if the firm has disputes with the government and 0 if otherwise. In Column (3), the dependent variable is a dummy variable that is 1 if the firm has disputes with other firms and 0 otherwise. All variables are winsorized at the upper and lower one percentile. Industry FE denotes whether the industry of the listed firms (categorized according to industry categorization from CSMAR database) is considered in the specification. Exchange FE denotes whether the effect of exchange (Shanghai or Shenzhen Exchange) in which the firms are listed is considered in the specification. The *t-statistics* are computed using standard errors that are White-corrected. *, **, *** indicate significance at the 1%, 5% and 10% level respectively.

	All Disputes	Disputes with government	Disputes with private firms
	(1)	(2)	(3)
SOE dummy	-0.367** (-2.087)	-0.432** (-2.542)	-0.388** (-2.205)
Log(Total Asset)	0.002*** (3.293)	-0.000 (-1.000)	-0.001 (-1.262)
ROA	-0.006 (-0.274)	0.003 (0.166)	-0.033* (-1.753)
Tobin's Q	0.012 (0.419)	0.018 (0.557)	-0.057** (-2.300)
Constant	0.480 (1.628)	0.405 (1.460)	0.781** (2.324)
Industry FE	Yes	Yes	Yes
Exchange FE	Yes	Yes	Yes
Adj. R ²	0.133	0.133	0.264
# of Obs.	43	43	43

Table 12. The Short- and Long-Term Stock Market Reactions

The sample consists of all nonfinancial listed firms in the CSMAR database from 2008 to 2017. This table presents the result of the regression analysis of the stock market reaction in the short and long run. The cumulative abnormal returns in the next two trading days are used to measure the short-term stock market reaction. The increase of Tobin's Q in the next 5 years after the event net of its 2 years growth before the event was used to measure the long-term stock market reaction. *Titling Firm* is a dummy variable that is 1 if the firm has allocated land before the land title scheme starting from 2012 and 0 if otherwise. *SOE* is a dummy variable that is 1 if the firm is affiliated to the government and 0 if otherwise. All variables are winsorised at the upper and lower 1-percentile. Industry FE denotes whether the industry of the listed firms (categorized according to industry categorization from CSMAR database) is considered in the specification. Exchange FE denotes whether the effect of exchange (Shanghai or Shenzhen Exchange) in which the firms are listed is considered in the specification. The *t-statistics* are computed using standard errors that are White-corrected. The *, **, *** indicates significance at the 1%, 5% and 10% level respectively.

	Stock Market Reaction [0,2]					Δ Tobin's Q [-2 Year, 5 Year]		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Titling Firm	0.076*** (7.073)	0.097*** (4.606)	0.068*** (6.392)	0.082*** (7.361)	2.851** (2.510)	1.952 (0.900)	0.907* (1.836)	1.423 (1.571)
SOE		0.002 (0.762)				0.823* (1.740)		
Titling Firm * SOE		-0.030 (-1.234)				1.723* (1.780)		
Bureaucrats on boards			0.000 (0.057)				-0.441 (-0.780)	
Titling Firm * Bureaucrats on boards			0.027 (0.986)				8.748*** (3.423)	
Party Member				-0.001 (-1.156)				-0.783*** (-5.492)
Titling Firm * Party Member				-0.098 (-0.956)				10.773*** (3.559)
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Exchange FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R ²	0.031	0.031	0.031	0.031	0.027	0.028	0.029	0.052
# of Obs.	1250	1250	1250	1250	1250	1250	1250	1250

Table A1 Statistical Description

The sample consists of all financial listed firms in the CSMAR database from 2008-2017.

	N	Mean	St. Dev.	Min	Max
$\Delta(\text{Investment}/\text{Total Fixed Asset})$	1250	0.03	0.43	-.832	1.25
Titling Firm dummy	1250	0.04	0.19	0	1
ROA in 2012	1250	6.16	17.12	-13.29	40.18
Tobin Q in 2012	1250	2.04	8.69	.11	232.59
Δ Tobin's Q	1250	0.83	6.71	-89.14	101.35
The relative size of the acquirees in the M&A deals	1250	0.05	1.27	0	44
Shenzhen dummy	1250	0.06	0.23	0	1
Tenure Unexpired	1250	0.02	0.16	0	1
Rights Uncontended	1250	0.02	0.15	0	1
SOE dummy	1250	0.69	0.46	0	1
Historical Annual Stock Market Return	1250	-0.36	0.12	-0.54	-0.07
Δ Historical Annual Stock Market Return	1250	-0.01	0.19	-0.37	0.40
Dividend / Total sales	1250	0.02	0.07	0	1.94
Incentive Package	1250	2.53	8.48	0	78.04
Chairman-CEO duality dummy	1250	0.71	0.46	0	1.00
% of Independent board	1250	0.36	0.05	0.09	0.57
Size-Age Measure	1250	0.83	3.91	-0.68	23.92
External Finance Reliance	1250	0.27	0.26	-0.14	1.14
CAR in QE announcement	1250	0.19	0.09	-0.50	0.50
Bureaucrats on boards	1250	0.11	0.38	0	3
Party Member	1250	0.14	0.88	0	1
All Disputes	1250	0.01	0.11	0	1
Disputes with government	1250	0.01	0.09	0	1
Disputes with private firms	1250	0.01	0.10	0	1