



ARTICLE

# Does housing liquidity matter? Housing property rights and labour market participation of older migrants in China

Chengrui Xiao<sup>1</sup>  and Lijuan Chen<sup>2\*</sup> 

<sup>1</sup>School of Business, Hohai University, Nanjing, China and <sup>2</sup>High-Quality Development Evaluation Institute, Nanjing University of Posts and Telecommunications, Nanjing, China

\*Corresponding author. Email: [chenlijuan.nju@gmail.com](mailto:chenlijuan.nju@gmail.com)

(Accepted 6 December 2021; first published online 16 February 2022)

## Abstract

This paper adds to the literature by identifying the effect of home ownership on rural-to-urban older migrants' labour market participation in China. Using the 2016 wave of the China Migrants Dynamic Survey, we find that older migrants who do not own houses are more likely to participate in the labour market than home owners. To alleviate endogeneity caused by the potential sample selection problem, the propensity score matching method is employed. Our results imply that home ownership can be used as a type of precautionary/retirement savings for older migrants, especially for the ones lacking in financial security. We also show that older migrants owning houses with a higher level of liquidity are less likely to participate in the labour market. It indicates that liquidity may significantly affect the effectiveness for older migrants to use home ownership as precautionary/retirement savings.

**Keywords:** home ownership; liquidity; labour market participation; rural-to-urban older migrants; China

## Introduction

Over the past few decades, socio-economic reforms in China have encouraged a huge amount of the rural labour force to migrate to cities in search of opportunities (Liang and Ma, 2004; Lucas, 2004; Johnson and Woon, 2010; Lyu and Chen, 2019). In recent years, these rural-to-urban migrants, who have been significantly contributing to economic growth and urbanisation in China, are ageing at an unprecedented level (Chen and Powell, 2012). However, rural-to-urban older migrants still participate more actively in the labour market than urban older residents. In 2016, the paid employment rates for rural-to-urban older migrants and urban older residents were 45 and 19 per cent, respectively.<sup>1</sup> Meanwhile, the effective health insurance and social security coverage for rural-to-urban older migrants is perilously lower than that for urban older residents.

As a crucial form of storing family wealth, housing can be served as precautionary/retirement savings for older people.<sup>2</sup> The literature has documented that the retirement decision of older people in developed countries is shaped by housing wealth (e.g. Farnham and Sevak, 2015; Zhao and Burge, 2017). It is still not clear to what extent the labour market participation of older migrants in China depends on home ownership.<sup>3</sup> Furthermore, it remains to be studied whether or not home ownership could be used as compensation for the lack of financial security when older migrants in China make their retirement decision. This paper sheds light on the two questions referred to above, and is concerned with the wellbeing of older migrants.

In addition, the effectiveness for older migrants to use houses as precautionary/retirement savings may differ remarkably across properties with different liquidity levels. Since the liquidation value or redeployability of houses in China is highly correlated with the types of property rights, we use property ownership to approximate the liquidation value of houses. In particular, we investigate whether the labour market participation of older migrants would heterogeneously respond to houses with different liquidity levels. Our analysis provides some further discussions on the importance of improving the housing property rights system in China.

To alleviate the potential endogeneity between home ownership and older migrants' labour market participation, we employ the propensity score matching method to construct comparable treatment and control groups. Our empirical findings are novel. First of all, older migrants who do not own houses more actively participate in the labour market than home owners. This negative effect of home ownership on older migrants' labour market participation is more prominent when older migrants own houses with full property rights, that is, can be more easily liquidated in the market.<sup>4</sup> Second, the heterogeneous analysis reveals that older migrants with a greater lack of financial security would more heavily rely on home ownership in making retirement decisions. Our findings suggest that houses indeed can be used as a form of precautionary savings to compensate for the retirement insecurity of older migrants in China. The wellbeing of older migrants could also be improved by alleviating the urban–rural disparities in housing property and land use rights systems in China.

## Literature review

A sizeable literature has stressed the importance of economic incentives on the labour force participation of older workers (e.g. Vickerstaff and Cox, 2005; Coile and Levine, 2006, 2011; Schils, 2008). Empirical studies generally show that the accumulation of private wealth leads to earlier retirement of older people. For example, Coronado and Perozek (2003) take advantage of the bull market in the United States of America (USA) in the 1990s as an exogenous positive shock to private wealth. They find that older workers who held corporate equities before the bull market retired earlier than they planned. van Ooijen *et al.* (2010) use the Dutch Central Bank Household Survey between 1994 and 2009, and find a small but significant impact of wealth on planned early retirement.

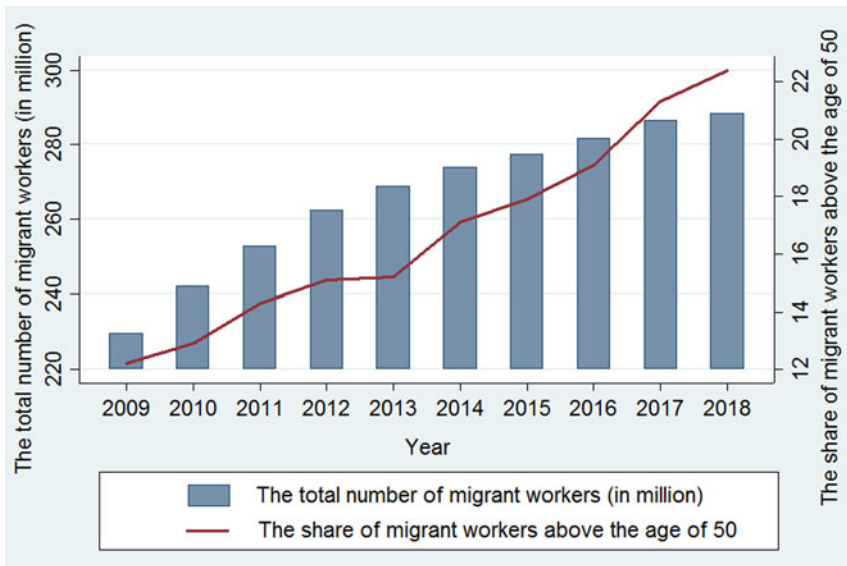
As a major component of private wealth, home ownership imposes a great influence on the labour market participation of older workers. Many studies are

concentrated on providing empirical evidence from the USA. Sevak (2002) and Farnham and Sevak (2015) show that increasing housing wealth leads to earlier retirement. Zhao and Burge (2017) exploit the 2008 financial crisis as an exogenous negative shock to housing wealth and show that the labour supply of older people, especially females, was significantly increased after the bust of housing prices. Similarly, Begley and Chan (2018) find that older workers significantly postponed retirement and delayed their claims on Social Security after 2008, because housing wealth was significantly decreased by the subprime crisis.

In other developed countries, home ownership also contributes to a large share of retirement income for older people in Australia (Yates and Bradbury, 2010), and facilitates early retirement in the European Union member states (Doling and Horsewood, 2003). Morris (2016) demonstrates that older people who are home owners are generally in a better financial condition than older private renters in Australia. Yet, Disney *et al.* (2015) find little support for a statistically significant relationship between housing wealth and the timing of retirement for older people in Britain. Overall, the literature examining the effect of home ownership on labour market participation of older people focuses on developed countries. Our paper contributes to the existing literature by providing empirical evidence from the largest developing country in the world.

It is widely recognised that housing liquidity can be capitalised in housing prices (Head and Lloyd-Ellis, 2012; Head *et al.*, 2014). The previous literature also shows that assets with a higher liquidity level are often more desirable, because they enable people to respond flexibly to retirement events, raise the marginal utility of consumption and improve the financial adequacy of retirees significantly (Carroll, 1997; Noviarini *et al.*, 2019). To some extent, this study provides an understanding of housing liquidity in shaping the effect of home ownership on the labour market participation of older people. Instead of directly investigating the effect of housing wealth on older people's labour supply, we pay attention to how the labour market participation of older migrants in China is affected by home ownership with different types of property rights, which induce tremendous variations in housing liquidity.

Moreover, our paper is closely related to studies examining the economic consequences of property rights. In urban areas, securing property titles to households can significantly increase the labour supply of squatters and facilitate the substitution of adult for child labour (Field, 2007). Property rights can also foster the beliefs of free market (Di Tella *et al.*, 2007), increase subject wellbeing (Cheng *et al.*, 2016), improve real wages and housing costs (Aragón, 2015), and encourage investment in housing and children's education but reduce family size (Galiani and Schargrodsy, 2010). Some studies further show that property titles could increase investment and productivity in agricultural sectors (Goldstein and Udry, 2008; Hornbeck, 2010; Liscow, 2013), and lead to increased migrations from rural to urban areas (De Janvry *et al.*, 2012). Our paper incorporates property rights in studying the effect of home ownership on the labour market participation of older migrants. It also implies that improving housing property rights may foster the wellbeing of older migrants, especially the ones in great need of financial security after retirement.



**Figure 1.** Migrant workers in China: the total number *versus* the share of elderly ones, 2009–2018. Source: National Bureau of Statistics of China, Migrant Worker Survey Reports (2009–2018).

## Institutional background

### *Chinese pension system and retirement patterns of migrant workers*

The Chinese government has established the household registration system known as *hukou*, which divided people into agricultural and non-agricultural residents, since the 1950s. The purpose of *hukou* is to restrict population migration between urban and rural areas. People registered as non-agricultural (urban) and agricultural (rural) residents are entitled to different economic and social benefits. This urban–rural dual system leads to tremendous disparities in socio-economic development between urban and rural areas in China (Adams and Gaetan, 2010; Gunatilaka, 2010).

After the 1978 reform and opening-up, the *hukou* restrictions in China have been gradually deregulated (Chang, 1996; Johnson and Woon, 2010). As a result, the surplus labour in rural China has been crowding into urban areas to seek job opportunities with higher returns (Shen, 1996; Lucas, 2004). Figure 1 plots the total number of migrant workers and the share of migrant workers older than 50 from 2009 to 2018. The total number of migrant workers in China has significantly increased from around 230 million in 2009 to almost 290 million in 2018. In recent years, this enormous rural-to-urban migrant labour force has been ageing rapidly. The share of migrant workers older than 50 was 12.2 per cent in 2009. This number increased to 22.4 per cent in 2018, almost doubling in the past decade. Consequently, the labour market participation of older migrants has recently been increasing in China.

Despite the rapidly ageing migrant workers, the pension system<sup>5</sup> in China discriminates against rural workers.<sup>6</sup> To narrow down disparities in pension plans

for urban and rural workers, in 2009, the central government in China established the New Rural Social Pension System (NRSPS) to provide wide endowment insurance coverage for the rural population.<sup>7</sup> Although the NRSPS participation rate increased dramatically from less than 11 per cent in 2010 to over 78 per cent in 2014,<sup>8</sup> the amount of NRSPS pension benefits is far below the minimum cost of living (Lei *et al.*, 2013). According to the data provided by the 2014 wave of the China Longitudinal Ageing Social Survey (CLASS), the average pension received by rural residents is merely 137 RMB (around US \$20) per month under the NRSPS, while the average pension collected by urban residents is 995 RMB (around US \$145) per month under the Urban Social Pension System.<sup>9</sup>

Since migrant workers receive much lower pension benefits than urban residents, the retirement pattern of older migrants differs tremendously from that of urban workers. In China, male and female urban workers generally retire at 60 and 50–55, respectively. To some extent, the retirement for urban workers is mandatory, especially for those employed in state sectors and government-affiliated institutions. Some urban workers may continue to stay in the labour market after retirement, even though they can live on pensions in later life. On the other hand, the retirement for migrant workers is voluntary, especially for the ones in informal sectors. Since older rural workers cannot receive adequate pension benefits to cover living expenses, they mainly rely on savings and financial support from children in later life. Hence, it is only when older rural workers have obtained enough savings to cover consumption and medical expenses in later life that retirement is an option.

### **The urban–rural dual land system: property rights and liquidity**

The so-called socialist public land ownership is a critical component of the urban–rural dual system in China. This land ownership profoundly impacts urban and rural socio-economic development (Lai, 2000), and induces fundamental differences in urban and rural land transactions from at least three aspects. First and foremost, the land ownership in urban and rural China is different. According to the Land Administration Law, urban land is completely state-owned, whilst rural land is generally collectively owned by local agricultural residents, whose *hukou* are registered in local administrative villages. Agricultural residents with *hukou* registered in these villages could apply for a parcel of land as a homestead. Furthermore, the re-application for such house sites shall not be granted if local agricultural residents sell or lease out their homesteads and houses.

Second, the real-estate development process for collectively owned (rural) land differs from that for state-owned (urban) land (Song, 2015). Specifically, the collectively owned land cannot be used for commercial real-estate development unless it is requisitioned by governments and transferred as state-owned (Li, 2012). The requisition process involves high costs, including compensation for rural residents, and various taxes and fees. However, this process is necessary so that real-estate developers can obtain permits from the Bureau of Land and Resources to build commercial real estate. If not, these houses could not be granted with property ownership certificates issued by the Housing Administration Bureau (HAB) and could not be traded on the open market. The property ownership of houses without HAB certificates is only endorsed by local township governments or village committees.

Third, transaction regulations for real estate on state-owned (urban) land are different from those for property built on collectively owned (rural) land. Commercial property which is built on state-owned land has full property rights and can be traded on the open market. However, the transaction of real estate on rural land does not follow the same rule. By law, rural land is exclusively reserved for villagers, who are registered as local agricultural residents. Both rural land and houses built on it should not be sold, transferred or leased out to people, especially non-agricultural residents, whose *hukou* are registered outside the village (Deng, 2009). Thus, the property built on rural land cannot be classified as standard commercial real estate, since it only has limited property rights and cannot be traded on the open market. Therefore, compared to commercial real estate, houses on rural land have limited property rights, and thus have a lower level of liquidity.

In this paper, home ownership refers to houses owned by older migrants either from the official housing market (*i.e.* the standard commercial housing with full property rights) or from the unofficial housing market (*i.e.* housing with limited property rights), rather than those built on their own entitled village land.

## Methods

### Data

To investigate the effect of home ownership on the labour market participation of older migrants in China, we employ the 2016 wave of the China Migrants Dynamic Survey (CMDS) conducted by the National Health Commission. The National Health Commission sent formally trained investigators to conduct face-to-face data collection. During the process, smartphones or pads with computer-assisted personal interviewing systems were used. The CMDS is not a panel survey, and the questionnaires of the waves differ slightly from each other. We chose the 2016 wave, because it is the most recent one containing general information on locations of migrants' houses. The sampling frame of the 2016 CMDS is based upon the 2015 annual report of migrant population. The survey adopts a stratified, multi-stage and probability proportional to size method for sampling. The 2016 CMDS has a national representativeness and covers 1,459 counties in 31 provinces. The sample size of each province was divided into five levels: 10,000, 8,000, 7,000, 5,000 and 4,000. The 2016 CMDS contains 169,000 respondents older than 15. All migrants have lived in the current place for more than one month but are not registered as local residents in *hukou* status. The survey contains rich information on migrants' socio-economic characteristics, such as family structure, marriage status, employment, education, income and health conditions.

This study focuses on rural-to-urban older migrants who are put in a disadvantaged position under the current health-care and social security system in China (Chen *et al.*, 2020). We restrict our sample to migrants registered as agricultural residents in *hukou* status. We further narrow the sample down to male migrants aged between 60 and 75, and female migrants aged between 55 and 75.<sup>10</sup> The final sample contains 3,217 observations. All continuous variables are winsorised at the 1 and 99 per cent levels in order to alleviate the influence of outliers.

## Measures

### Dependent variable

Our dependent variable *Labour market participation* is an indicator, which equals 1 if the older migrant participates in the labour market and equals 0 otherwise. We define the older migrant as a labour market participant if he or she chooses 'yes' as the answer to the following question: 'Are you employed or looking for a job before participation in this survey?'

### Explanatory variables

To measure home ownership, we use three alternative measures, *i.e.* *Housing*, *Commercial housing* and *Local commercial housing*. The indicator *Housing* equals 1 if the older migrant owns a house, regardless of whether the house has full property rights or not, and equals 0 otherwise. *Commercial housing* is an indicator of whether the older migrant owns a commercial house, which is endorsed with full property rights. *Local commercial housing* is an indicator of whether the older migrant owns a commercial house in the city in which he or she currently lives.

Broadly speaking, commercial housing can be more easily liquidated in the market than houses without HAB certificates. Houses with ownership only endorsed by township governments or village committees cannot be traded in the open market, so it is difficult to find buyers for resale. Additionally, a property resale transaction requires both buyer and seller to be physically present at the local HAB to sign the contract on the spot. It has been documented in the literature that the long distance brings obstacles for business transactions (Cai *et al.*, 2016; Ha *et al.*, 2021). Thus, it is reasonable to expect that, in general, local commercial housing is more easily liquidated in the market than non-local commercial housing, since the transaction would not severely suffer from the asymmetric information problem and the transaction costs are lower. It is worth noting that we mainly discuss the differences in liquidation driven by different types of property rights/home ownership in general.<sup>11</sup> In practice, the liquidity would significantly affect the effectiveness of a fixed asset to be used as precautionary savings.

### Control variables

We also include various socio-demographic variables, such as age, gender (female or male) and education (measured by years of education), as control variables, which may significantly correlate with older people's participation in paid work after retirement (Larsen and Pedersen, 2012).

For married couples, one spouse will value retirement more once the other one has retired (Gustman and Steinmeier, 2000). Hence, we include the marital status of the respondent (married or unmarried) in the regression. In addition, prior studies show that having more children is associated with later retirement for men, while the presence of young children may reduce women's labour force participation (Cebula and Coombs, 2008; Hank and Korbmacher, 2013). The gender of children also matters. Older adults living with unmarried sons are more likely to participate in the labour market (Tong *et al.*, 2019). Furthermore, older people who are economically responsible for other family members are more likely to stay in the labour market (Clark *et al.*, 1980; Szinovacz and Deviney, 2000; Brosig *et al.*,

2010). Thus, we control family size (the number of family members living within the current residential city) and an indicator of whether the older migrant has at least one son in our analysis.

Migration status may also correlate with home ownership and retirement decision. Therefore, the migration geographic distance, frequency and time length are all taken into account. We further add the older migrant's residence willingness, which is measured by an indicator of whether or not the migrant is willing to stay permanently in the current residential city, as an additional control variable. Older migrants' financial status is also brought under control. We include three variables, *i.e.* household income per capita (the logarithm of household income per capita last year), household consumption per capita (the logarithm of household consumption per capita last year) and an indicator of whether the older migrant is covered by endowment insurance to capture older migrant family income, expenditure and social security status.

Table 1 summarises the statistics for the whole sample, for older migrants who own houses and for those who do not. The definitions of dependent and control variables are presented in the last column of Table 1. On average, the labour market participation rate of older migrants in our sample is around 45.06 per cent. This number in older migrants who do not own houses (*i.e.* 53.28%) is higher than that in home owners (*i.e.* 38.19%). We find a similar pattern regarding employment rate. For other control variables, we find that home owners tend to be female, married and have a higher level of education. Compared to older migrants who do not own houses, home owners have a lower level of migration frequency and a relatively longer migration time length. Moreover, in older migrants, home owners are more willing to stay permanently in the current city and have a higher level of household income and consumption per capita than those who do not own houses.

### Model specification

We employ the logit model to examine the effect of home ownership on older migrants' labour market participation. The baseline empirical model is specified as follows:

$$Participation_{ij} = \beta_0 + \beta_1 \times Home\ ownership_i + X_i\theta + \mu_j + \varepsilon_i \quad (1)$$

where  $i$  and  $j$  denote individual and city, respectively.  $Participation_{ij}$  is a dummy variable, which equals 1 if the older migrant  $i$  participates in the labour market of city  $j$  and equals 0 otherwise. In robustness checks, we replace  $Participation_{ij}$  with the dummy variable  $Employed_{ij}$ , which equals 1 if the older migrant  $i$  is employed in city  $j$  and equals 0 otherwise.

The regressor of our main interest, *Home ownership*, contains three measurements, *i.e.* *Housing*, *Commercial housing* and *Local commercial housing*, which are included into the regression one by one. A negative  $\beta_1$  suggests that older migrants who do not own houses are more likely to participate in the labour market than home owners. In other words, when an older migrant becomes a home owner, he or she is inclined to retire. It implies that home ownership is used as precautionary savings for older migrants' retirement. Meanwhile, a positive  $\beta_1$  indicates the opposite effect.



**Table 1.** Summary statistics and definitions of key variables

	Whole sample (1)	Older migrant home owners (2)	Older migrants who do not own houses (3)	(2) – (3)	Definition
Dependent variable:					
Labour market participation	0.4506 (0.0087)	0.3819 (−0.0116)	0.5328 (0.0113)	−0.1509***	Dummy variable, equals 1 if an older migrant has or is looking for a job, equals 0 otherwise
Employed	0.4416 (0.0087)	0.3740 (0.0115)	0.5227 (0.0113)	−0.1487***	Dummy variable, equals 1 if an older migrant is currently employed, equals 0 otherwise
Controls:					
Age	63.1448 (0.0828)	63.0723 (0.1113)	63.2316 (0.1238)	−0.1593	Age of the older migrant
Gender	0.4413 (0.0087)	0.4203 (0.0117)	0.4665 (0.0130)	−0.0462**	Dummy variable, equals 1 if the older migrant is male, equals 0 if female
Marital status	0.8281 (0.0066)	0.8441 (0.0086)	0.8091 (0.0102)	0.0350**	Dummy variable, equals 1 if the older migrant has a spouse, equals 0 otherwise
Education	6.1035 (0.0595)	6.3729 (0.0796)	5.7806 (0.0888)	0.5923***	Years of education
Inter-province migration	0.3957 (0.0086)	0.3972 (0.0116)	0.3940 (0.0127)	0.0032	An indicator of inter-province migration
Inter-city migration	0.7718 (0.0074)	0.7655 (0.0101)	0.7793 (0.0108)	−0.0138	An indicator of inter-city migration
Migration frequency	1.1494	1.1294	1.1733	−0.0440*	The total number of migrations

(Continued)

Table 1. (Continued.)

	Whole sample (1)	Older migrant home owners (2)	Older migrants who do not own houses (3)	(2) – (3)	Definition
Migration length	8.2769 (0.0100) (0.1312)	8.6853 (0.0127) (0.1821)	7.7874 (0.0159) (0.1879)	0.8979***	The total time length of migrations
Family size	2.5109 (0.0226)	2.5508 (0.0307)	2.4631 (0.0335)	0.0877	The member of families living in the current city
Family with at least one son	0.8245 (0.0067)	0.8237 (0.0091)	0.8253 (0.0099)	−0.0016	Dummy variable, equals 1 if the older person has at least one son, equals 0 otherwise
Residence willingness	0.6409 (0.0084)	0.7000 (0.0109)	0.5701 (0.0129)	0.1299***	An indicator of long-term residence willingness
Household income per capita	7.1169 (0.0175)	7.1803 (0.0109)	7.0408 (0.0265)	0.1395***	Logarithm of household income per capita
Household consumption per capita	6.5938 (0.0107)	6.6579 (0.0143)	6.5171 (0.0159)	0.1408***	Logarithm of household consumption per capita
Endowment insurance	0.5433 (0.0087)	0.5469 (0.0118)	0.5389 (0.0112)	0.0080	An indicator of endowment insurance
N	3,217	1,770	1,447		

Notes: The data are mean values of covariates with standard errors in parentheses. The last column provides the definitions of the key variables.

Significance levels: \* 5%, \*\* 1%, \*\*\* 0.1%.

$X_i$  is a vector including various socio-economic characteristics such as education, financial status, family structure and migration status.  $\mu_j$  indicates city fixed effects capturing unobservable time-invariant city factors such as culture and natural endowment, which may have influences on the local labour market.<sup>12</sup> The standard errors are clustered at the province level to deal with the potential heteroscedasticity and serial correlation problems induced by policy interventions regarding migrant workers (Bertrand *et al.*, 2004).

For older migrants, home owners (treatment group) may fundamentally differ from those who do not own houses (control group). The sample selection may lead to a biased estimator. To alleviate this concern, we first estimate Equation (2) via the logit model, and then use the propensity score matching method to construct the comparable treatment and control groups:

$$\text{Prob}(\text{Home ownership}_i = 1|X_i) \quad (2)$$

where the vector  $X_i$  contains the same set of control variables included in Equation (1). We use *Housing*, *Commercial housing* and *Local commercial housing* to replace *Home ownership* in Equation (2) one by one. The results indicate that older migrants who do not own houses indeed differ from home owners with respect to various socio-economic characteristics and migration status.<sup>13</sup>

Next, we use the nearest neighbour matching (NNM) method to construct comparable treatment and control groups.<sup>14</sup> Figure 2 compares the pre- and post-matching density functions of home owners (treatment group) and older migrants who do not own houses (control group). The figure demonstrates that the difference between the density functions of home owners and older migrants who do not own houses disappears after matching. The balancing property of the matching method is satisfied.<sup>15</sup>

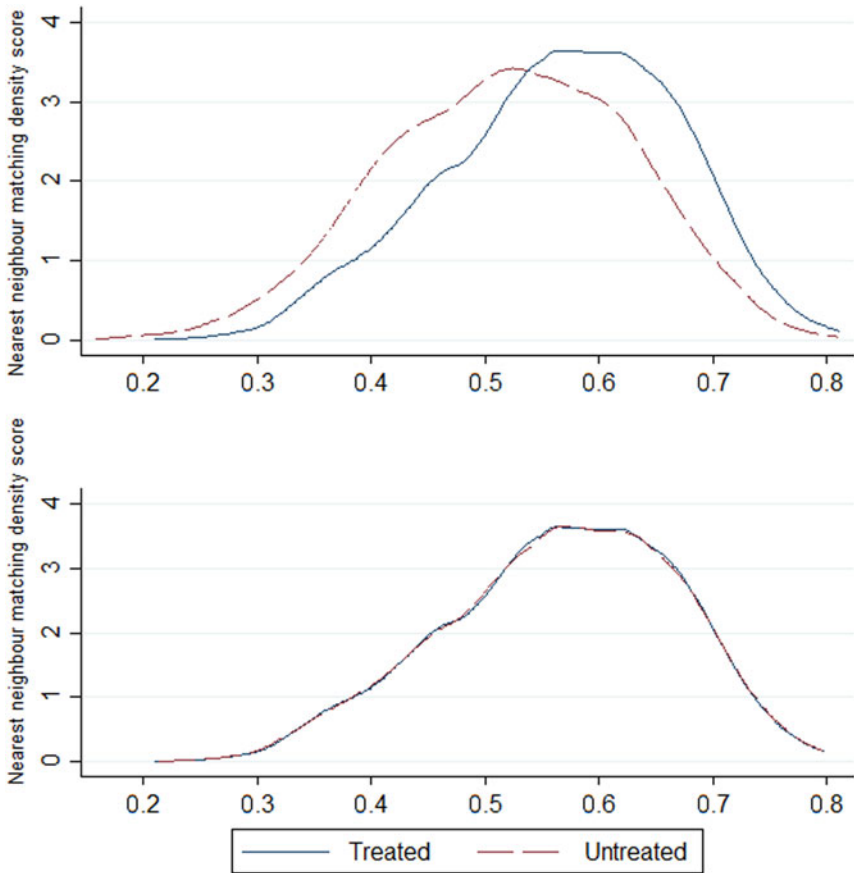
## Empirical results

### Main results

We report the marginal effects at mean values of covariates in all tables, since the logit model is adopted. In Table 2, we present the baseline results of estimating Equation (1) after implementation of the NNM. In column (1), we investigate the effect of home ownership on the labour market participation of older migrants. In columns (2) and (3), *Housing* is replaced by *Commercial housing* and *Local commercial housing*, respectively, in order to examine the effect driven by different types of home ownership.

The marginal effects of *Housing*, *Commercial housing* and *Local commercial housing* are all negative and statistically significant at the 0.1 per cent level. The estimates in Table 2 indicate that older migrants who do not own houses are more likely to participate in the labour market than home owners. That is, when older migrants become home owners, they are inclined to retire. It implies that home ownership can be used as a type of precautionary/retirement savings for older migrants.

Additionally, the marginal effects of *Housing*, *Commercial housing* and *Local commercial housing* are gradually enlarged in magnitude. Since *Housing* is an indicator of home ownership regardless of whether the house has full property rights or



**Figure 2.** Distribution of propensity scores, unmatched versus matched.  
 Source: Authors' elaboration.

not, the larger marginal effect of *Commercial housing* suggests that the negative effect of houses with full property rights on labour market participation of older migrants is larger than that of houses only having limited property rights. We obtain a similar pattern from comparing marginal effects of *Commercial housing* and *Local commercial housing*. Therefore, older migrants are less likely to participate in the labour market when they own local commercial houses than those not in the current residential city. These findings imply that as a type of precautionary saving, home ownership with a higher liquidity level has a more prominent influence on the labour market participation of older migrants in China.

With respect to other control variables, we find that age, family size and household consumption per capita are negatively correlated with the labour market participation of older migrants. On the contrary, male and married older migrants more actively participate in the labour market than female and unmarried counterparts. Older migrants with inter-city (within the same province) migration, a longer

**Table 2.** Main results, marginal effects, logit model after nearest neighbour matching (caliper 0.01)

Dependent variable: Labour market participation	(1)	(2)	(3)
Housing	-0.1617*** (0.0362)		
Commercial housing		-0.2066*** (0.0321)	
Local commercial housing			-0.2850*** (0.0359)
Age	-0.0334*** (0.0041)	-0.0311*** (0.0037)	-0.0328*** (0.0047)
Gender	0.3293*** (0.0349)	0.3174*** (0.0299)	0.3185*** (0.0359)
Marital status	0.1699*** (0.0273)	0.1936*** (0.0308)	0.1598*** (0.0293)
Education	-0.0022 (0.0045)	-0.0009 (0.0042)	-0.0074 (0.0046)
Inter-province migration	0.0379 (0.0489)	0.0640 (0.0511)	0.0387 (0.0451)
Inter-city migration	0.1355** (0.0396)	0.1254** (0.0468)	0.1094** (0.0342)
Migration frequency	0.0396 (0.0323)	0.0494 (0.0305)	0.0504 (0.0322)
Migration length	0.0082** (0.0027)	0.0092*** (0.0022)	0.0078** (0.0023)
Family size	-0.0762*** (0.0164)	-0.0625*** (0.0130)	-0.0471** (0.0145)
Family with at least one son	0.0306 (0.0335)	0.0333 (0.0272)	-0.0099 (0.0388)
Residence willingness	-0.1330*** (0.0357)	-0.0349 (0.0372)	-0.0385 (0.0490)
Household income per capita	0.2718*** (0.0321)	0.2185*** (0.0376)	0.1493*** (0.0356)
Household consumption per capita	-0.1853*** (0.0321)	-0.674*** (0.0440)	-0.0944* (0.0418)
Endowment insurance	-0.0025	-0.0255	-0.0160

*(Continued)*

Table 2. (Continued.)

Dependent variable: Labour market participation	(1)	(2)	(3)
	(0.0389)	(0.0332)	(0.0341)
City fixed effects	Yes	Yes	Yes
N	2,236	1,877	1,650
Pseudo $R^2$ , unmatched	0.0339	0.0876	0.1166
Likelihood ratio $\chi^2$ , unmatched	151.87***	380.84***	490.75***
Pseudo $R^2$ , matched	0.001	0.003	0.004
Likelihood ratio $\chi^2$ , matched	5.53	9.34	12.84

Note: The data are marginal effects at mean values of covariates with standard errors in parentheses. Significance levels: \* 5%, \*\* 1%, \*\*\* 0.1%.

length of migration period and a higher level of household income per capita are also more likely to participate in the labour market.

Following Sianesi (2004), for each regression, we compare the pseudo  $R^2$  and the corresponding likelihood ratio  $\chi^2$  values of the logit model before and after matching. Consistently, we find that the explanatory power of our regressors on the potential sample selection of treatment and control groups becomes statistically insignificant after matching. These results further confirm that the estimated marginal effects are unbiased.

### Robustness checks

#### Alternative measure of the dependent variable

Our main dependent variable is *Participation*, defined as an indicator of older migrants who are employed or are currently looking for a job. As a robustness check, we replace *Participation* with *Employed*, which is an indicator of whether older migrants are employed or not, to investigate how home ownership affects the actual employment of older migrants. The results are summarised in Panel A of Table 3.

The marginal effects of *Housing*, *Commercial housing* and *Local commercial housing* are similar to the corresponding baseline results regarding sign, magnitude and the significance level. Consistently, older migrants who do not own houses are more likely to work than home owners. Older migrants are less likely to get employed in the labour market, when they own houses having a higher level of liquidity, which is driven by the types of property rights/home ownership.

#### Alternative matching method

To check whether our findings are sensitive to the choice of matching method, we adopt alternative methods in the matching process. The results obtained from radius matching with caliper  $0.25 \sigma$  and Mahalanobis distance with propensity score are displayed in Panels B and C of Table 3, respectively. The estimates are close to our baseline findings. Hence, our results would not be significantly altered

**Table 3.** Robust, alternative specifications and subsample analysis

	(1)	(2)	(3)
Dependent variable: Employed:			
Panel A: Alternative measure of dependent variable:			
Housing	-0.1593*** (0.0365)		
Commercial housing		-0.2059*** (0.0321)	
Local commercial housing			-0.2841*** (0.0355)
N	2,233	1,885	1,646
Dependent variable: Labour market participation:			
Panel B: Radius matching with caliper 0.25 $\sigma$ :			
Housing	-0.1646*** (0.0374)		
Commercial housing		-0.2066*** (0.03220)	
Local commercial housing			-0.2962*** (0.0350)
N	2,259	1,893	1,665
Panel C: Mahalanobis distance with propensity score:			
Housing	-0.1330*** (0.0444)		
Commercial housing		-0.2218*** (0.0421)	
Local commercial housing			-0.2500*** (0.0446)
N	1,535	1,294	1,141
Panel D: Exclude older migrants in megacities:			
Housing	-0.1450*** (0.0395)		
Commercial housing		-0.1881*** (0.0411)	
Local commercial housing			-0.2378*** (0.0371)

(Continued)

Table 3. (Continued.)

	(1)	(2)	(3)
N	1,682	1,410	1,229
Panel E: Exclude older migrants with ages above 69:			
Housing	-0.1596*** (0.0358)		
Commercial housing		-0.2120*** (0.0356)	
Local commercial housing			-0.2869*** (0.0368)
N	1,949	1,639	1,412
Panel F: Multi-level logit analysis (random-intercept model):			
Housing	-0.6322*** (0.0970)		
Commercial housing		-0.9329*** (0.1043)	
Local commercial housing			-1.2011*** (0.1098)
N	2,538	2,180	1,974
Controls	Yes	Yes	Yes
City fixed effects	Yes	Yes	Yes

Notes: The data are marginal effects at mean values of covariates with standard errors in parentheses. In Panel F, coefficients and standard errors are reported. Significance level: \*\*\* 0.1%.

by different matching methods. The results further boost our confidence on the validity of the identification strategy.

### *Exclude older migrants in megacities*

In China, housing prices and living expenses are much higher in megacities, *i.e.* Beijing, Shanghai, Guangzhou and Shenzhen, than in other places (Gyourko *et al.*, 2013). As a result, it is more difficult for older migrants to own houses in megacities than in other urban areas. It is also possible that the migration status and labour market participation of older migrants in these megacities are systematically different from those in other cities, although city fixed effects are included to absorb the potential impacts induced by city-level macro-economic factors. If megacities provide better job opportunities to older migrants, our estimates may be upward biased.



To alleviate this concern, we exclude all older migrants in megacities and re-estimate Equation (1) after the NNM. The results are shown in Panel D of Table 3. The marginal effects remain negative and significant in all three columns, with magnitudes similar to the counterparts in the aforementioned findings. Thus, our results are not driven by older migrants in megacities.

#### *Exclude older migrants with ages above 69*

In previous sections, the age ranges for male and female older migrants are 60–75 and 55–75, respectively. In some provinces, older residents above 70 in both urban and rural areas are entitled to receive some allowances from local governments, although the amount of allowances is not enough to cover the minimum cost of living. Yet, such allowances may lead to different incentives in labour market participation for older migrants above and below 70. That is, our results may be sensitive to the upper age limit of older migrants.

To alleviate this concern, we exclude all migrants older than 69. The results are summarised in Panel E of Table 3. The marginal effects of *Housing*, *Commercial housing* and *Local commercial housing* continue to be negative and significant, and are almost unchanged in magnitude. Hence, our findings are robust to the alternative upper age limit of older migrants. Consistently, we find that older migrants who do not own houses are more likely to participate in the labour market than home owners. This negative relationship between home ownership and labour market participation of older migrants is more prominent when houses have a higher level of liquidity induced by property rights.

#### *Alternative model specification*

The CMDS adopts hierarchical multi-stage sampling, so that the data have nested attributes. We employ the multi-level logit model as an alternative model specification to examine whether our findings would be changed when we control for the nested attributes of data. The results are presented in Panel F of Table 3. Similarly, the coefficients of *Housing*, *Commercial housing* and *Local commercial housing* stay significantly negative, and are gradually enlarged in magnitude. Our findings are robust when the multi-level logit model is adopted.

#### *Heterogeneous effects*

In this subsection, we investigate the potential heterogeneity induced by older migrants' socio-economic characteristics, and provide some insights into the pathways of home ownership to labour market participation of older migrants. We also provide further discussions on how the labour market participation of older migrants who own local commercial housing varies across cities with differential potential demand for real estate. The estimated results are summarised in Tables 4 and 5. We adopt the NNM method to construct comparable treatment and control groups in all regressions.

#### *Gender*

In China, social norms have different requirements for males and females (Glasser, 1997; Liu, 2014). Men are considered as the main bread-winner in the family and

**Table 4.** Heterogeneous effects

Dependent variable: Labour market participation	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Gender:		Male			Female	
Housing	-0.2258*** (0.0512)			-0.1143** (0.0406)		
Commercial housing		-0.2628*** (0.0399)			-0.1723*** (0.0328)	
Local commercial housing			-0.3915*** (0.0556)			-0.2324*** (0.0378)
N	889	733	651	1,141	988	832
Panel B: Family structure:		At least one son			No sons	
Housing	-0.1539*** (0.0370)			-0.3092** (0.1056)		
Commercial housing		-0.1883*** (0.0326)			-0.3827*** (0.0730)	
Local commercial housing			-0.2583*** (0.0381)			-0.4513*** (0.0795)
N	1,792	1,525	1,339	323	255	209
Panel C: Distance:		Inter-province migration			Intra-province migration	
Housing	-0.1147* (0.0583)			-0.1738*** (0.0417)		

Commercial housing			-0.2323***			-0.1725***
			(0.0437)			(0.0505)
Local commercial housing				-0.3396***		-0.2540***
				(0.0551)		(0.0489)
N	754	626	569	1,317	1,139	985
Panel D: Endowment insurance:	Endowment insurance			No endowment insurance		
Housing						
	-0.1718**				-0.2159**	
	(0.0480)				(0.0730)	
Commercial housing			-0.1925***			-0.2383***
			(0.0398)			(0.0409)
Local commercial housing				-0.3107***		-0.3105***
				(0.0492)		(0.0504)
N	1,139	995	840	891	731	660
Controls	Yes	Yes	Yes	Yes	Yes	Yes
City fixed effects	Yes	Yes	Yes	Yes	Yes	Yes

Note: The data are marginal effects at mean values of covariates with standard errors in parentheses.  
 Significance levels: \* 5%, \*\* 1%, \*\*\* 0.1%.

**Table 5.** Heterogeneous effects (city-level characteristics)

Dependent variable: Labour market participation	(1)	(2)	(3)
Local commercial housing × City scale	−0.1306† (0.0703)		
City scale	−0.1080 (0.0748)		
Local commercial housing × Urbanisation		−0.1164* (0.0534)	
Urbanisation		−0.3776*** (0.0875)	
Local commercial housing × Average price			−0.2437*** (0.0502)
Average price			−0.0302 (0.0827)
Local commercial housing	−0.2581*** (0.0612)	−0.2650*** (0.0500)	−0.1944** (0.0565)
N	1,485	1,030	1,453
Controls	Yes	Yes	Yes
City fixed effects	Yes	Yes	Yes

Note: The data are marginal effects at mean values of covariates with standard errors in parentheses. Significance levels: † 10%, \* 5%, \*\* 1%, \*\*\* 0.1%.

take the primary responsibility for purchasing houses. Compared to female older migrants, male ones are expected to participate more actively in the labour market if they do not own houses. That is, it is reasonable to expect that male older migrants are less likely to retire, unless they have fulfilled the task that they have to provide enough precautionary savings to their families. To check whether the effect of home ownership on older migrants' labour market participation exhibits gender differences, we split the sample according to gender. The results obtained from gender-specific models are summarised in Panel A of Table 4.

The marginal effects of *Housing*, *Commercial housing* and *Local commercial housing* remain negative and significant in all columns, indicating that older migrants who do not own houses are more likely to participate in the labour market. Within each gender-specific model, the magnitudes of marginal effects gradually increase along with the level of housing liquidity. These results are consistent with our aforementioned findings. We then compare the results to their counterparts across gender-specific models. As expected, the estimated marginal effects are larger in magnitude in the male subgroup than their counterparts in the female subgroup. This difference is persistent across houses with different liquidity levels. Our finding differs from Zhao and Burge (2017), who showed

that in the USA female labour supply is affected to a greater extent by changes in housing wealth than male labour supply. In China, male older migrants are more responsive to home ownership than female ones with respect to labour market participation.

### *Family structure*

Son preference is prevailing in China and is especially deeply rooted in rural culture (Lei and Pals, 2011; Murphy *et al.*, 2011), because sons are generally considered as the primary providers for their aged parents. Older migrants having male offspring expect that they can receive intergenerational financial support as income after retirement, so it is possible that they are less dependent on housing wealth as precautionary/retirement savings. In other words, older migrants having no son may more heavily rely on home ownership as precautionary/retirement savings, so they are more likely to participate in the labour market if they do not own houses than those with at least one son. Therefore, we divide the sample into two subgroups, *i.e.* older migrants with at least one son and those having no son, to investigate whether home ownership heterogeneously affects the labour supply of older migrants with different family structures. The results are displayed in Panel B of Table 4.

The marginal effect estimates on three measures of home ownership continue to be significantly negative in all columns. The estimates obtained from older migrants having at least one son subsample are smaller in magnitude than their counterparts in the subsample containing older migrants with no son. In line with our prediction, older migrants having no son are more responsive to home ownership regarding labour market participation than those with at least one son. Our findings also imply that the retirement decision could be considered as a family decision rather than an individual decision (Becker, 1988).

### *Migration distance*

Migrants who are further away from their hometown generally encounter more difficulties in life. For instance, China's social health insurance system was segmented by provinces before 2017, so inter-provincial migrants could not get social health insurance reimbursement if they sought inpatient services in hospitals in the current residential province. Social health insurance provides affordable health care and financial protection to enrollees, so it is a crucial factor affecting older people's medical expenses. This segmentation significantly increased out-of-pocket medical expenses for inter-provincial migrants.<sup>16</sup> Therefore, inter-provincial older migrants may more heavily depend on home ownership as precautionary savings than intra-provincial older migrants. That is, inter-provincial older migrants who do not own houses may have stronger incentives to participate in the labour market than intra-provincial ones. To investigate such a possibility, the sample is divided into two subgroups, *i.e.* inter-provincial older migrants and intra-provincial older migrants. We redo the analysis for these two subsamples and the results are presented in Panel C of Table 4.

Similarly, we find that the estimates in each subsample stay significantly negative, and become larger in magnitude when housing liquidity is increasing. The marginal effect of *Housing* for inter-provincial older migrants is smaller in

magnitude than that for intra-provincial older migrants. However, as predicted, the marginal effects of *Commercial housing* and *Local commercial housing* for inter-provincial older migrants are greater in magnitude than their counterparts for intra-provincial older migrants. These results suggest that commercial housing, especially local housing, which can be easily liquidated in the market, indeed can serve as precautionary/retirement savings to compensate for the potential loss of long-distance migration for older migrants.

### *Endowment insurance*

The social security system in China discriminates against people registered as agricultural residents. Home ownership can be used by older migrants as a substitute for endowment insurance, since the two can be considered as different forms of precautionary/retirement savings. As a result, it is possible that older migrants with no endowment insurance would more actively engage in the labour market than the older migrants having endowment insurance, when they do not own houses. To examine whether older migrants with and without endowment insurance are heterogeneously affected by home ownership regarding labour market participation, we separate the sample according to whether older migrants are covered by endowment insurance or not. The results are shown in Panel D of Table 4.

We consistently find that the estimates in all columns are negative and significant. The marginal effects of our regressors of interest also become larger in magnitude when housing liquidity level is increasing. Furthermore, the estimated marginal effects of *Housing*, *Commercial housing* and *Local commercial housing* are larger in magnitude for older migrants with no endowment insurance than their counterparts for older migrants covered by endowment insurance. These results are in support of our prediction that compared to those having endowment insurance, older migrants with no endowment insurance are more responsive to home ownership regarding labour market participation. Our finding also implies that increasing the coverage of endowment insurance for older migrants can mitigate the effect of home ownership on their labour market participation.

### *City-level characteristics*

Hereinbefore, we find that older migrants owning houses, which can be considered as a form of precautionary/retirement savings, are less likely to participate in the labour market than those who do not own houses. We further show that this negative effect of home ownership on labour market participation of older migrants is more prominent when older migrants own commercial houses, especially local ones, because broadly speaking, (local) commercial houses can be more easily liquidated in the market. Nonetheless, housing liquidity and values as well also depend highly on the locations of properties. Unfortunately, the CMDS does not contain the precise information on locations or values of houses. We can only obtain information on older migrants' current working places at the city level. Then, we infer locations of local commercial houses at the city level, accordingly.

To provide further insights into how housing liquidity affects older migrants' labour market participation, we use city-level characteristics correlated with the potential demand of local real estate to approximate the general liquidity of local

commercial houses at the city level. Specifically, we estimate the empirical model as follows:

$$\begin{aligned} \text{Participation}_{ij} = & \gamma_0 + \gamma_1 \times \text{Local commercial housing}_i \times \text{City}_j \times \gamma_2 \times \text{City}_j \\ & + \gamma_3 \times \text{Local commercial housing}_i + X'_i\theta + \mu_j + \varepsilon_i \end{aligned} \quad (3)$$

The NNM method is also adopted to construct comparable treatment and control groups before we estimate Equation (3). In practice, cities on a larger scale, with a higher level of urbanisation and higher average commercial housing price, are considered to be the ones where commercial houses are in greater demand, that is, can be more easily liquidated in the market. We expect that older migrants owing local commercial houses in cities with a higher housing liquidity level would be less likely to participate in the labour market.

$\text{City}_j$  contains three city-level characteristics capturing the general liquidity level of local commercial houses.  $\text{City scale}$  is an indicator of whether the city is classified as a large city.<sup>17</sup>  $\text{Urbanisation}$  is a dummy variable which equals 1 if the city is highly urbanised and equals 0 otherwise.<sup>18</sup>  $\text{Average price}$  is also a dummy variable, which equals 1 if the city has a relatively high average commercial housing price and equals 0 otherwise.<sup>19</sup> We introduce  $\text{City scale}$ ,  $\text{Urbanisation}$  and  $\text{Average price}$  into Equation (3) one by one, and summarise the results in columns (1) to (3) of Table 5, respectively.

The estimated marginal effects of *Local commercial housing* remain negative and significant in all columns, indicating that older migrants who do not own local commercial houses are more likely to participate in the labour market than local commercial house owners. Meanwhile, the estimates for interaction terms are also negative and statistically significant in all columns. Hence, older migrants owning local commercial houses in larger-scale cities, with a higher degree of urbanisation, and those with a relatively higher level of average commercial housing price have much lower incentives to participate in the labour market. These results confirm our prediction.

## Conclusion

In this paper, we show that the labour market participation of older migrants in China is significantly affected by home ownership. Older migrants who do not own houses participate more actively in the labour market than home owners. Hence, as a type of precautionary savings, home ownership imposes a great influence on the retirement decision of older migrants. We further show that home ownership plays a more important role in the labour market participation of older migrants suffering from greater financial responsibility and insecurity. Specifically, male older migrants, older migrants having no son, those moving inter-provincially and those uncovered by endowment insurance are more likely to use home ownership as a compensation for retirement insecurity than their counterparts.

In addition, we investigate how the labour market participation of older migrants is heterogeneously affected by home ownership with different levels of liquidity, mainly resulting from different types of property rights. The results indicate that houses with a higher level of liquidity can be used as precautionary/retirement savings more efficiently for older migrants. Particularly, older migrants who own local commercial housing in cities with potentially larger demand for real

estate, *i.e.* local commercial houses having a higher level of liquidity, are also less likely to participate in the labour market. Since we pay attention to the housing liquidity differences essentially driven by the urban–rural land dual system in China, our results imply that the financial security of older migrants regarding retirement can be enhanced by alleviating trading barriers for rural land, and improving the property rights system for housing in China.

**Financial support.** This work was supported by the National Social Science Funds of China (CX, grant number 16CRK002); and the Social Science Planning Project of Shandong Province (LC, grant number 20CRK01).

**Conflict of interest.** The authors declare no conflicts of interest.

**Ethical standards.** Ethical approval was not required.

## Notes

- 1 The data were obtained from the 2016 wave of the China Migrants Dynamic Survey (CMDS).
- 2 The China Household Finance Survey shows that in 2015 housing took up around 69.2 per cent of total family assets in China. In 2018, this reached over 77.7 per cent for urban households in China.
- 3 In the rest of the paper, unless otherwise stated, ‘older migrants’ refers to rural-to-urban older migrants who are registered as agricultural residents in *hukou* status.
- 4 In general, an asset with a higher level of liquidity means it can be traded or redeployed in the market in a shorter period of time.
- 5 In China, the pension system contains several different types of pension plans. Each plan targets a specific group of people. Urban workers are generally covered by either the Urban Employee Pension System (UEPS) or the Urban Social Pension System (USPS). The UEPS covers employees of state sectors, governments and government-affiliated institutions, state-owned enterprises, collective-owned enterprises, foreign-invested enterprise and some private enterprises as well. The premiums of the UEPS are jointly contributed by beneficiaries themselves and organisations employing the beneficiaries. The USPS covers urban people who work in informal economic units, the self-employed or even the unemployed. The premiums of the USPS are mainly contributed by beneficiaries themselves and some subsidies from local governments. In rural China, people who are not in the social security system for urban workers are generally covered by the New Rural Social Pension System (NRSPS). The premiums of the NRSPS are primarily paid by beneficiaries themselves and subsidies from collectively pooled organisations and local governments.
- 6 The rural-to-urban migrant workers are discriminated against in the urban labour force market. They have limited access to the social security system designed for urban residents who have stable jobs and/or work in state sectors (Chan and Zhang, 1999; Davin, 1999; Fan, 2001; Huang, 2012). In 2011, the proportion of rural-to-urban migrant workers covered by the UEPS was only 16.4 per cent (Qin *et al.*, 2015); this number was even lower for older migrant workers.
- 7 The NRSPS is designed for rural residents older than 16 (excluding students) who are not covered by pension plans for urban workers. Participation in the NRSPS is voluntary. However, local governments vigorously push forward the NRSPS for rural residents, because the NRSPS participation rate is an important performance evaluation index for local officials. Initially, the premium of the NRSPS was 100–500 RMB (around US \$15–75) per person per year. In 2014, the upper limit for premiums of the NRSPS was raised to 2,000 RMB (around US \$290) per person per year. Under the NRSPS, people who have continuous premium payments over 15 years can collect their pension benefits once they are older than 60. Nevertheless, the incentive for young rural residents to participate in the NRSPS is relatively low. Since the insurance premium imposes a financial burden on participants, rural residents generally prefer to choose the minimum coverage of the NRSPS.
- 8 According to the China Health and Retirement Longitudinal Study (CHARLS) conducted by the National School of Development at Peking University, the NRSPS participation rates in the 2010 wave, 2012 wave and 2014 wave are 10.6, 67.4 and 78.1 per cent, respectively.
- 9 According to the 2014 wave of the CLASS, the average pension received by urban enterprise workers covered by the UEPS was 2,452 RMB (around US \$354) per month. This reaches 2,808 RMB (around US \$406) for people retired from governments and government-affiliated institutions.



- 10** In China, generally speaking, male workers older than 60 and female workers older than 50/55 can collect their pension benefits. We also use male migrants above 60 and female migrants above 55 as an alternative sample, and obtain similar results, which are available upon request.
- 11** The CMDS does not contain information on home values and the precise zip code for a property. We are aware that housing liquidity can be significantly affected by factors other than home ownership. Although housing liquidity can be capitalised into home values, it does not necessarily mean that a property with a lower liquidity level should have a lower value.
- 12** For example, Talhelm *et al.* (2014) show that people in rice-farming south China tend to be more interdependent and more co-operative than people in north China. The cultural differences between hometown and the current residential city may affect the participation of older migrants in the local labour market. Moreover, if older migrants cannot speak the local dialect in the current residential city, the language barrier can also create obstacles for older migrants to participate in the local labour market.
- 13** The regression results are available upon request.
- 14** We plot the figure that shows the common support for home owners (treatment group) and older migrants who do not own houses (control group). We also plot the figure that shows the standardised bias across covariates for home owners and those who do not own houses in older migrants. The figures suggest that the baseline covariates are balanced after the NNM. Due to the space limitation, the results of the balance test are not shown but are available upon request.
- 15** The same NNM method is employed to construct the comparable groups for older migrants who own commercial houses and those who do not, and is also used to construct the comparable groups for older migrants who own local commercial houses and those who do not as well. The balancing property is satisfied in the matching process. The results are available upon request.
- 16** Since 2017, the Chinese central government has made efforts to alleviate the segmentation in the social health insurance system. However, the inter-provincial social health insurance reimbursement is still very confined and takes a lot of time.
- 17** A large city is defined as the one having more than 2 million permanent residents.
- 18** In 2016, the average urbanisation rate was 57.4 per cent in China. We define a city with a higher degree of urbanisation as the one with urbanisation rate above the national average.
- 19** We calculate the city-level average relative housing price as the city-level annual average wage over the city-level annual average commercial housing price (per square metre) in 2016. We define a city having a relatively high average commercial housing price if its city-level average relative housing price is above the median value in 2016.

## References

- Adams J and Gaetano A** (2010) *One Country, Two Societies: Rural-to-urban Inequality in Contemporary China*. Cambridge, MA: Harvard University Press.
- Aragón FM** (2015) Do better property rights improve local income? Evidence from First Nations' treaties. *Journal of Development Economics* **116**, 43–56.
- Becker GS** (1988) Family economics and macro behavior. *American Economic Review* **78**, 1–13.
- Begley J and Chan S** (2018) The effect of housing wealth shocks on work and retirement decisions. *Regional Science and Urban Economics* **73**, 180–195.
- Bertrand M, Duflo E and Mullainathan S** (2004) How much should we trust differences-in-differences estimates? *Quarterly Journal of Economics* **119**, 249–275.
- Brosig S, Glauben T, Herzfeld T, Rozelle S and Wang X** (2010) The dynamics of Chinese rural households' participation in labor markets. *Agricultural Economics* **37**, 167–178.
- Cai Y, Tian X and Xia H** (2016) Location, proximity, and M&A transactions. *Journal of Economics and Management Strategy* **25**, 688–719.
- Carroll CD** (1997) Buffer-stock saving and the life cycle/permanent income hypothesis. *Quarterly Journal of Economics* **112**, 1–55.
- Cebula RJ and Coombs CK** (2008) Recent evidence on factors influencing the female labor force participation rate. *Journal of Labor Research* **29**, 272–284.
- Chan KW and Zhang L** (1999) The hukou system and rural-to-urban migration in China: processes and changes. *China Quarterly* **160**, 818–855.

- Chang SD** (1996) The floating population: an informal process of urbanisation in China. *International Journal of Population Geography* **2**, 197–214.
- Chen S and Powell JL** (eds) (2012) *Ageing in China: Implications to Social Policy of a Changing Economic State*. New York, NY: Springer Science + Business Media.
- Chen S, Chen Y, Feng Z, Chen X, Wang Z, Zhu J, Jin J, Yao Q, Xiang L, Yao L, Sun J, Zhao L, Fung H, Wong E and Dong D** (2020) Barriers of effective health insurance coverage for rural-to-urban migrant workers in China: a systematic review and policy gap analysis. *BMC Public Health* **20**, 1–16.
- Cheng Z, King SP, Smyth R and Wang H** (2016) Housing property rights and subjective wellbeing in urban China. *European Journal of Political Economy* **45**, 160–174.
- Clark RL, Johnson T and McDermed AA** (1980) Allocation of time and resources by married couples approaching retirement. *Social Security Bulletin* **43**, 3–16.
- Coile CC and Levine PB** (2006) Labor market shocks and retirement: do government programs matter? *Journal of Public Economics* **91**, 1902–1919.
- Coile CC and Levine PB** (2011) Recessions, retirement, and social security. *American Economic Review* **101**, 23–28.
- Coronado JL and Perozek MG** (2003) Wealth effects and the consumption of leisure: retirement decisions during the stock market boom of the 1990s. *Social Science Electronic Publishing* **2**, 591–596.
- Davin D** (1999) *Internal Migration in Contemporary China*. New York, NY: St. Martin's.
- De Janvry A, Emerick K, Gonzalez-Navarro M and Sadoulet E** (2012) Certified to migrate: property rights and migration in rural Mexico. UC Berkeley, Center for Effective Global Action, Working Paper.
- Deng F** (2009) Housing of limited property rights: a paradox inside and outside Chinese cities. *Housing Studies* **24**, 825–841.
- Disney R, Ratcliffe A and Smith S** (2015) Booms, busts and retirement timing. *Economica* **82**, 399–419.
- Di Tella R, Galiani S and Scharfrodsky E** (2007) The formation of beliefs: evidence from the allocation of land titles to squatters. *Quarterly Journal of Economics* **122**, 209–241.
- Doling J and Horsewood N** (2003) Home ownership and early retirement: European experience in the 1990s. *Journal of Housing and the Built Environment* **18**, 289–308.
- Fan CC** (2001) Migration and labor-market returns in urban China: results from a recent survey in Guangzhou. *Environment and Planning A* **33**, 479–508.
- Farnham M and Sevak P** (2015) Housing wealth and retirement timing. *CESifo Economic Studies* **62**, 26–46.
- Field E** (2007) Entitled to work: urban property rights and labor supply in Peru. *Quarterly Journal of Economics* **122**, 1561–1602.
- Galiani S and Scharfrodsky E** (2010) Property rights for the poor: effects of land titling. *Journal of Public Economics* **94**, 700–729.
- Glasser CK** (1997) Patriarchy, mediated desire, and Chinese magazine fiction. *Journal of Communication* **47**, 85–108.
- Goldstein M and Udry C** (2008) The profits of power: land rights and agricultural investment in Ghana. *Journal of Political Economy* **116**, 981–1022.
- Gunatilaka JKR** (2010) The rural-to-urban divide in China: income but not happiness? *Journal of Development Studies* **46**, 506–534.
- Gustman AL and Steinmeier TL** (2000) Retirement in dual-career families: a structural model. *Journal of Labor Economics* **18**, 503–545.
- Gyourko J, Mayer C and Sinai T** (2013) Superstar cities. *American Economic Journal: Economic Policy* **5**, 167–199.
- Ha S, Hilber CA and Schöni O** (2021) Do long-distance moves discourage homeownership? Evidence from England. *Journal of Housing Economics* **53**, 101766.
- Hank K and Korbmacher JM** (2013) Parenthood and retirement. *European Societies* **15**, 446–461.
- Head A and Lloyd-Ellis H** (2012) Housing liquidity, mobility, and the labor market. *Review of Economic Studies* **79**, 1559–1589.
- Head A, Lloyd-Ellis H and Sun H** (2014) Search, liquidity, and the dynamics of house prices and construction. *American Economic Review* **104**, 1172–1210.
- Hornbeck R** (2010) Barbed wire: property rights and agricultural development. *Quarterly Journal of Economics* **125**, 767–810.
- Huang Y** (2012) Low-income housing in Chinese cities: policies and practices. *China Quarterly* **212**, 941–964.
- Johnson G and Woon YF** (2010) Rural development patterns in post-reform China: the Pearl River delta region in the 1990s. *Development and Change* **28**, 731–752.

- Lai OK** (2000) Housing reforms at fifty (1949–1999): the political economy of a production-biased housing regime in transition. *China Review* 481–507.
- Larsen M and Pedersen PJ** (2012) Paid work after retirement: recent trends in Denmark. Institute for the Study of Labor, Bonn, Germany, IZA Discussion Paper 6537.
- Lei L and Pals H** (2011) Son preference in China: why is it stronger in rural areas? *Population Review* 50, 27–46.
- Lei X, Zhang C and Zhao Y** (2013) Incentive problems in China's new rural pension program. *Research in Labor Economics* 37, 181–201.
- Li Z** (2012) Study on the 'Housing with Limited Property Rights' in transitional China: a case of Xingwei Village in Nanjing, China. In *2012 6th International Association for China Planning Conference (IACP)*. Manhattan, New York, U.S.: IEEE, pp. 1–7.
- Liang Z and Ma Z** (2004) China's floating population: new evidence from the 2000 census. *Population and Development Review* 30, 467–488.
- Liscow ZD** (2013) Do property rights promote investment but cause deforestation? Quasi-experimental evidence from Nicaragua. *Journal of Environmental Economics and Management* 65, 241–261.
- Liu J** (2014) Ageing, migration and familial support in rural China. *Geoforum* 51, 305–312.
- Lucas RE** (2004) Life earnings and rural-to-urban migration. *Journal of Political Economy* 112, 29–59.
- Lyu L and Chen Y** (2019) Parental migration and young migrants' wages in urban China: an exploratory analysis. *Urban Studies* 56, 1968–1987.
- Morris A** (2016) A qualitative examination of Jim Kemeny's arguments on high home ownership, the retirement pension and the dualist rental system focusing on Australia. *Housing, Theory and Society* 33, 484–505.
- Murphy R, Tao R and Lu X** (2011) Son preference in rural China: patrilineal families and socioeconomic change. *Population and Development Review* 37, 665–690.
- Noviari J, Coleman A, Roberts H and Whiting RH** (2019) Housing liquidation and financial adequacy of retirees in New Zealand. *Housing Studies* 34, 1543–1580.
- Qin M, Zhuang Y and Liu H** (2015) Old age insurance participation among rural-to-urban migrants in China. *Demographic Research* 33, 1047–1066.
- Schils T** (2008) Early retirement in Germany, the Netherlands, and the United Kingdom: a longitudinal analysis of individual factors and institutional regimes. *European Sociological Review* 24, 315–329.
- Sevak P** (2002) Wealth shocks and retirement timing: evidence from the nineties. Michigan Retirement Research Center, Research Paper No. WP 27.
- Shen J** (1996) Internal Migration and Regional Population Dynamics in China. *Progress in Planning* 45(3), 123–188.
- Sianesi B** (2004) An evaluation of the Swedish system of active labor market programs in the 1990s. *Review of Economics and Statistics* 86, 133–155.
- Song J** (2015) Official relocation and self-help development: three housing strategies under ambiguous property rights in China's rural land development. *Urban Studies* 52, 121–137.
- Szinovacz ME and Deviney S** (2000) Marital characteristics and retirement decisions. *Research on Aging* 22, 470–498.
- Talhelm T, Zhang X, Oishi S, Shimin C, Duan D, Lan X and Kitayama S** (2014) Large-scale psychological differences within China explained by rice versus wheat agriculture. *Science* 344, 603–608.
- Tong Y, Chen F and Su W** (2019) Living arrangements and older people's labor force participation in Hong Kong, 1986–2016. *Social Science & Medicine* 229, 50–59.
- van Ooijen R, Mastrogiacomo M and Euwals R** (2010) Private wealth and planned early retirement: a panel data analysis for the Netherlands 1994–2009. Netspar, Tilburg, The Netherlands, Discussion Paper 10/2010-075.
- Vickerstaff S and Cox J** (2005) Retirement and risk: the individualisation of retirement experiences? *Sociological Review* 53, 77–95.
- Yates J and Bradbury B** (2010) Home ownership as a (crumbling) fourth pillar of social insurance in Australia. *Journal of Housing and the Built Environment* 25, 193–211.
- Zhao L and Burge G** (2017) Housing wealth, property taxes, and labor supply among the elderly. *Journal of Labor Economics* 35, 227–263.

---

**Cite this article:** Xiao C, Chen L (2023). Does housing liquidity matter? Housing property rights and labour market participation of older migrants in China. *Ageing & Society* 43, 2673–2699. <https://doi.org/10.1017/S0144686X21001902>