2009
OKS0901

Economics Working Paper Series
OKLAHOMA STATE UNIVERSITY

Housing Tenure Choice Implications of Social Networks

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by Jeffry Jacob *and* Abdul Munasib

Abstract

The recent literature on tenure choice has been focusing increasingly on the information aspects of the tenure choice decision. However, despite the obvious information channel between social networks and tenure choice, the relationship has drawn little attention in academic research. Since the homeownership decision is almost always associated with a change of location, researchers have often emphasized the importance of modeling tenure choice and mobility decisions jointly. In that joint decision process, the impact of social networks may be multidimensional. Social networks, which in large part are tied to the physical location, are likely to increase the transaction costs of relocation. On the other hand, social networks may ease encourage homeowning through the information channel (e.g., by providing information about mortgage loans and related credit issues, etc.). We estimate the effect of social networks on the joint tenure-mobility decision mechanism. We also address the issue of potential endogeneity of social networks in this joint mobility-tenure choice decision process.

Key words: Social network, housing tenure choice, mobility, multinomial logit, endogeneity.

JEL Classification: D85, J6, R, R2, R21, Z13

I. Introduction

The recent literature on housing tenure choice has been focusing increasingly on the information aspects of the tenure decision [Haurin and Morrow-Jones 2007]. While research over the last two decades has established the crucial importance of social networks in information sharing and dissemination [Durlauf and Fafchamps 2004], the relationship between social networks and tenure choice is conspicuously absent despite the obvious information channels between the two. Social networks can encourage homeownership by channelizing important information regarding mortgage and credit issues, knowledge about managing owned homes, etc. Social network may also provide support, emotional and otherwise, for an undertaking such as homeownership which entails additional responsibilities and resourcefulness (knowing a good local plumber, etc.). This paper is the first study of the tenure choice implications of social networks.

Since the homeownership decision is frequently associated with a change of location, researchers have often emphasized the importance of modeling tenure choice and mobility decisions jointly. Several empirical studies have established that tenure choice and mobility decisions are correlated [Zorn 1988, Boehm et al. 1991, Ioannides 1987, Ioannides and Kan 1996, Kan 2000, Ozyildirim 2005]. The agent-based dynamic models of mobility and tenure choice pose mobility and tenure decisions as joint decisions [Ioannides and Kan 1996, Ozyildirim 2005]. Because social networks in large part are tied to the physical location, the mobility decision and the level of social networks are intricately related [Glaeser et al. 2002, Durlauf and Fafchamps 2004, Munasib 2005]. Since mobility depreciates social networks – and social networks are valued by the individual [Dusgupta 2002, Munasib 2005] – high

levels of local social networks create greater transaction costs of relocation.[1] Using a large scale survey of Indonesian households, the Indonesian Family Life Survey (IFLS) 1993-98, we estimate the effects of social networks on the joint tenure-mobility decision mechanism.

This estimation, however, is complicated by the fact that social network is very likely to be endogenous. Since homeowners are invested in the location of their homes, they are likely to have higher levels of social networks compared to non-owners [DiPasquale and Glaeser 1999]. Furthermore, households expecting to move have a lower incentive to invest in building up local social networks. We used an instrumental variable approach proposed by Lewbel [1997] to account for endogeneity of social networks in the tenure-mobility joint decision mechanism.

Another contribution of this study is the use of extensive social network measures. The measure "number of associational memberships" – the so-called "Putnam's Instrument" popularized by Robert Putnam [Putnam 1995, Putnam 2000] – has a special place in the social capital literature. It is arguably the most commonly used proxy for social capital.[2] Since the *trust/co-operation* view of social capital that defines social capital as the level of trust in the society is not very conducive to individual optimization [Munasib 2005, Glaeser, Laibson and Sacerdote 2002, Durlauf and Fafchamps 2004], when membership is used to measure individual social capital it is essentially based on the network view where social capital of an individual represents her social connectedness [Durlauf and Fafchamps 2004].

Number of membership alone, however, is not an adequate measure of individual's social networks [Munasib 2005, Jacob 2006].[3] Putnam's Instrument is vulnerable to the

[1] See Munasib [2005] for a discussion of mobility and the dynamic decisions of social network accumulation.
[2] Carter and Maluccio (2003), Grootaert (2000), Narayan and Pritchett (1999), Costa and Kahn (2003), Malucccio, Haddad and May (2001), and Helliwell (1996), are some of the frequently cited studies that used this measure.
[3] See Durlauf and Fafchamps [2004] for a detailed survey of studies that used this proxy.

following criticisms raised in Paldam [2000], Sobel [2002], and Fukuyama [2000]. Memberships in voluntary organizations with weak intensity could be difficult to keep track of. Large number of voluntary organizations exists with memberships that cost little and demand little contact. Such voluntary organizations may claim a large membership while they do not require any sacrifice of time or other resources. The justification for using intensity weights come from the fact that, while some voluntary organizations do not require much involvement and little or no real trade-offs, there are others that are very demanding and come to dominate the lives of its members (church affiliations, for instance). Thus, a household whose members participate in several different groups will have more social networks than a household where all members belong to the same group. However, mere membership may not have any significant impact on social networks unless the households actively participate in these groups. In this study, we use four kinds of social network measures: the number of memberships, the amount of time spent in these organizations (an intensity measure with real trade-offs), cash contribution to these organizations (another intensity measure with real trade-offs), and an index made out of these three measures (a multilevel index of social engagement).

In what follows, section II reviews the existing literature, section III describes the data, section IV explains the econometric model, section V discusses the results and section VI concludes.

In addition to a detailed discussion of this measure and its various criticisms, Munasib (2005) also discusses and makes use of an alternative approach. Also see Jordan and Munasib (2006) for a discussion of the determinants of associational activities.

II. Literature Review

Tenure choice, knowledge and information, and social networks

Haurin and Morrow-Jones [2007] find that lack of real estate knowledge is a barrier to becoming a homeowner. They estimate that racial differences in the amount of real estate knowledge explain 8.5 percentage points of the racial gap in homeownership rates. The reason behind the expectation that social network may have an impact on homeownership (and tenure choice, in general) is the strong link that channeling of information and Information diffusion are some of the most widely discussed aspects of social networks, especially at the individual level [Durlauf and Fafchamps 2004]. When individuals interact with one another, transfer of information takes place. Often the purpose of such interaction – even in social circumstances – may be the sharing of information itself, and sometimes this information sharing occurs as a by-product in the form of a Marshallian externality.[4]

As an individual becomes socially engaged she has a heightened exposure and access to information about various markets and about various social and economic systems, processes, and opportunities. Barr [2000] argues that social networks among Ghanaian entrepreneurs served to channel information about new technology. The role of business networks in conveying information about employment and market opportunities has been much emphasized [Fafchamps and Minten 1999, Granovetter 1995, Montgomery 1991, Rauch and Casella 2001]. In the literature on knowledge spillover, social ties and contacts play a crucial role not only in dissemination of ideas but also in the cross breeding of ideas through social interaction [Jacobs 2002, Krugman 1991]. Furthermore, when individuals share common interests and beliefs communication among them is more likely to be effective. As a result, learning from groups may be more effective compared to other avenues of learning

[4] See Durlauf and Fafchamps (2004) for a detailed discussion.

(e.g. reading books). Munshi and Myaux [2002] find evidence that information diffusion among households with similar religious affiliations helps explain adoption of improved contraception methods in Bangladesh.

The links between social networks and homeownership is rarely explored in the literature. DiPasquale and Glaeser [1999] argue that homeownership gives individuals an incentive to improve their community and because homeownership creates barriers to mobility it may encourage investment in local amenities and social capital measured by organization memberships. Using the U.S. General Social Survey they document that homeowners invest more in social capital. They also find evidence that a large portion of the effect of homeownership on these investments comes from lower mobility rates for homeowners.

Mobility and tenure choice as a joint decision

Krumm [1984] and Zorn [1988] were the earliest works that explored empirically the joint mobility-tenure decision. Zorn [1988] provides a cost-benefit analysis of the mobility decision, joint with tenure prior to and after a potential move. Since mobility and tenure are both binary decisions, this provides eight discrete alternatives for households, which he reduces to six by assuming that households cannot change tenure without moving. Zorn [1988] emphasizes the simultaneous nature of mobility and tenure choice. Since it is assumed that housing consumption cannot be adjusted without moving, this divides households' lifetimes into two terms, each of which can be identified by their housing choice. The budget constraint incorporates the fixed costs of moving as a flow cost. Any fixed costs associated with purchasing a home are assumed to be perfectly capitalized into house prices. For this reason they do not show up as separate costs in the budget constraint. Existing owners can choose to move-own, move-rent, or stay-own. Li [1977] also addresses the joint mobility-

tenure decision, but in a purely statistical framework. He models mobility and tenure decisions over time as a Markov process.

Ioannides and Kan [1996] develop a dynamic behavioral model of households' decision on residential mobility and housing tenure choice together with the amounts of housing and non-housing consumption. Household/individual behavior is formulated as a stochastic dynamic programming problem in which a household makes a sequence of decisions (joint choices of housing tenure mode, housing consumption and investment levels, and non-housing consumption level), which maximize remaining lifetime utility. They also make the assumption that housing consumption/investment can only be changed by moving. The possibility for adjustment through home improvement is, therefore, ignored. They estimate their model using a random effects model where individual heterogeneity is modeled as a time-invariant random variable that varies across individuals.

III. Data

Our data comes from the second and third waves (1997 and 2000) of the Indonesian Family Life Survey (IFLS) [Frankenberg et al., 1995, 2000; Strauss et al., 2004]. IFLS was conducted in 13 provinces representing more than 83 percent of the national population. IFLS contains rich information on community participation by households and information on intra-household transfers allowing us to construct various measures of social networks. Since the households were followed over time a variable called expected move could be constructed.

A notable strength of this study is the comprehensiveness of the social network measure used. The IFLS dataset is especially rich in terms of the information it contains on community participation (PM module) and other measures of social networks. The first measure used is an index of the number of unique group memberships of a household in the

various community groups. These groups range from organizations for local governance, cooperatives, and women's groups with the focus on family welfare to manning community health posts. The motivation for using unique memberships is that once a household member participates in a group, the household has access to the group's networks. Thus a household whose members participate in several different groups will have more social networks than a household where all members belong to the same group. However, mere membership may not have any significant impact on social networks unless the households actively participate in these groups. The next two indicators look at the time a household spends and the monetary contributions the household makes per group membership. The PM module of IFLS-2 asked questions about 12 different groups while in IFLS-3 had information on 10 groups. To make comparisons across waves, these three variables are rescaled for each wave to lie between 0-100. An index of membership is also created in which these three indicators enter interactively. Time and money contributions are grouped according to quintiles and are rescaled by diving them by the middle value, 3. These rescaled scores are then multiplied with the number of unique group memberships to obtain a composite index of social networks. This approach is similar to Maluccio et al. [2001].[5]

The IFLS consumption module contains weekly expenditure data on various food items purchased or consumed from self-production. The non-food questionnaire has information on various monthly and annual expenditures including spending on education. It is well know that consumption data can be rather noisy. To correct for this, the values below 1st and above 99th percentile are replaced with the 1st and 99th percentile value, respectively.

[5] For example, suppose a household had 1 unique group membership. Also the household was ranked amongst the median households in terms of attendance and in the topmost quintile in terms of cash contributions. Its index of social network will be SN = 1 x (3/3) x (5/3) = 0.56. On the other hand, if the household was a member of one group, but did not attend any meetings or make monetary contributions, it's score is SN = 1x (1/3) x (1/3) = 0.11. In case of more than one group memberships, we first find average cash and time contributions, rescale each by dividing by the midpoint, 3, and multiply by number of group memberships.

The households which had only a few missing values for consumption were retained and these missing values were replaced by item specific community median. If the community median was missing, it was replaced by the municipality median.[6] We use total household non-durable consumption expenditure as a measure of household income.

IV. Empirical Model

IV.1. Econometric Model

Our objective is to study the effect of SNs on the household's joint decisions regarding the choice of homeownership and mobility. We carry out this investigation in the framework of multinomial logit model. SNs, however, suffers from simultaneity bias. Not only do SNs affect the above decisions of the households, it may also have a feedback from them. To address this potential endogeneity issue, we employ a two step process. First, we carry out Durbin-Wu-Hausman (DWH) tests of endogenous regressors [Hausman 1978, 1983] to verify whether the SN variables are endogenous. If a SN variable is not endogenous, we move to the multinomial logit model of joint tenure-mobility decision. If a SN variable turns out to be endogenous, we employ a two-stage estimation process. In the first stage, we predict the SN measure using all the exogenous variables and instruments. In the second stage, we use the predicted values of SNs from the first stage to estimate the multinomial logit model. We generate efficient standard errors by bootstrapping.

Whether it is for the DWH test or the first stage of the two-stage estimation, we need valid instruments for the SN variables. Given the multifaceted nature of SNs that crosses over almost all aspects of the individual's life, it is exceedingly difficult to find outside instruments

[6] These median values were adjusted for household size. See Vuong (1997) in IFLS-1RR user's guide (Peterson, 2000)

for the SN variables.[7] We solve this issue by employing the instrumental variable approach proposed by Lewbel [1997] in which higher order moments of the endogenous variable are used as instruments [see, for example, Millimet and Osang 2005]. We carry out weak instrument test to find statistical support for our instrument.

Below we briefly discuss the empirical model of the second stage (Wooldridge [2002]). Let, y denote a random variable denoting the following 4 decisions,

$$(1) \qquad y = \begin{cases} 1, & \text{not own this period} \\ 2, & \text{(own this period) and (not expect to move next period)} \\ 3, & \text{(own this period) and (expect to move next period)} \end{cases}$$

Thus, every period the household decides on two things: housing tenure choice for the period and the location for the next period. This way of looking at decision problem captures the importance of the joint nature of the two decisions [Boehm 1981].

Let $\mathbf{x} = \{x_1, \ldots, x_k\}$ be a $(1 \times k)$ vector of explanatory variables with the first-element unity. With $y = 1$ being the base outcome, the multinomial logit has response probabilities,

$$(2) \qquad P(y = j \mid \mathbf{x}) = \begin{cases} \dfrac{\exp(\mathbf{x}\beta_j)}{1 + \sum_{h=2}^{3} \exp(\mathbf{x}\beta_h)}, & j = 2,3 \\ \dfrac{1}{1 + \sum_{h=2}^{3} \exp(\mathbf{x}\beta_h)}, & j = 1, \end{cases}$$

where, β_j is $(k \times 1)$. Since the direction of the effect of the k-th covariate is is not determined entirely by the k-th elements of β_j, we calculate

$$(3) \qquad p_j(\mathbf{x}, \beta_j) / p_1(\mathbf{x}, \beta_1) = \exp(\mathbf{x}\beta_j), \qquad j > 1,$$

[7] Usually, good instruments for SNs are available if we have detailed information about the people who are in the individual's network [Calvó-Armengol, Patacchini, and Zenou (2009)]. The IFLS does not have such information.

which is the relative probability (or relative risk) of outcome j compared to the base outcome, where denotes the response probability in equation (2). Thus, and the ratio of relative risk for one unit change in x_i is $\exp(\beta_j)$.

The assumption of the disturbances being independent and homoscedastic results in the property of the logit model whereby P_j/P_k is independent of the remaining probabilities, the so called *Independence from Irrelevant Alternatives* (IIA) properties. This, however, is a somewhat artificial restriction on consumer behavior. However, if this property does not hold then the parameter estimates obtained when these choices are included will be inconsistent with the usual bias for Hausman's specification test. The statistic

(4) $$(\hat{\beta}_s - \hat{\beta}_f)[\hat{V}_s - \hat{V}_f]^{-1}(\hat{\beta}_s - \hat{\beta}_f)$$

has a limiting $\chi^2(K)$ distribution, where s indicates the estimator based on the restricted subset, f indicates the estimator based on the full set of choices, $\hat{V}_s$ and $\hat{V}_f$ are the respective estimates of the asymptotic covariance matrices. We carry out this test to check if the IIA property holds in our estimates.

IV.2. Motivation for explanatory variables

We appeal to the widely used *User Cost* model to choose the right-had-side variables. A general expression for the user cost of housing is [Doughty and Van Order 1982, Ermisch 1984, Haurin and Gill 2002, Andrew, Haurin and Munasib 2006]:

(5) $$UC = \left[(r+\tau) - \theta(r+\tau) + d - \pi^e + \frac{\lambda}{\mu_c} + C \right] \frac{p_h}{p},$$

where, θ is the applicable "tenure choice tax rate" which is a function of household income,[8] r is the interest rate, τ is the property tax rate, d is the rate of depreciation and maintenance, π^e is expected house price appreciation, p_h is the constant-quality price of housing, and p is the average price level.[9] The last two terms in (1) represent credit constraints and transaction costs. The first is the ratio of λ, which is the shadow price of the credit rationing constraint, to μ_c, which is the marginal utility of the non-housing consumption good. The second represents the annualized transaction cost associated with homeownership, represented by C, this being a function of the planned length of stay. Homeownership is more likely the lower the user cost of homeownership is relative to the cost of renting. Intertemporal, spatial, and household level variations in the components of the user cost formula yield a rich set of hypotheses about when homeownership is more likely to occur.

As mentioned before the set of covariates for the regressions is motivated by equation (5). Although we have reported rent and house price information of the individual, which we use, we do not have information on interest rates. We also do not have information on property tax rates, depreciation and maintenance. So, we use geographical variables (province and urban dummies) and the house characteristics to capture these effects. We use household wealth to account for possible credit constraints and transaction costs and expenditure to account for non-housing consumption good. And finally, we use a large number of demographic variables. Table 1 reports the descriptive statistics of these variables.

[8] This term appears in the user cost because the U.S. tax code has tax breaks for homeownership. If the tax code of the county under investigation does not have that, then this term will drop out.

[9] The tenure choice tax rate is defined in Hendershott and Slemrod (1983) and it accounts for non-linearities in the tax code.

V. Results

V.1. Findings

(a) The Hausman specification test for the IIA property satisfied.

(b) The multinomial logit relative risk ratios are presented in tables 3 and 4.

V.2. Robustness

The user cost model in equation (5) has in it the constant quality house price and house price appreciation variables. Such variables are not available to use for Indonesia. The alternative that we use is using the information from the surveyed individuals to arrive at the average values for each province. We use this house-price to calculate realized appreciation between 1997 and the 2000. Table 5 presents these results.

VI. Conclusion

This paper is the first study of the link between social networks and tenure choice. The policy emphasis on homeownership promotion is partly a reflection of the fact that recent research provides evidence of numerous economic and social benefits accruing to homeowners [Dietz and Haurin 2003]. Given the consistent findings over the last two decades as to how important social networks are in both economic and non-economic aspects of the individual's life [Durlauf and Fafchamps 2004], it is natural to ask if social networks exert any influence on the determination of homeownership. We find measurable impact of social network on the mobility-tenure choice mechanism of the household. Given the policy emphasis on homeownership promotion, an assessment of the impact of social networks on the determination of homeownership will have substantial appeal for policy makers.

One of the major discussions surrounding the current subprime/foreclosure crisis in the United State is whether people made poor and uninformed choices regarding home-buying

due to a lack of understanding of the homeownership process or the mortgage market. Since social networks make available to a decision maker the accumulated knowledge and experience within the network about the process and the market, it is certainly an aspect of homeownership that the policy makers need to take a closer look in order to try and exploit it in a way that will make the homeownership process less prone to bad judgments. So, a future area of research certainly involves studying if greater levels of social networks, apart from raising the probability of homeowning, also raise the probability of a more informed decision making.

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Tables

Table 1: Descriptive Statistics (N=4026)

Variable	Mean	Std. Dev.	Min	Max
SN01: Number of unique memberships in HH	2.58	1.80	0.00	9.00
SN02: Total household time contribution	141.96	175.72	0.00	1519.00
SN03: Total household cash contribution	11665.92	37485.85	0.00	830000.00
SNIndex: Multilevel Index	3.40	4.62	0.00	25.00
Head female	0.12	0.32	0.00	1.00
Head Married	0.87	0.33	0.00	1.00
Age of head	45.01	11.15	15.00	98.00
Year of Schooling of Head	4.38	4.96	0.00	15.00
Head Employed	0.91	0.28	0.00	1.00
Total Household Wealth	34200000.00	99400000.00	6000.00	2570000000.00
Total Expenditure	35654.83	3.66	1.00	2000004.52
Transfers from parents	0.41	0.49	0.00	1.00
Members under 15	1.69	1.36	0.00	8.00
Members between 15-65	2.82	1.37	0.00	15.00
Members 65+	0.13	0.37	0.00	3.00
Rent	35654.83	3.66	1.00	2000004.52
Urban	0.45	0.50	0.00	1.00
Electricity	0.86	0.40	0.00	8.00
Indoor Toilet	0.62	0.49	0.00	1.00
Flowing sewage	0.43	0.50	0.00	1.00
Piped water	0.25	0.43	0.00	1.00
Single unit	0.86	0.35	0.00	1.00
Masoned outer walls	0.61	0.49	0.00	1.00
Hard floors	0.83	0.37	0.00	1.00
Real house value appreciation by province	68.66	38.96	0.00	138.63

Table 2: Social Network Measures by Expected Mobility and Housing Tenure Choice

	not own	*own + not expect to move*	*own + expect to move*
Number of households	358	3598	71
SN01: Memberships	1.75	2.68	2.07
SN02: Time	80.61	148.85	102.06
SN03: Cash	8855.31	12069.96	5362.68
SNIndex: Multilevel Index	2.12	3.54	2.45

Table 3: Relative Risk Ratios of Multinomial Logit with SN01 and SN02

	own + not expect to move	*own + expect to move*	*own + not expect to move*	*own + expect to move*
SN01: Memberships	1.241	1.028		
	(0.000)***	(0.766)		
SN02: Time			1.533	1.189
			(0.000)***	(0.311)
Head female	2.408	1.978	2.214	2.090
	(0.074)*	(0.438)	(0.123)	(0.394)
hh_hdmarrd97	1.119	1.354	1.003	1.331
	(0.807)	(0.721)	(0.995)	(0.758)
Age of head	1.059	1.018	1.057	1.017
	(0.000)***	(0.295)	(0.000)***	(0.345)
Year of Schooling of Head	0.898	0.925	0.900	0.923
	(0.000)***	(0.024)**	(0.000)***	(0.011)**
Head Employed	2.012	1.354	1.946	1.335
	(0.037)**	(0.627)	(0.064)*	(0.672)
Total Household Wealth	3.142	2.901	3.093	2.912
	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Total Expenditure	0.362	0.367	0.381	0.378
	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Transfers from parents	1.290	1.581	1.314	1.571
	(0.154)	(0.140)	(0.129)	(0.147)
Members under 15	1.359	1.634	1.358	1.621
	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Members between 15-65	1.331	1.050	1.350	1.050
	(0.000)***	(0.737)	(0.002)***	(0.729)
Members 65+	2.059	2.895	2.111	2.951
	(0.022)**	(0.015)**	(0.035)**	(0.024)**
Rent	1.320	1.835	1.289	1.788
	(0.002)***	(0.000)***	(0.013)**	(0.000)***
Urban	0.148	0.213	0.159	0.224
	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Electricity	0.529	0.287	0.530	0.300
	(0.000)***	(0.003)***	(0.077)*	(0.007)***
Indoor Toilet	0.760	0.696	0.763	0.682
	(0.172)	(0.311)	(0.239)	(0.377)
Flowing sewage	0.407	0.629	0.411	0.624
	(0.000)***	(0.187)	(0.000)***	(0.191)
Piped water	0.572	1.202	0.583	1.208
	(0.002)***	(0.581)	(0.006)***	(0.610)
Single unit	2.656	2.149	2.596	2.153
	(0.000)***	(0.061)*	(0.000)***	(0.062)*
Masoned outer walls	1.276	0.882	1.236	0.870
	(0.237)	(0.749)	(0.307)	(0.775)
Hard floors	0.304	0.277	0.308	0.270
	(0.002)***	(0.020)**	(0.004)***	(0.012)**
13 Province dummies	*yes*	*yes*	*yes*	*yes*
Constant	0.00071	0.00002	0.00055	0.00001
	(0.000)***	(0.001)***	(0.000)***	(0.001)***
Observations	4026	4026	4026	4026
Weak Identification F	2280.65	2280.65	4971.79	4971.79
H test Endogeneity	0.7406	0.7406	0.0001	0.0001
Sargan p-value			0.3323	0.3323

Notes: (a) *** p<0.01, ** p<0.05, * p<0.1. (b) Bootstrapping standard errors in parenthesis.

Table 4: Relative Risk Ratios of Multinomial Logit with SN03 and SNIndex

	own + not expect to move	*own + expect to move*	*own + not expect to move*	*own + expect to move*
SN03: Cash	1.000	1.000		
	(0.758)	(0.136)		
SNIndex: Multilevel Index			1.534	1.189
			(0.000)***	(0.310)
Head female	2.230	2.012	2.214	2.092
	(0.097)*	(0.430)	(0.123)	(0.394)
hh_hdmarrd97	1.221	1.372	1.003	1.332
	(0.656)	(0.711)	(0.995)	(0.757)
Age of head	1.059	1.017	1.057	1.017
	(0.000)***	(0.305)	(0.000)***	(0.345)
Year of Schooling of Head	0.895	0.922	0.900	0.923
	(0.000)***	(0.018)**	(0.000)***	(0.011)**
Head Employed	2.143	1.404	1.946	1.335
	(0.022)**	(0.589)	(0.065)*	(0.672)
Total Household Wealth	3.180	3.001	3.093	2.912
	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Total Expenditure	0.372	0.384	0.381	0.378
	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Transfers from parents	1.362	1.606	1.314	1.571
	(0.081)*	(0.125)	(0.129)	(0.147)
Members under 15	1.395	1.657	1.358	1.621
	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Members between 15-65	1.397	1.074	1.350	1.050
	(0.000)***	(0.630)	(0.002)***	(0.729)
Members 65+	2.140	3.040	2.109	2.951
	(0.014)**	(0.010)**	(0.035)**	(0.024)**
Rent	1.301	1.831	1.289	1.788
	(0.002)***	(0.000)***	(0.013)**	(0.000)***
Urban	0.154	0.224	0.159	0.223
	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Electricity	0.519	0.286	0.530	0.300
	(0.000)***	(0.003)***	(0.077)*	(0.007)***
Indoor Toilet	0.782	0.686	0.764	0.683
	(0.218)	(0.289)	(0.240)	(0.377)
Flowing sewage	0.401	0.618	0.411	0.624
	(0.000)***	(0.168)	(0.000)***	(0.191)
Piped water	0.572	1.224	0.583	1.208
	(0.002)***	(0.545)	(0.006)***	(0.610)
Single unit	2.620	2.210	2.596	2.153
	(0.000)***	(0.053)*	(0.000)***	(0.062)*
Masoned outer walls	1.214	0.833	1.236	0.870
	(0.341)	(0.638)	(0.306)	(0.775)
Hard floors	0.310	0.272	0.308	0.270
	(0.002)***	(0.017)**	(0.004)***	(0.012)**
13 Province dummies	*yes*	*yes*	*yes*	*yes*
Constant	0.000431	0.000005	0.000546	0.000012
	(0.000)***	(0.000)***	(0.000)***	(0.001)***
Observations	4026	4026	4026	4026
Weak Identification F	9965.93	9965.93	5000.27	5000.27
H test Endogeneity	0.9316	0.9316	0.0014	0.0014
Sargan p-value			0.8243	0.8243

Notes: (a) *** p<0.01, ** p<0.05, * p<0.1. (b) Bootstrapping standard errors in parenthesis.

Table 5: Table 5: Relative Risk Ratios of Multinomial Logit Regional House Value Appreciation in Place of Province Dummy

	own + not expect to move	*own + expect to move*	*own + not expect to move*	*own + expect to move*	*own + not expect to move*	*own + expect to move*	*own + not expect to move*	*own + expect to move*
SN: Memberships	1.252	1.000						
	(0.000)***	(0.998)						
SN: Time			1.637	1.182				
			(0.000)***	(0.341)				
SN: Cash					1.000	1.000		
					(0.355)	(0.148)		
SN: Index							1.640	1.182
							(0.000)***	(0.340)
All the other covariates	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*
Real house value appreciation by province	2.863	3.846	2.954	3.896	2.838	3.543	2.954	3.900
	(0.000)***	(0.001)***	(0.000)***	(0.000)***	(0.000)***	(0.001)***	(0.000)***	(0.000)***
Constant	0.00128	0.00010	0.00104	0.00007	0.00157	0.00005	0.00104	0.00007
	(0.000)***	(0.005)***	(0.001)***	(0.003)***	(0.000)***	(0.003)***	(0.001)***	(0.003)***
Observations	4026	4026	4026	4026	4026	4026	4026	4026
Weak Identification F	2598.31	2598.31	4818.69	4818.69	9833.40	9833.40	5316.16	5316.16
H test Endogeneity	0.7714	0.7714	0.0000	0.0000	0.8801	0.8801	0.0012	0.0012
Sargan p-value			0.2153	0.2153			0.9371	0.9371

Notes: (a) *** p<0.01, ** p<0.05, * p<0.1. (b) Bootstrapping standard errors in parenthesis.