BSc Economics

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The Impact of Land Titling Confirmation Programme [1]to China's Rural Land Circulation[2]

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Abstract

The lack of rural land property right is identified as the main obstacle to effectively allocate factors of production in China. Among the series of reforms, the land titling confirmation programme is expected to have a positive effect on households' land rental decisions and the overall land rental price. Both theoretical and empirical analysis are offered in this paper. This study finds the reform has positive effect on both land rent-in decision and the overall rental price of land but is unable to draw decisive conclusion regarding the rent-in decision.

* I would like to thank Prof. Vera Eva Troeger, my supervisor, who has dedicated much support and for their time, effort and suggestions and assistance in writing this paper. All errors are my own.

1 See Appendix A for explanation

2 See Appendix A for explanation

Contents

Section I: Introduction and Historical background

The agricultural land, prior the introduction of the household responsibility system, was owned and controlled by the state or collective authorities in China. Scholars generally agree that this planning approach is inefficient in allocating scarce resources (Deininger and Jin, 2003). The rural land reform after 1978, which to some extent, allows household to cultivate agricultural production in their own interests and retain revenues, was proved to be successful and has made an enormous contribution to China's economic development (Lin, 1992).

Despite the gradual shift to the market approach in allocating a production factor, the authority insists that rural land must remain collectively [3]owned. This raises question of how the possession of land property right could be enforced if the property rights cannot be completely held by individuals. The solution provided economists in China is to decompose the property rights as use rights and ownership – the land remains collectively owned while the use rights of the land are granted to individual households.

Although policies have evolved over time to strengthen the use right of land granted to the rural household, it was only after the publication of The Property Law of 2007 that property rights of all types (state, collective, and private) were officially entitled with the same level of legal protection (China's Urbanization and Land: A Framework for Reform, 2014). However, by the time the law was published, there was no formal registration system of land nor officially released certificate to truly make the right realised. What follows is the "land titling confirmation programme," which aims to affirm farmers' property rights to land through registration and certification. Starting with a few provinces in 2008, in Central Document No.1 of 2013, the central governments pushed the target forward to "finish the process nation-wide within five years."

While literature on institutional economics and the effect of land reform is large, studies related to China's reform are normally region-based. The primary aim of this project is to assess whether the Land titling confirmation programme has any impact on rural households' land rental behaviour by testing if the probability of rent-in land and rent-out land are affected by the reforms, and then to test if the impact of the programme is reflected in the rental price.

[3] The collective refers to the village and some sub-village entities, meaning that the main body of property rights is neither individual- nor household-based.

The remainder of this paper is organised as follows: Section II presents a theoretical discussion and empirical studies. Section III contains the background knowledge, regarding the reforms, necessary for understanding the conceptual framework. Section IV describes the data sources and analyses their descriptive statistics. The model specification and identification strategy is discussed in Section VI. The paper is concluded in Section VII.

Section II: Literature Review

Property rights refer to an owner's right to use a good or asset for consumption and/or for income generation. Only when property rights are well-defined and enforced without cost, the welfare results of economics can be derived. Since North (1990), property rights were thought of as an important element of the institutional structure of an economy, which incentivises the human exchange of goods, services, and factor of productions. Since property rights are not exogenously given, to ensure the property rights are well-defined and enforced, the idea that the states involvement in codifying and protecting such rights has gained great prominence from in many political-economic studies (Acemoglu, 2003).

At the international scale, there is an abundance of literature that concludes that better-protected property rights help to promote land rental behaviour. Macours et al. (2011) finds that, in Dominican Republic, more secure and stable land rights increase the rental price by 21%. Studies in Ethiopia find that property rights reforms have helped to promote land market participation, among which females are more willing to rent out their land (Bezaih and Holden, 2006). In Nicaragua, improvement in property right is also confirmed to have a positive effect on land rental market participation (Deininger et al., 2003).

However, since China's property rights reforms are still at an early stage, studies related to China are typically concentrated on analysing the loss of market efficiency due to the lack of property right. For example, Benjamin and Brandt (2002) conclude that the inactivity of China's rural land rental market is due to its property rights insecurity, where farmers who rented out their land find it difficult to take back their land upon expiration of the rental agreement. Also, Holden and Yohannes (2002) find that in the early stages of China's first wave of land reforms, the village leader might consider farmers who rent out their land as a signal indicating they are incapable of managing their land well; the consequence would hence be the reallocation of land within the collectives. This land tenure insecurity could be seen to increase the transaction cost involved in land rental activities, thus deterring China's efforts in promoting market rental activity.

Studies related to the ongoing property right reform is relatively few. Li (2012) investigated the effectiveness of the land titling programme in Chengdu and concludes that property right improvement is associated with the increase in land price. However, this paper does not explain the increase in land price from a theoretical ground and only looks at the impact of the programme in one province.

Section III: Background knowledge and Conceptual Framework

Motivated by most of the agricultural household models (Carter and Yao, 2002), this study assumes that the representative agricultural household's primary goal is to maximise its total level of production. There are two ways in which they could increase their income: choosing to work on their endowed farmland hence increasing the agricultural production; or choosing to engage in off-farm activity.

Before the reforms took place, the land property rights were not properly defined and hence were not well-protected. The potential risks included disputes over land boundaries between neighbours, and the chance of encountering land expropriation, and redistribution within the collectives.

These risks can be considered as the transaction cost, which refers to the cost incurred when a trade, exchange, or transaction takes place. For example, the dispute over the boundary of the land and the insecure land tenure can be anticipated by those intend to rent-in land and invest in agricultural production, but their demand for land would be higher had the risks been absent. For those who intend to rent out their land, their motivation is primarily driven by off-farm employment opportunities where they can seek higher wages compared with engaging in agricultural production. If they cannot rent out their land, the opportunity cost of seeking off-farm employment would be higher than if they could rent out their land (and receive payment).

The land titling programme involves using advanced-technology to measure farmland boundaries of each household and typing in details of land structure and land area into the government's administration system. Afterwards, details of land will be printed on the officially issued land certificate. In theory, these actions will help to reduce the transaction cost and strengthen the property right of land held by individual households.

The introduction of the programme will lower the risk and hence improve the land circulation because the demand for rent-in land will be increased for those who have a willingness to rent

in land. For those who have relatively higher labour productivity over off-farm activities, their need to cultivate the land they endowed has also reduced; the amount of land they rent-out will thus increase.

Because the burden of transaction cost in this analysis mostly falls on those who rent-in land from other households, the reduction in transaction costs will increase the overall demand for land rent and hence the land rent itself.

Section IV: Data Description and Summary Statistics

This paper uses cross-sectional data collected from China Health and Retirement Longitudinal Study (CHARLS) supported by Peking University. The 2011 national survey includes 10,000 households and 175,000 individuals in 150 countries and 450 villages committees. For rural households, the questionnaire not only includes detailed individual-level and household-level questions regarding the land property, but also has community level information, which allows the tracking of the land policy of different villages. Since this study only focuses on rural areas, the final dataset contains 6,811 households from 228 villages.

To assess whether the programme does have any effects on the rural land circulation, this study focuses on two aspects:1) whether rural households' rental decision has changed because of the programme; 2) to what extent the new equilibrium is reflected by the market price. Since the programme is one of the most important land policies in the early stages of the property rights reforms, the following analysis uses "reform" and "the programme" interchangeably.

To measure the households' response to the reform, responses to question: "Did you rent-out any of your cultivated land (farmland) in the past year?" and "Did you rent-in any cultivated land from others (including the collective) in the past year?" are chosen.

To capture the effect on land rental price, answers to the question: "What is the rent per mu per year you would get if you rent-out all your cultivated land?" are chosen. This question asks for household's valuation on the price of their land rather than the true rental price they received from renting out their land. It is assumed that, on average, households report their land price based on market information. There are two merits to choosing the answer to this question as the measure of land rental price: firstly, this question is not specific to households who lent out their land thus avoiding the selection bias where the "rental price" is only

observable to those who had rented out their land. Secondly, assuming that the agricultural households have perfect information on the price of their land, the answer to this question is a good reflection on the market price of the land at the time the survey is conducted.

The key explanatory variable of our interest is collected from the village level survey. The answers to two questions are combined to generate the explanatory variable "reform." The first question asks: "has your village carried out property rights delineation and land titling in the past 5 years?" and the second question asks "Have your village residents got the Contract Certificate for Farmland?" As mentioned before, the issuance of the certificate indicates that all of the procedures of the programme have been completed. Without the officially-released certificate, it is hard to assume that the programme could have any effect on households' decision. Besides, it is compulsory to participate in the programme because the old certificate is no longer lawfully protected upon completion of the programme; therefore, it is credible to use the village level record to measure the effect of the programme on individual households' decision making.

Figure 1 shows the village level differences between villages that underwent reform and villages that did not. It is clear that in 2011 the practice of the programme is still at its early stages where most of the village had not undergone the reform. The table indicates that at the village level, both rental prices and the percentage of leased out land are greater in the reformed village, but neither are statistically different.

The demographic characteristics of non-reformed and reformed villages are very similar. Other village development-related characteristics are not statistically different. This implies that although the ultimate goal of the programme is to promote market activities and hence achieve better allocation of resources, any perceivable change might take longer to be realised. Besides, these results also show that the governments did not intentionally pick up some of the better performing villages over others when introducing the programme. The overall village level summary statistics can be found in Appendix B1.

Figure 1: Village level overview with mean-difference t-test statistics

Varname	obs	mean	obs	mean	mean-diff	t
	Non-Reformed		Reformed			
Key Variables of interest						
Percentage of leased out arable land	149	13.653	59	16.720	-3.067	-1.013
The rental price for land (Yuan per Mu)	149	438.503	59	616.119	-177.615	-1.129
Demographic Characteristics						
Percentage of Population Aged 65 or above	149	0.142	59	0.153	-0.012	-0.790
Percentage of Migration to the village	149	0.128	59	0.074	0.054	0.589
Percent of Working Out population	149	0.239	59	0.241	-0.002	-0.051
Percent of Local Hukou Population	149	0.925	59	0.890	0.035	0.734
Percent of Non-agricultural Population	149	0.058	59	0.067	-0.009	-0.342
Developmental Status						
Agricultural Revenue last year	149	56199.805	59	51440.390	4759.415	0.071
Industrial Revenue last year	149	14618.918	59	7906.577	6712.341	0.466
Difficulties of Loaning from financial institute	149	2.638	59	2.831	-0.193	-1.018
Bus Line Availability	149	0.510	59	0.576	-0.066	-0.860
Other Village Characteristics						
Social economic status	149	3.564	59	3.475	0.089	0.409
Land structure of the village	149	2.094	59	2.169	-0.076	-0.478
Past Experience of expropriation	149	1.624	59	1.593	0.031	0.412
Large Surname in the village	149	1.181	59	1.271	-0.090	-1.445

1) The socioeconomic status reported here is the interviewers' observation of the community on a scale of 1 to 7, where 1 indicates poor while 7 indicates rich. 2) The land structure is a categorical variable while the score only indicates whether the land structure is significantly different in the two groups of villages. 3) Difficulties in loaning from financial institutions are scored from 1 to 5 where 1 indicates the most difficult while 5 indicates the easiest. 4) *, **, or *** indicates the significance level at 1%, 0.5% and 0.1%. respectively

Figure 2 reveals details of the programme at the household level, the overall summary statistics for which are in Appendix B2. Apart from the number of labourers, other household characteristics are well-balanced between two groups of households. Furthermore, the reformed village has a greater percentage of households renting out their land, and the mean differences are statistically significant at the 10% level. However, the table also shows that the proportion of households who rent land from others are not significantly different from the two groups of villages.

The average rental price for cultivated land is approximately 50 yuan per mu greater in the reformed village, which means that on average a household in the reformed village receives 150 to 200 yuan per year more than their unreformed counterparts. The average rental price of arable farmland is also much lower than the average rental price of all land types, as shown at the village level. This is possible because the land rental price is closely related to its potential usage and other factors. Land that is more suitable for construction and other industrial purposes could be more valuable than the arable land.

Figure 2: Household-level overview with mean-difference t-test statistics

varname	obs	mean	obs	mean	mean-diff	t
	Non-reformed		Reformed			
Rent-out	3717	0.113	1772	0.139	-0.026*	-2.712
Rent from	3717	0.127	1772	0.104	0.023	2.411
Rent (yuan/mu/year)	3717	278.831	1772	327.950	-49.119***	-4.362
Irrigable Land (Mu)	3717	2.954	1772	2.866	0.088	0.624
Average age of household head and his/her spouse	3717	59.312	1772	59.909	-0.597	-2.080
Gender of household head	3717	0.516	1772	0.491	0.025	1.735
Health status good	3717	0.672	1772	0.644	0.028	2.043
Number of labor	3717	1.989	1772	1.786	0.203***	4.256
Educational level	3717	0.616	1772	0.590	0.027	1.496

1)The educational level is measured on the scale of 1 to 3, where 1 indicates non-educated, 2 indicates received up to high school education, 3 indicates university degree or above; 2)*, ** or *** indicates a significance level at 10%, .5% and .1% respectively

Section VI: Econometric Model and Estimation

Model specification

To measure the effect of the land titling confirmation programme on household's rental decisions and the market rental price, the following regression equation is constructed:

$$y_{vi} = \alpha + \delta * reform_v + X'_{vi}\beta_1 + Z'_v\beta_2 + \varepsilon_{vi},$$

where the y_{vi} stands for the explanatory variables of household i lives in village v. The explained variables include 1) whether the households decided to rent-out their land in the last year (rent-out); 2) whether the household decided to rent land from others (rent-in); 3) the natural log of the rental price of the land if the land were to be rented out (lnrent) next year. X'_{vi} stands for the household-level characteristics and Z'_v stands for the village specific factors.

The key explanatory variable is the dummy variable "reform." For each individual agricultural household, the introduction of the programme could be thought of as an exogenous shock. The balanced village characteristics as shown in Table 1 also verify this idea.

At the household level, the control variables include the average age of the household head and their spouse, the gender of the household head, the highest education level obtained by one of the household member, number of labours in the household (members whose age are above 16 and lower than 55), the self-reported health status of the household head, and the amount of irrigable land (measured by Mu, where 1 Mu $\approx 667\ m^2$) they were assigned to by the collective.

Village characteristics include measures of the infrastructure situation of the village (the questionnaire asks if the village has a bus line), whether the village has large surnames and the land structure of the village. Past experience of land expropriation is also included in the model to control for the property rights environment prior to the introduction of the programme. When investigating the effect of the reforms on the rental price of land, another element controlled for is the percentage of migration to the village as a measure of the development status of the village. Since the economic development status in China varies greatly across different regions, the model also includes regional dummies.

Since the intention is to capture any impact of the programme, this study tries to limit our choice of control variables to fixed characteristics of households and villages, which are unlikely to change after the introduction of the programme.

Estimation strategy

Since the decision to rent-in or rent-out the land are two binary variables, I use the Probit model to measure the effect of the programme: if the household decides to rent out the land or rent land from others, their level of production will be Y_i^1, otherwise the household will produce at Y_i^0.

$$Y_{vi}^1 = \alpha^1 + \delta^1 * reform_{vi} + \mathrm{X}_{vi}{'\beta_1}^1 + Z_{vi}{'\beta_2}^1 + e_{vi}^1$$

$$Y_{vi}^0 = \alpha^0 + \delta^0 * reform_{vi} + \mathrm{X}_{vi}{'\beta_1}^0 + Z_{vi}{'\beta_2}^0 + e_{vi}^0$$

Since I have assumed that the agricultural households' primary goal is to maximise its total level of production, the household will choose between renting out their land or renting land from others when $Y_i^1 - Y_i^0 > 0$, and will not participate in land circulation otherwise.

$$Y_{vi}^1 - Y_{vi}^0 = y_{vi}^* = \alpha + \delta * reform_{vi} + \mathrm{X}_{vi}'\beta_1 + Z_{vi}'\beta_2 + e_{vi}$$

$$\mathrm{P}(y_{vi} = 1) = \Phi(y_{vi}^* > 0) = \Phi(\alpha + \delta * reform_{vi} + \mathrm{X}_{vi}'\beta_1 + Z_{vi}'\beta_2)$$

The idea is that if the property right reform brings down the transaction cost through better information of land and more secure land tenure, participation to market circulation will be at households' best interest, and will be captured by the model through the coefficient of reform.

In the first regression, I only control the individual characteristics that are directly related to the land rental decision; in the second stage I include the village level characteristics, and in

the final regression I include regional controls. The rationale behind the regression is to assume the households in the non-reformed village to be the counterfactual of those that are in the reformed village.

To estimate the effect of programme to the land rental price, I take the natural log of the rental price:

$$\ln(rent) = \alpha + \delta * reform_{vi} + X'_{vi}\beta_1 + Z'_v\beta_2 + \varepsilon_{vi}$$

Since the intention is to capture the effect of the programme on the market price, in the first regression, the only explanatory variable is the reform.

The widely-adopted methods of estimating the influence of property rights to the land asset value was to compare the market price of land, controlling for other land characteristics (Lanjouw and Levy, 2002). Other village-level and regional dummies were added to the second regression in order to pin down effect of regional factors on the market price. Finally, since the rental price is self-reported, household characteristics could also be sources of variation, so I control for those factors in our final regression.

Regression results

Based on the conceptual framework, I first hypothesize the effect of reform as being positive on both rent-in and rent-out decisions. The estimated effect on the rent-out decision, as shown in Table 1, is consistent with our hypothesis: compared to people who live in the non-reformed village, an otherwise averaged household is 3.0% more likely to rent out their land in the reformed area, and the difference in probability is at 1% level of statistical significance.

Table 1

	(1) model 1	(2) AME	(3) model 2	(4) AME	(5) model 3	(6) AME
Reform	0.160***	0.032***	0.135***	0.026***	0.155***	0.030***
	(3.46)	(3.34)	(2.82)	(2.75)	(3.11)	(3.01)
Irrigable land (Mu)	0.001	0.000	0.001	0.000	0.000	0.000
	(0.23)	(0.23)	(0.13)	(0.13)	(0.08)	(0.08)
Edu=2[4]	0.043	0.008	0.023	0.004	0.023	0.004
	(0.81)	(0.81)	(0.42)	(0.42)	(0.41)	(0.41)
Edu=3	0.302***	0.066***	0.298***	0.064***	0.293***	0.063***
	(3.40)	(3.07)	(3.25)	(2.96)	(3.17)	(2.88)
Gender: Male	-0.053	-0.010	-0.045	-0.008	-0.035	-0.007
	(-1.18)	(-1.18)	(-0.98)	(-0.98)	(-0.75)	(-0.75)
Health	0.007	0.001	0.027	0.005	0.002	0.000
	(0.14)	(0.14)	(0.55)	(0.55)	(0.04)	(0.04)
Number of Labour	-0.029*	-0.006*	-0.025	-0.005	-0.030*	-0.006*
	(-1.69)	(-1.69)	(-1.44)	(-1.44)	(-1.69)	(-1.69)
Age	0.004	0.001	0.004	0.001	0.003	0.001
	(1.47)	(1.47)	(1.57)	(1.57)	(1.23)	(1.23)
Village Characteristics	NO	NO	YES	YES	YES	YES
Regional Control	NO	NO	NO	NO	YES	YES
N	5619	5619	5435	5435	5435	5435
Chi2	29.524		69.146		97.751	

The reported results in (2) (4) and (6) are Average Marginal Effect; To correct for heteroskedasticity issue, the reported standard errors are all robust standard errors, Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1

However, the sign of the effect on rent-in decision is opposite to our hypothesis. The reform reduced the probability of the rent-in land from other households by around 1.8% on average. One possible explanation for this is that since our data only contain households with an ageing population head, so when the demand for land rent-increases in the market and pushes up the market price, ageing household heads are less likely and have less incentive to rent-in land from other households.

[4] See Appendix C for variable explanation.

Table 2

	(1) model 1	(2) AME	(3) model 2	(4) AME	(5) model 3	(6) AME
Reform	-0.054	-0.010	-0.092*	-0.017*	-0.105*	-0.019**
	(-1.11)	(-1.12)	(-1.80)	(-1.84)	(-1.94)	(-1.99)
Irrigable land (Mu)	0.009**	0.002**	0.008*	0.001*	0.007	0.001
	(2.19)	(2.19)	(1.89)	(1.89)	(1.63)	(1.63)
Edu=2	-0.008	-0.002	-0.031	-0.006	-0.042	-0.008
	(-0.15)	(-0.15)	(-0.56)	(-0.56)	(-0.74)	(-0.74)
Edu=3	-0.082	-0.015	-0.103	-0.019	-0.131	-0.023
	(-0.86)	(-0.88)	(-1.04)	(-1.08)	(-1.30)	(-1.37)
Gender: Male	0.042	0.008	0.041	0.008	0.036	0.007
	(0.94)	(0.94)	(0.89)	(0.89)	(0.76)	(0.76)
Health	0.052	0.010	0.078	0.014	0.079	0.014
	(1.05)	(1.07)	(1.53)	(1.56)	(1.52)	(1.55)
Number of Labour	0.015	0.003	0.026	0.005	0.044**	0.008**
	(0.88)	(0.88)	(1.47)	(1.47)	(2.36)	(2.36)
Age	-0.015***	-0.003***	-0.014***	-0.003***	-0.012***	-0.002***
	(-5.53)	(-5.52)	(-4.83)	(-4.82)	(-4.13)	(-4.12)
Village Characteristics	NO	NO	YES	YES	YES	YES
Regional Control	NO	NO	NO	NO	YES	YES
N	5619	5619	5436	5436	5436	5436
Chi2	65.967		91.885		140.233	

The reported results in (2) (4) and (6) are Average Marginal Effect; To correct for any heteroskedasticity issues, the reported standard errors are all robust standard errors. Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1

Due to limitations of the data, this study is unable to estimate the effect of the reform on the volume of land circulation. The conceptual framework section explains that because the reform decreases the transaction cost through the reduction of property rights risk, the demand of renting land from others and expanding the scale of production increases. However, it does not make any prediction on who would eventually rent-in the land from the market. When property rights are better specified and protected, one would expect that some larger agricultural households or some investors from other parts of the region would rent-in land from many small households and make intensive investments to improve the efficiency of agricultural production. Hence, the negative average marginal effect of reform on rent-in behaviour does not necessarily imply that the programme has a negative impact on the rural land circulation.

Another way to look at the impact of the reforms on the renting-in decision is to introduce the interactive term of reform and the number of working labourers into the model. Although ageing household heads might be less likely to rent land from others, having a greater number of working-age labourers in the household indicates a greater potential to expand the level of production through renting land from others. The positive sign of the coefficient before the interactive term (See Table 3) also verifies this idea – for households with a greater number

of labourers, the likelihood of renting-in land from others increases with the introduction of the programme.

Table 3

	(1)	(2)	(3)
Reform	-0.148**	-0.214***	-0.230***
	(-2.00)	(-2.79)	(-2.84)
Reform*Number of labour	0.047*	0.060**	0.061**
	(1.67)	(2.12)	(2.10)
Irrigable land (Mu)	0.009**	0.008*	0.006
	(2.11)	(1.79)	(1.56)
Edu=2	-0.009	-0.031	-0.042
	(-0.16)	(-0.56)	(-0.73)
Edu=3	-0.080	-0.099	-0.127
	(-0.83)	(-1.00)	(-1.27)
Gender: Male	0.045	0.044	0.038
	(0.99)	(0.96)	(0.81)
Health: good	0.052	0.078	0.079
	(1.05)	(1.53)	(1.52)
Number of labour	0.002	0.009	0.026
	(0.10)	(0.45)	(1.27)
Age	-0.015***	-0.014***	-0.012***
	(-5.54)	(-4.85)	(-4.14)
Village characteristics	NO	YES	YES
Regional control	NO	NO	YES
N	5619	5436	5436
Chi2	69.035	95.543	143.408

To correct for any heteroskedasticity issues, the reported standard errors are all robust standard errors. Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1

Table 4 shows the effect of the reforms on the land rental price. The rental price in the reformed villages compared to the non-reformed villages increased by 21 ~ 26%. The results are also statistically significant at the 1% level. This implies that the programme effectively improves the land property rights and increases the demand for land circulation.

Table 4

	(1)	(2)	(3)
Reform	0.259***	0.216***	0.214***
	(7.09)	(5.54)	(5.51)
Percentage of migration to the village in the last year		-0.147	-0.093
		(-1.37)	(-0.87)
Irrigable land (Mu)		0.014***	0.013***
		(2.67)	(2.94)
If the village has bus line		0.173***	0.166***
		(4.64)	(4.46)
Land structure and regional control	NO	YES	YES
Household characteristics	NO	NO	YES
N	4511	4324	4285
R-Square	0.010	0.150	0.161

To correct for any heteroskedasticity issues, the reported standard errors are all robust standard errors. Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

In conclusion, most of the findings are consistent with our expectation, except for the effect of programme on rent-in decision. This could be caused by the group of people the survey targeted. The effect of the programme on rental price is, interestingly, very close to the early study of Macours et al. (2011). Despite statistical significance, the results suggest that the programme only has very limited influence on individual rural households.

Limitations

One most obvious threats to the internal validity of the model are the endogeneity issue. Although the author argues that the reform could be thought of as an exogenous shock to each individual household and provide the balanced village level characteristics to support this argument, there could still be unobservable factors associated with both the households' decisions and the reform dummies. For example, villages close to more developed cities might have a greater demand for land circulation hence the governments pick those places as reform regions first. Similar factors might put an upward bias on the effect of the programme.

The missing value issue also raises concerns regarding the model's validity, especially for the assessment of the impact of the programme on the land rental price, where 33.77% of variables are shown to be missing. If explanatory variables are missing at random, the estimation of the impact would still be consistent, but previous research has shown that missing values are often not randomly distributed (Ferber, 1966; Francis and Busch, 1975). Although choosing households' opinions on their next year rent-out price effectively reduces the selection bias, whether the self-reported rental price is missing at random is hard to testify. Appendix B3 shows the pattern of the missing values.

In addition to internal validity, the conclusion of the results might not be general because the CHARLS only surveyed household heads whose age was above 45. Although rural China constitutes mainly of ageing household heads, younger household heads, if they exist, are likely to behave differently.

Besides, the economic implication of institutional reform may take years to be fully realised. Since only cross-sectional data is available, I am unable to track the impact of the reform over time. The long run impact of the programme might be underestimated by the model because institutional changes take time to be fully realized.

Section VII: Conclusion

This paper assesses whether the new wave of the property rights reforms in China have any impact on rural households' rental behaviour. Assuming that agricultural households' primary goals is to maximize their total level of production, I derive the potential impact of the reform is discussed through the lens of reduced transaction costs. Results suggest that the probability of renting-out land increased by 3% because of the reforms but reduces the probability of renting-in land by approximately 1%. Several discussions have been given to explain why the negative impact on renting-in behaviour does not indicate the failure of the programme. Furthermore, our regression also suggests that the reform boosts the market rental price of land by 21~26%. All of these findings are statistically significant at the 1% level and are robust to different control settings.

However, the model faces threats in terms of both internal and external validity. Although the reform is now introduced national-wide, it was implemented in different villages at different times. Therefore, to more precisely capture the impact of the programme, I suggest that further studies using panel data and more sophisticated econometrics model would be an ideal step forward from this research.

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Appendix

Appendix A. Glossary of terms

Land titling confirmation programme "Tu Di Que Quan":

The land titling confirmation programme in this paper only means the confirmation of land using rights. The procedure includes application summation, cadastral survey, further inspection, land registration, and finally the issuance of contract management certification.

Rural Land Circulation "Tu Di Liu Zhuan"

Promoting Rural Land Circulation is one target of property rights reform. Rural land circulation refers to a type of economic activity: the agricultural households transfer the use right of land to other agricultural households through methods such as exchange, leasing, and corporation. This paper focuses on the rental/leasing aspect of the circulation.

Appendix B. Summary Statistics

Appendix B1: Summary Statistics (Village Level)

VarName	Obs	Mean	SD
Reformed Village	275	0.298	0.458
Key Statistics			
Percentage of leased out arable land	273	13.984	19.521
The rental price for land (Yuan per Mu)	266	579.541	2155.402
Demographic Characteristics			
Percentage of Migration to the village	385	0.115	0.514
Percentage of population aged 65 or above	401	0.148	0.103
Percent of Working out population	276	0.247	0.256
Percent of Local Hukou Population	391	0.883	0.289
Percent of Non-agricultural Population	398	0.302	0.487
Developmental Status			
Agricultural Revenue last year	250	52124.469	4.09e+05
Industrial Revenue last year	239	12274.231	88884.391
Bus Line Availability	401	0.651	0.477
Difficulties of Loaning from financial institute	276	2.699	1.245
Social economic status	399	3.835	1.333
Other Village Characteristics			
Land structure of the village	400	1.905	1.041
Past Experience of expropriation	400	1.685	0.465
Large Surname in the village	275	1.193	0.395

1) The social economic status reported here is the interviewers' observation of the community on the scale of 1 to 7, where 1 indicates poor while 7 indicates rich; 2) The land structure is a categorical variable while the score only indicates whether the land structure are significantly different-in two group of villages; 3) Difficulties of loaning from financial institute cores from 1 to 5 where 1 indicates the most difficult while 5 indicates the easiest

Appendix B2: Summary Statistics (Household level)

VarName	Obs	Mean	SD
Key variable of interests			
Rent from	5728	0.113	0.317
Rent-out	5727	0.116	0.320
Rent (yuan/mu/year)	5132	306.292	397.838
Reform	6811	0.301	0.459
Other characteristics			
Irrigable Land (Mu)	5676	2.868	4.845
Educational level	6811	0.615	0.629
Gender of household head (Male)	6755	0.493	0.500
Health status good	6723	0.665	0.472
Number of labour	6758	1.884	1.668
Average age of household head and his/her spouse	6742	60.081	10.396

1)The educational level is measured on the scale of 1 to 3, where 1 indicates non-educated, 2 indicates received up to high school education, 3 indicates university degree or above;

Appendix B3: Missing Value Table

Variable	Missing	Total	Percent Missing
Irrigable	1,135	6,811	16.66
Rent	1,679	6,811	24.65
Rentout	1,084	6,811	15.92
Rentfrom	1,083	6,811	15.90
Gender	56	6,811	0.82
Age	69	6,811	1.01
Health	88	6,811	1.29
Expropriation	32	6,811	0.47
Landstruc	20	6,811	0.29
Largesur	51	6,811	0.75
Bus	0	6,811	0.00
Percentofmi	237	6,811	3.48
Reform	0	6,811	0.00
Edu	0	6,811	0.00
Huadong	0	6,811	0.00
Huanan	0	6,811	0.00
Huazhong	0	6,811	0.00
Huabei	0	6,811	0.00
Xibei	0	6,811	0.00
Xinan	0	6,811	0.00
Dongbei	0	6,811	0.00
Numberoflabour	53	6,811	0.78
lnrent	2300	6,811	33.77

Appendix C: Definition of key variables

Variable name	Definition
Household level	
Reform	=1 if reformed
Rent	Rent (yuan/mu/year)
lnrent	ln(rent)
Rentout	=1 if Rent out
Rentfrom	= 1 if Rent from
Irrigable	Irrigable Land (Mu)
Gender	=1 if male
Age	Average age of household head and his/her spouse
Health	=1 if Health status good
Numberoflabour	The number of working age labour in the family (16⩽age<55)
reform_num	reform*Numberoflabour
Village level	
Expropriation	=1 if the village has past Experience of expropriation
Landstruc	Land structure of the village which includes plain, hill, mountainous region, plateau and basin
Largesur	=1 if there are large surnames in the village (i.e. agricultural households in one village might share the same surname)
Bus	=1 if Bus Line is available
Percentofmi	Percentage of Migration to the village
Edu	The highest level of education obtained by household members =1 if Elementary or less =2 if Up to high school =3 if College or above