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Do homeowners stay unemployed longer ? A French micro-econometric study

Les propriétaires restent-ils plus longtemps au chômage ? Une investigation micro-économétrique sur données françaises

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Les propriétaires restent-ils plus longtemps au chômage ?
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Résumé

L'objectif de cet article est une évaluation micro-économétrique de l'hypothèse d'Oswald selon laquelle la propriété immobilière produit des effets négatifs sur le marché du travail. On estime dans une première étape le choix du statut résidentiel par un modèle logistique multinomial. Les probabilités ainsi estimées d'être propriétaire, locataire ou logé à titre gratuit sont utilisées dans une seconde étape pour expliquer la durée des épisodes individuels de chômage. Cette méthode d'estimation flexible permet de tenir compte du biais de sélection et de la censure des observations de durée sans contraindre l'allure du taux de sortie du chômage. Les résultats obtenus sur un échantillon de 3 965 individus suggèrent que la propriété immobilière exerce un effet positif sur la durée de chômage.

Do homeowners stay unemployed longer?
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Abstract

The objective of this paper is to provide microeconomic evidence for the so called "Oswald's hypothesis", which is whether homeownership results in negative outcomes in the labour market. In a first step, a multinomial logit model for the choice of tenure status is estimated. Estimated probabilities of being either homeowner, renter or housed free of charge are then used to explain the length of an individual unemployment spell. This flexible method of estimation accounts for both censoring and selection bias, without constraining the shape of the hazard rate of leaving unemployment. Results from a 3,965 individuals French data set suggest that homeownership has a positive effect on unemployment duration.

I. Introduction

Differences in structures relative to residential tenure status (respective share of homeowners and renters) have recently been proposed as an explanation to international or interregional differences in unemployment rates, especially with reference to Europe and United States.

In this line of idea, Oswald (1996, 1997, 1998) obtains many results from macroeconomic data of countries belonging to the Organisation for Economic Cooperation and Development [OECD]: the correlation between unemployment levels or growth rates and homeowners share amounts to 0.2, both between and within countries. These results are based on simple evaluation of the statistical relationship between the two variables or alternatively on estimations introducing country or region fixed effects in order to control for unobserved heterogeneity. Nickell and Layard (1999) come to a similar result when they study 20 OECD countries: a ten per cent change in the share of homeowners is associated with a variation of 1 up to 1.5 per cent of the unemployment rate.

Although the hypothesis of a positive relationship from homeownership rate towards unemployment rate, which is sometimes referred to as Oswald's hypothesis, stems from macroeconomic evidence, its theoretical foundations are mainly microeconomic. They relate to the idea that individual efficiency in job search depends positively on individual spatial mobility. If homeowners are less mobile than renters because of higher mobility costs due to property holding, they will experience both higher unemployment rates and longer unemployment periods than renters. Other things being equal, an increase in the number of homeowners implies a decrease in the number of matches between job seekers and vacancies, which translates into a higher unemployment rate. This direct microeconomic mechanism is amplified by macroeconomic effects (changes in housing prices) and indirect effects (negative externalities due to congestion costs).

However, because of aggregation and selection bias, macroeconomic evidence can hardly be used as a proper test of microeconomic mechanisms underlying Oswald's hypothesis. Two major questions are indeed raised when one wish to infer microeconomic behaviour from aggregated data (Green et Hendershott, 2001a, 2001b). The first one relates to restrictive aggregation conditions that have to be met for macroeconomic results to reflect individual behaviours. The second one concerns the choice process of individuals with respect to their residential tenure status: one need to control for non-randomness of individuals self selection in order to get consistent estimates. Only microeconomic data can reveal individual heterogeneity and then allow a proper treatment of the problem.

Green and Hendershott (2001a, 2001b) present a micro-econometric study, which uses US data to evaluate the effect of housing tenure status on the length of individual unemployment spells. They obtain results that are qualitatively in line with Oswald's hypothesis although the effect of homeownership on unemployment duration amounts to only one eight of that found with aggregated data. However, other micro-econometric investigations conclude on the one side to better outcomes in the labour market for homeowners, namely lower unemployment probability and shorter unemployment spells (Van Leuvensteijn and Koning [2000]), and on the other side to a negative influence of home owning on residential mobility (Van Ommeren, 1996). In a recent contribution to this debate, Coulson et Fisher (2002) come to a rejection of Oswald's hypothesis on the basis of econometric estimations that are successively run on U.S. individual data from the Current Population Survey [CPS] (for march 2000) and from the Panel Survey of income Dynamics [PSID] (for 1993). The results obtained with data from the first survey show that, whatever the specification used, the probability of unemployment is negatively correlated with homeownership. Moreover, the estimation of a wage equation reveals that homeowners receive, ceteris paribus, higher wages. Finally, estimation of a Weibull duration model with data from the PSID confirms that the length of unemployment spells is shorter for homeowners than for renters. However, these results are to be considered with caution as neither the endogenous nature of residential tenure status, nor unobservable heterogeneity, are dealt with in the different estimations. In addition, sample building and a small number of observations (204), among which 75% are censored, put doubt on the consistency of the results. Thus, if Oswald's hypothesis seems overall consistent with stylised facts obtained from macroeconomic evidence, micro-econometric results fail to recover the mechanisms that are supposed to be at play or display ambiguous features.

This paradox calls for an analysis of interdependences between housing tenure status and labour market behaviour. The matter is of special importance as the last decades are characterised, in France as in most European countries, by a massive increase both in the share of homeowners and in the unemployment rate. Taking France as an example, the unemployment rate amounted indeed to less than 5% of the working population in the fifties against more than 10% during the nineties. Although the number of people becoming homeowners is stationary during this last decade (Dubujet and Le Blanc, 2000), the share of primary homes that are occupied by their owner has increased from 30% in 1955 to 55% in 1996 (Louvot-Runavot, 2001).

Part of this tendency is due to public policies that are aimed at facilitating home owns achievement (preferential rate loans, subsidized loans, zero interest rate loans). This trend is also rooted in deep changes with respect to the links between housing and labour markets, especially through the expansion of sub-urbanization and daily commutes.

Numerous developments in the analysis of housing and real estate market have been undertaken since the late sixties in order to take into account specific features of this asset (durability, consumption and investment aspects, spatial fixity, heterogeneity, sensitivity to public interventions), which imply to amend standard microeconomics in different ways (Smith, Rosen and Fallis 1988, Goffette-Nagot, 1994). Two main conclusions emerge once specificities associated to housing are acknowledged. First, home owning means higher mobility costs relative to renting and in this way constitutes an impediment to mobility. As the choice of a residential status is by nature an inter-temporal one, individuals who decide to become homeowners might then have, ceteris paribus, lower mobility expectations or more optimistic views relative to their ability to handle high costs in case of a need for mobility. Second, the more or less constrained choice for a residential status is as well one for a distance to different social locations among which the workplace.

In face of the diversity of factors implied in an analysis of the links between residential tenure status and unemployment duration, we are left without a unique theoretical background in that matter. The objective of this study is thus to provide an analysis of the influence of residential tenure status (owning or renting) of unemployed individuals on their probability of finding another job by using developments from search theory (Mortensen 1986) and its micro-econometric applications (Lancaster 1990). Such an orientation, which aims at including the spatial dimension in job search models, embraces the more general framework of the spatial mismatch analysis [Holzer, Ihlandfeldnet and Sjosquist (1994), Rogers (1997), Van Den Berg and Gorter (1997), Bouabdallah, Cavaco and Lesueur (2002), Wasmer and Zenou (2001, 2002)]. Taking into account housing and its specificities (heterogeneity, spatial fixity, durability) leads to investigate mobility constraints of individuals according to their residential status and their effects on the duration of unemployment.

The plan of this paper is the following. In the first section, problems arising when testing Oswald's hypothesis are reviewed and a procedure of estimation using duration models is suggested. The second section describes the sample main features and offers a first non parametric analysis of distinctive effects of residential status on the hazard rate of leaving unemployment. The third section presents estimation results from parametric duration models that control both the endogenous selection rule that underlies the choice of a residential status and unobserved heterogeneity. The last section concludes by giving research perspectives in the light of the obtained results.

II. Estimation of an unemployment duration model with endogenous residential tenure status.

Assessment of the effect of the residential tenure status on unemployment duration has received little attention in empirical works for two main reasons. Firstly, reasons exposed earlier on explain that interactions between housing and labour markets have become a research subject only recently. Secondly, their measurement confronts with econometric problems that come from the combination of duration analysis and the simultaneity of underlying decision process. We will first give an overview of econometric problems that arise with such an analysis and then present our estimation procedure.

Empirical studies on the effect of homeownership on labour market outcomes

In a recent study, Van Leuvenstein and Koning (2000) use competing risks duration models in order to get insights about the effect of housing market on employment durations of 7, 500 Dutch individuals surveyed between 1989 and 1998. Several types of exit states are examined: transition to another job, entry into unemployment or leaving the labour market. To put it another way, their analysis is about the hazard rate of leaving current position at time t, conditional to being in that position until time t, and entering one of the previously mentioned exit state. Although available data allow to track individual employment or residential status and personal features like age, sex and marital status, the absence of recording for educational attainment leads the authors to adopt a non-parametric procedure that was proposed by Heckman and Singer (1984) to correct for unobserved heterogeneity. This specification is not rejected through different estimations that all come to the same type of results. These contradict mechanisms underlying Oswald's hypothesis in the sense that homeowners have a lower risk of becoming unemployed or exiting the labour market. However, estimations do not take into account potential linkages between the choice of a residential tenure status and decisions relative to labour market participation. The lack of treatment for the simultaneity of behaviours in housing and labour markets suggests that estimated coefficients for the effect of home owning on job duration might be biased.

In contrast to Van Leuvensteijn and Koning (2000) approach, the treatment of the endogeneity of the variable reflecting residential status is central to Green and Hendershott

(2001b) study on U.S. data. In order to examine the effect of homeownership on unemployment duration, the authors adopt a two regimes duration model in which latent variables that are functions of individual features represent choices made as to residential tenure status. Two unemployment duration equations, one for homeowners and one for renters, are then simultaneously estimated while endogeneity of the choice of the residential status is controlled by introducing the appropriate inverse of Mill ratio in each equation.

Results confirm the endogeneity of the residential tenure status variable, which displays a negative but small effect on the hazard rate of leaving unemployment: unemployment durations of homeowners are in average 0.2 months longer than those of renters.

The advantage of the procedure adopted by Green and Hendershott is to put in the first place the question of the endogeneity of the residential status variable and to treat it in a frequently used way through Heckman's method. However, the introduction of the Mill ratio in a duration equation in order to account for individual self-selection implies a particular model specification (that is an accelerated failure time model) and residuals to follow the normal distribution. Besides, estimations conducted by Green and Hendershott do not account for censoring of some of the duration data although it amounts up to 20% of the used sample: censored observations are treated as completed ones or simply deleted which then cause another attrition bias. More generally, taking into account individual selection through a two-regime duration model renders the likelihood function quite hard to express. By referring to the specification adopted in Heckman and Borjas (1980) in the case of complete durations, the authors circumvent this difficulty by choosing a log-linear specification for duration, conditional to a Weibull distribution.

In front of the difficulties and strong restrictions that prevail when estimating a two regime model accounting fort censoring, we adopt a more flexible estimation procedure that allow to control both for censoring and for the endogeneity of the residential tenure status variable and to measure its effect on the length on an unemployment spell. The econometric method is based on the procedure suggested by Heckman and Robb (1985) to deal with self-selection.

Econometric specification

As we shall see in the descriptive statistics of the sample, individual are distributed between three residential tenure status in our sample: homeowner (j=1), renter (j=2) or free of charge housed (j = 3) which mainly concerns young workers leaving at parental home (30 per cent of the sample). So residential tenure status results from a multinomial logit selection equation that conditions its choice (latent variable $M_{ij}*$) to individual characteristics Z_i.

M_{ij}* represents the utility differential that an individual i experiments when comparing utility level alternatively associated to residential status j, denoted by U_{ij}, or $m, j \neq m$, denoted by U_{im}. We have:

$$M_{ij}^* = U_{ij} - U_{im} = \alpha' Z_i + \mu_{ij} \quad , \forall\ j \neq m, j = 1, 2, 3$$

And we observe:

$$M_{ij} = 1 \Leftrightarrow \text{Prob}(U_{ij} > U_{im}) \Leftrightarrow \text{Prob}(Y = j) = \frac{\exp^{\beta_j' Z_i}}{1 + \sum_{m=1}^{J-1} \exp^{\beta_m' Z_i}} \quad , \forall\ j \neq m$$

The discrete selection variable is instrumented by variables Z_i that control for, in addition to individual features, perceived constraints to home owning accession and features of the local housing market. The estimated probabilities $\hat{M}_{ij}$ are then introduced for final estimation in a lognormal parametric duration model[1]. Beyond observable characteristics, the presence of unobservable heterogeneity terms, v_i , is tested, adopting a Gamma distribution[2] for the v_i effects (Greene, 1997, pp.946-947). Under these hypotheses, the following duration model is estimated:

$$DU_i = \left[1 + \frac{1}{\mathrm{k}} \lambda_i \right]^{1-k} .\lambda_i^{-1} \qquad (1)$$

where DUi is the duration of unemployment for individual i, $\frac{1}{k}$ is the Gamma variance of the unobserved component, and λ_i is the log normal hazard rate defined as:

$$\lambda_i = \frac{1}{\sigma t_i} \frac{\varphi(w_i)}{1 - \phi(w_i)} \qquad (2)$$

and:

$$w_i = \frac{\log t_i - \beta X_i - \sum_{k=1}^{3} \gamma_k \hat{M}_{ij}}{\sigma} \qquad (3)$$

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[1] We first estimated different parametric and semi-parametric models in order to evaluate alternative hypothesis regarding the shape of the hazard rate. The comparison between different specifications (Gamma, Weibull, exponential and lognormal) with regards to Akaike information criterion and Cox-Snell residuals shows that the lognormal distribution suits the best the data. The hazard rate of leaving unemployment is thus non-monotonous, first increasing until a peak between the eleventh and twelfth, and then decreasing. In addition, the Cox proportional hazard model is not supported by the data.

[2] v terms are distributed as a Gamma function with mean 1 and variance $\frac{1}{k}$, then $g(v) = \frac{k^k}{\Gamma(k)} e^{-kv} v^{k-1}$ where Γ is the gamma distribution.

where X_i is a vector that represents variables of interest regarding labour market outcomes. Parametric estimation of the duration model under this specification allows to obtain unbiased estimators for β and γ.

The flexibility of this method entails several benefits, especially in our duration models framework: the procedure does not require specific hypothesis on the residuals distribution and allows non-linear transformations. Moreover, the procedure is simple to apply (the matter of having good instruments is still a crucial one as in any instrumentation strategy) and offers a nice economic interpretation, as the instrumented variable that reflects individuals' choices is in its own sake a variable of the econometric model.

The first critique that can be addressed when this procedure is used is that it does not proceed to a rigorous statistical correction of the selection bias, as the estimated probability cannot stand for the inverse of the Mill ratio. The extent to which the estimated probability corrects the bias is then unknown.

The second critique relates to uncertainties about the uniformity of the effect of the endogenous variable that is to be instrumented. Indeed, we implicitly made the hypothesis that, once the bias due to non-randomness of the choice of a residential status is controlled for, the residential status has a similar effect on each sub-group. This allows an estimation of the whole sample average effect of the residential status. However, it is possible to think about individuals living under different residential status experiencing different average effects. This heterogeneity seems the more plausible that we model the decision to choose a particular residential status as a beneficial one. In this kind of heterogeneous model, the instrumental variable estimator can identify the average effect of the residential status only under strong hypothesis and it is necessary to specify the model differently in order to disentangle several parameters of interest. In the homogenous model, these parameters are equivalent and reduce to the average effect on the whole population (Heckman [1990], Blundell and Costa Dias [2002]).

Heckman (1990) provides some elements of response to each of these interrogations relative to Heckman and Robb method. On the one hand, this method has proven efficient for the analysis of unions influence on wages by producing similar results to those obtained from sophisticated procedures. On the other hand, variations of unobservable characteristics between the two sub-groups in the main equation seem to contribute only weakly to the endogeneity of the variable whose effect one wish to measure.

III. Sample description and non-parametric results.

Data that are used in econometric estimations come from three sources. Individual data are from the "Trajectoires des demandeurs d'emploi-Marchés Locaux du Travail" [TDE-MLT] survey carried out by the Research Direction of Employment Ministry [DARES] on a cohort of individuals who entered unemployment between April and June in 1995 and have been traced during thirty-three months. Information about housing costs were extracted from a database built by the Institut National de la Statistique et des Etudes Economiques [INSEE] and Parisian Sollicitors Chamber. They are supplemented by data from the population census of 1999 and from township census of 1988 and 1998 both held by the INSEE.

The sample includes 3,965 individuals and is free of left censoring regarding unemployment duration as the initialisation of the database matches registration by individuals to the national employment agency.

Main descriptive statistics of the sample are presented before we proceed to a non-parametric estimation for the effect of residential status on unemployment duration.

Sample descriptive statistics[3]

The average duration for an unemployment spell is comprised between ten and eleven months. Although 74% of individuals have returned to employment after a complete unemployment spell whose average duration is about seven months, 26% were still unemployed by the end of the survey and had unemployment average duration spell of twenty months. 58% of individuals in the sample receive unemployment benefits.

Educational attainment corresponds to a technical qualification for nearly half of individuals. 18% have a university degree. Last position was a workman one for 44% of individuals and an employee one for 39%. Executives or professional people amount to only 5% of the sample.

Entry into unemployment was due to dismissal for 36% of cases and to contract termination for 46% of cases.

Over 63% of individuals state they dedicate less than 10 hours per week to job seeking, almost 16% do more than 20 hours of job search in a week.

Regarding residential tenure status, 22% of surveyed people are homeowners or acceding this status[4]. Their residential duration is about ten years and 16% of them have financial burden due

[3] All variables are listed in table 1.

[4] The discrepancy between sample and national figures regarding home-owners share lies in the fact that 62% of individuals in the sample are less than 35 years old (see below).

to their main dwelling. Renters represent 48% of the sample. They have been living in their dwelling for less than five years in average and 63% of them receive rent subsidy. 30% of individuals do not incur any charge for their accommodation, among which 95% are young people living in their parents home.

Individuals are spread around eight employment areas that define the scope for most of home to workplace travels: Cergy-Pontoise, Mantes and Poissy-les-Mureaux (Ile-de-France *region*), Roubaix and Lens (Nord *region*), Aix-en-provence, Etang-de-Berre and Marseille (Provence-Alpes-Côte d'Azur [PACA] *region*). Nearly two third of individuals are located in suburbs and more than three quarters have their driving license.

More than 62% of individuals are less than 35 years old, 56% are men, 56% live with somebody and 37% are single. Surveyed individual is the head of the household in 44% of cases, its spouse in 25% of cases and its child in 28% of cases.

Mixing several criterions allow to get first insights into discriminating effects of residential tenure status on unemployment duration as well as individual characteristics that seem to be associated with it. Unemployment durations of homeowners thus seem to be longer than those of renters (almost a year for homeowners whereas renters stay unemployed for less than 11 months). Those who are housed free of charge have shorter unemployment duration that last eight months in average. In the same way, analysing the sample by age group and socio-professional category makes strong differences relative to residential status to appear. Residential status is thus home owns for 50% of executives and professionals, this share declining to 34% for intermediary professions, 20% for workmen and 26% for employees. Age group structure according to residential status is as well much differentiated as almost nobody under 25 years age owns his house, 14% of individuals aged between 25 and 34 are homeowners and this share reaches 42% and 52% respectively between age 34 and 50 and then after age 50.

This simple descriptive analysis highlights that socio-demographic features that may affect labour market performances are as many factors of influence on the residential tenure status. We now proceed to a non-parametric estimation of individual's unemployment duration in order to get preliminary measure of the influence of the residential tenure status on the exit rate of unemployment.

Non parametric analysis

In order to complete sample descriptive analysis, we estimated survival rates in unemployment by means of Kaplan-Meier non-parametric estimator. This allows an examination of survival time in unemployment without taking into account observable heterogeneity between individuals by measuring the instantaneous probability of finding employment (hazard rate) and the survival rate in unemployment. The hazard rate corresponds to the share of individuals who find a job at time t, knowing these individuals have been unemployed until time t. Survival and integrated hazard functions that are evaluated on stratified samples show discriminating effects of residential tenure status on unemployment duration. We thus observe that in average, the survival time in unemployment is, *ceteris paribus*, longer for homeowners (figure 1) than for individual with other residential tenure status. This gap is strengthened by the presence of individuals who are housed with no charge (30% of the sample) and whose survival time in unemployment is always shorter than renters one (figure 2).

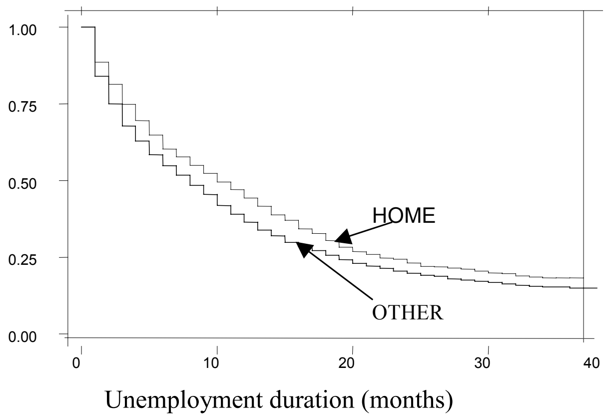

Figure 1 :
Survival Function, by home owning

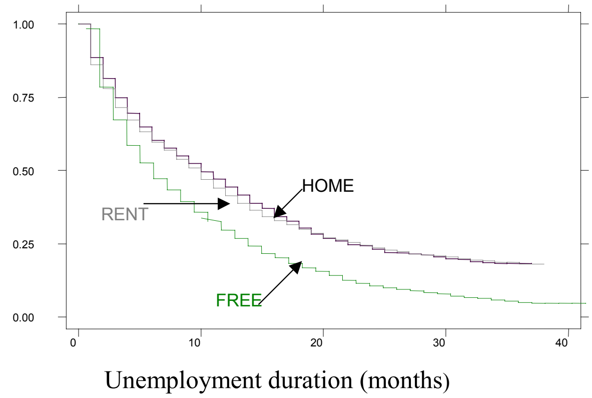

Figure 2 :
Survival Function, by residential status

<u>Legend</u> : HOME : Homeowners, OTHER: Other, RENT: Renters, FREE: Free of charge

Inspection of figures 1 and 2 informs on discriminating effects of residential tenure status and reinforces observed statistical features of average unemployment duration for the three previously mentioned strata. These estimations are however conducted under a strong hypothesis of population homogeneity within each stratum. They must then be enriched by an analysis of unemployment duration that takes count of inter-individual heterogeneity. With respect to developments of section 2, we thus proceed to a parametric estimation of a duration model that controls for the endogeneity of the residential tenure status choice.

IV. Estimation results

Multinomial logit estimation of the residential status choice[5]

In order to control for the endogeneity of the residential tenure status choice, we instrument in a first step the residential status indicator on a set a variables that account for both environmental factors and individual features.

Environmental variables stand for local features of housing market and residence area that influence the choice of the residential status. Firstly, the cost of owning relative to renting is represented by several elements. An index of the average sale price of real estate goods at the township level is introduced. It is computed by taking the mean of sale prices for different types of goods (old and new houses, old and new flats) from 1994 to 1996. To take count of specificities of the housing market in Ile-de-France region, a dummy variable that take value 1 for townships located in this area is coupled with the price index and introduced in the regression. Finally, an index for the cost of renting was obtained by computing the average township rent based on rents that are reported by surveyed individuals. Although this index does not represent the true cost of renting, it is used as a *proxy,* for lack of other available information, as its variations between townships indicate inter-communal differences on the renting market. These price indexes reflect both dwellings intrinsic features, which are not recorded in the survey, and spatial characteristics whose influence can be controlled. We thus introduce distance to the most visited township, distance to jobs and the type of the township where the individual live (rural, suburb, main town or isolated town) as explanatory variables for the decision of being a homeowner. Indicators for housing market tightness are also introduced through a township population index, the rate of vacant dwellings and the share of homeowners in the population at the department level. Considering the distribution of dwellings purchases through time, we control the effect of the speculative bubble that has been affecting the real estate market from 1987 to 1991, especially in Ile-de-France region. Indeed, during this phase, a favourable conjuncture and measures relaxing legal regulation on the real estate market (Méhaignerie law in 1986) were encouraging the development of the speculative bubble that translated into unconventional prices dynamics (Renard, 1996). We thus use in the estimation a binary variable that takes the value 1 for all homeowners that acquired their dwelling during the speculation

[5] The Hausman test does not reject the assumption of independence of irrelevant alternatives.

phase. A specific effect for acquisition in Ile-de-France region during this same period is also introduced.

Among personal characteristics affecting the choice of a residential status, the age when entering the dwelling is introduced to reflect attitudinal variations of individuals along their life cycle with respect to residential status. We also take into account individuals marital status (living in couple or single), household structure (number of households members, mono-parental family), socio-professional category and gender. We use the socio-professional category of the individuals' father as a *proxy* for permanent income, because of positive externalities on children from their parents' level of income and human capital.

Variables reflecting French or European nationality take into account possible differences in residential status preferences as well as potential discrimination towards foreigners. Length of stay in the department when entering the dwelling is introduced to reflect a form of preference for immobility.

Estimations are processed using the White correction so unbiased Student tests can be obtained in case of heteroskedasticity. Estimation results can be found in table 2. The model is overall significant, with a pseudo-R^2 that equals 0.48. Contingency tables indicates that the average percentage of good predictions amounts to 82% among which 66% of "success" event predictions.

As we have a special interest in describing homeowners behaviours, not all of the variables we introduced exert statistically significant marginal effect on individual probabilities of being in all of the three sub-group. Explanatory variables act as predicted on the probability of being a homeowner and most associated coefficients are significant at usual threshold. Nonetheless, we can not recover a significant effect of the variable representing age when entering the dwelling, although this is not the case for the two other sub-groups where it has conventional significant effects. Also, two variables, namely the socio-professional category of the individuals father except if he does not participate in the labour market, and the distance to the most visited township, have non significant coefficients for the three types of residential status.

The index of housing original cost has a regular negative influence on the probability of homeownership once we control the effects of the speculative bubble, except in Ile-de-France region where the effect is positive. Features of the real estate market can explain this unconventional price effect in the Parisian area, where housing prices are highly correlated with housing attributes that we can not control although they are crucial regarding housing acquisition (proximity to schools, public facilities, transportation means, infrastructures level). This is apparent also in the marginal effects exerted by these variables on the probability of renting.

Finally, the cost of renting has a positive effect on the probability of being a homeowner, while the effect is the opposite on the probability of renting.

Spatial variables have expected effects: an increase in the distance to jobs reduces the probability of home owning, while it has no effect on the two other sub-groups. Compared to other localization, suburban localization increases the probability of being homeowner, which is in line with stylised facts of French urban growth in the last decade (Bessy-Pietri 2000). This variable does not affect the probability of being renter or housed free of charged.

Variables that stand for housing market features have also predicted effects: the more populated the township, the less (respectively the more) are individuals homeowners (respectively renters); the rate of vacant dwellings has a positive (negative) influence on the probability of being homeowner (renter), whereas the share of homeowners in the population exerts the opposite effect.

Note that no environmental variables (but one) has any effect on the probability of being housed free of charge.

Living in couple has a positive influence on both the probability of being a homeowner or a renter, whereas being single or in a mono-parental household produces the opposite effect. The probability of being a homeowner is higher for women, French or European individuals, and increases with the number of household members and length of residence in the department.

Social origin variables (one's father socio-professional category) indicate that children of workmen or non-participants have lower probability of being homeowners relative to children of employees. With regard to individual socio-professional category, executives and intermediary professions experience higher probability of being homeowners.

The model global significance indicates potential endogeneity of the residential status variable. We then use the estimated probabilities of living under a particular residential status for each individual in order to evaluate the effect of homeownership on the duration of individual unemployment spells.

Estimation of the unemployment duration model: the effect of homeownership

We estimate the model presented in the second section by introducing the estimated probabilities of being respectively homeowner or renter, denoted by variables "HOMEest" and "RENTest", and we let variable "FREEest" representing people who are housed free of charge be our base category. Besides, we introduce covariates that account for other housing market local and individual features, personal characteristics, job search strategies and unemployment benefits.

Specifically, we take count of housing public subsidies as they are often incriminated as a source of immobility and we let another variable representing the effects of financial constraints that are due to main residence.

Among personal features, we introduce individuals' age, sex, nationality, marital status, educational attainment, last position socio-professional category, reasons of entry into unemployment and possession of a driving licence. The effects of job search strategies are identified through a series of variables that indicate job search intensity. Labour market public policies are represented by a variable that takes value 1 if the individual receives unemployment benefits. Lastly, the employment area an individual belongs to is introduced in the estimation to account for local labour market specificities.

Parameter estimation is done via maximization of the following log-likelihood:

$$\ln L = \sum_{j=1}^{n} \left[\theta^{-1} \ln\{1 - \theta \ln S_j(t_{0j})\} - (\theta^{-1} + d_j) \ln\{1 - \theta \ln S_j(t_j)\} + d_j \ln h_j(t_j) \right]$$

Results are presented in table 3.

The effect of the estimated probability of homeownership on the duration of unemployment is positive and statistically significant at 5% threshold. Our results with French data thus do not reject Oswald's hypothesis, as did not those obtained by Green and Hendershott (2001), though they use a different method of estimation, with U.S. data. Moreover, we do not find any statistically significant difference in the duration of unemployment between renter and people housed free of charge. Thus, mobility costs associated to homeownership seem to have, *ceteris paribus*, a negative effect on the hazard rate of leaving unemployment. Note the divergence of descriptive statistics and Kaplan-Meier estimation from section 3 with results obtained from the estimation of a parametric duration model taking into account endogenous residential status, censoring and unobservable heterogeneity.

Housing subsidy recipients have longer unemployment spells, as do unemployment benefits recipients. People holding a driving license have significantly shorter unemployment periods.

Demographic variables exert conventional effects: living by couple reduces the time spent unemployed, age has a positive and increasing effect on the duration of unemployment, whereas being French or European results in shorter unemployment spell, the effect of the French nationality being stronger.

Job search intensity reduces the duration of unemployment, although coefficients indicate that the marginal productivity of search effort is decreasing. If the reason for leaving last position was a dismissal, individuals experience longer unemployment spell.

Individuals having technical diploma or university degree spend less time unemployed than people having no diploma, the effect of a university degree being of a bigger scope. Besides, individuals who were occupying an employee position have significantly longer unemployment periods than workmen.

Lastly, being in a Parisian or North employment area reduces time spent in unemployment compare to PACA region.

V. Concluding remarks

Macroeconomic stylised facts highlighting a correlation between homeownership and unemployment rates led us to investigate relationships between housing and labour markets at the microeconomic level. The objective was to isolate the influence of homeownership on the duration of an individual unemployment spell.

The necessity of taking into account individuals self-selection regarding their residential tenure status and willingness to use flexible estimation procedures with respect to unemployment duration data made us use an instrumental variables method that was first proposed by Heckman and Robb (1985).

Estimation of a multinomial logit model for the choice of a residential tenure status has revealed the influence of several individual features and was enriched by the introduction of variables reflecting spatial characteristics as well as housing costs.

Having corrected for unobserved heterogeneity, the investigation of the influence of the residential tenure status through different duration models do not reject Oswald's hypothesis. However, the extent to which underlying mechanisms work through individual search effort and/or reservation wage is yet an open question.

Future research thus include a deeper account of individual search behaviour, especially with respect to spatial constraints that are borne during job search, in order to explore links between residential localization, mobility costs due to tenure status and labour market transitions. Structural parameters estimation of a job search model that would include these elements would bring an even more robust test of Oswald's hypothesis.

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Table 1. List of variables

Number of observations is 3, 965

Variable	Mean
DICHOTOMIC VARIABLES :	
HOME: homeowner	0.24
RENT: renter	0.52
FREE: free of charge	0.24
Age when entering the dwelling:	
AGENT1 [0; 16[	0.22
AGENT2 [16; 24[	0.24
AGENT3 [24 ; 34[	0.34
AGENT4 [34 ; 50[	0.18
AGENT5 [50 and over[	0.012
COUPLE: living by couple	0.56
CELIB: being single	0.37
AUTRES (divorced or widowed)	0.08
MONOP: monoparental household	0.11
FEMAR : married women	0.26
CPPLP : father is executive or professional	0.08
PIITP : father has intermediary profession	0.13
EMPYP : father is employee	0.11
INACP : father is non participant	0.01
OUVRP : father is workman	0.54
Distance from home to employment area:	
CENTRE1 : near [0 ; 15 km[	0.46
CENTRE2 : remote [15 ; 45 km[	0.43
CENTRE3 : very remote [45 km and plus[	0.11
Type of the township:	
BANLIEUE : suburb	0.63
RURAL : rural	0.03
VILIS : isolated town	0.04
VILC : main town	0.30
CENSU : uncensored duration of unemployment	0.74
ENFPRO : homeowner’s child in his parents	0.16
CF: financial constraints related to housing	0.16
SPEC : home acquisition from 1987 to 1991	0.23
SPECIDF : home acquis. in IDF from 1987 to 1991	0.09
ALLOCLOG: housing subsidy	0.46
INDEMCHO unemployment benefits	0.58
PERMIS : driving license	0.77
Age : CLASSE1 : [16 ; 25[	0.29
CLASSE2 : [25 ; 34[	0.33
CLASSE3 : [34 ; 50[	0.33
CLASSE4 : [50 and over[	0.05
FRANC : french	0.88
EUROP : european	0.03
FEMME : female	0.46

Table 1. (continued)

Variable	Mean
<u>Search intensity</u> (hours/week) :	
PEURECHE, MOYRECH1:[0; 10[	0.63
MOYRECH2 : [10 ; 20[	0.22
BCQRECH : [20 and over[	0.16
<u>Educational attainment</u> :	
NDIPL : no diploma	0.32
DIPLTEC : technical diploma	0.49
ENSUP : college degree	0.18
<u>Type of previous occupation</u> :	
CPPL :executive or professional	0.05
PIIT : intermediary profession	0.12
EMPY : employee	0.39
OUVR : workman	0.41
<u>Reason of leaving previous occupation :</u>	
PRECA : end of contract	0.46
DEMIS : resignation	0.13
LICEN : dismissal	0.36
OTHER	0.04
<u>Employment area :</u>	
ROUBAIX	0.17
LENS	0.16
CERGY	0.12
MANTES	0.10
POISSY	0.12
MARSEILLE	0.17
AIX	0.09
ETANG	0.07
CONTINUOUS VARIABLES	
HOMEest : homeowner (estimated probability)	0.24
RENTest: renter (estimated probability)	0.53
FREEest: free of charge (estimated probability)	0.23
CHOMDUR : unemployment duration in months	10.41
DEPDUR : length of residence in the department by time of entrance into the dwelling	23
PROINDEX : dwellings sale price index	290
PROIDF : dwellings sale price index in IDF	106
LOCINDEX : renting cost	2436
D : distance to the most visited township	4
POPINDEX : population index	223
VACRES : vacant dwellings rate	6.28
PROPRO: share of homeowners in the population	56
NBMEN : number of household's members	3.59

Table 2. Multinomial logit analysis of residential status choice

	HOME (Home-owning)		RENT (Renting)		FREE (Free of charge)	
Independent variables	Marginal effect	Student Statistic	Marginal effect	Student Statistic	Marginal effect	Student Statistic
PROINDEX : dwellings sale price index	-0.0002	-1.70 *	0.0002	1.51 ns	0.000	0.04 ns
PROIDF : dwellings sale price index in IDF	0.0004	2.88 ***	-0.0003	-2.08 **	-0.000	-0.90 ns
LOCINDEX : renting cost	0.0001	2.77 ***	-0.00006	-2.87 ***	0.000	0.74 ns
SPEC: dwelling acquisition from 1987 to 1991	0.04	1.78 *	-0.019	-0.81 ns	-0.021	-1.73 *
SPECIDF: dwelling acquit in IDF from 1987 to 1991	0.103	2.36 **	-0.143	-3.22 ***	0.041	1.21 ns
D : distance to the most visited township	-0.003	-1.54 ns	0.003	1.34 1ns	0.000	0.12 ns
Distance from home to workplace:						
CENTRE1 : near [0 ; 15 km[= base						
CENTRE2 : remote [15 ; 45 km[	-0.284	-6.88 ***	0.282	6.37 ***	0.002	0.08 ns
CENTRE3 : very remote [45 km and over[	-0.217	-9.49 ***	0.233	7.16 ***	-0.017	-0.65 ns
Type of the township :						
BANLIEUE: suburb	0.038	1.76 *	-0.022	-0.92 ns	-0.016	-1.01 ns
AUTRES: rural, main town, isolated town = base						
IPOP : population index	-0.004	-8.27 ***	0.004	8.40 ***	-0.000	-1.26 ns
VACRES : vacant dwellings rate	0.126	6.37 ***	-0.136	-6.37 ***	0.011	0.83 ns
PROPRO: share of homeowners	-0.016	-2.14 **	0.009	1.14 ns	0.007	1.45 ns
Age when entering the dwelling						
AGENT1 [0; 16[= base						
AGENT2 [16; 24[	-1.158	-2.75 ***	0.303	5.18 ***	-0.146	-6.53 ***
AGENT3 [24 ; 34[	-0.034	-0.53 ns	0.355	5.12 ***	-0.321	-6.76 ***
AGENT4 [34 and over[	-0.050	-0.78 ns	0.249	3.68 ***	-0.199	-7.73 ***
COUPLE : living by couple	0.132	4.37 ***	0.270	5.37 ***	-0.401	-6.93 ***
CELIB : single	-0.147	-4.44 ***	0.012	0.29 ***	0.135	3.71 ***
AUTRES (divorced or widowed) = base						
MONOP : mono-parental household	-0.113	-3.56 ***	0.066	1.86 **	0.047	1.95 **
FEM : female	0.088	4.72 ***	-0.025	-1.23 ns	-0.063	-4.86 ***
NBMEN : number of household's members	0.017	2.90**	-0.070	-9.32 ***	0.053	10.28 ***
FRANC : French	0.127	5.22 ***	-0.176	-6.74 ***	0.049	4.04 ***
EUROP : European	0.225	2.70 ***	-0.353	-5.37 ***	0.128	1.32 ns
DEPDUR : length of residence in the department when entering the dwelling	0.006	8.71 ***	-0.005	-7.07 ***	-0.001	-1.50 ns
CPPLP : father is executive or professional	0.055	1.59 ns	-0.037	-1.08 ns	-0.019	-1.07 ns
PIITP : father is intermediary profession	-0.008	-0.33 ns	0.026	1.08 ns	-0.018	-1.41 ns
INACP : father is non-participant	-0.144	-2.50 **	0.202	3.46 ***	-0.058	-5.64 ***
EMPYP : father is employee	0.032	1.15 ns	-0.037	-1.27 ns	0.005	0.27 ns
OUVP : father is workman= base						
CPPL : executive or professional	0.174	3.55 ***	-1.166	-3.48 ***	-0.008	-0.21 ns
PIIT : intermediary profession	0.074	2.59 ***	-0.033	-1.14 ns	-0.041	-3.31 ***
OUV : workman	-0.051	-2.52 **	0.064	2.92 ***	-0.013	-0.99 ns
EMPY : employee = base						
% of correct predictions	80.58		69		95	
% of correct "success" predictions.	40		73		86	
Pseudo-R²	0.48					
Log Likelihood	-2085.74					
Number of observations	3965					

(***) : significant at 1% ; (**) : significant at 5% ; (*) : signifiacnt at 10% ; ns : non significant

Table 3. Estimation results of the lognormal duration model with Gamma correction

Variable	Coefficients	Student statistic
HOMEest : homeownership (estimated prob.)	0.369	1.96 **
RENTest : rental	0.056	0.58 ns
FREEest : free of charge housed = base		
CF: main home financial constraints	-0.074	- 1.14 ns
ALLOCLOG: housing subsidy	0.222	4.64 ***
INDEMCHO unemployment benefits	0.583	10.48 ***
PERMIS : driving licence	-0.401	-6.34 ***
Age : CLASSE1 : [16 ; 25[= base		
CLASSE2 : [25 ; 34[	0.259	4.24 ***
CLASSE3 : [34 ; 50[	0.561	7.46 ***
CLASSE4 : [50 and over[	1.054	7.22 ***
FRANC : French	-0.371	-3.76 ***
EUROP : European	-0.240	-1.64 ns
FEMALE	0.072	1.29 ns
COUPLE	-0.250	-3.27 ***
Search intensity (hours/week) ::		
PEURECHE, MOYRECH1:[0; 10[= base		
MOYRECH2 : [10 ; 20[	-0.157	-2.95 ***
BCQRECH : [20 and over[	-0.141	-2.33 **
Educational attainment :		
NDIPL : no diploma = base		
DIPLTEC : technical diploma	-0.168	-3.50 ***
ENSUP : university degree	-0.245	-3.78 ***
Socio-professional category of last position :		
CPPL :executive or professional	0.106	0.92 ns
PIIT : intermediary profession	0.055	0.76 ns
EMPY : employee	0.250	4.25 ***
OUVR : workman = base		
Reason for leaving last position :		
PRECA : end of contract	-0.148	-1.21 ns
DEMIS : resignation	0.098	0.75 ns
LICEN : dismissal	0.274	2.20 **
OTHER = base		
Employment area:		
ROUBAIX	-0.432	-6.32 ***
LENS	-0.233	-3.23 ***
CERGY	-0.421	-6.09 ***
MANTES	-0.311	-3.78 ***
POISSY	-0.394	-5.48 ***
MARSEILLE/AIX/ETANG = base		
CONSTANTE	2.199	12.42 ***
Ln(sigma)	0.176	12.77 ***
Ln(theta)	-22.45	-48.37 ***
Sigma	1.19	
Thêta	1.77×10^{-10}	
Log Likelihood	-4554.10	
Number of observations	3280	
Wald χ^2	729.36	

(***) : significant at 1%, (**) : significant at 5%, (*) : significant at 10%, ns : non significant