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The impacts of farmland expropriation on Vietnam's rural households

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Abstract

The expropriation of agricultural land to provide new land
for industrial and urban expansion, referred to as compulsory acquisition, is prevalent in developing countries. Using
Vietnam as a laboratory, this study evaluates the impacts of
losing farmland through compulsory acquisition on household welfare and reaches the following findings. A 10 percentage point increase in the fraction of land expropriated
results in a 2.2% decrease in household welfare proxied by
food expenditure. Furthermore, politically unconnected and
ethnic minority households are disproportionately vulnerable. The adverse welfare effect could take up to 10 years
to evaporate. The reduction in household welfare is attributable to the decline in agricultural income and the inability
to participate in the non-agricultural labor market. Other aspects of household behavior following compulsory acquisition are also explored, such as saving, social capital, labor,
and capital allocation.

KEYWORDS

Land expropriation, rural households, Vietnam

JEL CLASSIFICATION

O12; O13; R28; J22

1 | INTRODUCTION

Conversion of agricultural land into land designated for industrial and urbanized projects is an essential
feature of industrialization in developing countries. The process has been facilitated by the power of

government in which farmland is acquired without the consent of its owner or occupant, also referred to as compulsory acquisition (Keith et al., 2008). From a bird's-eye view, compulsory acquisition is considered necessary when land must be devoted to growth-enhancing investments such as transportation networks and public facilities. However, the traditional livelihoods of those whose farmland is expropriated are entirely uprooted, thus entailing significant costs of adjustment and resettlement. In spite of that, the compensation paid to them has been criticized as inadequate. Consequently, compulsory acquisition often fuels widespread social and political tensions, raising concerns among scholars, policy-makers, and politicians.[1]

Despite the spate of media reports, there is still very little empirical evidence investigating the direct impacts of compulsory acquisition on rural households. Much of the focus has been placed on the relationship between compulsory acquisition and urbanization at the aggregate level (see, e.g., Lin & Yi, 2011; Narain, 2009; Xu, Tang, & Chan, 2011). Focusing on this under-explored area of research, this paper causally estimates the effects of compulsory acquisition on households' living standards and behaviors. By using household-level data within a regression framework, our work can be related to several studies such as Tran, Lim, Cameron, and Van Huong (2014a, 2014b), Jiao, Smith-Hall, and Theilade (2015), and Harris (2015).[2] Since compulsory acquisition is often followed by social unrest and violence (Banerjee et al., 2007; Cao, Feng, & Tao, 2008; Tang, Wong, & Lau, 2008), carefully quantifying its impacts on affected households is crucial to facilitating a smoother and healthier structural transformation.

In this paper we investigate the impacts of compulsory acquisition on rural households by considering the case of Vietnam. We aim to address how compulsory acquisition affects household welfare (proxied by food expenditure) and household resource allocation to revenue-generating activities such as agricultural work, salaried employment, exploitation of common property resources, and self-employment. We also examine how households use their compensation from the government through their saving decisions.

We are interested in Vietnam because it is a country where the government relies heavily on compulsory land acquisition for industrial and urban expansion. For example, Anderson and Davidsen (2011) document that 10% of all agricultural land nationwide was expropriated between 2001 and 2010. More recently, a national prioritization of industrialization and modernization has called for the conversion of a large quantity of agricultural land into industrial, export-processing, and hi-tech zones (Adams, 2012; Anderson et al., 2012; World Bank, 2011). With approximately 70% of the population living in rural areas and 50% of the labor force working in agriculture, changes to land use structures from agricultural to non-agricultural purposes by the Vietnamese government have been reported to engender severe social consequences (Phuc, Van Westen, & Zoomers, 2014; Wells-Dang, 2013).

Our main contributions are as follows. First, we present empirical evidence on the causal effects of compulsory acquisition on rural household welfare. Second, we conduct heterogeneity analyses in terms of acquisition time, household political connections, and household ethnicity. Third, we provide rigorous analysis of household behaviors following compulsory acquisition, including resource allocation to various revenue-generating activities, social capital, and saving behaviors associated with cash compensation. Moreover, we differ from previous studies by further accounting for the intensive margin of the impacts of land acquisition (the fraction of the household's farmland being expropriated), instead of focusing only on the extensive margin of the effect (whether households are subject to compulsory acquisition).

Our identification strategy comes from within-household variations over time. We exploit the panel nature of the Vietnam Access to Resources Household Survey, and the findings of our paper are as follows. First, compulsory acquisition depresses household welfare measured by food expenditure. Specifically, a 10 percentage point increase in the fraction of land expropriated leads to a decrease

in household food expenditure by 2.2%. Our analyses further suggest that the adverse consequences of compulsory acquisition may take up to 10 years to dissipate. Furthermore, politically unconnected and ethnic minority households are disproportionately vulnerable. Second, the reduction in household welfare can be attributed to a 9.0% decline in household agricultural income and household inability to earn income from other sources. Third, we look in detail at household behavior following the acquisition. Expropriated households tend to reduce agricultural capital and labor after their land is taken away. Quantitatively, households divest their agricultural capital by 10.9% and reduce their working days in agriculture by 6.7% in response to a 10 percentage point increase in the fraction of farmland expropriated. While resources devoted to agriculture decrease, there is no evidence that households reallocate their resources to non-agricultural activities such as salaried jobs or self-employment. These results imply that the barrier to the non-agricultural labor market prevents expropriated households from shifting their labor supply away from agriculture. We also show that compulsory acquisition decreases households' contribution to agriculture-related social capital but not other forms of social capital. Furthermore, our findings indicate that cash compensation from the government increases household savings. By investigating the reasons for saving, we document a positive relationship between compensation and saving for educational purposes, with a suggestion that expropriated households attempt to raise their human capital, thus improving their competitiveness in the non-agricultural labor market.

From a normative perspective, rural households should not be made worse off by compulsory acquisition. Moreover, they should be able to substitute the income generated from their expropriated farmland with earnings from other activities. However, neither these points is supported by our findings. Our results highlight the need for government interventions that go beyond a lump-sum payment. In particular, the government should adopt policies that aim to increase the competitiveness of non-agricultural occupations among affected households. Our results also call for extra attention to be directed toward the ethnic minority population who are disproportionately vulnerable and could fall further behind during the development process.

The paper proceeds as follows. Section 2 provides a brief discussion on the legal framework and related literature. Section 3 describes the data. Section 4 presents our empirical strategy. Section 5 reports our results, heterogeneity analyses, and placebo tests. Section 6 concludes.

2 | BACKGROUND AND LITERATURE REVIEW

2.1 | Legal framework

The period of central planning in Vietnam ended in 1986 with the introduction of various market-oriented reforms in both agricultural and non-agricultural sectors. In agriculture, a crucial reform was the enactment of Directive No.10 in 1988, which eliminated collective farming and situated the household as an independent unit of production in the economy. The Directive allowed agricultural land to be allocated to households along with certificates of land use rights (commonly known as Red Books). A Red Book is a license validating its recipient's rights to use an assigned parcel of land.[3] With the issuance of the Directive, farmers were allowed to make their own decisions regarding the use of inputs and the sale of outputs, thus fueling a substantial incentive for agricultural production. Later, another agricultural reform, the Law on Land 1993, was enacted granting farmers the right to trade their Red Books (i.e., providing transfer, exchange, lease, inheritance, and mortgage rights). Since then, a series of adjustments to the Law on Land were introduced in 1998, 2001, 2003, and 2008 to stimulate land market development.

It is important to note that agricultural land itself still belongs to the state.[4] Farmers are only granted the right to use their state-assigned parcels for a certain amount of time. Formally, according to Articles 1 and 5.1 of the Law on Land 2003 (Law No. 13/2003/QH11), the land belongs to the entire people, with the state acting as representative of the owner for the purposes of uniform administration of the land. Articled 5.2 and 22.1 further emphasize the powers of the state in land acquisition. According to these articles, the state shall exercise the right of land acquisition for purposes of socioeconomic development such as the development of industries, localities, and national security. Therefore, agricultural land can be expropriated when the land in the public interest, as determined by the state. Article 42.2 further delineates the state's responsibility for paying compensation to those subject to compulsory land acquisition. The compensation amount is equal to the Red Book value (based on cadastral surveys) at the time the expropriation decision is made.

It is also interesting to understand how the process of compulsory acquisition works. First, a five-year master land-use plan is established by the central government after approval by the National Assembly. The master plan is designated to meet land demand based on the country's socioeconomic, defense, and security targets. According to the master plan, land is classified into three major groups: agricultural land such as rice land, forest land, and aquaculture land; non-agricultural land such as land for defense, land for industrial parks, and land for infrastructure development; and unused land such as land remaining unutilized and areas to be used. After the aggregate targets are set for each land type (e.g. 1,578,000 hectares are designated for infrastructure development by 2020 [Resolution 17/2011/QH13, 2011]),[5] the Ministry of Natural Resources and Environment and provincial governments work together to decide on the provincial, district, and commune targets for each land type. Since the process follows a top-down approach, the plan is very rigid. Any adjustment at the lower administrative level requires changes in the aggregate targets set by the central government. Therefore, it is impossible for individual households to influence the master plan, which lays a foundation for our identifying assumption in Section 4 that compulsory acquisition is not correlated with time-varying household characteristics.

As industrialization and urbanization become national priorities, a significant quantity of agricultural land has been acquired for urban-industrial expansion. For example, in 2006, the Vietnamese government issued a decision[6] expressing its determination to extend the total area of industrial zones at the expense of agricultural land. Quantitatively, almost 1 million hectares of agricultural land, which corresponds to 10% of the total agricultural land nationwide, were expropriated from 2001 to 2010 (Anderson & Davidsen, 2011). For a nation with 70% of the population living in rural areas where agricultural land is extensively used for daily livelihood (Wells-Dang, 2013), the acquisition of agricultural land often results in severe social consequences (Phuc et al., 2014; Wells-Dang, 2013), thus posing a challenge to both scholars and policy-makers.

2.2 | Literature review

Our paper is related to two strands of literature. The first explores the effects of the compulsory acquisition on both macroeconomic and microeconomic outcomes. From the aggregate-level analyses, it is documented that land expropriation accelerates urbanization and transforms rural villages in developing countries (Lin & Yi, 2011; Narain, 2009; Xu et al., 2011). At the micro level, a number of works concentrate on the interplay between the threat of acquisition and ex-ante investment in agricultural land. These papers find that farmers reduce investment in their farmland in response to the risk of compulsory acquisition. For example, Deininger and Jin (2006), Ali, Dercon, and Gautam (2011), and Fenske (2011) show that the threat of land expropriation reduces planting and productivity-enhancing practices in Africa. Jacoby, Li, and Rozelle (2002) find that compulsory acquisition risk in China

decreases the use of organic fertilizer but has no effect on other forms of plot-specific investment. In the context of India, Ghatak and Mookherjee (2014) document that productivity-enhancing investments are also negatively influenced by compulsory acquisition.

Similar to ours, a few papers assess the economic and social consequences of compulsory acquisition on the lives of expropriated households. Conducting household surveys in India, Ghatak, Mitra, Mookherjee, and Nath (2013) reveal that the acquisition of agricultural land leads to reduction of income and loss of employment. Specifically, affected households still attempt to cultivate in non-acquired plots, and their agricultural income declines by 17%. These results, however, are descriptive in nature, making it impossible to infer causality from the impacts of land acquisition. Others attempt to draw causal inferences from different identification strategies. Jiao et al. (2015) employ the propensity score matching method to investigate how compulsory acquisition affects rural households in Cambodia. The authors point out a reduction in household income by 15–19% if the household experiences land expropriation. Nevertheless, the propensity score matching method cannot address the fact that there exist unobserved factors that influence both land acquisition and household income at the same time, thus making it hard to interpret the estimated effects as causal. Our paper overcomes this endogeneity issue by exploiting the within-household variation over time in a household fixed effects model.

The closest works to our paper are Harris (2015) and Tran et al. (2014a, 2014b). Harris (2015) explores the effect of land acquisition in the context of Ethiopia on a group of individual farmers. Employing the first-difference method, Harris (2015) does not detect any effect on overall food consumption but finds that households suffering land loss substitute home-produced food with food purchased from the market. These households receive a lower income share from crops and more from household business, while the share of earnings from other sources generally remains unchanged. Tran et al. (2014a, 2014b) employ the multinomial logit model to study the effects of land expropriation in the context of Vietnam. The authors detect the increase in consumption immediately following expropriation, a reduction in agricultural income share, and a transition from agricultural to informal-waged occupations.

Both Harris (2015) and Tran et al. (2014a, 2014b) look at the impact of compulsory acquisition on income share from multiple sources. The use of income share does not correctly reflect the increase or decrease in each activity. For example, the increase in wage/salary share could simply result from the reduction in agricultural earnings without the actual increase in earnings from wages/salaries. In this paper we directly examine earnings (not the share) from various revenue-generating activities (e.g., agriculture, salaried jobs, self-employment). In this sense, our income measures are more meaningful and provide a direct earnings comparison in each activity. Besides, Both Harris (2015) and Tran et al. (2014a, 2014b) tend to focus on the extensive margin (i.e., whether the farmer experiences land acquisition), instead of looking at the intensive margin (the fraction of land expropriated). Our paper makes use of the intensity of land acquisition, which could better capture the effects of interest since the impacts on households which had a larger share of farmland expropriated could potentially differ from the impacts on those who only lose a small proportion of farmland.

Our paper can be further distinguished from Tran et al. (2014a, 2014b) and Harris (2015) in multiple aspects. While Tran et al. (2014a, 2014b) only examine the immediate impacts of compulsory acquisition in a small peri-urban district (the effects of farmland lost 1–2 years ago), our study investigates the impacts of accumulated farmland expropriation (farmland expropriated from many years ago up to the present). Our estimation sample has a wider coverage: 134 districts of Vietnam over 8 years. Furthermore, we account for the potential endogeneity issue of land expropriation by adopting a household fixed effects model as well as conducting a series of placebo tests to support the causal interpretation of our findings. In this sense, our study complements Tran et al. (2014a, 2014b) by

tackling the endogeneity issue and providing estimates that could be generalized to all Vietnamese rural households.[7] Moreover, we differ from Harris (2015) and Tran et al. (2014a, 2014b) by further conducting rigorous analysis on heterogeneity in terms of acquisition time, household political connections, and household ethnicity, and on household behaviors following land expropriation such as labor–capital allocation and behaviors contributing to social capital as well as savings.

Our work also fits into the second strand of literature which assesses the impacts of cash transfers in the context of developing countries. Previous works show that cash transfers from the government facilitate the transition of unemployed youths into formal employment (Blattman, Fiala, & Martinez, 2013) and raise household expenditure and investment in productive activities (Gertler, Martinez, & Rubio-Codina, 2012). The context of our paper differs from that of the above-mentioned papers in the sense that households in our study receive cash payments after they lose one of their most crucial income-generating assets, agricultural land. Although compulsory acquisition and cash compensation are intimately connected, most studies, with the exception of Ghatak et al. (2013) and Harris (2015), tend to consider them individually. Addressing this gap, we not only quantify the impacts of land acquisition, but also explore how households use their compensation after losing their land. Notably, we examine household saving behavior and various purposes of saving.

3 | DATA

To estimate the impacts of compulsory acquisition on a wide range of household-level outcomes, we employ the Vietnam Access to Resources Household Survey (VARHS), carried out in even years from 2006 to 2014. The VARHS is part of the UNU-WIDER project on "Structural transformation and inclusive growth in Vietnam." Conducted jointly with the Central Institute for Economic Management and the Vietnam Institute of Labour Science and Social Affairs, VARHS is an unbalanced panel survey of rural households in 12 provinces of Vietnam.[8] It is worth noting that households surveyed in 2006 were chosen to constitute a representative sample of the rural areas in the 12 provinces. However, the subsequent rounds (2008, 2010, 2012, and 2014) are not provincially representative in a strict statistical sense as they are based on the households surveyed in 2006.

The underlying sampling unit of VARHS is the household in rural Vietnam, which is composed of members living together and sharing income as well as expenditure for at least 6 months. Income and expenditure modules are defined consistently across the five waves of VARHS. For example, items underlying food expenditure and types of income-generating activity are all identical. The reference period is also the same, namely, the last 12 months for income and saving, and the monthly average for food expenditure as well as the number of workdays in various revenue-generating activities.

We group our outcomes of interest into four sets of variables. The first set includes household food expenditure and income from agricultural activities, common property resources, salaried jobs, as well as self-employment. Household food expenditure refers to the monthly total spending of all members on food. Household income from each activity refers to the income contribution of all household members from that activity. The second set consists of the current market value of total agricultural capital owned by the household, household time allocation on agricultural as well as non-agricultural work, and a dummy variable indicating whether the household has any member engaged in a salaried job. Household time allocation on an activity refers to the total number of workdays per month that all household members devote to that activity. Non-agricultural work covers all revenue-generating activities that are not classified as agriculture. The third set of outcomes includes social capital indicators such as whether the household has any member taking part in the farmers' union, cooperative, and religious groups. The final

set comprises household saving rate and dummy variables indicating various purposes of saving (e.g., for education, health care, old age, and interest earning) in the last 12 months.

Summary statistics of the primary outcome and control variables are presented in Table A1 in Appendix A. Mean values with standard deviations in parentheses are provided for the whole sample (column 1) and disaggregated by land acquisition status (columns 2 and 3). While food expenditure (in thousands of Vietnamese dong (VND)) refers to the amount of money the household spends on food per month, income (also in thousands of VND) refers to the revenues the household receives from various activities in the last 12 months.[9] An average household spends approximately 547,000 VND on food consumption per month. Households whose lands are expropriated spend slightly more than those that do not lose their land.

The mean income from agriculture is around 9,968,000 VND annually, larger than the mean income from other activities, namely salaried jobs, common property resources, and self-employment. Households that experience compulsory acquisition tend to earn less from agriculture, common property resources, and self-employment but more from salaried employment, in comparison to non-expropriated households. Turning to time allocation, on average, households spend 22 days each month doing agricultural work and 20 days doing non-agricultural work. The mean proportion of households with any member participating in salaried employment is 0.6 and the average value of agricultural capital is 1,160,000 VND.

Our main explanatory variable is the fraction of land expropriated. This variable is computed by dividing the household's accumulated area of expropriated land by the total land area in the survey period. The accumulated area of expropriated land refers to the total land area of the household being taken away up to the survey date. For example, the accumulated area of expropriated land reported in the 2010 survey includes all areas of the household's land taken away by the government in 2010 and before. Therefore, our measure of the fraction of land expropriated captures the cumulative effects of compulsory acquisition over time and not just the contemporaneous effects of expropriation. We henceforth refer to this measure as the fraction of land expropriated. As reported in Table A1, the mean value of the fraction of land expropriated is approximately 13% and 36% for all households and expropriated households, respectively. We also illustrate the distribution of fraction of land expropriated among households that lose any part of their farmland in Figure A1. The horizontal axis gives the fraction of expropriated land while the vertical axis provides the frequency ranging from 0 to 1.

The VARHS allows us to track the history of households' plots of farmland. Specifically, households were asked whether they had had any plot expropriated, in which year the plot was taken, and the area of farmland lost through acquisition in each year. Figure 1 illustrates the fraction of land expropriated over time. In Figure 1a we provide the proportion of land lost through compulsory acquisition during each year (not accumulated). For example, sampled households lost less than 1% of their farmland in 2003. The share of land expropriated in 2011 was 2.5%. Figure 1b demonstrates the accumulated share of expropriated land relative to the total area reported in the 2014 survey. For instance, the accumulated share of sampled households' land expropriated in 2003 was around 1.5%, which also accounts for the land lost in 2003 and before.

4 | EMPIRICAL METHODOLOGY

To investigate the relationships between compulsory acquisition and various outcomes at the household level, our estimating equation is given by

$$Y_{ht} = \beta_0 + \beta_1 FLE_{ht} + X'_{ht}\Omega + \lambda_h + \delta_t + \epsilon_{ht}, \tag{1}$$

(a) Share of Land Expropriated by Year   **(b)** Accumulated Share of Land Expropriated
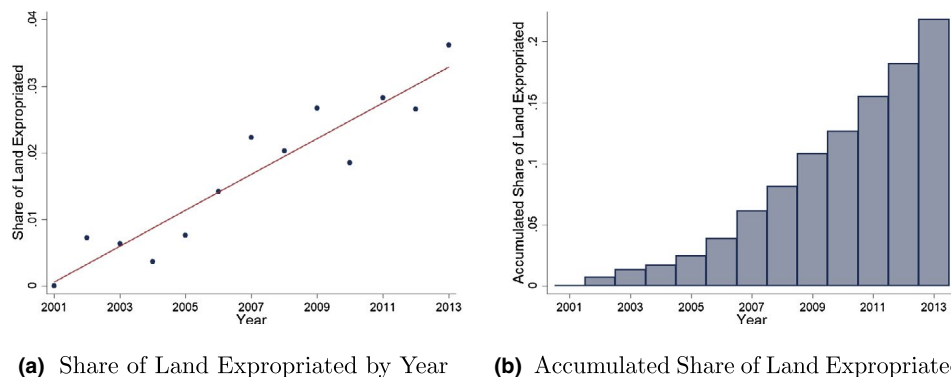
FIGURE 1   Land expropriation over time. Share of land expropriated refers to the proportion of the household land lost through acquisition during a given year. Accumulated share of land expropriated refers to the proportion of the household land taken away up to a given year [Colour figure can be viewed at wileyonlinelibrary.com]

where Y_{ht} denotes the outcomes of interest for household h in year t. There are three sets of outcome variables. The first set contains monthly food expenditure, net annual income from agriculture, salaried jobs, common property resources, and self-employment (all in log form). The second set consists of the log total market value of agricultural capital owned by the household, the log number of days spent on agricultural and non-agricultural work, and a dummy indicating salaried employment participation. The final set contains social capital indicators such as whether the household has any member taking part in the farmers' union, cooperative, and religious groups.

Next, the term FLE_{ht} represents our main explanatory variable, the fraction of land expropriated, which is the fraction of household h's land that is cumulatively expropriated up to year t. The coefficient of interest is β_1, which reflects the causal effects of compulsory land acquisition on rural households in multiple aspects. Standard errors throughout the paper are clustered at the household level.

The vector X'_{ht} denotes other covariates in two groups. The first group includes household characteristics such as gender, age, age squared, ethnicity, and education of household head.[10] The second group consists of household size (the number of members), household composition (proportion of young children and elderly disaggregated by gender), household total land area (in log terms), and whether any household member is affiliated with the Communist Party. A province-specific linear trend is also controlled for in the regression. The terms λ_h and δ_t respectively represent household fixed effects and year fixed effects. We also denote by ϵ_{ht} an idiosyncratic and time-varying error term.

The inclusion of household fixed effects λ_h is intended to eliminate confounding household unobserved *time-invariant* characteristics that are correlated with the proportion of land expropriated and, at the same time, affect household outcomes. However, household fixed effects do not account for household unobserved *time-varying* characteristics that are correlated with the fraction of land subject to acquisition. The presence of such time-varying factors could potentially jeopardize our identification. For example, if households whose productivity tends to depreciate over time are more likely to have a higher fraction of land expropriated, then our coefficient estimate would be biased. We address this potential issue both qualitatively and quantitatively. Qualitatively, in Section 2.1, we provide a detailed discussion on the legal framework and designation of compulsory acquisition laying the foundation for our identifying assumption, that compulsory acquisition is not correlated with time-varying household characteristics. In particular, compulsory acquisition that converts agricultural land into land designated for urban and industrial purposes is planned centrally by the state many years before compulsory acquisition actually occurs. The top-down approach of the acquisition process makes it

impossible for any correlation between household unobserved time-varying characteristics and land expropriation to exist. In addition to providing qualitative discussion, we quantitatively perform two placebo tests in Section 5.5 to further strengthen our argument that the resulting estimates are indeed causal.

5 | RESULTS

5.1 | Compulsory acquisition and household welfare

We present the estimates of the effects of compulsory acquisition on household welfare proxied by household monthly food expenditure in Table 1. As evident in column 1, losing land through acquisition decreases household welfare. Specifically, a 10 percentage point increase in the fraction of land expropriated is associated with a 2.2% decline in household monthly spending on food.

In column 2, instead of looking at the fraction of land expropriated, we examine the extensive margin (whether the household ever has its land taken away by the government). Exposure to land expropriation reduces household food expenditure by 6.4%. Since food consumption is a good measure of household welfare, especially in developing countries (Meyer & Sullivan, 2003; World Bank, 2014), our estimate implies that households are worse off when their farmland is expropriated.

In order to distinguish between the long-run and the short-run effects of compulsory acquisition, we also estimate a modified version of our main specification (i.e., Equation 1) by replacing a single measure of the proportion of land lost through compulsory acquisition cumulatively up to a given year with four variables: the fraction of land expropriated up to 4 years ago; the fraction of land expropriated from 4 to 7 years ago inclusive; the fraction of land expropriated from 8 to 11 years ago inclusive; and the fraction of land taken away 12 years ago and before. It is worth noting that the sum of these four variables is equal to the fraction of land expropriated in column 1.

As shown in column 3, there are negative repercussions for households in the short and medium run. These adverse consequences become less severe in the long run. Specifically, 10 percentage point increases in the fraction of land expropriated up to 4 years ago and in the fraction lost 4–7 years ago are associated with a reduction in current food expenditure by 2.2% and 2.1%, respectively. Interestingly, the fraction of land expropriated 8–11 years ago or at least 12 years ago does not seem to have a significant impact on current household welfare. The results suggest that the adverse ramifications of compulsory acquisition on rural households' welfare may take up to 10 years to fade away.

5.2 | Heterogeneous effects of compulsory acquisition

In Vietnam, households without political connections and ethnic minority households tend to face many disadvantages. In particular, compared to those with strong ties to government officials, politically unconnected households in rural Vietnam have weaker property rights protection and limited access to credit as well as transfers (Markussen & Tarp, 2014). Relative to the Kinh majority group, the ethnic minority population falls behind in multiple aspects, such as poorer living conditions, fewer employment opportunities, lower access to education, and other resources (Dang, 2012; World Bank, 2009). Therefore, it is of interest to analyze the heterogeneous impacts of compulsory acquisition on household welfare in terms of political connection and ethnicity.

First, household political connection may be correlated with both household welfare and the fraction of land expropriated. Specifically, richer households with connections to local officials who are

TABLE 1 Impacts of compulsory acquisition on household welfare

	Y = log monthly food expenditure		
	(1)	**(2)**	**(3)**
Fraction of land expropriated	−0.215***		
	(0.059)		
Land expropriation (indicator)		−0.064**	
		(0.027)	
Fraction of land expropriated < 4 years ago			−0.224***
			(0.065)
Fraction of land expropriated 4–7 years ago			−0.211***
			(0.069)
Fraction of land expropriated 8–11 years ago			−0.135
			(0.106)
Fraction of land expropriated ≥ 12 years ago			0.321
			(0.227)
Sample size	9,381	9,381	9,381

Notes: Robust standard errors are clustered at household level. All controls include: (i) household characteristics such as gender, age, age squared, ethnicity, education of household head, household size, demographic composition of household (proportion of young children and elderly disaggregated by gender), household total land area (in log terms), and whether any household member is affiliated with the Communist Party; (ii) household and year fixed effects; (iii) province-specific linear trend.

*p < .1; **p < .05; ***p < .01.

responsible for implementing compulsory acquisitions (Section 2.1) can reduce their area of expropriated farmland. Thus, besides conditioning on household affiliation with the Communist Party, we further control for a new variable proxying for household political connection (relative/friend with officials). This variable is an indicator taking the value 1 if household has a relative or friend holding office or a trusted position in the commune, and 0 otherwise. The results are reported in column 1 of Table 2. The magnitude is slightly reduced compared to the baseline estimate (column 1, Table 1).

The pattern observed suggests that the effects can be different between politically connected households and those without any political connection. Therefore, we estimate the effects of compulsory acquisition for each group separately in columns 2 and 3 of Table 2. Politically unconnected households are those neither having a friend/relative holding office/trusted position in the commune (relative/friend with officials = 0) nor having any household member affiliated with the Communist Party (Communist Party = 0). Politically connected households are those either having a friend/relative holding office/trusted position in the commune (relative/friend with officials = 1) or having any household member affiliated with the Communist Party (Communist Party = 1). As expected, the effects of compulsory acquisition are stronger for households without any political connection. For politically connected households, the estimate is statistically non-significant. Therefore, it is possible that the impacts of compulsory acquisition mainly come from politically unconnected households. Our findings are in line with those of Markussen and Tarp (2014) who document the relative advantage in terms of access to economic resources among Vietnamese households with political connections. In particular, the authors point out that having a relative as a government official raises the odds ratios of receiving public transfers and obtaining credit by 1.43 and 1.62, respectively.

Next, we provide the estimates of the impacts of compulsory acquisition on household welfare by household head's ethnicity in columns 4 and 5. There is a negative association between the fraction of

TABLE 2 Heterogeneous impacts of compulsory acquisition on household welfare

	Y = log monthly food expenditure				
	All households	**Politically unconnected households**	**Politically connected households**	**Minority ethnicity households**	**Kinh ethnicity households**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**
Fraction of land expropriated	−0.213***	−0.262***	−0.109	−0.375***	−0.150**
	(0.059)	(0.073)	(0.122)	(0.133)	(0.065)
Relative/friend with officials	0.055*		0.101*		
	(0.032)		(0.056)		
Communist Party	0.060***		0.099*		
	(0.017)		(0.052)		
Sample size	9,381	6,662	2,719	1,929	7,452

Notes: Robust standard errors are clustered at household level. All controls include: (i) household characteristics such as gender, age, age squared, ethnicity, education of household head, household size, demographic composition of household (proportion of young children and elderly disaggregated by gender), household total land area (in log terms), and whether any household member is affiliated with the Communist Party; (ii) household and year fixed effects; (iii) province-specific linear trend.
*$p < .1$; **$p < .05$; ***$p < .01$.

land expropriated with household welfare for both minority households and Kinh (the major ethnicity) households. A 10 percentage point increase in the fraction of land expropriated is associated with a reduction in monthly food expenditure of approximately 3.8% and 1.5% for minority and Kinh households, respectively. The magnitude of the impact is much larger for minority households. This observation raises a critical concern that compulsory acquisition during urbanization and industrialization could perpetuate the ethnic inequality in Vietnam. For instance, Dang (2012) shows that the poverty rate among ethnic minority people is five times higher than that of the majority Kinh and the educational gap between these groups is almost 2.5 years. The author also points out that minority people have lower access to health care and higher child mortality rate. Given these enormous disparities, we urge the Vietnam government to pay extra attention to minorities to save this group from falling even further behind during the development process.

5.3 | Compulsory acquisition and household income

To explain the fall in food expenditure, we examine the effects of compulsory acquisition on household income from various activities. The results in Table 3 indicate that the loss of land through compulsory acquisition lowers household earnings from agriculture but not from other activities. A 10 percentage point increase in the fraction of land expropriated leads to a 9% decrease in agricultural income (column 1). Since land is the key input to agricultural production, the loss of farmland unsurprisingly depresses farm output and reduces household income from agriculture. This finding is consonant with Ghatak et al. (2013) and Jiao et al. (2015) who also detect a decline in agricultural earnings following land acquisition.

Turning to non-agricultural income, we find that households suffering loss of land are unable to substitute the loss of agricultural income with income from non-agricultural activities. In particular, compulsory acquisition does not have any impact on household income from salaries as the coefficient

estimate is positive but falls short of statistical significance (column 2). The effects of compulsory acquisition on household income from common property resources and self-employment are all negative but statistically indistinguishable from zero (columns 3 and 4). If we instead look at the share of income from each source in household total income, we uncover similar findings to Tran et al. (2014b). Specifically, the fraction of land expropriated is negatively associated with the share of agricultural income but positively associated with the share of income from wages/salaries (Table A2).

Overall, compulsory acquisition results in loss of income and employment opportunities for rural households. Income loss accounts for the reduction in household welfare as evidenced by the drop in food expenditure. Given that approximately half of total employment in Vietnam comes from agriculture, rural households are especially vulnerable to land acquisition. If they cannot substitute agricultural income loss arising from compulsory acquisition with alternative forms of income, rural households could become marginalized during the period of urban industrial expansion, worsening the income inequality problem in Vietnam.

5.4 | Household behaviors following compulsory acquisition

In this subsection we explore in detail the four main aspects of household behaviors following compulsory acquisition: household allocation of agricultural production factors (i.e., capital and labor); household entry to other non-agricultural occupations; changes in household behaviors that contribute to social capital; and household saving behaviors.

5.4.1 | Capital and labor allocation

First, we expect households to decrease the amount of both capital and labor devoted to agricultural activity after their land is seized. This is exactly what we find in Table 4. We estimate Equation (1) with outcome variables the log of household total market value of agricultural capital (column 1) and the log of the monthly average number of days the household spends on agricultural activity (column 2). The estimated effects on agricultural capital and labor are negative and statistically distinct from zero. Specifically, the value of agricultural capital falls by 10.9% in response to a 10 percentage point increase in the fraction of expropriated land. Intuitively, once households lose part of their farmland, they may not need as much agricultural equipment as before and could divest some of their

TABLE 3 Impacts of compulsory acquisition on household income

	Log income from agriculture	Log income from salaried jobs	Log income from common property resource	Log Income from self-employment
	(1)	(2)	(3)	(4)
Fraction of land expropriated	−0.903***	0.124	−0.257	−0.053
	(0.110)	(0.119)	(0.208)	(0.191)
Sample size	8,462	5,673	2,930	2,530

Notes: Robust standard errors are clustered at household level. All controls include: (i) household characteristics such as gender, age, age squared, ethnicity, education of household head, household size, demographic composition of household (proportion of young children and elderly disaggregated by gender), household total land area (in log terms), and whether any household member is affiliated with the Communist Party; (ii) household and year fixed effects; (iii) province-specific linear trend.

*$p < .1$; **$p < .05$; ***$p < .01$.

agricultural capital. Analogously, households also devote less time to agricultural work. An additional 10 percentage point increase in the fraction of expropriated land is associated with a reduction in the monthly average number of days spent on farming of 6.7%.

Second, although households spend less time on agricultural activities and reduce agricultural capital, they are no more likely to switch to other non-agricultural work. Formally, we estimate Equation (1) with outcome variables the log of the monthly average number of days the household spends on non-agricultural activities (column 3) and an indicator that takes the value 1 if any household member participates in salaried employment and 0 otherwise (column 4). Despite being positive, these estimates are statistically and economically insignificant, suggesting that compulsory acquisition does not have any effect on the number of days spent on non-agricultural activities or on the probability of participating in salaried employment.

Taken together, Table 4 provides evidence that while households losing their land divest their agricultural capital and reduce their working time in agriculture, they cannot transition into non-agricultural occupations. Our estimates in Table 4 offer a deeper explanation for the conclusion of Section 5.3 on the household's inability to replace agricultural income loss with alternative forms of income. In particular, households are unable to supply their labor in the non-agricultural labor market.

5.4.2 | Social capital

Given the importance of social capital in a broad range of outcomes such as household welfare (Adepoju & Oni, 2012; Yusuf, 2008), access to credit (Grootaert, Oh, & Swamy, 2002), and micro-enterprise performance (Santarelli & Tran, 2013), it is also of interest to examine potential changes in household behaviors that contribute to social capital. To do so, we estimate Equation (1) with a set of dummy variables indicating the household's contribution to social capital as dependent variables.

The results are reported in Table 5. The dependent variables include a dummy that takes the value 1 if any household member is part of the farmers' union and 0 otherwise (column 1); an indicator that equals 1 if any household member is part of a cooperative and 0 otherwise (column 2); and an indicator that takes the value 1 if any household member is affiliated with a religious group and 0 otherwise (column 3). We find that a higher fraction of land expropriated decreases the probability of household being a member of the farmers' union. A 10 percentage point increase in the fraction of land expropriated decreases the likelihood of households being affiliated with the farmers' union by approximately 0.68 percentage points. Compulsory acquisition, however, does not have any effect on household

TABLE 4 Impacts of compulsory acquisition on capital and labor allocation

	Log value of agricultural capital	Log days spent in agriculture	Log days spent in non-agriculture	Having a salaried job
	(1)	(2)	(3)	(4)
Fraction of land	−1.089***	−0.667***	0.108	0.009
expropriated	(0.228)	(0.077)	(0.131)	(0.038)
Sample size	9,381	9,381	9,381	9,381

Notes: Robust standard errors are clustered at household level. All controls include: (i) household characteristics such as gender, age, age squared, ethnicity, education of household head, household size, demographic composition of household (proportion of young children and elderly disaggregated by gender), household total land area (in log terms), and whether any household member is affiliated with the Communist Party; (ii) household and year fixed effects; (iii) province-specific linear trend.

*$p < .1$; **$p < .05$; ***$p < .01$.

membership of a cooperative or a religious group. Quantitatively, the resulting estimates presented in columns 2 and 3 are economically and statistically insignificant. According to this exercise, the main takeaway is that compulsory acquisition reduces the household's contribution to agriculture-related social capital, but not other forms of social capital.

5.4.3 | Saving behaviors

Finally, we investigate how compulsory acquisition can alter household saving behaviors. As discussed in Section 2.1, after the seizure of land, cash payments from the state are provided to affected households to compensate for their loss of farmland. Cash transfers have been shown by previous studies to improve the livelihoods of the disadvantaged group in developing countries by increasing employment opportunities and consumption (Blattman et al., 2013; Gertler et al., 2012). In our context, the household could use its compensation to purchase new plots of land and continue working in agriculture, or for other non-agricultural purposes. The reduction in agricultural income induced by the decline in both capital and labor devoted to agriculture documented earlier suggestively negates the former possibility.

Here, we further explore how households make use of cash compensation following compulsory acquisition. To do so, we re-estimate Equation (1) with the compensation amount the household received (in log form) as the main explanatory variable, instead of the fraction of land expropriated (FLE_{ht}). The dependent variables of interest include household saving rate and indicators for various purposes of saving. Household saving rate is computed by dividing the household total savings by household total net income. There are four indicators of purposes of saving: saving for education (column 2) takes the value 1 if the household wants to save for educational purposes and 0 otherwise; saving for health care (column 3) takes the value 1 if the household savings are intended for medical expenditure and 0 otherwise; saving for old age (column 4) takes the value 1 if the household wants to save for retirement and 0 otherwise; and saving to earn interest (column 5) takes the value 1 if household savings are put in the bank to earn interest and 0 otherwise.

The estimation results are reported in Table 6. We find that the compensation amount is positively associated with the household saving rate (column 1). In other words, the higher the compensation, the more the household tends to save. Turning to purposes of (columns 2–5), a higher compensation amount leads to an increase in the probability of saving for education but not for other purposes such as health care, old age, and interest earning. Taken together, we find evidence that households attempt

TABLE 5 Impacts of compulsory acquisition on social capital

	Being a member of farmers' union	Being a member of cooperative	Being a member of religious group
	(1)	(2)	(3)
Fraction of land	−0.068*	−0.005	0.000
(expropriated)	(0.041)	(0.009)	(0.028)
Sample Size	9,360	9,360	9,360

Notes: Robust standard errors are clustered at household level. All controls include: (i) household characteristics such as gender, age, age squared, ethnicity, education of household head, household size, demographic composition of household (proportion of young children and elderly disaggregated by gender), household total land area (in log terms), and whether any household member is affiliated with the Communist Party; (ii) household and year fixed effects; (iii) province-specific linear trend.

*$p<.1$; **$p < .05$; ***$p < .01$.

TABLE 6 Impacts of cash compensations on saving behaviors

	Household saving rate	Saving for education	Saving for health care	Saving for old age	Saving to earn interest
	(1)	(2)	(3)	(4)	(5)
Log compensation	0.110*	0.021**	0.005	−0.001	0.010
amount	(0.065)	(0.010)	(0.004)	(0.021)	(0.006)
Sample size	1,801	1,801	1,801	1,801	1,801

Notes: Robust standard errors are clustered at household level. All controls include: (i) household characteristics such as gender, age, age squared, ethnicity, education of household head, household size, demographic composition of household (proportion of young children and elderly disaggregated by gender), household total land area (in log terms), and whether any household member is affiliated with the Communist Party; (ii) household and year fixed effects; (iii) province-specific linear trend.

*p < .1; **p < .05; ***p < .01.

to raise their stock of human capital. Suggestively, it could be the case that households intend to raise their competitiveness in the non-agricultural labor market by investing in human capital.

5.5 | Placebo tests

As discussed in Section 4, the inclusion of household fixed effects cannot eliminate household time-varying characteristics that are correlated with the fraction of land expropriated. While the top-down approach in designating land acquisition makes it almost impossible for land expropriation to be correlated with household characteristics (see Section 2.1), we further strengthen this argument by conducting additional quantitative analysis. In particular, we perform two placebo tests supporting the causal interpretation of our estimated effects of compulsory acquisition on food expenditure and agricultural income.

In the first placebo test, we estimate the effects of compulsory acquisition on a household's welfare (proxied by food expenditure) *before* its land is actually expropriated. To do so, we simply regress the outcomes of interest on the land expropriation indicator (taking the value 1 if the household ever loses any part of its land through compulsory acquisition, 0 otherwise). It is important to emphasize that this is not panel regression, that is, household fixed effects are not included. The unit of observation in this exercise is a unique household; therefore, the sample size is reduced substantially.

It is also worth noting that we cannot do this placebo test for the effects of treatment intensity (i.e., regressing on FLE_{ht}), as the fraction of land expropriated changes over time. The motivation for this placebo test is as follows. If the household's unobserved characteristics are uncorrelated with the probability of expropriation, there should be no relationship between household outcomes prior to land acquisition and household's expropriation status. In other words, if compulsory acquisition indeed has negative impacts on food expenditure, we expect the placebo estimates to be statistically insignificant.

The results are provided in Table 7. Column 1 presents the actual estimate of the effects of compulsory acquisition on food expenditure (the same as Table 1, column 2). In column 2, land expropriation (indicator) takes the value 1 if households did not experience compulsory acquisition in 2006 but had their farmland expropriated in subsequent years, 0 otherwise.[11] Expropriated households in 2006 are dropped because we do not observe characteristics prior to 2006. The coefficient on land expropriation (indicator) captures the "impact" of compulsory acquisition (occurring after 2006) on household

TABLE 7 Placebo tests

	Y = log monthly food expenditure				
	Actual Estimate	Placebo Estimates			
	(1)	(2)	(3)	(4)	(5)
Land Expropriation (Indicator)	−0.064**	0.043	−0.014	0.023	−0.002
	(0.027)	(0.043)	(0.046)	(0.050)	(0.063)
Sample size	9,381	1,502	1,370	1,220	1,081

Notes: Robust standard errors are clustered at household level. All controls include: (i) household characteristics such as gender, age, age squared, ethnicity, education of household head, household size, demographic composition of household (proportion of young children and elderly disaggregated by gender), household total land area (in log terms), and whether any household member is affiliated with the Communist Party; (ii) household and year fixed effects; (iii) province-specific linear trend. Household fixed effects are only included in column 1.

*$p < .1$; **$p < .05$; ***$p < .01$.

welfare in 2006. The placebo estimate has an opposite (wrong) sign and is statistically indistinguishable from zero.

In column 3, land expropriation (indicator) takes the value 1 if households did not experience compulsory acquisition in 2006 and 2008 but were subject to such an event in subsequent years, 0 otherwise (expropriated households during 2006–2008 are excluded). Similarly, in column 4, land expropriation (indicator) takes the value 1 if households did not experience compulsory acquisition from 2006 to 2010 but had their farmland expropriated in subsequent years, 0 otherwise (households subject to acquisition during 2006–2010 are dropped). In column 5, land expropriation (indicator) takes the value 1 if the household did not experience compulsory acquisition from 2006 to 2012 but was subject to such an event in subsequent years, 0 otherwise (households exposed to acquisition during 2006–2012 are omitted). The placebo estimates are both economically and statistically insignificant, supporting the causal interpretation of the actual estimate.
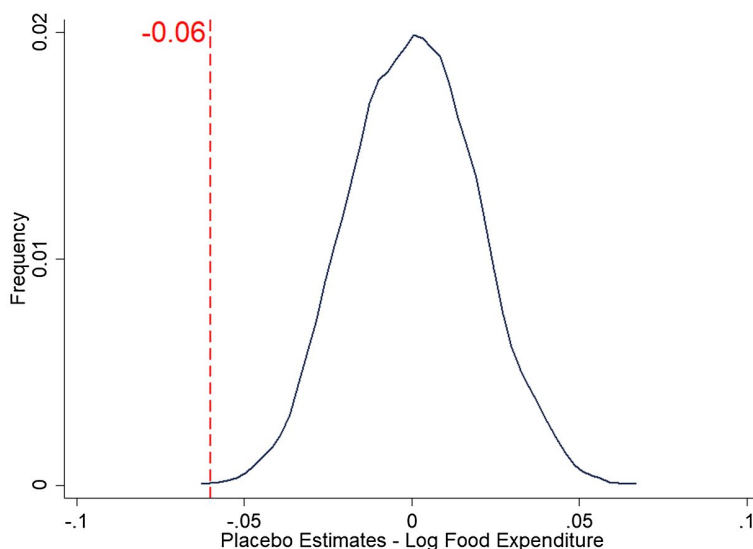

FIGURE 2 Compulsory acquisition and household welfare: Placebo estimates [Colour figure can be viewed at wileyonlinelibrary.com]

In the second placebo test, we randomly assign the treatment status of having land expropriated to households, with the assigned years drawn from the actual pool of treatment years, without replacement. Put it differently, in a given year, the number of households being randomly assigned to have the placebo land expropriation is the same as the actual number of households. Furthermore, conditional probability (assigning without replacement) ensures that the treatment status of a placebo expropriated household does not change once being assigned. We do this for 1,000 sets of placebo compulsory acquisition and estimate Equation (1). Figure 2 plots the distribution of point estimates for food expenditure. The vertical red line denotes the actual estimate. The location of the true estimate indicates that the likelihood of finding the effect of interest merely by chance is very unlikely. Taken together, the results from two placebo tests suggest that our estimated effects of compulsory acquisition could be interpreted as causal.

6 | CONCLUSION

Exploiting the panel nature of the Vietnam Access to Resources Household Survey which provides rich information on rural households within a fixed effects regression framework, we uncover the negative impacts of compulsory acquisition on household welfare (proxied by food expenditure). Specifically, a 10 percentage point increase in the fraction of land expropriated results in a 2.2% reduction in food expenditure. Our analyses further suggest that the adverse consequences of compulsory acquisition on household welfare may take up to 10 years to evaporate. Furthermore, politically unconnected and ethnic minority households are disproportionately vulnerable. We attribute the decline in household welfare to the 9% decrease in agricultural income and households' inability to participate in non-agricultural activities. A deeper analysis shows that the barrier to the non-agricultural labor market prevents expropriated households from shifting their labor supply away from agriculture. We also find that compulsory acquisition decreases households' contribution to agriculture-related social capital but not other forms of social capital. In the analysis of household saving, we provide evidence that cash compensation increases household saving rate. A closer look at the purposes of saving reveals that households intend to raise their human capital levels and thus their competitiveness in the non-agricultural labor market.

The findings presented offer meaningful implications for policy-making on structural transformation and urbanization. In the process of rapid industrialization and urbanization, compulsory acquisition is an inevitable phenomenon in many developing countries, forcing millions of people off their farm livelihood (Jiao et al., 2015; Xu et al., 2011). The practice of compulsory acquisition is particularly prevalent in Vietnam, as it is one of the fastest-growing economies. Hence, by using Vietnam as a laboratory, our study reveals that the loss of farmland due to compulsory acquisition lowers household welfare because households lose earnings from agriculture but cannot switch to other non-agricultural occupations. The provision of cash compensation alone does not solve the problem. Our findings call for immediate action by policy-makers to safeguard households that lose land. Government interventions should aim to facilitate household participation in the non-agricultural labor market such as enhancing skills and competitiveness for expropriated households. Extra attention should be paid to the ethnic minority population who are disproportionately vulnerable and could fall further behind during the development process.

the Vietnam Business and Economics Research Conference (Ho Chi Minh City) 2019. Any errors remain our own.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

DECLARATIONS OF INTEREST

None

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ENDNOTES

[1] For example, China reported a total of 17,900 cases of "massive rural incidents," in which a total of 385,000 farmers protested against the government during the first 9 months of 2006 (Cao et al., 2008).

[2] Tran et al. (2014a, 2014b) find that compulsory acquisition has no effect on household income but leads to a declining share of agricultural income in Hoai Duc district (a peri-urban district of Vietnam). In the context of Cambodia, Jiao et al. (2015) report a reduction in household income if the household experiences land expropriation. Focusing on Ethiopia, Harris (2015) documents that expropriated households are no more likely to move into non-farm activities and that they experience a falling share of income from crops.

[3] The information in a Red Book includes personal details of the recipient and plot characteristics (e.g., address, size, blueprint, expiration date, and land use purpose).

[4] Note also that farmers are granted the right to trade their land-use rights (i.e., their Red Book), not the land itself.

[5] Resolution No. 17/2011/QH13; see https://vanbanphapluat.co/resolution-no-17-2011-qh13-on-the-land-use-master-plan-up-to-2020.

[6] Decision No. 1107/QD-TTg; see https://luatminhkhue.vn/en/decision-no-1107-qd-ttg-dated-august-21–2006-of-the-prime-minister-approving-the-planning-on-development-of-industrial-parks-in-vietnam-up-to-2015-and-orientations-to-2020.aspx.

[7] Further comparison is provided in Appendix B.

[8] The 12 provinces are Dak Lak, Dak Nong, Dien Bien, Ha Tay, Khanh Hoa, Lai Chau, Lam Dong, Lao Cai, Long An, Nghe An, Phu Tho, and Quang Nam

[9] Monetary values are adjusted for inflation and are expressed at 2000 constant prices.

[10] Education of the household head is an indicator that takes the value 1 if the household head completes primary education and 0 otherwise.

[11] In the first placebo test, land expropriation (indicator) takes the value 1 if the household did not experience compulsory acquisition in a given year but was subject to such an event in subsequent years, 0 otherwise. Therefore, the sample size is smaller than that in the baseline regression in column 1.

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APPENDIX A

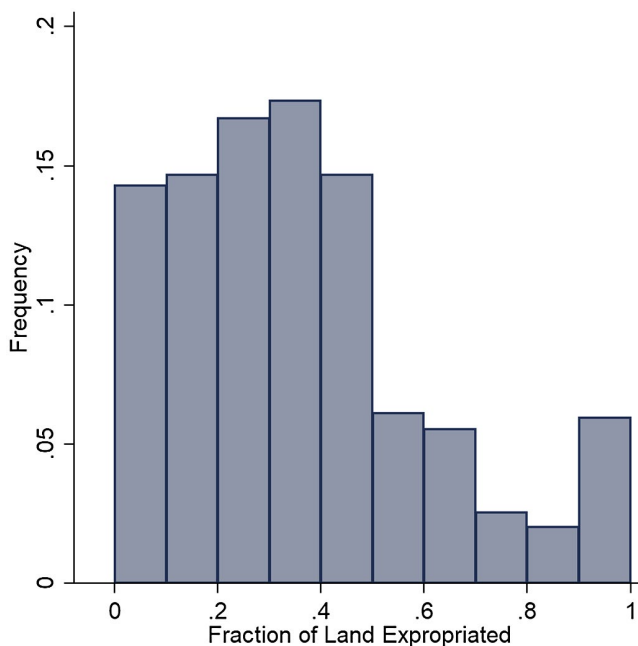## ADDITIONAL QUANTITATIVE ANALYSES

FIGURE A1   Fraction of Land Expropriated among Affected Households

TABLE A1 Summary statistics

	All	Households without land expropriated	Households with land expropriated	Difference (2)–(3)
	(1)	(2)	(3)	(4)
A: Outcome variables				
Monthly food expenditure	547	541	558	−17
	(487)	(513)	(435)	
Income from agriculture	9,968	10,289	9,383	906
	(18,726)	(17,646)	(20,538)	
Income from wage/salary	8,661	8,060	9,757	−1,697
	(13,508)	(12,758)	(14,718)	
Fraction having a waged/salaried job	0.602	0.605	0.596	0.009
	(0.490)	(0.489)	(0.491)	
Income from common property resource	458	474	428	46
	(2,036)	(1,797)	(2,410)	
Income from self-employment	5,758	5,767	5,740	27
	(30,694)	(34,851)	(21,109)	
Number of days spent in agriculture	22.122	21.683	22.956	−1.273
work each month	(23.747)	(23.584)	(24.036)	
Number of days spent in non-agriculture	19.917	21.056	17.752	3.304
work each month	(17.148)	(17.395)	(16.455)	
Market value of agricultural capital	1,160	1,059	1,344	−285
	(9,424)	(8,256)	(11,234)	
B: Control variables				
Fraction of land expropriated	0.129	0.000	0.364	−0.364
	(0.230)	(0.000)	(0.252)	
Household size	4.399	4.580	4.069	0.511
	(1.767)	(1.742)	(1.765)	
Household head is male	0.798	0.818	0.760	0.058
	(0.402)	(0.386)	(0.427)	
Age of household head	53.130	51.185	56.677	−5.492
	(13.384)	(12.939)	(13.455)	
Education of household head	0.725	0.709	0.754	−0.045
	(0.447)	(0.454)	(0.431)	
Ethnic minority household	0.206	0.234	0.154	0.080
	(0.405)	(0.424)	(0.361)	
Fraction of household affiliated	0.082	0.072	0.100	−0.028
with the Communist Party	(0.275)	(0.259)	(0.301)	
Sample size	9,381	6,066	3,315	

Notes: Monetary values are in thousands of VND at 2000 constant prices. Household size is the total number of household members. Gender takes the value 1 for female and 0 otherwise. Years of education are grades completed, top coded at 12.

Table A2 Impacts of compulsory acquisition on household income share

	Income share from agriculture	Income share from salaried jobs	Income share from common property resource	Income share from self-employment
	(1)	(2)	(3)	(4)
Fraction of land expropriated	−0.135***	0.089***	0.018	0.019
	(0.029)	(0.033)	(0.011)	(0.024)
Sample size	9,206	9,205	9,205	9,206

Notes: Robust standard errors are clustered at household level. All controls include: (i) household characteristics such as gender, age, age squared, ethnicity, education of household head, household size, demographic composition of household (proportion of young children and elderly disaggregated by gender), household total land area (in log terms), and whether any household member is affiliated with the Communist Party; (ii) household and year fixed effects; (iii) province-specific linear trend.

*p<.1; **p < .05; ***p < .01.

APPENDIX B

ADDITIONAL QUALITATIVE ANALYSES

In this appendix we compare our study with that of Tran et al. (2014a, 2014b) who also study the case of Vietnam with different sample and methodology. We see our paper as an improvement and complement to Tran et al. (2014a, 2014b). First, in terms of data, Tran et al. (2014a, 2014b) cover one peri-urban district in Hanoi (the capital city) over 2 years. The authors use cross-sectional data with a sample size of fewer than 500 observations. Our paper covers 134 districts across the country over a period of 8 years. We employ the household panel data with a sample size of over 9,000 observations. Thus, we improve Tran et al. (2014a, 2014b) by having a more representative sample and more efficient estimates.

Second, our paper differs from Tran et al. (2014a, 2014b) in its empirical methodology. Tran et al. (2014a, 2014b) use the multinomial logit model and do not deal with the endogeneity of farmland expropriation. We adopt the household fixed effects model to deal with the endogeneity of farmland expropriation. We also provide a series of placebo tests to support the internal validity of our estimates.

Third, there are also differences in the main explanatory variable. Tran et al. (2014a, 2014b) only look at the extensive margin of expropriation, that is, whether households lost their land in a given year (1 year or 2 years ago). However, our explanatory variables capture both the extensive and intensive margins of compulsory acquisition. Our variables further allow us to explore the effects over time.

We proceed to compare the findings. Regarding household income, Tran et al. (2014a, 2014b) do not detect any effect of expropriation on household income. However, Tran et al. (2014a, 2014b) uncover a decrease in the share of agricultural income and an increase in the share of wages/salaries, which is mainly because expropriated households were able to switch from agricultural to non-agricultural sectors. The use of income share does not correctly reflect the increase or decrease in each activity. For example, the increase in wage/salary share could simply result from the reduction in agricultural earnings without the actual increase in earnings from waged work. On the other hand, we directly examine earnings (not the share) from various revenue-generating activities (e.g., agriculture, salaried jobs, self-employment). In this sense, our income measures are more meaningful and provide direct earnings comparison in each activity. We find that compulsory acquisition reduces household income from agriculture. The effect on household income from salaried jobs is positive but falls short of statistical significance.

As for the results on household expenditure and occupation choice, Tran et al. (2014a) find that the positive effects on household expenditure diminish after 2 years. It also takes expropriated households 2 years to switch to non-agricultural occupations. However, with larger sample size and a longer time period, our paper reveals that expropriated households reduce their working time in agriculture but are unable to transition into non-agricultural jobs. While diminishing over time, the negative effects of compulsory acquisition on household welfare may take up to 10 years to evaporate. It is possible that households in Tran et al. (2014a) that suffer loss of land live in a peri-urban area of the capital city, therefore, they could have better non-farm employment opportunities. Households in our context that suffer loss of land reside in rural areas of 12 Vietnamese provinces, hence they may have relatively limited access to the non-agricultural labor market.