KEIO/KYOTO JOINT
GLOBAL CENTER OF EXCELLENCE PROGRAM
Raising Market Quality-Integrated Design of "Market Infrastructure"

KEIO/KYOTO GLOBAL COE DISCUSSION PAPER SERIES

DP2010-021

Youth's Beginning of Individual Housing Payment and Tenure Choice: New Entries to Japanese Housing Market.

Takuya Ishino*

Abstract:

Purposes of this paper are to establish the model for explaining Japanese young's housing demand and to derive the implication to guide Japanese housing policy. For this, I investigate the determinants of their tenure choice, considering their housing independence from their parents.

On the basis of Japanese features, I would rather regard their housing self-pay as their independence than regard their nest-leaving as their independence. Here, housing self-pay means people bear their housing cost by themselves.

As a result, this paper finds the strong relationship between Japanese young's financial ability and their housing independence. Just as I thought, recent severe economic environment of Japanese young discourages them from entering housing market. This result also shows their complete dependent choice is an essential element for considering the magnitude of their housing demand. Furthermore, my findings validate Japanese housing policy of recent years.

*Takuya Ishino
Research Associate, Global COE Program,
Graduate School of Economics, Keio University

KEIO/KYOTO JOINT GLOBAL COE PROGRAM

Raising Market Quality-Integrated Design of "Market Infrastructure"

Graduate School of Economics and Graduate School of Business and Commerce,
Keio University
2-15-45 Mita, Minato-ku, Tokyo 108-8345, Japan

Institute of Economic Research,
Kyoto University
Yoshida-honmachi, Sakyo-ku, Kyoto 606-8501, Japan

Youth's Beginning of Individual Housing Payment and Tenure Choice: New Entries to Japanese Housing Market.

Graduate School of Economics,

Keio University,

Takuya Ishino*

Abstract:

Purposes of this paper are to establish the model for explaining Japanese young's housing demand and to derive the implication to guide Japanese housing policy. For this, I investigate the determinants of their tenure choice, considering their housing independence from their parents.

On the basis of Japanese features, I would rather regard their housing self-pay as their independence than regard their nest-leaving as their independence. Here, housing self-pay means people bear their housing cost by themselves.

As a result, this paper finds the strong relationship between Japanese young's financial ability and their housing independence. Just as I thought, recent severe economic environment of Japanese young discourages them from entering housing market. This result also shows their complete dependent choice is an essential element for considering the magnitude of their housing demand. Furthermore, my findings validate Japanese housing policy of recent years.

*Takuya Ishino
Research Associate, Global COE Program,
Graduate School of Economics, Keio University
Mita Toho Bldg. 5th Floor, 3-1-7 Mita, Minato-ku, Tokyo, 108-0073 Japan
e-mail: stonefield11@gmail.com

This paper is a revised edition of my paper which was presented at the annual meeting of the Applied Regional Science Conference in 2009. I would like to thank Professor Seko and Professor Fukushige for valuable comments and suggestions.

1. Introduction

Purposes of this paper are to establish the model for explaining Japanese young's housing demand and to derive the implication to guide Japanese housing policy. For this, I investigate the determinants of their tenure choice, considering their housing independence from their parents. This paper focuses on Japanese young first housing decision. In Japan, their first housing decision clings to them over a long time, because high mobility cost depresses their mobility.

Figure 1 shows that the majority of Japanese household's housing demand is formed to about 40 years old. That is to say, the housing demand of young is important in Japanese housing market. However, Figure 1 also shows that the housing demand of young Japanese is shifting now. For explaining this change, there is a need to establish the model. However, there are few earlier studies about housing demand of young in Japan. Therefore, this paper analyzes their housing demand by constructing the model considering its unique features.

Generally speaking, when young are independent from Japanese young's housing offer of their parents, they enter into housing market and carry out their first housing decision. Earlier studies regard their nest-leaving as this housing independence. On the other hand, Japanese young's nest-leaving is not necessarily independence. Japanese nest-leaving problem is as follows. Parents occasionally bear all housing cost of their children, even if children live apart from their parents. In addition, there is common matter that both parents and children live in the same house which is purchased by children. Nest-leaving is not always housing independence. Moreover, Nest-staying is not necessarily housing dependence. Then, I would rather regard their housing self-pay as their independence than regard their nest-leaving as their independence. Here, housing self-pay means people bear their housing cost by themselves. The reason Japanese young bear their housing cost by themselves is derived from Japanese culture. Independence gives social pride to Japanese people like American case Campbell (1963) notes. Therefore, Japanese young want to get housing independence.

In Japan, parents sometimes bear all housing cost of their children. According to Keio Household Panel Survey (KHPS), about 30% of Japanese young 21-40 years old are completely dependent on their parents about their housing cost. Now, Japanese young are confronting a number of economic problems. For example, they suffer from serious employment conditions and high housing price. There is the possibility that these economic problems discourage Japanese young from entering housing market.

Japanese housing price is high by far. Kanemoto (1997) says that this problem originates in laws which are exogenous factors of housing market. By taxation system, housing cost is considerably different in rented houses and owned houses. Then, tenure choice is important problem in Japan like as Horioka (1988), and Seko and Sumita (2007) show. For deriving the implication to guide Japanese housing policy, this paper takes particular note of housing price.

Earlier studies with the relation between independence of young people and their housing demand include the following. Börsch-Supan (1986) researches the housing demand of American young, considering whether they become a head of household or not. Haurin, Hendershott, and Kim (1994) find the correlation between American young's tenure choice and their decision whether they live together with their parents. Haurin (1993) and Ermisch (1999) show that housing price impacts on their cohabitation with their parents. Clark (2000) defines that youth's living apart from their parents is new entries to the housing market. This study analyzes the demand of these new entries from the viewpoint of tenure choice. These earlier studies demonstrate the cross-section analysis. According to Börsch-Supan (1990), the cross-section analysis cannot explain the transition of housing demand.

On the basis of these earlier studies and Japanese feature, the contribution of this paper is to establish suitable model for explaining their demand, considering a start of their self-pay home with the dynamic decision making model. Using survival analysis, this paper analyzes the process which Japanese young pay their housing cost by themselves and their tenure choice at the point they begin to pay.

As a result, this paper finds the strong relationship between Japanese young's financial ability and their housing independence. Just as I belief, recent severe economic environment of Japanese young discourages them from entering housing market. This result also shows their complete dependent choice is an essential element for considering the magnitude of their housing demand. Furthermore, my findings validate Japanese housing policy of recent years.

In Section 2, I introduce my model and estimation method for my analysis. Next, in Section 3, I introduce the housing user cost for deriving the implication to guide Japanese housing policy. I explain the data set used in the empirical analysis in Section 4. In Section 5, I discuss the estimation results. There are conclusion remarks in Section 6.

2. Model

This paper is to analyze the dynamic process of young Japanese people's housing independence from their parents and their first housing demand. For achieving this goal, this paper considers that young Japanese who have not begun to pay face following alternatives every period.

(1) They are completely dependent on their parents.

(2) They reside rented house and begin to pay the rent.

(3) They reside own house and begin to pay residential cost.

They select an alternative among these alternatives. If they select second or third alternative, they will begin to pay. This paper will reveal the determinants of this decision.

In the empirical analysis, this paper employs competing risk models in discrete time survival analysis. Japanese young who begin to pay will be dropped from the observations of the next period for this analysis. This concept is depicted in Figure 2.

There is the possibility that assumption of Independence of Irrelevant alternatives (IIA) isn't realized in this discrete choice model. Therefore, this paper adopt Mixed Logit (ML) model in addition to standard Conditional Logit (CL) model.

According to Train (2003), ML obviates IIA limitation by allowing for random coefficient. The choice probability of person n for alternative i under ML model becomes

$$P_{ni} = \int \left(\frac{e^{\beta X_{ni}}}{\sum e^{\beta X_{ni}}} \right) \varphi(\beta) d\beta, \tag{1}$$

where β is random parameter, X_{ni} is independent variable, $\varphi(\beta)$ is density function. This random coefficient logit model exhibits unrestricted substitution patterns. The percentage change in the probability for one alternative given a percentage change in the mth attribute of another alternative is

$$E_{niX_j^m} = -\frac{1}{P_{ni}} \int \beta^m \left(\frac{e^{\beta X_{ni}}}{\sum e^{\beta X_{ni}}} \right) \left(\frac{e^{\beta X_{nj}}}{\sum e^{\beta X_{nj}}} \right) \varphi(\beta) d\beta, \tag{2}$$

where β^m is the mth element of β. This elasticity is different for each alternative i. Hence, ML model is unconstrained by IIA.

3. User cost

For deriving the implication to guide Japanese housing policy, this paper takes particular note of housing price. The user cost is the housing price which reflects housing policy. By taxation system, user cost must be distinguished for a housing

tenure. According to Poterba (1984), Iwata (1986) and Ishikawa (2001), the user cost of Japanese owned house is

$$\left[\theta\left(i+\delta-\frac{\dot{P_t^B}}{P_t^B}\right)+(1-\theta)\left(i+\frac{\dot{P_t^L}}{P_t^L}\right)\right](1-MITD+\gamma)+\tau, \qquad (3)$$

where

$$\theta=\frac{P_t^B}{P_t^B+P_t^L},$$

i is the real interest rate, δ is the rate of depreciation, P_t^B is the price of building, P_t^L is the price of land, $\dot{P_t^k}/P_t^k$ $(k=B,L)$ is the expected rate of appreciation, $MITD$ is the rate of mortgage interest tax deduction, τ is the property tax, and γ is the estate acquisition tax.

Iwata (1986) and Ishikawa (2001) also derive the user cost of Japanese rented house. The user cost of Japanese rented house is

$$\left[\theta\left(i+\delta-\frac{\dot{P_t^B}}{P_t^B}\right)+(1-\theta)\left(i+\frac{\dot{P_t^L}}{P_t^L}\right)\right]\frac{\left[1-\frac{0.9b_t(1-e^{-iS})}{iS}+\gamma\right]}{1-b_t}+\tau, \qquad (4)$$

where b is the business tax, and S is the statutory life.

As for complete dependent choice, the user cost set to be zero.

In the empirical analysis, these components of each user cost are defined same as Ishikawa (2001) for the most part. Major difference is that the ratio of building price to land price and the rate of mortgage interest tax deduction set to be the observed value for owner occupiers. I cannot observe the ratio and the deduction of the samples reside complete dependent house and self-pay rented house. For filling in the blanks, the prefectural and annual average of observed value in whole KHPS samples is applied to their value.

Using equations (3) and (4), this paper investigates the price responsiveness of young's decision and evaluate recent Japanese housing policies from the viewpoint of housing demand expansion.

4. Data

The data is drawn from Keio Household Panel Survey (KHPS) 2005-2008. The Major advantage of using KHPS for this paper is that KHPS can provide rich information about housing, financial ability, and characteristics of household. KHPS is especially useful for my purpose because it has separate rich information concerning the allocation of housing cost and transfers of income between parents

and children. KHPS is annual follow-up survey started from 2004. Keio University conducts it. KHPS 2005 has data on 3,314 Japanese people. These respondents were selected by a stratified two-stage random sampling.

The financial variables and the demographic variables enter the demand function directly. The financial variables consist of the user cost, the income, the plan of housing inheritance, and the academic background of their fathers. Income is defined as annual total income of a respondent and his/her spouse. If the respondent is single, income of his/her spouse will be zero. The plan of housing inheritance and the academic background of their fathers represent financial ability of their parents. The demographic variables consist of the marital status and the age.

This paper constructs the dataset which includes completely dependent people aged 21-40 at the beginning of observation period. I restrict the sample those whose parents is alive during my sample period. This dataset doesn't include students don't earn anything at all. These students may not be economic decision maker. There are 554 respondents in this datasets.

Young people begin to pay for residing rented house are defined as follows.

A. Young people live in a rented house and apart from their parents. And, they don't get income transfer more than 99% rent from their parents.

B. Young people live in a rented house with their parents. While, they pay their residential cost even a little.

Next, young people begin to pay for residing their own house are defined as follows.

C. When purchasing a home, they shared the cost even a little.

D. They live in the house which is purchased by their parents. But, they pay a housing cost to parents.

Table 1 presents the choices observed in my dataset and descriptive statistics.

5. Empirical results

I have constructed a demand system of three alternatives, depicted in Figure 2, with demand functions defined by the discrete time competing risk models in Section 2. Baseline hazard is age in this survival analysis.

The parameter estimates are presented in Table 2. The result estimated by mixed logit model is shown in ML column. As in Börsch-Supan, Florian and Seko (2001), I assume coefficients follow an independent normal distribution with mean and standard deviation estimated in this ML model. At the same time, the result

estimated by standard conditional logit model is shown in CL column.

Both ML and CL show three findings. Firstly, young people avoid selecting choices with a high price. Secondly, if their income is high, they will be independent. This result can be explained by liquidity constraint and preference. Japanese mortgage is only available to people with enough income to buy a house. Besides, complete dependent choice is inferior goods for them. This means that they want to reside self-pay home as soon as possible. Thirdly, an existence of their spouse enhances an aspiration of their housing independence.

ML shows that estimated standard deviation are significantly different from zero for many variables. In other words, estimated parameters vary among individuals. Moreover, compared to CL model, log likelihood of ML model is larger. Therefore, ML model is better than CL model for this model.

To gain some intuition for the magnitudes of the coefficients, and to measure the effect of the user cost on each housing choice, this paper calculate the price elasticity and the cross price elasticity in Table 3. Calculating price elasticity, this paper simulates the effect of price change on the choice probability for the average sample by using mean values of ML coefficient estimates. As will be noted from Table 3, the user cost affects not only their tenure choice but the decision whether they begin to pay or not. In particular, the user cost of owned house has stronger impacts on the housing self-pay decision of Japanese young than that of rented house.

6. Conclusions

The main conclusions from the baseline estimates and from the housing price elasticity is the strong relationship between Japanese young's financial ability and their housing independence. Their complete dependent choice responds to housing price and their income acutely. Unless they can afford to pay their housing cost by themselves, they aren't independent from their parents and don't enter the housing market. That is, recent severe economic environment of Japanese young discourages them from entering housing market.

Cross price elasticity shows that the user cost affects not only their tenure choice but the decision whether they begin to pay or not. Additionally, cross price elasticity of completely dependent choice is large as well as that of other choices. Therefore, their complete dependent choice cannot be treated as a trivial matter for considering the magnitude of their housing demand.

Furthermore, cross price elasticity also shows self-pay decision is highly

responsive to the price of owned house. This finding validates Japanese housing policy of recent years. Recent Japanese government has been enlarging mortgage interest tax deduction for expansion of housing demand. These policies lower the user cost of owned house. Lowering user cost of owned house expands their housing demand effectively.

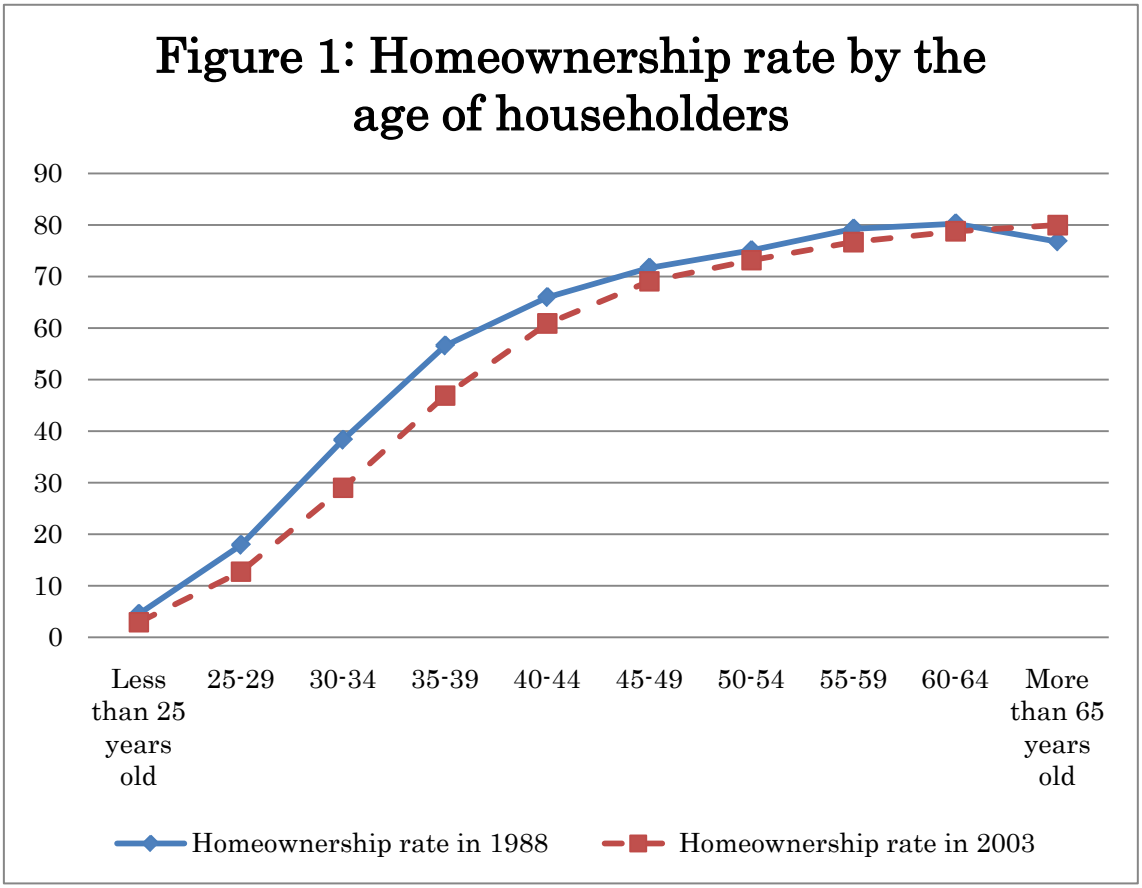
Figure 1: Homeownership rate by the age of householders
90
80
70
60
50
40
30
20
10
0
Less than 25 years old
25-29
30-34
35-39
40-44
45-49
50-54
55-59
60-64
More than 65 years old
Homeownership rate in 1988
Homeownership rate in 2003

Figure.2

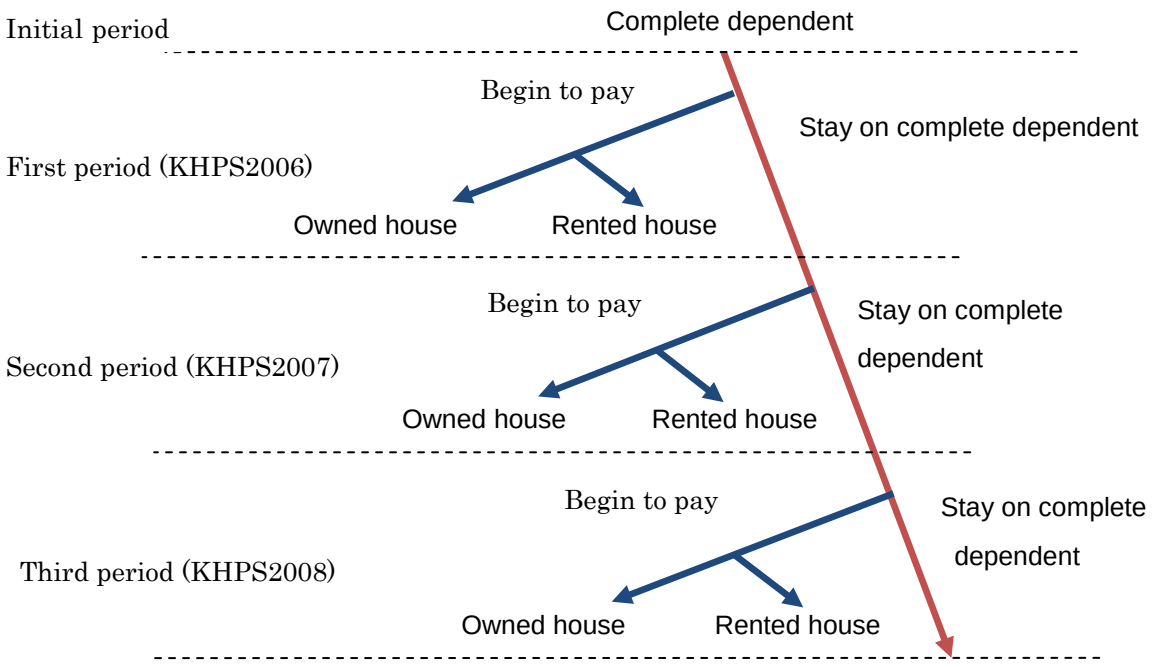
Initial period
Complete dependent
Begin to pay
Stay on complete dependent
First period (KHPS2006)
Owned house
Rented house
Begin to pay
Stay on complete dependent
Second period (KHPS2007)
Owned house
Rented house
Begin to pay
Stay on complete dependent
Third period (KHPS2008)
Owned house
Rented house

Table 1: Descriptive statistics	Complete dependent			Renters			Owner occupiers		
	Obs.	Means	S.D.	Obs.	Means	S.D.	Obs.	Means	S.D.
User cost	715	0	0	183	0.070	0.004	236	0.085	0.011
Annual income (ten thousands yen)	715	356.615	273.422	183	429.415	272.489	236	475.140	276.503
Age	715	31.911	6.046	183	31.749	5.455	236	33.503	5.855
Spouse dummy	715	0.371	0.483	183	0.628	0.485	236	0.580	0.494
Plan of housing inheritance dummy	715	0.678	0.468	183	0.530	0.500	236	0.628	0.484
Father is better educated than high school	715	0.226	0.419	183	0.224	0.418	236	0.211	0.409

Table 2: Estimation result	Mixed logit			Conditional logit		
	Parameter mean	S.E.		Coefficient	S.E.	
User cost	−18.198	8.188	**	−16.471	3.842	***
Annual income × rented house	−0.058	0.069		−0.001	0.000	*
Annual income × dependent	−0.002	0.001	***	−0.001	0.000	***
Age × rented house	−0.338	0.475		−0.029	0.008	***
Age × dependent	0.006	0.024		−0.010	0.011	
Spouse dummy × rented house	18.325	26.945		0.823	0.248	***
Spouse dummy × dependent	−1.064	0.423	***	−0.485	0.182	***
Plan of housing inheritance dummy × rented house	−13.375	15.271		−0.369	0.189	**
Plan of housing inheritance dummy × dependent	0.227	0.283		0.225	0.146	
Father is better educated than high school × rented house	7.499	13.706		0.232	0.226	
Father is better educated than high school × dependent	0.035	0.357		−0.081	0.171	
	S.D.					
User cost	9.543	9.800				
Annual income × rented house	0.089	0.101				
Annual income × dependent	0.002	0.001	*			
Age × rented house	0.308	0.391				
Age × dependent	0.046	0.023	**			
Spouse dummy × rented house	26.019	33.970				
Spouse dummy × dependent	1.483	0.722	**			
Plan of housing inheritance dummy × rented house	15.073	15.513				
Plan of housing inheritance dummy × dependent	1.397	0.529	***			
Father is better educated than high school × rented house	8.916	10.080	**			
Father is better educated than high school × dependent	1.368	1.417	**			
Observation	1134			1134		
Log likelihood	−691.56			−1063.74		

*, **, *** significant at the 1%, 5%, 10%

Table 3: Price elasticity of hazard probability

	Probability of living in owned house	Probability of living in rented house	Probability of complete dependent
Lowering user cost of owned house by 1%	0.93	-0.60	-0.61
Lowering user cost of rented house by 1%	-0.13	1.1	-0.13

References

Axel Börsch-Supan (1986) "Household formation, housing prices, and public policy impacts," *Journal of Public Economics*, vol.30, pp.145-164.

Axel Börsch-Supan (1990) "Panel Data Analysis of Housing Choices," *Regional Science and Urban Economics,* vol.20, pp.65-82.

Axel Börsch-Supan, Florian Heiss, and Miki Seko (2001) "Housing demand in Germany and Japan," *Journal of Housing Economics,* vol.10, pp.229-252.

Buruham O. Campbell (1963) "Long Swings in Residential Construction: The Postwar Experience," *American Economic Review,* vol.53, pp.508-518.

Charles Y. Horioka (1988) "Tenure Choice and Housing Demand in Japan," *Journal of Urban Economics*, vol.24, pp.289-309

Donald R. Haurin, Patric H. Hendershott, and Dongwook Kim (1993) "The Impact of Real Rents and Wages on Household Formation," *The Review of Economics and Statistics*, vol.75, pp.284-293.

Donald R. Haurin, Patric H. Hendershott, and Dongwook Kim (1994) "Housing Decisions of American Youth," *Journal of Urban Economics,* vol.35, pp.28-45.

James M. Poterba (1984) "Tax Subsidies to Owner-Occupied Housing: an Asset-Market Approach," *The Quarterly Journal of Economics*, vol.99, pp.729-752

John Ermisch (1999) "Prices, Parents, and Young People's Household Formation," *Journal of Urban Economics*, vol.45, pp.47-71

Kazumasa Iwata, Ikuo Suzuki, Atsushi Yoshida (1986) "Taxation System and User Cost of Equipment Investment (in Japanese)," *September Report of Economic and Social Research Institute* (in Japanese).

Kenneth Train (2003) *Discrete Choice Methods with Simulation,* Cambridge University press.

Miki Seko., and Kazuto Sumita. (2007) "Japanese Housing Tenure Choice and Welfare Implications After the Revision of the Tenant Protection Law," *Journal of Real Estate Finance and Economics,* vol.35, pp.357-383.

Tatsuya Ishikawa (2001) "The Transition of Taxation System and The Long Term Change of Residential User Cost (in Japanese)," *Quarterly Journal of Housing and Land Economics* (in Japanese), vol.42, pp.28-43.

William A V. Clark, and Clara H. Mulder (2000) "Leaving Home and Entering the Housing Market," *Environment and Planning A*, vol.32, pp.1657-1671

Yoshitsugu Kanemoto (1997) "The Housing Question in Japan," *Regional Science and Urban Economics,* vol.27, pp.613-641.