Persistence of land reallocations in Chinese villages: The role of village democracy and households' knowledge of policy

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ABSTRACT

Land reallocations have been severely restricted in rural China since 1998. Nevertheless, land continues to be reallocated in some regions. Little is known about the forces behind the persistence of land reallocations. In this paper we argue that village self-governance rules affect the implementation of national laws and regulations, and that the election of village leaders and villagers' knowledge of relevant policies are major forces in the use of village self-governance rules for land reallocations. Estimation results based on primary data collected from 124 villages in four provinces in 2015 and 2016 provide evidence that both village democracy and households' knowledge of the Rural Land Contract Law (RLCL) positively affect the incidence of land reallocations.

1. Introduction

Since the collective farming system was replaced by the household responsibility system (hereafter referred to as HRS), the use right of land in rural China has been granted to individual households while the ownership remains "collective" at the village level. Collective ownership is maintained in the HRS with a primary consideration of equality across all households within the village (Wang et al., 2011). The initial land allocation under this system is primarily egalitarian, based upon either the family size or the number of adult labourers in a household, or both. Land reallocations to preserve equality within villages were carried out in response to demographic changes (Kong and Unger, 2013).

Land reallocations, however, undermine tenure security and households' incentives to invest in agricultural land, and consequently result in lower productivity (Gong, 2018; Ahmed et al., 2002; Prosterman et al., 1996). A high frequency of land reallocations makes households expect that some of their contracted plots may be reallocated in the future and make their perceptions of land tenure insecure (Ren et al., 2019; Broegaard, 2005; Holden and Yohannes, 2002; Kung, 2000). Such perceptions further discourage households' investment in their contracted land, especially in the longer term (Fenske, 2011; Li et al., 1998; Wen, 1995).

The Chinese central government realised that granting land use rights to households for a sufficiently long period of time is important for guaranteeing long-term investment in land (Feng et al., 2014). Since

the second round of land contracting in 1998 (hereafter referred to as 1998 land contracting round), the Chinese central government has completely prohibited land reallocations in villages in response to demographic changes. In 2002, the Rural Land Contract Law (RLCL) mandated that land reallocations were only allowed under special conditions, such as natural disasters or land expropriation, and that formal approval was needed from two-thirds of the villagers or villager representatives as well as authorization by higher-level governments (hereafter referred to as constrained rules of land reallocations). Hence, land reallocations were severely constrained and individual villages were empowered to determine their own arrangement of land reallocations (Zhong et al., 2012; Zhu and Prosterman, 2007; Yao, 2004).

Significant differences have been observed among villages in the implementation of the ban on land reallocations (Ma et al., 2015, 2017; Rao et al., 2017). Ma et al. (2015) found that land had been reallocated at least once since 1998 for 70% of the households in their study area in northeast Jiangxi Province but for only 6% of the households in Minle County in Gansu Province. Rao et al. (2017) found that 26% of the surveyed households in Xinjiang had experienced at least one land reallocation since 1998.

Several studies have identified factors affecting land reallocations before the 1998 land contracting round (e.g. Brandt et al., 2004; Yao, 2004; Kung, 2000; Rozelle and Li, 1998). Most studies consider land reallocations to be a result of competition between "economic efficiency" (e.g. maximization of households' investment incentives; minimization of administration costs) and "ensuring equitable land

distribution" ([Kung and Bai, 2011](); [Rozelle and Li, 1998]()). In other words, villages that place more importance on equitable land distribution than economic efficiency will tend to reallocate land more frequently. To our knowledge, however, little research has been done on the driving factors of the persistence of land reallocations after the 1998 land contracting round.

As individual villages were empowered to decide on their own arrangement of land reallocations, village democracy could play an important role in their decisions of land reallocations. Moreover, as the approval of two-thirds of villagers or villager representatives (hereafter referred to as the majority principle) became a crucial requirement after 1998, households' knowledge of policy might influence villages' decisions on land reallocations as well. It is interesting to investigate the driving factors for the persistence of land reallocations, particularly those related to village empowerment such as village democracy and villagers' knowledge of policy.

The objective of this paper is therefore to investigate the socio-economic factors affecting the persistence of land reallocations in Chinese villages after 1998. Our first contribution is to develop a more comprehensive theoretical framework, taking into account village democracy and households' knowledge of policy. Our second contribution is to conduct an empirical analysis on the factors explaining the persistence of land reallocations after the 1998 land contracting round. For this purpose, data were collected through village and household surveys held in Jiangsu and Jiangxi provinces in 2015 and in Chongqing Municipality and Liaoning Province in 2016. A Probit model is applied to these data to obtain insights into the major determinants of villages' land reallocations.

The paper is organized as follows. Section 2 gives an overview of the land tenure reforms in China and develops the theoretical framework for explaining factors of land reallocations. Section 3 briefly describes the research area and the dataset, and presents the econometric model and variables used in the model. Section 4 deals with the descriptive statistics, discusses the estimation results of the econometric models and presents a robustness check. Conclusions are drawn in Section 5.

2. Land tenure reforms in China and theoretical framework

2.1. Land tenure reforms in China

The transformation from the collective system to the HRS began in 1979 and was essentially completed by the end of 1983. The current land tenure system in China is to a large extent based on the HRS, under which land is owned by village collectives and use rights were allocated to the households in a village for a period of 15 years. Using egalitarian

principles, the size of land assigned to a household was determined by the number of household members and/or labourers ([Qu et al., 1995]()). This led to frequent land reallocations within villages in order to correct for demographic changes that occurred within the 15-year period. Based on a survey covering 215 villages in eight provinces in China, [Brandt et al. (2002)]() found that land was reallocated 1.7 times on average per village from 1982 to 1995.

The second round of land reform (called second round of land contracting) started in 1998. In this round, the state extended the contract period of land use rights from 15 years to 30 years. The 1998 Land Administration Law (LAL) mandated that a written 30-year land use contract should be issued to all farmers to legally protect their land use right and that land reallocations should be limited or completely eliminated ([Deininger and Jin, 2003]()). Land reallocations were further restricted by the Rural Land Contract Law (RLCL) issued in 2002, which specified constrained rules of land reallocations. The 2007 Property Law (PL) further indicated that land use rights should be retained and inherited when the 30-year period had passed. In 2008, the central government further extended the land contracted period from 30 years to an unspecified "long-term" period ([Rao et al., 2017]()). In 2009, the central government started pilots of land registration and certification. The 19th National Congress of the Communist Party of China held in 2017 proposed that farmers' land use right contracts will be extended by another 30 years upon expiration. These series of reforms initiated by the central government (see Table 1 for an overview) aim to improve farmers' land tenure security.

2.2. Impact of village democracy and households' knowledge of policy

According to some researchers ([Ma et al., 2015](); [Piotrowski et al., 2009]()), Chinese laws are often deliberately formulated in an ambiguous way so that their implementation can be adapted to the local environment in different regions. Significant differences exist among regions in the implementation of legal land tenure regulations in rural China, particularly in the implementation of bans on land reallocations ([Ma et al., 2015](), [2017]()). The extent to which bans on land reallocations are implemented at the local level depends on many factors. Below we discuss major factors that drive land reallocations (see also Fig. 1).

Village self-governance is an important channel in the enforcement of legal rules. The Organic Law of the Villager Committees of the People's Republic of China (OLVC) stipulates that village committees should use village self-governance mechanisms to manage issues regarding land contracting. The OLVC specifies that village self-governance should be in accordance with national laws and regulations, but it does not specify how to avoid or how to deal with potential

Table 1
Legal rules on land tenure reform in China.

Policy documents	Main content
No. 1 document (1982)	The central government affirmed the "Household Responsibility System", and implemented it across the country.
No. 1 document (1984)	Land use right should be granted to farmers for at least 15 years.
No. 1 document (1993)	Contract period of farmers' land use rights should be extended by 30 years upon contract expiration.
Land Administration Law (LAL) (1998)	Farmers' land use right should be extended by another 30 years after the first lease period of 15 years. Land reallocations within villages require acceptance by two-thirds of villagers or villagers' representatives and approval by higher-level governments.
Rural Land Contract Law (RLCL) (2002)	Land reallocations are prohibited in general; they are allowed in special cases such as natural disasters or land expropriation, and require approval by two-thirds of the villagers or villagers' representatives and by higher-level governments.
Property Law (PL) (2007)	Land reallocations are only allowed in the cases specified by the 2002 RLCL. Land use rights should be retained and inherited when the 30 years period has passed.
No. 1 document (2009)	Pilots of farmland use right registration should be carried out gradually; the size and spatial location of contracted farmland should be specified in land use rights certificates.
No. 1 document (2010)	Ensure the current land contract is stable for the long term; expand the range of pilots for registration of farmland use rights.
Report on the 19th National Congress of the Communist Party of China (2017)	Farmers' land use rights contracts will be extended by 30 years upon expiration.

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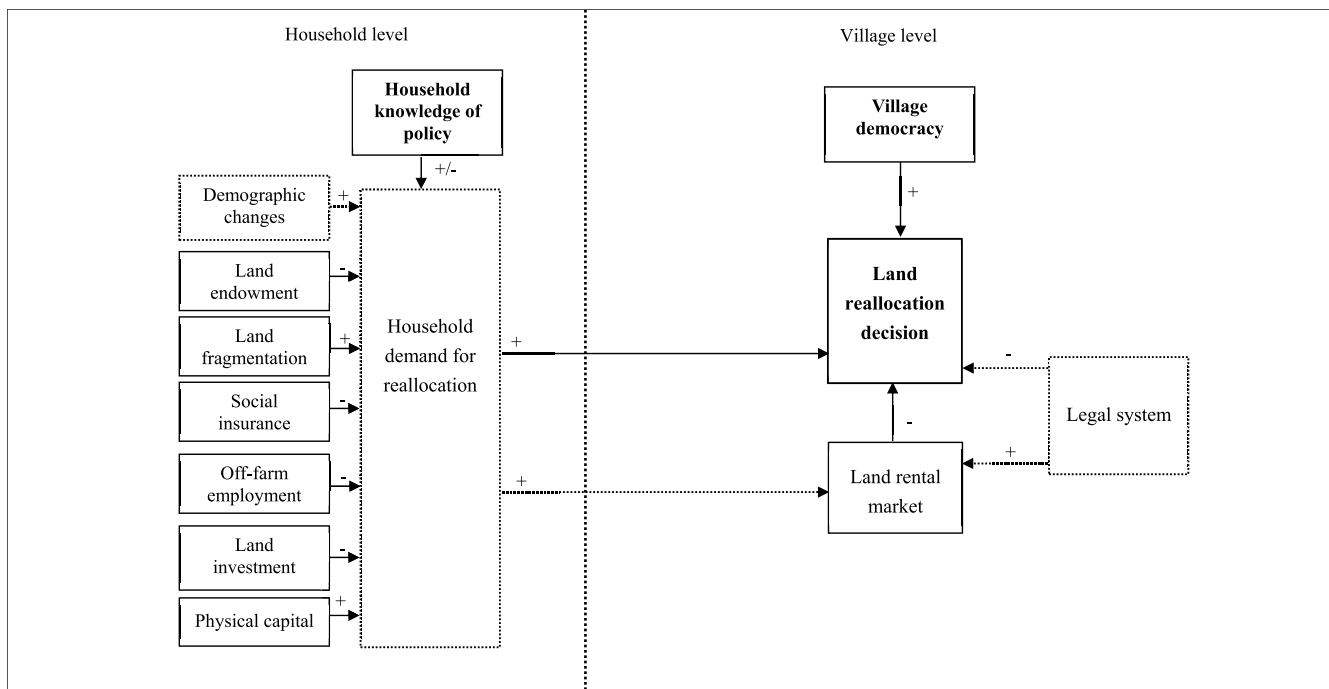

Fig. 1. Conceptual framework of factors driving land reallocations.

inconsistencies between self-governance rules and national laws (Ma et al., 2015). This allows villages to conduct land reallocations based on village self-governance rules even though these reallocations do not comply with existing land laws (Ma et al., 2015).

Whether land is reallocated through village self-governance may depend on the *degree of village democracy*. In villages with democratically elected leaders, land may be more likely to be reallocated through the village self-governance channel than in villages where the leaders are appointed by higher-level government. Village leaders appointed by higher-level governments are more likely to adhere to the formal ban on land reallocations. On the other hand, democratically elected village leaders are generally more accountable to villagers and are therefore more likely to reallocate land when there is a high demand for it. In this case, villages with democratically elected leaders are less likely to conduct land reallocations (Brandt et al., 2004). The impact of the democratic election of village leaders on land reallocations could therefore be positive.

As the majority principle is one of the legal conditions for land reallocations, *households' knowledge of policy* might affect their demand for land reallocations. If the majority of villagers are willing to reallocate land, land reallocations can be organized by an appeal to village self-governance regulations (Ma et al., 2015). Households that are familiar with the RLCL are expected to be aware of the ban on land reallocations and the policy promoting land transfers through land rental markets, but they may also be more aware of the possibility to use a village's self-governance rules for land reallocations (Deininger and Jin, 2009). The impact of knowledge of related laws on land reallocations could therefore be either positive or negative.

2.3. Other factors affecting land reallocations in China

Apart from acting as a production factor, land also provides social security for rural households in China (Brandt et al., 2002). Land reallocations originally served to provide all households equal access to land resources for their livelihoods when *demographic changes* occurred in a village (Brandt et al., 2002). However, when social security improves, it can be expected that demand for such land reallocations falls (Yang, 2012). The social security of rural households depends largely

on the possession of, or access to, land, social insurance and off-farm employment (Ma et al., 2015; Wang et al., 2013). Both land endowment and land fragmentation play important roles in households' demand for land reallocations. *Land endowment* is important for guaranteeing a minimum livelihood to households that lack other resources (Yang, 2012). When the land is relatively abundant in a village, the need to reallocate land is not obvious. Similarly, *land fragmentation* may affect households' demand for land reallocations due to the different level of productivity of different plots (Kung and Bai, 2011). Demand for land reallocations will be lower in villages with less fragmented land.

With the improvement of *social insurance*, farmers will have fewer incentives to realign land resources for the changing demographic structure in a village. Publicly provided social insurance or safety nets in rural China include public health insurance and retirement insurance (Qin and Wang, 2016). The public health insurance, called the New Rural Cooperative Medical Insurance, was introduced in 2003 and covered all rural counties by 2008. It is intended to reimburse mainly catastrophic expenses (Cheng et al., 2015). The retirement insurance, known as New Rural Pension Insurance, was introduced in 320 pilot rural counties in 2009 and covered nearly all counties in 2012 (Cheng et al., 2016). Participants get a pension at age 60, including a non-contributory basic pension and a monthly payment from the individual account. The basic pension varies considerably across counties, with higher payments in relatively developed areas.

If households have access to *off-farm employment*, the contribution of inequality in land endowments to livelihood insecurity will be lower (Ma et al., 2015; Rozelle and Li, 1998; Kung and Liu, 1997). Hence, demand for land reallocations will be less in villages where a large share of the households participates in off-farm employment.

As land could act as a production factor, *investment in the improvements of land quality* may also affect households' demand for land reallocations. When households improve land quality through investment, these households are more likely to resist land reallocations if they are not sufficiently compensated for their investment costs. Hence, land investment may reduce the possibility of land reallocations (Deininger and Jin, 2006; Sjaastad and Bromley, 1997; Besley, 1995).

Physical capital for cultivating land may also affect households' demand for land reallocations (Luo and Li, 2010). Households possessing

machinery might prefer larger and less fragmented land holdings. Hence, they are more likely to support the consolidation of fragmented land holdings through land reallocations. Possession of machinery therefore increases households' demand for land reallocations.

Additionally, the formal enforcement of the *legal system* will reduce the possibility of land reallocations. As discussed in Section 2.1, land reallocations are prohibited unless special conditions prevail. In the latter case, they require formal approval at the village level and by higher-level government. Hence, the legal system has significantly reduced the options for reallocating land within villages.

In addition to the administrative procedures, land can also be reallocated through a market-based mechanism (i.e. the land rental market), which is highly promoted by the *legal system* (Brandt et al., 2017; Carter and Yao, 1993). In rural China, *land rental markets* increasingly serve as a substitute for administrative land reallocations through self-governance rules (Jin and Deininger, 2009). The legal system affects land reallocations both directly and, through the development of land rental markets, indirectly. Empirical evidence shows that land rental markets redistribute land to households with lower endowments and that they are more effective in doing so than administrative land reallocations by village leaders (Deininger and Jin, 2005). Hence, in villages with well-developed land rental markets, the likelihood that land will be reallocated is expected to be low.

Fig. 1 illustrates the conceptual framework of our study. We expect that the degree of village democracy is likely to affect the occurrence of land reallocations. There may be a high demand for reallocations by households when households' knowledge of policy is high or low. On the other hand, there may be a high demand for reallocations by households when demographic changes have occurred in recent years, when land endowment is less abundant, when land is more fragmented, when social insurance is low, when more investments have been made in the land, and when there is a high level of possession of physical capital. Formal enforcement of the legal system will reduce the occurrence of land reallocations directly and through land rental market indirectly. The land rental market may serve as a substitute for land reallocations. "+" or "-" signs indicate the expected effect of a factor. The boxes and arrows with solid lines are tested in the empirical analysis, while those with broken lines are not due to lack of data.

3. Methods

3.1. Study area and data source

To understand the impact of village democracy and households' knowledge of policy, we selected the provinces Jiangsu, Jiangxi, Liaoning and Chongqing as our study areas. They are located in China's four major agro-ecological zones. Fig. 2 shows the locations of the selected provinces. We collected data by conducting both village and household surveys in Jiangsu and Jiangxi in 2015 and in Liaoning and Chongqing in 2016. The collected information covers land tenure, agricultural production, off-farm employment, land transfer and related issues.

Table 2 shows the sample composition. We collected data from 124 villages and 1486 households in total. The sample villages and households were selected through a similar process in each province. We ignored counties with less than 10% of arable land in the total arable land of the city in which a county is located. Four counties in each province were randomly selected from the list of counties arranged in decreasing order of the average grain yield (grain output/mu) in the previous three years, one from each quartile. For each quartile, random values generated by Excel were used for this purpose. Given the selected total number of sample villages and townships (i.e. 32 villages and 16 townships in each province), the number of townships selected in each county depends on the share of its arable land area to the total arable land area in the four selected counties. Within each county, we selected townships by applying the same procedure as used for county selection, using the arable land area of townships as the criterion. Two villages were then randomly selected in each township. Ten to fifteen households were randomly selected in each village.

3.2. Model specification

Several factors may affect the occurrence of land reallocations, as illustrated in Fig. 1. We do not include the legal system among the explanatory variables, because it is the same for all villages. We do not include demographic changes either, because our survey only covered the demographic situation at the time of the survey. The demand for
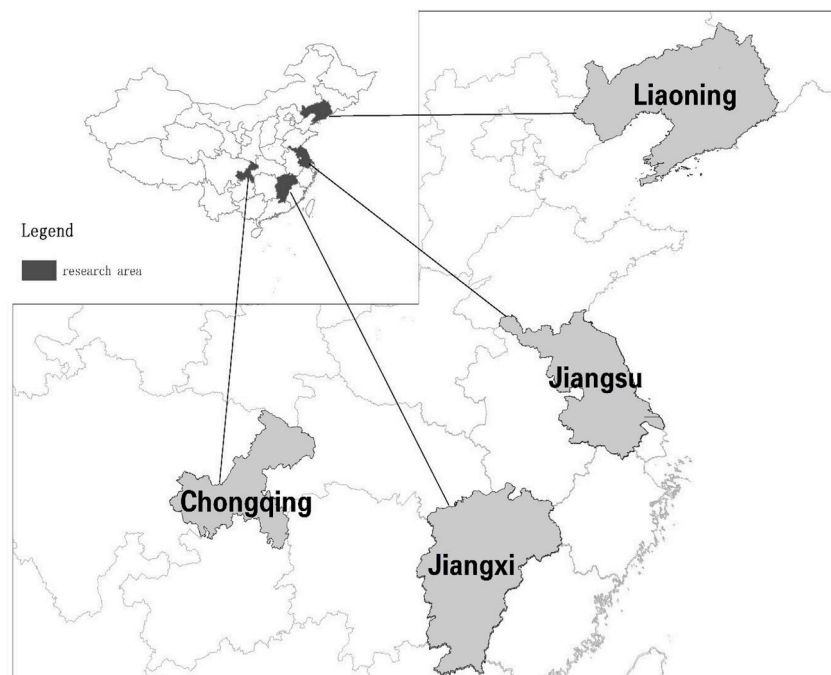

Fig. 2. Study area location.
Data source: National Catalogue Service for Geographic Information (2017).

Table 2
Sample sizes of villages and households and sampled counties by province.

	Jiangsu	Liaoning	Chongqing	Jiangxi	Total
Number of villages	28[a]	32	32	32	124
Number of households	298	416	376	396	1486
Sampled counties	Zhangjiagang	Zhangwu Xinmin	Jiangjin Banan	Anyi Gaoan	
	Jiangdu	Zahuanghe	Wanzhou	Yujiang	
	Dongtai	Fengcheng	Wulong	Shangrao	
	Jinhu				

[a] We initially selected 32 villages in Jiangsu but we did the survey only in 28 villages, because the other four villages were mainly engaged in agri-tourism rather than conventional agriculture.

land reallocations by households is the underlying mechanism, which is not included among independent variables. Thus, we specify the following model to analyse which factors influence land reallocations at the village level:

$$R_i = \alpha_0 + \alpha_1 D_i + \alpha_2 K_i + \alpha_3 E_i + \alpha_4 F_i + \alpha_5 S_i + \alpha_6 O_i + \alpha_7 I_i + \alpha_8 P_i + \alpha_9 L_i$$
$$+ \alpha_{10} G_i + \varepsilon_i \tag{1}$$

where

R_i denotes the land reallocation choice of village i. D_i denotes village democracy of village i. K_i represents households' knowledge of policy. E_i, F_i, S_i, and O_i represent land endowment, land fragmentation, social insurance and off-farm employment of village i respectively. I_i denotes investment in improving land quality in village i. P_i represents the physical capital of village i. L_i indicates the degree of land rental market development in village i. G_i represents regional characteristics of village i. α are unknown coefficients; and ε_i are residuals.

3.3. Definition of variables

Table 3 presents the definitions of the variables used in the model. The dependent variable takes the value 1 if the village reallocated land at least once after the 1998 land contracting round, and 0 otherwise. Village democracy (D) is indicated by the occurrence of the democratic election of the villager leader. We include two variables for households' knowledge of policy (K), i.e., households disagreeing with bans on land reallocations, and familiarity with the RLCL. As the majority principle is a prerequisite condition for land reallocations, a larger share of households disagreeing with bans on land reallocations does not necessarily result in land reallocations. However, if more than two-thirds of households disagree with bans on land reallocations, the village is more likely to decide to reallocate land. Therefore, we use a dummy variable, which takes the value 1 if more than two-thirds of surveyed households in a village disagree with the policy that farmland should not be reallocated within 30 years, and the value 0 otherwise. As discussed in 2.2, the impact of knowledge of the RLCL could be either

Table 3
Variables in the empirical model of land reallocations at village level.

Variable	Definition	Source
Dependent variable		
Land reallocations	= 1 if the village reallocated farmland at least once after the 1998 land contracting round[b], = 0 otherwise	Village surveys
Independent variables		
Village democracy (*D*)		
Democratic election of village leader	= 1 if the village leader is elected by villagers, = 0 otherwise	Village surveys
Households' knowledge of policy (*K*)		
Households disagree with bans on land reallocations	= 1 if more than two-thirds of surveyed households disagree with bans on land reallocations, = 0 otherwise	Household surveys
Households familiarity with RLCL	Share of surveyed households knowing RLCL in the village	Household surveys
Land endowment (*E*)		
Land endowment per capita	Per capita land endowment of the village (mu/capita)	Village surveys
Land fragmentation (*F*)		
Number of contracted land plots	Average number of contracted land plots of surveyed households	Household surveys
Social insurance (*S*)		
Income per capita[a]	Average income per capita (yuan)	Village surveys
Off-farm employment (*O*)		
Off-farm employment ratio[a]	Share of village labour force involved in off-farm employment	Village surveys
Ratio of households with non-agricultural skill	Share of surveyed households in the village having at least one member with training for a non-agricultural occupation	Household surveys
Land investment (*I*)		
Investments in the improvement of land quality[a]	Share of surveyed households who invested in improving land quality through applying organic fertilizers or planting green manure	Household surveys
Physical capital (*P*)		
Number of machines per unit land	Average number of machines per unit land (mu) of surveyed households in the village	Household surveys
Land rental market (*L*)		
Ratio of land transfer[a]	Share of transferred contracted farmland in the total farmland	Village surveys
Regional characteristics (*G*)		
Jiangsu	= 1 if the village is located in Jiangsu province, = 0 otherwise	Village surveys
Liaoning	= 1 if the village is located in Liaoning province, = 0 otherwise	Village surveys
Chongqing	= 1 if the village is located in Chongqing municipality, = 0 otherwise	Village surveys

[a] Variables are measured as the average value of the other sampled villages within the same county to minimize the potential endogeneity bias (hereafter the same).

[b] Land reallocations in our sample are mainly periodical land reallocations (e.g. every three years) correcting for demographic changes and one-time land reallocations after land expropriation.

positive or negative as households might be aware of different specific aspects of RLCL. Unfortunately, we do not have detailed data on household knowledge of specific aspects of the RLCL, so we can only test the overall impact of knowledge of the RLCL. Thus households' familiarity with the RLCL is measured by the ratio of surveyed households in a village that had heard of the RLCL.

Land endowment (*E*) is measured by the average farmland area per capita in a village, whereas land fragmentation (*F*) is measured by the average number of contracted land plots of surveyed households in a village. Social insurance, i.e. public health insurance and retirement insurance, may vary due to different levels of economic development. As we do not have data on the level of social insurance in the village, we include average village income per capita as a proxy for social insurance (*S*) in the model. Off-farm employment could be measured by either share of off-farm labour (e.g. Yao, 2004; Scott and Li et al., 1998) or share of income from off-farm sources (e.g. Kung, 2000). Villages with a large share of labourers involved in off-farm employment are likely to have a lower share of villagers demanding land reallocations. This may not necessarily be true for villages with large shares of incomes earned outside agriculture, namely in cases where some villagers were earning disproportionately large off-farm incomes. We therefore use share of the village labour force working off-farm to measure off-farm employment (*O*). To reflect the medium- to long-term access to off-farm employment, the share of households in the village having at least one family member with training for non-agricultural occupations is included.

Investment in land quality (*I*) is measured by the share of surveyed households in the village applying organic fertilizers or planting green manure. Other fixed investments in land, such as terracing, irrigation and drainage, are not included in the model, because these fixed investments are rarely made by Chinese households (Jacoby et al., 2002). Physical capital (*P*) is measured by the average number of machines per unit contracted land of surveyed households in a village. The development of the land rental market (*L*) is measured by the ratio of land transfer, which is the ratio of transferred farmland to the total area of

farmland of the village. It is derived from village leaders' responses to the question "what share of the farmland in the village has been transferred?". Finally, three dummy variables (*G*) are included to control for unobserved factors, such as enforcement by province-level governments, which may differ across the four provinces in our sample.

It should be noted that income per capita may depend on land investment in a village and hence on the land tenure insecurity arising from land reallocations. Likewise, development of the off-farm labour market, development of the land rental market, and investment in soil quality improvements may to a certain degree be affected by land reallocations (Ma et al., 2016; Xu et al., 2014; Deininger and Feder, 2001; Jacoby et al., 2002). Following Ma et al. (2017) and Mullan et al. (2011), we use the average value of these variables (i.e., income per capita, off-farm employment ratio, investments in the improvement of land quality and ratio of land transfer) of the other sampled villages in the same county as proxy variables to minimize the potential endogeneity bias.

4. Results and discussion

4.1. Descriptive statistics

Table 4 shows the descriptive statistics of the dependent and independent variables. We observe that in our sample, 33% of the villages reallocated land after the 1998 land contracting round. There are large differences among the four provinces. In Jiangxi 66% of the sampled villages reallocated land, whereas this share was just 9% in Chongqing.

In 77% of the villages the leader was elected by the villagers. There are 14 villages (about 11% of the surveyed villages) with more than two-thirds of the households disagreeing with bans on land reallocations. On average, 56% of the surveyed households had heard about the RLCL.

The mean land endowment per capita is 2.26 mu. It ranges from 0.14 mu to 10.6 mu for the villages in our sample. Notably, the average farm size of households in the sample villages for Liaoning province (4.74 mu) is much larger than for the other three provinces (1.53, 1.48

Table 4
Descriptive statistics of variables included in the model.

Variable	Mean					Std. Dev.[a]	Min[a]	Max[a]
	Jiangsu	Liaoning	Chongqing	Jiangxi	Average			
Dependent variable								
Land reallocations	0.29	0.28	0.09	0.66	0.33	0.47	0	1
Independent variables								
Village democracy								
Democratic election of village leader	0.61	0.72	0.91	0.81	0.77	0.43	0	1
Households' knowledge of policy								
Households disagree with bans on land reallocations	0.14	0	0	0.31	0.11	0.32	0	1
Households' familiarity with RLCL	0.70	0.61	0.51	0.42	0.56	0.22	0.09	1
Land endowment								
Land endowment per capita (mu/capita)	1.53	4.74	1.48	1.18	2.26	2.11	0.14	10.63
Land fragmentation								
Number of contracted land plots	3.04	5.65	13.85	8.42	7.89	4.95	1.3	20.7
Social insurance								
Income per capita	18,006	11,221	8241	6731	10,826	6625	1400	30,000
Off-farm employment								
Off-farm employment ratio	0.60	0.25	0.52	0.57	0.48	0.27	0	1
Ratio of households with non-agricultural skills	0.20	0.11	0.11	0.08	0.13	0.11	0	0.5
Land investment								
Investments in the improvement of land quality	0.32	0.43	0.77	0.29	0.45	0.29	0	1
Physical capital								
Number of machines per unit land	0.01	0.00	0.01	0.04	0.02	0.09	0	1
Land rental market								
Ratio of land transfer	0.35	0.09	0.23	0.20	0.21	0.24	0	1
Regional characteristics								
Jiangsu						0.23	0.42	0	1
Liaoning						0.26	0.44	0	1
Chongqing						0.26	0.44	0	1

Source: Village-level surveys and household-level surveys.

[a] Values of "Std. Dev.", "Min" and "Max" refer to the whole sample of 124 villages.

and 1.18 mu respectively). The average number of contracted plots per household is 7.89, ranging from 1.3 to 20.7 between villages. A large difference can be observed among the four provinces. The average number of contracted plots per household is 13.85 in Chongqing, while it is only 3.04 in Jiangsu.

The mean value of income per capita is 10,826 yuan, which is almost equal to the national average per capita rural household income in 2015 (10,772 yuan) (NBS, 2016). The income per capita of sampled villages in Jiangsu province (18,006 yuan) is much higher than the national average.

The share of the village labour force working off-farm equals 48%. It shows a large variation over the villages in the sample. There is one village in Jiangxi with no labourers engaged in off-farm employment, while all labourers participate in off-farm employment in two villages in Jiangsu and one village in Jiangxi. The share of surveyed households having at least one member with training for non-agricultural occupations is only 0.13.

As much as 45% of the surveyed households invested in improving land quality in the survey year. For the villages in Chongqing, this share was as high as 77%. The average number of machines per mu of contracted land equals 0.02. There are 64 villages in the sample that do not possess any machinery.

The ratio of transferred contracted land is 21% on average. This is lower than the national average of transferred land (33%) in 2015 (MOA, 2016). There is one village in Jiangsu in our sample where all the land has been transferred.

The villages in the sample are almost equally distributed over the four provinces: 23% of the villages are located in Jiangsu, 26% in Liaoning, 26% in Chongqing, and 25% in Jiangxi.

4.2. Factors influencing decisions on land reallocations in the villages

A Probit model was used to estimate equation (1). The regression results are shown in Table 5. The most notable finding is that village democracy and households' knowledge of policy encourages land reallocations. We find that villages with elected leaders are more likely to have experienced land reallocations. This finding contradicts the conclusion of Brandt et al. (2004) that the democratic election of village leaders leads to fewer land reallocations between 1982 and 1995. Our outcome provides supportive evidence of the crucial positive role played by village democracy in reallocating land after the 1998 land contracting round in China. We also find that villages with more households that have heard of the RLCL are more likely to conduct land reallocations after the 1998 land contracting round. This finding suggests that households that have heard of the RLCL might positively affect land reallocations through improving households' awareness of the possibility of reallocating land through self-governance rules.

We further find that per capita land endowment in a village does not significantly affect the occurrence of land reallocations. A similar result was found by Kung (2000) for 80 villages in four Chinese provinces, i.e. Zhejiang, Henan, Jilin and Jiangxi. Neither do we find a significant impact on the occurrence of land reallocations of income per capita, number of contracted plots and physical capital. Several other factors that we expect to affect the demand for land reallocations (see Fig. 1), however, do seem to play a significant role in land reallocations.

With regard to off-farm income sources, it is not the current level of off-farm employment that affects the demand for land reallocations, but the medium- to long-term access to off-farm employment as proxied by the possession of non-agricultural skills. As expected, the latter variable is found to have a significant negative impact (at 10% testing level) on the occurrence of land reallocations. This is consistent with the finding in Kung (2000) that the share of income from off-farm sources has a negative effect on land reallocations.

As expected, investment in land quality improvements has a significant negative impact (at 10% testing level) on land reallocations. This supports the proposition that land investment reduces the

Table 5
Regression results for land reallocations, Probit model[a].

Independent Variables	Coef. [b]	Robust Std. Err.	VIF[c]
Village democracy			
Democratic election of village leader	0.74**	0.34	1.21
Households' knowledge of policy			
Households disagree with bans on land reallocations	0.89	0.56	1.50
Households familiarity with RLCL	2.59***	0.75	1.58
Land endowment			
Ln(Land endowment per capita)	0.70	0.53	3.32
Land fragmentation			
Number of contracted land plots	0.01	0.07	3.31
Social insurance			
Ln(Income per capita)	0.24	0.45	4.77
Off-farm employment			
Off-farm employment ratio	2.51	1.67	4.77
Ratio of households with non-agricultural skills	−2.39*	1.43	1.45
Land investment			
Investment in the improvement of land quality	−3.70*	1.94	10.30
Physical capital			
Number of machines per unit land	2.12	1.88	1.09
Land rental market			
Ratio of land transfer	−4.00**	1.96	4.42
Regional characteristics			
Jiangsu	−1.07	0.93	8.18
Liaoning	−1.13	0.75	7.98
Chongqing	−0.19	1.03	11.57
Constant	−3.59	3.66	–
Observations	124		–
Pseudo-R[b]	0.31		–
Log likelihood	−54.17		–

[a] The Pearson χ2 statistic is 109.1 (P = 0.4795), which suggests we cannot reject the model.

[b] * 10% significance level; ** 5% significance level; *** 1% significance level.

[c] To test the magnitude of multicollinearity between independent variables, we presented the Variance Inflation Factors (VIF) of all independent variables. The mean VIF is 4.61, while two variables have VIF values that are slightly higher than 10. But the VIFs of the explanatory variables on our focus (e.g. village democracy and households' knowledge of relevant policies) are between 1.2 and 1.6. In other words, the main conclusions that we draw from the empirical analysis are not affected by potential interactions between some of the other explanatory variables.

likelihood of land reallocations and improves tenure security, which is consistent with the findings from the study of Brasselle et al. (2002) for Burkina Faso.

Development of the land rental market is found to have a significant negative effect on land reallocations. This finding re-confirms the substitution relationship between land transfers and land reallocations found by Deininger and Jin (2005) for three other Chinese provinces, i.e. Guizhou, Hunan and Yunnan.

The estimated coefficients for the provincial dummies do not significantly differ from zero. In other words, the large differences in the frequency of land reallocations between Jiangxi Province on the one hand and Jiangsu, Liaoning and Chongqing on the other hand almost completely disappear when differences between these provinces in the values of the explanatory variables are taken into account.

4.3. Robustness check

To examine the robustness of our results we also applied a linear probability model. The results presented in Table A.1 show some minor differences. First, the dummy variable indicating that more than two-thirds of the surveyed households disagree with bans on land reallocations becomes significant, while it was insignificant (with a P-value of 0.110) in the Probit model. Second, the land investment and land rental market variables no longer have statistically significant

effects in the linear probability model (with P-values of 0.140 and 0.108, respectively). We employed the Akaike information criterion (AIC) and Bayesian information criterion (BIC) to compare the goodness of fit between the Probit model and the linear probability model (Table A.2). Both criteria suggest that the Probit model fits better. The main conclusions that we draw from our analysis, however, do not depend on choice between these models.

5. Conclusions

This study examines factors driving land reallocations as a source of land tenure insecurity. Based on data collected from village and household surveys in Jiangsu and Jiangxi in 2015 and Liaoning and Chongqing in 2016, we find that the democratic election of the village leader and households' knowledge about the Rural Land Contract Law (RLCL) encourage land reallocations, while investment in improvement of land quality, stability of off-farm employment and development of the land rental market reduce the occurrence of land reallocations.

Some important implications for policy-making can be drawn from our results. *Firstly*, households' knowledge of the RLCL and the democratic election of villager leaders positively affect the likelihood of land reallocations. A possible explanation of these findings is that, although the RLCL prohibits land reallocations in general, households that have some knowledge of the law are in particular more aware of the possibility of reallocating land through self-governance rules than the policy of restricting land reallocations and promoting land transfers through land rental markets. This points to the need for improved information dissemination. A better understanding of national laws and regulations by households can improve their acceptance of bans on land reallocations and weaken their demand for land reallocations.

Secondly, bans on land reallocations may lead to inequity across rural families. The emerging land rental and labour markets partly reduce this problem through the substitutional effect of land renting and the social security provided by off-farm employment. Well-functioning land rental and labour markets encourage division of labour. Families with higher agricultural productivity can gain access to additional land and thereby increase their operational farm size. Others, who participate in off-farm employment, can rent out their land and find employment in the manufacturing or service sectors in surrounding cities.

Stimulating the development of land rental and labour markets is therefore expected to decrease the occurrence of land reallocations, and contribute to increased farm incomes and lower overall inequality.

Thirdly, investments in improving land quality play an important role in protecting land use rights. Villages where households make more investment in improving land quality are less likely to reallocate land, because this investment will decrease households' willingness to reallocate land. Measures to stimulate households to invest in improving land quality can therefore reduce land reallocations in villages and thereby contribute to improved land tenure security.

A number of limitations of our study need to be pointed out. The empirical analysis is based on cross-sectional data, implying that we could not include information about demographic changes and land investments that were made in the periods before land reallocations took place. Moreover, only rough proxies were used as indicators of the stability of off-farm employment and social security. Panel data sets with more accurate off-farm employment and social security indicators should preferably be used in future studies to test the robustness of our main conclusions. Additionally, the focus of our study is on the impact of village democracy and households' knowledge of relevant policies on the persistence of land reallocations. Other factors, like issues of fairness, commitment and tradition, might also play a role, but the surveys that we used for our study did not include questions on those aspects. Researchers with a background in other social sciences would be better qualified to perform this.

Acknowledgements

Appendix

Table A.1
Regression results using linear probability model

Independent Variables	Coef. [a]	Robust Std. Err.
Village democracy		
Democratic election of village leader	0.18**	0.08
Households' knowledge of policy		
Households disagree with bans on land reallocations	0.26*	0.15
Households familiarity with RLCL	0.56***	0.20
Land endowment		
Ln(Land endowment per capita)	0.18	0.13
Land fragmentation		
Number of contracted land plots	0.001	0.02
Social insurance		
Ln(Income per capita)	0.10	0.14
Off-farm employment		
Off-farm employment ratio	0.68	0.45
Ratio of households with non-agricultural skill	−0.70*	0.41
Land investment		
Investment in the improvement of land quality	−0.87	0.59
Physical capital		
Number of machines per unit land	0.34**	0.16
Land rental market		
Ratio of land transfer	−0.84	0.52
Regional characteristics		

Table A.1 (*continued*)

Independent Variables	Coef. [a]	Robust Std. Err.
Jiangsu	−0.36	0.30
Liaoning	−0.32	0.23
Chongqing	−0.11	0.32
Constant	−0.73	1.21
Observations	124	
Pseudo-R^2	0.34	

[a] * 10% significance level; ** 5% significance level; *** 1% significance level.

Table A.2
AIC and BIC of Probit and OLS model

	AIC	BIC
Probit model	138.35	180.65
Linear probability model	142.70	185.00

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