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Drivers of transaction costs affecting participation in the rental market for cropland in Vietnam

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Farm incomes in rural Vietnam are tightly constrained by very small farm sizes. Stringent limits on the area of cropland that individuals may own means that farmers need a well-functioning rental market to consolidate land parcels, grow their farm enterprises, adopt new technology and increase incomes. This research investigates the efficiency and equity impacts of the rental market in rural Vietnam and attempts to identify transaction costs impeding the market. A generalised ordered logit model with shifting thresholds allowing transaction costs to impact lessors and lessees differently was specified and estimated using data extracted from the Vietnam Household Living Standards Surveys. The findings show that rental transactions reduced imbalances in factor endowments, transferring cropland to households that were relatively land-poor but more willing and able to farm. However, the market is constrained by transaction costs that affect lessors and lessees differently. It is recommended that government should complete its land registration program and relax restrictions on the use of wetlands to grow crops other than rice. It should also improve access to all-weather roads as this encourages participation on both sides of the rental market, whereas better access to communications infrastructure was found to promote only the supply side.

Key words: generalised ordered logit model, land reform, lessees, lessors, small farms.

1. Introduction

Vietnam recorded impressive economic growth and poverty reduction during the 1990s in response to market-oriented policy reforms (World Bank 2006), including ambitious land reforms in 1988, 1993 and 2003. The break-up of collective farms mandated in 1988 was followed by an equitable allocation of exclusive use rights to individuals. Legislation introduced in 1993 and 2003 broadened the bundle and duration of property rights assigned to landholders but there are concerns that these reforms have not produced institutions

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strong enough to support efficient markets and that economic growth has slowed (Gaiha and Thapa 2007).

Vietnam's per capita GNI was estimated at US$1400 in 2012 – a level much closer to the threshold for low-income countries (US$1035) than to the threshold for upper-middle-income countries (US$4086) (World Bank 2014). More than 80 per cent of Vietnam's poor are located in rural areas, where their livelihoods depend primarily on agriculture (VASS 2007). However, farm incomes are tightly constrained by very small and fragmented land holdings. The average area of cropland operated by farmers is only 0.63 ha (VASS 2007), among the world's smallest (Eastwood *et al.* 2010). Furthermore, some 75 million cropland parcels are owned by almost 12 million rural households (Kerkvliet 2006; Hung *et al.* 2007) resulting in land fragmentation, land losses between plots and inefficient production practices (Hung *et al.* 2007; Phuong 2008).

In theory, an efficient land market should help resolve these problems by providing aspiring farmers with opportunities to consolidate land and expand their operations. As Vietnam's 2003 Land Law still imposes strict ceilings on land ownership (3 ha), opportunities to consolidate and expand farming operations through the land sale market are very limited. Vietnam therefore requires an efficient land rental market to promote growth in agriculture and to raise rural incomes while safeguarding against distress sales and a 'landless class' problem. Previous studies of cropland markets in Vietnam (Deininger and Jin 2008; Do and Iyer 2008) were conducted in the context of Vietnam's 1993 Land Law, which initially allowed household heads to transfer, exchange, mortgage, lease and inherit land use rights. The 2003 Land Law enhanced tenure security by broadening the bundle of land rights to include subletting. In addition, the Law streamlined land administration and made provision for more land to be titled. In theory, this should have improved the efficiency of rental markets for cropland and strengthened incentives to invest in agriculture.

It is pertinent to ask whether rental markets for cropland in Vietnam are efficient as the purchase of cropland by relatively efficient farmers is constrained by stringent ceilings on the area of cropland that individuals may own. In this study, it is contended that rental markets for cropland remain inefficient in many parts of rural Vietnam, preventing farmers from consolidating cropland parcels, growing their farm enterprises, adopting new technology and increasing both their incomes and those of nonfarming rural households. This study examines factors that motivate farm households to participate in the rental market for cropland in rural Vietnam, the efficiency and equity impacts of these transactions, and the efficiency of the market itself. A generalised ordered logit model is developed and estimated using pooled data extracted from the Vietnam Household Living Standards Surveys (VHLSS) of 2004 and 2008. These surveys were conducted by the General Statistics Office of Vietnam with technical support from the World Bank.

A key contribution of this study is that the theoretical model proposes an ordered dependent variable to measure market participation regimes and uses a generalised ordered logit model with shifting thresholds to identify significant sources of transaction costs and their different impacts on lessors and lessees. This approach offers more nuanced policy insights than earlier studies (Deininger *et al.* 2008; Jin and Deininger 2009; Holden *et al.* 2011) as it does not impose the 'parallel lines' assumption of standard ordered logit and probit models.

2. Efficiency and equity advantages of a land rental market

Existing literature suggests that voluntary land rental transactions have both efficiency and equity advantages (Crookes and Lyne 2003). Allocative efficiency improves because the market imposes an opportunity cost on idle and underutilised cropland. This creates incentives for voluntary transactions that transfer this land to more effective farmers, that is farmers willing and able to make more profitable use of the land (Lyne and Nieuwoudt 1991). Cost efficiency improves because the rental market allows farmers to exchange and consolidate cropland parcels (Norton 2004). Perhaps more important than these static efficiency gains, the rental market allows effective farmers to grow the scale of their farming operations making investments in knowledge and new technology more profitable as larger farms increase the revenue from new technology while reducing the unit costs of adoption (Kille and Lyne 1993). These efficiency gains may further translate into higher levels of output and better employment opportunities on farms and in service industries (Deininger and Jin 2005). In addition, efficient cropland rental markets help overcome imperfections in markets for credit, insurance, management, labour, draught power and machinery through interlinked contracts (Bardhan 1989).

Viewed from an equity perspective, a rental market offers these efficiency gains without the threat of distress sales and a 'landless class' problem as it entails only a temporary transfer of certain use rights (Crookes and Lyne 2003; Deininger and Jin 2005). Lessors and lessees would not transact voluntarily unless the rental transaction creates greater utility for both parties than the costs it imposes on them. Furthermore, land rental markets allow prospective farmers to 'scale the agricultural ladder' while also providing lessors with an opportunity to gain experience in nonfarm occupations (Crookes and Lyne 2003).

However, land markets will not develop in the absence of secure land tenure and low transaction costs (Lyne and Thomson 1998). Security of land tenure defined by Place *et al.* (1994) involves three components: breadth, duration and assurance of land rights. The breadth of land rights refers to the bundle of rights, such as rights of access, use, exclusion and transfer assigned to an individual or organisation. Duration of rights means the length of time during which the validity of a specified right or set of rights is protected by law or custom. Assurance of land rights signifies the certainty with which

rights and duration are exercised. Although rental markets do not require a bundle of land rights as broad or durable as those essential to sale markets, these rights must nevertheless be assured.

This definition of tenure security signals an inverse relationship between security of tenure and transaction costs (TCs) in land rental markets (Lyne *et al.* 1997; Lyne 2009). In the case of an inadequate breadth of rights, for example, a potential lessee may be faced with prohibitively high TCs of discovering the owner of a land parcel and establishing a contract if there are many legitimate claimants with inclusive rights to the parcel. Risks that arise from inadequate assurance of land rights can also be viewed as a source of TCs (Lyne *et al.* 1997). Examples of risks stemming from inadequate assurance of rights include uncertainty about institutions to resolve disputes, complex and costly procedures to establish or defend contracts, or unpredictable judgements (Lyne *et al.* 1997). All of these reduce land tenure security and raise TCs.

Transaction costs can be usefully divided into *ex ante* and *ex post* components (Williamson 1985). *Ex ante* TCs are mainly fixed costs associated with costs of searching for markets and partners, drafting, negotiating and safeguarding contracts. Hence, *ex ante* TCs tend to rise when physical infrastructure is poor (specifically roads and telecommunications) (Lyne 2009), when accessing necessary documents or securing approval from local officials is time-wasting and costly, or when the legal fees from the use of a notary and the registration of land transfer are high (de Janvry *et al.* 2001). *Ex post* TCs are largely variable costs associated with monitoring, renegotiating and enforcing contracts, and losses or risk of losses arising from the opportunistic behaviour of lessees and lessors (Skoufias 1995).

Transaction costs effectively drive a wedge between potential lessees and lessors; these costs tend to lower the price offered by the potential lessee while raising the potential lessor's reserve price, creating a 'price band' in land rental markets and excluding those within the band who find it unprofitable to participate (Key *et al.* 2000; Crookes and Lyne 2003). When land is highly fragmented, as in Vietnam, potential market participants will face pronounced unit *ex ante* TCs. In the case of prohibitively high *ex ante* fixed TCs, the costs preclude contracting and are therefore unobservable (Crookes and Lyne 2003). An increase in *ex post* TCs tends to reduce the quantity of land transacted as they are largely variable costs. It follows that insecure tenure and high transaction costs prevent land rental markets from functioning as efficiently as they might.

3. Land reform in Vietnam since 1988

Vietnam initiated ambitious and comprehensive land reforms in 1988. The Land Law of 1988 mandated the break-up of collective farms and the allocation of exclusive use rights to individuals. By 2007, more than 80 per

cent of the agricultural land had been registered with land use certificates (LUCs) that conferred a relatively broad bundle of use and transfer rights on landholders (Phuong 2008). It was anticipated that enhanced tenure security would motivate farming households to invest more labour and capital in land. The 2003 Land Law intended to strengthen these incentives and promote allocative efficiency by allowing subletting and by removing earlier limitations imposed on lease duration (less than or equal to 3 years in the 1993 Land Law). Furthermore, the extended use of LUCs as a mortgage, guarantee or capital share was expected to increase the supply of credit to farming households.

Despite the impressive success of its land reforms, there is evidence of widespread inadequacy in the breadth of rights to cropland in Vietnam. Possession of a LUC does not prevent local authorities from zoning wetland for rice production. Markussen *et al.* (2011) found that, at plot level, about 36 per cent of sampled plots 'must grow rice in all seasons' despite the user's preference for other crops. The duration and assurance of land rights are also constrained. According to the 2003 Land Law, the right to land cultivated with annual crops expires after 20 years, and the limit for land supporting perennial crops is 50 years. Although LUCs may be renewed at the end of the period (the first certificates expired in 2013), renewal is conditional on an official's assessment that the farmer has used, and will continue to use, the land for its certified purpose. When making its assessment, local government can (and may have a political incentive to) adjust rights (Kerkvliet 2006). Huyen and Ha (2009) provide evidence of land disputes that government has been slow to resolve, and of local governments expropriating land 'in the public interest' without offering fair compensation. These deficiencies in tenure security raise TCs. High TCs have also been attributed to cumbersome and costly bureaucratic procedures for transferring farmland use rights (Phuong 2008) and to poor physical infrastructure, particularly rural roads and telecommunications (Anderson *et al.* 2009).

Huy (2013, pp. 62–67) presents descriptive statistics computed from 2004 and 2008 VHLSS data suggesting an improvement in the efficiency of the rental market over this period. The proportion of rural households making use of the rental market increased from 16.9 per cent in 2004 to 18.4 per cent in 2008. The average area operated by farming households was not significantly higher in 2008 than 2004, but the data revealed a consolidation of parcels as indicated by a reduction in the average number of plots operated. Despite these gains, more than 80 per cent of the sample households did not participate in the market. The rate of nonparticipation remained high compared to corresponding estimates of 54 per cent for India (Deininger *et al.* 2008) and 37 per cent for Bangladesh (Rahman 2010). In addition, approximately five per cent of sample households left cropland idle, supporting the view that TCs are high – fixed *ex ante* TCs in particular.

4. The empirical model and its results

4.1. Data and the empirical model

In this study, a generalised ordered logit model was specified and estimated using pooled data from the VHLSS04 and VHLSS08.[1] These VHLSS were designed as cross-sectional surveys each covering around 45 000 households with a small panel component. Questions relating to expenditure and agricultural land were addressed to a subset of about 9000 households in both 2004 and 2008. These households were drawn from roughly 3000 communes representative at the national, regional, urban and rural levels (Baulch and Dat 2011). This study focuses only on the subsample of rural households that farm or possess farmland, for which the sample sizes were 5782 and 5648 for 2004 and 2008, respectively.

Approximately 20 per cent of households interviewed in 2004 were reinterviewed in 2008. The analysis could have been confined only to the panel data, but this would have resulted in a substantial loss of information as the number of rental market participants in the subsample declined from 1962 to just 371. While most of this decline can be attributed to survey design, some of it can be attributed to attrition. Baulch and Dat (2011) report attrition at the household level of 14 per cent between VHLSS02 and VHLSS04. They also found evidence that attrition was nonrandom – a problem that can bias a balanced panel. While the 2004 to 2008 time period is perhaps small enough to treat unobserved household characteristics (like farming ability) as time invariant, a decision was taken to analyse pooled data rather than panel data in order to preserve information on land rental transactions and to increase the sample size and the precision of the estimators. A detailed explanation of the model outlined in this section is provided by Huy (2013, pp. 99–106).

In the absence of TCs, the market rent is determined by the supply of available cropland and the demand for cropland for agricultural production. The demand for cropland, in turn, derives from the value of the marginal product of cropland (MPC), the implicit land rent. A lessee is willing to pay rent based only on the result of the agricultural production process because he/she receives only the benefits derived from using the land as a productive factor (Binswanger *et al.* 1995). For this study, the value of the MPC is defined as the net return to land, accounting for the income remaining after paying for all productive factors and inputs (except land) involved in the agricultural production process.

Let $e'(\bullet)$ denote the first derivative of a well-behaved net income function $e(\bullet)$ with respect to cropland, and $\check{S}_h$ denote the latent value of the MPC for household h in cropland autarky when the household is not capital

[1] VHLSS key data were either not gathered or were not gathered at the parcel level prior to 2003 and could not be used in this study. The data were purchased from the General Statistical Office of Vietnam and access is restricted to the buyer.

constrained. Then $\check{S}_h$ can be written as a linear expression of $\acute{e}(\bullet)$ as:

$$\check{S}_h = \acute{e}(X_h) = \alpha + X_h\beta + \varepsilon_h, \tag{1}$$

where α is the intercept; X_h is a $(1 \times K)$ vector of explanatory variables with associated parameters β; ε_h is the random error.

In the presence of TCs associated with market participation, the costs cause a gap between rented-in and rented-out prices, creating a 'price band'. Let $r_h(TC^{\text{i}})$ denote the effective rent paid by household h written as a function of TCs, which equals the market rent plus TCs associated with renting in land. Let $r_h(TC^{\text{o}})$ denote the effective rent received by household h written as a function of TCs, which equals the market rent minus TCs associated with renting out land. Accordingly, the 'price band' implies that $r_h(TC^{\text{i}}) - r_h(TC^{\text{o}}) > 0$ and this gap is an indicator of the size of TCs when using the market. It is assumed that a household cannot simultaneously be both a lessee and a lessor, given the existence of TCs. The assumption is reasonable in the context of Vietnam where only about 0.4 per cent of households in the sample participate in both sides of the market.

With the existence of TCs, a rural household's decision on market participation is based on its latent value of the MPC under land autarky, $\check{S}_h$, and TCs associated with market participation, $r_h(TC^{\text{o}})$ or $r_h(TC^{\text{i}})$. Assuming rational economic behaviour and that other markets important to farmers function reasonably well, the household becomes a lessor if $\check{S}_h < r_h(TC^{\text{o}})$. In contrast, the household becomes a lessee if $\check{S}_h > r_h(TC^{\text{i}})$. Finally, the household does not participate in the market if $r_h(TC^{\text{o}}) \leq \check{S}_h \leq r_h(TC^{\text{i}})$, that is no land adjustment occurs inside the 'price band'.

Being an abstract construct, $\check{S}_h$ is an underlying continuous but latent process. However, the outcome of the household's decision on market status (i.e. being a lessor, nonparticipant or lessee) can be observed. The discussion in the preceding paragraph suggests that there are only three mutually exclusive and collectively exhaustive regimes of the cropland rental market that can be ranked in order of $\check{S}_h$ for farming household h. Accordingly, the observed market participation regime for farming household h can be tied to $\check{S}_h$ by a nonlinear probability model of ordinal outcomes in a form:

$$R_h = \begin{cases} = 1 \text{ for the lessor regime} & \text{if } -\infty < \check{S}_h \leq \mu_1 \\ = 2 \text{ for the autarkic regime} & \text{if } \mu_1 < \check{S}_h \leq \mu_2 \\ = 3 \text{ for the lessee regime} & \text{if } \mu_2 < \check{S}_h \leq +\infty \end{cases}, \tag{2}$$

where R_h is an index taking on values of 1, 2 and 3 in ascending order and $\mu_1 = r_h(TC^{\text{o}})$ and $\mu_2 = r_h(TC^{\text{i}})$ are thresholds. It is worth noting that the difference between two levels of ordering scale (i.e. the lessor regime compared to the autarkic regime, the autarkic regime compared to lessee regime) is not the same on the scale of $\check{S}_h$. The focus of this type of model is

on the order response probabilities, and the actual values assigned to R_h are irrelevant, except that they maintain the order.

A generalised ordered logit model was used to estimate order response probabilities for the regimes in Equation (2). This overcomes the limitations of a parallel-lines model[2] (Long 1997; Williams 2006) and allows the thresholds (cut points) to be influenced by a number of proxy variables representing TCs. The latter point is demonstrated and explained by Huy (2013, pp. 99–106). In this study, the parallel assumption was relaxed and the threshold equations were expressed as linear functions in the form:

$$\begin{aligned} \mu_{1h} &= r_h(TC^{\mathrm{o}}) = \gamma_0^o - Z_h^{\mathrm{TC}}\gamma^o \\ \mu_{2h} &= r_h(TC^{\mathrm{i}}) = \gamma_0^i + Z_h^{\mathrm{TC}}\gamma^i. \end{aligned} \tag{3}$$

where Z_h^{TC} is a vector of proxy variables for TCs assumed to influence threshold levels for household h with associated parameters γ; the superscripts o and i indicate renting out or renting in cropland, respectively.

The variables used to explain the thresholds and implicit value of the MPC are presented in Table 1 and Appendix S1, respectively. Most of the variables explaining the implicit value of the MPC are self-explanatory. Dummy variables were introduced to capture systematic differences in land quality anticipated across the four land typologies in which households are located (DELTA, MIDLAND, MOUNTAIN and COASTAL). REGIONCPI, a consumer price index expressed in January 2004 prices, was used to control for regional differences in output market prices that affect the value of the MPC. Regional dummy variables were also included to control for differences in weather and other unobserved factors that vary systematically across regions.

The drivers of TCs[3] presented in Table 1 warrant further explanation. ENDOWTITLED, defined as the share of endowed cropland registered with LUCs, was included to capture the effect of titling on TCs. Whether or not the registration of LUCs has promoted the cropland rental market in rural Vietnam remains an empirical question as titling programs and their outcomes tend to be context specific.

RICEZONING, measured as the ratio of rice sown area to total sown area, was intended to capture TCs arising from the limited breadth and assurance of land rights associated with restrictions on converting rice land to other more profitable crops. LANDDISPUTE, scoring one for communes with land conflicts and disputes, and zero otherwise, captures risks at the

[2] In a parallel lines model, the vector of coefficients is the same for all values of outcomes, except the intercept (or thresholds), that is changing the intercept shifts the probability curve to the right or to the left, but it does not change the slope coefficients. It is in this sense that the regression curves are parallel.

[3] No attempt was made to measure the absolute size of TCs as TCs are often unobserved (Key *et al.* 2000).

Table 1 Summary statistics of variables driving transaction costs

Variables	Description	Cropland rental regime					
		Lessors (n = 839)		Nonparticipants (n = 9468)		Lessees (n = 1123)	
		Mean	SD	Mean	SD	Mean	SD
ENDOWTITLED	Share of endowed cropland area with LUCs	84.03	33.98	77.02	38.35	66.53	43.82
RICEZONING	Rice zoning index (ratio of rice sown area to total sown area)	0.27	0.39	0.56	0.37	0.65	0.33
LANDDISPUTE	Commune has land conflicts and disputes (1 if yes, 0 otherwise)	0.40	0.49	0.37	0.48	0.32	0.47
OWNPHONE	Household owns a telephone (1 if yes, 0 otherwise)	0.42	0.49	0.30	0.46	0.30	0.46
RADIOSTATION	Commune has a radio relay station (1 if yes, 0 otherwise)	0.88	0.32	0.76	0.43	0.80	0.40
OWNVEHICLE	Household owns a motorised vehicle (1 if yes, 0 otherwise)	0.52	0.50	0.57	0.50	0.55	0.50
CMNROAD	Commune has all-weather roads (1 if yes, 0 otherwise)	0.73	0.44	0.61	0.49	0.67	0.47
CMNMARKET	Commune has a local market (1 if yes, 0 otherwise)	0.67	0.47	0.60	0.49	0.65	0.48
ETHNICITY	Commune has diverse ethnic groups (1 if yes, 0 otherwise)	0.40	0.49	0.58	0.49	0.43	0.50
RELIGION	Commune has diverse religions (1 if yes, 0 otherwise)	0.67	0.47	0.56	0.50	0.58	0.49

Source: Computed from VHLSS04 and VHLSS08.

commune level, which arise from both inadequate assurance and inadequate breadth of land rights. Like zoning, LANDDISPUTE is expected to impact negatively on market participation.

Ownership of a telephone (OWNPHONE) and a motorised vehicle (OWNVEHICLE) were viewed as proxy variables for fixed TCs. Households that own these assets are expected to face lower TCs when participating in the cropland rental market, although the assets might also explain differences in productivity between farms. TCs were expected to be lower in communes that have radio broadcast systems (RADIOSTATION) to disseminate local news and information, roads with permanent surfaces that can be negotiated by cars (CMNROAD) and a local market (CMNMARKET) serving as a forum for the exchange of information and social interaction.

ETHNICITY, scoring one if the commune has more than one ethnic group and zero otherwise, is introduced to account for language barriers and lower mutual trust that may serve to raise TCs. Similarly, RELIGION, scoring one if the commune has more than one religious group and zero otherwise, captures diversity in belief and norms that could discourage people from exchanging information.

4.2. Results

The generalised ordered logit model was estimated using the maximum likelihood method with Stata software. All of the explanatory variables had variance inflation factors less than ten, suggesting that the estimated model is free of any serious multicollinearity (Long 1997). Individual parameter estimates are presented in Table 2 (all variables explaining rental market participation) and Table 3 (ranking of transaction cost drivers).

Appendix S2 compares parameters estimated for the generalised ordered logit with those generated by a standard ordered logit model and a multinomial logit model. A global test of the parallel-lines assumption was conducted using both Brant and Likelihood Ratio tests. The test results rejected the standard ordered logit model and favoured the generalised ordered logit model at the one per cent level of probability (Huy 2013, p. 166). The reason for this becomes apparent when comparing the coefficients estimated by the generalised ordered logit model for the transaction cost drivers, as some of the significant coefficients (e.g. CMNROAD and ETHNICITY) have different signs for lessors and lessees. These coefficients also differ markedly from those estimated by the multinomial logit model, which does not make use of information provided by the ordered dependent variable. For these reasons, only the results of the generalised ordered logit model presented in Table 2 are considered in the sections that follow.

When interpreting the estimates in Table 2, it is worth noting that the scores assigned to the ordered dependent variable increase with increases in the latent value of the MPC. A positive coefficient estimated for an explanatory variable therefore indicates that an increase in the variable

Table 2 Motives for, and effects of transaction costs on, rental market participation

Variables	Description	Generalised ordered logit parameter estimates	
Variables explaining the motive for rental market participation			
ENDOWAREA	Cropland endowment (ha)	−0.13**	
ENDOWPLOT	No. of endowed cropland plots	−0.15**	
DELTA	Delta commune (dummy)	−0.22	
MIDLAND	Midland commune (dummy)	−0.21	
MOUNTAIN	Mountainous commune (dummy)	−0.18	
HHLDSIZE	Adult equivalent household size	0.093**	
CHILDDEPCY	Child dependency ratio	0.84**	
WIDOW	Widow headed household (dummy)	−0.067	
HEADAGE	Age of the head (years)	−0.042**	
lnHEADAGE2	Ln† Square of head age	0.24	
HHLDEDU	Education of the household (yrs)	0.026*	
EXPERIENCE	Farming experience of the household (yrs)	0.018**	
SELFFARM	Self-employed farmer (dummy)	0.30**	
EXTENSION	Visits by extension officers to commune	−0.0054*	
FARMWAGE	Commune average farm wage (1000VND/hr)	0.091**	
lnFARMASSET	Ln Value of farm assets (1000VND)	0.086**	
lnREMITTANCE	Ln Annual income from remittances (1000VND)	−0.015	
lnLOANVALUE	Ln Total loan amount (1000VND)	0.020**	
REGIONCPI	Regional CPI (Rural Red River Delta = 1)	−1.37	
REGION2	North East (dummy)	0.18	
REGION3	North West (dummy)	−0.17	
REGION4	North Central Coast (dummy)	0.20*	
REGION5	South Central Coast (dummy)	0.17	
REGION6	Central Highlands (dummy)	0.47*	
REGION7	South East (dummy)	0.46*	
REGION8	Mekong River Delta (dummy)	0.35**	
YEAR	Time dummy (1 if 2008, 0 otherwise)	−0.17	
Variables driving transaction costs with shifting thresholds		*Renting-out*	*Renting-in*
ENDOWTITLED	Share of endowed cropland area with LUC	−0.003**	−0.006**
RICEZONING	Rice zoning index	2.14**	0.71**
LANDDISPUTE	Commune has land conflicts and disputes	0.03	−0.14
OWNPHONE	Household owns a telephone	−0.51**	0.01
RADIOSTATION	Commune has a radio relay station	−0.50**	−0.03
OWNVEHICLE	Household owns a motorised vehicle	0.07	−0.16*
CMNROAD	Commune has all-weather roads	−0.21*	0.17*
CMNMARKET	Commune has a local market	−0.08	0.09
ETHNICITY	Commune has diverse ethnic groups	0.80**	−0.56**
RELIGION	Commune has diverse religions	−0.15	0.08
CONST/CUT	Constants/cut points	2.86	−1.95
	Observations	11 430	
	Log likelihood	−5653	
	Prob > χ^2	0.000	
	Pseudo R^2	0.141	

Note: The dependent variable is cropland rental market regime, which takes on values of 1, 2 and 3 for the lessor, the autarkic and the lessee, respectively. †Ln is the natural logarithm. *, **Significantly different from zero at the 5 and 1 per cent level of probability, respectively.
Source: Computed from VHLSS04 and VHLSS08.

Table 3 The relative importance of sources of transaction costs

	Renting-out threshold			Renting-in threshold		
	Estimates	Partially standardised estimates	Rank	Estimates	Partially standardised estimates	Rank
Land tenure						
ENDOWTITLED	−0.003**	−0.125	5	−0.006**	−0.223	3
RICEZONING	2.14**	0.801	1	0.71**	0.267	2
LANDDISPUTE	0.03	0.013	10	−0.14	−0.066	6
Other sources of transaction costs						
OWNPHONE	−0.51**	−0.237	3	0.01	0.004	10
RADIOSTATION	−0.50**	−0.231	4	−0.03	−0.013	9
OWNVEHICLE	0.07	0.035	9	−0.16*	−0.080	5
CMNROAD	−0.21*	−0.103	6	0.17*	0.083	4
CMNMARKET	−0.08	−0.039	8	0.09	0.041	7
ETHNICITY	0.80**	0.299	2	−0.56**	−0.278	1
RELIGION	−0.15	−0.073	7	0.08	0.040	8

*, **Significantly different from zero at the 5 and 1 per cent level of probability, respectively.
Source: Computed from VHLSS04 and VHLSS08.

implicitly leads to higher MPC. This, in turn, makes it more likely that the household would shift to a higher category of market regimes than its current one, given the prevailing market rent and associated TCs, when using the market. By contrast, negative coefficients indicate that higher values of the explanatory variable increase the likelihood of being in the current, or a lower, market regime. Given this interpretation, the estimated results are, with one exception, consistent with *a priori* expectations.

Among the traditional factors of agricultural production, the coefficients estimated for ENDOWAREA and ENDOWPLOT are negative, while those estimated for HHLDSIZE and FARMASSET are positive. These estimated coefficients are statistically significant at the one per cent level of probability. The implication is that the rental market transfers cropland from relatively land-abundant, but labour- and capital-poor rural households to those with relatively less cropland but more family labour and farm assets. This is in line with findings in KwaZulu (Lyne 2009), China (Jin and Deininger 2009) and Ethiopia (Holden *et al.* 2011). This evidence supports the view that the cropland rental market promotes efficient land use and reduces imbalances in factor endowments at household level, leading to greater equalisation of the shadow prices for cropland, family labour and farm capital across rural households.

Specialisation effects are also evident. The coefficient estimated for HEADAGE is negative and statistically significant, while the coefficients estimated for HHLDEDU, EXPERIENCE, SELFFARM and LOANVALUE are positive and statistically significant. These estimates suggest that the rental market transfers cropland to younger, full-time farmers and households that have more farming experience, better education and greater access

to credit. In short, the market transfers cropland to more effective farmers, that is to those more willing and able to farm.

Equity impacts of the cropland rental market are also evident. The negative coefficient estimated for ENDOWAREA suggests that rental transactions tend to equalise farm sizes, with cropland transferred from relatively land-rich to land-poor households. The negative coefficient of HEADAGE is consistent with the hypothesis that the rental market allows young prospective farmers to 'scale the agricultural ladder'. Similarly, the results show that households with more dependent children rent in extra cropland – presumably to help meet their higher subsistence needs.

The coefficient estimated for FARMWAGE is statistically significant and positive. If differences in farm wages between communes reflect differences in the quality of farm labour, this finding supports the view that farmers in communes with higher quality labour are more likely to hire additional cropland. Alternatively, it could indicate that wages are higher because renting increases profits and the demand for farm labour. The estimated coefficient of EXTENSION is statistically significant but its sign, contrary to expectations, is negative suggesting that extension services are first targeted at farming households in communes with lower MPC.

Table 3 presents both unstandardised and partially standardised parameters estimated for the threshold equations. The partially standardised coefficients 'provide the rank ordering of the strengths of the relationships of the predictors to the outcome…' (Menard 2011, p. 1416). Importantly, Table 3 points to differences in the effects of individual sources of TCs on lessors and lessees, highlighting the asymmetries in TCs faced by market participants.

On the supply side, RICEZONING and ETHNICITY are respectively the most and second most important sources of TCs that discourage prospective lessors from supplying cropland to the market. In contrast, improvements in physical infrastructure (i.e. access to telephones, the presence of a local radio station and all-weather roads in the commune) reduce TCs and encourage participation by prospective lessors. However, the influence of physical infrastructure on market participation is weaker than that of restrictions on land use and of ethnic diversity in the commune. Registration of LUCs, which also encourages participation by prospective lessors, is the fifth important source of TCs affecting the supply side of the rental market.

Turning to the demand side, ETHNICITY has the highest rank ordering but impacts negatively on prospective lessees. RICEZONING ranks second followed by ENDOWTITLED. Whereas zoning encourages farmers to hire additional cropland (presumably land that is not zoned for rice production), registration of LUCs has the opposite effect. A possible explanation is that improved land tenure security has encouraged emerging farmers, at least as a first step, to invest in fixed improvements and land-saving technology instead of renting in more cropland. The nonsignificance of LANDDISPUTES suggests that the registration of land use rights has indeed served to promote

tenure security. CMNROAD and OWNVEHICLE represent the fourth and fifth most important sources of TCs. Whereas good quality roads encourage prospective lessees to participate in the land rental market, ownership of a motorised vehicle has the opposite effect as it gives prospective lessors better access to the off-farm job market. Lessor households earned twice as much income from off-farm wage remittances than did lessee households (see Appendix S1).

The results presented in Table 3 support the interpretation of these variables as drivers of TCs and not as drivers of productivity. RICEZONING is the only variable that has significant and positive coefficients estimated for both the supply and demand sides, but this result is not consistent with a productivity argument as rice is less profitable than other crops (hence the obligation to grow rice). Although this study benefited from a large sample size and a relatively rich dataset, it is clear that rental market participation is influenced by factors other than those considered in the foregoing analysis. Panel data may reduce potential bias in the parameter estimates but would pose some interesting challenges in estimating the generalised ordered logit model. Similar models can be estimated from panel data using random-effects techniques, but routines are not yet available to estimate such models with fixed effects.

5. Conclusions

This research set out to examine factors that motivate farm household decisions to participate in the rental market for cropland in rural Vietnam, the efficiency and equity impacts of these transactions and the efficiency of the market itself. A generalised ordered logit model with shifting thresholds was used to identify significant sources of transaction costs and their different impacts on lessors and lessees. This flexibility provided more nuanced policy insights than the standard ordered logit model and was also preferred to a multinomial logit model as it exploited the information offered by an ordered dependent variable.

The findings suggest that the cropland rental market reduced imbalances in factor endowments at the household level by transferring cropland to more effective users, that is to those more willing and able to farm. The evidence points to a class of farmers who are using the rental market to extend their farming operations, allowing them to benefit from size economies that make investments in knowledge and new technology more profitable. Equity advantages were also revealed as cropland transferred from relatively land-rich to land-poor households, allowing young farmers to 'scale the agricultural ladder'.

However, the findings also reveal significant sources of transaction costs that prevent the cropland rental market from functioning effectively. Importantly, the results identify sources of transaction costs that affect lessors and lessees differently and signal the relative importance of their

impacts. Drawing on these findings, it is recommended that the Vietnamese government should complete its very successful land registration program and consider relaxing restrictions on the use of wetlands to grow only rice. It should also focus on improving access to all-weather roads as this encourages participation on both sides of the rental market whereas better access to communications infrastructure was found to promote only the supply side of the market.

Ethnic diversity appears to be a very important source of transaction costs in the land rental market. Although the surveys delivered rich economic data, they did not provide sufficient information to explore the reasons underlying this finding. Clearly, there is scope for more research into the roles played by social capital and cultural norms, which – in the context of the model developed in this study – may have different impacts on potential lessors and lessees.

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Supporting Information

Additional Supporting Information may be found in the online version of this article:

Appendix S1. Summary Statistics of Variables Explaining the Motive for Rental Market Participation.

Appendix S2. A Comparison of Motives for, and Effects of Transaction Costs on, Market Participation.