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Residential Mobility and Housing Equity in Japan

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Abstract

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Residential Mobility and Housing Equity in Japan[1]

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Abstract

This paper draws on five waves of Japan household longitudinal data (Keio Household Panel Survey, KHPS) and estimates a conditional fixed effects logit model to investigate the effect of Japanese government policy on owner-to-owner residential moves. We examine whether housing equity constraints deter owner-to-owner residential mobility and whether government policy aimed at addressing this constraint has a timely impact on residential moves. The specific policy we examine is the implementation of the income tax deduction system that permits the carrying over of capital losses for owner-occupied households. These tax policies were devised to cope with the severe equity constraints that followed the bursting of Japan's asset Bubble in the early 1990s. We find that housing equity constraints deter residential moves and that government policy has an impact on residential mobility, especially in the same year and the following year after the introduction of this tax system. The implementation of an income tax deduction system linked to capital losses increases owners' mobility to another owner-occupied housing immediately after the introduction of this tax revision, especially for higher income households (often self-employed) when future housing price depreciation is anticipated.

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1. Introduction

The purpose of this paper is to examine the effect of government policy on residential mobility in Japan. The 2004 income tax deduction system that introduced the carrying over of capital losses on housing is unique to Japan. It was a belated policy response to the implosion of real estate prices following the bursting of Japan's asset Bubble from 1991. From the late 1980s, Japan witnessed a rise and fall in land and housing values that rivals that of any period in modern history anywhere. The sharp downturn left many Japanese homeowners with low or negative housing equity that constrained residential mobility. We investigate the effect of this government policy on residential mobility in Japan.

Japan is known as a low residential mobility society. Between 1998 and 2003, the average annual residential mobility rate is 5.1 percent of all Japanese households.[2] The degree of residential mobility varies across countries.[3] Relatively high residential mobility rates are common in the U.S. and Canada; the residential mobility rate between 1995 and 2000 in the U.S. is 50.39 percent while that between 1996 and 2001 in Canada is 41.9 percent.[4] In contrast, the Japanese residential mobility rate between 1998 and 2003 is 24.1 percent, less than half of that in the U.S., and this rate has been decreasing.

Well functioning housing markets in market economies allocate housing to households when they enter the market, and determine housing equity, a very important component of household wealth. Residential mobility is an equilibrating factor in this allocating function of housing markets. When institutional constraints or other barriers impede residential mobility, this allocating role of housing markets is disrupted. Countries with low rates of residential mobility tend to suffer from high price volatility (see Englund and Ioannides, 1993). That is to say, due to high transaction costs most households do not immediately react to price changes by changing their residences,

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[2] This figure is based on the *2003 Housing and Land Survey of Japan*. The annual residential mobility rate between 1968-1973 was 8.1%, 7.5% between 1973-1978, 6.8% between 1978-1982, 6.2% between 1982-1988, - 6.1% between 1988-1993 and 5.8% between 1993-1998.

[3] Long (1991) analyzed residential mobility differences among developed countries. Strassmann (1991) made an international comparison of housing market interventions and mobility. Angel (2000), Table A.25 (p.372) shows annual residential mobility rates as of 1990 among 53 major cities in 53 countries. Harsman and Quigley (1991), Table 1-5 shows annual residential mobility rates among European countries and the U.S.

[4] U.S. census 2000 analyzed by the Social Science Data Analysis Network http://www.censusscope.org/us/s48/chart_migration.html .
Statistics Canada released 2001 census mobility data.

causing market disequilibrium and price volatility because adjustments by relocation do not occur smoothly. In addition, low rates of residential mobility can adversely affect economic growth because low rates of residential mobility make labor markets less efficient (see Hardman and Ioannides, 1999). In order to address the problems associated with low residential mobility, government policies are devised to promote residential mobility (see Englund and Ioannides, 1993, and Long, 1991).

In the following analysis, we focus on important government policies related to residential mobility in Japan, i.e. the 2004 income tax deduction systems in the owner-occupied housing market. This policy was devised to cope with housing equity constraints that resulted from sharp asset deflation after Japan's asset bubble burst in the 1990s. This significant change in the tax code is having a significant impact on residential mobility and the Japanese housing market.

This is a rigorous econometric analysis of the effect of government policy on residential mobility in Japan focusing on the owner-occupied housing market based on household longitudinal data. It is essential to understand the impact of government policies on residential mobility to formulate more effective housing policy so that Japanese housing markets can function more effectively. The distinctive characteristics of the Japanese owned housing market detailed above, together with the availability of the first Japanese household longitudinal data suitable to analyze Japanese housing markets, enable us to assess the effect of government policies on residential mobility in Japan. Our micro-data is based on the "Keio Household Panel Survey, KHPS" covering all Japan. In this research, the conditional fixed effects logit model is used to investigate the impact of government policies on residential moves.

The organization of the remainder of this paper is as follows: in Section 2, we briefly review the characteristics of the Japanese economy, Japanese housing markets and relevant government policies; in Section 3, we briefly review the related research, in Section 4, we discuss the econometric model, in Section 5, we discuss the data and variables; in Section 6, we present the estimation results about the effect of government policy on residential moves, and; Section 7 offers some concluding remarks.

2. Overview of the Japanese economy, housing markets and housing related policies

Since 1986, Japan has experienced a sharp rise and fall in land and housing values that rivals that of any period in modern history. Figure 1 shows the trend in land prices between 1965 and 2008 and Figure 2 shows the actual housing price of 75 square meters in the Tokyo Metropolitan Area between 1975 and 2007. Asset prices began increasing in 1983, and it was around 1986 when the rise began accelerating rapidly. The rise in land prices spread from Tokyo to major cities such as Osaka and Nagoya, and then to other cities.

<Figure 1 around here>

<Figure 2 around here>

Many Japanese households that bought housing during the Bubble era have a low or negative equity due to asset price deflation. Due to the high price of housing in Japan, many households carry large mortgages and for those that bought during the Bubble era, loans outstanding exceed the current value of the housing. In 2005, for example, 64.4% of households that bought houses took out loans, 75.0% of which suffered capital losses when they sold their previous houses.[5] In Japan, housing finance is based on recourse loans. That is to say, in asset deflation periods, borrowers have to take all risks stemming from the decline in collateral values in the form of real estate and they cannot move to a different residence without fully repaying the borrowed amount (i.e. principal plus interest). In order to address the problems of these borrowers and enable them to buy and move to another residence, in 2004 the Japanese government greatly revised a tax deduction system that permits carrying-forward of capital losses on replacement of residential property.

In Japan, there are several other housing related tax subsidies. Regarding income tax, the marginal tax rates as of 2006 are 10-37%. Imputed income on owner-occupied housing is not taxed. As for capital gains, nominal gains are taxed on a realization basis. A taxpayer's own residence is exempted from capital gains tax if certain conditions are met. Tax rates differ depending on length of ownership: 15% of taxable capital gains income for more than 5 years ownership and 30% for less than 5 years ownership.

[5] Survey of Housing Market Dynamics 2006 (Juutaku Shijou Doukou Chousa Heisei 18,) Ministry of Land, Infrastructure and Transportation (Tokyo, MLIT, 2007).

Property taxes are not deductible. Interest payments on housing loans are deductible although the total amounts are not large. Interest income on housing-related saving is tax-exempt up to a certain limit. There is also partial tax credit for recent home-buyers.

As for property taxes, the tax rate ranges from 1.4% to 2.1% of assessed market value.[6] In general, assessed market value has been far lower than actual market value until the bubble burst in the 1990s.

In 2003, the ratio of the total amount of housing related subsidies to government annual expenditure in Japan was only 0.8%.[7] For comparison, this ratio in the U.S. for 2003 was 5.9%. When we calculate the ratio of the sum of housing- related national budget and subsidies to government annual expenditure in both countries, it was only 2.1% in Japan compared with 7.5% in the U.S.

We examine the effect of the capital losses related tax deduction system on mobility from owned housing because it is the most important government housing related tax subsidy aimed at increasing mobility in Japanese housing markets. We find that this tax stimulates residential mobility, especially immediately after the introduction of this tax system.

3. Literature review

There are several theoretical studies focusing on the role of the equity constraint hypothesis related to the movements of prices and transaction volumes in the housing market. Stein (1995) presented a static model and demonstrated how extreme credit constraint distress may result in lower housing prices and fewer transactions because negative equity prevents some households from moving. Ortalo-Magne and Rady (2006) developed a life-cycle model of the housing market with a property ladder and a credit constraint.[8]

There are several empirical studies about the impact of equity constraints on residential moves based on mainly Western owner-occupied samples. For example, Henley (1998) investigated the impact of negative housing equity on residential moves

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[6] Gomi (2006), p.48.

[7] The values in this paragraph are all cited from *Housing Economy Databook 2005*, (*Juutaku Keizai Data-shu*,) (Tokyo: Housing Industry Newspaper Company, 2006) p.181.

[8] Leung (2004) surveyed research focusing on the relationship between housing price cyclicality, volatility and the structure of the residential lending market in his survey paper.

using a single and competing risk discrete time duration model of residence duration based on a U.K. owner-occupied sample. He also assessed whether labor market flexibility is impaired by a stagnant housing market. Chan (1996, 2001) empirically analyzed the impact of equity constraints on residential moves based on U.S. owner-occupied samples. Engelhardt (2003) examined the effect of equity constraints and nominal loss aversion on household mobility based on US data. Seslen (2003) examined the role of housing price dynamics in mobility decisions, asking whether households respond to prices in a forward- or backward-looking manner, and the extent to which high leverage constrains moving behavior using PSID (the Panel Survey of Income Dynamics). Lee and Ong (2005) empirically analyzed the impact of equity constraints on residential moves based on Singapore owner-occupied samples using the probit model. Although those studies investigate the impact of housing equity constraints on residential moves, none of them explicitly examine the effects of government policies aimed at easing equity constraints on residential moves. Seko and Sumita (2007) investigated the effect of the tax deduction policy on residential mobility in Japan based on an owned-housing panel sample in Japan using a proportional hazard model. They found that the tax deduction policy has a strong impact on owners' residential mobility. Although this study investigated the impact of housing equity constraints on residential moves from owned housing in Japan, they did not explicitly consider the timing of this tax policy. Moreover, their analysis heavily depended on the retrospective nature of the KHPS panel data.

There are several empirical studies using the conditional fixed effects logit model. Bjorklund (1985) studied the linkage between unemployment and mental health problems in Sweden using the Swedish Level of Living Surveys. Winkelmann and Winkelmann (1998) applied the conditional fixed effects logit approach to study the effect of unemployment on the level of satisfaction. Borsch-Supan (1987, 1990) employed this model to analyze the choice of housing tenure and size using five waves of PSID. Andrew (2004) used this model to explain why home ownership rates among young adults fell in the early 1990s when various indicators suggested it had become more affordable.

Our present study extends Seko and Sumita (2007) and attempts to shed light on the role of equity constraints and the effects of tax deduction policy on owner-to-owner residential mobility, assessing whether the timing of the introduction of tax deductions

influences residential moves using the conditional fixed effects logit model and the more reliable annual spot KHPS survey data information. The reason why we adopted the conditional fixed effects logit model is that the fixed effects specification captures the selection of a housing tenure and the timing of the move into it (see Borsch-Supan, 1990). This is the first rigorous econometric study to analyze the effects of government policy on the timing of owner-to-owner residential moves in Japan based on the conditional logit panel data estimation method.

4. Conditional Fixed Effects Logit model

We adopt a discrete dependent variable panel model for estimation. In particular, we consider the following underlying latent model:

$$S_{it}^{*} = x_{it}^{'}\beta + \alpha_i + \varepsilon_{it,} \quad i = 1,...,N, \quad t = 1,\ldots,T, \qquad (1)$$

where S_{it}^{*} is a continuous but unobserved index of residential mobility of owner-occupied household i in period t, x_{it} is a vector of explanatory variables, and α_i is an idiosyncratic fixed effect which accounts for inter-household differences in the factors affecting residential mobility, intrinsic differences in the factors affecting residential mobility and unobserved explanatory variables, as long as these differences are constant over time. ε_{it} is the stochastic error term.

Rather than observing S_{it}^{*}, we observe:

$$S_{it} = \begin{cases} 1 \ \ if \ \ S_{it}^{*} > 0 \\ 0 \ \ otherwise \end{cases} \qquad (2)$$

We assume that ε_{it} follows independently logistic distribution, that is:

$$P(S_{it} = 1 \mid x_{it}, \alpha_i) = \frac{\exp(\alpha_i + x_{it}^{'}\beta)}{1 + \exp(\alpha_i + x_{it}^{'}\beta)}. \qquad (3)$$

Chamberlain (1980) shows that such a fixed effects logit model can be estimated by conditional maximum likelihood. In particular, the probability of a particular sequence:

$(S_{i1}, \cdots, S_{iT})$, conditional on $s_i = \sum_{t=1}^{T} S_{it}$,

$$P(S_{i1},\cdots,S_{iT} \mid x_{i1},\cdots,x_{iT},\alpha_i,s_i) = \frac{\prod_{t=1}^{T}\exp(x_{it}^{'}\beta)}{\sum_{d\in D_i}\prod_{t=1}^{T}\exp(S_{it}x_{it}^{'}\beta)} \qquad (4)$$

where D_i is the set of all possible combinations of s_i ones and $T-s_i$ zeros, is independent of α_i . All the observed frequencies of tenure choice sequences are tabulated in Table 1. In this table "Os" means staying in the owner occupied housing, "Om" means moving into another owner occupied housing in the survey year. From this table, the household for the group of s_i=1, that is the household moving into another owner occupied housing once between the observation periods, can be analyzed.[9] The estimator obtained by this estimation method is called the conditional fixed effect logit estimator and denoted as β_{CFML}. Use of this conditional fixed effect panel data logit model provides the opportunity to properly identify the dynamics of residential mobility adjustments, especially the impact of government policy on the timing of moves by distinguishing time-varying dynamic effects such as unanticipated policy changes from selection effects that are due to time-invariant characteristics of households such as family growth.

In order to test for the fixed individual household effect, one can perform a Hausman-type test based on the difference between the above conditional MLE and the pooled logit MLE, denoted as β_{ML}, ignoring the individual effects (where the constant is dropped to compute the statistic). The test-statistic:

$$H = (\hat{\beta}_{CFML} - \hat{\beta}_{ML})'(\hat{V}_{CFML} - \hat{V}_{ML})^{-1}(\hat{\beta}_{CFML} - \hat{\beta}_{ML}) \qquad (5)$$

is asymptotically χ^2 distributed with k degrees of freedom.

< Table 1 around here >

5. Data

5.1 Explanation of our main KHPS data

The KHPS started to collect data from 2004. The first wave of the KHPS was

[9] The other household groups moving into another household more than two times cannot be estimated because of the lack of observations.

conducted in January, 2004, the second wave in January, 2005, the third wave in January, 2006, the fourth wave in January, 2007 and the fifth wave in January, 2008. The details of the KHPS are as follows: The KHPS are collected by Keio University (the Faculties of Economics, and Business and Commerce). Respondents for the first wave were limited to men and women aged between 20 and 69 as of 31 January 2004 from the whole of Japan. The first wave (2004) has data on 4,005 households, the second wave (2005) has data on 3,314 of the 4,005 households in the first wave, the third wave (2006) has data on 2,884 households, the fourth wave (2007) has data on 2,643 households, that is, the attrition rate between the first wave and fourth wave is about 34%. In addition to these samples, in the fourth wave, a new sample of 1,419 households is added. The fifth wave(2008) has data on 3,691 households.

A little over 70% of the households contain married couples. For each married couple, the respondent and his/her spouse were asked essentially the same questions, so the number of individuals on which we have data is roughly 1.7 times the number of households for each wave. We collect information related to household characteristics, and detailed information on labor market choices and housing choices. Although the respondents to the survey were restricted to the 20-69 age group at the time of the first survey in early 2004, all other demographic characteristics are representative of Japanese households.

Theoretically, residential moves are determined by life-cycle factors over the whole life of households. In addition, there exist several institutional barriers to residential moves. Residential moves are determined by socioeconomic factors at the time of the move, past histories, future expectations, financial asset position, changing liquidity constraints, price of each tenure, rate of change of housing prices for each tenure, and government policies and/or systems. In the following section, we examine determinants that influence residential moves in Japan such as household attributes, housing attributes, labor market conditions, borrowing situation, the tax system, and regional characteristics.

5.2 Determinants of residential moves in Japan

Variables we used as determinants of residential moves in Japan are presented in Table 2. The survey is conducted from 2004. In each survey conducted in January every

year, household information of the previous year was asked. For example, the first wave (2004) contains household information from 2003. In order to assess household mobility, we use the previous year's information as determinants of residential moves. That is, if the household answered that they moved house in the 2005 survey, we rely on the information from the 2004 survey.

As for household attributes, we use the household's current real income (*rincome*). Several dummy variables are used to characterize the households: *kid* signifies households living with children; *grandpa* represents households living with grandparent(s).

As for housing attributes, we use the number of rooms (*rooms*), and the dummy variable that represents the single detached house (*detach*). For the housing price (*hprice*), we use the real prefecture level owned detached house average price data. This data is taken from the *Annual Report on the Borrowers Survey of the House for Installment Sale* issued by the Government Housing Loan Corporation (GHLC). This price data reflects the prefectural average purchase price for ready-built houses purchased by those who borrow funds from the GHLC. This data is converted to real terms by using the CPI such that the average value throughout Japan in 2000 is unity. In order to explain the residential move at time *t*, *hprice* at *t* is used. That is, *hprice* at 2005 is used to explain the the residential move at 2005.

As for labor market conditions, we use the dummy variables that represent regular employment (*reg*) and frequency of job changes (*change*).

We constructed the following variables to analyze the impact of housing equity constraints on residential moves. We constructed the Loan to Value Ratio variable (*LTV*), that is to say, the ratio of loans outstanding to purchase price because households residing in owned housing may borrow funds for their housing purchase.

$$LTV = \frac{mortgage\ loan\ outstanding}{housing\ \ price}$$

The denominator, *housing price,* is calculated as follows: First based on the owner assessed price of the owner occupied housing[10] and housing attributes information, we estimate the hedonic price model with fixed effects. When households own both land and housing structure, the assessed value of the total sum of them is used. The

[10] This measure of housing price is constructed from the question about subjective assessment of the value of current residence ("How much do you think this lot/house would sell for on today's market?").

estimation result of the hedonic model is reported in the Table A under the name of the Model A2. Second, based on the estimated model, we predict the price of the existing owner occupied housing.

For the numerator *Mortgage loan outstanding*, we used the figures reported in the questionnaire. This figure is the total amount of the housing loan at the end of the last year. If this figure is missing, we completed the missing values by calculating on the assumption that the repayment amount in each year is equal to the repayment in January, 2008, based on the information about the loan outstanding and the repayment amount as of the fifth wave of the KHPS (January, 2008). In Japan, equal monthly payments including interest are the most widespread repayment method. In addition, the average repayment period on Japanese housing loans is fairly long (about 20 to 25 years), so that almost all households in our survey entering their residence with loans still have loans as of 2008. That is to say, *mortgage loan outstanding* in each year after entering the current residence= loan outstanding as of January, 2008 + repayment amount as of January, 2008 × length of the residence spell in each year. We set *LTV* at zero for households that did not borrow funds.

In this paper, we have examined effects of the tax deduction system on residential mobility,

We have constructed the dummy variable to represent the "establishment of an income tax deduction system regarding the carrying over of capital losses for specific houses in January 1, 2004 (*taxdedc*)". This tax deduction dummy variable is 1 if this system is applicable to the household and is zero otherwise.

The details of this tax deduction rule are as follows: When the household sells its housing after owning housing more than five years, if its loan outstanding is greater than the selling price (we denote this difference as A), or if the purchase price of previous owned housing is greater than the selling price of the previous owned housing (we denote this difference as B), the smaller amount of either A or B will be deducted from the income tax for three years, beginning in the tax year following the purchase. The amount of the tax deduction calculated from our data is 9,400,000 JPY.[11] To be

[11] The amount of the tax deduction is calculated as follows: A= loan outstanding at the end of the year－selling price, B= purchase price－selling price and the amount of the tax deduction is equal to the Min(A,B). Here, the purchase price is made from the fitted values of hedonic regression tabulated in the appendix Table A Model A1. Similarly the owner assessed selling price is made from the fitted values from the hedonic regression tabulated in Table A Model A2. These fitted values from the hedonic model are the truncated predictor (See Baillie and Baltagi 1999) ignoring the fixed effects estimator in order to

eligible to apply for this tax deduction, the households must have been living in the same house over 5 years and the annual income of the household in the selling year must be less than 30,000,000 JPY.

It is theoretically expected that this tax deduction dummy has a positive effect on residential moves.

We have constructed the regional dummies by dividing Japan into 8 regions to capture regional differences.

< Table 2 around here >

5.3 Descriptive statistics of the sample

In this section, we discuss the descriptive statistics of the variables. Table 3 shows that the descriptive statistics of the whole sample and the means classified by the sequences of own-to-own moves tabulated figures.

The ratio of the households that moved once during the observation periods is 3.5% for the whole sample.

For the household characteristic variables, the average real income (*rincome*) in the whole sample is 6,913,000 JPY. Regarding the regional dummies, about 33% of the households in the whole sample are living in the Kanto area, and 22% of the households are living in the Kinki area.

Descriptive statistics for the owned housing sample by time sequence are also tabulated in Table 3. The mean of the LTV for the sample categorized as om-os-os-os is 0.67 which is the highest among the 5 categories. Based on the mean of *taxdedc*, tax deductions for capital losses for specific houses can be claimed by 8% of all households. This low figure may reflect the very strict eligibility conditions of this tax system such as the minimum residence period requirement and other conditions.

< Table 3 around here >

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predict the missing house values.

6. Estimation results of the conditional fixed effects logit model for residential moves

Estimation results of the logit models are presented in Table 4.

In Table 4, estimation results of the two models are tabulated. Model 1 includes household related variables. These variables are omitted in Model 2. These two models are estimated by two specifications: the first specification is the conditional fixed effect logit model, equation (1), and the second one is the usual pooled logit model, the equation in which the fixed effects α_i are omitted from equation (1). These estimation results are not similar at all. In order to select the proper method, we use the Hausman specification test. The test statistics are calculated by equation (5) and the hypotheses of no fixed effects are tested. The results are tabulated in Table 5. In both models, the test statistic is so large that the null hypothesis is rejected and the conditional fixed effect logit models are favored. We can say that individual effects are so important and that pooled logit models ignoring the individual effects produce inconsistent estimates.

From the conditional fixed effect estimate of Model 1 and Model 2 in Table 4, the estimated coefficients, as a whole, have the expected coefficients. Since LTV has a significant negative sign, we can say that the large LTV deter owner-to-owner moves. On the other hand, from the coefficient of *taxdedc*, income tax deductions stimulate owner-to-owner moves.

<Table 4 around here>

<Table 5 around here>

In Table 6, the estimation results of Model 3 are reported. In this model, the coefficient of tax deduction dummy variable *taxdedc* is allowed to change for 2005 and 2006 to check the effect of the tax policy on the timing of the moves. The large coefficients of the cross-terms of *taxdedc* for 2006 and 2005 indicate that the tax deduction had the most impact on the owner-to-owner moves in 2006 and next in 2005, that is, immediately after the introduction of the 2004 revised tax system.

<Table 6 around here>

Simulation analysis is conducted using the estimation result of the conditional fixed effect estimate of Model 2. If the conditions of the tax deduction were relaxed, how could the probability of the owner-to-owner movement change? We change the required residential years the household has to live before selling from 5 years to 1 year. These simulation results are described in Figure 4. The probability of mobility increases from about 4.7% (with 5 years) to 4.9% (with 1 year) without relaxing the other eligibility conditions (see section 5.2 for details of the tax deduction rule).

<Figure 3 around here>

7. Conclusion

Japan is known as a low residential mobility society. The contemporary Japanese economic environment, involving severe asset price deflation, promotes this tendency. The present paper used five waves of Japan household longitudinal data (Keio Household Panel Survey, KHPS) and estimated a conditional fixed effects logit model to investigate the effect of Japanese government policy on owner-to-owner residential moves. We examined whether housing equity constraints deter owner-to-owner residential mobility and whether the government policy to ease this constraint has an immediate impact or not on residential moves. The policy we examined is the implementation of the income tax deduction system that permits the carrying over of capital losses for owner-occupied households. These tax policies were devised to cope with the severe equity constraints that followed the bursting of Japan's asset Bubble in the early 1990s. We find that housing equity constraints deter residential moves and that government policy has an impact on residential mobility, especially in the same year and the following year after the introduction of this tax system. The implementation of an income tax deduction system linked to capital losses increases owners' mobility to another owner-occupied housing situation immediately after the introduction of this tax revision, especially for higher income households without regularly employed household heads that anticipate further housing price depreciation.

In order to address regulatory related disequilibrium in the housing market it is important to lessen regulatory barriers to residential mobility. For example, in the rental

housing market, the government should promote an increase in the rate of fixed term rental contracts compared to the more popular general rental contracts, as the traditional Japanese Tenant Protection Law for the general rental contracts is a strong barrier to residential mobility (see Seko and Sumita, 2007). Enhancing the residential mobility rate would help limit housing price volatility in Japan by encouraging adjustments in the pricing and supply of housing available. These recent tax innovation is a step in the right direction because our study showed that it has an *immediate* impact, but we should reconsider the eligibility criteria carefully to enhance the impact.

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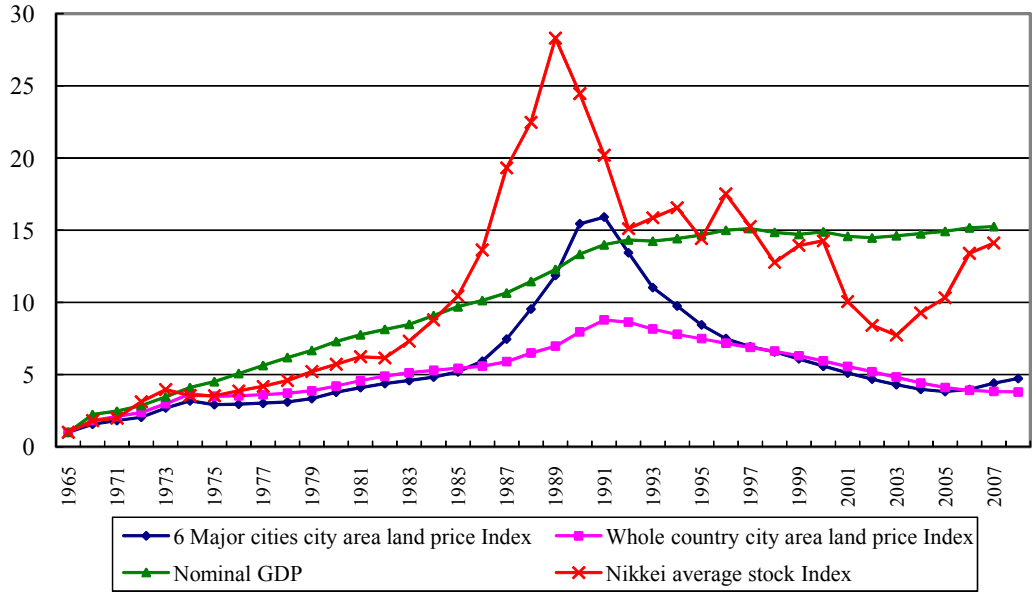
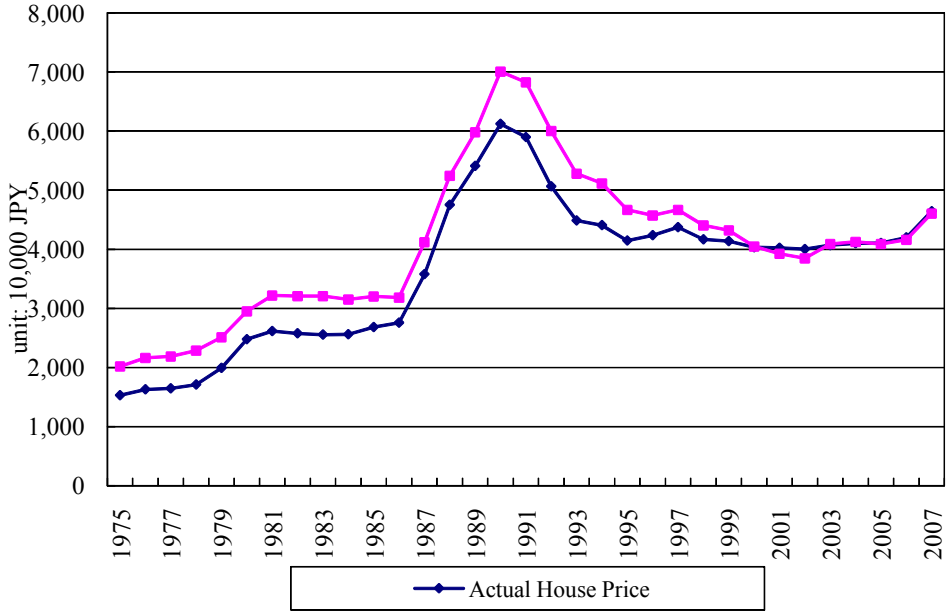
Figure 1: Trends of land price index etc (1965=1)



Source:"Real Estate Related Statistics," Mitsui Fudosan Co., Ltd.,2008

Figure 2: House prices, 1975-2007 (Tokyo metropolitan area)



Source: "Housing Economy Databook", Housing Industry Newspaper Company

Table1: Observed frequencies of tenure choice sequences

Survey Year					s_i	
2005	2006	2007	2008	N[a)]	=Σ Om	N[b)]
Os	Os	Os	Os	8498	0	6194
Os	Os	Os	Om	50	1	38
Os	Os	Om	Os	85	1	60
Os	Os	Om	Om	0	2	
Os	Om	Os	Os	90	1	66
Os	Om	Os	Om	0	2	
Os	Om	Om	Os	5	2	
Os	Om	Om	Om	0	3	
Om	Os	Os	Os	248	1	156
Om	Os	Os	Om	0	2	
Om	Os	Om	Os	0	2	
Om	Os	Om	Om	0	3	
Om	Om	Os	Os	0	2	
Om	Om	Os	Om	0	3	
Om	Om	Om	Os	5	3	
Om	Om	Om	Om	0	4	
Total				8981		6514

Note: Os: Stay and Owner occupied housing, Om: Move and Owner Occupied housing. The observations included in the dushed line is the sample used in the analysis. a) indicates the total number of the observations. b) means the number of the observations after deleting the observarions including missing values

Table 2 : Variables and definitions

Variables	Definitions
Om	1: household moved from owner occupied housing to other owner occupied housing during 2004-2007
Household Characteristics	
rincome	real income at the beginning of the current residence (ten thousand yen, in 2000 price)
kid	1: household living with children, 0: otherwise
grandpa	1: household living with grandparents, 0: otherwise
Housing Characteristics	
hprice	real prefecture level owned detached house average price (ten thousand yen, in 2000 price)
hage	house of age (years)
rooms	number of rooms
detach	1: detached house, 0: otherwise
Labor market(h.h.'s labor status)	
reg	1: regular employment, 0: otherwise
change	1: h.h. have moved to the other job., 0: otherwise
Loan	
LTV	Loan to value ratio
Tax system	
taxdedc	1: if the tax deduction system regarding the carrying over of capital losses for specific houses in Januray 1, 2004 is applicable, 0: otherwise
Regional dummies	
hokkaido	1: Hokkaido area, 0: otherwise
tohoku	1: Tohoku area, 0: otherwise
kanto	1: Kanto area, 0: otherwise
chubu	1: Chubu area, 0: otherwise
kinki	1: Kinki area, 0: otherwise
chugoku	1: Chugoku area, 0: otherwise
shikoku	1: Shikoku area, 0: otherwise
kyushu	1: Kyushu area, 0: otherwise
Survey year dummies	
year04	1: 2004, 0: otherwise
year05	1: 2005, 0: otherwise
year06	1: 2006, 0: otherwise
year07	1: 2007, 0: otherwise

Table 3: Descriptive statistics

	Total		Os-Os-Os-Os		Om-Os-Os-Os		Os-Om-Os-Os		Os-Os-Om-Os		Os-Os-Os-Om	
Variable	Mean	Std.Dev.	Mean	Std. Dev.	Mean	Std.Dev.	Mean	Std.Dev.	Mean	Std.Dev.	Mean	Std.Dev.
Om	0.01	0.11	0.00	0.00	0.26	0.44	0.26	0.44	0.27	0.45	0.26	0.45
rincome	691.30	498.20	690.52	503.38	700.55	394.77	709.70	341.59	616.69	346.92	866.04	431.21
LTV	0.32	0.65	0.31	0.65	0.67	0.66	0.46	0.60	0.56	0.77	0.03	0.07
taxdedc	0.08	0.27	0.08	0.27	0.03	0.16	0.03	0.17	0.10	0.30	0.00	0.00
reg	0.67	0.47	0.67	0.47	0.81	0.39	0.68	0.47	0.80	0.40	0.37	0.49
change	0.03	0.16	0.02	0.15	0.04	0.21	0.06	0.24	0.03	0.18	0.00	0.00
kid	0.30	0.46	0.30	0.46	0.58	0.49	0.36	0.48	0.40	0.49	0.11	0.31
grandpa	0.16	0.36	0.16	0.37	0.08	0.28	0.12	0.33	0.00	0.00	0.00	0.00
hprice	3370.4	538.4	3360.5	536.2	3565.7	595.1	3557.4	469.1	3505.8	527.1	3649.5	499.4
(Regional dummies)												
hokkaido	0.04	0.20	0.04	0.20	0.05	0.22	0.00	0.00	0.00	0.00	0.00	0.00
tohoku	0.07	0.26	0.08	0.26	0.01	0.08	0.06	0.24	0.07	0.25	0.00	0.00
kanto	0.33	0.47	0.33	0.47	0.42	0.50	0.32	0.47	0.37	0.49	0.42	0.50
chubu	0.16	0.37	0.16	0.37	0.12	0.33	0.12	0.33	0.02	0.13	0.18	0.39
kinki	0.22	0.41	0.22	0.41	0.15	0.36	0.32	0.47	0.48	0.50	0.18	0.39
chugoku	0.05	0.22	0.05	0.22	0.04	0.21	0.06	0.24	0.00	0.00	0.11	0.31
shikoku	0.03	0.18	0.03	0.18	0.10	0.30	0.06	0.24	0.00	0.00	0.00	0.00
kyushu	0.09	0.29	0.09	0.29	0.10	0.30	0.06	0.24	0.07	0.25	0.11	0.31
(Survey year dummies)												
year04	0.23	0.42	0.23	0.42	0.26	0.44	0.23	0.42	0.25	0.44	0.21	0.41
year05	0.25	0.44	0.25	0.44	0.24	0.43	0.26	0.44	0.27	0.45	0.26	0.45
year06	0.26	0.44	0.26	0.44	0.25	0.43	0.26	0.44	0.27	0.45	0.26	0.45
year07	0.26	0.44	0.26	0.44	0.25	0.43	0.26	0.44	0.22	0.42	0.26	0.45
N	6514		6194		156		66		60		38	

Note: Os: Stay and Ownere occupied housing, Om: Move and Owner Occupied housing,

Table 4: Estimation results of the logit models

	Model 1						Model 2					
	fixed effect logit model			pooled logit model			fixed effect logit model			pooled logit model		
Variables	Coef.	Std. Err.		Coef.	Std. Err.		Coef.	Std. Err.		Coef.	Std. Err.	
rincome	0.0031	0.001	***	0.0002	0.000		0.0030	0.001	***	0.0001	0.000	
LTV	-2.3216	0.513	***	-0.7450	0.311	**	-2.3358	0.511	***	-0.3331	0.277	
taxdedc	2.8578	1.074	***	0.3077	0.527		2.9620	1.058	***	0.2715	0.529	
reg	-1.3524	0.660	**	0.1350	0.294		-1.1607	0.636	*	0.3426	0.269	
change	-2.0062	1.260	+	-0.7701	1.041		-1.9015	1.246	+	-0.5865	1.033	
kid	0.6589	0.995		0.8825	0.272	***						
grandpa	-1.2774	1.468		-1.8948	0.597	***						
hprice	-0.0015	0.001	+	0.0004	0.000	**	-0.0015	0.001	*	0.0005	0.0002	**
constant				-5.1585	0.804	***				-5.4298	0.793	***
regional dummies	Yes			Yes			Yes			Yes		
time dummies	Yes			Yes			Yes			Yes		
fixed effects	Yes			No			Yes			No		
log L	-75.053			-414.925			-75.820			-426.856		
N	320			6514			320			6514		

Note: ***, **, *, and + indicate that the estimated coefficient is significant at 1%, 5%, 10% and 15% levels, respectively.

Table 5: Hausman specification tests: conditional fixed effects logit vs pooled logit model

	Model 1	Model 2
stat	37.111	38.426
P-value	0.000	0.000

Note: stat follow the chi-saured distributuion under the null of no fixed effects. Degrees of freedom of the distribution is 14 for Model 1 and 12 for Model 2.

Table 6: Estimation results of the logit models

	Model 3 fixed effects logit model		
Variables	Coef.	Std. Err.	
rincome	0.003	0.001	***
LTV	-3.128	0.665	***
taxdedc×year05	2.954	1.439	**
taxdedc×year06	7.732	1.968	***
reg	-1.098	0.656	*
change	-1.641	1.250	
hprice	-0.002	0.001	*
regional dummies	Yes		
time dummies	Yes		
fixed effects	Yes		
log L	-69.837365		
N	320		

Note: ***, **, *, and + indicate that the estimated coefficient is significant at 1%, 5%, 10% and 15% levels, respectively.

Figure 3: Probability of moving by the change of the tax deduction availability condition, changing of the year condition from 5 to 1 year.

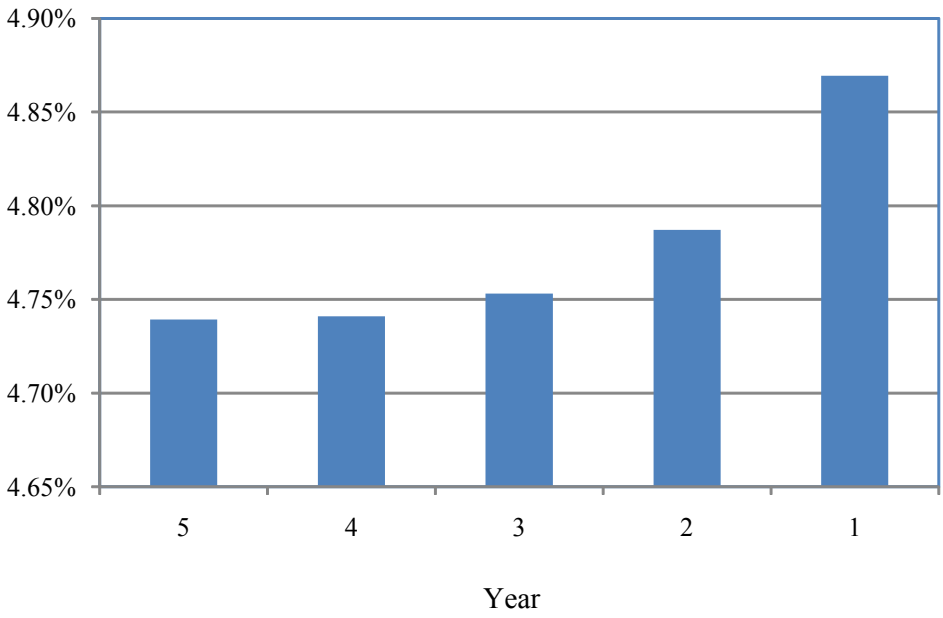


Table A: Estimation results of purchase price model and owner assessed value model

	Model A1			Model A2		
Explained variable	ln(Purchase value)			ln(Owner assessed value)		
Explanatory variables	Coef.	Std. Err.		Coef.	Std. Err.	
hage	-0.011	0.003	***	-0.020	0.002	***
rooms	0.014	0.008	*	0.029	0.011	***
detach				0.560	0.114	***
constant	8.453	0.119	***	7.171	0.169	***
Regional dummies	Yes			Yes		
Purchase year dummies	Yes			No		
Survey year dummies	No			Yes		
Individual fixed effects	Yes			Yes		
S_u	0.863			0.884		
S_e	0.254			0.439		
F test for all u_i=0 [P-value]	15.34 [0.000]			7.4 [0.000]		
R-squared	0.002			0.0445		
N	5745			9863		

Note: ***, ** and * indicate that the estimated coefficient is significant at 1%, 5%, and 10% levels, respectively.