

Aizawa, Toshiaki; Helble, Matthias

## Working Paper

# Determinants of tenure choice in Japan: What makes you a homeowner?

ADB Working Paper, No. 625

### Provided in Cooperation with:

Asian Development Bank Institute (ADBI), Tokyo

*Suggested Citation:* Aizawa, Toshiaki; Helble, Matthias (2016) : Determinants of tenure choice in Japan: What makes you a homeowner?, ADB Working Paper, No. 625, Asian Development Bank Institute (ADBI), Tokyo

This Version is available at:

<https://hdl.handle.net/10419/163124>

#### Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

#### Terms of use:

*Documents in EconStor may be saved and copied for your personal and scholarly purposes.*

*You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.*

*If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.*



<https://creativecommons.org/licenses/by-nc-nd/3.0/igo/>



**ADB Working Paper Series**

**DETERMINANTS OF TENURE  
CHOICE IN JAPAN: WHAT MAKES  
YOU A HOMEOWNER?**

---

Toshiaki Aizawa and  
Matthias Helble

No. 625  
December 2016

**Asian Development Bank Institute**

Toshiaki Aizawa is a research associate at the Asian Development Bank Institute (ADBI).

Matthias Helble is a research economist at ADBI.

The views expressed in this paper are the views of the authors and do not necessarily reflect the views or policies of ADBI, ADB, its Board of Directors, or the governments they represent. ADBI does not guarantee the accuracy of the data included in this paper and accepts no responsibility for any consequences of their use. Terminology used may not necessarily be consistent with ADB official terms.

Working papers are subject to formal revision and correction before they are finalized and considered published.

The Working Paper series is a continuation of the formerly named Discussion Paper series; the numbering of the papers continued without interruption or change. ADBI's working papers reflect initial ideas on a topic and are posted online for discussion. ADBI encourages readers to post their comments on the main page for each working paper (given in the citation below). Some working papers may develop into other forms of publication.

Suggested citation:

Aizawa, T., and M. Helble. 2016. Determinants of Tenure Choice in Japan: What Makes You a Homeowner? ADBI Working Paper 625. Tokyo: Asian Development Bank Institute.

Available: <https://www.adb.org/publications/determinants-tenure-choice-japan-what-makes-you-homeowner>

Please contact the authors for information about this paper.

E-mail: [toshiaki.aizawa3818@gmail.com](mailto:toshiaki.aizawa3818@gmail.com); [mhelble@adbi.org](mailto:mhelble@adbi.org)

Unless otherwise stated, boxes, figures and tables without explicit sources were prepared by the authors.

Asian Development Bank Institute  
Kasumigaseki Building, 8th Floor  
3-2-5 Kasumigaseki, Chiyoda-ku  
Tokyo 100-6008, Japan

Tel: +81-3-3593-5500

Fax: +81-3-3593-5571

URL: [www.adbi.org](http://www.adbi.org)

E-mail: [info@adbi.org](mailto:info@adbi.org)

© 2016 Asian Development Bank Institute

**Abstract**

Despite Japan's highly developed housing market, little is known about the determinants of renter-to-homeowner tenure transition. Exploiting the Japanese longitudinal household data of the Keio Household Panel Survey (2004–2013), this paper aims to close this gap. Our results show that income level and increase in family size are the strongest determinants for homeownership in Japan. We find that although both rural and urban households with higher incomes are more likely to transition to homeownership, access in rural areas is more equally distributed over various income groups. Since most of the previous empirical studies on tenure choice pay little attention to wealth as a measure of purchasing power, possibly due to data limitation, we draw attention to it and its relative levels. We find that household wealth levels matter, particularly in urban areas, whereas in rural areas homeownership is more equally distributed. Nonetheless, given the relatively low levels of household wealth among renters, our results suggest that income is a more important determinant of successful tenure transition.

**JEL Classification:** R21; R30

## Contents

1.	INTRODUCTION .....	1
2.	TENURE CHOICE LITERATURE .....	2
3.	DATA.....	4
3.1	The Keio Household Panel Survey .....	4
3.2	Variables.....	4
3.3	Data Description .....	7
4.	METHODOLOGY .....	9
5.	RESULTS AND DISCUSSION.....	10
6.	CONCLUSION.....	14
	REFERENCES .....	16
	APPENDIX.....	18

## 1. INTRODUCTION

Purchasing housing is typically the largest investment decision in a person's life. Acquiring property requires substantial financial means and is subject to considerable transaction costs. People decide to become homeowners for various reasons. Buying property for own use is often considered as a profitable financial investment. Furthermore, homeownership is highly valued in many countries. Finally, several studies have shown the benefits of homeownership to individuals, local communities, and the economy as a whole (for example, Rossi and Weber 1996; Aaronson 2000; DiPasquale and Glaeser 1999; Di 2007; Aizawa and Helble 2015). Despite these positive effects, becoming a homeowner remains difficult for many low- and middle-income households. To make housing more affordable, various housing policies promoting homeownership have been implemented in many countries (see for example, Yoshino, Helble, and Aizawa 2015).

Japan experienced a tremendous real estate bubble in the late 1980s. Starting in the mid-1980s, many Japanese invested heavily in real estate. It was a widely held belief that land prices would never fall, which, due to continued investment, became a self-fulfilling prophecy. Prices started to rise drastically, until the bubble burst in 1988. Land prices fell sharply as people finally dispelled the myth about continuous land price increases. The sharp decline in land price made housing more affordable again, but the burst of the bubble was followed by depressed demand and deflation. The global financial crisis in the US and the Great East Japan Earthquake in 2011 prolonged the recovery of the Japanese economy. Becoming a homeowner remains an unfulfilled dream for many Japanese, especially among low- and middle-income metropolitan households. Due to a declining population, land prices have fallen across Japan; however, in metropolitan areas housing prices have been stable or increasing due to continued migration into these areas.

The objective of this paper is to uncover tenure choice determinants in Japan. We are particularly interested in those characteristics of households that are strongly related to the decision to become a homeowner. This paper studies whether these relevant characteristics differ between urban and rural areas.<sup>1</sup> Our interest lies in the dynamics of the tenure choice and we therefore focus on households who rented their houses and became homeowners in the following year. Following Raya and Garcia (2012), we carefully distinguish between tenure choice and tenure status.

Our study has several advantages over previous tenure choice studies. First, we exploit a variety of sociodemographic and socioeconomic information for our statistical analysis such as educational background, occupation type, and financial status. Second, our paper is the first one to our knowledge that explicitly includes a measurement of wealth. We argue that wealth more accurately reflects purchasing power as compared with income. Third, we include macroeconomic factors, such as a land growth rate and inflation rate, in order to look further into households' decision making affected by a price change. Finally, we show that urban and rural areas exhibit marked differences in the predicted probabilities of becoming a homeowner.

---

<sup>1</sup> In this paper, urban areas denote the 20 largest cities in Japan, with rural areas defined as other cities and towns.

## 2. TENURE CHOICE LITERATURE

There is a large amount of empirical (and theoretical) literature on tenure choice. Over the last few decades, numerous attempts have been made to show why some people choose to rent while others decide to become homeowners. The existing literature on tenure choice can be categorized into the following three fields: (i) user-cost comparison, (ii) empirical analysis of tenure choice, and (iii) analysis with a consumer choice model.

The first field is rather simple and its logic straightforward: a person compares rental and ownership costs and chooses whichever is lower. A great deal of effort has been made to calculate costs precisely. In particular, Linneman (1985) and Peiser and Smith (1985) presented sophisticated cost frameworks. The advantage of the user-cost comparison is that it can relatively simply demonstrate the effect of exogenous change on owner-occupancy qualitatively in a diagram and estimate the quantitative effect by calibration. Mills (1990), for example, set up the portfolio decision model that includes all relevant components and presents a numerical analysis. However, the user-cost analysis is often criticized because unobservable and unquantifiable aspects such as pride in being a homeowner and home purchase financial risk are often ignored.

Another stream of empirical literature studies household behaviors and characteristics that affect the decision to purchase a house. Our study falls into this second category. Renaud, Follain, and Lim (1980) introduced a tenure choice model and estimated it with ordinary least squares (OLS) regressions, reporting that income was a significant determinant of homeownership. Research has been conducted extensively in developed as well as developing countries.<sup>2</sup> Daniere (1992), for example, examined tenure choice in Cairo and Manila with a logit model and concluded that family size, education, income, and mobility are among its most powerful determinants.

The definition of tenure choice varies and sometimes generates unintended confusion. Raya and Garcia (2012) pointed out the essential difference between tenure status and tenure choice, which are nevertheless often used interchangeably. The former explains the characteristics describing the homeowner at a specific point in time, while the latter focuses on reasons or factors that affect the transition from renting to homeownership. In this sense, the latter has a dynamic aspect; our research focus lies in it.

Current tenure status is a result of past, current, and future events (Goodman 1995). For example, income earned in the past, present, and future determines the ability to purchase housing. We attempt to capture all three dimensions in our estimation model. However, without data on future plans of households, we need to work with proxies. For example, the increase in family size is an indicator that more housing space is needed.

Krumm (1987) set up an intertemporal tenure choice model and estimate with a multinomial logit model to explain the determinants of 4-year (1976–1979) tenure

---

<sup>2</sup> Fisher and Jaffe (2003) carried out empirical research on homeownership using international data. The authors tried to find determinants of international homeownership rates and explain the differences across different economies. The authors were unfortunately less successful in providing a single equation with comprehensive explanatory power of homeownership as a global pattern. As the authors admit, homeownership is a complex issue with multiple cultural and institutional determinants (Fisher and Jaffe 2003; Tan 2008). Tan (2008) noted that households have different motivations for owning homes and examined determinants of externalities of homeownership in Malaysia.

status patterns.<sup>3</sup> The advantage of this lies in the use of information about household behavior in previous as well as following periods, not solely current-period information. Kan (2000) empirically modeled housing tenure choice, taking into account its intricate conditional relation with residential mobility.

The number of papers that study tenure choice in Japan is small. Horioka (1988), Morizumi (1993), and Tiwari and Hasegawa (2004) researched simultaneous decision of tenure choice and housing demand. Horioka (1988) estimated the price and permanent-income elasticities of demand for owner-occupied housing using the 1981 Survey and Saving data by the Sociology Department of the Faculty of Letters of the University of Tokyo and the Japan Research Centre. Morizumi (1993) estimated income elasticity for rental housing with the individual household data from the 1979 Consumer Expenditure Survey conducted by the Office of the Prime Minister. Tiwari and Hasegawa (2004) estimated housing demand in Tokyo with a nested multinomial logit model (NMNL), using Housing and Land Survey of Japan micro-data. Seko (2000) analyzed tenure choice behavior among older households with a family over the age of 65 with a bivariate logit model.

The last category of the existing literature is based on consumption models in which a representative household seeks to maximize lifetime utility by choosing a tenure type (rent or ownership) and deciding how much to consume. The advantage of this is that the model can simultaneously analyze the tenure choice and housing demand. However, these models generally require rather complex mathematic assumptions and thus are only accessible to a relatively small group of analysts (Fallis 1983). Fallis (1983) introduced a simple and rather intuitive one-period model that demonstrated the effects of policy changes on tenure choice. However, the simplicity gained by some strong assumptions comes at the cost of ignoring some of the distinct aspects of housing, such as its durability. Attanasio et al. (2012) developed a more complex dynamic programming model that simulated the latter by assuming that in each period the representative household chooses the tenure pattern from the three options: renting, owning a flat or owning a house. Their model allowed them to elegantly analyze the quantitative effect of stochastic macro shocks, such as income shock and housing price, on the homeownership rate in the whole economy.

To the best of our knowledge, this paper is the first to analyze Japanese tenure transition during the “lost decades” (after the collapse of the bubble economy) and to discuss differences between rural and urban areas. Furthermore, our paper contributes to the literature because we use for the first time wealth as a determinant of homeownership. As most of the households make decisions about buying their property based on their deposits or securities rather than their annual income, wealth reflects households’ purchasing power more precisely than income. The previous empirical research typically ignores wealth because of unavailability of data. Our paper demonstrates clear differences when income or wealth is used as a measure of households’ financial status. Finally, thanks to the rich longitudinal data set, our paper investigates the tenure choice decision over time. In this sense, our paper is one of the few that study the determinants of tenure transition. Other empirical research typically explores cross-section tenure status to make predictions about tenure choice.

---

<sup>3</sup> Krumm (1987) defined the following eight patterns of 4-year tenure status decision: (RRRR), (RRRO), (RROO), (ROOO), (OOOO), (OOOR), (OORR), and (ORRR), where R denotes rental housing and O denotes owner-occupied residence.



### 3. DATA

#### 3.1 The Keio Household Panel Survey

In this paper, we exploit data collected by the Keio Household Panel survey (KHPS) available from the Panel Data Research Centre at Keio University. The longitudinal survey data assesses private households in Japan, providing not only demographic, occupational, and economic information, but also information about educational backgrounds and housing. The KHP survey is one of the most comprehensive in Japan and is conducted by investigators using the drop-off pick-up (DOPU) method, which means that a surveyor distributes a questionnaire to a respondent, and then collects it once complete. In principle, responses by spouses or other family members are not permitted.

The KHP survey uses a two-stage stratified random sampling of people aged between 20 and 69, and was first conducted in January 2004 covering 4,005 households, which represented 67.2% of the total population. In wave 2 in 2005, only 3,314 of the 4,005 individuals who were surveyed responded to the survey. The number of samples of the following wave 3 increased slightly to 3,342. However, to avoid a decrease in the sample size, in wave 4, 1,419 new households were added to the old cohort of the then 2,894 households. The number of surveys received in waves 5–8 was 3,691, 3,422, 3,207, and 3,030, respectively. In the ninth and tenth surveys, another 1,012 and 866 new households were added to the existing ones.

#### 3.2 Variables

##### 3.2.1. Independent Variable

One question in the survey is whether the respondent lives in their own apartment or their own house. We thus define a tenure status variable, *own*, which is equal to 1 if the respondents live in their own house. As our interest lies in the transition of tenure status, especially from renters to homeowners, we additionally define the following tenure choice variable, *tenure change*, which becomes 1 if the household's tenure status changed from renters to homeowners and 0 if they stayed as renters compared with the previous period. Once the respondents become homeowners, they are excluded from the sample until they become renters again. The first wave and the newly added samples in 2007, 2012, and 2013 are excluded at each year with care because no information is available for the previous years and therefore we cannot track their transition. The dependent variable is structured as follows with its frequency shown in Table 1.

$$tenure\ change_{it} = 1 \quad \text{if } own_{it-1} = 0 \text{ and } own_{it} = 1$$

$$tenure\ change_{it} = 0 \quad \text{if } own_{it-1} = 0 \text{ and } own_{it} = 0$$

$$tenure\ change_{it} = -, \quad \text{otherwise}$$

**Table 1: Tenure Choice of Renters between 2005 and 2013**

Tenure Type	2005	2006	2007	2008	2009	2010	2011	2012	2013	Total
Rent to Rent	693	594	522	701	646	585	546	510	661	<b>5,458</b>
Rent to Own	69	43	36	46	45	27	33	24	44	<b>367</b>
Total	762	637	558	747	691	612	579	534	705	<b>5,825</b>

Source: Authors' calculation based on the Keio Household Panel Survey.

### 3.2.2 Dependent Variables

We separate household characteristics that would potentially affect their tenure choice into four categories: sociodemographic factors, socioeconomic factors, financial factors, and macroeconomic factors.

Sociodemographic factors consist of age, family size, a child dummy variable, and marital status (Table 2). The change in these factors needs to be considered because it is obvious that the households do not make a decision solely on the basis of their current situation. For instance, an increase in family size from the previous year may affect the decision. Similarly, a change in marital status due to marriage or divorce may also exert some influence. Because of the unique feature of a bequest tax system in Japan, people have a strong incentive to hold real assets instead of financial assets until their death (Ito 1994; Kanemoto 1997).

**Table 2: Sociodemographic Factors**

Sociodemographic Factors	Definition
29<age<40	1 if age is between 30 and 39
39<age<50	1 if age is between 40 and 49
49<age<60	1 if age is between 50 and 59
Married	1 if married, 0 otherwise
Married change	1 if get married or divorced between years t-2 and t, 0 otherwise
Family size	Number of families in a household
Family increase	Increase in family size between years t-2 and t; it is 0 if family size decreased
Children	1 if having a child
Living with parent	1 if living with a parent(s)
# of earners	Number of earners in a household

Socioeconomic factors include educational background and occupation type (Table 3). Educational background is measured in terms of the respondent's number of years of education. The type of occupation is closely related to the accessibility of mortgages in Japan. Employees working for large companies and regular workers with a stable annual income tend to have easier access to mortgages because their future wage profile can be used by commercial banks to evaluate the household's loan application.

**Table 3: Socioeconomic Factors**

<b>Socioeconomic Factors</b>	<b>Definition</b>
Education years	Respondent's years of education
Regular worker	1 if a respondent is a regular worker, 0 otherwise
Self-employed worker	1 if a respondent is self-employed, 0 otherwise
Manager	1 if a respondent is in a managerial position
Large company	1 if a respondent works for a company/organization with more than 500 employees

We consider the inflation rate as a macroeconomic indicator that potentially affects the tenure choice (Table 4). When prices are increasing every year, people are more likely to buy houses for the expectation of capital gain when selling them. In contrast, if prices are falling (i.e., deflation), households may postpone their housing purchase. We control for rent and land price growth rates as well as the inflation rate<sup>4</sup> because they (Figure 1) could also possibly affect households' decision making. For these macroeconomic statistics, we used data published by the Ministry of Land, Infrastructure, Transport and Tourism as well as from the Bureau of Statistics, Ministry of Internal Affairs and Communications. The changes in regional rent and land prices are illustrated in figures in the Appendix. Finally, we define the urban dummy variable, which is equal to 1 if a respondent lives in one of the 20 largest cities in Japan and 0 if he or she lives in other smaller cities, towns, or villages.

**Table 4: Macroeconomic Factors and the Urban Dummy**

<b>Macroeconomic Factors</b>	<b>Definition</b>
Inflation	Inflation rate, national level
Change rate of rents	Growth rate of rents, national level
Change rate of land prices	Growth rate of land prices, national level
Urban	1 if living in an urban area

Financial factors are those that contribute to a household's income (Table 5). It seems natural to assume that households make a tenure decision on the basis of their lifetime income rather than their current income. We hence use the mean of their income during the period 2004–2013 as a proxy of their lifetime income, and divide it into quintile levels. In this paper, these levels are calculated in each year among renters, not among the entire sample. In addition to income, we use wealth as another variable conveying the purchasing power of households. Ideally, wealth should include not only financial assets and liabilities, but also other unquantifiable assets such as human capital. However, due to the data limitations, we only include observable financial assets as wealth. In this paper, wealth is defined as the aggregate value of the amount of deposits<sup>5</sup> plus securities<sup>6</sup> less borrowings.<sup>7</sup> Additionally, the interaction terms of

<sup>4</sup> Based on national level price data (Core CPI).

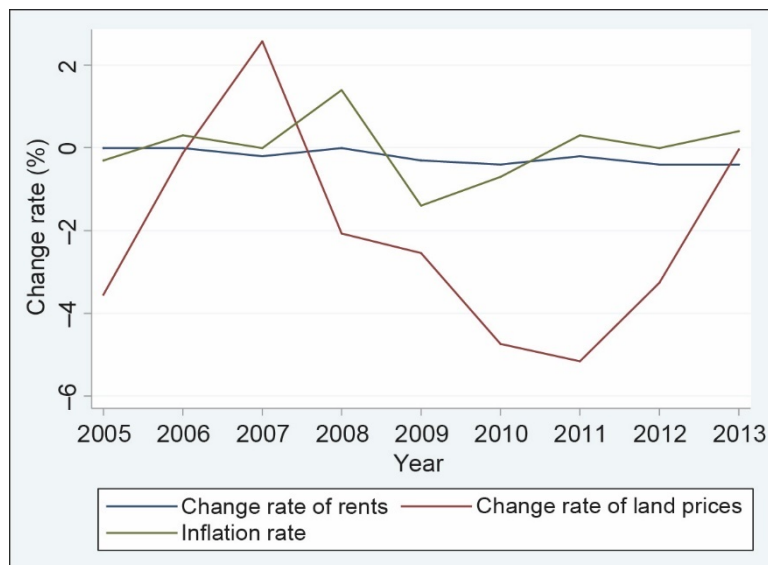
<sup>5</sup> Deposits refer to the following types of items: postal savings, time deposits, installment savings, ordinary deposits, company deposits, gold investment accounts, medium-term government bond funds, etc. Deposits include foreign currency denominated deposits (yen equivalent), but exclude real estate such as housing and other real assets.

<sup>6</sup> Securities refer to the following types of items: shares (market value), bonds (par value) and stock investment trusts (market value), corporate and public bond investment trusts (market value), loans in trust, and money in trust (par value), etc. Foreign currency denominated securities (yen equivalent) are also included.

<sup>7</sup> Balance of household's present borrowings.

these variables and the urban dummy will be used in our estimation to clearly see the different quantitative effects of these financial factors in rural and urban neighborhoods.

**Figure 1: Growth Rate of Rents and Land Prices, and Inflation Rate in Japan**



Source: Ministry of Land, Infrastructure, Transport and Tourism; and Bureau of Statistics, Ministry of Internal Affairs and Communications.

**Table 5: Financial Factors**

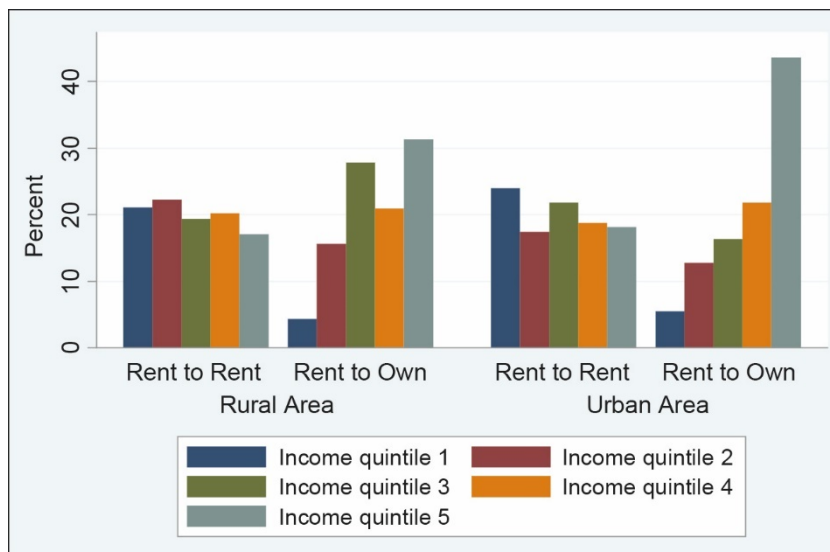
Financial Factors	Definition
ln(Income)	Logarithmic amount of household's income
Second quintile of income	Second quintile level of income (lower middle)
Third quintile of income	Third quintile level of income (middle)
Fourth quintile of income	Fourth quintile level of income (upper middle)
Fifth quintile of income	Fifth quintile level of income (upper/highest)
ln(Wealth)	Logarithmic amount of household's wealth
Second quintile of wealth	Second quintile level of wealth (lower middle)
Third quintile of wealth	Third quintile level of wealth (middle)
Fourth quintile of wealth	Fourth quintile level of wealth (upper middle)
Fifth quintile of wealth	Fifth quintile level of wealth (upper/highest)

### 3.3 Data Description

In this subsection, we first closely look at the differences in financial status between rural and urban areas, dividing the sample into the following four subsamples: (i) people who stayed renters in rural areas, (ii) people who newly became homeowners in rural areas, (iii) people who stayed renters in urban areas, and (iv) people who newly became renters in urban areas. Figure 2 shows the composition of tenure choice with respect to different income levels. In rural areas, almost 80% of those who changed their tenure are from the top three income groups (quintiles 3, 4, and 5). In contrast, in urban areas the highest income group represents over 40% of those who became homeowners. The figure shows that, in urban areas, becoming a homeowner

is harder not only for low-income and middle-income groups, but also for upper-middle-income groups compared with rural areas.

**Figure 2: Composition of Tenure Transition (Income Quintile Levels), 2004–2013**



Note: Quintiles two periods ago.

Source: Authors' calculation based on the Keio Household Panel Survey.

The figure implies several points with respect to tenure decision, but it remains to be seen whether these figures are significantly different from zero even when controlling for other pertinent characteristics of households, such as family size, marital status, and the possibility of inheriting a house. In the next sections, we clarify the determinants of tenure transition when controlling for economic situation and household characteristics.

Next, Table 6 shows the descriptive statistics of the variables used in this research. Values in the table are calculated by the data in 2013. The variable labeled “Becoming a homeowner” is a dummy variable that is 1 for the case that a renter became a homeowner in 2013. In our sample, 6.7% of renters were able to attain homeownership in 2013. The households in our sample have on average 0.71 children, count 1.41 earners, and are employed only rarely by large companies. The average annual household income as defined above is ¥4,780,200 and wealth is ¥1,931,700. The average wealth level is substantially lower than the income level, which indicates that renters have relatively small savings. The standard deviation for wealth is higher than for income, which means that the variation of wealth levels across households is much higher than that for income. In other words, renters have little savings and the amount of saving varies greatly. Given this observation, the household income will probably be the most important determinant for commercial banks when deciding to grant mortgages.

**Table 6: Descriptive Statistics in 2013**

Variable	Count	Mean	SD
Becoming a homeowner	705	0.06	0.24
29<age<40	705	0.27	0.44
39<age<50	705	0.26	0.44
49<age<60	705	0.17	0.37
Married	705	0.61	0.49
Married change	705	0.03	0.16
Family size	705	2.75	1.34
Family increase	500	0.15	0.48
Children	705	0.71	0.45
Living with parents	705	0.51	0.50
# of earners	705	1.41	0.84
Education years	700	13.29	2.29
Regular worker	705	0.36	0.48
Self-employed worker	705	0.12	0.32
Manager	705	0.02	0.12
Large company	699	0.20	0.40
Inflation rate	705	0.40	0.00
Change rate of rents	705	-0.40	0.00
Change rate of land prices	705	-0.04	0.00
Income	683	478.02	335.23
Wealth	688	193.17	1,182.23

Source: Authors' calculation based on the Keio Household Panel Survey.

## 4. METHODOLOGY

We perform random effect probit estimators to take into account serial correlations and unobservable factors of households. The basic econometric specification is the following:

$$\Pr\{y_{it} = 1|X_{it}, \beta, \alpha_i\} = \Phi(\alpha_i + X'_{it}\beta)$$

Where  $\Phi(\cdot)$  is the standard normal cdf.  $y$  denotes the tenure decision and  $X$  is a vector of covariates.

The joint density for the  $i^{\text{th}}$  observation is

$$f(y_i|X_i, \beta, \alpha_i) = \prod_{t=1}^T \Phi(\alpha_i + X'_{it}\beta)^{y_{it}} (1 - \Phi(\alpha_i + X'_{it}\beta))^{1-y_{it}}$$

under the assumption that the normal distribution of the individual effects,  $\alpha_i \sim N[0, \sigma_\alpha^2]$ , the random effects, and the maximum likelihood estimates of  $\beta$  and  $\sigma_\alpha^2$  are obtained by numerically maximizing the following log-likelihood;

$$\sum_{i=1}^N \ln f(y_i|X_i, \beta, \sigma_\alpha^2)$$

where

$$f(y_i|X_i, \beta, \sigma_\alpha^2) = \int f(y_i|X_i, \beta, \alpha_i) \frac{1}{\sqrt{2\pi\sigma_\alpha^2}} \exp\left(\frac{-\alpha_i}{2\sigma_\alpha^2}\right) d\alpha_i$$

To control for differences in households' purchasing power, we include variables of household income and wealth. First, we run a regression with income as a continuous independent variable and then use its quintile levels as explanatory variables to capture the nonlinearity of their relations with tenure decision. As wealth as a stock seems no less important when deciding to purchase a house than income, we use wealth and the wealth quintile levels in the same way. As income and wealth can be largely correlated, we run regressions separately to avoid potential multicollinearity.

In our estimations, we will use the previous 2-year quintile levels of income and wealth to take into account the time lag between becoming an owner and deciding to own a house. This time lag effect should be explicitly considered, especially for the case of housing tenure decisions, which often require a large down payment. A household usually decides to buy a house a few years before it actually purchases the property. Therefore, the decision should have been made based on the prior economic situation of the respondent, rather than on the economic situation after he or she became an owner.

Introducing the interaction terms, the products of income/wealth and the urban dummy, and the products of income/wealth quintiles and the urban dummy, we look closely for differences of the tenure transition determinants between rural and urban neighborhoods. Using the estimates from the regressions, predicted probabilities of becoming homeowners are calculated.

## 5. RESULTS AND DISCUSSION

Table 7 shows the estimation results and the average marginal effects. In the first two columns, we use income and income quintiles to control for households' purchasing power, whereas in the last two columns we use wealth and wealth quintiles.

The size of the marginal effects and their significance levels of demographic variables show similar results in all four columns. People aged between 30 and 39 are the main groups who change tenure status. Marital status and the change in it did not show significance, which means that we cannot reject the hypothesis that both single and married households have statistically the same probability of becoming homeowners, all else being equal. Family size is one of the important factors for tenure change since rental housing in Japan is generally much smaller than owner-occupied housing; this difference is conspicuous compared with other developed countries.<sup>8</sup> Larger families may feel a stronger need to move to owner-occupied properties than do households with only a few members. An increase in the number of family members seems another strong driving force in the decision to purchase housing, and it is significant at a 1% level.

Studying the effect of socioeconomic variables also provides interesting results. The number of earners in a household has no impact on the prospect of housing purchase at a 5% level. In general, the more earners, the more a household's income and

---

<sup>8</sup> For example, The Building Center of Japan (2014) makes an international comparison.

the financially easier it is to own a house. However, we could not find such a positive effect from the results; interestingly, they show a negative sign in column 2, even though the effect is small and barely statistically significant at the 10% level. This could be explained by worker commuting times. Double-income families of which members are working as salaried workers may prefer to rent because purchasing a house in the suburbs may lengthen their commuting time. Another explanation could be that when a double-income family has more children and needs more space but both parents are not able to continue to work due to child-raising, the purchasing decision and number of earners would correlate negatively. This strong disincentive, seen particularly in Japanese society, might have outweighed the anticipated positive aspect.

Educational background does not show significance in any of the columns, which could be attributable to the fact that educational achievement is usually correlated with income, and exhibits a strong relationship with job type. As we control also for occupational types and income levels, educational background may not work as an important determinant. Regular worker status also did not show a positive sign in any the columns. Generally speaking, regular workers in Japan can easily take mortgages, other things being equal. The reason for its insignificance could be explained in the same way as in the case of educational background.

The self-employment dummy does not show significance. Generally speaking, self-employed people, especially individual proprietors, often need enough space for their own business and have a high incentive to own a house. However, we cannot observe such effects from our regression. They might have already owned their houses or had different reasons for not owning a house. On the other hand, we found a significant effect of the large company dummy, which could be explained by people working for these firms having better access to mortgages in general. As well as the large company dummy, the managerial position dummy shows significance and its marginal effect is relatively large.

We failed to obtain meaningful results from the change rate of rents, land price, and the inflation rate. The urban dummy shows negative significance in all columns except for column 2, meaning that urban residents are less likely to be homeowners, which is probably due to higher land and housing prices.

Column 1 does not reveal any positive relationship between a household's income and housing purchase, but its interaction term with the urban dummy does. We reject the null hypothesis that they are jointly insignificant ( $p = 0.04$ ). In column 2, the third, fourth, and fifth quintile levels show significance, which implies that middle- and high-income households are more likely to become homeowners. Interaction terms with the urban dummy do not show significance, but the null hypotheses of the joint insignificance of quintile variables and the urban dummy are rejected at a 5% level, except at the second income quintile.

We address wealth in columns 3 and 4. When wealth is used as continuous (column 3), its interaction term with the urban dummy shows a significant positive relation and the logarithm amount of wealth does not. We fail to reject the null hypothesis of the joint insignificance of wealth variables and the urban dummy ( $p = 0.09$ ). Column 4 used wealth quintiles instead of continuous wealth and reveals that the fourth and fifth quintiles interacted with the urban dummy to show positive significance. These findings imply that wealth works as an important factor for homeownership, particularly in urban regions.



**Table 7: Probit Estimation Results**

	(1)	(2)	(3)	(4)
	Income	Income Quintile	Wealth	Wealth Quintile
29<age<40	0.0266** (0.0125)	0.0279** (0.0121)	0.0319*** (0.0122)	0.0321*** (0.0122)
39<age<50	-0.0026 (0.0133)	-0.0019 (0.0127)	0.0036 (0.0129)	0.0031 (0.0128)
49<age<60	-0.0079 (0.0146)	-0.0092 (0.0139)	-0.0014 (0.0141)	-0.0031 (0.0142)
Married	0.0058 (0.0206)	-0.0033 (0.0200)	0.0151 (0.0195)	0.0122 (0.0195)
Married change	-0.0012 (0.0171)	-0.0036 (0.0165)	-0.0072 (0.0169)	-0.0024 (0.0169)
Family size	0.0082** (0.0039)	0.0077** (0.0037)	0.0080** (0.0038)	0.0085** (0.0038)
Family increase	0.0459*** (0.0061)	0.0443*** (0.0058)	0.0439*** (0.0059)	0.0444*** (0.0059)
Children	0.0054 (0.0186)	0.0039 (0.0177)	0.00133 (0.0177)	0.0001 (0.0178)
Living with parents	0.0129 (0.0155)	0.0106 (0.0148)	0.00873 (0.0150)	0.00736 (0.0149)
# of earners	-0.0075 (0.0053)	-0.0092* (0.0050)	-0.0049 (0.0050)	-0.0030 (0.0050)
Education years	0.0011 (0.0019)	-0.0000 (0.0018)	0.0020 (0.0018)	0.0005 (0.0018)
Regular worker	-0.0006 (0.0089)	-0.0046 (0.00852)	0.0008 (0.0085)	0.0004 (0.0085)
Self-employed worker	-0.0038 (0.0135)	-0.0005 (0.0126)	-0.0040 (0.0131)	-0.0016 (0.0131)
Manager	0.0518*** (0.0191)	0.0395** (0.0180)	0.0520*** (0.0186)	0.0494*** (0.0185)
Large company	0.0148 (0.0091)	0.0100 (0.0087)	0.0178** (0.0087)	0.0157* (0.0088)
L2.Change rate of rents	0.0430 (0.0340)	0.0371 (0.0322)	0.0368 (0.0330)	0.0303 (0.0331)
L2.Change rate of land prices	0.0004 (0.0016)	0.0003 (0.0015)	0.0001 (0.0015)	0.0003 (0.0015)
L2.Inflation rate	-0.0083 (0.0059)	-0.0061 (0.0056)	-0.0063 (0.0057)	-0.0058 (0.0057)
Urban	-0.0455** (0.0184)	-0.0214 (0.0151)	-0.0438** (0.0180)	-0.0378*** (0.0142)
L2.ln(Income)	0.0073 (0.0059)			

*continued on next page*

Table 7 continued

	(1)	(2)	(3)	(4)
	Income	Income quintile	Wealth	Wealth quintile
L2.In(Income)*Urban	0.0064** (0.0029)			
L2.Second quintile of income		0.0199 (0.0183)		
L2.Third quintile of income		0.0512*** (0.0179)		
L2.Fourth quintile of income		0.0361** (0.0182)		
L2.Fifth quintile of income		0.0609*** (0.0188)		
L2.Second quintile of income*Urban		0.0226 (0.0232)		
L2.Third quintile of income*Urban		-0.0092 (0.0212)		
L2.Fourth quintile of income*Urban		0.0175 (0.0209)		
L2.Fifth quintile of income*Urban		0.0232 (0.0190)		
L2.In(wealth)			-0.0740 (0.154)	
L2.In(wealth)*Urban			0.0033** (0.0016)	
L2.Second quintile of wealth				-0.0196 (0.0139)
L2.Third quintile of wealth				0.0027 (0.0142)
L2.Fourth quintile of wealth				-0.0104 (0.0139)
L2.Fifth quintile of wealth				0.0083 (0.0137)
L2.Second quintile of wealth*Urban				0.0196 (0.0226)
L2.Third quintile of wealth*Urban				0.0338 (0.0223)
L2.Fourth quintile of wealth*Urban				0.0402** (0.0198)
L2.Fifth quintile of wealth*Urban				0.0382** (0.0190)
Observations	3,151	3,367	3,274	3,274

Standard errors in parentheses.

RE: Random effect estimators.

L2. stands for a two-period lag operator.

\* $p < 0.1$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$

Table 8 shows the predicted probabilities of becoming a homeowner from one year to the next across different income and wealth quintiles. As expected, the better-off households have a higher probability of becoming homeowners in general. In rural areas, the probability of a renter in the lowest income quintile in a given year becoming a homeowner is 1.41%. In contrast, the probability of a renter in the highest income quintile is more than seven times as high, reaching 8.84%. In urban areas, the difference between income quintiles is even more pronounced. Renters in the lowest income quintile have a 0.67% chance of becoming a homeowner, whereas renters in the higher income quintile are 15 times more likely to achieve this step.

This discrepancy between groups is less strong for wealth. As observed above, renters on average have accumulated only small amounts of wealth compared to their income. Being from different wealth quintiles is therefore less a driving factor of inequality in access to homeownership. Being from the lowest wealth quintile puts renters at a disadvantage compared with the highest wealth quintile, though to a much smaller extent compared with income. Comparing rural and urban areas, the disadvantage is again larger in urban areas.

**Table 8: Predicted Probability of Becoming a Homeowner across Different Income and Wealth Quintile Levels**

Income	Rural		Urban	
	Mean (%)	Variance	Mean (%)	Variance
Quintile 1	1.41	0.0015	0.67	0.0002
Quintile 2	3.79	0.0035	2.66	0.0012
Quintile 3	7.67	0.0071	3.37	0.0011
Quintile 4	5.71	0.0031	4.90	0.0021
Quintile 5	8.84	0.0100	10.10	0.0107
All	5.39	0.0056	4.20	0.0040
Wealth	Mean (%)	Variance	Mean (%)	Variance
Quintile 1	4.99	0.0041	2.35	0.0011
Quintile 2	3.32	0.0042	2.08	0.0038
Quintile 3	6.71	0.0072	4.19	0.0028
Quintile 4	6.27	0.0077	4.77	0.0029
Quintile 5	7.07	0.0043	7.30	0.0043
All	5.43	0.0056	4.13	0.0035
All Areas				
All	4.94	0.0048		

## 6. CONCLUSION

The purpose of this paper was to research the determinants of Japanese renters' transition to homeownership. This research differs from the existing literature on empirical tenure in that we exclusively studied households that changed their tenure status. In this regard, our research should be considered as a study not so much on tenure choice as on tenure transition. We turn our concentration to wealth as a variable reflecting affluence of households, as well as income. Although past empirical studies on tenure choice paid little attention to wealth as a stock, possibly due to data limitation, we strongly believe that wealth is no less important than income as an indicator describing the financial situation of households.

We estimated the quantitative impact of those factors exploiting the longitudinal household data of the Keio Household Panel survey (2004–2013). To analyze the probability that households living as renters become homeowners, we heavily restricted the data sample. Overall, our estimations provided empirical evidence of the existence of different dynamisms influencing homeownership between rural and urban areas, and showed differences in predicted probability of becoming a homeowner when we used income and wealth as measures of household purchasing power.

We first used income as a status reflecting households' financial situation. Our results showed that income level and increased family size were the strongest determinants for becoming a homeowner. The increase in family size showed a positive correlation. Residing in urban areas may make it more challenging to purchase housing, mainly because of higher land and housing prices there. The results also revealed that middle- and high-income households are significantly more likely to become homeowners. When we used wealth as a substitute for income, our results showed that the impact of financial status on tenure decision varied depending on the measurement of households' purchasing power.

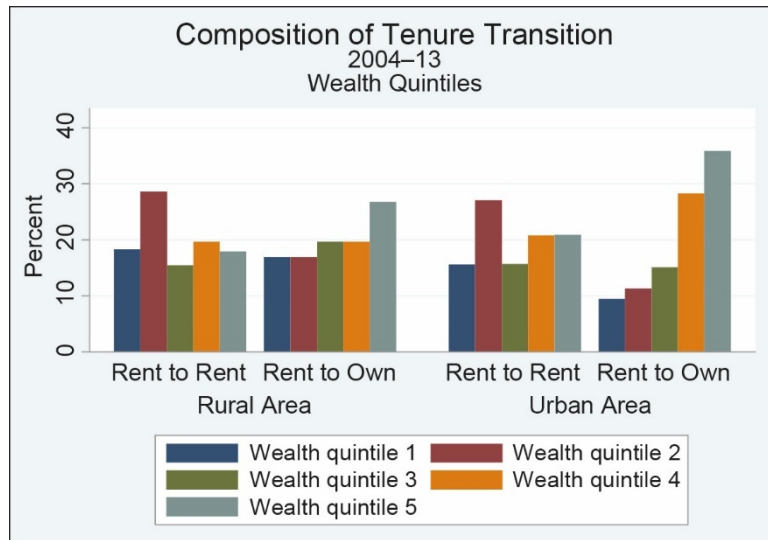
Finally, we calculated predicted probabilities of becoming a homeowner on the basis of our regression estimates. They clarified three important points: The first is that in urban areas the likelihood of becoming a homeowner is higher than average only if households belong to the top 20% of income/wealth level, while in rural districts they only need to be among the top 60%. The second is that in rural areas the access to homeownership was more equally distributed across different income and wealth quintiles. The third is that wealth is less of a driver of inequality in reaching home ownership compared with income. The main reason appears to be that renters have relatively small amounts of savings at their disposal. The first two findings suggest that different policy planning in urban and rural regions is required to improve access to homeownership for low- and middle-income households. The last finding implies that to improve access to homeownership, improving income is more important than favoring the accumulation of wealth.

## REFERENCES

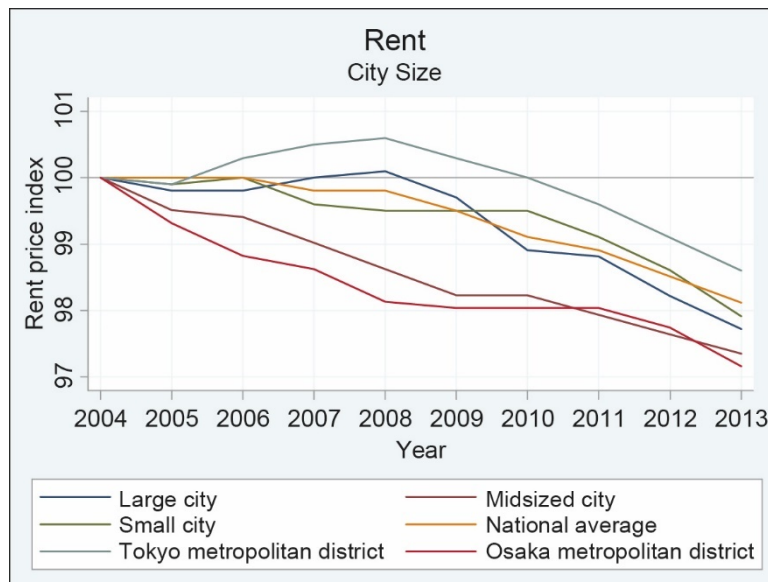
- Aaronson, A. 2000. A Note on the Benefits of Home Ownership. *Journal of Urban Economics* 47: 356–369.
- Aizawa, T., and M. Helble. 2015. Health and Home Ownership: Findings for the Case of Japan. *ADBI Working Paper Series No. 525*. Tokyo: Asian Development Bank Institute. <http://dx.doi.org/10.2139/ssrn.2605794>
- Attanasio, O., R. Bottazzi, H. Low, and L. Nesheim. 2012. Modelling the Demand for Housing over the Life Cycle. *Review of Economic Dynamics* 15: 1–18.
- Daniere, A. 1992. Determinants of Tenure Choice in the Third World: An Empirical Study of Cairo and Manila. *Journal of Housing Economics* 2: 159–184.
- Di, Z. X. 2007. Do Homeowners Have Higher Future Household Income? *Housing Studies* 22(4): 459–472.
- DiPasquale, D., and L. Glaeser. 1999. Incentives and Social Capital: Are Homeowners Better Citizens? *Journal of Urban Economics* 45: 354–384.
- Fallis, G. 1983. Housing Tenure in a Model of Consumer Choice: A Simple Diagrammatic Analysis. *AREUEA Journal* 11(1): 30–42.
- Fisher, M., and A. Jaffe. 2003. Determinants of International Home Ownership Rates. *Housing Finance International* 18(1): 34–42.
- Goodman, A. 1995. A Dynamic Equilibrium Model of Housing Demand and Mobility with Transactions Costs. *Journal of Housing Economics* 4: 307–327.
- Harvey, J. 2000. *Urban Land Economics*. 5th edition. Basingstoke, UK: Macmillan.
- Horioka, C. 1988. Tenure Choice and Housing Demand. *Journal of Urban Economics* 24: 289–309.
- Ito, T. 1994. Public Policy and Housing in Japan. In Y. Noguchi and J. Poterb, eds. *Housing Market in the U.S. and Japan*. Chicago: University of Chicago Press.
- Kan, K. 2000. Dynamic Modelling of Housing Tenure Choice. *Journal of Urban Economics* 48: 46–69.
- Kanemoto, Y. 1997. The Housing Question in Japan. *Regional Science and Urban Economics* 27: 613–641.
- Krumm, R. 1987. Intertemporal Tenure Choices. *Journal of Urban Economics* 22: 263–215.
- Linneman, P. 1985. An Economic Analysis of the Homeownership Decision. *Journal of Urban Economics* 17(2): 230–246.
- Mills, E. 1990. Housing Tenure Choice. *Journal of Real Estate Finance and Economics* 3: 323–331.
- Morizumi, Y. 1993. Tenure Choice and the Demand for Rental Housing in Japan. *The Economic Studies Quarterly* 44(1): 29–40.
- Peiser, R., and L. Smith. 1985. Homeownership Returns, Tenure Choice and Inflation. *Real Estate Economics* 13(4): 343–360.
- Raya, J., and J. Garcia. 2012. Which Are the Real Determinants of Tenure? A Comparative Analysis of Different Models of the Tenure Choice of a House. *Urban Studies* 49(16). doi: 10.1177/0042098012446998.

- Renaud, B., J. Follain, and G. Lim. 1980. The Determinants of Home Ownership in a Developing Economy: The Case of Korea. *Urban Studies* 17: 13–23.
- Rossi, P., and E. Weber. 1996. The Social Benefits of Homeownership: Empirical Evidence from National Surveys. *Housing Policy Debate* 7(1): 1–35.
- Seko, M. 2000. Tenure Choice of Older Households (Koreisetaino Kyojukeitai Sentakukodo). *Keio Journal of Economics* 93(2): 353–368 (in Japanese).
- Tan, T. 2008. Determinants of Homeownership in Malaysia. *Habitat International* 32: 318–335.
- The Building Center of Japan. 2014. *A Quick Look at Housing in Japan, May 2014*.
- Tiwari, P., and H. Hasegawa. 2004. Demand for Housing in Tokyo: A Discrete Choice Analysis. *Regional Studies* 38(1): 27–42.
- Yoshino, N., M. Helble, and T. Aizawa. 2015. Housing Policies for Asia: A Theoretical Analysis by Use of Demand and Supply Model. *ADBI Working Paper Series No. 526*. Tokyo: Asian Development Bank Institute.  
<http://dx.doi.org/10.2139/ssrn.2619614>

## APPENDIX



Note: Quintiles two periods ago.



Note: Tokyo metropolitan district includes Tokyo, Kanagawa, Chiba, and Saitama. Osaka metropolitan district includes Osaka, Kyoto, and Hyogo.

Appendix, continued

