Papeles de Trabajo

RESIDENTIAL MOBILITY AND HOUSING TENURE IN SPAIN: A PANEL DATA APPROACH

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ABSTRACT

This paper studies the simultaneous household's decision to move and type of tenure of this new housing: rent or own. To do this, using Spanish data for the period 1994-2001 from the European Household Panel (ECHP), we perform a descriptive analysis of this joint decision and also we estimate a multinomial logit model allowing individual heterogeneity. The results show that the heterogeneity of households, in addition to several explanatory variables such as number of children, age of household head or household income, play a key role in the decisions of mobility and type of housing tenure.

Keywords: panel data multinomial logit, mobility, housing tenure.

JEL classification: R20, C23.

1. INTRODUCTION

Residential mobility promotes labor mobility and this one fosters a better adjustment between supply and demand in the labor market, by means of reducing unemployment and also improving productivity and competitiveness. This due to the fact that mobility implies suitable allocations of workers in all geographical areas and, therefore, an improvement of the economic growth in all regions, so the factors that determine mobility have important implications from a political and socio-economic view.

Spain, with one of the highest unemployment rates of the EU, is trying to reduce these high values and working in order to get out of the economic crisis. To this end, the promotion of mobility as well as productivity labor have become some of the priorities of the Spanish government, and the most important goals included in the Strategy "Europe 2020". In particular, the initiative called "Agenda for new skills and jobs," which seeks "modernizing labor markets and empowering people by developing skills throughout their life in order to increase labor participation and better adjustment between supply and demand for labor, particularly through labor mobility".

Besides mobility, another element of great interest, affecting the household's decisions as well as government's behavior –by means of taxes or subsidies– is the kind of housing tenure, which can be summarized between rent and purchase. There are two approaches that analyze this household's decision: the consumption approach or the investment theory. According to the first one, housing, seen as a commodity, is characterized in comparison to other goods, by its transaction costs[1] (searching, moving, taxes, etc). A household moves to a new dwelling if the benefits obtained with this change outweigh the costs it generates. In the case of absence of these transaction costs, a household can immediately adjust their demand of asset housing, but the existence of these costs implies that changes in this asset will be generated only in situations of large modifications in the amount of housing consumption.

If we analyze housing tenure from the financial perspective, there are certain features that are very relevant, especially when we take into account the investment portfolio approach. The value of the house is the main investment asset in the majority of the spanish households. The government, using legal and tax measures, can make rent housing becomes more attractive than purchase, in which transaction and investment costs (financing, taxes, etc.) associated with the latter represent a very important element to consider. These financial aspects of housing demand have been extensively studied in this literature by Schwab (1982), Henderson and Ioannides (1983) and Plaut (1987) among others. These authors suggest that the financial components play an important role in deciding which type of housing tenure chooses the household. Empirical studies that collect the importance of the financial aspects are Mankiw and Weil (1989) and Goulder (1989).

In the analysis of the events "type of housing tenure" and "mobility" there are a lot of investigation showing the need to study jointly the decisions of mobility and type of housing tenure, since the choice of housing tenure is affected by the (future) mobility decision and, in turn, the household's decision to move depends on the housing tenure at the present (and future). The works of Goodman (1995, 2002), Ioannides and Kan (1996) and Gobillon and Le Blanc (2002) introduced a dynamic theoretical model that analyses the households' behavior that make a simultaneous decisions of mobility, choice of tenure and the amount of housing consumed in the presence of transaction costs, so the problem facing households is to maximize their welfare (utility) by the decisions of changing residence (mobility), type of tenure of new housing (own or rent) and how much housing consume. These studies conclude that relevant variables, such as permanent income, the price of housing and consumer preferences affect this simultaneous choice. Noteworthy are the approximations made by Pickles and Davies (1985), Henderson and Ioannides (1986,1989) and Rosenthal (1989) that studied the simultaneous choice of the events "duration of stay" in a dwelling and the "type of tenure" using panel data. The fact of deciding whether to rent or purchase a new dwelling does not make sense if you don't take into account the fact of moving, so it seems reasonable to believe that, conditional to moving, a household decides to rent or purchase a new dwelling based on the different benefits and costs of each alternative.

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[1] Adding to the monetary costs related to financial or investment point of view, there are emotional costs associated with the lost of friends, neighbors or environmental reasons.

The recent history of Spain is characterized by two facts: poor mobility and the high level of ownership comparing with the alternative of renting[2]. Focusing in the phenomenon of mobility, Spanish households show a much higher propensity to move within the same region, more than other provinces. This fact has strong implications for labor supply and its effect in the labor market. Several studies link the lack of residential mobility with several reasons: high housing prices, the lack of tradition of renting, and cultural factors that foster geographical stability[3]. Moreover, data of worker mobility[4] suggest a positive association between difficulties in the labor market and mobility reduction, perhaps searching for the maintenance of social relationships based on proximity.

Several empirical studies analyze the simultaneous choice of moving and types of tenure. However, the accuracy and relevance of the different works depends on the kind (and source) of information used in the analysis as shown in Edin and Englund (1991). They point out that, because of the presence of transaction costs, an empirical study with cross section data can lead to incorrect interpretation of results. The most appropriate way to address issues of housing tenure and mobility is the panel data approach[5]. However, most studies conducted in Spain have used cross-sectional information, such as the works of Rodriguez and Garcia (2006), Colom and Moles (1998, 2004) and Manrique and Ojah (2003) among others. These works show that the increase in house prices reduces the mobility and also increases ownership. Other main result is that permanent income is a key variable to explain the households' behavior, while the work of Manrique and Ojah (2003) analyzes the demand for first and second dwelling, concluding that there are different factors that affect these housing demands as the need to diversify investment risks. In contrast, the work of Barceló (2006) overcomes the problem of cross section approach because it examines housing demand using panel data, analyzing the effect of type of housing tenure on the labor mobility. In order to do so, with the European Household Panel (ECHP) and a duration model approach she estimates the effect in the unemployment and it concludes that the ownership adversely affects mobility, among other results.

Given the lack of investigation and empirical results in this field for the Spanish case, the problem we propose to study in this paper is the simultaneous analysis of the decision of moving and the type of tenure. The aim of this paper is to investigate the determinants of residential mobility of Spanish households and the type of housing tenure using a panel data of the Spanish households for the period 1994-2001. The way that we implement our approach allow us to pick up the importance of household heterogeneity in the decision of moving, and to explain the choice between rent or purchase. We also examine the financial aspects of the simultaneous housing decision of mobility/tenure of housing. In order to do so, we apply the simulated maximum likelihood method (see Borsch-Supan and Hajivassiliou, 1990) which is particularly suitable for panel data because it does not require numerical integration.

The rest of the paper is organized as follows. The next section develops the theoretical model and econometric approach. Section 3 defines the variables and shows the descriptive analysis. The results of different econometric estimates are shown in section 4. Finally, conclusions are in Section 5.

2. THEORETICAL APPROACH AND ECONOMETRIC MODEL

In this section we develop a theoretical model of households' decisions on residential mobility and housing tenure choice. Household behavior is formulated as a stochastic dynamic programming problem in

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[2] Unlike other countries, it's not seem a high correlation between the decision to move and rent in Spain. Even more, it can be said that the most typical result is the opposite: when a household moves to another dwelling tends to do in ownership option.

[3] This phenomenon of geographical stability can be interpreted as a lack of mobility to other regions.

[4] Observatorio de las Ocupaciones, Servicio Público de Empleo.

[5] There is already a large literature in other countries using this panel data methodology, as Battu, Ma and Phismister (2008) for the English case, which examine the effect of the type of housing tenure on employment of individuals, or Melenberg and Van Soest (1997) which analyze housing expenditures (whether owned or rented) using panel data with a semiparametric specification for the Dutch case, concluding that estimates vary considerably depending on whether you use fixed effects model or a random effects. Also for the Dutch country, the work of Van Leuvensteijn and Koning (2004) studies how it affects the different types of housing tenure on labor mobility and unemployment (noting that owners are less affected by unemployment), as well as Munch, and Svarer Rosholm (2006) for the Danish case. Finally, Finnie (2000) analyzes, for Canada, which variables affect the moment of time to move to other regions, and the factors that reduce mobility are age, being married or having children while living in a city increases it.

which a household makes a sequence of decisions (joint choices of residential mobility and housing tenure mode) that maximize its lifetime utility. We assume that time is discrete, households have infinite horizon and they choose the value of non-housing consumption Ct and housing consumption Ht according to the utility function in one period, given by:

$$U_t = U(C_t, H_t, \theta_t) \qquad (1)$$

where θ_t are the tastes that vary over time. Once θ_t becomes known in the period, a household decides whether to adjust the path of non-housing and housing consumption (including tenure mode) accordingly. We assume that whereas C_t may be changed costlessly in every period, housing consumption may not. Therefore, focus only in the housing consumption Ct, the previous model of choice housing tenure and residential mobility should be studied as a joint decision. Moreover, the type of tenure of a new dwelling should be accompanied by a residential mobility. This result suggests that modeling of housing tenure choice should be conditional on a move. According to this, in order to obtain the maximum of the utility function, the household observes the utility generated by the different alternatives: Stay in the same dwelling (*i. e.* no move), move to rent or move to ownership. Then, the selected alternative is that generates the maximum wellbeing. Now, the utility functions for each alternative are written as:

$$U_{t,NC} = U(X_t, \theta_t)$$
$$U_{t,CA} = U(X_t, \theta_t)$$
$$U_{t,CP} = U(X_t, \theta_t)$$

where $U_{t,NC}$, $U_{t,CA}$, $U_{t,CP}$ are the maximum utility of a household that stays in the same dwelling, the household moves to rent and the maximum utility if a household moves to ownership respectively, and X_t are the observed variable related to the household. Note that X_t may include information not only on the time t, but include the possibility of lags.

A given household "i" chooses the option "j" if the utility related to this alternative is the highest of all options. Therefore, if the household "i", in a given period of time t, satisfies simultaneously the following inequalities: $U_{t,NM} > U_{t,MR}$, and $U_{t,NM} > U_{t,MP}$, then it decides to stay in the same dwelling (not move), so that household's decisions are:

— In the first step, the household's decision is whether to move, *i. e.* a household doesn't move if $U_{t,NM} \geq U_{t,M}$, otherwise, the household moves to a new home if $U_{t,NM} < U_{t,M}$, where $U_{t,M}$ is the maximum utility of moving (rent or ownership).

— In the second step, those households that move, decide between rent or purchase a new residence. If $U_{t,MP} \geq U_{t,MR}$ will purchase a new dwelling, otherwise they select the rent option.

These utility functions are unobservable. What is observed is the fact whether a household moves to a new dwelling (in this case $y_{1i} \neq 0$) otherwise ($y_{1i} = 0$), and if the household has moved, if it have purchased the new dwelling ($y_{1i} = 1$), against the option of rent ($y_{1i} = 2$). Therefore,

$$y_{1i} = \begin{cases} 2 & \text{if } (U_{i,MR} \geq U_{i,NM}) \cap (U_{i,MR} \geq U_{i,MP}) \\ 1 & \text{if } (U_{i,MP} \geq U_{i,NM}) \cap (U_{i,MP} \geq U_{i,MR}) \\ 0 & \text{if } (U_{i,NM} \geq U_{i,MP}) \cap (U_{i,NM} \geq U_{i,MR}) \end{cases} \qquad (2)$$

To perform our empirical research we assume that the value of the conditional function defined in (1) can be written, for a household "i" at time "t", as a function of X_t:

$$U_{ijt} = V_j(X_{it}\beta_j) + e_{ijt} \qquad \text{with} \qquad j \in [NM, MR, MP] \qquad (3)$$

where $V_j(.)$ is the conditional utility associated with each alternative, β_j is vector of parameters of option "j". The random variable e_{jt} is the unobserved part of the utility function that will be specified

later. Alternatively, we assume a specification of the utility more convenient for our study: The conditional utility function associated with each of the alternatives is written as:

$$U_{ijt} = V(X_t \beta_j) + e_{ijt} \qquad (4)$$

So that the probability of choosing the alternative "k" at the time "t" is given by:

$$P(k_t) = Pr\,ob[V(X_t \beta_k) - V(X_t \beta_j) \geq e_{ijt} - e_{ikt}] \qquad (5)$$

where $(k, j) \in [NM, MP, MR]$. In order to estimate the theoretical model given in equations (1) through (5) is necessary to use a random effects model.

2.1. Random Effects Model

We take into account the unobserved individual heterogeneity by means of a random effects model specification. If the number of periods is fixed, the parameter estimates with individual heterogeneity are often inconsistent. Even more, in nonlinear models, the inconsistency is transmitted to all parameters. An approach to overcome this drawback consists in the use of the conditional logit model with fixed effects, which avoids the problem of 'incidental parameters' assuming that the individual effects are fixed parameters that are conditioned out (Chamberlain, 1980,1984). However, there are some drawbacks that prevent us from applying this method in our work. If one wants to use a logit model to characterize a multinomial choice problem, among other problems, the researcher must impose a structure on the variance-covariance rather restrictive for the unobserved terms. The substantial reduction in degrees of freedom is another problem, since each fixed effect is treated as a parameter.

We avoid the incidental parameter problem by assuming the random effects model. In this situation, individual heterogeneity is specified as a random variable time-invariant but changes over individuals, so unobserved term for the individual "i" regarding choice "j", such that e_{ijt} can be decomposed into:

$$e_{ijt} = \alpha_{ij} + v_{jti} \qquad (6)$$

Where α_{ij} is the individual heterogeneity term, and it is constant over time. The variable v_{jti} follows a multivariate normal distribution with zero mean. In order to estimate this specification we use the Mixed logit model, which is a type of model that has great flexibility to approximate utility functions (Train, 2003). More specifically, our work uses the multinomial logit model with random effects.

As above mentioned, we assume that a household "i" faces "j" different choices at any given time t. Then, the probability of choosing option "j" conditional on observed explanatory variables X_{it}, that vary over time and between different individuals, and one individual effect observed α_i, which is constant over time, is expressed in the following way:

$$P(j|X_{it}, \alpha_i) = \frac{\exp(X_{it} \beta_j + \alpha_{ij})}{\sum_{k=1}^{J} \exp(X_{it} \beta_k + \alpha_{ik})} \qquad \text{where} \qquad (j) \in [NM, MP, MR] \qquad (7)$$

As the choice probabilities are conditional on α_i it is necessary to integrate over the distribution of unobserved heterogeneity. Therefore, the sample likelihood of the random effects multinomial logit has the following form:

$$L = \Pi_{i=1}^{N} \int_{-\infty}^{\infty} \Pi_{t=1}^{T} \Pi_{j=1}^{J} \left(\frac{\exp(X_{it} \beta_j + \alpha_{ij})}{\sum_{k=1}^{J} \exp(X_{it} \beta_k + \alpha_{ik})} \right)^{d_{ijt}} f(\alpha) d\alpha \qquad (8)$$

where $d_{ijt} = 1$ if household i chooses alternative j at time t, and $d_{ijt} = 0$ otherwise. For identification purposes, the coefficient vector and the unobserved heterogeneity term for one of the categories set to zero. For convenience we assume that the unobserved heterogeneity is distributed as a multivariate normal with mean "a" and covariance matrix "W". that is: $\alpha_{ij} \approx f(a; W)$.

In order to maximize the sample likelihood function it is necessary to integrate over the whole distribution of unobserved heterogeneity. However, there is no analytical solution to solve the equation (8). Fortunately, because of the development of numerical methods that compute approximations of multidimensional integrals, we can estimate this discrete choice model with random effects (see Borsch-Supan and Hajivassiliou, 1990). In our case, we focus on the classical method of Gauss-Hermite quadrature. (see Butler and Moffitt, 1982).

The idea of the Gauss-Hermite quadrature consists in approximating the integral by a number of discrete values[6]. This allow us to integrate over the distribution of unobserved heterogeneity using simulation and maximizing the simulated likelihood function. The idea is to extract R values of the distribution of unobserved heterogeneity. For each of these values we calculate the likelihood and we generate the average over the R draws (observations). So, instead of estimating the exact likelihood function given in (8) we maximize the simulated sample likelihood function given by:

$$L = \Pi_{i=1}^{n} \frac{1}{R} \sum_{r=1}^{R} \Pi_{t=1}^{T} \Pi_{j=1}^{J} \left(\frac{\exp(X_{it}\beta_j + \alpha_{ij})}{\sum_{k=1}^{J} \exp(X_{it}\beta_k + \alpha_{ik})} \right)^{d_{ijt}} \tag{9}$$

In our particular case $j = 3$ and, for identification β_1 y α_{i1} are normalized to zero (For more details see Hann and Uhlendorff, 2006).

3. DATA AND VARIABLES

The database used in this work is the ECHP Household Panel 1994-2001. Unfortunately, due to consistency reasons we don't use the whole sample. the selection rules in extracting the suitable information from the panel data are the following: We only consider households who initially has a dwelling in rent of ownership, eliminating those which housing tenure is free of charge or pseudo-free of charge receivables, which represent 6% of the total sample. We also exclude those households with missing observations in some of the variables included in the analysis. Thus, the original sample was about 45,651 observations and, after all, the final sample is 42,841 observations, representing 8221 households.

In line with many empirical studies on housing tenure choice (Borsch-Supan and Pitkin, 1988, Edin and Englund, 1991, Borsch-Supan, Heiss and Seko, 2001, Rouwendal and Meijer, 2001) we include in our sample all households finally valid and not simply a sample of household which moved recently. The reasons for this decision are both theoretical and practical: first, the theoretical model assumes that each household, in each period, consider decisions about the tenure and consumption of housing (and other goods), according to its dynamic planning and basis on current values and expectations of future developments of the variables considered in their decision making, even those who finally stay in the same dwelling and don't move. Moreover, although a household hasn't moved recently, the values of the explanatory variables, such as income, may reflect expectations that were taken at a previous time, when the household took the final housing decision (Edin and Englun, 1991). The second reason is that the usual rates of residential mobility in Spain are so low that the consideration of a sample of "recent moved" may shorten dramatically the sample size, making this new sample becomes statistically insignificant comparing it the total population.

Similar to other works in housing literature, we have considered two types of explanatory variables: sociodemographic and economic household characteristics. The definitions of the dependent and

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[6] This quadrature method is discussed in detail in Rabe-Hesketh, Skrondal, and Pickles (2002).

independent variables included in the model are presented in Table 1 while Table 2 contains their sample descriptive statistics. In this work, we consider two different endogenous variables. The first one denominated "MOVE" takes value 1 if the household has moved to a new dwelling in the last year, and zero otherwise. The variable "MOVE/TENURE" can take 3 different values, depending on whether the household hasn't moved, or if it has moved and consequently rent the new dwelling, or purchase it.

Table 1
DEFINITION OF VARIABLES

VARIABLES	VALUES	DEFINITION
dependent		
movtenure	0	if household stay in the same dwelling
	1	if household moves to a new dwelling and rent
	2	if household moves to a new dwelling and own
moving	0	if household stay in the same dwelling
	1	if household moves to a new residence
explanatory		
sociodemographic var.		
MALE	1	if the household head is male
	0	otherwise
AGE		age of the household head
AGE2		age square of household head
NCHILD		number of childer under 17
DIVORCED	1	if apreviously married household head becomes single
	0	otherwise
HIGHSCHO	1	household head has high school education
	0	otherwise
UNIVERSITY	1	household head has university education
	0	otherwise
UNEMPLOY	1	working status of household head is unemployed
	0	otherwise
NORTHERN REG	1	Residence in regions: Galicia, Asturias or Cantabria
	0	otherwise
MADRID REG	1	Residence in Madrid
	0	otherwise
CENTRAL REG	1	Residence in regions:Castilla y Leon, Castilla la Mancha, La Rioja or Extremadura
	0	otherwise
EST REG	1	Residence in regions: Catalonia, Comunidad Valenciana or Balearic islands
	0	otherwise
SOUTH REG	1	Residence in regions Andalucia or Murcia
	0	otherwise
economic var.		
TOTINC		Total gross annual household earnings in the previous year
UNCONSTR	1	if household has much better liquidity situation than in the previous year
	0	otherwise
CONSTR	1	if liquidity situation of household is much worse than the previous year
	0	otherwise
EXPENDOK	1	if household has had no difficulties in payment of rent or mortgage during the last year
	0	otherwise
SAVING	1	if household could save money (comparing total income vs total expenditure)
	0	otherwise
MONTHOK	1	if household has no economic difficulties (in terms of net monthly income)
	0	otherwise

In the next subsection we study what are the general characteristics of housing tenure in Spain.

3.1. General characteristics of mobility and housing tenure

The panel consists of 42,841 observations, referring to 8221 households. Table 3 gives the percentage of the population with housing ownership in the sample depending on the region (NUTS 1) and year. It shows that ownership is most popular type of tenure of dwelling. about 80% -90% of Spanish households. Since not all households can access the credit market for housing purchase, some household take the option of rent, but this is not necessarily because that choice responds to their preferences and expectations, but rather, that given their financial constraints there may be no better option.

Table 2
DESCRIPTIVE STATISTICS OF VARIABLES-8 YEARS PANEL DATA

Variable	minimum	maximum	mean	std. Dev.
MOVTENURE	0.00	1.00	0.06	0.29
MOVING	0.00	3.00	0.07	0.37
NCHILD	0.00	9.00	0.52	0.85
AGE	16.00	91.00	50.59	16.67
AGE2	256.00	8281.00	2837.78	1788.76
TOTINC	1.00	64886297.00	2610191.07	2060571.56
UNCONSTR	0.00	1.00	0.13	0.34
CONSTR	0.00	1.00	0.26	0.44
MONTHOK	0.00	1.00	0.62	0.49
SAVING	0.00	1.00	0.37	0.48
EXPENDOK	0.00	1.00	0.03	0.16
PARADO	0.00	1.00	0.08	0.26
MALE	0.00	1.00	0.77	0.42
HIGHSCHO	0.00	1.00	0.13	0.34
UNIVERSITY	0.00	1.00	0.13	0.34
DIVORCED	0.00	1.00	0.04	0.20
NORTHERN REG	0.00	1.00	0.14	0.35
MADRID REG	0.00	1.00	0.09	0.29
CENTRAL REG	0.00	1.00	0.16	0.36
EST REG	0.00	1.00	0.22	0.41
SOUTH REG	0.00	1.00	0.23	0.42

Figure 1, similar to Table 3, shows the small percentage of people who decided for renting the dwelling. About 88% of households are ownerships of their residence; also it shows an upward trend (from 84% purchased of the whole population in 1994 to 90% in 2001) in all regions. There may be several reasons why there is a predominance of owners versus renters. On the one hand, historical reasons arising from government intervention into the housing market, promoting the purchase at the expense of rent. In addition, housing not only provides the hosting service because it is the most important investment asset in most households, and it is the most common way in which families maintain or increase wealth. In addition, in the nineties we observe a bubble in this sector with an explosion in the creation and sales of dwellings, largely due to the ease of attaining financing in the credit markets by all agents, whether builders, companies or consumers.

Table 3
RENT *VS* OWNERSHIP RATES BY REGION AND YEAR

Year	Norhtern Reg	North-west Reg	Madrid Reg	Central Reg	Mediterranean Reg	South	Canary Island
1994	0.841	0.904	0.810	0.868	0.801	0.875	0.845
1995	0.843	0.914	0.841	0.881	0.811	0.873	0.819
1996	0.852	0.906	0.839	0.886	0.832	0.884	0.857
1997	0.869	0.914	0.828	0.888	0.856	0.901	0.831
1998	0.877	0.917	0.845	0.901	0.865	0.898	0.842
1999	0.893	0.909	0.850	0.906	0.864	0.904	0.820
2000	0.895	0.927	0.872	0.925	0.880	0.908	0.846
2001	0.907	0.924	0.892	0.925	0.878	0.922	0.869

We carefully analyze certain variables that are very relevant to determining the type of housing tenure. The most important of these factors is the household income. In several cases, the household income of those who rent is much lower than those purchasing (at least 20% lower). Figure 2 shows the relationship between income and housing tenure. It is noted that the percentage of ownership increases when household income increases. For high income values, the ownership rate is much higher, with values in the range of 90%, and for the last decile the percentage of renters is barely 5%.

This result suggests that these households correspond to the proportion of the population, although they fulfill the conditions for a financial credit, do not purchase a dwelling because it doesn't maximize their expectations. Obviously, for households in the last deciles of income distribution, the availability of credit does not operate as a restriction.

Figure 1
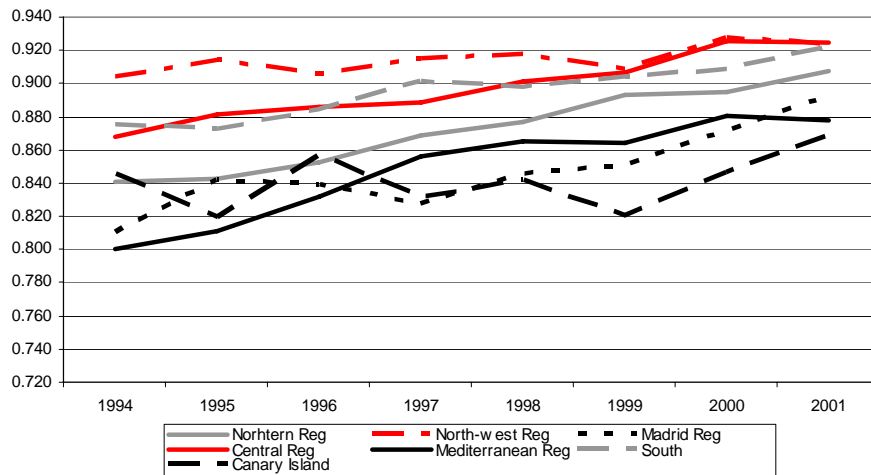**PERCENTAGE OF HOUSEHOLDS WITH OWNERSHIP DWELLING**
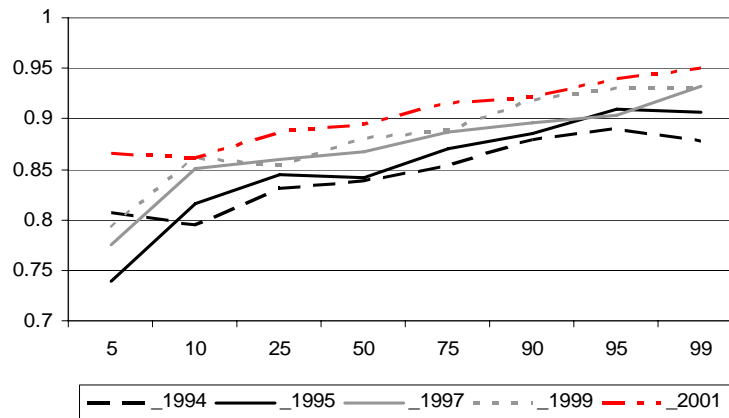

Figure 2
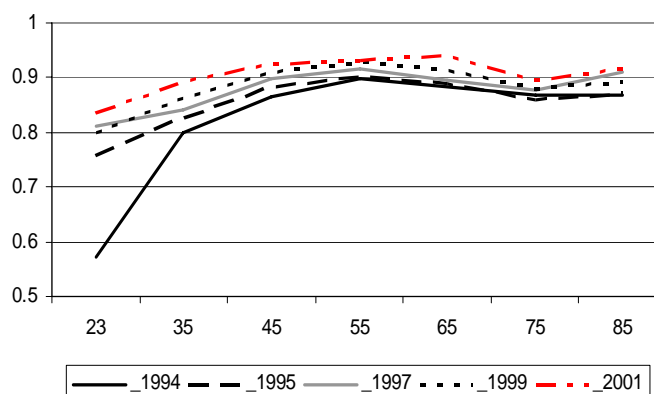**PERCENTAGE OF OWNERSHIP BY INCOME PERCENTILES**

Figure 3
PERCENTAGE OF OWNERSHIP BY AGE

The second variable taken into the analysis is the age of the household head (whether male or female). It appears that most rented household are those in which the reference person is young. This confirms the belief that young people rent more because given their economic situation, they encounter serious difficulties in the financial system to access credit for dwelling purchases. Until ages between 35-40 years, most households are not accessing to funds for purchasing dwelling. Only for household with the household head older than 40, we observe high values of ownership as type of tenure, remaining the percentage steady in older ages.

Other feature to consider is whether the type of tenure varies with the level of education, the rent option is prevailing in those households where the reference person reaches college versus those households where the household head has only primary studies, where most of them are owners.

Figure 4

**PERCENTAGE OF OWNERSHIP BASED ON EDUCATION LEVEL OF HOUSEHOLD HEAD**
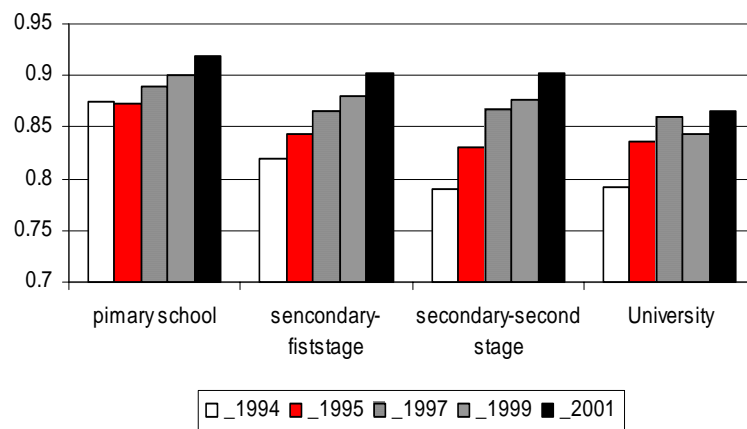
According to Figure 4, educated people have fewer options to be owners of the dwelling. However, this result may be because individuals with higher education have an average age lower than the rest of the sample. If we take exclusively the subsample of individuals aged 40-50 years, and we observe the proportion of ownership by level of studies of the household head we obtain the following figure:

Figure 5

PERCENTAGE OF OWNERSHIP BY EDUCATION LEVEL - HOUSEHOLD HEAD 40-50 YEARS OLD
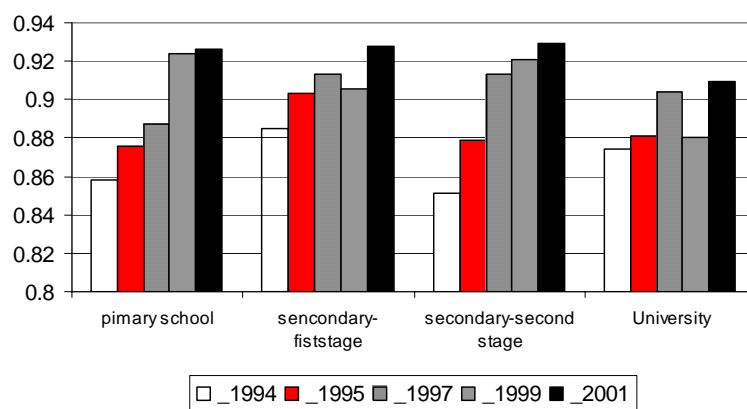
Now, the level of educational attainment is not as significant in determining whether to purchase housing (values of the percentage are between 88% and 92% of ownership in most of the cases). In regard to marital status, it is shown in the following figure that widowers have higher probability to own the dwelling, but logically, this variable is highly correlated with age.

Figure 6
PERCENTAGE OF OWNERSHIP BY MARITAL STATUS

□ _1994 ■ _1995 □ _1997 ▨ _1999 ■ _2001
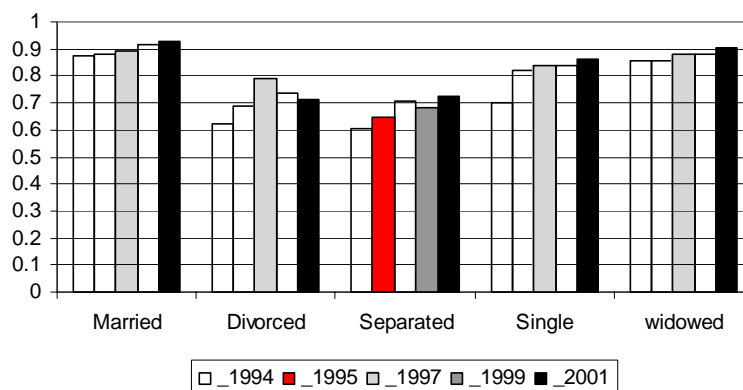
Once considered the most influential factors in the type of housing tenure, we analyze the event "moving to a new dwelling" and we want to see what household factors affect this decision. We begin by presenting the household movements throughout the period 1994-2001, shown in Table 4. The first result that we point out is in Column 1, which shows the small degree of mobility in Spain. The percentage of households that moves to a new dwelling is only 4.5% (annual average during this period of eight years from 1994 to 2001). Furthermore, within the sample period, there is no clear trend because the higher values of mobility are in the middle years of the sample (with values close to 5%), while the first and last years show smaller rates of mobility (3.2% in 1994 and 2.4% in 2001).

Table 4
MOBILITY AND HOUSING TENURE

Year	MOV	STAY	OWN	MOV/RENT	MOV/OWN	MOV REG	MOV SPAIN
1994	0.032	0.968	0.848	0.017	0.014	0.029	0.004
1995	0.052	0.948	0.856	0.017	0.035	0.028	0.005
1996	0.050	0.950	0.865	0.017	0.032	0.027	0.005
1997	0.050	0.950	0.875	0.012	0.036	0.021	0.004
1998	0.044	0.956	0.882	0.015	0.028	0.022	0.005
1999	0.059	0.941	0.884	0.019	0.039	0.029	0.006
2000	0.049	0.951	0.898	0.014	0.034	0.021	0.005
2001	0.024	0.976	0.905	0.007	0.017	0.013	0.002

STAY: Proportion of households that do not move in period "t" since 1994.

MOV: Proportion of households that have moved in year "t".

OWN: Proportion of households that own their first residence in year "t".

MOV/RENT: Proportion of households that have moved and have rented the new dwelling in year "t".

MOV/OWN: Proportion of households that have moved and purchase the new dwelling in year "t".

MOV_REG: Proportion of households that have moved to another dwelling in the same region (NUTS1) in year "t".

MOV_SPAIN: Proportion of households that have moved to another spanish region in year "t".

Table 4 gives us an idea about the joint decision "mobility / tenure". Columns 5 and 6 present the proportion of households that purchase or rent and they show that households have a propensity to move to dwelling ownership rather than renting. Adding to this, the option "moving / ownership" shows values twice as those presented to "move / rent". Another fact to note is that mobility that occurs in Spain is mainly within the same region. i.e. households move nearby, as seen in the series of "MOV_SPAIN" that takes values well below those of column "MOV_REG". Therefore, the mobility in the spanish households has two characteristics: scarce and not so far.

From a sample of 8221 households in eight years only produced 1928 events of housing changes. In 1083 of them, the moving is produced in the first year in which the household enters the sample, so that we can not know its type of housing tenure in the previous year. For this reason we have to discard

these household for the next analysis. Then we study changes in housing tenure when there has been at least one moving of residence. Table 5 shows the total number of changes over the period 1994-2001.

Table 5
PERCENTAGE OF CHANGES IN HOUSING TENURE (PERIOD: 1994-2001)

Change Tenure	%of total movings
Rent-Rent	20.60%
Own-Rent	7.19%
Rent-Own	28.26%
Own-Own	43.95%
Total	100.00%

Purchase a dwelling (option "own") is the most common situation, regardless of whether the previous situation of the household is rent or ownership, and represent more than 70% of all changes. Figure 7 analyzes the same phenomenon, showing the evolution of the number of movements based on the previous 4 mobility options during the sample period.

Figure 7
NUMBER OF CHANGES BY TYPE OF TENURE
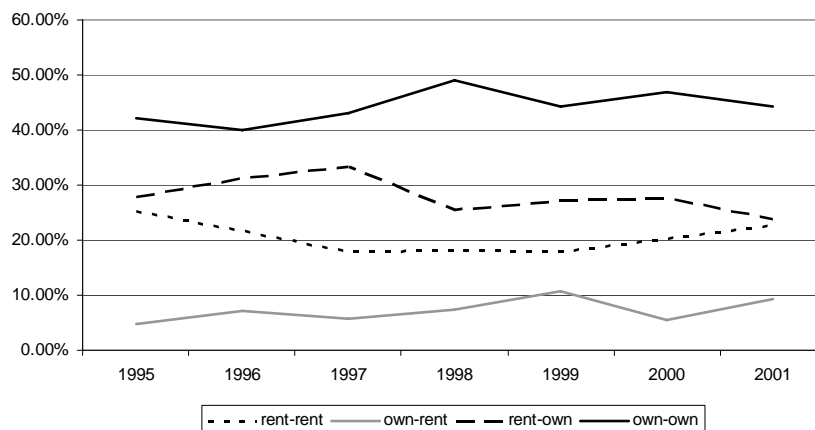
Households tend to move to ownership dwelling, with about 45% of movements in whole year if the previous situation is ownership, or if they previously have a rented dwelling, with 30% of changes in 1995 to 23% in 2001. The situation that occurs rarely is moving to rental when the household has ownership dwelling.

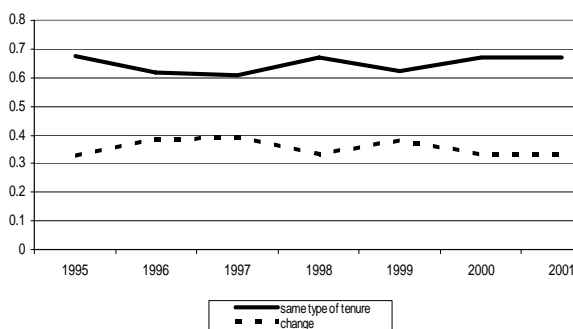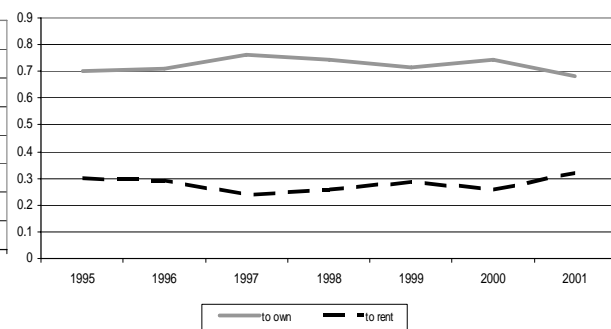| **Figure 8**	**Figure 9**
PERCENTAGE OF HOUSEHOLDS WITH NO CHANGES IN TYPE OF TENURE	**PERCENTAGE OF HOUSEHOLDS: PURCHASE OR RENT THE NEW DWELLING**

Figure 8 shows the percentage of movements for each of the years depending on whether it has changed the type of housing tenure after moving. Figure 9 shows whether the new dwelling change

has meant purchasing of the new residence or rent. It is observed that almost 70% of households that changed dwelling did not make a change in type of tenure, but compared to Figure 9, the most usual situation of housing tenure if household change the type of housing tenure ,when changing residence, is purchasing (regardless of their previous dwelling was in ownership or rental).

Another interesting element to consider is whether the people who rented will use the new dwelling as a temporary situation to purchase other dwelling. We consider situations of households moved from ownership to rent during the period 1994-2001 (60 in total). Only 26% of the sample (16 households of these 60) went to another dwelling after this first moving (19 moving in total, almost 30%), which can be considered a negligible amount. The following table shows the results:

Table 6
FLOW OF CHANGES IN HOUSING TENURE (% OF HOUSEHOLDS)

sequence of residential mobility	% of Households
Rent-Own	81.25
Rent-Rent-Own	6.25
Rent-Rent-Rent-Own	6.25
Rent-Rent	6.25
Total	100

According to this figure it seems that Spanish households consider renting a temporary situation, and tend to purchase the dwelling, as only 6% of the households which had moved after initial moving from ownership to renting, continued in that final tenure mode when it moves to a new dwelling.

Another feature of interest is whether households move to a dwelling near their former dwelling or further afield (in other region). This question is closely related to the labor market, since labor force with a high degree of mobility allows improve the adjust between supply and demand in the labor market at any point of the national territory, while a population with low mobility will be a drawback for a fast and suitable adjustment in the labor market. Table 7 shows different types of residential mobility in the period of analysis:

Table 7
PERCENTAGE OF HOUSEHOLD MOBILITY (PERIOD 1994-2001)

mobility	other country	same region	other region	total
rent-rent	0.24	18.37	2.04	20.65
own-rent	0.12	5.76	1.44	7.32
rent-own	0.00	27.25	0.96	28.21
own-own	0.12	40.94	2.76	43.82
total	0.48	92.32	7.20	100.00

The first conclusion to be drawn of this Table is that households move especially to ownership in the same region (92% of movements), the other two options are rather statistically irrelevant, so that interregional migration doesn't look a reliable instrument for adjustments in the Spanish labor market.

It is also interesting to analyze the different reasons leading to household mobility, considering three possible options: professional, personal or dwelling reasons.

**Table 8**
RESIDENTIAL MOBILITY (% OF TOTAL MOVINGS)

mobility	familiar-personal	labor	dwelling	Total
rent-rent	5.93	3.27	11.26	20.46
own-rent	3.03	1.57	2.66	7.26
rent-own	6.66	2.66	18.89	28.21
own-own	16.22	2.06	25.79	44.07
total	31.84	9.56	58.60	100.00

The number of housing changes due to work reasons is negligible compared to the other two options, so it is noteworthy that this result, together with that obtained in previous Table, indicates that the labor adjustment in the labor market due to labor force mobility is very small.

Finally, we study household variables that may affect the moment of time of a residential mobility. We focus on analyzing two elements: the age of the household head and whether there has been change in the number of children (new born) of the family. As regards whether the age of the household head affects when deciding which type of housing tenure has when moving, Figure 10 shows the relationship between the changes in type of housing tenure and the age of household head.

Figure 10
PERCENTAGE OF HOUSING TENURE CHANGES BY AGE OF HOUSEHOLD HEAD
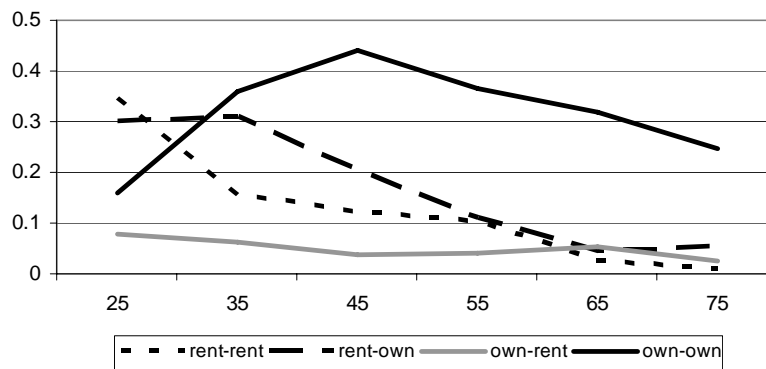
This figure shows that for young households heads, residential mobility tends to renting the new dwelling, and that household with older household head are going to purchasing the new dwelling, showing for the oldest ages the highest values for this purchasing option (rent option is completely negligible). Also interesting to note that after 50 years old the possibility of residential mobility is considerably reduced.

The last variable to be discussed is whether the fact of increasing the size of the family affects the probability of residential mobility. The following figure shows the ratio of the number of housing changes depending on the difference (in years) between the event "year the family had a newborn" and the event "year of change of residence." Most residential mobility is in the same year the child born, but there is a peak at 2 years which may be associated necessity of a bigger dwelling: maybe the reason is that the newborn is moved from the parent's room to a different room.

Figure 11
NUMBER (PERCENTAGE OF THE TOTAL MOVINGS) OF RESIDENTIAL MOBILITY (PERIOD 1994-2001)
BY THE DIFFERENCE BETWEEN "BIRTH YEAR" AND "YEAR OF MOVING"

Difyear = Year of change - child birth year
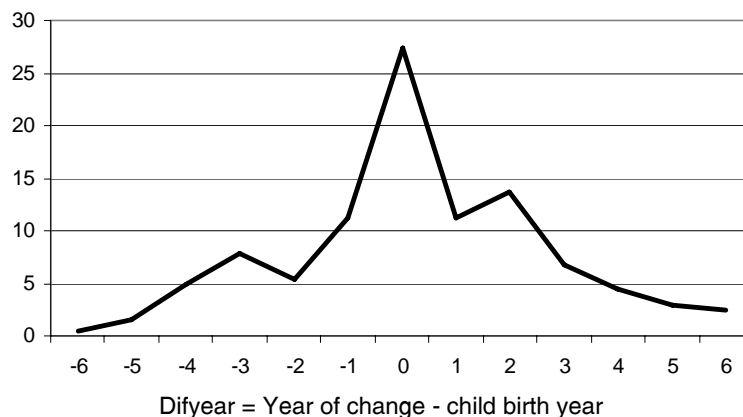
Once statistically analyzed the panel data sample, in the next section we consider different econometric models that allow us to study the various features that affect the joint decision of mobility / housing tenure.

4. ECONOMETRIC ESTIMATION OF RESIDENTIAL MOBILITY AND TENURE CHOICE MODEL

For this section we analyze separately two household's decisions: first, we study exclusively the decision to move to another dwelling. Finally, we analyze the joint decision of moving / type of tenure.

4.1. Residential Mobility

In this section we study the decision made by households between staying in the same dwelling or move to a new one, without differentiating whether the household moves to a dwelling in ownership situation or rental. Therefore, we face a discrete choice model (standard logit) in which the dependent variable that the researcher observes is:

$$mov_{it} = \begin{cases} 1 \text{ if household "i" has moved to a new dwelling in period t} \\ 0 \text{ if household stay in the same dwelling in periodo t} \end{cases}$$

The results of the econometric estimation for the panel data and cross section (year 2001) are given in Table 9.

Table 9
LOGIT ESTIMATION OF DECISION TO MOVE OR STAY IN THE SAME DWELLING

	panel 1994-2001			cross section: year 2001		
	coefficient	t-statistic	marginal effect	coefficient	t-statistic	marginal effect
nchild	-0.271	-8.070	-0.265	0.006	0.050	0.000
male	0.532	7.560	0.548	0.385	1.410	0.006
age	-0.173	-15.550	-0.163	-0.142	-3.720	-0.002
age2	0.001	9.300	0.001	0.001	2.700	0.000
highscho	0.143	2.120	0.182	-0.353	-1.150	-0.004
universtiy	0.471	6.620	0.597	0.310	1.150	0.009
ln(totinc)	-0.105	-8.000	-0.104	-0.038	-0.430	-0.083
unconstr	0.619	10.050	0.637	1.211	5.140	0.029
constr	0.236	3.740	0.236	0.824	3.010	0.016
monthok	0.124	2.150	0.074	-0.055	-0.250	-0.002
saving	0.439	8.020	0.455	0.188	0.830	0.004
expendok	0.210	1.660	0.214	0.356	0.640	0.006
unemploy	-0.255	-2.820	-0.287	-0.385	-0.800	-0.005
divorced	0.951	8.870	0.947	0.936	2.170	0.020
north reg	-0.085	-0.810	-0.104	-0.477	-1.000	-0.006
madrid reg	0.252	2.430	0.265	0.612	1.570	0.013
central reg	0.358	3.830	0.326	0.420	1.170	0.006
est reg	0.246	2.860	0.243	0.295	0.870	0.005
south reg	0.130	1.510	0.100	-0.194	-0.530	-0.003
constant	2.479	8.120		-0.225	-0.150	
/lnsig2u	-1.4173	std:(0.1970)				
σ_e	0.4923	std:(0.0485)				
rho	0.0686	std:(0.0125)				

The first result that stands observing Table 9 is that estimates of cross section and panel are rather different. In the case of using the estimates obtained only for one year, there are very few variables that are statistically significant. Even more, the parameters, which are statistically significant in the cross section case, present values quite different from those obtained in the panel specification, such as "unconst" and "constr", while for the variables "age", "age2" and "divorced" in both specifications show enough consistency. Of note in the specification of random effects panel that most variables are statistically

significant in explaining the behavior of households that have changed (or not) of their residence. The propensity of a household to move depends significantly on socioeconomic characteristics. Focusing in the panel approach, the probability of residential mobility decreases with the age of the household head, the number of children in the family (nchild) and household income level (lntotinc). To highlight the estimator related to unemployed situation variable ("unempl"), reflecting that household with its head is working has more possibilities to move to a new dwelling comparing with the situation of unemployed household head. This result merely corroborates the little mobility that exists in the Spanish labor market. Furthermore, the estimation of the parameters associated with the level of studies suggests that the higher level of education attained by the household head foster the household mobility. Also note that the parameters associated with the region dummies are all significant and positively affect residential mobility. Unfortunately, these movements occur within the same region, as seen in the previous section.

This random effects logit model is able to capture the fundamental characteristics of residential mobility. However, if one wants to analyze in more detail the joint decision of mobility and housing tenure type, it is necessary to estimate a multinomial logit model with random effects, as noted in Section 2.

4.2. Simultaneous decision of mobility/type of housing tenure

We study a multinomial logit model that takes into account simultaneously the fact of residential mobility to another dwelling and its tenure mode (ownership or rent), so the options of the household are the following:

— Stay in the same dwelling.

— Move to a new dwelling-rent.

— Move to a new dwelling-ownership.

So the dependent variable can take the following values:

$$\text{movten}_{it} = \begin{cases} 3 \text{ if household moves to a new dwelling - rent in period t} \\ 2 \text{ if household moves to a new dwelling - ownership in period t} \\ 1 \text{ if household stay in the same dwelling in period t} \end{cases}$$

With the estimation method developed in Section 2 it is possible to estimate a multinomial logit model with random effects. In this model $\sqrt{\sigma(\alpha_1)}$ and $\sqrt{\sigma(\alpha_2)}$ are, respectively, the standard deviations of the individual effects of the choices of "move and own" and "move and rent" while $\frac{\sigma(\alpha_1,\alpha_2)}{\sqrt{\sigma(\alpha_2)}\sqrt{\sigma(\alpha_2)}}$ is the correlation coefficient. The importance of the panel structure is supported by the statistical significance of the standard deviations of individual effects ($\sqrt{\sigma(\alpha_1)}$, $\sqrt{\sigma(\alpha_2)}$) even though the non-significance of the correlation coefficient. This statistical insignificance implies that, after conditioning on household characteristics, there is no unobserved dependency between choices "move and own «and» move and rent". The interpretation of this result is that households differ in their unobserved propensity to move (purchase or rent). However, the fact that a household possesses a high unobserved propensity to move and own a dwelling doesn't imply that also it has higher probability to "move and rent".

Multinomial logit results are consistent with those obtained in the previous estimation, but the standard logit econometric specification offers poor information. Similar to logit estimations, the explanatory variable age (and its square) of the household head significantly affects mobility, detecting that older people move less to rent. Also, the more children a household has the less likely is moving to a new dwelling (purchase or rent). Economic variables that positively affect the propensity of residential mobility (either rental or purchase) are "unconstr", "constr", while "lntotinc" has a negative effect on the option "move to rent", being non-significant in the case of purchasing a new dwelling . If the household has enough income in order to avoid problems of consumption restrictions during the month (related to "monthok" and "Saving") is more likely that such a residential mobility implies a purchase, while the fact that the head of household is unemployed has a strong negative effect in moving to a new household residence. This last result not only confirms those obtained previously, reflecting that

households do not move unless the household head has a good labor market position. Another variable that has a positive effect on household's mobility is "divorced", particularly in the case of moving and rent, with an associated parameter value much higher than in case of purchasing. Finally, the parameters related with the regional variables are not significant for "moving and rent", except for the "central area". However, they have a significantly positive effect for the "move and own", showing very similar values for several dummy regional alternatives. This result confirms the ideas given in Figure 1, which shows that the behavior of different geographical areas has no significant variations.

Finally, we have to point out the mistake of not taking into account unobserved heterogeneity, because it influences the parameter estimation, resulting in incorrect values in the case of cross section. This can be show, for instance, in the parameters related to "nolimit" and "limited" wich present higher values in the cross section alternative than those obtained with the panel data approach.

5. CONCLUSIONS

This paper studies the simultaneous choice made by households in Spain in terms of residential mobility and the type of tenure of this new dwelling, either rent or own. To do this, using data for the period 1994-2001 from the European Community Household Panel (ECHP), we propose a descriptive analysis of this period, obtaining results indicating the low mobility of Spanish households. Furthermore, in the case of moving to a new dwelling, this is not because of labor reasons. Another interesting result is the observation of no relevant changes in the type of tenure during this period of study, since 70% of households, which move to a new dwelling, does not change the type housing tenure. However, if the household changes the type of tenure it chooses the purchasing option.

This paper also proposes a suitable econometric specification in order to estimate panel data using a multinomial logit model allowing individual heterogeneity. The results show that the heterogeneity of households and several explanatory variables play an important role in the decisions of mobility and type of housing tenure.

Table 10
MULTINOMIAL LOGIT OF SIMULTANEOUS DECISION "MOVE AND HOUSING TENURE"
Options: 1) stay in the same house, 2) move and ownership and 3) move and rent

	panel 1994-2001			cross section: year 2001		
	coefficient	t-statistic	marginal effect	coefficient	t-statistic	marginal effect
opction:moving/own						
nchild	-0.2449	-6.4100	-0.2296	-0.0581	-0.36	-0.0062
male	0.6293	7.4700	0.5533	0.5490	1.56	0.0051
age	-0.1108	-8.7000	-0.1024	-0.0837	-1.75	-0.0008
age2	0.0005	3.6200	0.0007	0.0006	1.18	6.14E-06
highscho	0.0448	0.5800	0.0435	-0.2413	-0.7	0.0020
universtiy	0.1293	1.5300	0.1049	0.1139	0.33	0.0041
ln(totinc)	-0.0217	-1.0100	-0.0217	-7.03E-08	-1.05	-7.45E-10
unconstr	0.4747	6.5400	0.4443	1.1997	4.38	0.0105
constr	0.2072	2.7300	0.1872	0.8011	2.38	0.0037
monthok	0.2564	3.8500	0.2500	-0.2839	-1.07	0.0036
saving	1.0047	15.0600	0.8047	0.7305	2.56	0.0194
expendok	-0.6014	-2.8200	-0.4014	0.2092	0.28	-0.0073
unemploy	-0.2980	-2.5500	-0.2820	-1.4755	-1.45	-0.0049
divorced	0.3460	2.3000	0.3284	0.6971	1.26	0.0076
north reg	-0.0547	-0.4400	-0.0511	-0.3745	-0.67	-0.0011
madrid reg	0.3658	3.0700	0.3451	0.5006	1.05	0.0074
central reg	0.3931	3.5900	0.3312	0.4682	1.11	0.0073
est reg	0.3690	3.7200	0.3035	0.3574	0.9	0.0069
south reg	0.3056	3.0400	0.2856	-0.0136	-0.03	0.0052
constant	-0.0992	-0.3600		-2.6642	-2.33	

(*Keep.*)

(*Continuation.*)

	panel 1994-2001			cross section: year 2001		
	coefficient	t-statistic	marginal effect	coefficient	t-statistic	marginal effect
option:moving/rent						
nchild	-0.2643	-4.8400	-0.2299	0.1807	0.79	-0.0013
male	0.1000	1.0100	0.4197	0.2767	0.62	0.0026
age	-0.1878	-10.3500	-0.1999	-0.2042	-2.78	-0.0010
age2	0.0010	5.1000	0.0013	0.0015	1.86	0.0000
highscho	0.3008	2.4800	0.2557	-0.4861	-0.73	0.0024
universtiy	0.9568	7.7000	0.7176	1.2836	2.68	0.0107
ln(totinc)	-0.1609	-9.3400	-0.1207	-2.75E-07	-2.01	-5.88E-10
unconstr	0.7592	7.0300	0.5694	1.3087	2.86	0.0056
constr	0.2623	2.4100	0.2230	0.9022	1.91	0.0014
monthok	-0.0728	-0.6900	-0.0619	0.3428	0.75	-0.0011
saving	-0.6847	-6.6800	-0.5820	-0.8723	-1.94	-0.0025
expendok	0.9603	5.7500	0.8163	0.4094	0.5	0.0070
unemploy	-0.1603	-1.1500	-0.1362	0.1088	0.19	-0.0014
divorced	1.7372	10.8400	1.4767	1.4410	2.05	0.0186
north reg	0.0010	0.0100	0.0008	-0.4959	-0.55	-0.0001
madrid reg	0.1544	0.8100	0.1236	1.1585	1.67	0.0012
central reg	0.4448	2.6500	0.3780	0.2734	0.4	0.0022
est reg	0.1508	0.9500	0.1282	0.2816	0.43	0.0009
south reg	-0.0207	-0.1300	-0.0176	-0.5882	-0.84	-0.0004
constant	1.6200	4.3700		0.2506	0.16	

$\sqrt{\sigma(\alpha_1)}$ 0.1389, (std:.0484)

$\sqrt{\sigma(\alpha_2)}$ .1765 (std: .08301)

$\sigma(\alpha_1, \alpha_2)$ 0.0178 (std:.0578)

$\dfrac{\sigma(\alpha_1, \alpha_2)}{\sqrt{\sigma(\alpha_1)}\sqrt{\sigma(\alpha_2)}}$ 0.11423

reference option: stay same dwelling

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SÍNTESIS
PRINCIPALES IMPLICACIONES DE POLÍTICA ECONÓMICA

El incremento de la movilidad residencial promueve la movilidad laboral y ésta, a su vez, fomenta un mejor ajuste entre la oferta y la demanda en el mercado de trabajo, ya permite una reducción del desempleo y mejora la productividad y la competitividad. Teniendo presente las altas tasas de desempleo existentes en España, la movilidad laboral fomenta la asignación adecuada de trabajadores y un incremento en el crecimiento económico en todas las regiones, por lo que los factores que determinan esta movilidad residencial tienen consecuencias importantes desde el punto de vista económico.

Este trabajo trata de analizar las decisiones que toman los hogares a la hora de trasladarse a una nueva vivienda y en que tipo de posesión que realizan de la misma, es decir: compra o alquiler. El articulo permite estudiar cuales son las principales características de la movilidad residencial en España que se pueden resumir en 1) la mayoría de las familias viven en viviendas de su propiedad, y no en alquiler; 2) que no existe una gran movilidad en comparación a otros países, y 3) que de existir un cambio de residencia, con casi toda seguridad se produce dentro de la propia región.

Además, este artículo propone una nueva especificación econométrica que permite observar que variables afectan a la hora de que una familia cambie de hogar, destacando la edad del cabeza de familia, su estado civil, o el número de hijos entre las más importantes.