Inter-Regional Labour Mobility and Unemployment Benefits: Evidence from the European Community Household Panel.

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Abstract

This paper studies the impact of unemployment benefits on regional labour mobility. A partial equilibrium search model is developed, which shows that in the presence of mobility costs, benefit recipients might be more likely to move to another region compared to non-recipients. The result depends on the extent to which benefits lower the utility loss from moving and on the extent to which the higher loss the non-recipients face, counteracts the disincentive effect of benefits. Empirical evidence is provided using the European Community Household Panel data set, for 1994 to 1998, for Germany, France and the UK. After controlling for potential endogeneity bias due to unobserved individual heterogeneity, as well as, personal and household characteristics, it is shown that benefit recipients are more likely to migrate than non-recipients for all these three countries.

Keywords: Regional Labour Mobility, Unemployment Benefits, Panel Data, Logit, Fixed Effect.

JEL Codes: J61, J64, J65, C23, C25.

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1 Introduction

The purpose of this paper is to study how unemployment benefits affect the incentives of unemployed to move to another region for accepting a job, that is, to what extent unemployment benefits affect regional labour mobility.

It is a stylised fact that labour mobility rates in Europe are very low compared to the US. Evidence provided by Decressin and Fatas (1995), suggests that regional demand shocks cause different reaction in the labour market of Europe compared to the US. European labour markets adjust mainly through changes of unemployment and participation rates and less through mobility, relative to the US.

While low mobility rates across European countries can be justified by cultural and language barriers, it is hardly convincing to be determinants of low mobility within countries. The research on low regional mobility has been focused on institutional factors like the unemployment benefit system and the importance of the structure of home ownership.

The main argument is that both unemployment benefits and home ownership make workers more geographically attached. For the unemployment benefits, the attachment arises due to the disincentive search effort effect. That is, by raising the value of being unemployed, benefit recipients have higher reservation wage and lower search effort, which reduce the probability to exit unemployment and consequently to change region for a new job.[1]

In a recent paper, Hassler et al.(2001), argue that the Unemployment Insurance system (UI) can explain the differences in mobility rates between the US and EU countries. Unemployment insurance makes workers more geographically attached, which deters mobility and ensures the demand for UI will be sustained over time.

The disincentive search effort effect of UI has been questioned by a number of studies. Allowing the search effort function to depend both on the time and expenditures devoted to search, Barron and Mellow (1979), show that the existence of unemployment benefits will reduce search time, but increase expenditures. If search time and expenditures are complementary rather than separable inputs into the search effort function, the increased expenditure afforded by benefits can be used to enhance the productiveness of time spent on job search, (Tannery, 1983). So, the overall effect of benefits on search effort might be positive even though the length of time one searches falls. Wadsworth (1991), using UK data, provides an empirical link between unemployment benefits and search effort and finds that benefits can improve job-matching efficiency by improving job search productivity.

In this paper, we develop a partial equilibrium search model in which the un-

[1]There are studies looking at the role of housing tenure. For instance, Oswald (1997), suggests that being a house owner in the UK is bad for unemployment. Boheim and Taylor (1999), conlcude that policies promoting home ownership might not be the most efficient mechanism to promote labour mobility. We will focus on the effect of unemployment benefits on labour mobility controlling for housing tenure.

employed search in a region different from the region they currently reside. Thus, escaping unemployment requires a regional move, which involves some cost. We model this mobility cost as a loss on the value of being employed. It is shown that unemployment benefits might also increase the probability to migrate. This may happen when benefit recipients use the benefits to cover the costs involved in a change of region, which otherwise would lower the value of being employed in the new region. As long as this cost subsidisation counteracts the disincentive effect of benefits on search effort, benefit recipients will be more likely to move to another region to obtain a job than no-recipients.

There are many empirical studies showing that the unemployed are more likely to migrate compared to the employed. For instance, a significant effect of unemployment on the probability to migrate has been found, among others, by Da Vanzo (1978), for the US, Pissarides and Wadsworth (1989); Taylor and Boheim (2000); for the UK.[2] However, very few studies have attempted to provide some evidence on the effect of unemployment benefits on the probability to migrate.

Antolin and Bover (1997) using data for Spanish male, find that the unemployed not registered at the employment office are more likely to migrate compared to those registered. In Spain, it is required to be registered in order to receive benefits, so they interpret this evidence as an indication of the likely negative effect of unemployment benefits on migration.

To the best of my knowledge, the only paper studying the effect of unemployment benefits on migration, using information on unemployment benefits and actual individual migration, is Goss and Paul (1990). Using a sample of heads of households from the PSID for 1982-1983, they find that the unemployment benefits have no net impact on the probability to migrate. However, distinguishing each unemployed benefit recipient as either voluntarily or involuntarily (laid off) unemployed, they find that the UI recipients who are involuntarily unemployed are less mobile than the unemployed without benefits. Conversely, those benefit recipients who are voluntarily unemployed are more mobile than non-benefit recipients. The intuition is that those laid off will be more likely to wait for recall, reducing the likelihood to migrate.

The empirical part of the paper provides cross-country evidence on the effect of unemployment benefits on the probability to migrate for a new job, for Germany, France and UK, using the European Community Household Panel (ECHP), for the years 1994-1998. The sample consists of males aged 18-65 years old, who are labour force participants. We focus on these three countries because the regional mobility rates are high enough, especially compared to the South European countries, and this provides enough variability for the estimation.

Apart from the evidence of the effect of benefits on migration for Germany, France and UK, the paper provides evidence on the effect of unemployment on mobility for a larger set of countries including, Italy, Spain and Greece. Although, there exist

[2]Reviews of the literature on migration can be found in Greenwood (1975) for the US, Greenwood (1997), Molho (1986) and Herzog et al. (1993).

country specific studies on the effect of personal unemployment on mobility, the ECHP data set allows a cross country comparison and also to control for potential endogeneity bias.

The main result is that unemployed males *with benefits* are more likely to move for a new job in another region than unemployed males *without benefits*. The results are robust to potential endogeneity of the unemployment status with unobserved individual heterogeneity. The panel feature of the data allows, using a Conditional Maximum Likelihood Estimation proposed by Chamberlain (1980), to control for fixed effects.

This evidence is in line with theoretical and empirical results suggesting that unemployment benefits improve the efficiency of the job matching process. For instance, Wadsworth (1991), provides empirical evidence on the positive effect of benefits on job search intensity in the UK. Marimon and Zilibotti (1999), developed an equilibrium search matching model in which UI helps workers to get a suitable job.

The rest of the paper is organised as follows. In section 2, we present the model and show that benefits might increase the probability to obtain a job, by moving to another region. In section 3, we describe the data used in the empirical analysis, while in section 4 we present the econometric methodology. Section 5, contains a discussion of the empirical results and Section 6 concludes.

2 Model

We develop a partial equilibrium search model to study the effect of unemployment benefits on the escape rate from unemployment. Although search models have been used extensively in the literature, the majority focus on a spaceless labour market in which the unemployed search for a job. Since we are interested in the decision to move to another region to obtain a job, we assume that the unemployed search for a job in a region different from the one currently residing.[3]

We are interested in the effect of unemployment benefits on labour mobility, that is, how benefits might alter the optimal choices of search intensity and reservation wage and thus, the escape rate from unemployment, in the presence of mobility costs. Changes in the escape rate from unemployment are mirrored in to labour mobility rates, since obtaining a job requires a regional move.

Unemployed receive a wage offer x at each period. The wage offer is a random variable assumed to be drawn from a known distribution described by a cdf, $F(w) = pr(x \leq w)$, with $\overline{w}$ denoting the maximum attainable wage. Moreover, the arrival of wage offers is assumed to be a stochastic process. In particular, an unemployed has probability $\lambda(s_t)$ of receiving an offer at each period, which an increasing function of

[3]For simplicity, we assume that all the unemployed search in another region. Obviously, this is not a realistic assumption, but it is sufficient in order to show how the mobility costs might affect the decision to move and the role unemployment benefits could play to alter it. A more complicated model would involve two regions in which unemployed could search in both, simultaneously.

the time devoted to search, s_t. Both the arrival rate and the distribution of offers are time invariant.

Unemployed may receive unemployment benefits denoted as b, where $b = 1$ for recipients and $b = 0$ for non-recipients. The instantaneous utility for the unemployed is thus, $u(y_t^b, 1 - s_t)$, where $y_t^1 > y_t^0$.

Each time an unemployed receives a wage offer decides either to accept the job and work forever at the specified wage, or to reject the offer and wait for a better one to arrive. We will denote the value of accepting and being employed as $V_a(x)$ and the value of rejecting and remaining unemployed as V_r^b, with $V_r^1 > V_r^0$ and $V_a^{'}(x) > 0$.

Accepting a job involves some mobility cost, which is the same for benefit recipients and non-recipients. We model this cost as a loss on the value of being employed, that is, $V_a(x) - c$, where c denotes the utility loss from moving.

The crucial point is that the unemployed who recieve benefits may face a lower loss on the value of being employed from moving. Recieving benefits allows to cover the mobility cost, which lowers the loss of utility from moving. The loss on the value of being employed can be written as, $(1 - \delta) \cdot c$. The parameter δ denotes the degree that benefits lower the utility loss. For the unemployed without benefits, $\delta = 0$, that is, they face all the utility loss from moving. For the unemployed with benefits $0 \leq \delta \leq 1$. The higher δ is, the lower the loss on the value of being employed.

The value function for an unemployed with benefits can be written as:

$$\rho V_r^1 = u(y^1, 1 - s) + \lambda(s) \int_{w^*}^{\overline{w}} \left\{ [V_a(x) - (1 - \delta) \cdot c] - V_r^1 \right\} dF(x) \tag{1}$$

and for non-recipients as:

$$\rho V_r^0 = u(y^0, 1 - s) + \lambda(s) \int_{w^*}^{\overline{w}} \left\{ [V_a(x) - c] - V_r^0 \right\} dF(x) \tag{2}$$

where ρ is the discount factor.

The objective is to choose the reservation wage and the search intensity in order to maximize these value functions.

Differentiating (1) and (2) with respect to w^* and equating the resulting expressions to zero yields:

$$\begin{aligned} \rho \frac{\partial V_r^1}{\partial w^*} &= -\lambda(s) \left\{ [V_a(w^*) - (1 - \delta) \cdot c] - V_r^1 \right\} F^{'}(w^*) = 0 \\ &\Rightarrow \quad V_a(w^*) = V_r^1 + (1 - \delta) \cdot c \end{aligned} \tag{3}$$

for those with benefits and

$$\begin{aligned} \rho\frac{\partial V_r^0}{\partial w^*} &= -\lambda(s)\left\{[V_a(w^*)-c]-V_r^0\right\}F^{'}(w^*)=0 \\ &\Rightarrow \quad V_a(w^*)=V_r^0+c \end{aligned} \tag{4}$$

for those without benefits

Similarly, differentiating (1) and (2) with respect to s and equating the resulting expressions to zero yields:

$$\begin{aligned} \rho\frac{\partial V_r^1}{\partial s} &= 0 \Rightarrow \\ u_2(y(1),1-s) &= \frac{\partial\lambda(s)}{\partial s}\int_{w^*}^{\overline{w}}\left\{[V_a(x)-(1-\delta)\cdot c]-V_r^1\right\}dF(x) \end{aligned} \tag{5}$$

for those with benefits and

$$\begin{aligned} \rho\frac{\partial V_r^0}{\partial s} &= 0 \Rightarrow \\ u_2(y(0),1-s) &= \frac{\partial\lambda(s)}{\partial s}\int_{w^*}^{\overline{w}}\left\{[V_a(x)-c]-V_r^0\right\}dF(x) \end{aligned} \tag{6}$$

for those without benefits. We define the expected net gain from obtaining a job as:

$$N^1(x) = \int_{w^*}^{\overline{w}}\{[V_a(x)-(1-\delta)\cdot c]-V_r(1)\}\,dF(x) \tag{7}$$

and

$$N^0(x) = \int_{w^*}^{\overline{w}}\{[V_a(x)-c]-V_r(0)\}\,dF(x) \tag{8}$$

To simplify the discussion below, we will assume that the utility function is log-linear i.e. $u(y^b,1-s)=\log y^b+\gamma\log(1-s)$, where $\gamma>0$ is a preference parameter for leisure. Finally, we assume that the probability to receive an offer is proportional to the time devoted to search , $\lambda(s)=\alpha s$, where $\alpha>0$.

From Equation (5) we get the optimal search effort for those with benefits, which is

$$\begin{aligned} \frac{\gamma}{1-s} &= \alpha N^1(x) \\ &\Rightarrow \quad s^* = 1 - \frac{\gamma}{\alpha N^1(x)} \end{aligned} \tag{9}$$

and from (6) the optimal search effort for those without benefits, which is

$$\begin{aligned} \frac{\gamma}{1-s} &= \alpha N^0(x) \\ &\Rightarrow \quad s^* = 1 - \frac{\gamma}{\alpha N^0(x)} \end{aligned} \tag{10}$$

From the FOC's (3) and (4) we obtain the standard result in the literature (when there is no move involved and thus, $c = 0$), which says that the unemployed with benefits have higher reservation wage. In addition, from (9) and (10) the unemployed with benefits devote less time for search purposes, compared to those without benefits. In the case of regional labour mobility, however, the existence of mobility cost may alter this standard result.

In particular, the reservation wage for those *without benefits* raises, since they require a higher wage in order to remain indifferent between being employed or unemployed. The increase of the reservation wage should be such that to cover the utility loss c. In addition, the search effort reduces since the expected gain from obtaining a job is lower. For those *with benefits,* the optimal reservation wage and the search effort depends on the parameter δ.

2.0.1 The case when $\delta = 0$

The one extreme case is when benefits do not compensate at all for the utility loss from moving. In this case, the reservation wage for the recipients increases as it does for the non-recipients, due to the cost c. Since, $V_r(1) > V_r(0)$, then $w^*(1) > w^*(0)$. That is, the reservation wage is higher for those with benefits compared to those without benefits due to the higher value of being unemployed for the former.

2.0.2 The case when $\delta = 1$

When the benefit recipients do not face any mobility cost c, then the FOC for those with benefits becomes $V_a(w^*) = V_r(1)$, and for those without benefits, $V_a(w^*) = V_r(0) + c$. Non- recipients will choose the same reservation wage as in the previous case, while recipients will choose a lower one. In order to compare them, since $V_r(1) > V_r(0)$, we need to consider the relation between c and $V_r(1) - V_r(0)$. That is, to what extent not facing the mobility costs due to the benefits, counteracts the disincentive effect the benefits tend to create, i.e. the higher value of being unemployed. In particular,

$$if \quad c \gtreqless V_r(1) - V_r(0) \; then \; w^*(1) \lesseqgtr w^*(0) \tag{11}$$

From (11), when the utility loss for those without benefits is sufficiently high, their reservation wage is lower compared to benefit recipients, since they require a higher wage in order to cover the mobility cost.

2.1 The search effort effect

The optimal search effort s^*, given by (9) and (10), depends on the net expected gain from obtaining a job, defined as $N^1(x)$ and $N^0(x)$, with $\frac{\partial s^*}{\partial N^b(\cdot)} > 0$. That is, the higher the expected gain from being employed the higher the search effort. As with the determination of the optimal reservation wage, the crucial parameter for the optimal search effort is δ. When $\delta = 0$, recipients will devote less time to search compared to non-recipients, while when $\delta = 1$, it depends on the extent to which non-recipients suffer a utility loss from moving.

2.2 The escape rate from unemployment

The escape rate from unemployment q, is defined as the product of the probability to receive an offer λ and the probability to accept it:

$$q = \lambda(s^*)[1 - F(w^*)] \tag{12}$$

Higher λ and lower w^* lead to a higher escape rate.

As mentioned before, the standard result in the literature shows that unemployment benefits lead to lower escape rate (higher duration of unemployment), since the benefit recipients have a higher reservation wage and search less. Following the analysis above, we have shown that in the presence of mobility costs this result does not always hold, since benefits may provide the means to subsidise the mobility costs, counteracting their disincentive effect on the decisions of the unemployed. In the following sections we provide some empirical evidence on the issue.

3 Data

The data are obtained from the European Community Household Panel (ECHP) covering the period from 1994 to 1998. The ECHP is a panel data set with annual frequency providing information on household and individual characteristics for all members above 16 years old.

A crucial feature of the ECHP is that individuals are observed even after a change of residence has occurred. The information on internal migration distinguishes between two types of moves: moves to the same region and moves to another region in the country. A move is taking place within the year between two consecutive waves.

From the information on migration a dummy is constructed with the value one, if a move to another region has taken place and zero, otherwise. Obviously, this dummy variable captures all the regional moves, which are not necessarily job related. For the dependent variable to be as close as possible to the definition of regional labour mobility, that is, a move to another region for a job related reason, we need to restrict only to those moves that occurred with a new job for the individual at the same year.

This is achieved by using the information on the starting year of the current job. A dummy is constructed with the value one, if the current job has been started during any year between two consecutive waves and zero, otherwise. Therefore, the dependent variable to be used is a dummy for regional labour mobility with the value one, if an individual has moved with a new job in the year between two waves and zero, otherwise.

The unit of observation is an individual at a certain year. We are focusing on labour force participants, who can be either employed, unemployed or inactive, excluding the retired and those still at school. Finally, the sample is restricted to males from 17 to 65 years old.[4]

An important point in a study of regional mobility is to distinguish the causes from the consequences of a move. That is, being unemployed may result in a change of residence, but can also be the consequence of a change of residence. The same holds for the unemployment benefits. Therefore, all the regressors are obtained using the information from the year before the year of the move.

The sample consists of Germany, France, United Kingdom, Italy, Spain and Greece. Table 1 reports some sample statistics. The number of observations, total and by country, is given in column 1. The total number of observations is 97373, corresponding to 31043 individuals. Column 2 of Table 1, shows the percentage of movers with a new job in the sample. These rates confirm that inter-regional mobility rates are low in Europe.[5] Moreover, we observe the difference in the mobility rates, which are higher in the North (Germany, France, UK) and lower in the South (Italy, Spain, Greece). Finally, among the North countries in the sample, UK has much higher mobility rate.

Columns 3 and 4 in Table 1, show the mobility rates for the employed and unemployed, respectively. In all countries the unemployed have higher mobility rates relative to the employed. Columns 3 and 4 in Table 2, show the mobility rates of the unemployed with benefits and the unemployed without benefits, respectively.[6] Due to the very low mobility rates in the data for the sub-group of the unemployed with benefits, for Italy, Spain and Greece, we will focus the analysis for the effect of

[4]Choosing an upper age level of 55 years old did not change the results, since retired are excluded.

[5]The regional mobility rate in the US, as the precentage who change region per year is 3.0%. (Source: Nickell&Layard, Table13, p.3037). Although the rates in Talbe 1 refer to movers with a new job, the picture is similar when all movers are considered and these rates are not reported.

[6]Column 2 is just the average of Columns 3 and 4, since the dummies for the unemployed with benefits and the unemployed without benefits are constructed by interacting the unemployed dummy with the dummy of benefits.

benefits on regional labour mobility only on Germany, France and the UK. For these countries, unemployed with benefits have higher mobility rates than those without benefits. However, one cannot draw conclusions from the statistics without controlling for other observed and unobserved characteristics that might determine the decision to move.

One important dimension is the institutional differences among these countries and in particular, the benefit system. The key features of the unemployment benefit system are the amount and the duration of the benefits. In addition, the active labour market policies (ALMP) in place are also significant. These include expenditure for the unemployed on labour market training, assistance with job search and employment subsidies. In the first two columns of Table (3), we present the replacement rate (the share of income replaced by unemployment benefits) and the duration of these benefits (4 years means indefinite duration). Benefits are generous with long duration in Germany and France, while in the UK are miserly but indefinite. In column 3 of Table (3) we present a measure of ALMP, which is the spending per unemployed person as a percentage of GDP per member of the labour force. Column 4 gives the number of unemployed per staff member in employment services. These two variables indicate a high expenditure on the unemployed in Germany and a low expenditure in France and the UK.

4 Empirical Methodology

In this section we describe the methodology used for the estimation of the effect of unemployment and unemployment benefits on the probability to migrate for obtaining a new job.

The econometric model is a discrete regression model in which the dependent variable, denoted as y_{it}, is binary where $i = \{1, 2, ...N\}$ refers to the individual and $t = \{1, 2...T\}$ to the year. We assume there is an underlying response variable y^*_{it} defined by the regression relationship

$$y^*_{it} = X_{it}\beta + \varepsilon_{it} \tag{13}$$

where X_{it} is the vector of individual and household characteristics. In practice, y^*_{it} is unobservable. What we observe is the dummy variable y_{it} defined by

$$\begin{aligned} y_{it} &= 1 \quad \text{if} \quad y^*_{it} \geq 0 \\ y_{it} &= 0 \quad \text{otherwise} \end{aligned} \tag{14}$$

At each year t, y_i takes the value 1 if an individual has moved with a new job during the time period $[t-1, t]$ and 0, otherwise.

The unobserved response variable y_{it}^* can be thought as the expected gain from being employed relative to remain unemployed. That is, when the gain is positive, then $y_{it} = 1$, which denotes that a move has taken place.

From (13) and (14) we get that

$$\begin{aligned} \Pr(y_{it} &= 1) = \Pr(\varepsilon_{it} \geq -X_{it}\beta) \\ &= 1 - F(-X_{it}\beta) = F(X_{it}\beta) \end{aligned} \tag{15}$$

where F is the cumulative distribution function of ε.

4.1 The Pooled Logit[7]

Assuming F to be the logistic distribution we obtain the Logit model

$$\begin{aligned} \Pr(y_{it} &= 1) = F(X_{it}\beta) = \frac{e^{X_{it}\beta}}{1 + e^{X_{it}\beta}} \\ &= \Lambda(X_{it}\beta) \end{aligned} \tag{16}$$

and the Log-Likelihood Function is given by

$$\ln(L) = \sum_{i=1}^{N} [(1 - y_{it}) \ln(1 - \Lambda(X_{it}\beta)) + y_{it} \ln(\Lambda(X_{it}\beta))] \tag{17}$$

Estimates of β are obtained by maximising this likelihood function.

4.2 The Panel Data Fixed Effect Logit

In the Panel data estimation, since the dependent variable is binary we have to follow the approach suggested by Chamberlain (1980), which consists in maximising a conditional version of the likelihood function. Assuming that the probability of individual i to move in period t is logistic

$$\Pr(y_{it} = 1 | X_{it}, \alpha_i) = \frac{e^{\alpha_i + X_{it}\beta}}{1 + e^{\alpha_i + X_{it}\beta}} \tag{18}$$

The problem is to estimate how the explanatory factors affect the probability to move controlling for the unobservable heterogeneity α_i.

Conditioning the likelihood of a sequence of moves for an individual on the total number of periods that the individual has moved, results in eliminating α_i from the likelihood. For instance, in the case of $T = 2$, the probability of having moved at the second period is

[7] By Pooled Logit we mean the pooling of the year observations for each individual.

$$\Pr(\{0,1\}|X_i,\alpha_i,\sum_{t=1}^{2}y_{it}=1)=\frac{e^{(X_{i2}-X_{i1})\beta}}{1+e^{(X_{i2}-X_{i1})\beta}} \tag{19}$$

and the probability of having moved at the first period is

$$\Pr(\{1,0\}|X_i,\alpha_i,\sum_{t=1}^{2}y_{it}=1)=\frac{e^{(X_{i1}-X_{i2})\beta}}{1+e^{(X_{i1}-X_{i2})\beta}} \tag{20}$$

For the other two possible sequences {1,1) and {0,0}the probability, given the total number of moves, is equal to 1. That is,

$$\Pr(\{1,1\}|X_i,\alpha_i,\sum_{t=1}^{2}y_{it}=2)=1 \tag{21}$$

$$\Pr(\{0,0\}|X_i,\alpha_i,\sum_{t=1}^{2}y_{it}=0)=1 \tag{22}$$

These two sequences do not contribute to the likelihood function because they are independent of the parameters. That is, the sample in this estimation will consist only of the individuals who have experienced at least once a move, which is obviously smaller than the sample in the pooled logit estimation.

The likelihood function can be written as

$$L=\prod_{i=1}^{N}\left(\frac{e^{(X_{i1}-X_{i2})\beta}}{1+e^{(X_{i1}-X_{i2})\beta}}\right)^{W_{10}}\left(\frac{e^{(X_{i2}-X_{i1})\beta}}{1+e^{(X_{i2}-X_{i1})\beta}}\right)^{W_{01}}1^{W_{00}}1^{W_{11}} \tag{23}$$

where $W^{10}=1$ for sequence {1,0}, $W^{01}=1$ for sequence {0,1} etc. Estimates of β are obtained by maximising this likelihood function.

5 Empirical Analysis and Results

As mentioned above, the empirical analysis will be divided into two parts. In the first specification, the sample consists of Germany, France, UK, Italy, Greece and Spain and the focus will be on the coefficient of the unemployment dummy. In the second specification, due to data limitations, we are restricting the sample only to Germany, France and the UK and we distinguish the unemployed into benefit recipients and non-recipients.

We can write the vector X_{it} as:

$$X_{it}^{1}=[U_{it},IN_{it},Z_{it}]\text{ (First Specification)}$$

and

$$X_{it}^2 = [U_{it}^B, U_{it}^{NB}, IN_{it}, Z_{it}] \text{ (Second Specification)}$$

where X_{it}^1 and X_{it}^2 denote the vector of regressors for the two different specifications. U_{it} is a dummy with value one if unemployed and zero, otherwise. U_{it}^B is the dummy for the unemployed with benefits and U_{it}^{NB} the dummy for the unemployed without benefits. The variable IN_{it} is a dummy with value one if being inactive. That is, the excluded group is the employed in both specifications.

Finally the vector Z_{it} contains other controls. In particular $Z_{it} = \{$being married, age groups, education, house owner, kids less than 14, household size$\}$.

The age groups are the following : 17-22, 23-29, 30-39, 40-49, 50-65, with the group 30-39 being excluded.[8]Education is split into three dummies, those with low education (less than second stage of secondary education, [ISCED 0-2]), those with medium education (second stage of secondary education, [ISCED 3]) and those with high education (recognised third level education, [ISCED 5-7]). The excluded group is the low education.[9]

Housing tenure is divided into house owners, renters and free renters. The excluded group is renters and free renters. Finally the dummy for kids less than 14 years old has been constructed by taking the difference between the household size and the number of adults above 14 years old.

For both specifications we will provide estimates from a Pooled and a Fixed Effect Logit, both for the total sample and for each country separately. The total sample is obtained by pooling the countries. Moreover, for the total sample we will interact U_{it} for the first specification and U_{it}^B, U_{it}^{NB} for the second, with country dummies. This will give estimates for the effect of these variables, for each country, on the probability to migrate relative to the average employed in the sample.

5.1 First Specification-The effect of Unemployment

Table 4, shows the results of the Pooled and Fixed Effect Logit estimation for the first specification using the total sample, which consists of the pooled data for Germany, France, UK, Italy, Greece and Spain. Columns A1 and B1 report the coefficients of the two estimations with a common coefficient for the unemployed dummy U_{it}, while columns A2 and B2 report the interaction between unemployed and country dummies, i.e. U_{it} x $Country$. The other coefficients of X_{it}^1 remain the same. Table 5 shows the estimates of the first specification for each country, separately.

[8]In the Fixed Effects Estimation age and age squared are used instead of the age groups.

[9]In the Fixed Effect Estimation, education is time invariant since we have excluded those still at work. Therefore, the effect cannot be identified and is not included.

5.1.1 Results from Pooled Logit Estimation

For the Pooled Logit estimation in Table 4, the coefficient of unemployed U_{it} in A1 is positive and significant at the 1% significance level. From Column A2, we see for all the countries that the unemployed are more likely to move relative to the average male employed in the sample. In particular, the positive effect is significant for Germany, Italy and Greece.

For the other variables, the coefficient in A1 and A2 on house ownership is significantly negative, as expected, since ownership increases the attachment to the home region. Moreover, individuals with high and medium level of education are more likely to move than those with low level, since the less-skilled tend to search more in the local labour market. Individuals below 23 years old and older workers, above 40, are less likely to move, compared to the base group of 30-39. The opposite holds for the age group 23-30. Coefficients for married, household size and kids are negative, but insignificant.

Results in Table 5 differ from Table 4 in that the estimation is performed for each country separately, so the relevant group is not the average European employed, but the employed in each country, with given characteristics.[10] In all countries, unemployed are more likely to move relative to employed after controlling for observed individual characteristics. The effect is significant for Germany, Italy and Greece. However, for Italy and Greece the hypothesis that the coefficient of unemployed is zero can be marginally rejected at the 5% significance level. For Germany, the odd ratio of 4.5 denotes that unemployed are 4.5 times more likely to move than employed. These results are in accordance with similar studies in the literature who have shown that the unemployed are more likely to migrate compared to the employed, since their opportunity cost is lower.

5.1.2 Results from Panel Logit Estimation Controlling for Fixed Effects

The Pooled Logit estimates are potentially biased if unobserved individual characteristics are correlated with X_{it}^1. In Columns B1 and B2 of Table 4, we report the estimates from the total sample after controlling for fixed effects. The coefficient of U_{it} in B1 is positive and significantly different than zero. That is, an average unemployed is more likely to migrate than an average employed. Column B2, shows the coefficient estimates of the (unemployed x country) interacted dummy. The coefficient is significant and positive for Germany and the UK. For France, Italy and Spain is positive but not significant, while for Greece is negative.

The sample size is much lower since the estimation conditions on having experienced a move. Thus, it contains only the observations for the individuals who have moved with a new job at least once, during the 5 years of the sample. Table 5, shows the estimated coefficient for U_{it}, for each country. For Greece and Spain no result is

[10] Only the coefficient estimates of U_{it} are reported and the odd ratios.

obtained, since the conditional estimation results in a very low sample.

Coefficient estimates from Table 5 are positive, for all countries, even after controlling for fixed effects. In particular, the coefficient is significant for Germany and the UK at the 1% level. The effect is higher for Germany having an odd ratio close to 10 compared to an odd ratio of 5 for the UK. For Italy, the coefficient is significant only at the 10% level, while for France it is not significant.

Therefore, the evidence after controlling for fixed effects confirms the known result from the literature that unemployed are more likely to move to another region relative to employed.

5.2 Second Specification-The effect of Unemployment Benefits

The second specification is estimated only for Germany, France and the UK. Table 6, shows the results for the total sample for Polled and Fixed Effect Logit, while Table 7, contains the results for each country, separately. From the previous analysis, it is expected a significant effect for either U_{it}^{B} and/or U_{it}^{NB}, for Germany in the Pooled Logit estimation and for Germany and the UK in the Fixed Effect Logit. The reason is that U_{it}^{B} and U_{it}^{NB} are obtained by interacting the unemployed dummy with a dummy on benefits, so the excluded group remains the employed. We are interesting in which of the two groups has a significant effect on the probability to migrate. If both have a significant effect then we would like to know for which group the effect is greater.

5.2.1 Results from Pooled Logit estimation

The coefficient of unemployed with benefits U_{it}^{B}, in Column A1 of Table 6, is positive and significantly different than zero, while the coefficient for the unemployed with no benefits U_{it}^{NB}, is not significant. From Column A2, only the coefficient of U_{it}^{B} and U_{it}^{NB} for Germany are significant, while U_{it}^{NB} only at the 10% level. Table 6a, column A2, shows for Germany that the odd ratio of U_{it}^{B} is higher (5.103) than the odd ratio of U_{it}^{NB} (3.568).

Table 7, shows the estimates by country. The odd ratio for recipients and non-recipients are very close for Germany, while for France and the UK the unemployed with benefits seem to be more likely to migrate compared to those without benefits, but the effect is not significant.

5.2.2 Results from Panel Logit Estimation Controlling for Fixed Effects

Column B1 in Table 6 and 6a, show that the coefficients and odd ratios for both U_{it}^{B} and U_{it}^{NB} are positive and significant, while the odd ratio for those with benefits is much higher than the odd ratio for those without benefits. That is, an average

unemployed with benefits is more likely to move, relative to an average employed, compared to an average unemployed without benefits.

Column B2 in Table 6, shows the coefficients for the country interaction dummies, which are all positive. In particular, the coefficients of U_{it}^{B} are significant for Germany and the UK, while those of U_{it}^{NB} only for the UK. In Column B2 of Table 6a, we see for each country that the odd ratio is higher for the unemployed with benefits. Moreover, the unemployed with benefits in the UK, are more likely to move (odd ratio 12.51), relative to an average employed in the sample, compared to an unemployed with benefits in Germany (odd ratio 7.184) and France (odd ratio 5.815).

Finally, Table 7, shows the coefficients and the odd ratios by country, and confirms the result that for all the countries the unemployed with benefits are more likely to move with a new job compared to the unemployed without benefits, even after controlling for fixed effects. For France, the effect is not significant, but the odd ratio is seven times higher for those with benefits compared to those without benefits.[11]

6 Conclusions

The purpose of this paper is to study how unemployment benefits affect the incentives of unemployed to move to another region for accepting a job, that is, to what extent unemployment benefits affect regional labour mobility.

A partial equilibrium search model is developed, which shows that in the presence of mobility costs, benefit recipients might be more likely to move to another region compared to non-recipients. This may happen when benefit recipients use the benefits to cover the costs involved in a change of region, which otherwise would lower the value of being employed in the new region. As long as this cost subsidisation counteracts the disincentive effect of benefits on search effort, benefit recipients will be more likely to move to another region to obtain a job than no-recipients.

Empirical evidence is provided using the ECHP data set for 1994-1998, for a sample of male labour force participants. The empirical analysis involves two specifications. In the first specification we focus on the effect of being unemployed, relative to employed, on the probability to migrate for a new job. The sample consists of Germany, France, UK, Italy, Greece and Spain. Using a conditional maximum likelihood estimation, we control for potential endogeneity of the unemployment status with unobserved heterogeneity and we find that the unemployed are significantly more likely to move.

In the second specification, we consider the effect of unemployment benefits on the probability to migrate for the restricted sample of Germany, France and the UK, due to data limitation. We find that the unemployed with benefits are more likely to move to another region compared to the unemployed without benefits. In particular, for Germany, both coefficients are positive, but only the coefficient for those with

[11] The hypothesis that the two coefficients are the same could not be rejected.

benefits is significant. For the UK, both coefficients are positive and significant, but unemployed with benefits are more likely to move. Finally, for France the coefficients are not significant, but the effect is higher for the benefit recipients.

Therefore, the main conclusion is that, not only unemployed are more likely to migrate compared to employed, but among the unemployed, the effect is higher for the benefit recipients. This evidence is in line with theoretical and empirical results of the positive effect of unemployment benefits on the efficiency of the job-matching process, for instance, Wadsworth (1991) and Marimon&Zilibotti (1999).

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Table 1. Description of Dependent Variable By Employment Status.

	(1)	(2)	(3)	(4)
	Number of Obs.	% of Movers	Employed Movers as % of Employed	Unemployed Movers as % of Unemployed
Total	97373	0.30 (294)	0.28	0.48
Germany	14171	0.27 (38)	0.22	0.99
France	14221	0.33 (47)	0.31	0.58
UK	11177	1.36 (152)	1.32	1.89
Italy	23029	0.10 (22)	0.07	0.26
Greece	14022	0.11 (16)	0.08	0.49
Spain	20754	0.09 (19)	0.08	0.14

Source: ECHP 1994-1998. The number in parenthesis in (2) are the number of moves with new job. Total refers to the sample when countries are pooled together.

Table 2. Description of Dependent Variable By Unemployment Benefits

	(1) % of Movers	(2) Unemployed Movers as % of Unemployed	(3) Unemployed Movers with Benefits as % of Unemployed with Benefits	(4) Unemployed Movers without Benefits as % of Unemployed without Benefits
Total	0.30 (294)	0.48	0.68	0.42
Germany	0.27 (38)	0.99	1.12	0.71
France	0.33 (47)	0.58	0.87	0.43
UK	1.36 (152)	1.89	2.38	1.69
Italy	0.10 (22)	0.26	1.09	0.23
Greece	0.11 (16)	0.49	0.00	0.57
Spain	0.09 (19)	0.14	0.00	0.20

Source: ECHP 1994-1998.

Table 3. The Benefit System

	(1) Benefit Replacement Ratio %	(2) Benefit Duration (years)	(3) Active Labour Market Policies	(4) Unemployed per Staff Member
Germany	63	4	25.7	39
France	57	3	8.8	79
UK	20	4	6.4	72

Source: Table 10 in S.Nickell and R. Layard (1999)

Note: Active Labour Market Policies are measured as: the spending per unemployed person as a percentage of GDP per member of the labour force.

Unemployed per Staff Member refers to employment offices.

Table 4. Pooled and Fixed Effect Logit Estimates. Dep. Variable: Inter-regional Move with New Job. Specification 1. Total Sample.

	A. Pooled		B. Fixed Effect	
	A1	A2	B1	B2
Unemployed	.724		1.17	
	(.180)		(.296)	
Unemployed*Germany		1.53		1.87
		(.395)		(.693)
Unemployed*France		.422		.454
		(.451)		(.634)
Unemployed*UK		.333		1.65
		(.295)		(.552)
Unemployed*Italy		.831		.551
		(.480)		(.750)
Unemployed*Greece		1.70		-.197
		(.578)		(1.24)
Unemployed*Spain		.513		.564
		(.591)		(1.05)
Inactive	.052		.527	
	(.213)		(.347)	
Married	-.117	-.124	.356	.433
	(.153)	(.154)	(.395)	(.406)
House Owner	-.865	-.876	.133	.160
	(.127)	(.129)	(.255)	(.261)
H.Size	-.085	-.082	.254	.283
	(.058)	(.056)	(.112)	(.116)
Children 14-	-.071	-.053	-.826	-.935
	(.175)	(.174)	(.345)	(.357)
High Education	1.20	1.19		
	(.169)	(.170)		
Medium Education	.576	.554		
	(.187)	(.187)		

Table 4. Pooled and Fixed Effect Logit Estimates. Dep. Variable: Inter-regional Move with New Job. Total Sample. (Continued)

	A. Pooled		B. Fixed Effect	
	A1	A2	B1	B2
Age			.305	.358
			(.248)	(.253)
Age^2			-.003	-.004
			(.003)	(.003)
18-22	-.198	-.212		
	(.250)	(.253)		
23-29	.432	.438		
	(.146)	(.147)		
40-49	-.994	-.990		
	(.213)	(.213)		
50-65	-1.92	-1.92		
	(.328)	(.329)		
Constant	-6.22	-6.20		
	(.359)	(.405)		
Log Likelihood	-1660	-1653	-318	-314
R^2	15.8	16.2		
Number of Obs	96170	96170	942	914

Notes: 1. In A1 and A2 the excluded group is an employed, not married, 30-39 years old, without children, renter or in free rent house, with low education.

2. In A2 and B2 the Unemployed and the Inactive dummy are interacted with the country dummies. The coefficients are intepreted relative to the average European employed. The Inactive coefficients are not reported.

3. In A1 and A2 year and country dummies are included. Standard errors in parenthesis are corrected for repeated observations for each individual.

Table 5. Pooled and Fixed Effect Logit Estimates. Dep. Variable: Inter-Regional Move with New Job. Specification 1. By Country.

	A. Pooled		B. Fixed Effect	
	Coef.	Odd Ratio	Coef.	Odd Ratio
Germany				
Unemployed	1.50	4.514	2.29	9.949
	(.443)		(.825)	
N	12898		135	
R^2	12.9			
France				
Unemployed	.603	1.828	.550	1.733
	(.489)		(.659)	
N	13240		161	
R^2	13.9			
UK				
Unemployed	.280	1.323	1.66	5.259
	(.298)		(.565)	
N	10981		483	
R^2	10.1			
Italy				
Unemployed	1.37	3.942	1.88	6.591
	(.692)		(1.08)	
N	18178		77	
R^2	7.7			
Greece				
Unemployed	1.24	3.489		
	(.636)			
N	10416			
R^2	18.2			
Spain				
Unemployed	.213	1.237		
	(.649)			
N	12204			
R^2	8.9			

Notes: 1.In Panel A other controls include: married, education, age groups, house owner, household size, kids. Standard errors are corrected for repeated observation for each individual. 2. In Panel B other controls are married, age, age^2, house owner, household size, kids for each country.

Table 6. Pooled and Fixed Effect Logit Estimates. Dependent Variable: Inter-Regional Move with New Job. Specification 2. Total Sample.

	A. Pooled		B. Fixed Effect	
	A1	A2	B1	B2
Unemployed with Benefits (UnWb)	1.02 (.279)		2.14 (.541)	
Unemployed without Benefits (UnNb)	.306 (.300)		.980 (.422)	
UnWb*Germany		1.61 (.436)		1.97 (.757)
UnWb*France		.840 (.618)		1.76 (1.20)
UnWb*UK		.616 (.466)		2.52 (1.15)
UnNb*Germany		1.27 (.749)		1.61 (1.10)
UnNb*France		.167 (.611)		.030 (.784)
UnNb*UK		.195 (.369)		1.37 .615
Inactive	.079 (.236)		.381 (.396)	
Married	-.051 (.171)	-.058 (.171)	.537 (.413)	.556 (.415)
House Owner	-1.04 (.151)	-1.05 (.151)	-.249 (.279)	-.214 (.284)
H.Size	-.120 (.072)	-.116 (.072)	.256 (.126)	.259 (.129)
Children 14-	-.100 (.210)	-.099 (.210)	-1.02 (.394)	-1.10 (.403)

Table 6. Pooled and Fixed Effect Logit Estimates. Dependent Variable: Inter-Regional Move with New Job. Total Sample. (Continued)

	A. Pooled		B. Fixed Effect	
	A1	A2	B1	B2
High Education	1.35	1.33		
	(.218)	(.172)		
Medium Education	.940	.922		
	(.241)	(.241)		
Age			-.056	-.039
			(.274)	(.277)
Age^2			.000	-.000
			(.004)	(.004)
18-22	-.277	-.295		
	(.287)	(.290)		
23-29	.368	.374		
	(.155)	(.155)		
40-49	-1.12	-1.12		
	(.248)	(.248)		
50-65	-1.89	-1.90		
	(.349)	(.351)		
Constant	-3.82	-3.80		
	(.303)	(.305)		
Log Likelihood	-1224	-1221	-260	-258
R^2	14.0	14.2		
Number of Obs	38957	38957	779	779

Notes: 1. In A1 and A2 the excluded group is an employed, not married, 30-39 years old, without children, renter or in free rent house, with low education.

2. In A2 and B2 the dummies UnWb and UnNb and Inactive are interacted with the country dummies. The coefficients are intepreted relative to the average European employed. The coefficients for Inactive are not reported.

3. In A1 and A2 year and country dummies are included. Also standard errors in parenthesis are corrected for repeated observations for each individual.

Table 6a. Odd Ratios of Pooled and Fixed Effect Logit Estimates. Dependent Variable: Inter-Regional Move with New Job. Specification 2. Total Sample.

	A. Pooled		B. Fixed Effect	
	A1	A2	B1	B2
Unemployed With benefits (UnWb)	2.798***		8.519***	
Unemployed Without benefits (UnNb)	1.358		2.665**	
UnWb*Germany		5.013***		7.184***
UnWb*France		2.318		5.815
UnWb*UK		1.852		12.51**
UnNb*Germany		3.568*		5.003
UnNb*France		1.182		1.031
UnNb*UK		1.216		3.957**

Notes: *** denotes significant at 1% significance level, ** at 5% and * at 10%

Table 7. Pooled and Fixed Effect Logit Estimates. Dep. Variable: Inter-Regional Move with New Job. Specification 2. By Country.

	A. Logit		B. Fixed Effect	
	Coef.	Odd Ratio	Coef.	Odd Ratio
Germany				
Unemployed with Benefits	1.49	4.480	2.43	11.36
	(.481)		(.902)	
Unemployed without Benefits	1.53	4.639	1.96	7.139
	(.811)		(1.20)	
N	12898		135	
R^2	12.9			
Log Likelihood	-225		-36	
France				
Unemployed with Benefits	.973	2.646	2.00	7.415
	(.641)		(1.28)	
Unemployed without Benefits	.324	1.383	.044	1.045
	(.633)		(.807)	
N	13238		161	
R^2	14.0			
Log Likelihood	-263		-53	
UK				
Unemployed with Benefits	.547	1.728	2.55	12.81
	(.463)		(1.17)	
Unemployed without Benefits	.156	1.169	1.39	4.039
	(.379)		(.623)	
N	10981		483	
R^2	10.2			
Log Likelihood	-708		-160	

Notes: 1.In Panel A other controls include: married, education, age groups, house owner, household size, kids. Standard errors are corrected for repeated observation for each individual. 2. In Panel B other controls are married, age, age^2, house owner household size, kids for each country.