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UNIVERSITY OF AARHUS • DENMARK

INSTITUT FOR ØKONOMI

AFDELING FOR NATIONALØKONOMI - AARHUS UNIVERSITET - BYGNING 322
8000 AARHUS C - ☎ 89 42 11 33 - TELEFAX 86 13 63 34

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SCHOOL OF ECONOMICS AND MANAGEMENT - UNIVERSITY OF AARHUS - BUILDING 350
8000 AARHUS C - DENMARK ☎ +45 89 42 11 33 - TELEFAX +45 86 13 63 34

Are Home Owners Really More Unemployed?*

Jakob Roland Munch†
Danish Economic Council

Michael Rosholm
Department of Economics
University of Aarhus

Michael Svarer
Department of Economics
University of Aarhus

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Abstract

This paper investigates the effects of home-ownership on labour mobility and unemployment duration. We distinguish between finding employment locally or by being geographically mobile. We find that home ownership hampers the propensity to move for job reasons but improves the chances of finding local jobs, which is in accordance with the predictions from our theoretical model. The overall hazard rate into employment is higher for home owners, such that there is a negative correlation between home-ownership and unemployment duration. Our empirical findings thus lend some support for the main mechanism behind the so-called Oswald hypothesis, even if it does not find positive correlation between unemployment duration and home ownership at the individual level.

Keywords: Home ownership, labour mobility, unemployment duration.

JEL Classification: C41, J61, J64, R23

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†Address: Danish Economic Council, Adelgade 13, DK-1304 Copenhagen, Denmark; Tel.: +45 3393 5129-47; Fax: +45 3332 9029; E-mail: jrm@dors.dk

1 Introduction

European countries have been plagued by relatively high levels of structural unemployment for decades, and one proposed explanation for this is the low mobility of labour between European countries. The low mobility of workers in Europe is a well established fact and is typically attributed to cultural and linguistic differences. However, these differences cannot explain that European countries also have relatively low internal migration rates. Alternative explanations have been put forward, and this paper is concerned with one such explanation. Oswald (1996) presents evidence that the unemployment rate and the share of home owners are positively correlated for a number of countries and regions. The proposed mechanism is that home owners are much less mobile than renters due to costs associated with buying and selling their home, and so they are relatively inflexible in the labour market. Thus, if the home owner share is high, then the work force is immobile, which tends to give higher structural unemployment due to insufficient supply of labour. In his original work Oswald presented evidence showing that countries or regions with 10 percentage points higher share of home owners have a two percentage points higher unemployment rate.

Home owners in most western countries receive favourable tax treatment of the capital invested in their homes (see Hendershott & White (2000)), which, *ceteris paribus*, tends to raise the share of home owners. In light of this it is not surprising that Oswald's hypothesis has received considerable attention, and it has been investigated more thoroughly in subsequent studies. Nickell & Layard (1999) show in an analysis for 20 OECD countries that when other explanatory covariates are included (such as unionization rate, coverage rate, degree of wage coordination, replacement rate of UI benefits, duration of UI benefits) then the effect of home ownership is reduced from 2 to around 1.3 percentage points. In addition, Green & Hendershott (2001*b*) have carried out an extended analysis for states in the US and find that the relationship only holds for households with middle aged individuals. In the present study we also present aggregate data for Danish regions that supports the Oswald hypothesis to some extent.

The studies mentioned above all use aggregate data to draw inference on individual behavior. In order for their conclusion to prevail the positive association between ownership and unemployment should be established on individual data, which is the subject of this paper. Specifically, we investigate whether the positive correlation found between aggregate unemployment and home ownership arises from a positive correlation between unemployment duration and home ownership on the individual level, which is the hypothesized cause of the correlation in aggregate data.

The main novelty of our analysis is the recognition that while home ownership may reduce geographical mobility and the willingness to move for jobs, there is a countervailing effect; in order to avoid having to move, individuals will set lower reservation wages for accepting jobs in the local labour market. This is likely to increase the transition rate into employment locally, and lower the transition rate into employment outside the local labour market. The net effect on unemployment depends on the empirical magnitudes of each of these two effects. We demonstrate this in a very stylized job search model. The theoretical finding that home owners are less inclined to be geographically mobile and therefore have longer spells of unemployment is the main mechanism proposed behind the Oswald hypothesis. In empirical work, the lesson from the theoretical model emphasizes the importance of distinguishing between jobs found in the local labour market (not involving a change of residence) and in distant labour markets (where a change of residence would be necessary). Using a very rich register based data set of Danish workers' event histories, we test the theoretical predictions in a competing risks duration model with two different employment destinations from unemployment; local jobs, and jobs outside the local labour market.

We are not the first to look at this issue from a micro data perspective, but there are only a few recent studies that have done so, and none of them consider competing risks. Coulson & Fischer (2002) test the hypothesis that owners have poorer labour market outcomes than renters on PSID data from the U.S. Both in terms unemployment duration and wages they find that this is *not* the case. On the contrary they find that home owners fare much better than renters in the labour market. Coulson & Fischer (2002) can be criticized on one major point. They do not consider the potential selection bias issue that is present. This selection bias can arise because some households are inherently less mobile than others (e.g. they could have a preference for stability), and such households are more likely to choose owner occupation, as the fixed costs associated with buying and selling a house is amortized over a longer period, and so user costs are lower. In the event of unforeseen unemployment these households might be less willing to move for a job, but this is not because of their choice of housing. Rather, it should be attributed to the household's preference for stability. In other words tenure choice is endogenous to the process that describes individual labour market transitions and failure to take that into account can result in inconsistent estimates of the effect of ownership on the escape rate from unemployment.

A number of studies have addressed the potential selection bias issue. Green & Hendershott (2001*a*) (also using U.S. PSID data) and Brunet & Lesueur (2003) (using French micro data) use a modified version of Heckman's selection model to purge the empirical

model for endogeneity. Specifically, they estimate the probability of being home owner and use the predicted value in a duration model for spells of unemployment. Both studies obtain estimates that support the Oswald hypothesis. A major concern in these studies is the way in which they try to correct for selectivity bias. This is also acknowledged by Brunet & Lesueur (2003) who state that their procedure does not proceed to a rigorous statistical correction of selectivity bias. A rigorous statistical procedure to correct for selectivity bias is applied by Leuvensteijn & Koning (2003). They consider different mechanisms to explain the Oswald hypothesis, and analyze the duration of job spells in the Netherlands while explicitly controlling for selection bias by simultaneously estimating a binary choice equation for the selection into home ownership and transitions in the labour market. The selection into home ownership is allowed to be correlated with the duration of employment by specifying a bivariate distribution for two unobserved variables, one of which affects the selection process and the other the duration of employment spells. They suggest that the negative correlation between home ownership and unemployment could be attributed to owners' lower job mobility and their increased risk of becoming unemployed. After correcting for self-selection into home ownership they find that home ownership has no significant impact on job-to-job mobility and that employed home owners have a lower probability of becoming unemployed, i.e. they find no empirical support for these alternative mechanisms behind the hypothesis.

We address selection bias in a model that is similar to Leuvensteijn & Koning (2003). The selection into home ownership is allowed to be correlated with the duration of unemployment by specifying a bivariate distribution for two unobserved variables, one of which affects the selection process and the other the hazard rate into employment. In order to identify the causal relationship between home ownership and unemployment duration we apply - and (informally) test the validity of - exclusion restrictions.

As mentioned above, to accommodate for the theoretical predictions in our empirical framework we estimate a competing risks duration model with two destination specific hazard rates for the transitions from unemployment to employment locally or employment in a geographically distant labour market. In line with the hypothesis home ownership should have a negative effect on the transition rate from unemployment to jobs involving geographical mobility.

We also investigate whether the overall effect of home ownership on unemployment duration is positive, since this is what the correlations found in aggregate data suggest. According to our search model the effect of home ownership on the local job hazard rate should be positive, so the negative effect on the 'mobility' hazard should dominate the positive effect on the local job hazard.

We find that home ownership indeed lowers the propensity to move geographically for jobs while unemployed. Also in line with expectations home ownership is shown to have a positive effect on the probability of finding employment in the local labour market. However, this positive effect on the hazard rate out of unemployment in the local labour market dominates the negative effect on the mobility hazard, such that the overall hazard rate is higher for home owners. Thus we find empirical support for the main mechanism behind the Oswald hypothesis, but we also find that there is a negative overall correlation between home ownership and unemployment duration which contrasts to the findings from other studies. However, the theoretical model suggests an explanation for this; in countries where geography, history or culture facilitate/necessitate higher geographical mobility for reasons unrelated to home ownership (think of USA vs. continental European countries), it is possible that the effect on the 'mobility' hazard dominates in the overall effect of home ownership on unemployment duration, whereas the opposite may be the case in countries with low 'innate' geographical mobility. This line of argument also illustrates how the macro data correlation found in some of the above mentioned studies may reflect spurious correlation rather than causality: if innate geographical mobility is high, the fraction of home owners will be low. On the other hand, when mobility is high, geographical mismatches in labour demand and supply are more easily accommodated, and hence unemployment will be low.

The rest of the paper is organized as follows. The next section sets up the theoretical search model. Section 3 describes data and briefly characterizes the Danish labour and housing markets. Section 4 sets up the empirical model and section 5 presents the estimation results. Section 6 concludes.

2 Theoretical model

This section sets up a two-region job search model in order to present the main idea of the paper formally. There are two labour markets, a local labour market and a national labour market, excluding the local market. We assume that the two regions are geographically separated, so workers must live and work in the same region, i.e. commuting is not possible. Let the arrival rate for job offers in the local labour market be α_l and denote the arrival rate for job offers in the national labour market α_n. The wage offer distribution, $F(w)$, is taken to be identical for the two regions. While unemployed workers receive unemployment insurance (UI) benefits, b, and the discount rate is ρ. Jobs are assumed

to last forever, implying that the asset value of employment with wage rate w is

$$V^E(w) = w/\rho. \tag{1}$$

Consider first a situation where the unemployed can move residence between the two regions without incurring any moving costs. Think of this as living in rented housing.[1] Following standard search theory the expected discounted lifetime income for an unemployed, V^U, can be expressed as the solution to the asset pricing equation

$$\rho V^U = b + (\alpha_l + \alpha_n) \int_{w^*}^{\overline{w}} \left(\frac{w}{\rho} - V^U \right) dF(w), \tag{2}$$

where w^* is the reservation wage. Such a reservation wage exists because the value of employment increases in the wage, w, whereas the value of unemployment does not, i.e. employment is more favourable than continued search for wages above w^*. The reservation wage can be expressed as

$$w^* = b + \frac{\alpha_l + \alpha_n}{\rho} \int_{w^*}^{\overline{w}} (w - w^*) dF(w). \tag{3}$$

Clearly, in this simple setup, an unemployed worker living in rental housing is indifferent between accepting a job locally or in a geographically distant region, and hence the reservation wage is the same for accepting a job offer in the two labour markets.

Now, if the unemployed worker lives in owner occupied housing, then accepting a job offer outside the local labour market involves costs associated with selling the house and buying a new one (or finding a rental apartment), c, since the worker must migrate to the new region. In this case the expected discounted lifetime income becomes

$$\rho \tilde{V}^U = b + \alpha_l \int_{w_l^*}^{\overline{w}} \left(\frac{w}{\rho} - \tilde{V}^U \right) dF(w) + \alpha_n \int_{w_n^*}^{\overline{w}} \left(\frac{w}{\rho} - c - \tilde{V}^U \right) dF(w), \tag{4}$$

where the reservation wage for the local labour market is defined by $w_l^* = \rho \tilde{V}^U$, while the reservation wage for jobs outside the local labour market is defined by $w_n^* = \rho \tilde{V}^U + \rho c$. Thus, the reservation wage for jobs outside the local labour market is larger than the reservation wage for local jobs, since the unemployed must be compensated for the costs of moving.

To determine the size of w^* relative to w_l^* and w_n^*, equation (4) is rewritten

$$w_l^* = b + \frac{\alpha_l}{\rho} \int_{w_l^*}^{\overline{w}} (w - w_l^*) dF(w) + \frac{\alpha_n}{\rho} \int_{w_n^*}^{\overline{w}} (w - (w_l^* + \rho c)) dF(w) \tag{5}$$

[1] The assumption of zero mobility costs for renters is for simplicity only. It is sufficient for the model's predictions that the costs of moving are larger for home owners than for those living in rented housing.

Consider first the sign of $w^* - w_l^*$. After rearranging terms, we obtain

$$\begin{aligned} w^* - w_l^* &= \frac{\alpha_l + \alpha_n}{\rho}\left[\int_{w^*}^{\overline{w}}(w - w^*)dF\,(w) - \int_{w_l^*}^{\overline{w}}(w - w_l^*)dF(w)\right] \\ &\quad + \frac{\alpha_n}{\rho}\int_{w_l^*}^{w_n^*}(w - w_l^*)dF(w) + c\alpha_n[1 - F(w_n^*)]. \end{aligned} \tag{6}$$

Now assume $w_l^* \geq w^*$. The term in square brackets is then positive since the option value of search is declining in the reservation wage. The other terms are positive as well, so by contradiction we must have $w_l^* < w^*$.

We can write w_n^* in the following way:

$$w_n^* = \rho c + b + \frac{\alpha_l}{\rho}\int_{w_l^*}^{\overline{w}}(w - (w_n^* - \rho c))dF(w) + \frac{\alpha_n}{\rho}\int_{w_n^*}^{\overline{w}}(w - w_n^*)dF(w) \tag{7}$$

Consider now the differential $w_n^* - w^*$:

$$\begin{aligned} w_n^* - w^* &= \rho c + \frac{\alpha_l + \alpha_n}{\rho}\left[\int_{w_n^*}^{\overline{w}}(w - w_n^*)dF(w) - \int_{w^*}^{\overline{w}}(w - w^*)dF\,(w)\right] \\ &\quad + \frac{\alpha_l}{\rho}\int_{w_l^*}^{w_n^*}(w - w_l^*)dF(w) + c\alpha_l[1 - F(w_n^*)]. \end{aligned} \tag{8}$$

Assume that $w_n^* \leq w^*$. Again the term in square brackets is then positive, and the other terms are positive as well, so by contradiction we must have $w_n^* > w^*$. That is, we now have the following result:

Proposition 1 $w_l^* < w^* < w_n^*$.

Home owners' reservation wage for jobs outside their local labour market is higher than the reservation wage of renters, because home owners have to cover their moving costs. Since fewer job offers from outside their local labour market are acceptable, home owners try to avoid having to move by reducing their reservation wage for jobs in the local labour market.

To see how moving costs associated with owner occupied housing affect individual transitions from unemployment we first state the hazard rate out of unemployment to a job in the local labour market, θ_l, and the hazard rate to jobs involving geographical mobility, θ_n, for renters with no moving costs:

$$\theta_l = \alpha_l(1 - F(w^*)) \qquad \text{and} \qquad \theta_n = \alpha_n(1 - F(w^*)). \tag{9}$$

The exit rate from unemployment is the product of the arrival rate of job offers and the probability that the offer is accepted. For owners the relevant hazard rates for exit to a new job in the local labour market and the national labour market, respectively, are

$$\tilde{\theta}_l = \alpha_l(1 - F(w_l^*)) \qquad \text{and} \qquad \tilde{\theta}_n = \alpha_n(1 - F(w_n^*)). \tag{10}$$

It follows that $\tilde{\theta}_l > \theta_l$ and $\tilde{\theta}_m < \theta_m$, so unemployed workers in owner occupied housing have higher transition rates into employment in the local labour market, while they have lower transition rates into jobs in regions outside the local labour market.

Oswald's hypothesis states that home ownership is the cause behind the observed positive correlation between home ownership rates and unemployment in aggregate data. In our framework this implies that the overall hazard rate out of unemployment should be higher for renters than for owners, or $\theta_l + \theta_n > \tilde{\theta}_l + \tilde{\theta}_n$. However, according to the model it is easy to see that the validity of this claim depends on the relative size of α_l and α_n, and the relative sizes of $F(w_l^*) - F(w^*)$, and $F(w_n^*) - F(w^*)$, which is an empirical question. It is clear that factors such as the geographical layout of a country, the spatial distribution of industries, cultural and linguistic differences between regions etc. are expected to also affect geographical mobility and therefore the offer arrival rate α_n.

Of course there may be other effects of home ownership on the labour market. First, the willingness to commute, and hence realised commuting distance, should be greater for unemployed workers who are home owners. Second, by setting a lower reservation wage for local jobs, unemployed workers accept matches with lower productivity (lower wages). This implies an efficiency loss for the economy as a whole. Moreover, it implies that employed individuals in owner occupied housing units will conduct more on-the-job search, *ceteris paribus*, because they have more to gain from doing so. However, it is beyond the scope of this paper to analyse these effects in depth.

3 Data and the Danish labour and housing markets

The Danish labour market is characterized by having a high turnover rate, which is due to weak employment protection and high unemployment benefit replacement rates. At the same time the labour market is highly unionized and the wage structure is very compressed. Also active labour market measures play an important role, and in a review of active labour market policies in Europe Kluve & Schmidt (2002) finds that the extent of participation in active labour market programmes in Denmark stand out. The geographical mobility of both employed and unemployed workers is modest, and regional migration rates are in the low end compared to other continental European countries, cf.

OECD (2000) and Danish Economic Council (2002).[2] For the unemployed 50 percent of migration costs can be reimbursed if they move to get a job, but the lack of mobility is illustrated by the fact that only 26 applications for reimbursement were accepted in the first quarter of 2002. Furthermore, since 1994 migration rates have declined somewhat even if regional unemployment disparities have been constant or rising.

The Danish housing market is comprised of four different main segments. The largest part is owner occupied housing with somewhat more than 50 % of all housing units. Private rental housing and social housing each contribute with almost 20 % and cooperative housing account for 6 % of the housing stock. The alternative to being an owner is to rent, and of particular relevance here is that the markets for private rental housing, social housing and cooperative housing are heavily regulated by rent controls. For the private rental market Munch & Svarer (2002) show that rent control seriously distorts mobility as tenancy duration is longer the more regulated the dwelling is.

To investigate the causes behind mobility of unemployed workers in Denmark a very rich data set, which is drawn from administrative registers, is employed. The data set is a flow sample of all unemployment spells in the years 1997-2000 for individuals in a 2.5 % random sample of the Danish population. The sample has been restricted to include only the inflow to unemployment of workers in the age group 19-66 years. The duration of each unemployment spell is known in weeks, and the subsequent destination state (new job locally, new job in another geographic area, other states than employment and unemployment) is known as well. In addition there is access to information on a number of demographic and socio-economic variables for each individual.

The local labour markets between which migration takes place are so-called commuting areas, that are defined such that the internal migration rate is 50 % higher than the external migration rate, cf. Andersen (2000). The commuting areas are based on geographically connected municipalities, and the 275 municipalities in Denmark are merged into 51 such commuting areas. An unemployed worker is then defined to be geographically mobile if he or she gets a job and moves to another commuting area up to 8 weeks before and 52 weeks after the beginning of the job spell.[3] This definition is based on the fact that the majority of all moves take place within this interval reflecting that workers typically first accept a new job and then search for a permanent new residence. Gregg,

[2]The continental European countries with the highest regional migration rates are the Netherlands (1.61%, 12 regions), Sweden (1.61%, 8 regions), and France (1.49%, 22 regions), while the lowest migration rates are found in Italy (0,50%, 20 regions), Czech Republic (0.55%, 8 regions), and Spain (0.60%, 17 regions). Depending on the regional definition the numbers for Denmark are 0.61% (2 regions) and 1.32% (5 regions).

[3]Exact moving dates are known for all individuals.

Machin & Manning (2003) find a similar pattern for the UK.

In the data there are 18,992 persons with at least one unemployment spell and altogether there are 52,738 unemployment spells. Of these only 653 (or 1.2 %) end with employment in another local labour market. Table 1 reports descriptive statistics for the individual characteristics behind the spells.

Insert Table 1 about here

The explanatory variables used in the econometric analysis are first of all an indicator for being a home owner, the age of the worker, gender, number of dependent children (aged 0-17), whether the person lives in a two-adults household, wether or not the person is an immigrant from a non-OECD country, the size of the municipality, the educational level of the worker, whether or not the person is a member of an unemployment insurance fund, and finally, if so, the UI replacement rate.

3.1 Share of home owners and level of unemployment

The Oswald hypothesis is based on the positive correlation between the share of home owners in a given country or region and the corresponding level of unemployment found in various aggregate data sets. Before we investigate the hypothesis on micro data, we take a look at some aggregate data for Denmark. In Table 2 we show the Pearson coefficient of correlation between the share of home owners in each municipality in Denmark (there are 275 different municipalities) and the level of unemployment in the region. We do not have access to level of unemployment on the municipal level. Instead we use a measure of regional unemployment constructed by the Institute for Local Government Studies in Denmark. The measure gives the unemployment rate in an area around the municipality. The area is defined by how far an individual living in a given municipality can commute without having a daily cost associated with commuting that exceeds 60 Danish kroner (corresponds to approximately 9 Euros in 1987 prices). The data is available in the period 1987-2000.[4]

Insert Table 2 about here

From 1987 to 1993 our aggregate data supports the finding in Oswald (1996) and Nickell & Layard (1999). After 1993 the relationship is insignificant. In the observation period of the micro data, 1997-2000, the correlation is either zero or positive, albeit not

[4] We are grateful to Leif Husted at the Institute for Local Government Studies for providing us with these data.

significantly positive. In 2000 the correlation is positive and significant at the 10% level. Thus, this correlation pattern is roughly in accordance with the aggregate data sets that have been used to support the Oswald hypothesis. To investigate whether the pattern reflects causality or is caused by 'spurious' correlation, we will now turn to an analysis of the patterns actually found in the micro-data.

3.2 Non-parametric hazard functions

In order to obtain a first impression of the association between home owner status and unemployment duration we plot different Kaplan-Meier estimates of the escape rate from unemployment. In Figure 1 we show the non-parametric single risk hazard functions for moving from unemployment to employment. We distinguish between owners and non-owners.

Insert Figure 1 about here

It is seen that owners have a consistently higher escape rate from unemployment than non-owners. This first raw picture is at odds with the Oswald hypothesis. The picture is, however, in line with Coulson & Fischer (2002) who show – based on US micro data – that home owners have better labour market outcomes than renters. Compared to Brunet & Lesueur (2003) who investigate the same issue on French micro data the results are not aligned. In the French labour market owners experience unconditionally longer unemployment periods than non-owners. We will not discuss the diverging results any further at this stage. Instead, we will present Kaplan-Meyer estimates of the competing risks hazard functions. Figure 2 presents the hazard functions for moving from unemployment to a job in the local labour market.

Insert Figure 2 about here

Once more, it is clear that owners have a higher escape rate than non-owners, which is in clear accordance with the theoretical model presented in Section 2. In Figure 3 we show the hazard functions for finding employment in geographically distant labour markets. In this case the non-owners have a higher escape rate. This picture is in accordance with both the theoretical model and also with the main contents of the Oswald hypothesis, namely that owners experience higher degree of unemployment because they are less geographically mobile. The difference between the two hazard functions beyond 12 months is not statistically significant.

Insert Figure 3 about here

In the remainder of this paper we take a closer look at the relationship between home ownership and unemployment duration. Specifically, we investigate whether home ownership is endogenous with respect to the unemployment process, and if so, whether that is the reason we observe a negative association between home ownership and unemployment duration in the raw data.

4 Econometric model

In order to investigate the effect of home ownership on unemployment duration we apply an empirical model that is quite similar to that applied by Leuvensteijn & Koning (2003). The part of the model that describes transitions in the labour market is specified as a competing-risks mixed proportional hazard model. Two transition rates out of unemployment are modelled; the unemployed can leave unemployment for a job locally (l) and for a job in another local labour market by being mobile (n). All other destinations (e.g. out of the labour force) are treated as right censored observations. Each destination specific hazard $j = l, n$ is the product of the baseline hazard, which captures the time dependence in the hazard rate, a function of observed characteristics, x, a time varying indicator for ownership status, z_t, and unobserved characteristics, υ_j

$$\theta_j\left(t|x, z_t, \upsilon_j\right) = \lambda_j\left(t\right) \cdot \exp(\beta_j' x + \gamma_j z_t + \upsilon_j), \tag{11}$$

where $\lambda_j\left(t\right)$ is the baseline hazard and $\exp(\beta_j' x + \gamma_j z_t + \upsilon_j)$ is the systematic part of the hazard. The baseline hazards are specified flexibly as both $\lambda_l(t)$ and $\lambda_n(t)$ have a piecewise constant specification, such that they are constant within duration intervals.

To account for possible endogeneity of the home ownership variable, z_t, we simultaneously model the selection process into home ownership and the transition rates out of unemployment. The selection process into home ownership depends on explanatory variables, x_h, and an unobserved component, υ_h, and is specified as a logit model. That is, the probability of being a home owner is

$$P(x_h, \upsilon_h) = P(z_t = 1|x_h, \upsilon_h) = \frac{\exp(\beta_h' x_h + \upsilon_h)}{1 + \exp(\beta_h' x_h + \upsilon_h)}. \tag{12}$$

The list of explanatory variables in x_h includes all covariates in the hazard rates, x, plus one or more valid instrumental variables that influence the selection process into home ownership, but that have no significant impact on the transition rate from unemployment to employment. A similar approach has been applied by Holm (2002) in a different setting. Our test procedure used to choose among potential instruments is the following. All

potential instruments are included in the selection equation and then they are included in the hazard rate one by one. In the final model only those variables that have a significant effect on the selection into home ownership and an insignificant effect on the transition from unemployment to employment remain.

The direct effect of home ownership on the transition out of unemployment might even be identified without any exclusion restrictions because there are multiple unemployment spells for many persons. As discussed by Lillard, Brien & Waite (1995), the existence of multiple spells means that the terms for unobserved heterogeneity in the selection equation and the unemployment hazard capture "within person" effects. When the correlation between these two individual effects is accounted for, the effect of home ownership on the unemployment hazard is purged of the effects of self-selection into home ownership. Hence, the causal relationship between home ownership and unemployment duration is identified.

The individual contribution to the likelihood function in our model is

$$\begin{aligned}\mathcal{L} \;=\; & \int\int\int P(x_h,\upsilon_h)^{z_t}(1-P(x_h,\upsilon_h))^{1-z_t}\cdot\theta_l\left(t|x,z_t,\upsilon_l\right)^{d_l}\cdot\theta_n\left(t|x,z_t,\upsilon_n\right)^{d_n} \\ & \cdot\exp\left(-\int_0^t\theta_l\left(s|x,z_t,\upsilon_l\right)ds-\int_0^t\theta_n\left(s|x,z_t,\upsilon_n\right)ds\right)dG(\upsilon_l,\upsilon_n,\upsilon_h), \qquad (13)\end{aligned}$$

where d_l and d_n are destination indicator variables for the unemployment hazard rates (thus also taking into account censoring of the duration variable), and $G(\upsilon_l,\upsilon_n,\upsilon_h)$ is the joint cdf of the unobservables. We use a flexible and widely applied specification of the distribution of the unobservables; it is assumed that υ_l, υ_n and υ_h each can take two values, where one of the support points in each destination specific hazard is normalized to zero (i.e. $\upsilon_{l1}=0$ and $\upsilon_{n1}=0$), because the baseline hazard acts as a constant term in the hazard rates. Thus, there are eight possible combinations of this trivariate unobserved heterogeneity distribution, each with an associated probability. For more details on this class of mixture distributions in duration models, see e.g. van den Berg (2001).

5 Results

This section first presents estimation results of a simplified version of the duration model, where no distinction is made between finding employment locally and finding employment by being mobile (i.e. a single risk duration model), but where the selection into home ownership is accounted for. The first two columns in Table 2 show estimated coefficients and their standard errors of the unemployment hazard while column three and four contain parameter estimates and standard errors of the selection equation. As an instrumental

variable in the selection equation we use the share of home owners in the municipality. This variable is valid in the sense that it strongly influences the propensity to be a home owner but has no significant effect on the hazard rate out of unemployment (see Table B1 in the Appendix).[5] Following the test procedure described in the previous section we have also tried other instruments, such as the share of home owners in the municipality in which the unemployed worker was born, and the ownership status of the unemployed workers parents in 1980, but these variables also had a significant impact on the unemployment hazard. Leuvensteijn & Koning (2003) also use regional home owner shares as instrument in their analysis of job durations in the Netherlands[6], while Green & Hendershott (2001*b*) use US state dummies in their selection equation. However, none of these studies test for validity of their instruments.

Insert Table 3 about here

With respect to other explanatory variables in the selection into home ownership, it is seen that older workers and households with two adults as expected are more likely to be home owners. Also, individuals living outside Copenhagen are more likely to own their home and individuals with vocational education are more often home owners than individuals in other education groups. Uninsured workers are less inclined to own, while UI fund members are less likely to be home owners the higher the benefit replacement rate they have. Since the UI has a quite low ceiling, this basically means that the wage is positively correlated with home ownership.

From the first column of Table 2 we conclude that home owners have a higher transition rate from unemployment to employment than renters. That is, owners have, *ceteris paribus*, shorter spells of unemployment, and this contradicts the positive correlation observed in aggregate data by Oswald (1996), and in our own regional data, see Section 3.1 above. This suggests that there may be unmeasured features of countries and/or regions, correlated with both the aggregate unemployment rate and the fraction of home owners, such that the correlation found in those studies is spurious. Alternatively, the causal relationship does not arise through unemployment duration, but rather through

[5] The parameter estimate of the home-ownership variable only changes marginally when the instrumental variable is left out of the model. This indicates that identification of the effect is obtained through multiple unemployment spells and "within person" effects, cf. the discussion in the previous section.

[6] As noted by Leuvensteijn & Koning (2003) using a variable related to group behaviour as instrument can cause problems in identification of causal relationships. However, they argue (as we do) that the group level in question (municipalities in our case) is not disaggregated enough to affect individual behaviour. For further details on this point see Leuvensteijn & Koning (2003).

job durations. The latter explanation, however, is rejected by Leuvensteijn & Koning (2003) on Dutch data.

With respect to other covariates it is noted that age has a negative effect on the hazard rate and women also have a lower hazard rate. Education improves the chances of escaping unemployment and the replacement rate of unemployment benefits has a negative effect, which is a standard result.

The unobserved heterogeneity terms in the selection equation, v_h, and in the hazard rate, v_e, are clearly correlated, so it is of importance to correct for selectivity. However, when the model is estimated without correction for selection into home ownership the coefficient to home ownership in the hazard is still significantly positive, but somewhat surprisingly it is lower (see Table B2 in the appendix). This means that there is a negative correlation between unobserved components in the two equations, such that unobserved characteristics that makes the unemployed more likely to be a home owner also have a negative effect on the transition rate out of unemployment.

The single risk hazard model offered no support for the Oswald hypothesis, but the main mechanism behind the hypothesis is that home owners' geographical mobility should be reduced, so the next step is to estimate the competing risks duration model where a distinction between finding a job by being geographically mobile and finding a job in the local labour market is made. The first two columns of Table 3 show estimated coefficients, β_n, and their standard errors in the hazard for finding a job in another region while columns three and four contain those of the local job hazard, β_l. Columns five and six contain parameter estimates of the selection equation.

Insert Table 4 about here

Before turning to the relationship between home ownership and unemployment duration we offer some comments on the effects of other covariates. Most variables seem to have a stronger impact on the mobility hazard than on the local job hazard. For example having children reduces the local job hazard by 35 % ($= exp(-0.43) - 1$) but it reduces the mobility hazard by 57 %. Interestingly, some variables have opposite effects on the two destination specific hazard rates. Unemployed workers living in households with two adults have a higher local job hazard but a lower mobility hazard than single workers. Living outside the Copenhagen metropolitan area has a strong positive effect on the mobility hazard, while it has no or a negative effect on the local job hazard. This is probably because of thin market effects, since the Copenhagen metropolitan area is by far the largest local labour market. It should also be noted that the estimated destination specific hazard rates exhibit negative duration dependence (except for the first couple of

weeks for the mobility hazard), i.e. they are declining with unemployment duration, cf. Figure 4. Figure 4 also reveals that the mobility hazard is much lower than the local job hazard reflecting that geographical mobility is a rather rare phenomenon in the Danish labour market.

Insert Figure 4 about here

Home ownership has the expected effect as it indeed lowers the propensity to move for job reasons. Hence, there is weak support for the Oswald (1996)-hypothesis in the sense that ownership reduces the chances of escaping unemployment by being mobile. Also in line with the theoretical search model home ownership has a positive effect on probability of finding employment in the local labour market. This positive effect on the much higher local job hazard (see Figure 4) dominates the negative effect on the mobility hazard such that there is a positive overall effect of home ownership on the transition rate from unemployment to employment, cf. Table 3. Put differently, the *reasoning* behind the Oswald hypothesis is empirically supported, since home ownership reduces the propensity to move for job reasons, but because so few workers move to get a job, this mechanism is not important enough to cause an overall positive correlation between home ownership and unemployment.

This is the main result, and it contrasts the findings for the US by Green & Hendershott (2001*b*) and for France by Brunet & Lesueur (2003). Apart from different econometric approaches one particular issue might play an important role in explaining the diverging results. Regional mobility is much more important for the functioning of the US labour market, so here home ownership has greater potential to do some damage, cf. the discussion in the introduction and the theoretical section.[7] In Denmark and in many other European countries, regional mobility is much lower than in the U.S.

Our theoretical model can thus explain the apparent contradictory results; in countries where culture (linguistic and cultural differences between regions etc.), geography (landscape size, distance between regions, population spread etc.) or the spatial distribution of economic activity leads to higher geographical mobility for reasons unrelated to home ownership, it is possible that the effect on the mobility hazard dominates in the overall effect of home ownership on unemployment duration, whereas the opposite may be the case in countries with low 'natural' geographical mobility. That is, the sign of the correlation between unemployment duration and home ownership depends on the size of the mobility

[7] With respect to the study by Brunet & Lesueur (2003), regional mobility is also relatively important for the French labour market as regional migration rates are more than double those of the Danish labour market when regions of a comparable size are considered (see section 3).

offer arrival rate, α_n, relative to the local job offer arrival rate, α_l. This line of reasoning illustrates how the macro data correlation found in some of the above mentioned studies may reflect spurious correlation rather than causality: if 'natural' geographical mobility is high, the fraction of home owners will be low. On the other hand, when mobility is high, geographical mismatches in labour demand and supply are more easily accommodated, and hence unemployment will be low.

Home ownership also competes with several other (non-geographical/cultural) candidates to be the culprit, particularly so in many European countries. One candidate is relatively easy access to early retirement schemes and disability pensions. In a comparison between Europe and the US, Decressin & Fatás (1995) find that in Europe region-specific shocks are absorbed by adjustments in the participation rate, while in the US workers move. For both areas the unemployment rate plays a minor role as an adjustment mechanism. Also, generous unemployment benefits are available without being conditional on job search in other regions, i.e. monitoring and sanctions in the search process are typically not implemented. In addition, enrollment of unemployed workers in active labour market programmes on a large scale may also play a role, as Frederiksson & Johansson (2002) show that participation in ALMPs reduce the probability of finding employment in other regions.

Another potential explanation is that the markets for rented housing in Denmark are heavily regulated by rent controls which prolong tenancy durations. We show in a companion paper (see Svarer, Rosholm & Munch (2003)) that this also distorts labour mobility. Thus the alternative to being a home owner is being a renter in a regulated market with relatively low mobility.

6 Conclusion

This paper has studied the micro data foundation for the positive correlation between home ownership and unemployment as observed by Oswald (1996) and others. Based on a theoretical search model we first show that home owners should have a reduced propensity to move for job reasons, which is the main mechanism proposed behind the hypothesis in the literature. However, in addition, home owners should also have a lower reservation wage for local jobs because of costs associated with selling and buying their home. The net effect of home ownership on unemployment duration is ambiguous, but if the observed pattern in aggregate data is to be believed the negative mobility effect should dominate.

Our results give support to the first two predictions, as owners are less likely to find

employment in another region and more likely to find employment locally than renters, but the net effect of home ownership on unemployment duration is negative, thus contrasting the Oswald hypothesis. Hence, our results indicate that home owners reduce their reservation wage for local jobs and this effect is quantitatively more important than the negative mobility effect. This result is found even though the correlation between the unemployment rate and home ownership is positive at the regional level.

We conclude that in a labour market with a very low level of mobility, which along with a high home ownership rate can be attributed to other characteristics such as incentives to leave the labour force, active labour market policies etc., home ownership does not lead to longer unemployment spells on average. It is possible that in countries where geographical mobility is a more important element of the functioning of the labour market (such as the US), home ownership might have an overall detrimental effect on unemployment. However, this is not likely to be the case in many European countries.

References

Andersen, A. K. (2000), *Commuting Areas in Denmark*, AKF Forlaget, Copenhagen.

Brunet, C. & Lesueur, J.-Y. (2003), 'Does homeownership lengthen unemployment duration? a french micro-econometric study'. Draft, University of Lumière Lyon.

Coulson, N. E. & Fischer, L. M. (2002), 'Tenure choice and labour market outcomes', *Housing Studies* **17,1**, 35–49.

Danish Economic Council (2002), *Danish Economy, Autumn 2002*, Copenhagen.

Decressin, J. & Fatás, A. (1995), 'Regional labor market dynamics in Europe', *European Economic Review* **39**, 1627–1655.

Frederiksson, P. & Johansson, P. (2002), Employment, mobility, and active labor market programs. Working paper, Department of Economics, Uppsala University.

Green, R. & Hendershott, P. (2001*a*), Home ownership and the duration of unemployment: A test of the Oswald hypothesis. Working paper.

Green, R. & Hendershott, P. (2001*b*), 'Home-ownership and unemployment in the US', *Urban Studies* **38**, 1501–1520.

Gregg, P., Machin, S. & Manning, A. (2003), Mobility and joblessness, *in* R. Blundell, D. Card & R. B. Freeman, eds, 'Seeking a Premier League Economy', The University of Chicago Press.

Hendershott, P. & White, M. (2000), 'The rise and fall of housing's favored investment status', *Journal of Housing Research* **11**, 257–275.

Holm, A. (2002), 'The effect of training on search durations: A random effects approach', *Labour Economics* **9**, 433–450.

Kluve, J. & Schmidt, C. M. (2002), 'Can training and employment subsidies combat European unemployment?', *Economic Policy* **35**, 411–448.

Leuvensteijn, M. V. & Koning, P. (2003), The effects of home-ownerhip on labour mobility in the Netherlands. Working paper.

Lillard, L. A., Brien, M. J. & Waite, L. J. (1995), 'Premarital cohabitation and subsequent marital dissolution: A matter of self-selection?', *Demography* **32**, 437–457.

Munch, J. R. & Svarer, M. (2002), 'Rent control and tenancy duration', *Journal of Urban Economics* **52**, 542–560.

Nickell, S. & Layard, R. (1999), Labour market institutions and economic performance, *in* A. Ashenfelter & D. Card, eds, 'Handbook of Labor Economics', Vol. 3, North Holland, Amsterdam.

OECD (2000), *Employment Outlook*, OECD, Paris.

Oswald, A. (1996), A conjecture on the explanation for high unemployment in the industrialized nations: Part I. Warwick University Economic Research Paper No. 475.

Svarer, M., Rosholm, M. & Munch, J. R. (2003), 'Rent control and unemployment duration'. Working paper.

van den Berg, G. J. (2001), Duration models: Specification, identification, and multiple durations, *in* J. J. Heckman & E. Leamer, eds, 'Handbook of Econometrics', Vol. V, North-Holland, Amsterdam.

A Appendix: Tables and figures

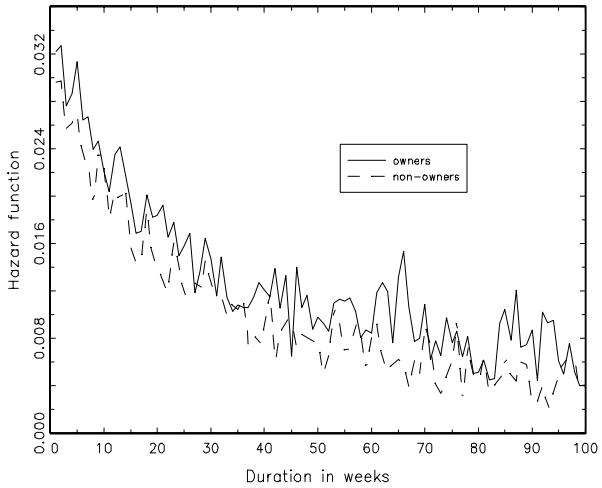

Figure 1: Kaplan-Meyer hazard functions.

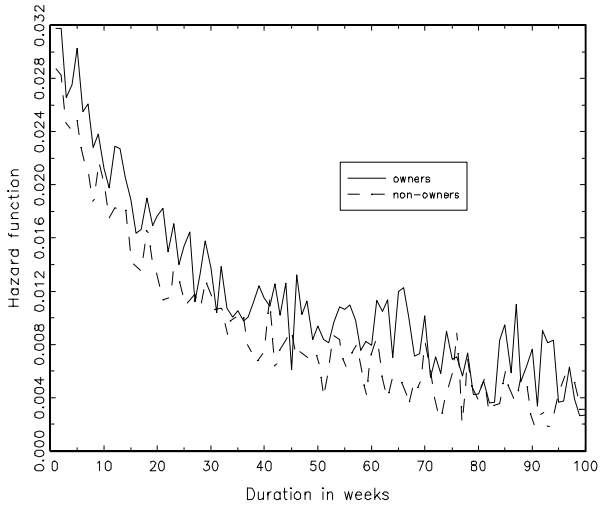

Figure 2: Kaplan-Meyer hazard function for unemployed who find job locally.

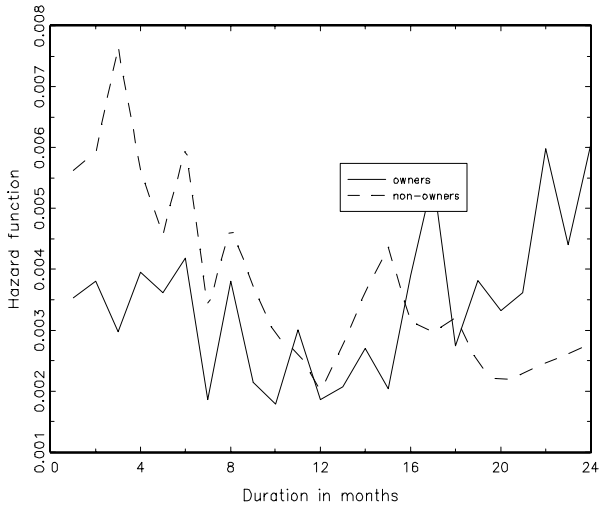

Figure 3: Kaplan-Meyer hazard functions for individuals who find a job nationally. Due to few exits the hazard are presented in monthly intervals.

TABLE 1

DESCRIPTIVE STATISTICS

Variables	Mean	Stdv.
home ownership	0.5718	0.4948
Age 19-24	0.1421	0.3492
Age 25-29	0.1551	0.3620
Age 30-39	0.2827	0.4503
Age 40-49	0.2039	0.4029
Age 50 +	0.2162	0.4116
Female	0.5645	0.4958
Children 0-17 years	0.3641	0.4812
Two adults	0.6209	0.4852
Non OECD country	0.0263	0.1600
Copenhagen	0.2865	0.4521
Large city	0.2900	0.4538
Rural	0.4234	0.4941
Basic schooling	0.4160	0.4929
Vocational education	0.3700	0.4828
High school	0.0798	0.2710
Higher education	0.1342	0.3408
Non insured	0.1422	0.3492
UI replacement rate	0.7680	0.1633
# observations	52,738	

[a]The mean UI replacement rate is reported for members of UI funds.

TABLE 2

COEFFICIENT OF CORRELATION: HOME OWNER AND UNEMPLOYMENT

Year	Correlation	P-value
1987	**0.1437**	0.0171
1988	**0.1854**	0.0020
1989	**0.1840**	0.0022
1990	**0.1915**	0.0014
1991	**0.1815**	0.0025
1992	**0.1239**	0.0400
1993	**0.1423**	0.0182
1994	0.0620	0.3052
1995	-0.0153	0.7998
1996	-0.0096	0.8740
1997	-0.0064	0.9157
1998	0.0406	0.5016
1999	0.0838	0.1655
2000	0.1083	0.0729

Note: Bold numbers indicate a significant parameter estimate (5 % level).

TABLE 3

ESTIMATION RESULTS: SINGLE RISK MODEL

	Unemployment hazard		Selection equation	
Variables	Coeff.	Stdv.	Coeff.	Stdv.
home ownership	**0.3309**	0.0297		
Ownership share			**6.2953**	0.1485
Age 19-24	**0.4485**	0.0342	**-0.7342**	0.0558
Age 25-29	**0.3773**	0.0309	**-1.3260**	0.0519
Age 30-39	**0.1833**	0.0272	**-0.7239**	0.0484
Age 50 +	**-0.4380**	0.0309	**0.3778**	0.0550
Female	**-0.2063**	0.0198	0.0061	0.0320
Children 0-17 years	**-0.1441**	0.0236	**-0.0896**	0.0409
Two adults	**0.0683**	0.0210	**1.2645**	0.0366
Non OECD country	**-0.7956**	0.0626	**-1.8874**	0.0793
Large city	-0.0239	0.0239	**0.6014**	0.0379
Rural	0.0399	0.0225	**0.6681**	0.0392
Basic schooling	**-0.2735**	0.0222	**-0.6004**	0.0346
High school	**0.1209**	0.0340	**-0.3140**	0.0569
Higher education	**0.1224**	0.0293	**-0.2116**	0.0469
Non insured	**-0.8519**	0.0540	**-2.4082**	0.1027
UI replacement rate	**-0.4126**	0.0579	**-1.2563**	0.1158
$v_{e,2}$	**-1.2816**	0.0267		
$v_{h,1}$	**-5.8701**	0.1328		
$v_{h,2}$	**-0.4729**	0.1223		
$P(v_{e,1}, v_{h,1})$	**0.1640**	0.0092		
$P(v_{e,2}, v_{h,1})$	**0.2139**	0.0094		
$P(v_{e,1}, v_{h,2})$	**0.1635**	0.0108		
$P(v_{e,2}, v_{h,2})$	**0.4586**	0.0113		

Note: Bold numbers indicate a significant parameter estimate (5 % level).

TABLE 4

ESTIMATION RESULTS: COMPETING RISKS MODEL

	Mobility hazard		Local job hazard		Selection equation	
Variables	Coeff.	Stdv.	Coeff.	Stdv.	Coeff.	Stdv.
home ownership	**-0.2482**	0.1187	**0.3581**	0.0309		
Ownership share					**6.2045**	0.1486
Age 19-24	**1.7185**	0.1777	**0.3999**	0.0348	**-0.7496**	0.0562
Age 25-29	**1.6457**	0.1828	**0.3356**	0.0313	**-1.3470**	0.0522
Age 30-39	**0.8332**	0.1798	**0.1725**	0.0275	**-0.7399**	0.0486
Age 50 +	**-0.9993**	0.2797	**-0.4349**	0.0312	**0.3625**	0.0554
Female	**-0.2904**	0.0930	**-0.2072**	0.0201	0.0163	0.0321
Children 0-17 years	**-0.8450**	0.1336	**-0.1209**	0.0239	**-0.1013**	0.0410
Two adults	-0.1806	0.1058	**0.0823**	0.0215	**1.2605**	0.0367
Non OECD country	**-1.4601**	0.3542	**-0.7772**	0.0636	**-1.9072**	0.0786
Large city	**1.3839**	0.1443	**-0.0706**	0.0243	**0.5888**	0.0380
Rural	**1.7879**	0.1374	-0.0197	0.0229	**0.6601**	0.0393
Basic schooling	**-0.5489**	0.1193	**-0.2620**	0.0224	**-0.5989**	0.0347
High school	**0.6205**	0.1475	**0.0735**	0.0348	**-0.3350**	0.0570
Higher education	**0.8452**	0.1402	**0.0907**	0.0296	**-0.2271**	0.0471
Non insured	0.1776	0.3067	**-0.8881**	0.0548	**-2.4032**	0.1031
UI replacement rate	0.1811	0.3587	**-0.4155**	0.0586	**-1.2505**	0.1162
$\upsilon_{m,2}$	**2.9855**	0.8864				
$\upsilon_{l,2}$	**1.2921**	0.0268				
$\upsilon_{h,1}$	**-5.8036**	0.1330				
$\upsilon_{h,2}$	**-0.4060**	0.1228				
$P(\upsilon_{m,1}, \upsilon_{l,1}, \upsilon_{h,1})$	**0.1621**	0.0320				
$P(\upsilon_{m,2}, \upsilon_{l,1}, \upsilon_{h,1})$	**0.0628**	0.0316				
$P(\upsilon_{m,1}, \upsilon_{l,2}, \upsilon_{h,1})$	**0.1010**	0.0249				
$P(\upsilon_{m,2}, \upsilon_{l,2}, \upsilon_{h,1})$	**0.0512**	0.0247				
$P(\upsilon_{m,1}, \upsilon_{l,1}, \upsilon_{h,2})$	**0.3982**	0.0546				
$P(\upsilon_{m,2}, \upsilon_{l,1}, \upsilon_{h,2})$	0.0772	0.0543				
$P(\upsilon_{m,1}, \upsilon_{l,2}, \upsilon_{h,2})$	0.0577	0.0352				
$P(\upsilon_{m,2}, \upsilon_{l,2}, \upsilon_{h,2})$	**0.0899**	0.0352				

Note: Bold numbers indicate a significant parameter estimate (5 % level).

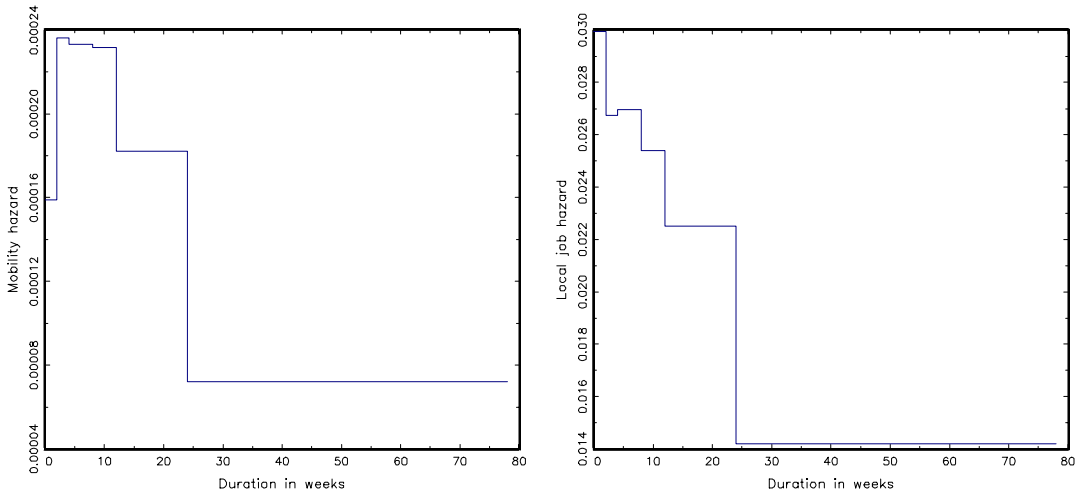

Figure 4: Estimated destination specific hazard rates

B Appendix: Tables and figures

TABLE B1

ESTIMATION RESULTS: SINGLE RISK MODEL

	Unemployment hazard		Selection equation	
Variables	Coeff.	Stdv.	Coeff.	Stdv.
home ownership	**0.3325**	0.0302		
Ownership share	0.1154	0.0806	**6.2697**	0.1488
Age 19-24	**0.4452**	0.0341	**-0.7346**	0.0559
Age 25-29	**0.3789**	0.0308	**-1.3249**	0.0519
Age 30-39	**0.1842**	0.0272	**-0.7242**	0.0485
Age 50 +	**-0.4396**	0.0309	**0.3763**	0.0551
Female	**-0.2121**	0.0198	0.0063	0.0320
Children 0-17 years	**-0.1459**	0.0236	**-0.0906**	0.0409
Two adults	**0.0698**	0.0210	**1.2619**	0.0366
Non OECD country	**-0.7939**	0.0627	**-1.8868**	0.0792
Large city	-0.0239	0.0239	**0.6021**	0.0379
Rural	0.0343	0.0231	**0.6704**	0.0392
Basic schooling	**-0.2712**	0.0221	**-0.5988**	0.0346
High school	**0.1274**	0.0338	**-0.3120**	0.0569
Higher education	**0.1332**	0.0292	**-0.2100**	0.0470
Non insured	**-0.8000**	0.0540	**-2.4041**	0.1028
UI replacement rate	**-0.3550**	0.0579	**-1.2517**	0.1159
$v_{e,2}$	**-1.2818**	0.0266		
$v_{h,1}$	**-5.8643**	0.1329		
$v_{h,2}$	**-0.4652**	0.1225		
$P(v_{e,1}, v_{h,1})$	**0.1570**	0.0091		
$P(v_{e,2}, v_{h,1})$	**0.2204**	0.0093		
$P(v_{e,1}, v_{h,2})$	**0.1508**	0.0104		
$P(v_{e,2}, v_{h,2})$	**0.4719**	0.0109		

Note: Bold numbers indicate a significant parameter estimate (5 % level).

TABLE B2

ESTIMATION RESULTS: SINGLE RISK MODEL

	Unemployment hazard	
Variables	Coeff.	Stdv.
home ownership	**0.1642**	0.0197
Age 19-24	**0.4353**	0.0341
Age 25-29	**0.3655**	0.0311
Age 30-39	**0.1767**	0.0273
Age 50 +	**-0.4445**	0.0311
Female	**-0.2089**	0.0199
Children 0-17 years	**-0.1456**	0.0237
Two adults	**0.0783**	0.0210
Non OECD country	**-0.8468**	0.0618
Large city	-0.0215	0.0239
Rural	0.0411	0.0226
Basic schooling	**-0.2772**	0.0222
High school	**0.1152**	0.0341
Higher education	**0.1226**	0.0295
Non insured	**-0.8643**	0.0539
UI replacement rate	**-0.3860**	0.0581
$v_{e,2}$	**1.2792**	0.0267
$P(v_{e,1})$	**0.6760**	0.0163
$P(v_{e,2})$	**0.3240**	0.0163

Note: Bold numbers indicate a significant parameter estimate (5 % level).

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