



Forced off the farm? Farmers' labor allocation response to land requisition in China

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ABSTRACT

Land requisition has been an important way for local Chinese governments to generate revenue and promote urbanization, but little is known how the land-losing farmers cope. This study investigates the impact of land requisition on farmers' off-farm labor participation. We provide evidence that rural-urban migration is one way that land-losing farmers now adapt to land requisition. Using data from the China Household Finance Survey, we first show that village characteristics, not household characteristics, are the key determining factors for how likely a household is to lose land. With a traditional difference-in-differences (DD) model and a DD model with individual fixed effects, we show that land loss due to government requisition has a significant migration effect in the total sample: it increases individual migration rates by 4.5–6.8 percentage points. Land requisition has no impact on local off-farm engagement. These findings are robust to using different samples, to correction for sample attrition, and to a falsification test. We also find that the migration effect is experienced in particular by younger and older farmers, by women, and by the better educated. From a policy perspective, the labor allocation response to land requisition identified in this paper suggests that providing job training and social protection to land-losing farmers, and facilitating their migration to cities, could help them to cope with the experience of land loss.

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1. Introduction

One of the most fundamental functions of government is the right to direct land-use practices in order to achieve certain development and social objectives. Legally termed “*eminent domain*”, the use of government power to take land can be necessary to acquire certain sites needed for desired public purposes that otherwise might be blocked by property owners.¹ In principle, the protection of the interests of both those whose land is taken and of those taking the land is important. In practice, the exercise of such government power can be very controversial. Perhaps no other country today experiences this contentious issue more than China. The amount of agricultural land requisitioned by Chinese local governments for urban and industrial purposes has increased substan-

tially in recent years.² The associated problems — unauthorized land seizure, forced eviction, inadequate compensation, and corruption — have made “*land issues*” a source of social discontent, topping the list of major agrarian matters that concern the public (Kung, Xu, & Zhou, 2013; Lin, 2009).

As the Chinese economy transitions out of agriculture, the migration of individuals or households from rural areas to cities is generally believed to be voluntary: such migration allows people to seek higher wages while enhancing their ability to cope with shocks to farm income (Giles, 2006).³ However, the movement out of rural areas often occurs incrementally at the household level, with only selected family members migrating while others stay behind. For farmers who stay behind in rural villages, farming remains an important production activity (de Brauw, Li, Liu, Rozelle, & Zhang, 2008; Mu & Van de Walle, 2011). Farming is also

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¹ For a general discussion on the public direction of land use, see Chapter 18 in Barlowe (1985).

² During 2004–2007, 0.72 million hectares of cultivated land were requisitioned for construction purposes in China. During 2012–2015 the number was 0.84 million hectares (Ministry of Land Resource 2004, 2005, 2006, 2007, 2012, 2013, 2014, and 2015).

³ As a form of off-farm employment, migrant work can also be an *ex post* labor response to income shocks in developing countries (Kochar, 1999; Rose, 2001).

a major source of income for the rural elderly, who due to their limited social security, stop working only when they are physically incapacitated (Cai, Giles, O'Keefe, & Wang, 2012; Benjamin, Brandt, & Fan, 2003; Pang, de Brauw, & Rozelle, 2004). When farmers are under-compensated for their lost land, a major productive asset and an important safety net, they are forced to make costly adjustments. This paper examines how farmers use the labor market to cope with land loss, specifically analyzing the impact of land requisition on their labor allocation to the non-farm sector. To our knowledge, this is one of the first studies to provide empirical evidence on how Chinese farmers cope with land loss due to requisitions.

The emerging body of literature on land requisition in China has focused mainly on its institutional foundations and processes. Across most of China, the competition for land between agricultural and non-agricultural sectors has intensified in recent decades because of the accelerated urbanization and industrialization (Lin, 2009). Land sales contribute substantially to local revenue, so local governments – as the constitutional owners of the land – have every incentive to engage in land requisition and land development (Kung et al., 2013; Lin, 2009). The evidence shows that local officials who are eventually promoted had maximized land revenue during their tenure, supporting the assertion that career incentives also fuel the observed increase in land requisition (Kung & Chen, 2016). While all of these studies raise concerns about farmers' welfare in this process, there is a relative paucity of work on how land requisition affects farmers and how they cope. Our study contributes new evidence on this front.

This paper is also closely related to the literature on land rights. Secure property rights in general, and land rights in particular, are among the most instrumental institutional arrangements that are believed to be conducive to economic development (e.g. North, 1990; Feder & Feeny, 1991).⁴ One theoretical argument about how property rights improve efficiencies in resource allocation asserts that well-defined rights can reduce the need for and the cost of property protection (Besley & Ghatak, 2009b). Evidence from multiple countries supports the argument that secure property rights can encourage people to engage in labor market activities, including as migrants (de Brauw & Mueller, 2012; Field, 2007; Valsecchi, 2014). China is no exception – land tenure insecurity, reflected by land reallocation among farming households by village cadres in the 1990s and early 2000s, has been associated with decreased participation in the labor market outside of the village (de la Rupelle, Deng, Li, & Vendryes, 2009; Giles & Mu, 2018; Mullan, Grosjean, & Kontoleon, 2011).

Even though the aforementioned studies have shown that forfeiting out-migration opportunities to remain as a present resident has been a strategy adopted by farmers in countries with weak property rights to guard against land loss, it's important to recognize that individual land rights cannot always be guarded by land users or owners. When the state uses its eminent domain power to expropriate land for claimed public interests, farmers often have no option but to surrender their land rights to the state, with or without proper compensations. For example, when infrastructure building by the states entails land expropriations, farmers are often forced to leave their land and have to bear costly readjustment burdens. A study of the dam and hydro-electric power plant constructions in Turkey notes that multiple such projects have forced many villagers to search for work in the metropolises of the country and whether those villagers man-

age to restore their livelihood after reallocation is largely unknown due to the lack of related assessments (Moran, 2004). The Diamer Bhasha Dam construction in Pakistan also raises concerns about the employability of the affected farmers outside of agriculture (Sabir, Torre, & Magsi, 2017). More recently, land tenure security in rural China has been increasingly threatened by land requisition. By focusing specifically on land requisition, this paper highlights that the relation between the land rights and off-farm labor participation may depend on how the rights are violated. When the infringement of the rights can be guarded against by an ex-ante reduction of engagement in off-farm work, strengthened property rights would likely increase off-farm activities. However, when the rights cannot be protected by the actions of individual farmers, increased out-migration is likely to be the affected farmers' response to land loss, hence a symbol of insecure land rights.

Our review of the underlying legal and administrative institutions governing the land requisition process suggests that decisions are made by county-level (sometimes township-level) governments or above. These decisions are driven mostly by the urbanization and industrial development plans of the locality, as well as by the fiscal motivations and/or career incentives of local officials. Our data show that, within a village, the observed characteristics of households that have been expropriated are no different from those that have not. Using data from the China Household Finance Survey, we begin our empirical analysis with a standard difference-in-differences (DD) model comparing individuals within the same village from land-losing households to those whose households did not lose land. We then use the panel version of the DD estimator and control for individual fixed effects to estimate the effect of land loss. We find a significant migration effect in the total sample: land loss due to government requisition increases individual migration rate by 4.5 to 6.8 percentage points. These findings are robust to using different samples, to correction for sample attrition, and to a falsification test. We also find that the migration effect is experienced most by younger and older farmers, by women, and by the better educated.

The remainder of the paper is organized as follows: Section 2 provides a review of the institutions related to land rights and land requisition in China. Section 3 presents a conceptual framework that links farmers' decisions about labor allocation to their land-holdings. Section 4 includes a discussion of the data and a summary of statistics, followed by an outline of our empirical approach. Section 5 reports the results, and Section 6 offers some concluding remarks.

2. Background

All land in China is the constitutional property of either the state or the rural collectives – the state owns land in urban areas while the collectives⁵ own agricultural land and homesteads in the suburban and rural areas.⁶

⁵ According to the Organic Law of Village Committees, administrative village committees have the authority to administer the affairs concerning the land and other property owned collectively by villagers. The Land Administration Law (Article 10) stipulates that, based on ownership, rural land can be managed by the collective economic organizations of the village, the villagers' committees, or the collective economic organization of the township. This is consistent with a nation-wide survey that found that the administrative village, the small group, and the township government can all be regarded as rural collectives with land ownership rights (Cai, 2003). The ambiguity concerning collective land ownership is believed to be "deliberate", allowing the government some leeway in reacting to social developments (Ho, 2001).

⁶ Land ownership is stipulated in Article 8 of the Constitution of the People's Republic of China, amended in 1998, and in Article 10 of the Constitution, amended in 2004.

⁴ Though the specific mechanisms through which property rights affect economic activity may depend on context, and on the existence of complementary conditions (Besley & Ghatak, 2009a; Katz & Owen, 2009), many empirical studies from different countries support the view that secure land rights enhance investment (Besley, 1995; Goldstein & Udry, 2008; Bandiera, 2007; Jacoby, Li, & Rozelle, 2002; Sánchez, López-uribe, & Fazio, 2010).

2.1. Rural land tenure and the institutions of land requisition

Without actual land ownership, natural persons, legal persons, and for-profit organizations in China only have land use rights for a fixed period of time. For example, under contractual arrangements with their village, rural individual households have 30-year land use rights.⁷ Because individual land use rights (contractual and operation rights) are distinct from and independent of land ownership by the collectives and the state, this legal framework has been succinctly described as a “dual land tenure system” (Khantachavana, Turvey, Kong, & Xia, 2013; World Bank and Development Research Center of the State Council, The People's Republic of China, 2014). The individual right to operate land can be legally transferred, as stipulated and protected by laws governing land rights. With farmers leaving land for job opportunities in cities, as of 2016 roughly 1/3 of the contracted land has been rented to a third party to operate (Ministry of Agriculture, 2017). In the government's effort to regulate the land rental market, there has been a recent emphasis on the separation of “land operation rights” from “land contractual rights” and “land ownership rights”, as reflected in the “three land rights separation system” (*tudi sanquan fen zhi*).⁸ The system is believed to facilitate land transfers and efficient scale farming (Xu et al., 2018). This new rural tenure system carries an explicit recognition of the rights of a third party but not fundamentally different from the dual land tenure system. As pointed out in Brandt, Whiting, Zhang, and Zhang (2017), land transfers between farmers and a third party are still often not voluntary but mediated or organized by village collectives or local governments. Therefore the dominant role of non-market mechanisms continues to define the land rights regime in rural China.

Under the dual land tenure system, land in China is divided into three types of use: “agricultural land”, “construction land”, and “unutilized land”. Any organizations or individuals needing land for construction purposes (including the construction of buildings, mining, transportation, water-conservancy facilities, and buildings for tourist or military use) must apply for the usage rights of land owned by the state.⁹ Rural collectives, though designated as owners of rural land, do not have the right to convert land for non-agricultural usage by directly selling or leasing land to non-state agencies. In this legal framework, land development in rural or suburban areas must proceed in two steps. First, governments seize land from rural collectives (*tudi zhengyong*). Second, a land lease transaction between the government and land developers occurs (*tudi churang*). In other words, land requisition by the government is a required step through which agricultural land is converted to non-agricultural use.¹⁰

According to Chinese land laws and the constitution, the government may only use its power to seize land for public interests. This stipulation is consistent with eminent domain practices worldwide. However, the definition of “public interest” is particularly vague in China. Many regulations on land requisition include a list of examples of public interests, but the list often ends with an

ambiguous phrase such as “...and other public interests as stipulated by laws or administrative regulations”.¹¹ The elastic scope of “public interest” can be stretched to include many types of land resource developments, such as establishing development zones,¹² ecological zones, tourist resorts, and industrial corridors or industrial cluster zones (Yew, 2012). More recently, it includes an increase in land used for commercial and real estate purposes (Kung et al., 2013).

Local land management bureaus have been set up at the city-/county level and given the authority to expropriate collective land and monitor land transactions, following the establishment of the Ministry of Land Management in 1986. The government land authorities are obligated to draft a yearly land utilization plan, in which they identify the land they can requisition in the following year. Such decisions on land use are jointly made with an urbanization plan, taking into consideration local development needs, agricultural resources, and the employment situation.¹³ Because of the annual planning activities, the authorities seem to have a clear idea about land inventories in their localities. Given the top-down nature of land use planning, the government authorities are not required to consult with village collectives or farmers when making the land use plans, nor are they expected to contact these groups before they decide on land requisition for a specific construction project. Only after the land requisition decision is made are they obligated to publicize information regarding the location, time, and compensation scheme for the land requisition.¹⁴ Anecdotally, sometimes the village collectives and the farmers are notified simultaneously through public notice; and sometimes the village cadres receive the notification privately from the government authorities before the information is announced publicly. It is obvious from these stipulations regulating land requisition procedures that neither the collectives nor farmers have to be consulted regarding which and how much land to be taken by the government.

In addition to the legal framework that allows governments almost unrestrained power to take land, China's fiscal structure further incentivizes local governments to utilize that power. After the Tax Sharing System reform in 1994, tax revenues were centralized and the central government's portion of shared tax revenue increased at the expense of local governments (World Bank, 2007). As compensation to local governments for this loss of tax revenue, revenue-sharing arrangements for land transactions moved in the opposite direction - municipal and county governments' share of the revenue from land transactions increased from 60% to an eventual 100% (Chan, 1997). In 1998, local governments were granted *de jure* ownership over land within their geographical jurisdiction, and local governments became the legal residual claimant of revenue obtained from land sales (Kung et al., 2013; Kung & Chen, 2016; Lin & Ho, 2005; Peterson, 2006).¹⁵ The abolition of the rural household tax in 2006 further incentivized local governments to turn toward land as a source of revenue (Chuang, 2014). Land revenues subsequently grew from 10% of counties' extra-budgetary revenue before 1998 to 79% in 2008, amounting to approximately 38% of the total annual revenue (Kung & Chen,

⁷ Under the 1978 Household Responsibility System (HRS), rural households were granted 15-year land use rights. In the late 1990s, when the original 15-year leases expired, the national government extended the term of farmers' use rights for an additional 30 years, and codified 30-year land use rights under the 1998 Land Administration Law (Chen & Davis, 1998).

⁸ See *Opinions about guiding orderly transfer of management rights of rural land and properly developing scale farming* issued by the general office of the CPC Central Committee and the State Council in November 2014.

⁹ One exception is that rural collectives can use the land they own for construction for community uses, such as township and village enterprises, public infrastructure, or residential housing for collective members. See the Land Administration Law Articles 3 and 43.

¹⁰ Land-use conversion is regulated through a quota system that allocates land down the jurisdictional hierarchy from the provincial to the township governments, with the higher level government taking more of the quota (Hsing, 2010).

¹¹ For example, the Acquisition of Land for State Construction Regulation (1982) and the Regulation for the Expropriation and Compensation for Housing on State-owned Land (2011), both passed by the Standing Committee of the National People's Congress, explicitly enumerated land usages for “public interests”.

¹² In 1998, The State Land Administrative Bureau revealed that, on average, each province had about 30 development zones. By 2005, China reportedly had a total of 6866 development zones with a planned area of 38,600 square kilometers (Lin, 2009).

¹³ Articles 15.1 and 23 of the Land Administration Law.

¹⁴ Articles 25 of the Regulations on the Implementation of the Land Administration Law.

¹⁵ Hsing (2006) documents that provincial and prefecture-level governments get 20% each and the remaining 30% is kept by the county level governments. Township governments' share is 5–10%, though this is not fixed and is decided by county-level governments.

2016). When land revenue is maximized, county officials are able to spend on large-scale construction projects which are often considered representative of an official's achievement (Kung & Chen, 2016). In 2001, the central government set a quota on the maximum quantity of land acquisitions out of a desire to protect China's farmland for food security purposes. Despite this effort, the conversion of farmland into industrial and urban developments has shown no signs of slowing down. The rate of land urbanization is faster than the rate of population urbanization (Liu, Li, & Yang, 2018).

In sum, decisions regarding the location and amount of land to be seized are made by local governments, shaped by the aforementioned fiscal and career incentives of local governments and implemented through annual land use planning. The collectives, despite being *de jure* landowners, have little bargaining power and do not have a choice on whether or not to sell land rights (Lin & Ho, 2005),¹⁶ just as the legal and administrative institutions governing land requisition suggests.

2.2. Compensating farmers in the processes of land requisition

The requisition of land by local governments has substantially shaped the state-farmer relationship and has been the primary driver of the proliferation of rural conflicts (Guo, 2001, Lin et al., 2018). As the previous discussion on land requisition procedure suggests, the collectives and farmers are not consulted with, but rather only notified of the land requisition plan. Many conflicts and disputes regarding land requisition stem from low and often delayed compensation to farmers. According to the Land Administration Law, farmers affected by the land requisition process are entitled to three types of compensation — compensation for loss of land, a resettlement subsidy, and compensation for structures and standing crops. However, under no circumstances shall the combined land compensation fees and resettlement subsidies exceed 30 times the value of the average annual yield of the land, as calculated over the three-year period preceding the requisition.^{17,18} While land compensation is legally bound by an upper limit, the sale price of the converted land is determined by its commercial value and is not capped. This asymmetry in “pricing” land is the essence of the government's land revenue practice.

Because the compensation scheme is solely based on the agricultural value of the land, even the maximum offer is often insufficient for expropriated farmers to sustain their livelihoods (World Bank and Development Research Center of the State Council, The People's Republic of China, 2014). Moreover, it effectively deprives farmers of the right to benefit from any increase in the commercial value of the land, confirming the notion that farmers only have the right to use the land, and not the right to profit from it. In addition, the compensation scheme ignores various social securities (e.g. old age support and insurance against unemployment) that land provides for farmers (Chen, 2014). Even in cases where landless farm-

ers are granted urban *Hukou* and incorporated into urban life, there is no guarantee that they are entitled to the welfare benefits and public services enjoyed by their urban counterparts (Chuang, 2014; Ong, 2014).

It is important to note that even though a village is not a formal government body, rather a “self-governing” agency, village leaders are effectively agents of the state, entitled to salaries, and obligated to implement government policies and carry out central mandates (Rozelle & Boisvert, 1994). As such, village leaders may not have the power nor the *incentive* to negotiate with the local government for fair compensation. There are even reports that corrupt village cadres embezzle compensation money designated for farmers (Cai, 2003; Hsing, 2010).

The procedure of land compensation also does not work in farmers' favor. As land lease transactions between local governments and developers are seldom transparent, farmers often do not know the sale price of the land rights. In the period from 1995 to 2002, 86% of government land requisition transactions were carried out via closed-door negotiations, with the remaining 14% executed through public tender and auction (Lin & Ho, 2005). In addition, the compensation funds are given to the collectives, rather than directly to the affected farmers.¹⁹ After receiving the compensation funds, village cadres have discretionary power in deciding how and how much money they give to the farmers, based on the compensation guidelines of the locality. Despite the universal formula for compensation, the compensation packages are sometimes tailored to individual cases, based on negotiations with each household (Hsing, 2010). Also, the few villagers with inside knowledge of the compensation scheme may benefit more than the majority (Chuang, 2014). In the urban fringe of southern cities, some villagers have benefited tremendously from land requisition (Hsing, 2010), but they are not representative of the land-losing farmers. Instead, under-compensating farmers is the norm in the processes of land requisition.²⁰

The above institutional arrangements regarding land requisition procedures suggest that individual and household characteristics may affect how much the affected farmers are compensated for land loss, but cannot affect their probability of losing land in a requisition. Undercompensated farmers sometimes resort to violence in their resistance to land requisition. Johnson (2013) writing for the New York Times describes how at least 39 farmers have resorted to self-immolation and suicide as a means of protest against land expropriation. More often, affected farmers cope with land loss through nonviolent strategies, but their coping strategies remain largely understudied.

3. A simple model of farmers' labor allocation

The simple model developed in this section relates a representative household's decision of labor allocation between agricultural and non-agricultural work to their land endowment. With some standard assumptions about the agricultural production function and the utility function, the model shows that an exogenous reduction of land without adequate compensation increases farmers' labor allocation to non-agricultural activities. This is a central hypothesis we test empirically in later sections.

We assume that the household maximizes the utility function, $u(l, c)$, which is composed of leisure (l) and consumption (c), by allocating labor between farming (L_f) and work in the non-farm sector (L_{nf}). The utility function has the conventionally assumed

¹⁶ One exception is some villages on the urban fringe in southern metropolises. Land-owning village collectives there can bargain effectively with urban governments seeking high-speed expansion (Hsing, 2010). As a result, some of these collectives receive about 10% of the requisitioned land returned to them as “reserved commercial land” (*ziliu jingji yongdi*) (Wong, 2015) all the while villagers manage to stay in their homes, forming a “village within city” (*chengzhongcun*). This arrangement enables the villagers to share the fortunes of the growing urban real estate market by renting out residential space and the commercial land reserved to them (Hsing, 2010; Wong, 2015).

¹⁷ Article 47 in the Land Administration Law.

¹⁸ To implement this law, provincial level governments are required to standardize and publicize the “average annual yield” used in land compensation, according to the 2004 Decisions of the State Council on Deepening Reform and Strengthening Land Management. For example, in 2009 the Bureau of Land and Resources of Sichuan Province cataloged agricultural land into 15 levels. Based on this ranking, the value of the annual yield on land was stipulated to range from 800 yuan per mu to 3065 yuan per mu.

¹⁹ Article 25 of the Regulation on the Implementation of the Land Administration Law.

²⁰ Guo (2001) documents that 60–70% of income from land sales goes to county township governments, 25–30% goes to village collectives, and only 5–10% is ever delivered to farmers.

properties: $u_1 > 0$, $u_2 > 0$, $u_{11} < 0$, $u_{22} < 0$, and $u_{12} > 0$ where the subscripts 1 and 2 indicate the derivative of the function with respect to its first and second arguments, respectively. The assumption $u_{12} > 0$ ensures that more leisure (consumption) increases the marginal utility of consumption (leisure). The household faces a time constraint and a budget constraint as specified below:

$$\text{Max } u(l, c) \quad (1)$$

$$\text{s.t. } l + L_f + L_{nf} = T \quad (2)$$

$$c \leq wL_{nf} + pf(L_f, \bar{L} - R) + \tau R \quad (3)$$

where T is a constant number denoting the total time available to the household. The price of consumption goods is normalized as 1, the wage earned in the off-farm sector is denoted as w , and the price of agricultural output is p . Initial land endowment is given by $\bar{L}$. The amount of land taken through requisition is denoted as R , and $0 \leq R \leq \bar{L}$. Farm labor L_f and remaining land $\bar{L} - R$ are the two inputs of the agricultural production function f . Compensation to the household for land requisition is specified as τR , where $\tau \geq 0$.²¹ We further assume that the production function f has the following commonly assumed features: $f_1 > 0$, $f_2 > 0$, $f_{11} < 0$, and $f_{22} < 0$.

By allocating labor between farming (L_f) and non-farm work (L_{nf}), the household maximizes the utility subject to the two constraints specified in (2) and (3). It follows that the first order condition for an interior solution is:

$$pf_1 = w \quad (4)$$

This equation dictates that the optimal amount of labor allocated to farming is such that the value of the marginal product of labor on the farm is equal to the forgone wage rate in the non-farm sector. To assess how land requisition influences the household's labor allocation decision, we apply the implicit function theorem to equation (4) and derive the following relationship between the amount of land taken by the government and the household labor allocated to the non-farm sector:

$$\frac{dL_{nf}}{dR} = \frac{(pf_2 - \tau)(u_{12}u_2 - wu_2u_{22})}{-u_{11}} \quad (5)$$

Given the aforementioned properties of the utility function, the sign of $\frac{dL_{nf}}{dR}$ is determined by the sign of the term $(pf_2 - \tau)$. There are two cases that distinctly define the above relationship:

Case I. The compensation for the unit land loss is no lower than the value of marginal productivity of land in agricultural production. That is,

$$\tau \geq pf_2 \quad (6)$$

then $\frac{dL_{nf}}{dR} \leq 0$. This is the case when compensation is high enough to generate an income effect leading to either no change or a reduction in labor allocation to non-agricultural sectors.

Case II. The compensation for the unit land loss cannot replace the value of marginal productivity of land in agricultural production:

$$\tau < pf_2 \quad (7)$$

²¹ We assume that the compensation (τ) is not tailored to the agricultural productivity of individual households. This assumption is based on the knowledge that provincial level governments have standardized and publicized the "average annual yield" used in land compensation as mandated by the 2004 Decisions of the State Council on Deepening Reform and Strengthening Land Management, hence in general individual households have limited scope to use agricultural productivity to influence compensation.

In this scenario, households will allocate more labor to the non-farm sector in response to land requisition, hence $\frac{dL_{nf}}{dR} > 0$.

As the model suggests, how land requisition affects labor allocation to the non-farm activities is an empirical question. Only under the second scenario will households allocate more labor to the non-farm sector in response to land expropriation. An empirical finding of a positive migration effect would suggest that on average farmers are neither adequately nor overcompensated.

4. Data and empirical framework

4.1. Data

The data used in this paper are mostly based on the second and third wave of the China Household Finance Survey (CHFS), which was carried out by Southwestern University of Finance and Economics from July to August 2013 and 2015, covering 29 provinces,²² and 1046 communities. The sample was drawn as a three-state stratified sample with probability proportional to population size. All data were collected by interviewers using a computer-assisted interviewing system.²³ The survey covers detailed household information including demographic characteristics, financial and non-financial assets, liabilities and credit constraints, expenditures, income, social security, and insurance. In both 2013 and 2015 households were asked whether their land had been requisitioned by government and when the requisition took place.²⁴ In 2015, a question was asked in the community survey to identify the purposes of the land requisition from the seven options: highway and railway construction, commercial housing development, construction land for enterprises, construction land for government agencies, community infrastructure construction, housing construction for residents of the community, and others.

To identify the impact of land requisition on individual labor allocation decisions, we mainly focus on the land requisition that occurred after the 2013 survey, according to the 2015 survey. With 2013 as the "baseline", we can then examine if and how the initial household characteristics are related to later land requisition. Moreover, we can investigate how individual labor allocation changes compared to the baseline and if the change differs by their land requisition experience during the period. For those households whose land was expropriated before the 2013 survey, we are missing key information from before their land was taken. In particular, we do not know their migration status and some of their household characteristics (e.g. whether the household head was a village cadre or a party member). Therefore, the relation between the earlier land loss and migration decisions cannot be identified unless some strong assumptions are made. Thus we exclude from the baseline analysis sample those households whose land was lost to requisition before 2013 and only include them later in a robustness check.²⁵

The survey respondents in rural villages were also asked the whereabouts of every household member, hence we are able to identify migrants working outside the county. To investigate indi-

²² The survey does not cover Tibet, Xinjiang, Hong Kong, Macao, and Taiwan.

²³ The sample size in 2013 is 28,142 households (12,023 rural households) and 97,916 individuals (48,072 rural individuals). In 2015 there are 37,289 households (16,132 rural households) and 133,183 individuals (65,204 rural individuals), among which 21,775 households and 82,702 individuals were interviewed in 2013.

²⁴ The first wave of CHFS was conducted in 2011. However, questions regarding land requisition were only directed to households who still owned land (rights) at the time of the interview. Consequently, households whose entire land holdings had been seized by the time of the interview cannot be identified. In addition, we can't identify the migration status of the individuals who are not a household head or the spouse of a household head. We also can't identify those migrants who had migrated for less than six months. Therefore, we exclude the 2011 data for the main analyses.

²⁵ In total 8.7% of the rural households surveyed in 2013 are excluded for this reason.

vidual labor allocation decisions, in the main analysis sample we include individuals from households with rural *hukou* who have members living in rural areas. All their household members (aged 16–60) are included in the analysis, counting those living in urban areas (migrants) and those in the rural areas (non-migrants). If individuals migrated with the whole family, we only know which county but not which village they are from. Because of this data limitation, we can't include them in the estimations with village fixed effects.²⁶ As a robustness check, we later include them in the individual fixed effects model.²⁷ Lastly, households with missing information on land requisition are dropped from the sample.

In the analysis sample, 3.62 percent of the households lost land due to government requisition. Fig. 1 shows the share of households who lost land and the amount of land lost in relation to the distance from their village to the county seat. In places closer to the county seat, where the commercial value of land is likely to be higher, land requisition is more likely to occur and higher proportions of the rural households lose land. About 11% of the households within 10–20 km from the county seat lost land during 2013–2015, compared to less than 3% of the households living over 100 km away. Conditional on losing land, households closer to the county seat also lose more land on average than households further away.

Land requisitions during 2013–2015 are mostly for infrastructure building purposes (Table 1) – 48% of the requisitions are for highway and railway constructions and 24% for community infrastructure buildings. Housing development accounts for 26% of the land requisition, with 13% for commercial housing and 13% for community housing construction. Converting agriculture land to construction land for industrial or commercial usage by enterprises accounts for 20% of the requisition.²⁸

The distributions of migrants and local-off farm engagements in the total sample and subsamples are reported in Table 2. Among individuals aged 16–60, 10.6% work as migrants out of the county. There is a noticeable decrease in the migration share from 12.7% in 2013 to 9.6% in 2015, a trend consistent with the national population census count reported in Naughton (2018). Migration is correlated with gender, age, and education in both years. On average, men have a higher migration rate than women. The young are more likely to migrate than the old – 22% of individuals aged 16–25 migrate, compared to 11% of the 26–44 age group, and just 2.5% of those older than 44. Migration rates correlate positively with education level. These correlations are consistent with what has been observed in other panel data (e.g. the CHNS and the RCRE data) (Giles & Mu, 2018). We also note that the individuals from villages further away from the county seat are more likely to migrate than those living closer to the county seat, possibly due to more local off-farm opportunities in areas around the county seat, as shown in Panel B of Table 2. The migration rate of the individuals who have not lost any land decreases from 12.6% in 2013 to 9.6% in 2015; whereas the migration rate of those who lost land

during the period stays roughly the same at 11%. More specifically, we observe an increase in the migration rate from 4.7% to 7.6% among those who lost all their land and a slight decrease from 12.4% to 11.7% for those who lost partial land. The difference in migration trends might be explained by the difference in their locations – those who have all of their land seized live on average 18 km away from the county seat, whereas those who lost only part of their land are on average more than 42 km away. Villages closer to the county seat seem to provide more local off-farm opportunities and 49% of the individuals aged 16–60 in those villages are engaged in local off-farm activities, compared to 34% in villages further away from the county seat. Other than this locality difference, we observe that men, the young, and the better educated are more likely to engage in local off-farm activities, consistent with the migration pattern. On average 40% of individuals are engaged in local off-farm activities and this rate has increased over the two years in the total sample and the different sub-samples.

4.2. Empirical framework

From the summary statistics we observe a smaller drop in migration during 2013–2015 among individuals from the land-losing households, compared to those who didn't lose land. However, it is not clear whether this difference is due to land requisition or part of the dynamic changes in agricultural production and urbanization taking place. Even less obvious is whether and in what ways those land-losing households are systematically different from others. Before we turn to household land loss experience and individual migration outcome, we first summarize the differences in observable characteristics between households who have lost land and those who have not. We estimate land requisition equations of the following form:

$$R_{jv} = H_{jv,2013}\phi + D_v + \varepsilon_{jv} \quad (1)$$

where R_{jv} represents land loss to government requisition during 2013–2015 for household j in village v . $H_{jv,2013}$ is a vector of control variables of household characteristics, all of which are dated in 2013, before the occurrence of the land requisition. These variables include household heads' age, education, gender, and ethnic minority status. Also included in $H_{jv,2013}$ are two controls: (1) whether the household head is a village cadre and (2) whether he/she is a Communist Party member. These variables are proxies for connections a household may have with the village's decision-making body. We also include a detailed list of variables measuring household size, demographic compositions (the number of children 0–6 years old, the number of children 7–15 years old, the number of members 16–35 years old, the number of household members older than 60, all designated by gender), and sex-ratio of the household members. In addition, we include two variables that capture the recent changes in household composition – if there is any newborn or death during 2013–2015. Village fixed effects D_v control for village characteristics, such as geographic location and administrative institution arrangements, that do not change over the two years and could affect the likelihood of land taking and how the process is carried out in the village. If requisition decisions are made by government officials without considering individual household characteristics, then we would expect the coefficients in ϕ to be statistically insignificant, conditional on village fixed effects.

Understanding the determinants of land loss at the household level helps us to strategize the potential identification of the causal links between land loss and labor allocation to non-farm activities. We start from the following difference-in-difference (DD) model:

$$L_{ijv,t} = \alpha + \beta_1 R_{jv} + \beta_2 D_{2015} + \beta_3 R_{jv} \times D_{2015} + X_{ijv,t}\gamma_1 + H_{jv,t}\gamma_2 + D_v + \varepsilon_{ijv,t} \quad (2)$$

²⁶ According to Lu (2014), of the 260 million rural-urban migrants, 37 million (14.2%) have migrated with whole family. Without including such individuals, we are likely to underestimate the positive impact of land requisition, if any, on migration.

²⁷ These individuals are from the urban sample and they are not double counted in the survey. All households in the urban sample have their economic activities centered in the urban areas (and all households in the rural sample have their economic activities centered in the rural areas). This matching of residence status and their major economic activities is a prerequisite for a household to be included in the survey. For example, if a household living in the urban area states that their economic activities are centered in the rural area, this household will not be interviewed further and will not appear in the survey data. For this reason, the households and their members, whether in the rural sample or the urban sample, cannot be surveyed twice.

²⁸ The reasons for the land requisitions occurred before 2013 show a slightly different pattern, where infrastructure building accounts for a smaller share (33% for highway and railway construction and 8% for community infrastructure building) and housing development accounts for a larger share (33%).

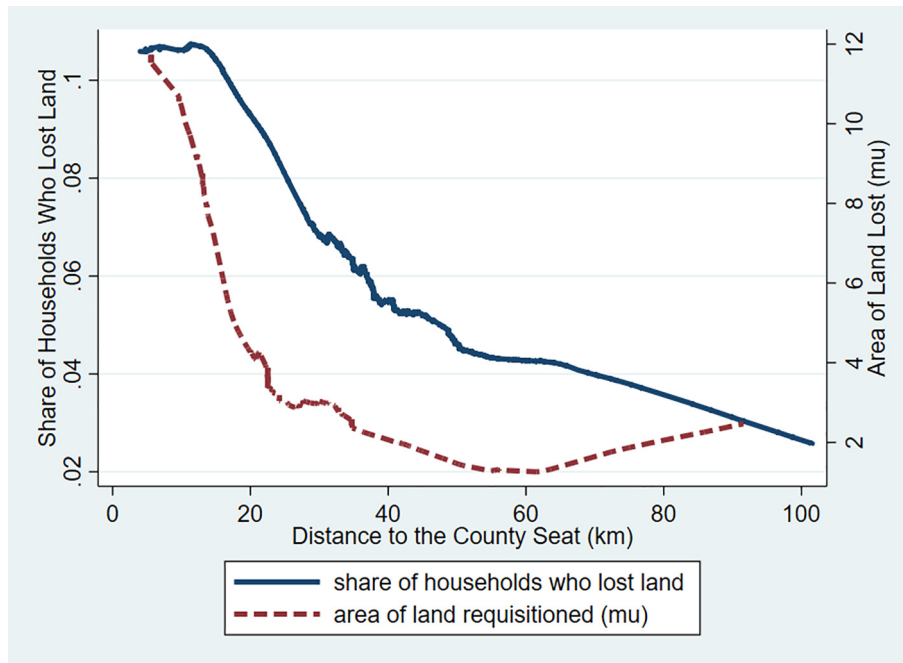


Fig. 1. Land requisition and distance to the county seat. Data source: China Household Finance Survey (2015).

Table 1
Reasons for recent land requisition.

Reasons	Share of Land Requisition
Highway and railway construction	48.15%
Housing development	25.93%
Community infrastructure building	24.07%
Construction land used by enterprises	20.37%
Construction land used by governments	3.70%
Others	9.26%

Data source: China Household Finance Survey (2015).

in which the labor participation in non-farm sectors (migration or local off-farm engagement) of individual i in household j of village v in year t ($t = 2013, 2015$) $L_{ijv,t}$ is a function of their household's land loss experience R_{jv} during 2013–2015. The coefficient β_1 captures differences in migration probability between land-losing households and other households in 2013. D_{2015} denotes the year 2015 and it controls for macroeconomic factors, common to all, that affect migration. Also included are time-varying characteristics of the individual ($X_{ijv,t}$): age (and finer account of age: if the person is turning 16 or 18 in the year and if the person is 20–30 years old), sex, and education,²⁹ and of his/her household characteristics ($H_{jv,t}$). Additionally the vector D_v contains village fixed effects. The error term is denoted by $\varepsilon_{ijv,t}$. The interaction term $R_{jv} \times D_{2015}$ identifies the change in migration probability during the two years between the individuals from land-losing households and the individuals from households that did not lose land, conditional on all the control variables. In this standard DD model with village fixed effects, land loss effects captured by the interaction term are identified by comparing the individuals with different experiences in land requisition within the same village.

²⁹ As a robustness check, we include three additional variables, possibly endogenous to labor allocation decisions, to control for changes in individual demographic characteristics. The three variables are if the individual is being single, getting married in the year, and having a baby in the year.

Table 2
Share of Migrants and Farmers in Local off-farm Activities (age 16–60).

	All	2013	2015
Panel A: Migrating to cities			
All	0.106	0.127	0.096
Men	0.124	0.149	0.114
Women	0.085	0.104	0.077
Age 16–25	0.225	0.285	0.196
Age 26–44	0.136	0.154	0.129
Age 45–60	0.025	0.030	0.023
Education level lower than high school	0.091	0.110	0.081
Education level at high school or above	0.165	0.208	0.150
Distance to the county seat ≥ 45 km	0.121	0.145	0.110
Distance to the county seat < 45 km	0.083	0.099	0.077
No land loss (After the 2013 Survey)	0.105	0.128	0.096
Lost land in government requisition (After the 2013 survey)	0.108	0.106	0.108
—Lost all land	0.068	0.042	0.076
—Lost partial land	0.119	0.124	0.117
Number of observations.	42,869	12,937	29,932
Panel B: Local Off-Farm Engagement			
All	0.401	0.346	0.428
Men	0.464	0.411	0.490
Women	0.319	0.265	0.346
Age 16–25	0.535	0.480	0.569
Age 26–44	0.482	0.414	0.516
Age 45–60	0.276	0.222	0.301
Education level lower than high school	0.358	0.311	0.382
Education level at high school or above	0.578	0.516	0.604
Distance to the county seat ≥ 45 km	0.341	0.298	0.363
Distance to the county seat < 45 km	0.491	0.428	0.519
No land loss (After the 2013 Survey)	0.398	0.344	0.428
Lost land in government requisition (After the 2013 survey)	0.471	0.450	0.477
—Lost all land	0.750	0.754	0.748
—Lost partial land	0.402	0.364	0.413
Number of observations.	34,250	11,325	22,925

Note: The sample contains households in the rural areas who have no land requisition experience at the time of the 2013 survey.

The review of the literature and the land policies in Section 2 suggests that in the land requisition process, compensation packages may be tailored to individual cases, but the land requisition

decision itself is largely imposed upon a village collective with few inputs from individual households. That is, land loss is likely to be exogenous to individual off-farm labor allocation decisions and our DD estimation would not suffer from the omitted variable bias. However, we cannot completely rule out the possibility that the rates of labor force participation in off-farm sectors of individuals with different experiences in land requisition within a village might change at different rates in the absence of land requisition. In other words, we cannot rule out the probability that losing land may be correlated with variables in the error term $\epsilon_{ijv,t}$. To partly address this concern, we use the panel version of the difference-in-differences estimator in the following equation:

$$L_{ijv,t} = \delta + \eta_1 D_{2015} + \eta_2 R_{jv} \times D_{2015} + X_{ijv,t} \theta_1 + H_{jv,t} \theta_2 + \mu_i + \epsilon_{ijv,t} \tag{3}$$

in which we control for individual-specific fixed effects μ_i . The land loss variable (R_{jv}) and the village fixed effects (D_v) in equation (2) are absorbed in μ_i . This estimation allows individual fixed effects to be correlated with both the household probability of losing land and individual migration decisions. Hence we effectively account for certain individual and household characteristics that do not change in two years (e.g. their connections with the township or county officials) that are otherwise left in the error term in the pooled cross-section model outlined in equation (2).

The above identification rests on the assumption that the migration trend of those expropriated is not different from those not affected by land requisition. To indirectly test this parallel trend assumption, we use the 2011 sample, albeit imperfect as aforementioned, combined with the 2013 sample to investigate the migration pattern during 2011–2013 by comparing the sectoral labor allocations between the individuals who lost land after the 2013 survey and those who did not.

5. Results

To examine the nature of land requisition as it relates to household characteristics, we begin by investigating the determinants of the probability that households lose land, as specified in (1). Then, we examine whether land loss changes the off-farm labor participation decisions of farmers. We conclude with a series of robustness checks and heterogeneity analyses.

5.1. The probability of losing land due to government requisition

Table 3 reports the estimation results on the correlation between household characteristics in 2013 and the subsequent probability of losing land. In addition to the set of household characteristic variables, the first column controls for “distance from the village to the county seat” and the second column includes village fixed effects (as outlined in equation (1)). The distance variable has a negative and significant coefficient, suggesting that households in villages closer to the county seat are more likely to lose land. Only one out of the 21 household characteristics is significant (as would be predicted by chance). The lack of significance is further confirmed by the small F-statistic for the joint significance test of all household variables (0.91 with a p-value of 0.58). Column 2 also shows that conditional on village fixed effects, all but one of the coefficients on the household level variables are small and statistically insignificant. Again, the joint significance test of the household characteristics renders a small F-statistic of 0.81. In contrast, the F-statistic for village fixed effects alone reaches 6447. This strongly suggests that village characteristics, not household characteristics, are the key to how likely a household will lose land to requisition. In the third column, we also control for the

Table 3
Household Characteristics in 2013 and the Probability that a Household Loses Land in Later Government Requisition.

	(1)	(2)	(3)
Age of household head	−0.000071 (0.00023)	−0.000032 (0.00024)	0.000026 (0.00024)
Education of household head:			
Primary school	0.0010 (0.0070)	−0.0041 (0.0077)	−0.0043 (0.0077)
Middle school	0.0071 (0.0078)	0.00025 (0.0085)	0.000058 (0.0085)
High school	−0.0017 (0.0097)	−0.010 (0.010)	−0.011 (0.010)
College	0.018 (0.024)	−0.0041 (0.023)	−0.0036 (0.023)
Sex of household head (male)	−0.0068 (0.0055)	0.0023 (0.0049)	0.0020 (0.0049)
Household head is an ethnic minority	−0.0069 (0.0086)	−0.0029 (0.012)	−0.0035 (0.012)
Household head is a village cadre	0.0093 (0.013)	0.014 (0.013)	0.014 (0.013)
Household head is a Communist Party member	0.015 (0.0096)	0.012 (0.0098)	0.012 (0.0098)
Household size	0.0029 (0.0020)	0.0023 (0.0035)	0.0031 (0.0036)
Number of boys aged 0–6	−0.0074 (0.0052)	−0.0020 (0.0058)	−0.0029 (0.0059)
Number of girls aged 0–6	−0.011* (0.0059)	−0.0065 (0.0062)	−0.0075 (0.0063)
Number of boys aged 7–15	−0.0038 (0.0060)	0.0019 (0.0057)	0.0014 (0.0057)
Number of girls aged 7–15	−0.0026 (0.0064)	0.0027 (0.0073)	0.0019 (0.0074)
Number of men aged 16–35	−0.0014 (0.0049)	−0.0020 (0.0058)	−0.011* (0.0059)
Number of women aged 16–35	−0.0019 (0.0047)	−0.0065 (0.0062)	−0.0045 (0.0059)
Number of men aged 60 and above	−0.0096 (0.0058)	−0.010* (0.0059)	0.0052 (0.0059)
Number of women aged 60 and above	−0.0041 (0.0059)	−0.0039 (0.0059)	−0.0057 (0.0046)
Sex-ratio of the household members	−0.017 (0.021)	−0.030 (0.021)	−0.030 (0.021)
Any newborn during 2013–2015	−0.0081 (0.034)	−0.00027 (0.029)	−0.00081 (0.029)
Any death during 2013–2015	−0.0011 (0.011)	0.0026 (0.0099)	0.0023 (0.0099)
Distance from the village to the county seat (log)	−0.018** (0.0077)		
Number of migrant household members			−0.0040 (0.0027)
Village fixed effects	No	Yes	Yes
F-statistic for joint significance of household characteristics (p-value)	0.91 (0.58)	0.81 (0.71)	0.90 (0.59)
F-statistic for joint significance of village fixed effects (p-value)		6447 (0.00)	3461 (0.00)
Number of observations	6,545	6,545	6,545

Note: (1) The sample (2013) contains households in the rural areas who have no land requisition experience at the time of the 2013 survey and are surveyed in both 2013 and 2015. (2) Village clustered robust standard errors in parentheses. ***p < 0.01, **p < 0.05, *p < 0.1.

number of migrant household members. The coefficient on this variable is also small and insignificant, suggesting that households with more migrant members in 2013 are not targeted in later land requisition.

Table 3 provides corroborating evidence that the observable household characteristics are not associated with the household’s probability of losing land. This suggests that land requisition decisions made by administrative bureaucracies, in general, are

Table 4

Participation in Off-Farm Activities and Land Loss due to Requisition: Estimations from the Difference-in-Difference Model.

	(1)	(2)
<i>Panel A: Migration to cities</i>		
Land loss × Year dummy (2015)	0.039* (0.023)	0.045* (0.024)
Land loss	−0.021 (0.023)	−0.025 (0.023)
Year dummy (2015)	−0.045*** (0.0055)	−0.054*** (0.0056)
Number of observations	42,869	42,869
<i>Panel B: Local off-farm engagement</i>		
Land loss × Year dummy (2015)	−0.047 (0.037)	−0.024 (0.036)
Land loss	0.0076 (0.035)	−0.011 (0.034)
Year dummy (2015)	0.071*** (0.0080)	0.072*** (0.0078)
Number of observations	34,250	34,250
Village fixed effects	Yes	Yes
Individual and household characteristics	No	Yes

Note: (1) The sample (2013–2015) contains individuals from households in the rural areas who have no land requisition experience at the time of the 2013 survey. (2) The variables of individual characteristics include age, if the person was turning 16 or 18 and if the person was 20–30 years old, gender and education level (primary school, middle school, high school, and college). Household characteristics include the number of boys age 0–6, the number of girls age 0–6, the number of boys age 7–15, the number of girls age 7–15, the number of women age 16–35, the number of men age 16–35, the number of men age 60 and above, the number of women age 60 and above, household size, if any household member died after 2013, the sex-ratio of household members, and if household head is a party member, or a village cadre. (3) Village clustered robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 5

Participation in Off-Farm Activities and Land Loss due to Requisition: Estimations from Individual Fixed Effects Model.

	(1)	(2)
<i>Panel A: Migration to cities</i>		
Land loss × Year dummy (2015)	0.070** (0.028)	0.068** (0.028)
Year dummy (2015)	−0.070*** (0.0062)	−0.068*** (0.0066)
Number of observations	19,834	19,834
<i>Panel B: Local off-farm engagement</i>		
Land loss × Year dummy (2015)	0.0090 (0.041)	0.017 (0.041)
Year dummy (2015)	0.053*** (0.0082)	0.057*** (0.0091)
Number of observations	16,146	16,146
Individual fixed effects	Yes	Yes
Individual and household characteristics	No	Yes

Note: (1) The sample (2013–2015) contains individuals from households in the rural areas who have no land requisition experience at the time of the 2013 survey, and are surveyed in 2013 and 2015. (2) The variables of individual characteristics include, if the person was turning 16 or 18 and if the person was 20–30 years old. Household characteristics include the number of boys age 0–6, the number of girls age 0–6, the number of boys age 7–15, the number of girls age 7–15, the number of women age 16–35, the number of men age 16–35, the number of men age 60 and above, the number of women age 60 and above, household size, if any household member died after 2013, the sex-ratio of household members, and if household head is a party member, or a village cadre. (3) Village clustered robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

independent of observed household characteristics.³⁰ We cannot rule out that they may still be correlated with unobserved individual characteristics, even though legally such a correlation is unlikely. In the following analysis, we first apply the DD model and then the individual fixed-effects model outlined above to estimate the effects of land loss on migration.

³⁰ We also examine the probability of losing land at the individual level, including controls for both the household and individual characteristics. In the model with village fixed effects, two variables (out of 26) are significant. Jointly, the household and individual characteristics are not significant, with an F-statistic of 0.91 and the p-value of 0.59, compared to an F-statistic of 10,908 for the village fixed effects. This finding further confirms our belief that the probability of losing land is not systematically determined by individual or household characteristics. The results are available upon request from the authors.

5.2. The main effects of land loss

Table 4 presents the DD estimation results of individual migration probabilities. The results without individual and household controls are in Column 1, and the results from the full controls in Column 2. Panel A presents the results on migration and Panel B on local off-farm engagement. In these estimations, the insignificant coefficient on the land loss variable shows that there is no difference in the probability of migration or local off-farm engagement in 2013 between individuals who lost land and those who did not. The coefficient on the year dummy is negative and significant for the migration estimation, showing roughly a 5 percentage point drop in the migration rate from 2013 to 2015. It is significantly positive for local off-farm engagement, suggesting a

7 percentage point increase during that time. For the migration outcome, the interaction term capturing the land loss effect is 0.039 in Column 1 and becomes 0.045 once the individual and household controls are added to the regression. Both estimates are significant at the 10% level. Individuals from land-losing households are thus 4.5 percentage points more likely to migrate than individuals whose household did not lose land. However, land expropriation has no impact on farmers' participation in off-farm activities.

Next, we turn to the results based on the individual fixed effects model (Table 5). Controlling for individual fixed effects partially accounts for potentially omitted variables and also increases the precision of the estimation. The results from estimations with and without individual and household controls are similar: land loss increases individual migration propensity by about 7 percentage points, and this effect is statistically significant at the 5% level. Consistent with the findings reported in Table 4, this set of estimations also shows that land loss has no impact on local off-farm engagement.³¹

For brevity, the coefficients on individual and household characteristics are not reported in the tables. The estimations show that young, male individuals, individuals with more education, individuals from households with more members or fewer children, and individuals without any household members who passed away during the year are more likely to migrate than their counterparts. Individuals from households whose heads are village cadres, or Communist Party members are less likely to migrate but are more likely to work off-farm locally.

In summary, the labor allocation adjustment to land loss is largely reflected in increased out-migration with little change in local off-farm engagement. These results suggest that the urban labor market, as opposed to rural local economies, may provide more job opportunities for land-losing farmers. Alternatively, the results may imply that with land expropriated during requisition, these farmers become less attached to the rural areas and hence more likely to migrate to cities.^{32,33}

The validity of the above estimations relies on the parallel trends assumption, that is, in the absence of land requisition all individuals should have exhibited the same trend in migration and local off-farm engagement over these two years. We look at the 2011 data to see whether we have evidence indirectly supporting this assumption. We include individuals surveyed in 2011, 2013, and 2015, to compare the migration and local off-farm work trends during 2011–2013 for those who were expropriated after 2013 and those who were not. The results are shown in Table 6. We find that these two groups of individuals exhibit similar migration trends during the 2011–2013 period. The common trend also holds for local off-farm engagement. The need to use individuals

Table 6

Examining the Pre-2013 Trend Using 2011–2013 Data.

	(1)	(2)
<i>Panel A: Migration to cities</i>		
Land loss after 2013 × Year dummy (2013)	−0.026 (0.023)	−0.022 (0.023)
Year dummy (2013)	0.015** (0.0064)	0.014** (0.0064)
Number of observations	4,365	4,365
<i>Panel B: Local off-farm engagement</i>		
Land loss after 2013 × Year dummy (2013)	−0.049 (0.037)	−0.045 (0.038)
Year dummy (2013)	0.015 (0.012)	0.015 (0.012)
Number of observations	4,084	4,084
Individual fixed effects	Yes	Yes
Individual and household characteristics	No	Yes

Note: (1) The sample (2011–2013) contains individuals from households in the rural areas who have no land requisition at the time of the 2011 survey, and are surveyed in 2011, 2013, and 2015. (2) The variables of individual characteristics include, if the person was turning 16 or 18 and if the person was 20–30 years old. Household characteristics include the number of boys age 0–6, the number of girls age 0–6, the number of boys age 7–15, the number of girls age 7–15, the number of women age 16–35, the number of men age 16–35, the number of men age 60 and above, the number of women age 60 and above, household size, if any household member died after 2013, the sex-ratio of household members, and if household head is a party member, or a village cadre. (3) Village clustered robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

surveyed in the three waves for this parallel-trend test leads to a relative sample size of about 4,000 observations. In addition, the migration measure for the 2011 survey is inconsistent with the 2013 measure, as aforementioned. Nevertheless, it is reassuring that the suggestive evidence obtained from this exercise shows that the parallel assumption underlying the main estimations is likely to hold.

5.3. Robustness checks

One concern with using the individual panel data is the reduced sample size. Because CHFS expanded the survey coverage in 2015, we cannot include those individuals who were newly added in the 2015 survey for the panel data model. More importantly, we cannot include the individuals who were in the 2013 survey but not followed in 2015. If they are systematically different from those who were in the panel, then the estimation based on the panel data might be biased. For example, if individuals from land-losing households were less likely to be followed in the survey due to out-migration, then the potential migration effect would be underestimated. To address the possible sample attrition problem, we apply inverse probability weighting (IPW) to the panel sample and then re-estimate the individual fixed-effects model. We first estimate the probability of staying in the 2015 survey based on the full 2013 sample. The IPW corrects for the potential sample attrition problem due to observables and thus makes the analysis sample more representative of the original sample (Wooldridge, 2004). The results with the IPW are reported in Column (1) of Table 7. The estimated land loss effect is almost identical to our baseline results as presented in Table 5.

The individual fixed-effects model allows us to include individuals who moved away with their entire family and for whom we have no information about their village of origin, even though we cannot use these observations for the DD model that requires controlling for village fixed effects. Among the rural households in our sample, the share of whole family migration is 6.5% in 2013 and 7.0% in 2015. When we include individuals from such families who are surveyed in both years in the regression, we add 234 individuals, accounting for 1.2% of the sample. The estimated migration effect is 0.073 (Column 2 of Table 7), larger than the

³¹ These results are robust to the inclusion of the three variables accounting for possible changes in individual demographic characteristics (if the individual is single, getting married, or having a baby in that year).

³² Because migration is mostly a household decision, we also examine the impact of land requisition on migration at the household level. On average, a rural household has 2.06 members ages 16–60. We apply the household fixed effects model in the estimation, and find that the households whose land was expropriated are 16% more likely to have a migrant member than the households who experienced no land loss. The impact on the participation in local off-farm activities is positive but not statistically significant. These estimates are consistent with those from the individual-level analysis. These results are available upon request from the authors.

³³ A related issue is how farmers not expropriated themselves would respond to land requisitions that occurred in their villages. In a separate analysis we replace the household-level land loss measure with an indicator of land requisition in the village. We find that the village-level land requisition has no impact on either migration or local off-farm engagement. These results, together with the results based on the measure of land expropriation at the household level, suggest that the migration effect comes only from household-specific land loss. These results are available upon request from the authors.

Table 7
Robustness Checks: Sample Attrition and Different Samples.

	(1) Correcting sample attrition by inverse probability weighting	(2) Including individuals whose whole family migrated	(3) Excluding households granted urban <i>Hukou</i>
Panel A: Migration to cities			
Land loss $\times$ Year dummy (2015)	0.065** (0.026)	0.073** (0.028)	0.068** (0.028)
Year dummy (2015)	-0.066*** (0.0064)	-0.079*** (0.0068)	-0.069*** (0.0066)
Number of observations	19,763	19,712	20,068
Panel B: Local off-farm engagement			
Land loss $\times$ Year dummy (2015)	0.016 (0.040)	0.016 (0.041)	0.016 (0.041)
Year dummy (2015)	0.056*** (0.0089)	0.058*** (0.0091)	0.057*** (0.0091)
Number of observations	16,100	16,044	16,191
Individual fixed effects	Yes	Yes	Yes
Individual and household characteristics	Yes	Yes	Yes

Note: (1) For sample attrition correction, the probability of remaining in the 2015 survey is estimated at the household level. (2) The sample contains individuals in households in the rural areas who have no land requisition experience in 2013. (3) The variables of individual characteristics include, if the person was turning 16 or 18 and if the person was 20–30 years old. Household characteristics include the number of boys age 0–6, the number of girls age 0–6, the number of boys age 7–15, the number of girls age 7–15, the number of women age 16–35, the number of men age 16–35, the number of men age 60 and above, the number of women age 60 and above, household size, if any household member died after 2013, the sex-ratio of household members, and if household head is a party member, or a village cadre. (4) Village clustered robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

baseline estimate of 0.068 as expected, but this difference is not statistically significant.

A small number of individuals were granted urban *Hukou* due to land loss during 2013–2015 and moved away from their rural villages. To ensure that the results are not driven by this group, we exclude them from the analysis sample. The resulting estimates are almost identical to the baseline regression, as shown in column 3 of Table 7.

In addition, one may wonder if the impact of land requisition before 2013 is the same as in Tables 4 and 5. Even though we have no information about the initial characteristics of many of the individuals and households who lost land before the 2013 survey (hence we exclude them from the regression analysis), we have no reason to believe that the land requisition process suddenly changed in 2013. Those households expropriated earlier are equally unlikely to be selected or targeted as the households who lost land after 2013. To assess the difference between the households whose land was expropriated after 2013 and those that experienced expropriation earlier, we employ a *t*-test of mean differences in the initial household characteristics of the 254 households expropriated during 2013–2015 and the 74 households expropriated during 2011–2013. The major difference we observe is the region where these households are located: 57% of those expropriated in earlier years are in the east-coastal region, versus 33% in later years.

Table 8
Robustness Checks: Including Individuals from Households Expropriated before 2013.

	(1)	(2)
Panel A: Migration to cities		
Land loss after 2013 $\times$ Year dummy (2015)	0.053** (0.026)	0.053** (0.026)
Land loss before 2013 $\times$ Year dummy (2015)	0.032** (0.013)	0.032** (0.013)
Year dummy (2015)	-0.069*** (0.0062)	-0.067*** (0.0065)
Number of observations	22,794	22,794
Panel B: Local off-farm engagement		
Land loss after 2013 $\times$ Year dummy (2015)	-0.010 (0.037)	-0.0049 (0.037)
Land loss before 2013 $\times$ Year dummy (2015)	0.0072 (0.019)	0.0080 (0.019)
Year dummy (2015)	0.053*** (0.0082)	0.055*** (0.0089)
Number of observations	18,392	18,392
Individual fixed effects	Yes	Yes
Individual and household characteristics	No	Yes

Note: (1) The sample contains individuals in households in the rural areas who are surveyed in both 2013 and 2015. (2) The variables of individual characteristics include, if the person was turning 16 or 18 and if the person was 20–30 years old. Household characteristics include the number of boys age 0–6, the number of girls age 0–6, the number of boys age 7–15, the number of girls age 7–15, the number of women age 16–35, the number of men age 16–35, the number of men age 60 and above, the number of women age 60 and above, household size, if any household member died after 2013, the sex-ratio of household members, and if household head is a party member, or a village cadre. (3) Village clustered robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

In the analysis presented in Table 8, we include those from the households who lost land before 2013, about 1,800 individuals in total in the regression. We find that the land loss effect on migration persists: individuals with land loss before 2013 are still 3.2% more likely to migrate in 2015 than those without land loss. Compared to the more immediate effect of land loss after 2013, which is 5.3%, the persistent long-term effect is smaller, but the difference is not statistically significant. This finding also suggests that out-migration has been a coping strategy adopted by the households affected by land requisition over the years and also in different regions. There is no impact, either long-run or in the immediate term, on local off-farm engagement.

Finally, to rule out the possibility that the migration effect estimated in Table 5 is a spurious relation of some sort, we conduct a placebo test in which we randomly assign “land loss” status to 3.62 percent of the sample and construct a false “land loss” variable accordingly. We repeat the random assignment and estimation process 1000 times and obtain all of the coefficients on the interaction term between the false “land loss” variable and the 2015 dummy variable. The distribution of these coefficients is presented in Fig. 2, with a vertical line indicating our baseline estimate (0.068). The simulated coefficients almost follow a perfect normal distribution and center squarely around 0 (the mean is -0.00024 and the standard deviation is 0.028). Our estimate lies in the upper tail of estimated placebo effects, as expected.

Overall, we find that the results from the baseline individual fixed effects model are robust to the correction of the sample attrition and to using different samples. The results consistently show that land loss due to government requisition increases an individual's migration propensity. We find no evidence that land requisition affects farmers' local off-farm engagement.

5.4. Heterogeneity analyses

The estimated land loss effects shown in Tables 4 and 5 are averages. It is important therefore to examine whether land loss

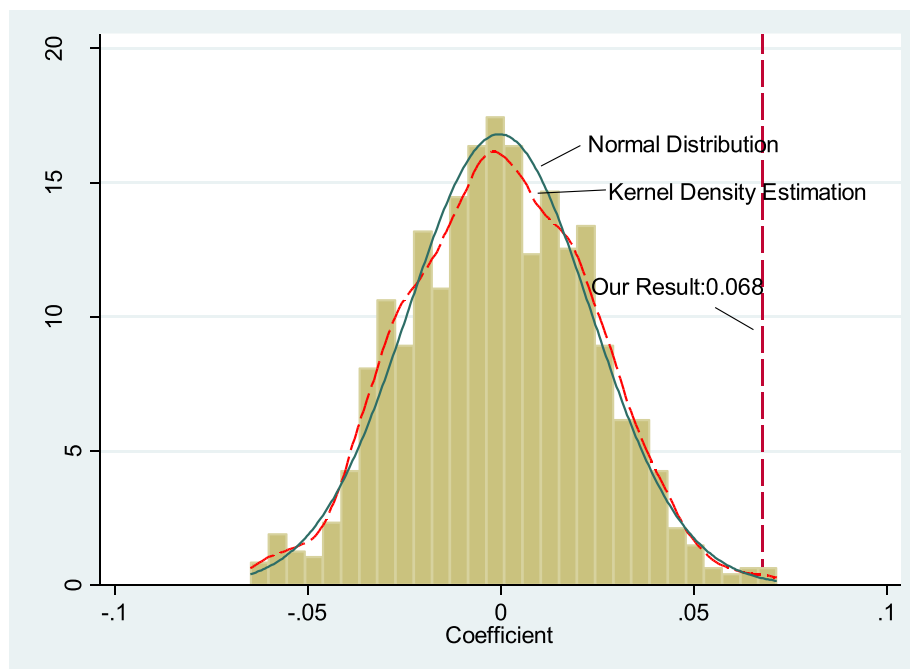


Fig. 2. Estimated Coefficients from 1000 Simulations Randomly Assigning Land Loss to Individuals.

affects different groups of individuals differently. For this purpose, we stratify the total sample by age (age 16–25, age 26–35, age 36–44, and age 45–60), sex, education, migrant status of household members in 2013, and distance to the county seat. The results on migration are presented in Table 9.

The migration effect is largely felt by older and younger farmers; it is insignificant for those in the middle age cohort. For the older farmers (age 45–60), those with land loss experience are 3.1 percentage points more likely to migrate. Statistically, the migration effect on this group is smaller than the significant effect of 0.21 on the younger age group (16–25). Further, land loss has a statistically significant impact on women, but not men. However, the gender difference is not significant. Individuals with a high school education or beyond are far more likely to migrate after experiencing land loss than those with a lower level of education who exhibit no such response. We might expect to find that individuals with family members already in cities may be more likely to migrate once their land is requisitioned. However, the stratification based on the migrant status of household members in 2013 fails to yield any significant estimates. Nor do we find any difference between the two groups. We find an increased migration propensity for individuals living further away from the county seat, but not for individuals close to the county seat. However, the difference between the two groups is not statistically significant.

The heterogeneity analyses of the local off-farm engagement outcome yield two interesting findings. First, the older farmers respond to land loss also by increasing their participation in local off-farm activities (by 11.4 percentage points). The difference between them and the young cohort in this regard is statistically significant. Second, there is a significant decrease in labor participation in local off-farm work for the higher educated group. This indicates a substitution for this group away from local off-farm engagement to migration as a result of land loss.³⁴

These heterogeneity analyses suggest that older farmers increase their participation in both the urban and the local off-farm labor markets in response to land requisition. Women and

younger farmers also increase their out-migration. Losing land in a requisition seems to cause the higher educated farmers to switch labor participation from the local off-farm sector to the urban sector. It is worth noting that land loss does not increase migration or local off-farm engagement for individuals with low education, who are likely to be most vulnerable to external shocks.

6. Conclusions

Land requisition has proven to be an important activity for local Chinese governments as a way to raise revenue and promote urbanization. This paper develops a simple model to show that an exogenous reduction of land without adequate compensation can lead a household to allocate more labor to non-agricultural activities. In our empirical analysis, we first show that land requisition decisions seem to be made independent of individual household observable characteristics. With a traditional DD model and a DD model with individual fixed effects, we find that land loss due to government requisition significantly increases individual farmers' migration rates on average but has no impact on their local off-farm engagement.

In a weak property rights regime, reduced labor participation by migrants has been adopted as a strategy, *ex ante*, to protect land rights. Examples are found in China (Giles & Mu, 2018), Ethiopia (de Brauw & Mueller, 2012), and Mexico (Valsecchi, 2014). However, land requisition is a form of threat to land rights that can't be guarded against, because it depends on the eminent domain power of a state and its timing and scope are out of the farmers' control. The increasing migration to cities, as shown in this paper, should be viewed as an *ex post* labor allocation strategy of the land-losing farmers to cope with the expropriation shock.

As a coping strategy of individuals affected by land requisition, labor reallocation indicates that one important role of the government is to facilitate farmers' transition to the non-farm labor market, particularly the urban labor market. The institutional rural-urban divide in labor market and social welfare is a feature unique to China. It means China faces additional challenges in compensating and supporting the expropriated farmers. More generally,

³⁴ These results are available upon request from the authors.

Table 9

Heterogeneities in Migration Decisions and Land Requisition: Estimations from Individual Fixed Effects Model.

	(1)	(2)	(3) =(1)- (2)
Panel A1: By Age (1)	Age 45–60	Age 16–25	
Land loss × Year dummy (2015)	0.031*** (0.010)	0.214** (0.085)	−0.184** (0.082)
Observations	7,142	3,658	10,800
Panel A2: By Age (2)	Age 26–35	Age 36–44	
Land loss × Year dummy (2015)	0.020 (0.102)	0.046 (0.035)	−0.026 (0.107)
Observations	4,545	4,486	9,031
Panel B: By Sex	Women	Men	
Land loss × Year dummy (2015)	0.082** (0.030)	0.056 (0.035)	0.026 (0.036)
Observations	9,488	10,344	19,834
Panel C: By Education Level	Lower than high school	High school or above	
Land loss × Year dummy (2015)	0.041 (0.030)	0.17*** (0.047)	−0.13** (0.052)
Observations	16,449	3,382	19,834
Panel D: By Migrant Status of Household Members in 2013	With a migrant member	Without a migrant member	
Land loss × Year dummy (2015)	0.113 (0.080)	0.031 (0.022)	0.082 (0.082)
Observations	5,644	14,187	20,103
Panel E: By Distance to the County Seat	Distance to county seat ≥ 45 km	Distance to county seat < 45 km	
Land loss × Year dummy (2015)	0.099** (0.041)	0.019 (0.031)	0.080 (0.051)
Observations	12,574	7,024	19,598

Note: (1) The sample contains individuals in households in the rural areas who have no land requisition experience in 2013 and are surveyed in both 2013 and 2015. (2) The variables of individual characteristics include, if the person was turning 16 or 18 and if the person was 20–30 years old. Household characteristics include the number of boys age 0–6, the number of girls age 0–6, the number of boys age 7–15, the number of girls age 7–15, the number of women age 16–35, the number of men age 16–35, the number of men age 60 and above, the number of women age 60 and above, household size, if any household member died after 2013, the sex-ratio of household members, and if household head is a party member, or a village cadre. (3) Village clustered robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

providing adequate compensation and timely assistance to the affected landowners or land users in land requisition is an obligation for any government using its eminent domain power.

Among both China scholars and policy-makers, there has been an increasing awareness of the inadequacy in compensation for land-losing households. In particular, they realize that the monetary compensation, often dispensed in a lump sum, can't make up for the loss of land's insurance functionality. This has led to the recent "land for welfare" programs in some provinces: the land-losing households are additionally provided with pension coverage (Cai, 2016). This coverage would certainly be helpful for the older farmers who have been expropriated. For the less educated farmers, job training and unemployment insurance are needed to cope with land loss and to better adapt to the off-farm labor market. Unfortunately, to our knowledge, there is no established program serving these farmers. However, one positive development is the ongoing Hukou reform. According to the 2019 Urbanization Plan, announced by the National Development and Reform Commission (NDRC, 2019), cities with populations of less than five million are required to lift or relax their urban residency

restrictions. If fully implemented, the migrants in these cities who were formerly excluded from the urban welfare system could now become permanent residents with the same rights to public service as the existing urban Hukou holders. This access to a social safety net through the Hukou reform would be particularly appealing to the land-losing farmers who no longer have their land as the last resort for generating income.

It's important to note that land requisition is only one of several forms of non-market land transfers in China (Brandt et al., 2017). Do other non-market land transfers – such as land rentals to village collectives, farmers' coops, farmers specializing in large-scale farming, and agribusiness enterprises – exhibit similar labor reallocation effects as government land requisition? Identifying the impact of these non-market land transfers is undoubtedly more difficult because individuals' behavior and choices, including their migration decisions, affect whether they are engaged in such transfers. How these non-market land transfers affect farmers' labor allocation decisions is an important topic for future research. In addition, future research should examine other strategies adopted by farmers to cope with non-voluntary land transfers. It should also investigate how various aspects of their lives, such as their income and consumption, are affected by non-market land transfer in general.

CRedit authorship contribution statement

Shuang Ma: Conceptualization, Methodology, Formal analysis.

Ren Mu: Conceptualization, Methodology, Writing - original draft, Writing - review & editing.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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