Land Rental in Rural China:

The Impacts of Demographics, Household Economy, Land Endowment, and Social Welfare, 2012-2016

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The Rural Sociological Society

2019 Annual Meeting

August 07 - 10, Richmond, VA

Introduction

1. Farmland is an indispensable factor for agricultural production;
2. Marx and Polanyi has demonstrated the commoditization of farmland;
3. Economists and rural sociologists have been studying farmers' land rental behavior in African countries and European countries;
4. Not too much attention has been diverted to China's farmland rental where land reform is on the move.

Three approaches in farmers' behavior analysis

1. Moral peasant

Peasants tend to maintain subsistence ethic (Scott, 1976) and a survival-level life for all the residents within the village, rather than maximizing the profits at the individual level.

2. Rational peasant

Peasants are utility maximizers who made short- and long-term investment in both the public and private sectors (Popkin, 1979).

3. Balanced approach

Peasants try to keep a balance between family needs and the drudgery of its labor force supply (Chayanov, 1964).

Research questions

1. Do off-farm opportunities affect rural family's land rental decision-making?
2. What is the effect of migration on rural family's land rental behavior?
3. Does local market affect farmers' land rental behavior?
4. What are the other socioeconomic factors that are associated with farmer's land rental decision-making?

Literature review

1. Farmland endowment and land disposal

- Small pieces of land are hard to apply agricultural machinery and are advocated aggregating into big blocks (Sklenicka et al., 2014).
- Land tenure security increases the willingness of subcontracting farmland (Holden et al., 2011; Benjamin & Brandt, 2002; Carter & Yao, 2002; Deininger & Jin, 2005).
- Land quality and land location also affect land rental behavior (Hüttel et al., 2016; J. F. M. Swinnen & Vranken, 2003).

Literature review (continued)

2. Household characteristics and land disposal

- There exists a negative relationship between the amount of land and income from crafts and trades (Chayanov, 1964).
- Nonagricultural income prompt land transaction and land abandonment (Noev's, 2008).
- Female landlords are more likely to rent out their land (Holden et al., 2011).
- Family size has a negative effect on land rental decision-making (Chayanov, 1964).
- Agricultural equipment and educational attainment also has a negative effect on land rental decision-making (Huang, Gao, & Rozelle, 2012; Kung, 2002; Feng & Heerink, 2008).

Literature review (continued)

3. Contractual arrangement and land disposal

- Oral leasing agreement occurred between relatives, while formal paper contracts are applied between lessors and lessees who are weakly connected (Wang, Riedinger, & Jin, 2015).
- Leasing with relatives are shorter compared to leasing with formal organizations (Swinnen et al., 2006).
- Transaction cost and rental price are closely related with land rental decision-making (Ito, Bao, & Ni, 2016; J. F. M. Swinnen & Vranken, 2003; Yan & Huo, 2016).

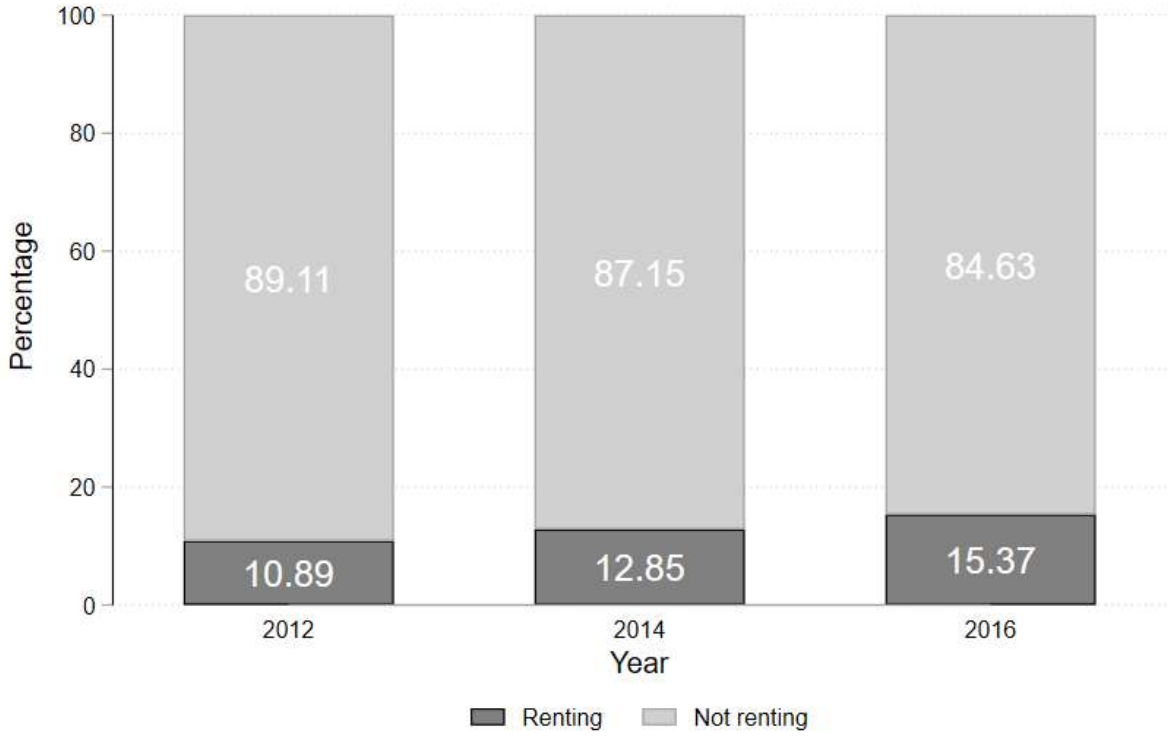
China’s land policy and land reform

1. Land belongs to the government and was distributed by the village collectives evenly by household size through leasing contract;
2. Contract length was 3 years at the beginning, then extended to 15 years from 1984, 30 years from 1993, and unspecified "long-term" from 2008;
3. Selling and buying at the individual household level was strictly banned, renting is acceptable and becomes one of the main ways in land transaction.

Data

We use the wave of 2012, 2014, and 2016 of the China Family Panel Studies (CFPS), a "nearly nationally representative" (Xie & Liu, 2016:472) dataset

Year	Frequent	Percent
2012	6,279	34.46
2014	5,994	32.90
2016	5,947	32.64



Variable description and coding scheme

	Variable	Description	Coding scheme
DV	Dependent variable	Whether or not rented out collectively distributed land in the previous year	Dummy variable 0 = No 1 = Yes
Household demographics	Household head age	Household head's age	Continuous variable
	Household gender	Household head's gender	Continuous variable
	Household head marital status	Household head's marital status	Dummy variable 0 = Single 1 = Married
	Household head education	Household head's educational attainment	Continuous variable
	Household size	Household size	Continuous variable
	Self-employment	Whether or not engage in self-employment business	Dummy variable 0 = Single 1 = Married
Household Economy	Household total income	Total income (1,000 Yuan)	Continuous variable
	Wage income	Wage income (1,000 Yuan)	Continuous variable
	Agricultural income	Agricultural income (1,000 Yuan)	Continuous variable

Variable description and coding scheme (continued)

	Variable	Description	Coding scheme
Land Endowment	Land area	Amount of collectively distributed land (Mu)	Continuous variable
	Agricultural machinery	Value of agricultural machinery (1,000 Yuan)	Continuous variable
	Agricultural subsidy	Whether or not receive an agricultural subsidy	Dummy variable 0 = Single 1 = Married
Social Welfare	Pension	Whether or not receive a pension	Dummy variable 0 = Single 1 = Married
	Medical care	Whether or not receive medical care	Dummy variable 0 = Single 1 = Married
Control variables	Market distance	Travel time to the nearest local market by typical transportation (minute)	Continuous variable
	Region	Geographic regions by National Bureau of Statistics of China	Categorical variable 1 = Eastern 2 = Central 3 = Western 4 = Northeastern
	Year	Survey year	Categorical variable 1 = 2012 2 = 2014 3 = 2016

Hybrid model

We use hybrid model (Allison, 2009; Schunck & Perales, 2017) to do the analysis:

$$g(\mu_{ij}) = \beta_w(x_{ij} - \bar{x}_i) + \beta_B\bar{x}_i + \gamma c_i + u_i$$

This method offers two advantages:

- Hybrid model can estimate both random effect and fix effect simultaneously;
- For time-variant variables, hybrid model can give both between-cluster effect and within-cluster effect, making comparison easier.

Missing data

Variable	Missing	Total	Percent missing
Household head age	2,912	18,220	15.98
Household gender	2,912	18,220	15.98
Household head marital status	2,914	18,220	15.99
Household head education	3,237	18,220	17.77
Household total income	601	18,220	3.3
Wage income	35	18,220	0.19
Agricultural income	132	18,220	0.72
Land area	2,113	18,220	11.6
Agricultural machinery	17	18,220	0.09
Agricultural subsidy	3	18,220	0.02
Pension	72	18,220	0.4
Medical care	72	18,220	0.4
Market distance	2,011	18,220	11.04

Imputation strategies

- Impute missing values using chained equations;
- Add 20 imputations;
- For continuous variables, we use Predictive Mean Matching (PMM) and set the knn=5 to mimic the distribution of observed data;
- For dummy variables, we use logistic regression technology to impute the missing values.

Results

		Between-cluster effect	Within-cluster effect	Random effect
Demographics	Household head age	0.0024****	-0.0001	
	Household gender = 1 (Male)	-0.0169	-0.0106	
	Household head marital status = 1 (Married)	-0.0822****	-0.0487***	
	Household head education	0.0026***	-0.0013	
	Household size	-0.0148****	-0.0032	
	Self-employment = 1 (Yes)	0.0991****	0.0369***	
Household Economy	Household total income	0.0001*	0.0000	
	Wage income	0.0009****	0.00040****	
	Agricultural income	-0.0008****	-0.0002**	
Land Endowment	Land area			0.0000
	Agricultural machinery value	-0.0004	0.0001	
	Agricultural subsidy = 1 (Yes)	-0.0288***	0.00147	
Social Welfare	Pension = 1 (Yes)	-0.0153	0.0014	
	Medical care = 1 (Yes)	-0.0314	-0.0254	
Control variables	Market distance			-0.0002***
	Region = 2 (Central)			0.00402
	Region = 3 (Western)			-0.0408****
	Region = 4 (Northeastern)			-0.0046
	Year = 2 (2014)	-0.1630****	0.0212****	
	Year = 3 (2016)	-0.0383	0.0444****	
	Constant		0.2442****	
	Observations		15,670	

**** p<0.001, *** p<0.01, ** p<0.05, * p<0.1

Notes: For the sake of simplicity, standard errors are not shown

Summary

1. The balanced approach is confirmed. Farmers trying to keep the equilibrium of production and consumption based on their economic and demographic characteristics;

2. Self-employment and migration experience substituted the role farmland and social welfare played and detached farmers from their farmlands.

Policy implication

1. In areas where farmers are leaving their farmlands, farmland transaction policies were needed to explicitly clarify the land title for both lessors and lessees and to promote agricultural efficiency and food security;

2. Delicate plans should be developed and employed to ensure the balance between land developability (Chi, 2010) and the survival of the local farmers.

Limitations and future studies

1. Multiple imputation technologies are not compatible with some complex survey setting, we do not consider survey structures such as PSU, SSU, and weight in this study;

2. The data do not have information on the amount and duration of rented farmland which determines the amount of rentable farmland. By treating farmland as a time-invariant variable, the results will probably be biased upward. Similarly, we do not have the information on land quality and rental price which may also play a role in the family's farmland rental decision-making.

Future studies

1. More detailed land transaction data should be collected repeatedly to unveil the causal mechanisms behind farmers' farmland disposal behavior;

2. More work should be done to invest the potential impacts of farmland transaction on land grabbing, food safety, land developability, and the dynamics between rural and urban development.

Thanks

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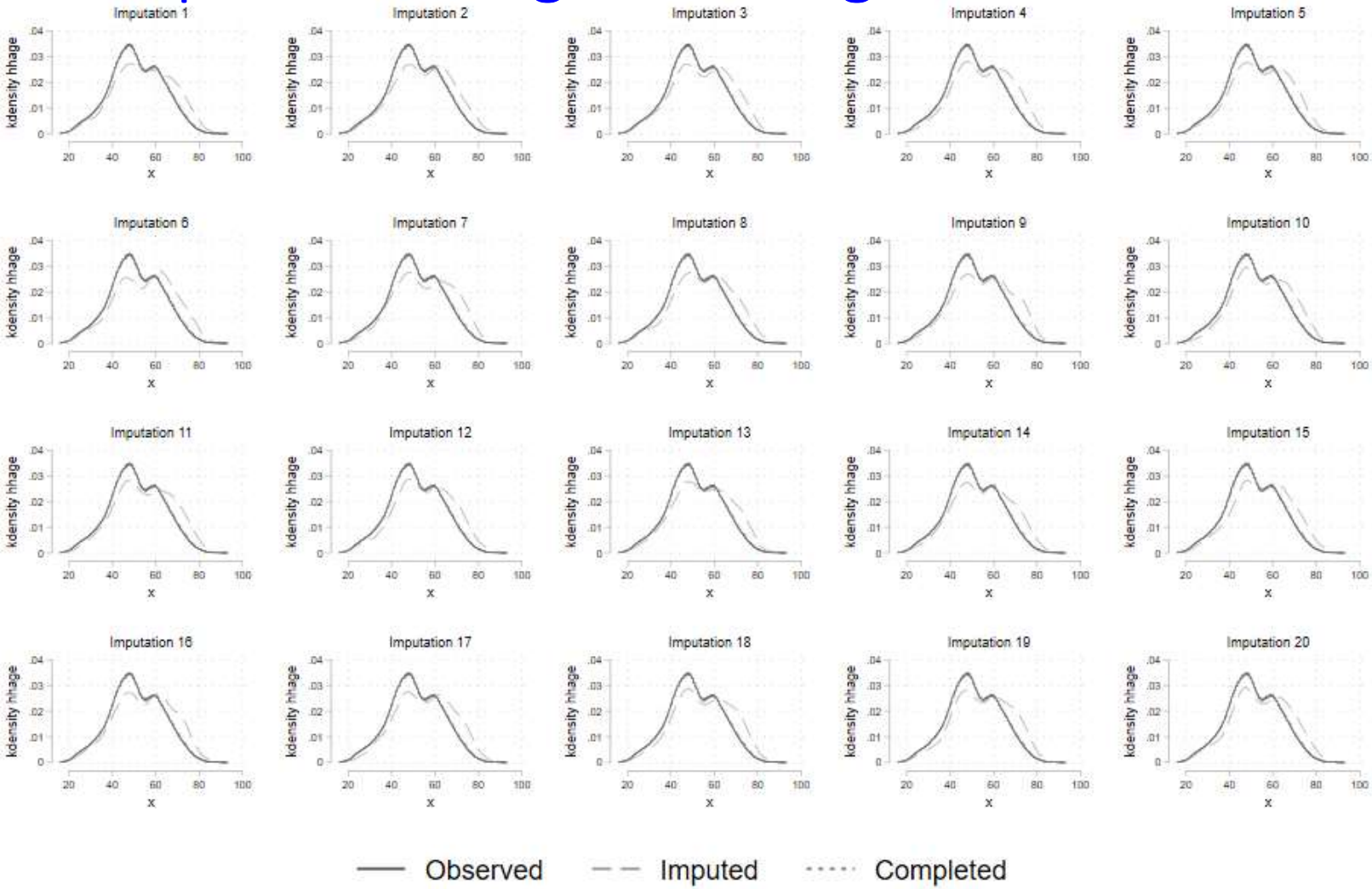
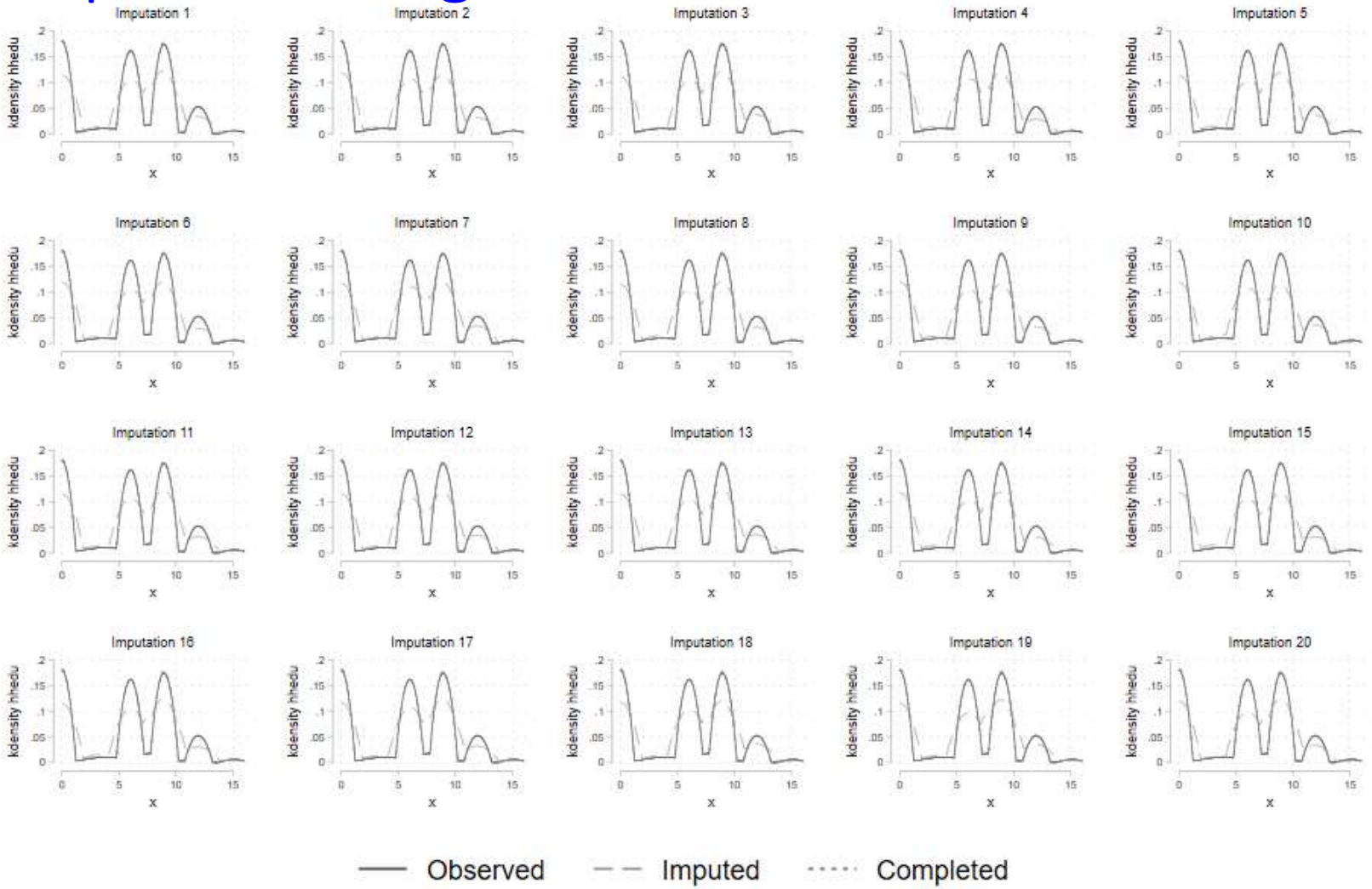
Imputation diagnostics: age distribution



Imputation diagnostics: education distribution



Descriptive statistics

	Variable	Obs	Mean	Std. Dev.	Min	Max
DV	Dependent variable	114,960	0.2178845	0.4128103	0	1
Demographics	Household head age	86,048	51.55718	13.19446	16	93
	Household head gender	86,048	0.6190033	0.4856346	0	1
	Household head marital status	86,026	0.8625997	0.3442715	0	1
	Household head education	82,163	5.575283	4.167822	0	16
	Household size	114,960	3.881159	2.015736	1	19
	Self-employment	114,960	0.0901183	0.2863524	0	1
Household Economy	Household income	109,639	51.38784	212.4026	0.001	11387.8
	Wage income	114,505	28.88997	144.5527	0	10386
	Agricultural income	113,968	8.49565	37.57179	0	1605
Land Endowment	Land area	123,270	9.644748	28.57964	0.1	1100
	Agricultural machinery	114,783	2.669083	17.44669	0	550
	Agricultural subsidy	114,917	0.56325	0.4959855	0	1
Social Welfare	Pension	113,908	0.520341	0.4995883	0	1
	Medical care	113,908	0.9492749	0.2194368	0	1
Control variable	Region = 1 (Eastern)	114,960	0.2821851	0.4500649	0	1
	Region = 2 (Central)	114,960	0.2530358	0.4347532	0	1
	Region = 3 (Western)	114,960	0.3533925	0.4780253	0	1
	Region = 4 (Northeastern)	114,960	0.1113866	0.3146116	0	1
	Year = 1 (2012)	114,960	0.1897965	0.3921417	0	1
	Year = 2 (2014)	114,960	0.3823417	0.4859615	0	1
	Year = 3 (2016)	114,960	0.4278619	0.4947709	0	1