Revista de Economía Aplicada E A *Número 75 (vol. XXV), 2017, págs. 53 a 85*

DID THE ECONOMIC CRISIS HAVE THE SAME EFFECT ON HOME-OWNERS AND RENTERS IN TERMS OF EMPLOYMENT?

JAVIER A. BARRIOS GARCÍA
Universidad de La Laguna

This paper investigates the effects of housing tenure choice (home-owning/renting) on individuals' employment status (employed/unemployed) through the empirical estimation of different dynamic panel data models with Spanish data covering the period 2004-2012 sourced from the EU Statistics on Income and Living Conditions. Taking into account the effect of unobserved heterogeneity, the endogeneity of housing tenure choice, and distinguishing between spurious state dependence and true state dependence, we find that there is no evidence of any significant spillover effect of the aggregate regional home-ownership rate on individuals' probability of employment. However, the average effect of housing tenure choice on this probability is robust and significantly positive, ranging from 3.8 percentage points for the home-owners group as a whole, and 4.3 percentage points for those home-owners with a mortgage left to pay off.

Key words: Home-ownership, unemployment.

JEL classification: C33, C35, J64, R23.

Research into any aspect related to the Spanish labour market is nowadays undeniably important. Although the main cause of the divergence between the functioning of the Spanish labour market and that of other OECD countries is certainly the different labour legislation in force in Spain [Bentolila *et al*. (2012)], there are a number of additional factors that have an impact in this area. A point in case is the housing market.

Following on from the groundbreaking studies by Oswald (1996), (1999), an extensive literature emerged at the beginning of this century, devoted to analysing the effects of the housing market on the labour market[1]. One of those effects is the focus of the present study: the impact that housing tenure choice, mainly in terms of renting/ownership, can have on individuals' employment/unemployment status. In this regard, the recent economic crisis that has affected Spain represents a key ex-

(1) Henley (1998), Coulson and Fisher (2002), (2009), Munch *et al*. (2006), (2008), Battu *et al*. (2008), Van Ewijk and Van Leuvenjstein (2009), Rouwendal and Nijkamp (2010), Farber (2012), Head and Lloyd-Ellis (2012), Coulson and Grieco (2013), and Isebaert *et al*. (2015), among others.

periment that will allow us to analyse whether the impact of the crisis in terms of unemployment differs between home-owners and renters.

Starting at the theoretical level, the classical job search model in the tradition of Mortensen (1986) or Pissarides (2000) has been adopted by different authors to include housing tenure type as an additional factor that can affect the individual's employment status [Dohmen (2005), Munch *et al*. (2006), (2008), Coulson and Fisher (2009), Rouwendal and Nijkamp (2010), Head and Lloyd-Ellis (2012)]. In all these models, it is basically assumed that home-owners face higher moving costs than renters. Thus, if home-owners were to move house, their reservation wage would go up to offset these additional costs, which leads to less mobility in terms of taking up job offers in areas away from their primary residence. Under this theoretical perspective, it is also worth pointing out additional transmission mechanisms, some with opposing effects: owners can compensate for the abovementioned negative effect on their employment situation by intensifying their search for local jobs [Munch *et al*., (2006), (2008)]; differences in the cost of housing may affect the final payment (utility) received by the individual [Coulson and Fisher (2009), Head and Lloyd-Ellis (2012)]; differences between home-owners and renters in terms of job vacancy rates or the probability of dismissal may result from the so-called "neighbourhood effect" [Ioannides and Loury (2004), Dujardin and Goffette-Nagot (2010)]; there may be differences between the two groups in terms of discount rates [DellaVigna and Paserman (2005), James (2009)] or additional mobility problems stemming from falling house prices [Farber (2012), Coulson and Grieco (2013)].

In summary, under the theoretical perspective set out above, the total effect of the housing tenure type on the individual's employment status is ambiguous and therefore requires empirical testing. However, empirical studies in this field have not yielded conclusive results; evidence at a fundamentally macro level supports the Oswald hypothesis [Nickell (1998), Nickell and Layard (1999), partially in Green and Hendershott (2001), Brunet and Lesueur (2009), Isebaert *et al*. (2015)], while evidence against it can be found in most micro-level studies [Coulson and Fisher (2002), (2009), Flatau *et al*. (2003), Munch *et al*. (2006), Battu *et al*. (2008), Rouwendal and Nijkamp (2010)], with the latter indicating that home-ownership leads to a greater probability of employment. A similar dichotomy has been found for Spain, depending on the period of time analysed. On the one hand, the results reported by Barrios and Rodríguez (2004) –using aggregate data from the Spanish provinces for 1991– and Rodríguez and Barrios (2010) –using micro data for 2010– do not support the Oswald hypothesis. However, the same authors (Rodríguez and Barrios, 2013), in a cross-sectional analysis for the period 2006-2009, conclude that there is no evidence of any effect of the housing tenure type on individuals' employment status. These contradictory results are an example of what has come to be called the "Oswald puzzle" in the related literature [Van Ewijk and Van Leuvenjstein (2009), p. 3].

Blanchflower and Oswald (2013) attempt to reconcile this disparity in the results by distinguishing between a micro-level effect of housing tenure type on the individual's employment status and the externalities that the aggregate home-ownership rate could produce on the labour market and the economy in general. They point out some transmission mechanisms that may apply in this case: the informational externalities that greater labour mobility can produce on the productivity of

workers; the applicable legislation in planning and construction that can hamper individuals' and companies' relocation decisions; limits on labour migration resulting from a weak rental housing market; or the longer commuting times and therefore higher labour cost typical of regions with higher home-ownership rates. Their results confirm those of Coulson and Fisher (2009), who found evidence at micro and macro levels for US states that, even though home-owners have a greater probability of employment, an increase in the home-ownership rate in the state where the individual lives leads to a subsequent increase in the unemployment rate in that state. Laamanen (2013) reaches similar conclusions with micro data for Finland.

This study attempts to shed some light on this issue by examining the temporal variation in employment and housing tenure type produced by the last economic crisis to hit Spain. To this end, in section 1, we analyse the employment situation in Spain by means of different dynamic probit models based on panel data from the European Union Statistics on Income and Living Conditions (EU-SILC) corresponding to the period 2004-2012. The econometric modelling used allows us to address a number of problems that were identified in the previous literature, and which have yet to be entirely resolved. First, the use of micro panel data enables us to account for the effect of unobserved heterogeneity on both tenure choice and individuals' employment status. Second, we explicitly address the endogeneity of housing tenure type as an explanatory variable for employment status, an issue which is of particular concern in the related literature. Lastly, the dynamic probit model allows us to distinguish between spurious state dependence (that is, resulting from the unobserved heterogeneity) and true state dependence (in other words, after controlling for the unobserved heterogeneity that occurs because employment status in one period significantly affects the probability of employment in subsequent periods).

In section 2, we discuss the results of the estimations, while section 3 provides a summary of the main conclusions drawn. Addressing the three abovementioned empirical problems, we find that in the period under study, Spanish home-owners and, to a greater extent, those with a mortgage to be paid off are in a slightly better position than renters when it comes to facing the employment-related effects of the economic crisis. Furthermore, the home-ownership rate by autonomous community of residence has no significant effect on the probability of individuals being employed. It is worth emphasizing that if we relax the focus on any of the identified empirical problems, we reach the same conclusions (incorrect, in my opinion) as Coulson and Fisher (2009), Blanchflower and Oswald (2013) or Laamanen (2013).

The paper concludes with two appendices containing descriptive statistics and details of the variables used, as well as the results of the estimations.

1. Data and econometric modelling

1.1. Data

We use annual longitudinal micro data from the EU-SILC (source: INE) corresponding to Spain for the period 2004-2012. This statistical database is designed as a rotating panel in which each home is followed for a maximum period of four years, with a quarter of the sample being renewed annually. The EU-SILC contains information at both the household level and at the level of the individuals therein.

The final sample comprises individuals responsible for the primary residence, aged between 18 and 64 (inclusive), who are economically active, and who are not occupying the home free-of-charge or paying rent below market prices[2]. In addition, since we estimate the dynamic models with lagged dependent variables, the sample includes only those individuals with observations in at least two consecutive periods and without any missing observations for any of the variables used. As a result, we have an unbalanced panel of 14,364 individuals with a total of 41,932 annual observations.

Table 1: Sample Size

2004			
	Unemployed	Employed	Total
Renters at market prices	24	204	228
Home-owners	165	2091	2256
Total	189	2295	2484
2005			
	Unemployed	Employed	Total
Renters at market prices	46	347	393
Home-owners	216	3733	3949
Total	262	4080	4342
2006			
	Unemployed	Employed	Total
Renters at market prices	40	391	431
Home-owners	214	3737	3951
Total	254	4128	4382
2007			
	Unemployed	Employed	Total
Renters at market prices	40	459	499
Home-owners	257	4199	4456
Total	297	4658	4955

Source: Own elaboration.

(2) Rentals below market prices include public housing, discounted rents offered by an employer or other organization, and rentals that predate the Boyer Decree. These properties are excluded because their unique characteristics in terms of mobility and employment [see for example Battu *et al*. (2008)] mean that including them could distort the fundamental objective of this study, that is, to evaluate the impact of two main housing tenure types(renting/ownership) on individuals' employment status.

Table 1: SAMPLE SIZE (continuation)

	2008		
	Unemployed	Employed	Total
Renters at market prices	53	490	543
Home-owners	345	4521	4866
Total	398	5011	5409
	2009		
	Unemployed	Employed	Total
Renters at market prices	139	467	606
Home-owners	590	4467	5057
Total	809	4952	5663
	2010		
	Unemployed	Employed	Total
Renters at market prices	151	468	619
Home-owners	658	4484	5142
Total	809	4952	5761
	2011		
	Unemployed	Employed	Total
Renters at market prices	143	432	575
Home-owners	660	4115	4775
Total	803	4547	5350
	2012		
	Unemployed	Employed	Total
Renters at market prices	99	258	357
Home-owners	556	2673	3229
Total	655	2931	3586
	Total		
	Unemployed	Employed	Total
Renters at market prices	735	3516	4251
Home-owners	3661	34020	37681
Total	4396	37536	41932

Source: Own elaboration.

Table 1 shows the final sample disaggregated by year, by renters at market price/home-owners, and by employed/unemployed. Looking at the total sample, it is noteworthy that renters have an unemployment rate around 8 percentage points higher than home-owners. Moreover, although the percentage of renters and home-owners remains relatively stable over the period under study, with around 10.1% being renters and 89.9% owners, the profound impact of the economic crisis caused unemployment rates to almost double for both groups over the same period, going from an average of 9.9% for renters and 6.2% for owners in the period 2004-2008, to values of 25.0% and 13.9%, respectively, in the subsequent period (2009-2012).

Table 2 presents the annual bivariate transition rates in order to precisely analyse the dynamics of employment and housing tenure type in the sample under study. Throughout the analysed period, the average percentage of both employed renters and employed home-owners remain relatively stable, with 82.4% and 94.7% of individuals in these groups, respectively, being in the same situation the following year. At the same time, once again as a result of the economic crisis, there is an increase in the transitions from employment to unemployment, going from an average of 5.7% for renters and 3.5% for home-owners in the period 2004-2008, to 13.5 % and 6.5%, respectively, in the period 2009-2012. Note that the transition rate from employment to unemployment for renters is roughly double that of home-owners over the entire period. Furthermore, the probability of employment in a particular period for a renter or home-owner who was unemployed in the preceding year decreases sharply after 2008, falling from an average of 61.7% and 52.5%, respectively, between 2004-2008 to around 32.0 % and 31.6%, respectively, over the period 2009-2012.

1.2. Variables used

As a dependent variable in the housing tenure equation, we use the binary variable *TENURE,* which takes a value of 1 if the person occupying the dwelling at the time of the survey is the owner, and 0 if the individual is renting it. The binary dependent variable *EMPLOY* indicates whether the person occupying the dwelling at the time of the survey is employed (1) or unemployed (0).

In both equations, we control for age, gender, educational level, whether the individual is living with a partner (married, common-law or otherwise), number of household members, years of work experience, health status, whether they were born in Spain, the population density of the local area, the home-ownership rate and the unemployment rate in the autonomous community of residence, as well as variables indicating the year in which the observation is made. In addition, following Coulson and Fisher (2009), to help identify the effect of the housing tenure type on employment, we also include in the housing tenure equation a variable indicating the percentage of households in detached or semi-detached houses in the autonomous community of residence. We present the descriptive statistics and definitions of the dependent and control variables in an appendix. These statistics reveal the differences between the distribution of the variables relating to home-owners compared to renters, with most t-tests reporting significant differences of means between the two groups. It is precisely for this reason that it is important to control for the divergences observed and thus ensure that selection bias does not distort estimates of the effects of housing tenure type on employment.

Table 2: ANNUAL BIVARIATE TRANSITION RATES FOR EMPLOYMENT AND HOUSING TENURE TYPE*

	2004/05				
	ER	UR	EO	UO	Observations
Employed renters (ER)	80.9	5.9	12.3	1.0	204
Unemployed renters (UR)	45.8	50.0	4.2	0.0	24
Employed home-owners (EO)	0.3	0.0	96.6	3.2	2091
Unemployed home-owners (UO)	1.2	0.0	59.4	39.4	165
Total	7.4	1.0	86.3	5.4	2484
	2005/06				
	ER	UR	EO	UO	Observations
Employed renters (ER)	80.8	4.7	14.5	0.0	234
Unemployed renters (UR)	65.6	25.0	9.4	0.0	32
Employed home-owners (EO)	0.3	0.0	95.9	3.7	2351
Unemployed home-owners (UO)	0.8	0.0	60.8	38.3	120
Total	8.0	0.7	86.4	4.9	2737
	2006/07				
	ER	UR	EO	UO	Observations
Employed renters (ER)	86.3	5.2	7.9	0.7	291
Unemployed renters (UR)	70.0	30.0	0.0	0.0	30
Employed home-owners (EO)	0.3	0.0	96.2	3.5	2740
Unemployed home-owners (UO)	0.0	0.0	52.6	47.4	137
Total	8.8	0.8	85.4	5.1	3198
	2007/08				
	ER	UR	EO	UO	Observations
Employed renters (ER)	87.0	6.9	5.4	0.6	331
Unemployed renters (UR)	65.4	26.9	3.8	3.8	26
Employed home-owners (EO)	0.3	0.0	96.1	3.6	3085
Unemployed home-owners (UO)	0.0	0.6	37.2	62.2	180
Total	8.7	0.9	84.2	6.2	3622

* Transition rates in % calculated for individuals that remain in the sample for at least the two consecutive years included.

Source: Own elaboration.

Table 2: Annual bivariate transition rates for employment and housing tenure type (continuation)*

	2008/09				
	ER	UR	EO	UO	Observations
Employed renters (ER)	79.7	15.4	4.6	0.3	345
Unemployed renters (UR)	24.3	73.0	0.0	2.7	37
Employed home-owners (EO)	0.2	0.0	93.7	6.1	3243
Unemployed home-owners (UO)	0.4	0.4	28.2	71.0	252
Total	7.5	2.1	80.6	9.7	3877
	2009/10				
	ER	UR	EO	UO	Observations
Employed renters (ER)	83.4	10.2	5.2	1.2	344
Unemployed renters (UR)	32.6	63.2	1.1	3.2	95
Employed home-owners (EO)	0.2	0.0	93.8	6.0	3226
Unemployed home-owners (UO)	0.2	0.5	37.2	62.1	414
Total	8.0	2.4	78.4	11.2	4079
	2010/11				
	ER	UR	EO	UO	Observations
Employed renters (ER)	82.2	12.5	5.0	0.3	303
Unemployed renters (UR)	39.1	59.1	0.9	0.9	110
Employed home-owners (EO)	0.2	0.0	94.0	5.8	3147
Unemployed home-owners (UO)	0.2	0.0	35.3	64.5	425
Total	7.5	2.6	78.4	11.5	3985
	2011/12				
	ER	UR	EO	UO	Observations
Employed renters (ER)	79.4	16.0	3.9	0.7	281
Unemployed renters (UR)	32.0	65.3	0.0	2.7	75
Employed home-owners (EO)	0.4	0.1	91.3	8.3	2793
Unemployed home-owners (UO)	0.2	0.7	25.9	73.2	437
Total	7.2	2.8	74.5	15.5	3586

* Transition rates in % calculated for individuals that remain in the sample for at least the two consecutive years included.

Source: Own elaboration.

1.3. Econometric modelling

We tackle three fundamental issues when performing an econometric analysis of the problem. First, the use of panel data allows us to isolate the effect on individuals' employment status from both observed heterogeneity, derived from control variables, and from unobserved heterogeneity. Second, the endogeneity of housing tenure choice as an explanatory variable for employment status is corrected in two stages, as in Wooldridge (2014). Lastly, the persistence over time of employment status, as shown in Table 2, points to the importance of establishing mechanisms that allow us to distinguish between spurious state dependence, resulting from unobserved heterogeneity, and true state dependence, occurring when an individual's employment status in one period significantly affects their probability of employment in subsequent periods. This is done by implementing a dynamic probit model with random effects, similar to that used in Hyslop (1999) or Stewart (2007). This is a key aspect of econometric modelling because if true state dependence –which corresponds to a dynamic effect of the employment status– is not explicitly accounted for, it could be confused with the effect of housing tenure type, which as we saw in Table 2 is also very persistent over time, leading to overestimation of the latter.

As a result, we employ a dynamic probit model with random effects correlated with the control variables, following Mundlak (1978) and Chamberlain (1980). The problem of initial conditions, that is, the fact that the initial condition of the dependent variable –in this case the binary employment status $E_{it} = 1$ employed/0 unemployed– depends on unobserved heterogeneity, is addressed as in Heckman (1981)[3]: The model is determined by the following equations:

$$\begin{aligned} E_{it} &= 1\left(x_{it}'\beta_1 + \gamma_1 E_{it-1} + \gamma_2 H_{it-1} + \bar{x}_i'\delta_1 + a_i + \varepsilon_{1it}\right), t \geq 1, \\ E_{i0} &= 1\left(x_{i0}'\beta_0 + \bar{x}_i'\delta_0 + \alpha_0 a_i + \varepsilon_{0i}\right), \end{aligned} \quad [1]$$

where 1 is the indicator function, $i = 1,\ldots, N$ represents the individuals, $t = 0,\ldots, T$ refers to the time period (years), E_{it} and H_{it} are, respectively, the binary variables *EMPLOY* and *TENURE,* x_{it} is a vector of strictly exogenous explanatory variables, $\bar{x}_i$ is a vector of individual means of the variables in x_{it} with temporal variation, β_1, β_0, δ_1, δ_0 are vectors of parameters, γ_1, γ_2, α_0 simple parameters, and finally a_i $N(0, \sigma_a^2)$ represents the remaining unobserved heterogeneity that is assumed to be uncorrelated with the observed explanatory variables and the errors ε_{1it}, ε_{0i} $N(0, 1)$, which are independent across time.

As is well known [Arulampalam and Stewart (2009)], model [1] can be estimated by conditional maximum likelihood as a panel probit model with random effects. If we were to do so, however, the potential endogeneity of the housing tenure type, even if evaluated in a period prior to that of the employment status in question, could lead to biased estimates[4]. We thus address this endogeneity problem in two stages,

(3) The Monte Carlo evidence reported in Akay (2012) indicates that of the two most widely-used methods to handle the initial conditions problem, those of Heckman (1981) and Wooldridge (2005), the former is preferable for short panels (fewer than five periods), in that it is more robust and less biased.

(4) It could be argued that the initial outlay of money required to purchase a home, as well as, in many cases, the necessary access to financial markets to undertake that purchase, could limit home-ownership to individuals with stable employment. Thus, the housing tenure decision made in an earlier period may be influenced in turn by the employment status in the following period.

as in Wooldridge (2014), first estimating a panel probit model with correlated random effects for the housing tenure type as follows:

$$H_{it} = 1\left(z'_{it}\beta_2 + \bar{z}'_i\delta_2 + b_i + \varepsilon_{2it}\right) \ , t \geq 0, \qquad [2]$$

with z_{it} being a vector of strictly exogenous explanatory variables for housing tenure with (an) additional variable(s) regarding x_{it} (instrumental variables), $\bar{z}_i$ a vector of individual means of the variables in z_{it} which change over time, β_2 and δ_2 vectors of parameters, b_i N(0, σ_b^2) the unobserved individual heterogeneity that is assumed to be uncorrelated with the variables in z_{it} and the errors ε_{2it} N(0, 1), which are independent across time. Once [2] has been estimated by conditional maximum likelihood, the generalized residuals are calculated:

$$GR_{it} = \frac{q_{it}\rho_b\phi\left(q_{it}(z'_{it}\beta_{2b} + \bar{z}'_i\delta_{2b})\right)}{\Phi\left(q_{it}(z'_{it}\beta_{2b} + \bar{z}'_i\delta_{2b})\right)} \ , t \geq 0 \qquad [3]$$

where $q_{it} = 2H_{it} - 1$, ϕ and Φ are the density function and the standard normal distribution function, and vectors β_{2b} and δ_{2b} are made up of the parameters in β_2 and δ_2 multiplied by $\rho_b = 1\Big/\sqrt{1+\sigma_b^2}$. We use these generalized residuals as control functions for the endogeneity of housing tenure type by adding them as an explanatory variable in [1]; thus, the second stage is a quasi-maximum likelihood estimation of the model:

$$\begin{aligned} E_{it} &= 1\left(x'_{it}\beta_1 + \gamma_1 E_{it-1} + \gamma_2 H_{it-1} + \bar{x}'_i\delta_1 + \lambda GR_{it-1} + a_i + \varepsilon_{1it}\right) \ , t \geq 1, \\ E_{i0} &= 1\left(x'_{i0}\beta_0 + \bar{x}'_i\delta_0 + \alpha_0 a_i + \varepsilon_{0i}\right), \end{aligned} \qquad [4]$$

The standard errors in the estimation of [4] are corrected using a bootstrap technique to take into account the two-stage estimation. In [4], a t-test for the null hypothesis H_0: $\lambda = 0$ allows us to test whether or not the housing tenure type is endogenous in the employment equation. Also, a t-test for H_0: $\alpha_0 = 0$ allows us to analyse whether or not the initial conditions problem is relevant to the estimation carried out. Then, the average partial effect (APE) on employment of the housing tenure type (π_1), the employment status in the previous period (π_2), as well as the home-ownership rate in the autonomous community of residence (π_3), are consistently estimated following Wooldridge (2014), by applying:

$$\frac{1}{N}\sum_{i=1}^{N}\Phi\left(x'_{it}\beta_{1a} + \gamma_{1a}E_{it-1} + \gamma_{2a}H_{it-1} + \bar{x}'_i\delta_{1a} + \lambda_a GR_{it-1}\right) \qquad [5]$$

where Φ is the standard normal distribution function, and the subscript a denotes the coefficients estimated in [4] divided by $\sqrt{1+\sigma_a^2}$. We take the differences in [5] for, respectively, $H_{it-1} = 1$ and $H_{it-1} = 0$ for π_1, $E_{it-1} = 1$ and $E_{it-1} = 0$ for π_2, and calculate the derivative of [5] with respect to the regional home-ownership rate for π_3. We then calculate the average over the entire period under study, that is, for all values of t, to obtain APEs for the entire period, or over a specific year to calculate annual APEs. The standard errors for these estimates are also obtained by bootstrapping.

The model employed offers several ways to solve the problem of identifying the causal effect of housing tenure type on individuals' employment status. First, its recursive structure makes it possible to consider the housing tenure choice in one year as predetermined with respect to the employment status in the subsequent year. Also, the very nature of the period under study, characterized by the economic crisis in Spain, provides us with exogenous variability in both dependent variables throughout the period. This, together with the stability over time assumed for the structural parameters of the model, provides an additional factor to facilitate identification. Nevertheless, it could be argued that the initial capital needed to purchase a home and, in many cases, the necessary access to financial markets in order to secure a mortgage, could limit home-ownership to individuals with stable employment. As such, the housing tenure choice in a given period could be correlated with employment status in the subsequent period. Thus, in order to further support the identification, and in line with Coulson and Fisher (2009), we include the rate of households whose primary residence is a detached or semi-detached house in the autonomous community of residence (*DSDHR*) as an instrumental variable in the housing tenure equation [2], though this variable is excluded from the employment equation [4]. It should be borne in mind that the data on the Spanish housing market indicate that the probability of single-family home-ownership is, on average over the period analysed, more than seven percentage points above the corresponding figure for multi-family housing (source: EU-SILC, INE). As a result, the regional rate of single-family home-ownership is correlated with the individual housing tenure decision and, at the same time, the aggregate nature of this instrumental variable is not expected to influence the individual's employment status, as will be statistically tested below.

2. Results

Table 3 shows the APEs of interest throughout the period analysed, under four different specifications for comparative purposes. In specification 1, a pooled dynamic probit model is applied for employment, assuming that there is no unobserved heterogeneity and including housing tenure type in the preceding period as an explanatory variable that is assumed to be exogenous. In this case, the dynamics of the model means that an additional time period is lost, resulting in a final sample with the same number of individuals but 27568 observations in total. Specification 2 is the dynamic probit model with correlated random effects that corresponds to [1] in the previous section; that is, it is now assumed that unobserved heterogeneity exists though lagged housing tenure type is still exogenous. Specification 3 lifts this last restriction, estimating model [4], which is the same as the previous one but with the endogeneity of housing tenure type corrected, as in Wooldridge (2014). Finally, in order to analyse the sensitivity of the obtained results to the distributional hypotheses set out, in specification 4 a standard linear dynamic panel data model is estimated using the Blundell-Bond GMM estimator (1998) applied to a reduced sample of individuals with observations for at least three consecutive years. This restriction is set due to the nature of this estimator, the results of which are qualitatively similar to the Arellano-Bond estimator (1991), but which is more suitable when T is small and persistence is high. Details on the estimated coefficients are given in Appendix B.

Table 3: Main average partial effects on employment

	Specification 1	Specification 2	Specification 3	Specification 4
π_1	0.018**	0.021**	0.038**	0.120**
	(0.006)	(0.005)	(0.009)	(0.164)
π_2	0.441**	0.109**	0.106**	0.322**
	(0.011)	(0.006)	(0.022)	(0.033)
π_3	-0.077*	-0.058	-0.024	0.091
	(0.031)	(0.125)	(0.135)	(0.877)
Nº individuals	14364	14364	14364	8288
Nº observations	27568	41932	41932	29780
Log-likelihood	-6627.78	-10460.77	-10447.02	–

Note: Standard errors in parentheses. * Significant at 5%, ** Significant at 1%. π_1, π_2 and π_3 are the APEs on the probability of employment of, respectively, lagged housing tenure type, lagged employment status and the home-ownership rate in the autonomous community of residence.

Source: Own elaboration.

First of all, it should be pointed out that in all cases, as expected, the existence of a dependence on the preceding employment status is confirmed by appropriate t-tests significant at 1% on the employment parameter in the preceding period (γ_1 in Eqs. 1 and 4 for specifications 2 and 3, respectively). In addition, a t-test on σ_a^2 rejects specification 1 in favour of specification 2, confirming the presence of correlated random effects. Moreover, a t-test on the generalized residual coefficient (λ in Eq. 4) or a likelihood ratio test allows specification 2 to be rejected in favour of specification 3, confirming the endogeneity of housing tenure type as an explanatory variable in the employment equation. In addition, a likelihood ratio test significant at 1% confirms the validity of the instrumental variable (*DSDHR*), both in terms of its influence in the housing tenure equation as well as confirming that it does not have an additional effect in the employment equation.

If we look at the APEs shown in Table 3, what first stands out is that most of the initial persistence in employment estimated under specification 1 is explained by the unobserved heterogeneity included in specifications 2 and 3. In all cases, the persistence of employment status is significant at 1%, and according to specifications 2 and 3, the fact that an individual is employed in a given period results in an 11-percent increase in the probability that they will also be employed in the subsequent period. At the same time, home-ownership in the preceding period leads to an increase in the probability of employment of around 2 percentage points with specifications 1 and 2, rising to an average of 3.8 percentage points after correcting for the endogeneity in this variable. This result once again calls into question Oswald's hypothesis. Furthermore, the effect of the regional home-ownership rate on the probability of employment, initially negative and significant at 5%, is weakened when we account for unobserved heterogeneity and also after correcting for the endogeneity of the housing tenure type, contradicting the conclusions obtained by Blanchflower and Oswald (2013) or Laamanen (2013), and thus casting doubt on the

existence of spillover effects of regional home-ownership rates on employment. In this respect, it should be noted that neither of the two abovementioned papers explicitly considers the dynamic nature of employment status, nor do they include unobserved heterogeneity in the modelling, despite the use of panel data in both cases.

Finally, specification 4, where we use the Blundell-Bond linear GMM estimator (1998), which is not subject to the previous distributional assumptions, points to the existence of significantly greater persistence in employment, more in line with the pooled probit model in specification 1, and effects of the lagged housing tenure type and the regional home-ownership rate not significantly different from zero. However, the results obtained with this model should be taken with caution since, on the one hand, the sample of individuals is reduced by almost 50% due to the nature of the estimator, and also because it is not possible to check its validity with a test for second-order correlation in the residuals as in Arellano and Bond (1991), due to the nature of the panel data used.

In Table 4, we analyse the robustness of the results obtained for specification 3 of Table 3 in relation to a number of relevant aspects. First, it could be argued that since the regional unemployment rate is included as a control variable, it could capture a substantial part of the regional variation in employment, thus leaving little variation to be explained by the regional home-ownership rate. To verify this, we first estimate specification 3 excluding the regional unemployment rate. Then, since Blanchflower and Oswald (2013) assert that the effect of the home-ownership rate occurs with a long lag, perhaps as long as four or five years, we again estimate specification 3, lagging the regional home-ownership rates by up to five years, instead of using their contemporaneous values. Finally, we estimate specification 3 without including regional unemployment rates and considering fixed effects at the level of the autonomous communities. In all these cases, the results remain consistent with those obtained in Table 3. If we perform the same exercise with specifications 1 and 2, the results are similar to those in Table 3.

Closer observation of Table 4 reveals an increase of around 2.4 percentage points in the APE of the housing tenure type on the probability of employment (π_1) as we work with the sample in the later years of the period under study. In order to delve deeper into this aspect, in Figure 1 we analyse the evolution over time of the three APEs of interest (π_1, π_2, π_3), in this case using the corresponding annual averages obtained under the dynamic probit model with correlated random effects and corrected for the endogeneity in housing tenure type (specification 3). As can be seen, while the APE of the regional home-ownership rate (π_3) remains not significantly different from zero over the entire period, both the APE of the housing tenure type (π_1), as well as the APE of the previous employment status (π_2), increase by around 3.1 and 7.0 percentage points, respectively, with both effects roughly doubling over this period. This result suggests that the economic crisis in Spain has intensified the positive effect on employment generated by home-ownership, but also, to a greater extent, the persistence in employment status, reflecting the fact that those who are employed in a given period are more likely than others to be employed in the following period.

Next, we analyse the differences that may arise between owners of a primary residence with/without a mortgage left to pay off and renters at market price, in terms of the estimated average effects on the probability of employment. To do so, we re-estimate the same models as in Table 3, but now alternatively excluding each of these

Table 4: Testing the robustness of specification 3 in Table 3

	Without *UNER*	With *HOR(t-1)*	With *HOR(t-2)*	With *HOR(t-3)*	With *HOR(t-4)*	With *HOR(t-5)*	With AC FE[1]
π_1	0.037**	0.037**	0.042**	0.053**	0.059**	0.061**	0.036**
	(0.008)	(0.010)	(0.010)	(0.014)	(0.015)	(0.017)	(0.007)
π_2	0.107**	0.108**	0.120**	0.154**	0.151**	0.102	0.111**
	(0.020)	(0.022)	(0.023)	(0.028)	(0.029)	(0.054)	(0.006)
π_3	-0.139	0.003	-0.177	0.032	0.024	-0.112	–
	(0.134)	(0.147)	(0.178)	(0.190)	(0.239)	(0.247)	
Nº individuals	14364	14364	12759	11575	10242	8710	14364
Nº observations	41932	39448	35106	30724	25769	20360	41932
Period included	2004-12	2005-12	2006-12	2007-12	2008-12	2009-12	2004-12

NOTE: Standard errors in parentheses. * Significant at 5%, ** Significant at 1%. π_1, π_2 and π_3 are the APEs on the probability of employment of, respectively, lagged housing tenure type, lagged employment status and the home-ownership rate in the autonomous community of residence.

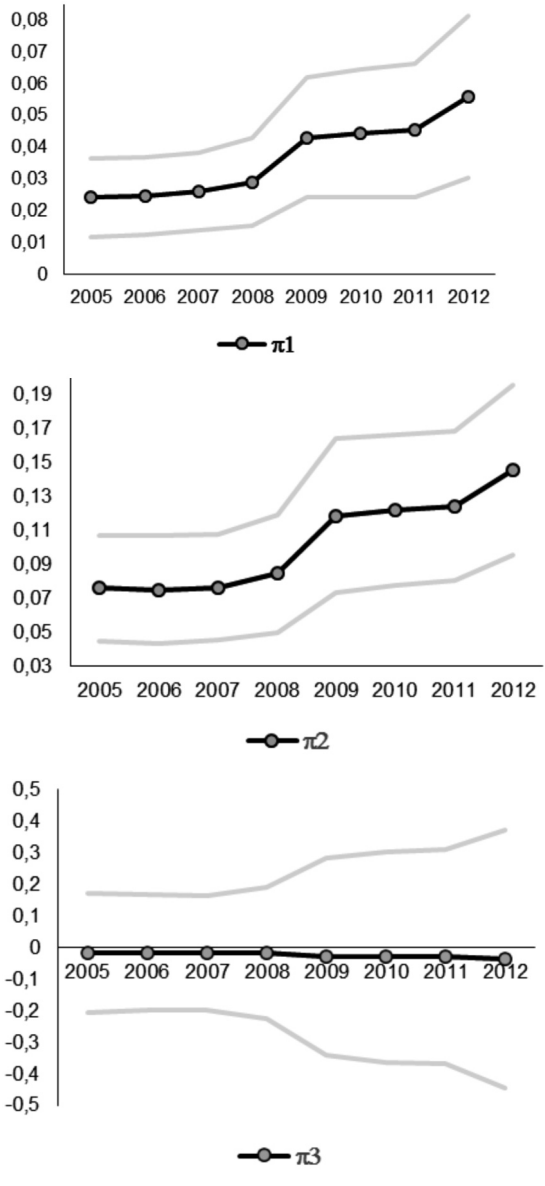
[1] Model without *UNER* or *HOR* and with fixed effects at the level of the autonomous communities.

Source: Own elaboration.

housing tenure types. Detailed results are included in Appendix B, while Table 5 shows the corresponding estimated APEs of interest. In this respect, it should be noted that the samples are now drastically reduced because data on owners' mortgage situations are only included in the EU-SILC from 2007 onwards. In general terms, the results in Table 5 replicate those obtained in Table 3 and, therefore, the same comments apply, albeit with two key exceptions. First, when we consider the unobserved heterogeneity in probit specifications 2 and 3, and confirmed by the linear GMM of specification 4, the persistence of employment (π_2) for sample II (owners with a mortgage and renters) is around 1.1 and 1.6 percentage points higher than that in sample I (owners without a mortgage and renters), indicating a slightly better response to the economic crisis by home-owners with mortgage left to pay off, in terms of maintaining their employment status.

It should also be noted that when we focus on sample III, which is made up exclusively of home-owners, the effect on unemployment of the housing tenure type (0 = owner without a mortgage, 1 = owner with mortgage left to pay off) fades; it is only significant when we compare owners with renters (samples I and II). In this case, being an owner without a mortgage in the preceding period as compared to being a renter, does not significantly alter the probability of employment in specifications 1 and 2, whereas in specification 3 this effect is significant at 5% and similar in magnitude to that reported in Table 3 for the whole sample. On the other hand, the group of home-owners with an outstanding mortgage shows a significant increase compared to renters in the probability of employment in all specifications: around 3 percentage points on average in specifications 1 and 2, rising to 4.3 percentage points in specification 3. This effect fades again in specification 4. With the latter model, it is worth bearing in mind the abovementioned caveats, which are exacerbated by the notable reduction in the sample used.

Figure 1: Annual evolution of the three APEs of interest (π_1, π_2, π_3) estimated under specification 3 (annual averages), along with 95% confidence intervals for estimated annual values



Source: Own elaboration.

Table 5: Main average partial effects on unemployment distinguishing between owners with/without a mortgage to pay off

Sample I: Owners without mortgage and renters at market price				
	Specification 1	Specification 2	Specification 3	Specification 4
π_1	0.014	0.019	0.038*	0.405
	(0.011)	(0.011)	(0.017)	(0.266)
π_2	0.533**	0.158**	0.160**	0.312**
	(0.019)	(0.013)	(0.049)	(0.058)
π_3	-0.095	0.068	0.084	0.832
	(0.072)	(0.305)	(0.305)	(0.751)
Nº individuals	3905	3905	3905	2292
Nº observations	7423	11328	11328	8102
Log-likelihood	-2198.78	-3507.93	-3504.67	–
Sample II: Owners with mortgage to pay off and renters at market price				
	Specification 1	Specification 2	Specification 3	Specification 4
π_1	0.028**	0.031**	0.043**	0.288
	(0.010)	(0.009)	(0.012)	(0.175)
π_2	0.451**	0.169**	0.176**	0.404**
	(0.018)	(0.012)	(0.046)	(0.045)
π_3	-0.115	0.026	0.055	-0.297*
	(0.065)	(0.255)	(0.283)	(1.428)
Nº individuals	4530	4530	4530	2748
Nº observations	8777	13307	13307	9743
Log-likelihood	-2605.74	-3966.66	-3963.78	–
Sample III: Owners without mortgage and owners with mortgage to pay off				
	Specification 1	Specification 2	Specification 3	Specification 4
π_1	0.005	0.004	0.102	-0.144
	(0.005)	(0.005)	(0.097)	(0.137)
π_2	0.510**	0.122**	0.124**	0.322**
	(0.005)	(0.008)	(0.029)	(0.043)
π_3	-0.090	-0.134	-0.130	0.290*
	(0.050)	(0.185)	(0.200)	(1.487)
Nº individuals	6786	6786	6786	4163
Nº observations	13921	20707	20707	14676
Log-likelihood	3680.30	5646.10	5645.69	–

NOTE: Standard errors in parentheses. * Significant at 5%, ** Significant at 1%. π_1, π_2 and π_3 are the APEs on the probability of employment of, respectively, lagged housing tenure type, lagged employment status and the home-ownership rate in the autonomous community of residence.

Source: Own elaboration.

3. Conclusions

This paper presents an empirical analysis of the effect that housing tenure type can have on individuals' employment status. To that end, we estimate different dynamic panel data models using Spanish data for the period 2004-2012. The results obtained allow us to highlight three main conclusions.

First, if we explicitly account for the effect of unobserved heterogeneity, the endogeneity of housing tenure type as an explanatory variable of employment, and distinguish between spurious state dependence and true state dependence, the empirical evidence on Spain is robust and indicates that there is no spillover effect of the regional home-ownership rate on individuals' probability of employment. This result calls into question those obtained by Blanchflower and Oswald (2013) or Laamanen (2013). None of those studies simultaneously addresses the three above-mentioned empirical problems.

Second, the recent economic crisis that hit the Spanish economy intensified the persistence of employment status, though more so for home-owners with a mortgage left to pay off, with this group showing greater efforts to retain employment throughout the crisis period.

Finally, the average effect of the housing tenure type on individuals' probability of employment is robust and significantly positive, at around 3.8 percentage points for the group of owners as a whole. This figure increases slightly for home-owners with a mortgage to pay off, up to 4.3 percentage points. This result is in line with the majority of evidence at the micro level, which contradicts the Oswald hypothesis.

Thus, once again, the results obtained suggest that any housing policy aimed at promoting home-ownership is compatible with one of the key objectives of developed economies: to reduce unemployment. Such objectives are particular suitable during the current period of economic crisis that Spain is undergoing.

Appendix A. Description of the explanatory variables

Table A1: Description of the explanatory variables

Variables	Definition
	Household characteristics:
HMEMBERS, HMEMBERS2	Number of household members and its square.
	Characteristics of the person responsible for the housing:
GENDER	Female = 0; Male = 1.
MARRIED	Married or living with a partner (whether or not legally recognized) = 1; otherwise = 0.
HEALTH	Self-reported health status excellent, good or normal = 1, otherwise = 0.
BSPAIN	Born in Spain = 1, otherwise = 0.

Table A1: Description of the explanatory variables (continuation)

Variables	Definition
Age:	
AGE	Individual's age.
*AGE25**	Individual younger than 25 = 1; otherwise = 0.
AGE35	Individual between 25 and 34 = 1; otherwise = 0.
AGE45	Individual between 35 and 44 = 1; otherwise = 0.
AGE55	Individual between 45 and 54 = 1; otherwise = 0.
AGE55+	Individual over 54 = 1; otherwise = 0.
Education:	
*EDU1**	Individual with no education, with primary education or who left secondary school without completing it = 1; otherwise = 0.
EDU2	Individual with secondary education o workplace training that requires second-stage high school diploma = 1; otherwise = 0.
EDU3	Individual with higher education = 1, otherwise = 0.
Work data:	
YWORK, YWORK2	Total number of years spent in paid work throughout the individual's working life, and its square.
Characteristics of the local area or the autonomous community of residence:	
POPDENS	The area of residence is a contiguous set of local areas each with a population density of over 500 inhabitants per km^2, and where the total population is at least 50,000 inhabitants = 1, otherwise = 0.
DSDHR	Percentage of households living in detached or semi-detached single-family houses in the autonomous community of residence obtained from the EU-SILC. Source: INE.
HOR	Percentage of home-ownership in the autonomous community of residence obtained from the EU-SILC. Source: INE.
UNER	Unemployment rate (%) in the autonomous community of residence obtained from the Active Population Survey (EPA in Spanish), Source: INE.
Time period indicators	
Y04,Y05,Y06 Y07,Y08,Y09, Y10,Y11,Y12*	Binary variables indicating the year of observation.

* Reference variable.

Source: Own elaboration.

Table A2: Descriptive statistics for the total sample

	Total		Owners		Renters		
	Average	St. Dev.	Average	St. Dev.	Average	St. Dev.	Difference in means[1]
EMPLOY	0.895	0.306	0.903	0.296	0.827	0.378	0.076**
HMEMBERS	3.212	1.262	3.233	1.216	3.024	1.602	0.209**
HMEMBERS2	11.907	9.031	11.930	8.475	11.707	12.957	0.223
GENDER	0.693	0.461	0.700	0.458	0.625	0.484	0.075**
MARRIED	0.778	0.415	0.798	0.401	0.602	0.489	0.196**
HEALTH	0.971	0.167	0.972	0.166	0.970	0.171	0.002
BSPAIN	0.915	0.279	0.956	0.205	0.549	0.498	0.408**
AGE	45.375	9.310	45.898	9.100	40.740	9.849	5.158**
AGE25	0.006	0.074	0.003	0.055	0.027	0.162	-0.024**
AGE35	0.136	0.342	0.119	0.324	0.283	0.450	-0.164**
AGE45	0.323	0.468	0.323	0.467	0.331	0.471	-0.009
AGE55	0.344	0.475	0.354	0.478	0.258	0.437	0.096**
AGE55+	0.192	0.394	0.202	0.401	0.101	0.302	0.101**
EDU1	0.173	0.378	0.175	0.380	0.158	0.365	0.016**
EDU2	0.482	0.500	0.475	0.499	0.536	0.499	-0.060**
EDU3	0.345	0.476	0.350	0.477	0.306	0.461	0.044**
YWORK	23.450	10.767	24.016	10.648	18.431	10.515	5.585**
YWORK2	665.827	544.951	690.148	548.261	450.242	461.769	239.906**
POPDENS	0.502	0.500	0.495	0.500	0.561	0.496	-0.065**
DSDHR	0.365	0.165	0.367	0.166	0.353	0.160	0.014**
HOR	0.796	0.053	0.798	0.052	0.780	0.062	0.018**
UNER	0.145	0.070	0.145	0.070	0.143	0.068	0.002
Y04	0.059	0.236	0.060	0.237	0.054	0.225	0.006
Y05	0.104	0.305	0.105	0.306	0.092	0.290	0.012*
Y06	0.105	0.306	0.105	0.306	0.101	0.302	0.003
Y07	0.118	0.323	0.118	0.323	0.117	0.322	0.001
Y08	0.129	0.335	0.129	0.335	0.128	0.334	0.001
Y09	0.135	0.342	0.134	0.341	0.143	0.350	-0.008
Y10	0.137	0.344	0.136	0.343	0.146	0.353	-0.009
Y11	0.128	0.334	0.127	0.333	0.135	0.342	-0.009
Y12	0.086	0.280	0.086	0.280	0.087	0.281	-0.001
Individuals		14364					
Total Observations		41932					

[1] Difference between the means of home-owners and renters (at market price).

* Significant at 5%. ** Significant at 1%.

Source: Own elaboration.

Appendix B. Parameter estimates

Table B1: Results of the estimation for the models in table 3[1]

	Spec. 1	Spec. 2	Spec. 3		Spec. 4
	EMPLOY	*EMPLOY*	*EMPLOY*	*TENURE*	*EMPLOY*
	Coef.	Coef.	Coef.	Coef.	Coef.
TENURE(t-1)	0.135**	0.200**	-0.674*	–	0.120
	(0.041)	(0.048)	(0.276)		(0.164)
EMPLOY(t-1)	1.668**	0.842**	0.821**	–	0.322**
	(0.032)	(0.035)	(0.102)		(0.033)
HOR	-0.596*	-0.572	-0.241	1.961	0.091
	(0.243)	(1.238)	(1.340)	(2.058)	(0.877)
GENDER	0.067*	0.103**	0.082	-0.191	0.018*
	(0.029)	(0.034)	(0.052)	(0.134)	(0.008)
AGE35	-0.096	0.017	0.127	1.664**	0.554
	(0.188)	(0.187)	(0.196)	(0.395)	(0.661)
AGE45	-0.283	-0.089	0.035	1.747**	0.540
	(0.190)	(0.198)	(0.214)	(0.450)	(0.668)
AGE55	-0.416*	-0.076	0.026	0.950	0.522
	(0.192)	(0.218)	(0.243)	(0.534)	(0.678)
AGE55+	-0.688**	-0.329	-0.210	0.550	0.482
	(0.194)	(0.242)	(0.276)	(0.610)	(0.678)
MARRIED	0.016	0.011	0.031	-0.194	-0.005
	(0.037)	(0.124)	(0.177)	(0.198)	(0.015)
EDU2	0.233**	0.007	0.014	0.034	0.038**
	(0.032)	(0.095)	(0.106)	(0.287)	(0.012)
EDU3	0.597**	-0.038	-0.021	0.548	0.070**
	(0.038)	(0.151)	(0.181)	(0.377)	(0.016)
HMEMBERS	-0.003	0.080	0.063	0.930**	-0.004
	(0.031)	(0.122)	(0.149)	(0.267)	(0.012)
HMEMBERS2	-0.000	-0.005	-0.003	-0.066	0.000
	(0.004)	(0.015)	(0.017)	(0.034)	(0.002)
BSPAIN	0.224**	0.434**	0.761**	10.384**	-0.005
	(0.044)	(0.050)	(0.125)	(0.220)	(0.069)
HEALTH	0.369**	0.368**	0.345**	-0.363	0.033
	(0.061)	(0.107)	(0.120)	(0.456)	(0.024)
YWORK	0.053**	0.056**	0.054**	0.038	0.003
	(0.005)	(0.011)	(0.013)	(0.031)	(0.003)

YWORK2	-0.001**	-0.001**	-0.001**	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)
POPDENS	0.008	0.005	-0.002	-0.681	-0.020*
	(0.025)	(0.031)	(0.041)	(0.109)	(0.009)
UNER	-2.139**	-4.049**	-3.973**	16.345**	-2.077**
	(0.254)	(0.814)	(0.840)	(2.191)	(0.602)
GR(t-1)	–	–	3.389*	–	–
			(1.327)		
DSDHR	–	–	–	1.431*	–
				(0.707)	
m(DSDHR)	–	–	–	1.769**	–
				(0.803)	
m(AGE)	–	0.040**	-0.038**	0.178**	–
		(0.005)	(0.008)	(0.021)	
m(MARRIED)	–	0.051	0.087	3.184**	–
		(0.133)	(0.201)	(0.283)	
m(EDU2)	–	0.502**	0.499**	-0.386	–
		(0.105)	(0.120)	(0.408)	
m(EDU3)	–	1.325**	1.335**	-0.021	–
		(0.161)	(0.216)	(0.493)	
m(HMEMBERS)	–	-0.095	-0.042	0.446	–
		(0.133)	(0.157)	(0.325)	
m(HMEMBERS2)	–	0.005	-0.002	-0.005*	–
		(0.016)	(0.018)	(0.002)	
m(HEALTH)	–	0.471**	0.528*	1.599*	–
		(0.151)	(0.231)	(0.684)	
m(YWORK)	–	0.055**	0.070**	0.406**	–
		(0.013)	(0.020)	(0.048)	
m(YWORK2)	–	-0.000	-0.001*	-0.008**	–
		(0.000)	(0.000)	(0.001)	
m(UNER)	–	0.078	0.117	-4.249*	–
		(0.820)	(0.899)	(1.815)	
m(HOR)	–	-0.663	-0.524	17.556**	–
		(1.268)	(1.403)	(2.459)	
Y05	–	–	–	0.530**	–
				(0.180)	
Y06	-0.052	-0.004	-0.010	1.216**	-0.008
	(0.068)	(0.076)	(0.086)	(0.191)	(0.011)
Y07	-0.086	-0.045	-0.055	1.451**	-0.022*
	(0.063)	(0.076)	(0.081)	(0.206)	(0.010)

Y08	-0.126*	-0.061	-0.052	1.170**	0.032
	(0.061)	(0.073)	(0.080)	(0.216)	(0.018)
Y09	-0.291**	-0.288**	-0.285**	0.210	0.122*
	(0.060)	(0.076)	(0.089)	(0.245)	(0.053)
Y10	-0.190**	-0.269**	-0.268**	-0.076	0.164*
	(0.062)	(0.076)	(0.093)	(0.273)	(0.053)
Y11	-0.154*	-0.219**	-0.234*	-0.079	0.185*
	(0.064)	(0.076)	(0.092)	(0.287)	(0.074)
Y12	-0.290**	-0.373**	-0.381**	-0.626	0.230*
	(0.068)	(0.085)	(0.108)	(0.359)	(0.097)
CONSTANT	-0.565*	1.043**	0.636	-35.201**	–
	(0.287)	(0.355)	(0.431)	(1.613)	
σ_a^2	–	1.283**	1.250**		–
		(0.052)	(0.213)		
σ_b^2	–		50.325**		–
			(1.973)		
α_0	–	0.831**	0.873**		–
		(0.023)	(0.067)		
Initial conditions controlled for[2]	No	Yes	Yes	No	
Nº individuals	14364	14364	14364	8288	
Nº observations	27568	41932	41932	29780	
Log-likelihood	-6627.78	-10460.77	-10447.02	-5147.99	–[3]

[1] Standard errors in parentheses. * Significant at 5%; ** Significant at 1%. All standard errors are robust to clustering of individuals. The variables *m (X)* are the time averages of the variables *X* that vary over time.

[2] Initial conditions are controlled for following Heckman (1981).

[3] The p-value of the Sargan test is 0.999. The p-value of the first-order autocorrelation test is <0.00001, the second-order autocorrelation test is not applicable.

Source: Own elaboration.

Table B2: Results of the estimation for the models in table 5[1]

Sample I: Owners without a mortgage and renters at market price					
	Spec. 1	Spec. 2	Spec. 3		Spec. 4
	EMPLOY	*EMPLOY*	*EMPLOY*	*TENURE*	*EMPLOY*
	Coef.	Coef.	Coef.	Coef.	Coef.
TENURE(t-1)	0.084	0.135	-0.805	–	0.405
	(0.068)	(0.079)	(0.530)		(0.265)
EMPLOY(t-1)	1.794**	0.940**	0.948**	–	0.312**
	(0.056)	(0.060)	(0.190)		(0.057)
HOR	-0.595	0.500	0.624	14.859	0.832
	(0.449)	(2.251)	(2.386)	(15.703)	(0.751)
GENDER	-0.104*	-0.226**	-0.240*	-0.831	-0.022
	(0.051)	(0.059)	(0.098)	(0.581)	(0.020)
AGE35	-0.341	-0.317	-0.299	1.437	-0.063
	(0.305)	(0.274)	(0.438)	(3.717)	(0.495)
AGE45	-0.721*	-0.676*	-0.623	2.095	-0.209
	(0.308)	(0.296)	(0.481)	(3.912)	(0.484)
AGE55	-0.695*	-0.491	-0.443	3.021	-0.255
	(0.312)	(0.330)	(0.506)	(4.303)	(0.488)
AGE55+	-0.934**	-0.730	-0.707*	2.746	-0.312
	(0.314)	(0.373)	(0.570)	(4.885)	(0.488)
MARRIED	0.097	0.431*	0.430	-1.986	0.031
	(0.060)	(0.195)	(0.315)	(1.739)	(0.024)
EDU2	0.241**	0.186	0.197	1.505	0.057
	(0.054)	(0.162)	(0.267)	(2.099)	(0.029)
EDU3	0.581**	0.106	0.084	1.549	0.110**
	(0.055)	(0.347)	(0.428)	(8.512)	(0.039)
HMEMBERS	-0.007	0.408	0.393	2.362	-0.040
	(0.050)	(0.215)	(0.255)	(1.687)	(0.030)
HMEMBERS2	0.003	-0.042	-0.041	-0.138	0.004
	(0.006)	(0.024)	(0.029)	(0.198)	(0.003)
BSPAIN	0.222**	0.414**	0.957**	40.960**	-0.219
	(0.076)	(0.085)	(0.334)	(6.159)	(0.164)
HEALTH	0.416**	0.640**	0.641**	-0.058	0.033
	(0.115)	(0.199)	(0.248)	(4.700)	(0.049)
YWORK	0.051**	0.034*	0.033	0.020	0.006
	(0.009)	(0.017)	(0.021)	(0.266)	(0.004)
YWORK2	-0.001**	-0.000	0.000	0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.006)	(0.000)

POPDENS	0.019	-0.013	-0.025	-2.123**	0.021
	(0.044)	(0.053)	(0.072)	(0.648)	(0.031)
UNER	-2.446**	-5.705**	-5.714**	33.741**	-0.766
	(0.385)	(1.368)	(1.747)	(16.899)	(1.565)
GR(t-1)	–	–	10.571	–	–
			(35.509)		
DSDHR	–	–	–	-1.061	–
				(7.566)	
m(DSDHR)	–	–	–	-10.908	–
				(7.327)	
m(AGE)	–	-0.039**	-0.024	0.976**	–
		(0.009)	(0.015)	(0.168)	
m(MARRIED)	–	-0.240	-0.217	4.514*	–
		(0.212)	(0.320)	(2.123)	
m(EDU2)	–	0.327*	0.342	0.402	–
		(0.177)	(0.312)	(2.520)	
m(EDU3)	–	1.175**	1.227*	1.536	–
		(0.360)	(0.522)	(8.638)	
m(HMEMBERS)	–	-0.463	-0.369	4.346*	–
		(0.238)	(0.295)	(1.923)	
m(HMEMBERS2)	–	0.053	0.045	-0.394	–
		(0.028)	(0.036)	(0.243)	
m(HEALTH)	–	0.071	0.219	15.700**	–
		(0.283)	(0.405)	(4.840)	
m(YWORK)	–	0.074**	0.084**	0.585*	–
		(0.022)	(0.028)	(0.262)	
m(YWORK2)	–	-0.001	-0.001	-0.010	–
		(0.000)	(0.000)	(0.006)	
m(UNER)	–	1.222	1.454	15.106	–
		(1.394)	(1.785)	(11.607)	
m(HOR)	–	-1.828	-1.681	17.354	–
		(2.222)	(2.441)	(15.844)	
Y08	–	–	–	-2.043	–
				(1.713)	
Y09	-0.193	-0.220	-0.231	-3.418	0.012
	(0.098)	(0.138)	(0.156)	(1.810)	(0.100)
Y10	-0.088	-0.183	-0.190	-4.362*	0.022
	(0.096)	(0.135)	(0.151)	(2.011)	(0.132)
Y11	-0.031	-0.145	-0.156	-4.561*	0.024
	(0.101)	(0.133)	(0.158)	(1.862)	(0.156)

Y12	-0.146	-0.212	-0.219	-6.043**	0.034
	(0.105)	(0.145)	(0.167)	(2.218)	(0.214)
CONSTANT	-0.423	1.543*	0.479	-131.96**	–
	(0.484)	(0.631)	(1.383)	(21.796)	
σ_a^2	–	1.171**	1.168*	–	–
		(0.086)	(0.576)		
σ_b^2	–	–	397.79**	–	–
			(119.50)		
α_0	–	1.083**	1.081**	–	–
		(0.047)	(0.235)		
Initial conditions controlled for[2]	No	Yes	Yes	No	
Nº individuals	3905	3905	3905	2292	
Nº observations	7423	11328	11328	8102	
Log-likelihood	-2198.78	-3507.93	-3504.67	-1407.83	–[3]

Table B2: RESULTS OF THE ESTIMATION FOR THE MODELS IN TABLE 5[1] (continuation)

Sample II: Owner with a mortgage and renters at market price

	Spec. 1	Spec. 2	Spec. 3		Spec. 4
	EMPLOY	*EMPLOY*	*EMPLOY*	*TENURE*	*EMPLOY*
	Coef.	Coef.	Coef.	Coef.	Coef.
TENURE(t-1)	0.164**	0.217**	-0.817**	–	0.288
	(0.055)	(0.062)	(0.412)		(0.175)
EMPLOY(t-1)	1.564**	0.952**	0.977**	–	0.404**
	(0.052)	(0.055)	(0.145)		(0.045)
HOR	-0.714	0.192	0.403	-5.834	-0.297
	(0.406)	(1.891)	(2.112)	(4.109)	(1.428)
GENDER	0.088*	0.121*	0.094	-1.309**	0.019
	(0.042)	(0.052)	(0.058)	(0.259)	(0.013)
AGE35	-0.387	-0.379	-0.369	1.724*	0.581
	(0.352)	(0.312)	(0.503)	(0.704)	(1.123)
AGE45	-0.513	-0.410	-0.379	3.891**	0.568
	(0.355)	(0.332)	(0.518)	(0.893)	(1.125)
AGE55	-0.622	-0.361	-0.341	3.136**	0.554
	(0.358)	(0.367)	(0.546)	(1.063)	(1.130)

AGE55+	-0.798*	-0.366	-0.386	2.915*	0.513
	(0.365)	(0.408)	(0.579)	(1.299)	(1.134)
MARRIED	-0.091	0.155	0.151	0.263	-0.048
	(0.059)	(0.176)	(0.207)	(0.465)	(0.028)
EDU2	0.273**	0.254	0.274	0.787	0.069*
	(0.059)	(0.198)	(0.250)	(1.101)	(0.029)
EDU3	0.620**	0.123	0.190	0.977	0.113**
	(0.068)	(0.289)	(0.326)	(1.350)	(0.034)
HMEMBERS	-0.026	-0.140	-0.138	0.693	-0.019
	(0.031)	(0.161)	(0.221)	(0.714)	(0.016)
HMEMBERS2	0.005	0.018	0.018	-0.063	0.003
	(0.007)	(0.020)	(0.023)	(0.093)	(0.002)
BSPAIN	0.262**	0.443**	0.866**	17.564**	-0.068
	(0.058)	(0.065)	(0.212)	(1.253)	(0.079)
HEALTH	0.349**	0.348	0.334	-0.586	0.056
	(0.123)	(0.224)	(0.251)	(1.565)	(0.053)
YWORK	0.034**	0.008	0.008	-0.069	0.001
	(0.009)	(0.020)	(0.021)	(0.101)	(0.004)
YWORK2	-0.000	0.000	0.000	0.003	0.000
	(0.000)	(0.000)	(0.000)	(0.002)	(0.000)
POPDENS	0.005	-0.011	0.006	0.322	-0.007
	(0.040)	(0.047)	(0.064)	(0.229)	(0.019)
UNER	-1.798**	-2.944**	-2.947*	15.213**	-0.576
	(0.375)	(1.222)	(1.415)	(4.620)	(0.822)
GR(t-1)	–	–	7.581	–	–
			(3.894)		
DSDHR	–	–	–	1.957	–
				(2.024)	
m(DSDHR)	–	–	–	-8.438**	–
				(2.257)	
m(AGE)	–	-0.038**	-0.039**	0.147**	–
		(0.009)	(0.011)	(0.046)	
m(MARRIED)	–	-0.312	-0.119	9.082	–
		(0.196)	(0.236)	(0.837)	
m(EDU2)	–	0.210	0.197	0.027	–
		(0.212)	(0.274)	(1.219)	
m(EDU3)	–	1.015**	0.994**	2.166	–
		(0.302)	(0.366)	(1.450)	
m(HMEMBERS)	–	0.133	0.125	-0.813	–
		(0.186)	(0.240)	(0.765)	

m(HMEMBERS2)	–	-0.015	-0.015	0.042	–
		(0.023)	(0.027)	(0.094)	
m(HEALTH)	–	0.376	0.479	5.118*	–
		(0.304)	(0.480)	(2.352)	
m(YWORK)	–	0.074**	0.095**	0.946**	–
		(0.024)	(0.029)	(0.131)	
m(YWORK2)	–	-0.001	-0.001*	-0.018**	–
		(0.001)	(0.000)	(0.003)	
m(UNER)	–	0.096	0.253	4.231	–
		(1.256)	(1.369)	(4.207)	
m(HOR)	–	-1.521	-1.484	22.777**	–
		(1.880)	(2.180)	(5.270)	
Y08	–	–	–	-0.512	–
				(0.524)	
Y09	-0.350**	-0.447**	-0.444**	-1.484*	-0.020
	(0.100)	(0.121)	(0.129)	(0.605)	(0.053)
Y10	-0.163	-0.316**	-0.315*	-1.595*	0.004
	(0.100)	(0.116)	(0.126)	(0.635)	(0.070)
Y11	-0.144	-0.276*	-0.272*	-1.640*	0.012
	(0.104)	(0.117)	(0.135)	(0.666)	(0.082)
Y12	-0.281**	-0.421**	-0.411*	-2.144**	0.002
	(0.109)	(0.125)	(0.161)	(0.809)	(0.111)
CONSTANT	0.003	1.581**	1.363	-33.660**	–
	(0.512)	(0.611)	(0.817)	(2.903)	
σ_a^2	–	0.828**	0.792**	–	–
		(0.057)	(0.280)		
σ_b^2	–	–	165.322**	–	–
			(24.126)		
α_0	–	0.677**	0.657**	–	–
		(0.035)	(0.106)		
Initial conditions controlled for[2]	No	Yes	Yes	No	
Nº individuals	4530	4530	4530	2748	
Nº observations	8777	13307	13307	9743	
Log-likelihood	-2605.74	-3966.66	-3963.78	-2118.64	–[4]

Table B2: Results of the estimation for the models in table 5[1] (continuation)

Sample III: Owners without a mortgage and owners with a mortgage to pay off

	Spec. 1	Spec. 2	Spec. 3		Spec. 4
	EMPLOY	*EMPLOY*	*EMPLOY*	*TENURE*	*EMPLOY*
	Coef.	Coef.	Coef.	Coef.	Coef.
TENURE(t-1)	0.032	0.036	0.037	–	-0.144
	(0.037)	(0.045)	(0.067)		(0.137)
EMPLOY(t-1)	1.785**	0.879**	0.884**	–	0.322**
	(0.044)	(0.047)	(0.117)		(0.043)
HOR	-0.633	-1.210	-1.172	0.400	0.290
	(0.353)	(1.667)	(1.814)	(1.522)	(1.487)
GENDER	0.022	0.012	0.006	-1.361	0.004
	(0.038)	(0.047)	(0.053)	(0.095)	(0.012)
AGE35	0.291	0.601	0.640	2.003**	0.598
	(0.370)	(0.316)	(0.523)	(0.644)	(1.200)
AGE45	0.146	0.551	0.625	2.248**	0.573
	(0.370)	(0.327)	(0.544)	(0.641)	(1.195)
AGE55	0.045	0.599	0.661	1.834**	0.512
	(0.372)	(0.349)	(0.547)	(0.641)	(1.190)
AGE55+	-0.165	0.402	0.443	1.793**	0.445
	(0.374)	(0.377)	(0.554)	(0.655)	(1.178)
MARRIED	0.045	-0.081	-0.085	-0.080	0.044*
	(0.050)	(0.195)	(0.220)	(0.172)	(0.020)
EDU2	0.288**	0.204	0.205	0.025	0.058*
	(0.045)	(0.150)	(0.185)	(0.174)	(0.024)
EDU3	0.668**	-0.086	-0.091	-0.136	0.104**
	(0.053)	(0.246)	(0.310)	(0.237)	(0.033)
HMEMBERS	-0.049	0.088	0.084	-0.043	-0.039*
	(0.046)	(0.176)	(0.232)	(0.215)	(0.020)
HMEMBERS2	0.007	-0.011	-0.010	0.033	0.005
	(0.006)	(0.020)	(0.031)	(0.029)	(0.003)
BSPAIN	0.276**	0.638**	0.563**	-1.480**	0.002
	(0.067)	(0.080)	(0.143)	(0.254)	(0.038)
HEALTH	0.348**	0.330*	0.326	0.135	0.019
	(0.094)	(0.166)	(0.181)	(0.208)	(0.040)
YWORK	0.055**	0.054**	0.053**	0.017	0.005
	(0.007)	(0.016)	(0.017)	(0.017)	(0.003)
YWORK2	-0.001**	-0.001	-0.001	-0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.0002)	(0.000)

POPDENS	0.029	0.056	0.080	0.362**	-0.012
	(0.033)	(0.042)	(0.066)	(0.091)	(0.014)
UNER	-2.134**	-4.931**	-5.161**	-2.464	-1.683**
	(0.300)	(1.089)	(1.134)	(1.533)	(0.630)
GR(t-1)	–	–	1.761	–	–
			(2.201)		
DSDHR	–	–	–	3.517*	–
				(1.667)	
m(DSDHR)	–	–	–	-4.920**	–
				(1.723)	
m(AGE)	–	-0.042**	-0.058**	-0.274**	–
		(0.007)	(0.022)	(0.016)	
m(MARRIED)	–	0.227	0.338	2.018**	–
		(0.209)	(0.305)	(0.265)	
m(EDU2)	–	0.400*	0.435*	0.509	–
		(0.161)	(0.207)	(0.267)	
m(EDU3)	–	1.588**	1.651**	1.117**	–
		(0.258)	(0.388)	(0.320)	
m(HMEMBERS)	–	-0.200	-0.256	-1.057**	–
		(0.192)	(0.263)	(0.297)	
m(HMEMBERS2)	–	0.028	0.033	0.058	–
		(0.023)	(0.034)	(0.039)	
m(HEALTH)	–	0.572*	0.575*	-0.175	–
		(0.242)	(0.280)	(0.610)	
m(YWORK)	–	0.070**	0.079**	-0.087*	–
		(0.019)	(0.028)	(0.034)	
m(YWORK2)	–	-0.000	-0.001	-0.001*	–
		(0.000)	(0.000)	(0.000)	
m(UNER)	–	0.879	1.130	4.648**	–
		(1.102)	(1.120)	(1.555)	
m(HOR)	–	-0.208	-0.503	-4.643*	–
		(1.674)	(1.795)	(2.023)	
Y08	–	–	–	-0.101	–
				(0.113)	
Y09	-0.088**	-0.072	-0.064	-0.141*	0.076
	(0.075)	(0.107)	(0.122)	(0.166)	(0.042)
Y10	0.026	-0.037	-0.035	-0.165	0.114*
	(0.074)	(0.104)	(0.113)	(0.188)	(0.055)
Y11	0.057	0.000	0.003	-0.515*	0.136*
	(0.078)	(0.102)	(0.128)	(0.211)	(0.065)

Y12	-0.086	-0.173	-0.183	-0.634*	0.171
	(0.082)	(0.111)	(0.142)	(0.258)	(0.090)
CONSTANT	-1.218*	1.183	0.718	15.438**	–
	(0.491)	(0.568)	(1.463)	(1.570)	
σ_a^2	–	1.486**	1.465**	–	–
		(0.080)	(0.363)		
σ_b^2	–	–	17.011**	–	–
			(1.073)		
α_0	–	0.953**	1.210**	–	–
		(0.035)	(0.186)		
Initial conditions controlled for[2]	No	Yes	Yes	No	
Nº individuals	6786	6786	6786	4163	
Nº observations	13921	20707	20707	20707	
Log-likelihood	-3680.30	-5646.10	-5645.69	-7330.13	–[5]

[1] Standard errors in parentheses. * Significant at 5%; ** Significant at 1%. All standard errors are robust to clustering of individuals. The variables m (X) are the time averages of the variables X that vary over time.

[2] Initial conditions are controlled for following Heckman (1981).

[3] The p-value of the Sargan test is 0.999, The p-value of the first-order autocorrelation test is <0.00001, the second-order autocorrelation test is not applicable.

[4] The p-value of the Sargan test is 0.519, The p-value of the first-order autocorrelation test is <0.00001, the second-order autocorrelation test is not applicable.

[5] The p-value of the Sargan test is 0.999, The p-value of the first-order autocorrelation test is <0.00001, the second-order autocorrelation test is not applicable.

Source: Own elaboration.

REFERENCES

Akay, A. (2012): "Finite-sample comparison of alternative methods for estimating dynamic panel data models", *Journal of Applied Econometrics*, vol. 27, pp. 1189-1204.

Arulampalam, W. and Stewart, M.B. (2009): "Simplified implementation of the Heckman estimator of the dynamic probit model and a comparison with alternative estimators", *Oxford Bulletin of Economics and Statistics*, vol. 71 (5), pp. 659-681.

Arellano, M., Bond, S. (1991): "Some tests of specification for panel data: Montecarlo evidence and an application to employment equations", *The Review of Economic Studies*, vol. 58, pp. 277-297.

Barrios, J.A. and Rodríguez, J.E. (2004): "User cost changes, unemployment and home-ownership: evidence from Spain", *Urban Studies*, vol. 41 (3), pp. 563-578.

Battu, H., Ma, A. and Phimister, E. (2008): "Housing tenure, job mobility and unemployment in the UK", *The Economic Journal*, vol. 118, pp. 311-328.

Bentolila, S., Cahuc, P., Dolado, J.J. and Le Barbanchon, T. (2012): "Two-tier labour markets in the great recession: France versus Spain", *The Economic Journal*, vol. 122, pp. F155-F187.

Blanchflower, D.G. and Oswald. A.J. (2013): "Does high home-ownership impair the labor market?", *NBER Working Paper* No. 19079.

Blundell, R. and Bond, S. (1998): "Initial conditions and moment restrictions in dynamic panel data models", *Journal of Econometrics*, vol. 87, pp. 115-143.

Brunet, C. and Lesueur, J. (2009): "Do homeowners stay unemployed longer? A French microeconometric study", in Van Ewijk, C. and Van Leuvenjstein, M., (eds.), *Homeownership and the labour market in Europe*, New York, Oxford University Press, pp. 137-160.

Chamberlain, G. (1980): "Analysis of covariance with qualitative data", *The Review of Economic Studies*, vol. 47, pp. 225-238.

Coulson, N.E. and Fisher, L.M. (2002): "Tenure choice and labour market outcomes", *Housing Studies*, vol. 17, pp. 35-49.

Coulson, N.E. and Fisher, L.M. (2009): "Housing tenure and labor market impacts: the search goes on", *Journal of Urban Economics*, vol. 65 (3), pp. 252-264.

Coulson, N.E. and Grieco, P.L. (2013): "Mobility and mortgages: Evidence from the PSID", *Regional Science and Urban Economics*, vol. 43, pp. 1-7.

Della Vigna, S. and Paserman, M.D. (2005): "Job search and impatience", *Journal of Labor Economics*, vol. 23 (3), pp. 527-588.

Dohmen, T.J. (2005): "Housing mobility and unemployment", *Regional Science and Urban Economics*, vol. 35, pp. 305-325.

Dujardin, C. and Goffette-Nagot, F. (2010): "Neighborhood effects on unemployment? A test à la Altonji", *Regional Science and Urban Economics*, vol. 40, pp. 380-396.

Farber, H.S. (2012): "Unemployment in the great recession: Did the housing market crisis prevent the unemployed from moving to take jobs?", *American Economic Review*, vol. 102 (3), pp. 520-525.

Flatau, P., Forbes, M. and Hendershott, P.H., Wood, G. (2003): "Homeownership and unemployment: The roles of leverage and public housing", *NBER Working paper* No. 10021.

Green, R.K. and Hendershott, P.H. (2001): "Home-ownership and unemployment in the US", *Urban Studies*, vol. 38 (9), pp. 1509-1520.

Head, A. and Lloyd-Ellis, H. (2012): "Housing liquidity, mobility and the labour market", *The Review of Economic Studies*, vol. 79 (4), pp. 1559-1589.

Heckman, J.J. (1981): "The incidental parameters problem and the problem of initial conditions in estimating a discrete time-discrete data stochastic process", in Manski, C. F. and McFadden, D. (eds.): *Structural Analysis of Discrete Data with Econometric Applications*, Cambridge, MA, The MIT Press, pp. 179-195.

Hyslop, D.R. (1999): "State dependence, serial correlation and heterogeneity in intertemporal labor force participation of married women", *Econometrica*, 67 (6), pp. 1255-1294.

Ioannides. M. and Loury, L.D. (2004): "Job information networks, neighborhood effects, and inequality", *Journal of Economic Literature*, vol. XLII, pp. 1056-1093.

Isebaert, D., Heylen, F., Smolder, C. (2015): "Houses and/or jobs: ownership and the labour market in Belgian districts", *Regional Studies*, forthcoming.

James, R.N. (2009): "Tenant time preference as a barrier to homeownership", *Applied Economics Letters*, vol. 16, pp. 1073-1077.

Laamanen, J-P. (2013): "Home ownership and the labour market: Evidence from rental housing market deregulation", Tampere Economic Working Paper, No. 89, University of Tampere, Finland. Downloadable at http://tampub.uta.fi/handle/10024/68116.

Mortensen, D.T. (1986): "Job search and labour market analysis", en: Ashenfelter, O. and Card, D. (Eds.), *Handbook of Labor Economics* Vol. II, Amsterdam, North Holland, pp. 849-919.

Munch, J.R., Rosholm, M. and Svarer, M. (2006): "Are homeowners really more unemployed?", *The Economic Journal*, vol. 116, pp. 991-1013.

Munch, J.R., Rosholm, M. and Svarer, M. (2008): "Home ownership, job duration and wages", *Journal of Urban Economics*, vol. 63, pp. 130-145.

Mundlak, Y. (1978): "On the pooling of time series and cross section data", *Econometrica*, vol. 46, pp. 69-85.

Nickell, S. (1998): "Unemployment: questions and some answers", *The Economic Journal*, vol. 108, pp. 802-816.

Nickell, S., Layard, R. (1999): "Labor market institutions and economic performance", in Ashenfeiter, O. and Card, D. (Eds.): *Handbook of Labor Economics* Vol. 3c, New York, North Holland, pp. 3029-3084.

Oswald, A.J. (1996): "A conjecture on the explanation for high unemployment in the industrialized nations: Part I", Warwick Economics Research Paper, #475, University of Warwick.

Oswald, A.J. (1999): "The housing market and Europe's unemployment: A non technical paper", Unpublished manuscript, University of Warwick.

Pissarides, C.A. (2000): *Equilibrium unemployment theory*, Cambridge, MIT Press.

Rodríguez, J.E. and Barrios, J.A. (2012): "¿Incide la forma de tenencia de la vivienda habitual sobre la situación de empleo en España?", *Estudios de Economía Aplicada*, vol. 30 (2), p. 751 (22 pages), online version at www.revista-eea.net, ref. Ý-30201.

Rodríguez, J.E. and Barrios, J.A. (2013): "Una estimación del efecto de la forma de tenencia de la vivienda sobre el empleo en España", *Estadística Española*, vol. 55 (181), pp. 187-212.

Rouwendal, J. and Nijkamp, P. (2010): "Homeownership and labour market behaviour: interpreting the evidence", *Environment and Planning A,* vol. 42 (2), pp. 419-433.

Stewart, M.B. (2007): "The interrelated dynamics of unemployment and low-wage employment", *Journal of applied econometrics*, vol. 22, pp. 511-531.

Van Ewijk, C. and Van Leuvenjstein, M. (2009): *Homeownership and the labour market in Europe*, New York, Oxford University Press.

Wooldridge, J.M. (2005): "Simple solutions to the initial conditions problem for dynamic, nonlinear panel data models with unobserved heterogeneity", *Journal of Applied Econometrics*, vol. 20, pp. 39-54.

Wooldridge, J.M. (2014): "Quasi-maximum likelihood estimation and testing for nonlinear models with endogenous explanatory variables", *Journal of Econometrics*, vol. 182, pp. 226-234.

Fecha de recepción del original: mayo, 2015
Versión final: enero, 2017

RESUMEN

Investigamos el efecto de la forma de tenencia de la vivienda habitual (propiedad/alquiler) sobre la situación de empleo de los individuos (empleado/desempleado) mediante la estimación empírica de diferentes modelos dinámicos con datos de panel de la Encuesta de Condiciones de Vida para España a lo largo del período 2004-2012. Teniendo en cuenta el efecto de la heterogeneidad inobservada, la endogeneidad de la elección de forma de tenencia de la vivienda, y distinguiendo la dependencia del estado espuria de la verdadera, encontramos que no hay evidencia de ningún efecto indirecto sobre la probabilidad de empleo inducido por la tasa de vivienda en propiedad regional, mientras que el efecto medio sobre esta probabilidad de la forma de tenencia de vivienda es robusto y significativamente positivo, manteniéndose en torno a 3.8 puntos porcentuales para el conjunto de propietarios de la vivienda, y aumentando hasta los 4.3 puntos porcentuales para aquellos propietarios con hipoteca.

Palabras clave: vivienda en propiedad, desempleo.

Clasificación JEL: C33, C35, J64, R23.