



Effects of Land Rights Certification on Rural Credit Market and the Market for Land Transfer - Evidence from China

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Abstract: This paper investigates how the recent land rights certification experiment in some pilot areas of rural China have affected household access to formal and informal credit, and activities in the market for rural land transfer. Based on the Ministry of Agriculture's Fixed Rural Observation Point System (FOPS) annual surveys and the 2015 Special Omnibus Survey on Rural Land Reforms and Rural Financial Innovations, we compile a panel dataset that includes 2073 rural households in 17 provinces for year 2010 (before the policy experiment of land rights certification) and 2015 (after the policy experiment for the treatment group). Our analysis of the data suggests that land rights certification significantly improved rural households' access to formal credit and reduced their reliance on informal loans. Our data reveal that transactions in the rural land market have increased substantially in recent years. However, our difference-in-differences analysis suggests that the increased land rental market activities were not attributable to the land rights certification experiment. In fact, we find a significant negative association between land rights certification and households' participation in both renting out and (to a lesser extent) renting in land. This is a surprising result that warrants further investigation.

Key words: Property Right; Land Rights Certification, Access to Credit, Land Rental Market, Difference-in-differences

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1. Introduction

There is considerable consensus among economists that societies with developed institutions that protect property rights protection institutions tend to perform better economically (Coase, 1960; North and Thomas, 1973; Acemoglu et al. 2001). Since land is one of the most important properties in rural areas, improving security to land rights is considered to be an effective strategy for promoting rural development. For instance, the World Bank sponsored various programs to systematically register land or to improve land administration in various member countries. In 2005, the land administration projects supervised by the World Bank succeeded US\$1 billion (Deininger and Feder, 2009).

Conceptually, improving security of land rights can promote rural development through a number of different channels: (1) providing stronger incentives for long-term investment; (2) promoting land transfers to more efficient producers; (3) improving access to credit; (4) reducing the scope for arbitrary government intervention in land-related issues (Deininger and Jin, 2006); and (5) increasing labor market participation by reducing private efforts required for property protection (Field, 2007). In this paper, we focus on two of these channels: credit access and land transfer. Specifically, we investigate how the recent land rights certification experiment in some pilot areas of rural China have affected (1) rural households' access to credit; and (2) activities in the market for rural land transfer.

A lack of credit access is an often cited obstacle for economic development (King and Levine, 1993; Aghion et al., 2007). A main source of the problem is information asymmetry – lenders do not have sufficient information to screen or effectively monitor borrowers. To manage the risk of default, lenders reduce the number of loans they make (quantity ration) (Stiglitz and Weiss, 1981) and require

collateral. Land is considered to be ideal collateral because it is immobile and relative indestructible. In developing countries it is often not the lack of land per se but the lack of land that can be used as collateral that is a barrier for small farmers to obtain credit. As De Soto (2000) argues, the absence of clearly defined and legally enforced property rights makes it hard to turn “dead” property, such as land, into “live” assets for productive purposes. If the institution of property rights can be strengthened to improve access to collateral assets such as land, the workings of credit market will improve as well. This is the so-called “de Soto effect” (Besley et al., 2012). From this perspective, land rights certification can improve access to credit by transforming land into a collateral asset. At the same time, even if land is not offered as collateral, land rights certification tends to increase household wealth for two reasons. First it reduces the risk of expropriation, which raises the value of the land. Secondly, land rights certification encourages participation in non-agricultural work (Field, 2007). Increased wealth lowers the risk of credit default, which improves credit access and reduces the cost of loans (Field and Torero, 2006).

While there is a clear theoretical link between improved land rights through certification and credit access, empirical evidence on this nexus is mixed. A number of studies have found significant positive credit effects on land certification in different countries. For instance, Feder and Onchan (1987) discover that ownership security of land improved rural households’ access to formal credit in Thailand. The improvement was larger in provinces with less developed informal credit markets. Foltz (2004) finds that land titling has a positive effect on credit access in Tunisia. Boucher et al. (2009)’s study of Peru’s land titling program concludes that a land title reduces a household’s probability of being credit constrained. Galiani and Schargrodsky (2010) also find a positive but modest credit effect of land titling in Argentina. Deininger and Goyal (2012) explore the credit effects of easier access to

land information provided by digitisation of land registry in India. They find statistically significant but quantitatively modest increases in credit access in urban areas where the quality of land records was lower. Dower and Potamites(2014) find that having a formal land title improves households' probability of obtaining a bank loan and increases the average loan size (if the title is offered as collateral) in Indonesia. For first time borrowers, merely possessing a land title (without offering it as collateral) is important for loan access, which suggest that land title serves as a signal of credit-worthiness. Piza and de Moura (2016) find that following a land titling program in Brazil, households increased borrowing from commercial banks and reduced reliance on informal credit from relatives.

Other studies suggest that the credit effects are not universal. Based on panel data on 300 Paraguayan households for 1991 and 1994, Carter and Olinto (2003) find that security of land rights increases investment demand for all farmers. However, only wealthier producers were able to increase the quantity of investment because they were less credit constrained than the poor. Field and Torero (2006) evaluate the effects of a land titling program in urban Peru. Their results show that land titling is associated with higher loan approval rates from the country's largest public sector bank, but has not improved credit access to private bank loans.

There are also studies that have found no evidence of improvement in credit access brought about by land titling. For instance, Place and Migot-Adholla (1998) find that land registration had not improved credit access for smallholder farms in Kenya. Boucher et al. (2005) assess the effects of the titling programs and legal reforms securing private property rights in Honduras and Nicaragua during the 1990s. They find some increase in land market activity, but no improvements in credit access. Do (2008) finds that land titling in Vietnam encouraged households to make long-term investment and to allocate more time to non-agricultural activities, but had no effect on credit access.

As for the effect of land certification on land transfer, the theoretical prediction is that land certification should stimulate activities in the market for land transfer for two main reasons. First land certification increases security of land rights which provides greater certainty for the parties to the transaction. Secondly land certification reduces the costs associated with obtaining and verifying information required for the transfer, including the identity of the owner, and boundaries of the land in question. There is indeed empirical evidence supporting the theoretical prediction. For instance, based on a national survey of 2011-2012, Cheng et al. (2016) find that land right certification significantly raised the probability of rural households renting out land, and almost doubled the amount of land rented out. Fu et al. (2016) report that land certification had a significant impact on renting out but not renting in land in Jiangsu province. Wang et al. (2015) looked into the characteristics of land transfer using survey data for 2000 and 2008 of six Chinese provinces. They conclude that land rights certification increased a household's probability of rent out land to non-relatives, and more law-compliant certificates have a greater stimulating effect on land transfer to non-relatives. They also find that households are discouraged from renting out land to non-relatives if the village had a history of administrative land readjustments.

This paper studies the effects of rural land rights reforms since 2010 on credit access and land rental activities. Based on the Ministry of Agriculture's Fixed Rural Observation Point System (FOPS) annual surveys and the 2015 Special Omnibus Survey on Rural Land Reforms and Rural Financial Innovations, we compile a panel dataset that includes 2073 rural households in 17 provinces for year 2010 (before the policy experiment of land rights certification) and 2015 (after the policy experiment in the treatment group). We find that land rights certification significantly improved rural households' access to formal credit and reduced their reliance on informal loans. We also show that transactions in the rural land market have increased

substantially in recent years. However, our difference-in-differences analysis suggests that the increased land rental market activities were not attributable to the land rights certification experiment. In fact, compared to the control group, the treatment group had lower levels of participation in both renting out and renting in land.

By providing the latest evidence on the effect of strengthening land rights in the Chinese context, this paper contributes to our understanding of the mechanisms through which the quality of property rights institutions affect economic outcome. The Chinese experience is significant for at least two reasons. First, the rural land reform in China since the late 1970s is a gradual and ongoing process during which rural households obtained an incrementally larger bundle of rights associated with land. In this context, “land rights certification” entails an increase in the scope of the land rights, including the issue of formal land rights certificates, permission to transfer land rights, and to use land rights as collateral. This is more than mere formalization of existing rights (Galinaï and Schargrodsy, 2011) or an improvement in accessing land rights information (Petracco and Pender, 2009) in other countries. Secondly, according to Article 10 of the Chinese Constitution, “...land in the rural and suburban areas is owned by collectives”. The land rights held by rural households are use-rights which in the past were informal and recognised by households within the relevant villages. The reforms since 2011 have formalised the land use-rights bundle. The treatment of use-rights as property rights which can be transferred and used as collateral offers a more nuanced view on the meaning of private property rights.

The rest of the paper is organised as follows. Section 2 provides an institutional background of the rural land rights system in China. Section 3 describes the data used in our analysis and our empirical strategy. Section 4 presents the estimation results. Section 5 concludes.

2. A brief history of China's rural land regimes and recent reforms

2.1. A brief history of China's rural land regimes

The Chinese Communist Party came to power in 1949 on the basis of strong support from the country's large population of rural poor. To secure the farmers' access to land for their livelihood, the government initiated a "land to the tiller" program in 1950 (Zhu et al., 2006). The Land Reform Law of 1950 redistributed land from landlords to poor rural households on an egalitarian basis, effectively granting them private ownership of land, verified by land ownership certificates (Vendryes, 2010).

Despite the huge productivity gains brought about by the 1950 land reform, the government decided to follow the Soviet model and started to collectivise rural land ownership in early 1950s. By 1958 when the Great Leap Forward began, rural residents were organised into "People's Communes" and the majority of China's rural land had become collectively owned and managed. Land collectivisation severed farmers' connection from an identifiable piece of land, and substantially weakened their work incentive. The resulting loss in agricultural production was seen as a major contributing factor to the disastrous Great Famine of 1959-61 (Lin and Yang, 2000).

From the late 1970s, farmers in Anhui province initiated (illegally) the experiment of contracting out the collective land to individual households to farm. This practice, known as the Household Responsibility System (HRS), was hugely successful in raising output and income. In 1982, the central government formally endorsed the HRS as a "constitutional part of the socialist agricultural economy"¹.

¹The China Communist Party's No.1 Document in 1982, "Summary of National Rural Working Conference" (全国农村工作会议纪要).

Soon afterwards, the HRS spread across the entire rural region of China rapidly, setting off a boom in agricultural productivity (Lin, 1992).

As part of the ongoing effort to promote rural development, the government has progressively increased the term of land use contract, and gradually relaxed various restrictions on land use. In 1984 the land use contract was for 15 years. By the time the first round of contracts was to expire in 1998, the term was extended to 30 years. In 2008, the government issued further policy documents stating that the present land contract relationship will “remain unchanged for a very long time”(Dean and Damm-Luhr, 2010). Over time, a legal framework that establishes and protects rural land rights has been set up. Currently the major laws governing rural land rights in China include the Constitution (宪法, adopted in 1982 and amended in 2004), the Land Administration Law (土地管理法, adopted in 1986 and amended in 1998 and 2004), the Law on Land Contract in Rural Areas (农村土地承包法, adopted in 2002) and the Property Law (物权法, adopted in 2007). The Constitution establishes the principles of land rights. Article 10 of the constitution states that “land in the cities is owned by the state and land in the rural and suburban areas is owned by collectives”. The Property Law provides equal legal protection to different types of ownership: state-owned, collectively-owned, and privately-owned. The Land Administration Law establishes the contractual land-use rights of individual farmers under the HRS (Dean and Damm-Luhr, 2010). The Law on Land Contract in Rural Areas sets out the rights and obligations of the contracting parties in greater detail, and provides protections for these rights. In particular, it defines rural land use rights as property rights rather than private contracts; it prohibits big re-allocations and spells out conditions for the small re-adjustments; and it requires the issuance of land

certificates to holders to the land rights (Deininger et al., 2014).

2.2 Recent reforms in relation to land transfer and credit access

The market for rural land transfer grew rapidly following the passing of the Law on Land Contract in Rural Areas of 2002 which allows the circulation of land use rights “by subcontracting, leasing, exchange, transferring or other means” (Article 32). According to the Ministry of Agriculture, a total amount of rural land transferred reached 228 million mu, which amounts to 17.8% of all rural land under the HRS. In comparison, only 1-3% of rural land circulated in the 1980s.

However despite the legality and the substantial growth of rural land transfer market, land rental activities are limited in some localities. Due to a lack of land rights certificates, and deficiency in legal and dispute resolution institutions, the transaction costs associated with land transfer remain very high. Consequently much of the land transfer takes place between relatives and close friends (Brandt et al., 2004; Jin and Deininger, 2009). This has limited the scope of transferring land to the most efficient users, which means true value of the land cannot be realised.

Rural land use rights are recognised under the Property Law of 2007 as property rights to be registered as immovable. This has provided impetus for the Ministry of Agriculture to implement further land rights certification reforms beginning in 2011. The certification reforms since 2011 have four distinct features.

First, reforms are implemented at the village level. Land rights certification proceeds village by village and applies to all households in a village. The task of land rights certification includes clarification of all boundaries of each plot of land by actual land surveying, verification of contractual land, registration of land use rights, and issuance of land rights certificates. Each household is supposed to receive written land contracts and land rights certificates specifying particular plots of land

contracted and their respective boundaries and areas. Usually the process of certification involves collection of land plot maps from villager groups, drafting maps of land plots, publicly display and verification of land maps, household verification of relevant land plots by signature or fingerprint, official audit, registration, issuance of land use rights certificate and archiving of relevant documents.

Second, land use rights are registered with the Ministry of Land and Resources. This provides a legal verification of households land rights which facilitates further development of the market for land transfer, and helps to reduce or resolve disputes related to land use rights.

Third, the central government has defined a timetable and route map for the land rights certification reforms. Local governments have been requested to complete land rights certification by the end of 2018. The cost of implementing the reforms (about 40-100 yuan per mu) is included in local government budget, and the central government provides a subsidy (of 10 yuan per mu) to help fund the reforms.

Fourth, incrementally more rural reform experimental areas have been set up to trial the use of land rights as collateral. Land rights certification is a prerequisite of such trials. Since the current Property Law and the Guarantee Law prohibit the use of rural land rights as collateral, loan contracts involving rural land rights as collateral cannot be legally enforced. To encourage lending institutions to participate in the experiment of land collateral, local governments provide support in the form of legal aid and risk compensation. Some lending institutions would accept land rights as collateral but also insist on other collateral assets as well. To remove the legal obstacle that discourages the trial of using rural land rights as collateral, the National Congress authorised the State Council in December 2015 to temporarily suspend the relevant provisions in the Property Law and the Guarantee Law that

prohibit the use of rural land rights as collateral in 232 counties (cities or districts).

Similar to other reforms in China, the land rights certification reforms since 2011 also took a gradual approach, starting from a small number of localities and then incrementally extended the geographical reach. In 2011 and 2012, 50 counties were randomly chosen each year as pilot localities. In 2013, 105 additional counties were chosen. In 2014, the entire provinces of Shandong, Sichuan and Anhui, plus 27 counties in other provinces were included. In 2015, 9 more provinces (Jiangsu, Jiangxi, Hubei, Hunan, Gansu, Ningxia, Jilin, Guizhou and Henan) were added. Table 1 provides a summer of the progress of land rights certification reforms between 2011 and 2016. The latest data from the Ministry of Agriculture suggests that by November 2016, 2545 counties (cities or districts), 29,000 township and 492,000 villages have participated in the implementation of land rights certification reforms. The total area of certified land area reached 750 million mu, amounting to 58.6% of total land contracted to rural households¹.

<Table 1>

3. Data and empirical strategy

3.1. Data

The data used in our analysis come from the annual surveys within the Ministry of Agriculture's Fixed Rural Observation Point System (FOPS) from 1986 and the 2015 Special Omnibus Survey on Rural Land Reforms and Rural Financial Innovations.

FOPS annual surveys follow about 23000 rural households from 360 villages in

¹http://news.xinhuanet.com/2016-11/04/c_1119846599.htm.

357 counties of 31 provinces. To ensure that the samples are representative of the national population, 3-25 villages are chosen from each province depending on the size (total number of villages), geographic and economic features of the province. Households are then randomly selected from each village. Each household in the sample is asked to keep a record book detailing the households land, asset, production, sale of agricultural products, income and expenditure, credit and social activities. At the end of the year, an enumerator helps the household complete a questionnaire based on the information in the record book. The enumerator also collects information to complete a village-level questionnaire which covers items such as village economy, population, labor supply, land, grain production and provision of public goods such as infrastructure. If a sample household leaves the village for some reason, the enumerator will find a similar household as replacement to keep the sample size stable.

The 2015 Special Survey on Rural Land Reforms and Rural Financial Innovations (“The 2015 Special Survey”) was intended to evaluate how the reforms on rural land use rights and other supporting reforms have affected the market for rural land transfer and the rural credit market. For this purpose, the survey first selects villages which are allocated both in the national experiment areas for rural reforms (including both experimental areas for rural reforms and experimental areas for integrated urban and rural reforms) and within the FOPS. These villages form the “treatment groups”. Then, the survey selects from within the FOPS other villages which are geographically similar to the treatment groups but which were not running policy experiments. These form the comparison groups. As shown in Figure 1, the treatment groups and control groups are widely distributed across China’s main agricultural areas. The 2015 Special survey used the same questionnaire to collect information from both the treatment groups and the comparison groups. The survey collected detailed information in 5 areas: (1) the impact of rural land reforms on

each household including the allocation, adjustment, transfer and use of land; and the status of land rights certification; (2) Household involvement in formal and informal credit market; (3) Household risk management; (4) household production and sales; and (5) household characteristics.

<Figure 1>

The focus of our analysis is on the impact of rural land rights certification on rural credit access and land transfer. We have made some minor adjustments to the survey's treatment groups and comparison groups to ensure that all villages in our treatment groups had completed land rights certification, and no villages in our comparison groups had completed land rights certification at the time of survey¹.

The panel dataset we have compiled based on the FOPS annual surveys and the 2015 Special Survey covers 40 villages in 36 counties of 17 provinces². All households in each of the 40 villages are included in our dataset. There are 1938 households for 2010 (before the policy experiment of land rights certification) and 2073 households for 2015 (after the policy experiment in the treatment group).

Since we focus on the effects of rural land rights certification reforms beginning in 2011, we take the FOPS 2010 survey as the baseline. Table 2 reports the main characteristics of the households (mean values and standard deviations) in 2010 and 2015. There is a sample attrition of 4.7% between the two surveys. The 2015 column

¹Since the Survey look at the impact of a broader set of policy experiments, there are a small number of villages in the Survey's treatment groups that had not completed land rights certification and also a small number of villages in the comparison groups that had.

²The 17 provinces (or autonomous regions or directly administered municipality) are: Shanxi, Liaoning, Jilin, Heilongjiang, Jiangsu, Zhejiang, Anhui, Fujian, Jiangxi, Shandong, Henan, Hubei, Guangxi, Sichuan, Guizhou, Chongqing and Ningxia.

reported includes replacement households. We note that over the period 2010-2015, household income, productive fixed capital investment, durable goods consumption have increased substantially, which may be attributed to both economic growth and increases in government expenditure in rural areas.

<Table 2>

3.2. Identification strategy

We take the gradual implementation of land reforms in China as a natural experiment and use the difference-in-differences approach to identify the effects of land rights certification on credit access and land transfer. Specifically we select villages that have implemented land rights certification as treatment groups and villages that are otherwise similar but have not yet implemented the reforms as comparison groups. We then use the comparison groups' outcome difference over time as the counterfactual and compare it to the treatment groups' before-and-after outcome difference. This comparison tells us how the outcome changes over time differ for the comparison groups and the treatment groups (difference-in-differences). Since the treatment groups and comparison groups are similar but for the treatment (after controlling for observable characteristics), the estimated difference-in-differences identifies the effect of the treatment, i.e., the effect of land rights certification.

Our baseline estimation equation in its general form is as follows

$$y_{ivpt} = \alpha_0 + \alpha_1 year_t + \alpha_2 title_{vp} + \alpha_3 (year_t \times title_{vp}) + X_{ivpt} \beta_1 + \varepsilon_{ivpt} \quad (1)$$

where y_{ivpt} is the dependent variable for household i in village v of province p at time t (either year 2010 or year 2015). The dependent variables we focus on

are household access to formal credit, household access to informal credit; land rented in and out. $year_t$ is a binary variable which equals to 0 for year 2000, and 1 for year 2015. $title_{vp}$ is a binary variable which equals to 1 if the village has completed land rights certification and 0 otherwise. X_{ivpt} represents a set of variables controlling for observable household and village characteristics.

In equation (1), the difference in the before-and-after outcomes for treatment group is $\alpha_1 + \alpha_3$, and that for the comparison groups is α_1 . The parameter we are interested in is α_3 which is the difference in outcome differences over the period 2010-2015 between the treatment group and the comparison group. α_3 is an estimate of the effect of the treatment (i.e., land rights certification) on the dependent variables (credit access and land transfer). We use Probit estimation if the dependent variable is binary (e.g., whether households have access to formal credit), and we use Tobit estimation if the dependent variable is continuous (i.e., the area of land rented in or rented out).

3.3. The issue of endogeneity

For the difference-in-differences estimation to be unbiased, the assignment into the treatment group should not be endogenous, that is, dependent on any factors influencing the outcome of the treatment. Since in our sample, the selection is at the village level rather than the household level (as all households in a selected village are included), differences in household characteristics may not be a big concern. However we need to consider village characteristics that may affect group assignment. For instance, to the extent that it is costly to implement land rights certification reforms, relatively richer villages may be more likely to be selected into the treatment group. Thus we examine specific village characteristics shown in the

2010 survey. Our results, presented in Table 3, show that treatment villages and the comparison villages were similar in 2010 by all the listed characteristics except that the treatment villages had a smaller proportion of land devoted to growing grains.

<Table 3>

To further assess whether the assignment of the treatment and comparison groups may pose a problem for our analysis, we investigate whether the probability of a village being chosen to carry out the land rights certification experiment is influenced by any specific or a combination of village characteristics that we have data on. The (Probit) regression results are presented in Table 4. The results indicate that apart from two variables –share of labor working outside of village and share of share of land devoted to grains –that have some explanatory power in relation to the assignment of treatment groups, other variables are not significant. Importantly, the Wald χ^2 tests suggest that apart from estimation (3), village characteristics jointly are not significant in explaining the probability of a village being selected into the treatment group. In other words, it seems that, in choosing the villages participating in the land rights certification experiment, the government has followed the principles of generality and representativeness. This means that for our analysis, the potential problem of endogenous assignment of treatment groups is unlikely to be a real one.

<Table 4>

4. Empirical results

4.1. Access to credit

We first estimate the effect on rural land rights certification on households' access to formal credit. In our estimation, the dependent variable, access to formal credit is a binary variable that equals 1 if the household applied for a loan from a

formal financial institution and the application was approved. We report results in Table 5 from 5 different estimations: (1) with no control variables or province fixed effects; (2) with no control variables but with province fixed effects; (3) same as (1) except attrition households are excluded; (4) with control variables but no province fixed effects; and (5) with control variables and province fixed effects. Estimation (4) is our baseline estimation specified in equation (1).

<Table 5>

As shown in Table 5, the estimated parameter for *Title x Year* is positive and significant in our baseline estimation (4), suggesting that land right certification had the effect of increasing the probability of households obtaining formal credit. This effect seems to be robust with altered model specifications as the positive significance of the parameter for *Title x Year* remains in all other 4 estimations. What may be the channels through which land rights certification have improved access to formal credit? First, land rights certification increases effective demand for credit. We note that access here is defined as the proportion of households obtaining formal credit. Other things equal, the more people actually apply, the more people would be granted credit unless the total quantity of credit is rationed. To the extent that improvement in land security provides greater incentives to invest, there would be a greater demand for formal credit. As long as some of the increased demands are expressed, credit access may be improved as a result. Second, land rights certification lowers the risk of credit and therefore increases the chances that loan applications are approved. The risk of credit may be lowered because greater land security increases the value of the land and therefore the wealth of the households; and because land may be offered as collateral. In this paper, we have not used our dataset to explore the effects of land rights certification on credit demand and risk, but future work to examine these issues is definitely warranted.

Apart from land rights certification, we have found that *total area of cultivated land, share of household members in the labor force, total household income, share of income from non-agricultural operations* have significant positive effects on access to formal credit. This confirms the common observation larger and wealthier households are more likely to obtain loans. Having a consumption shock in the current year also increases access to formal credit presumably because these households are more likely to make loan applications. In contrast, access to credit is diminished for households that have older heads and more family members.

Following a similar approach, we also consider the effects of land rights certification on households' access to informal credit. As shown in Table 6, our baseline estimation (4) suggests that land rights certification has reduces the probability of households gaining access to informal credit. This result is robust in the sense that 4 other estimations with different specifications also show a significantly negative association between land rights certification and access to informal credit. The reduced reliance on informal credit may in part be explained by the increased access to formal credit. Also, to the extent land rights certification has a positive wealth effect, it may reduce the demand for informal credit since in rural China informal credit is usually sought to meet consumption needs.

<Table 6>

4.2. Renting in and renting out land

Since land may be rented in or out for multiple years, the stock of land rented in or out at the end of a year is typically different from the flow of land rental transactions carried out during the year. Both stock and flow figures inform us about the state of the land rental market, but each from a different angle: the stock emphasizes the result of land market activities (over a few years in the past perhaps) whereas the flow focuses on market activities themselves during a given year.

In examining the effects land rights certification on renting in land, we consider its effect on both the stock and flow of land rented in. Specifically we ask four questions, corresponding to 4 estimation results represented in Table 7: how has land rights certification affected (1) a household's probability of having rented-in land at the end of the current year; (2) the quantity of rented-in land a household has the end of the current year; (3) a household's decision to rent in land during the current year; (4) the quantity of land a household decides to rent in during the current year.

We ask 4 similar questions with respect to renting out land. The corresponding estimation results are presented in Table 8.

From Table 7, we see that land rights certification does not have a significant effect on households' decision to rent in land or on the quantity of rented-in land during a year, that is, land rights certification does not seem to affect the flow of land rented in. However land rights certification appears to have a significant negative effect on the stock of land rented in at the end of a year. In addition, as shown in Table 8, land rights certification is associated with both reduced stock and flow of land rented out.

This is a surprising result. In general we expect land rental market activities to increase with improved security of land rights. Indeed we observe the rapid development of the land rental market across the country in recent years. In our dataset, the average quantity of land rented in rose from 0.85 mu per household in 2010 to 1.06 mu per household in 2015. The corresponding increase in land rented out over the same period was from 0.88 mu to 2.16 mu. In fact, our data show that the average quantities of land rented in or out were larger for households in the treatment group than for those in the comparison group. Nevertheless our difference-in-differences estimations suggest that the growth in the land rental market activities cannot be attributed to the implementation of the land rights

certification reform. Instead there may be a negative association between land rights certification and land rental market activities. To make sense of this counter-intuitive result, we consider several possibilities which we need to examine carefully in future research.

First, our result may not be reliable because of omitted control variables. For instance, we have not controlled for administrative land adjustment in the past. Since frequent past adjustment discourages renting out to non-relative (Wang et al., 2015), land rental markets would be less active in villages with a history of land adjustment.

Second, related to the first point, with land rights certification households may be more willing to rent out land to specialised agricultural producers, such as agricultural companies, modern farms or rural co-operatives, instead of renting out land to relatives. In fact, our data show that the proportion of households leasing out land to companies has increased from 0 to 5% between 2010 and 2015. It would be interesting to separate out the land transfers between non-relatives and see how they have been influenced by land rights certification.

Finally, it is plausible that in some cases, land rights certification could increase transaction costs of land transfer which in turn reduces land rental market activities. Since land rights certification clarifies the household as a right holder, the village collective ceases to be a party to the transaction. This in some cases increases the number of parties involved for the transfer of a given amount of land, and therefore increasing the scope of gaming. There is anecdotal evidence suggesting that it is harder for a large renter of land (such as an agricultural company) to finalise a land lease agreement if it has to negotiate with many different land rights holders instead of a few representatives of the village collective. It is however hard to obtain data to gauge how prevalent such cases are.

5. Conclusion

Using data drawn from official survey data for 2010 and 2015, we have studied the effects of land rights certification on rural households' access to credit and on land rental market activities. Our main findings are: (1) land rights certification improved rural households access to formal credit and reduced their reliance on informal credit. (2) there seems to be a significant negative association between land rights certification and households' participation in both renting out and (to a lesser extent) renting in land.

To our knowledge, this is the first study based on this dataset. In some sense, it has raised more questions than answers, and pointed to some promising future research directions for us. We have already discussed at the end of the last section some of the further research questions in relation to land rental market activities. Regarding rural credit market, there is also much follow-up work to be done. In this paper, we have only considered access to credit. It will be useful to look at, for instance, how land rights certification has affected (1) households' demand for credit, (2) the expression of their demand; (3) the extent of rationing in the market for credit; (4) the use of collateral in loan applications. It is hoped that with this and further research we will gain a fuller and more nuanced understanding of the impact of the recent land reforms in China, and the insight gained from studying the Chinese experience can provide some relevant lessons to land rights reforms in other countries.

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Figure 1. Location of Treatment and Control Villages

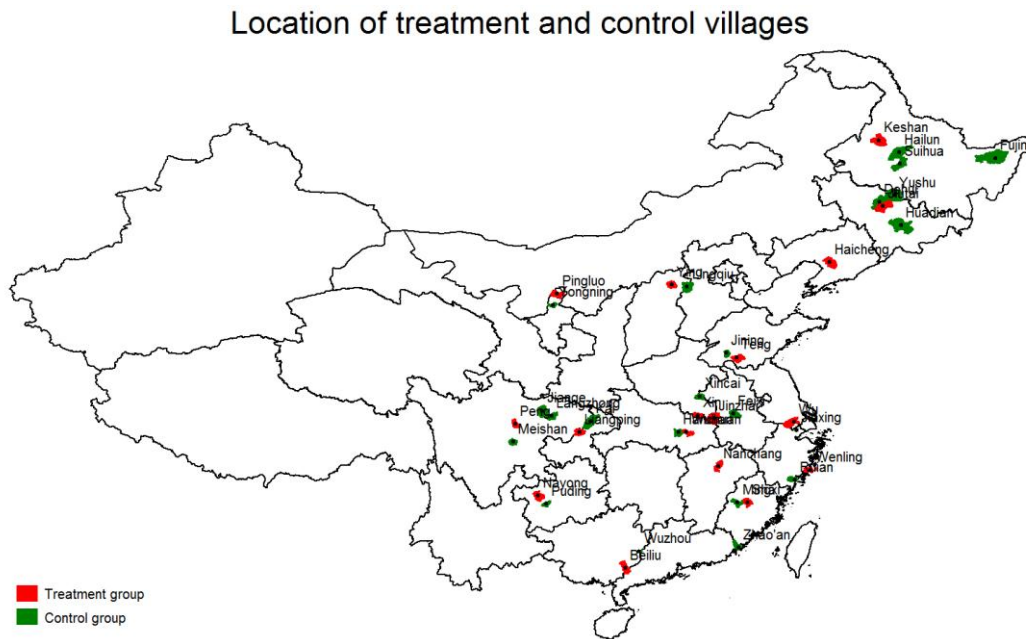


Table 1. Progress of land rights certification in China: 2011-2015

	No. of counties participated	Proportion of participating (%)	No. of entire provinces participated	Proportion of entire provinces participated (%)	Total area of land certified (million mu)	Proportion of land certified (%)
2011	50	1.75	0	0	--	--
2012	100	3.50	0	0	--	--
2013	205	7.18	0	0	--	--
2014	518	18.18	3	9.38	--	--
2015	1988	69.61	12	37.50	330	25.78

Note: Authors' calculation based on data from the Ministry of Agriculture of China.

Table2. Main Characteristics of Households: Mean Values and Standard Deviations

	2010 Survey		2015 Survey	
	Baseline Households	<i>Attrition Households</i>	Panel Households	Replacement Households
Number of households	1938	91	1847	226
Age of household head	50.59 (11.00)	49.84 (8.94)	55.27 (11.06)	53.79 (10.10)
Years of education of household head	6.87 (2.54)	6.64 (2.11)	6.67 (2.83)	7.04 (2.46)
Household size	3.80 (1.50)	3.67 (1.95)	3.58 (1.59)	3.32 (1.50)
Proportion of household members in the labor force	0.69 (0.26)	0.62 (0.26)	0.67 (0.29)	0.68 (0.30)
Total household income ('000 yuan)	40.86 (70.15)	34.32 (26.75)	69.48 (95.63)	77.50 (96.06)
Proportion of income from non-agricultural operations	0.10 (0.26)	0.01 (0.09)	0.09 (0.25)	0.08 (0.22)
Household fixed asset value ('000 yuan)	50.59 (71.88)	34.70 (61.78)	98.99 (184.45)	109.62 (112.52)
Number of mobilephones in the household	1.57 (1.11)	1.34 (1.02)	2.40 (1.21)	2.41 (1.09)
Whether the household owns a car	0.03 (0.18)	0.01 (0.10)	0.13 (0.33)	0.13 (0.34)
Whether the household has relatives holding government positions	0.10 (0.31)	0.12 (0.32)	0.11 (0.31)	0.18 (0.38)
Whether the household experience consumption shocks during the current year	0.32 (0.47)	0.37 (0.49)	0.36 (0.48)	0.28 (0.45)
Distance to nearest bank (km)	4.28 (3.40)	3.64 (2.56)	4.31 (3.43)	3.53 (2.70)
Whether the household rented in land	0.11 (0.31)	0.08 (0.27)	0.10 (0.30)	0.11 (0.31)
Whether the household rented out land	0.20 (0.40)	0.04 (0.21)	0.42 (0.49)	0.41 (0.49)

Table 3. Village Characteristics in 2010: mean value and standard deviations

Variables	All villages	Treatment group	Control group	Difference	No. of observations
	(1)	(2)	(3)	(4)=(2)-(3)	
Total cultivated land (mu)	3750.36 (5140.77)	2882.07 (4782.80)	4370.57 (5409.82)	-1488.51	36
Per capita cultivated land(mu)	1.68 (1.71)	1.30 (1.48)	1.95 (1.85)	-0.64	36
Share of land rented out	0.09 (0.13)	0.10 (0.13)	0.08 (0.13)	0.02	36
Share of labor working outside of village	0.35 (0.19)	0.40 (0.20)	0.31 (0.18)	0.09	36
Share of gain growing area	0.72 (0.26)	0.60 (0.24)	0.80 (0.24)	-0.20**	36
Per capita net income (yuan)	5814.39 (1497.46)	5467.33 (1497.46)	6074.69 (2537.64)	-607.35	28
Level of economic development (scale 1-5 with 1 being the most developed)	2.70 (0.70)	2.56 (0.73)	2.81 (0.68)	-0.25	37
Distance from main road (kilometers)	2.01 (3.36)	1.69 (2.14)	2.21 (4.00)	-0.52	33
Share of hardened road in village	83.84 (24.81)	85.90 (24.88)	82.86 (25.33)	3.04	31
Whether the village is suburban	0.19 (0.40)	0.19 (0.40)	0.19 (0.40)	-0.00	37
Whether the village hosts the township government	0.14 (0.35)	0.19 (0.40)	0.10 (0.30)	0.09	37
Whether the village is classified as a poverty village	0.13 (0.35)	0.13 (0.34)	0.14 (0.36)	-0.02	37
Terrain: Plain	0.50 (0.51)	0.50 (0.510)	0.50 (0.51)	0.00	40
Hills	0.32 (0.47)	0.31 (0.48)	0.33 (0.48)	-0.02	37
Mountainous	0.14 (0.35)	0.13 (0.34)	0.14 (0.36)	-0.02	37
No. of Observations	40	18	22		

** Significant at 5%.

Table 4. What determines implementation of land reform? (Sample: village)

Variables	<i>Pr</i> (Treatment group = 1)						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
In (Total cultivated land)	-0.10 (0.20)					-0.04 (0.23)	
Per capita cultivated land(mu)		-0.18 (0.16)					-0.13 (0.18)
Share of land rented out (2010)			1.20 (1.78)			-0.30 (2.06)	0.26 (2.07)
Share of labor working outside of village				2.26* (1.23)		1.94 (1.51)	2.03 (1.40)
Share of gain growing area					-2.35** (1.00)	-2.38* (1.39)	-2.02 (1.46)
Level of economic development	-0.41 (0.32)	-0.37 (0.33)	-0.43 (0.33)	-0.42 (0.35)	-0.26 (0.36)	-0.18 (0.38)	-0.16 (0.39)
Whether the village is suburban	-0.04 (0.66)	-0.21 (0.65)	0.04 (0.60)	0.14 (0.71)	-0.29 (0.66)	-0.18 (0.72)	-0.32 (0.74)
Whether the village hosts the township government	0.41 (0.74)	0.48 (0.78)	0.37 (0.68)	0.37 (0.63)	0.27 (0.75)	0.00 (0.73)	0.05 (0.75)
Whether the village is classified as a poverty village	-0.24 (0.67)	-0.28 (0.64)	-0.02 (0.69)	-0.07 (0.63)	0.42 (0.74)	0.53 (0.80)	0.56 (0.80)
Terrain: Plain	-0.11 (0.68)	-0.04 (0.67)	0.01 (0.73)	0.36 (0.67)	0.45 (0.70)	0.98 (0.85)	1.12 (0.92)
Hills	-0.01 (0.72)	-0.01 (0.69)	0.10 (0.78)	0.04 (0.70)	0.16 (0.72)	0.32 (0.83)	0.47 (0.89)
Constant	1.70 (1.88)	1.10 (1.12)	0.76 (1.16)	-0.07 (1.23)	1.90 (1.34)	1.05 (1.90)	0.48 (1.65)
Pseudo R^2	0.04	0.06	0.04	0.10	0.16	0.18	0.19
Log Likelihood	-23.43	-22.90	-23.37	-22.15	-20.84	-19.10	-18.93
No. of observations	36	36	36	36	36	34	34

- Notes: 1. Parameters are estimated using Probit regression. Figures in parentheses are robust standard deviations.
2. The reference terrain type is "Hills".
3. To ensure adequate degrees of freedom, per capita income, distance from main road and share of hardened road in village are not included in the regressions.

4. * and ** represent statistical significant at 10% and 5%, respectively.

Table5. The effects of land rights certification on access to formal credit

Dependent variable=1 If household have access to formal credit	No Controls	Province FE	Excluding attrition Households	With Controls	With Controls and Province FE
	(1)	(2)	(3)	(4)	(5)
Title×Year	0.398** (0.187)	0.361* (0.212)	0.352* (0.188)	0.534** (0.243)	0.447* (0.249)
Year	-0.460*** (0.111)	-0.520*** (0.135)	-0.462*** (0.111)	-0.753*** (0.208)	-0.815*** (0.210)
Title	-0.358*** (0.123)	-0.289 (0.210)	-0.312** (0.125)	0.013 (0.174)	-0.119 (0.272)
Whether the village is located in reform experimentalzone				-0.063 (0.124)	-0.026 (0.145)
Total area of cultivated land				0.026*** (0.003)	0.009** (0.004)
Age of household head				-0.028*** (0.005)	-0.025*** (0.005)
Years of education of household head				-0.030 (0.024)	-0.043 (0.027)
Household size				-0.114* (0.058)	-0.103* (0.058)
Share of household members in the labor force				0.505* (0.273)	0.582** (0.288)
Ln(total household income)				0.238** (0.102)	0.284*** (0.103)
Share of income from non-agricultural operations				0.433** (0.197)	0.412* (0.216)
Ln(value of household fixed assets)				2.43e-05 (0.048)	0.008 (0.059)
Number of mobilephones in the household				0.113 (0.069)	0.144** (0.070)
Whether the household owns a car				0.068 (0.216)	0.241 (0.244)
Whether the household has relatives holding government positions				0.073 (0.161)	0.198 (0.175)
Whether the household experience a consumption				0.728*** (0.114)	0.726*** (0.130)

shock during the current year					
Distance to nearest bank				0.013	0.020
				(0.015)	(0.018)
Constant	-1.703***	-2.119***	-1.700***	-3.723***	-4.172***
	(0.064)	(0.274)	(0.064)	(1.002)	(1.126)
Province fixed effects	No	Yes	No	No	Yes
Prob>Waldchi ²	0.000	0.000	0.000	0.000	0.000
No. of Observations	4,011	3,130	3,920	3,534	2,835

Notes: 1. Robust standard errors in parentheses.
2. *, **, *** indicate significant at 10%, 5%, and 1% levels, respectively.

Table6. The effects of land rights certification on access to informal credit

Dependent variable=1 If household have access to informal credit	No Controls	Province FE	Excluding attrition Households	With Controls	With Controls and Province FE
	(1)	(2)	(3)	(4)	(5)
Title×Year	-0.570*** (0.184)	-0.549*** (0.179)	-0.537*** (0.187)	-0.618*** (0.202)	-0.625*** (0.200)
Year	-0.184* (0.106)	-0.227** (0.103)	-0.187* (0.107)	-0.330*** (0.127)	-0.356*** (0.130)
Title	0.250** (0.102)	0.487*** (0.131)	0.217** (0.106)	0.324*** (0.119)	0.655*** (0.194)
Whether the village is located in reform experimental zone				-0.002 (0.100)	-0.076 (0.134)
Total area of cultivated land				-0.008* (0.005)	-0.008 (0.007)
Age of household head				-0.004 (0.004)	-0.004 (0.005)
Years of education of household head				-0.012 (0.020)	0.005 (0.022)
Household size				0.0302 (0.037)	0.0226 (0.040)
Share of household members in the labor force				-0.025 (0.200)	-0.062 (0.208)
Ln(total household income)				-0.003 (0.038)	0.011 (0.039)
Share of income from non-agricultural operations				0.305** (0.151)	0.186 (0.186)
Ln(value of household fixed assets)				0.282*** (0.054)	0.309*** (0.060)
Number of mobile phones in the household				0.001 (0.045)	-0.018 (0.049)
Whether the household owns a car				-0.167 (0.183)	-0.102 (0.197)
Whether the household has any relatives holding government positions				0.110 (0.139)	0.076 (0.150)
Whether face consumption shocks during the current year				0.388*** (0.096)	0.357*** (0.110)

Distance to nearest bank				0.067***	0.058***
				(0.014)	(0.018)
Constant	-1.836***	-2.765***	-1.833***	-3.130***	-4.196***
	(0.071)	(0.265)	(0.071)	(0.511)	(0.582)
Province fixed effects	No	Yes	No	No	Yes
Prob>Wald χ^2	0.000	0.000	0.000	0.000	0.000
No. of Observations	4,011	3,806	3,920	3,534	3,251

- Notes:*
1. Robust standard errors in parentheses.
 2. *, **, *** indicate significant at 10%, 5%, and 1% levels, respectively.

Table 7. The effects of land rights certification on renting in land

	Dependent variable=1 If a household has rented-in land at the end of the current year (stock)	Dependent variable=1 If a household rented in land during the current year (flow)	Dependent variable: Area of rented in land at the end of the current year (stock)	Dependent variable: Area of land rented-in during the current year (flow)
	(1)	(2)	(3)	(4)
Title×Year	-0.270** (0.134)	-0.012 (0.170)	-4.966** (2.137)	-0.704 (2.676)
Year	-0.195* (0.107)	-0.115 (0.141)	-1.606 (1.793)	-1.518 (2.395)
Title	1.007*** (0.148)	0.521*** (0.180)	15.601*** (2.635)	7.835*** (3.008)
Whether the village is located in reform experimental zone	-0.134 (0.101)	0.146 (0.124)	-0.799 (1.619)	2.074 (2.010)
Amount of per capita household land area over the village mean	0.078*** (0.010)	-0.009 (0.017)	1.884*** (0.300)	0.082 (0.405)
Ln(value of household productive assets)	0.192*** (0.030)	0.225*** (0.032)	3.210*** (0.506)	3.595*** (0.615)
Ln(average income from non-agriculture operations at village level)	0.213*** (0.051)	0.146** (0.058)	2.906*** (0.852)	2.405** (1.002)
Ln(average daily wage for males at village level)	0.249* (0.132)	0.205 (0.176)	2.354 (2.193)	2.429 (2.816)
Age of household head	0.002 (0.003)	-0.010*** (0.004)	-0.014 (0.053)	-0.134** (0.061)
Years of education of household head	0.020 (0.014)	0.022 (0.017)	0.380 (0.240)	0.424 (0.278)
Share of household members in the labor force	0.370*** (0.125)	0.463*** (0.159)	3.061 (2.105)	5.857** (2.412)
Share of income from non-agricultural operations	-1.137*** (0.171)	-1.345*** (0.222)	-18.104*** (2.825)	-21.515*** (4.245)
Ln(household house value)	0.032 (0.032)	-0.056 (0.038)	0.645 (0.555)	-0.598 (0.649)
Ln(value of household financial assets)	0.019* (0.010)	0.028** (0.012)	0.392** (0.170)	0.429** (0.193)

Number of mobile phones in the household	0.045	0.056	0.952*	1.100*
	(0.033)	(0.038)	(0.553)	(0.652)
Whether the household owns a car	-0.076	-0.101	-0.099	-1.994
	(0.146)	(0.183)	(2.556)	(2.968)
Whether the household has any relatives holding government positions	0.045	0.129	1.121	1.419
	(0.093)	(0.107)	(1.515)	(1.675)
Whether the household experience a consumption shock during the current year	0.049	-0.112	0.131	-1.606
	(0.074)	(0.100)	(1.189)	(1.563)
Whether the village hosts the township government	-0.527**	-0.474*	-8.603**	-8.682**
	(0.237)	(0.259)	(4.011)	(4.266)
Number of Households in the village	0.000	0.000	0.005*	0.002
	(0.000)	(0.000)	(0.003)	(0.004)
Per capita land areas at village level	-0.042	0.168	0.444	3.957*
	(0.092)	(0.109)	(1.652)	(2.057)
Constant	-5.404***	-4.316***	-79.230***	-71.716***
	(0.798)	(0.947)	(14.371)	(20.595)
Province fixed effects	Yes	Yes	Yes	Yes
Prob>Wald χ^2	0.000	0.000		
Pseudo R^2	0.194	0.160	0.109	0.100
Log Likelihood ratio	-995.696	-615.014	-2278.983	-1214.574
Number of observations	3,448	3,163	3552	3552

Notes: 1. Robust standard errors in parentheses.

2. *, **, *** indicate significant at 10%, 5%, and 1% levels, respectively.

Table 8. The effects of land rights certification on renting out land

	Dependent variable=1 If a household has rented-out land at the end of the current year (stock)	Dependent variable=1 If a household rented out land during the current year (flow)	Dependent variable: Area of rented out land at the end of the current year (stock)	Dependent variable: Area of land rented out during the current year (flow)
	(1)	(2)	(3)	(4)
Title×Year	-0.233** (0.105)	-0.346*** (0.124)	-1.484** (0.706)	-2.934** (1.213)
Year	0.591*** (0.085)	0.244** (0.099)	3.811*** (0.602)	2.306** (0.962)
Title	-0.142 (0.105)	0.349*** (0.131)	-1.513** (0.722)	2.748** (1.292)
Whether the village is located in reform experimental zone	0.176** (0.081)	0.140 (0.094)	0.450 (0.573)	0.703 (0.972)
Amount of per capita household land area over the village mean	-0.040*** (0.011)	0.039*** (0.009)	-0.091 (0.095)	0.612*** (0.115)
Ln(value of household productive assets)	-0.152*** (0.024)	-0.197*** (0.030)	-1.450*** (0.189)	-2.108*** (0.311)
Ln(average income from non-agriculture operations at village level)	0.350*** (0.042)	0.176*** (0.046)	2.227*** (0.305)	2.132*** (0.466)
Ln(average daily wage for males at village level)	0.142 (0.094)	0.202* (0.119)	0.717 (0.659)	2.364* (1.228)
Age of household head	-0.000 (0.003)	0.004 (0.003)	0.021 (0.019)	0.054* (0.029)
Years of education of household head	0.031*** (0.011)	0.015 (0.013)	0.222*** (0.078)	0.213* (0.123)
Share of household members in the labor force	-0.080 (0.098)	-0.057 (0.107)	-0.733 (0.628)	-0.594 (1.007)
Share of income from non-agricultural operations	0.325*** (0.117)	0.128 (0.150)	2.991*** (0.757)	2.544* (1.504)
Ln(value of household family home)	0.043* (0.023)	0.036 (0.026)	0.251 (0.159)	0.138 (0.285)
Ln(value of household financial assets)	0.006 (0.007)	0.028*** (0.009)	0.063 (0.053)	0.214** (0.093)
Number of mobile phones in the household	-0.032 (0.026)	0.029 (0.030)	-0.267 (0.172)	0.186 (0.302)

Whether the household owns a car	-0.002 (0.098)	0.087 (0.120)	0.374 (0.602)	1.924 (1.244)
Whether the household has any relatives holding government positions	0.091 (0.080)	-0.058 (0.089)	0.451 (0.479)	-0.811 (0.810)
Whether the household experience a consumption shock during the current year	-0.099 (0.061)	-0.131* (0.071)	-0.237 (0.406)	-1.092 (0.715)
Whether the village hosts the township government	0.348*** (0.107)	0.516*** (0.132)	1.471* (0.840)	3.910*** (1.373)
Number of Households in the village	-0.000*** (0.000)	-0.001*** (0.000)	-0.003*** (0.001)	-0.010*** (0.002)
Per capita land areas at village level	0.340*** (0.069)	0.475*** (0.081)	3.912*** (0.549)	6.349*** (0.874)
Constant	-5.038*** (0.617)	-4.531*** (0.713)	-35.568*** (4.781)	-54.387*** (7.418)
Province fixed effects	Y	Y	Y	Y
Prob>Wald χ^2	0.000	0.000		
Pseudo R^2	0.210	0.189	0.093	0.113
Log Likelihood ratio	-1742.716	-1281.829	-4778.164	-2937.129
Number of observations	3,551	3,551	3,552	3,552

Notes: 1. Robust standard errors in parentheses.
2. *, **, *** indicate significant at 10%, 5%, and 1% levels, respectively.