Hacienda Pública Española / Revista de Economía Pública, 171-(4/2004): 133-156

An extra time duration model with application to unemployment duration under benefits in Spain *

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Recibido: junio, 2003
Aceptado: Noviembre, 2004

Abstract

This paper postulates that the effect of unemployment benefits on the hazard rates changes considerably using a traditional duration model that uses only unemployment insurance (UI) data, or deals with unemployment assistance (UA) as a mere extension of UI, instead of an extra time duration model that accounts separately for transition rates to work of the unemployed who receive UI and UA. For UI recipients the hazard rate rises dramatically when UI benefits lapse approaches. On the contrary, for UA recipients the hazard rate remains flat or even has a slight fall nearby the UA lapse. Finally, there is a group of unemployed qualified for UA that quit UI due to the income fall that they will experience when they pass from UI to UA.

Key words: unemployment insurance, unemployment assistance, mixed proportional hazard model, sequential exits, unobserved heterogeneity.

JEL classification: J64.

1. Introduction

The design of an efficient Unemployment Compensation System (UCS) is a common concern of policy makers in OECD and transition countries. As is well known, in most of those countries the UCS is organised in two programs: unemployment insurance (UI) and, mainly after UI lapse, unemployment assistance (UA). The objective of this paper is to assess what can be learned about the influence of the UCS on the unemployment duration with

* We are indebted to Richard Blundell who participated in a substantial portion of this paper while José M.ª Arranz was a visitor in the Department of Economics in University College London. We also benefited from comments of participants at the 2001 European Association of Labour Economics (EALE) in Jyvaskyla (Finland), the 2002 Annual Conference of the Journal of Population Economics (ESPE) in Bilbao (Spain) and the First International Conference on Microeconometric Models and Simulation Tools for Fiscal Policy in the Institute for Fiscal Studies (IEF) in Madrid (Spain). José M.ª Arranz would like to thank the Ramón Areces Foundation for the financial support. This research was supported by grants MCYT SEC2001-1528 and CAM 06/0147/01. We also thank the Spanish Employment Agency (INEM) for providing the HSIPRE database and James Walker who gave us the CTM program.

administrative data records coming from an Unemployment Agency. We show that the information about UA matters in whatever analysis of the effect of unemployment benefits on the hazard rates. We find theoretical arguments and empirical evidence on the bias in which the traditional approach incurs. Thus, we will observe that the hazard rate of finding a job changes considerably when we specify a traditional duration model that takes account of only UI information (TDM), or deals with UA as a mere extension of UI (complete benefits model, CBM), instead of an extra time duration model that accounts separately for transition rates from unemployment benefits (ETDM) to work of the unemployed who receive UI and those who receive UA after UI has expired. In addition this paper examines why some unemployed in Spain [1], a country that is frequently criticised for having a generous UCS, qualified for getting UA decided to quit the UCS while they were receiving UI. We think that the distinction between UI and UA in a richer and suited specification should offer enough arguments for policy makers to better understand the determinants of welfare duration, and their associated costs, meaning an important step toward developing future public policies to preserve a possible crisis of the Welfare System.

The analysis of the influence of unemployment benefits on unemployment duration and job search behaviour is also a general purpose of empirical studies. The standard prediction [2] is that unemployment benefits —the level and the entitlement duration— tend to increase the duration of unemployment. This argument has been one of the most influential explanations of why unemployment rates are higher in Western Europe than in USA, where the UCS is less generous, Layard and Nickell (1986). Despite the important political influence of this view, the empirical evidence on the effect of the level and the entitlement duration of benefits vary according to the countries, see Atkinson and Micklewright (1991) for a survey.

In the literature, a number of microeconomic studies do not find effects of the UI level on the unemployment duration, for example Lynch (1989) for USA, Hujer and Schneider (1989) for Germany and Groot (1990) for Netherlands. Other studies show that this effect is negative, for example, Katz and Meyer (1990) and Moffit (1985) for USA, Narendranathan *et al.* (1985) for UK and Van den Berg (1990) for Netherlands. On the contrary, the UI level increase the intensity of job search by the unemployed such as Blau and Robins (1990) for USA and Wadsworth (1990) for UK. Finally, other studies take account of the possibility that the impact of UI level on the hazard rate depends on spell duration. Thus, Nickell (1979) for UK and Fallick (1991) for USA find that UI level effect disappears after 20 weeks.

Regarding the UI entitlement duration effect, Moffit and Nicholson (1982) for USA and Hunt (1995) for Germany detect that an increase in potential UI duration increases the mean length unemployment duration. However, generally hazard rates increase when UI exhaustion approaches, for example, Katz and Meyer (1990) for USA, Ham and Rea (1987) for Canada and Carling et al. (1996) for Sweden. Nevertheless, other studies find that the tendency to leave unemployment increases at the end of unemployment benefit is inaccurate. For example, Fallick (1991) and Narendranathan and Stewart (1993) for UK find that the effect of unemployment benefits decreases over time or Micklewright and Nagy (1998) for Hungary detect no rise in the hazard near the time of benefit exhaustion.

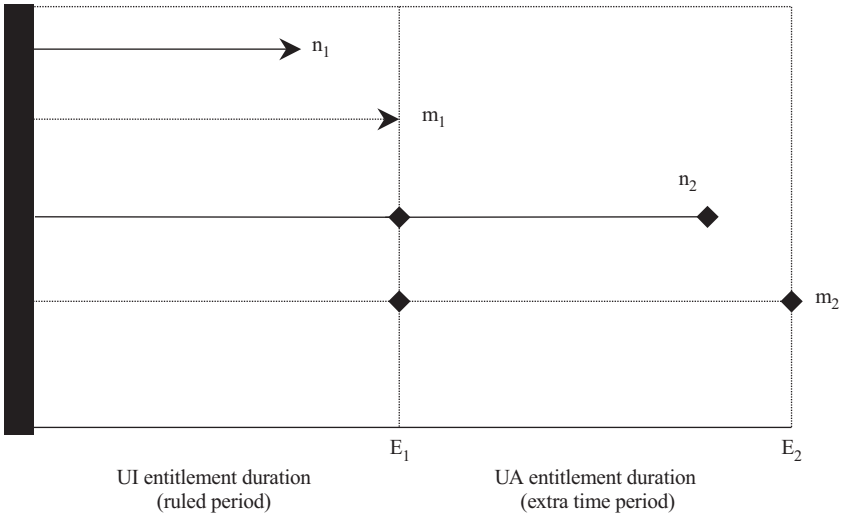

Figure 1. Unemployment duration of the unemployed using administrative database

The studies that analyse the effect of unemployment assistance (UA) on the hazard rate are scarce. While Micklewright and Nagy (1999) find that UA level discourages the search effort of the unemployed for Hungary; Earle and Pauna (1998) detect that the effect is null for Romania. Finally, Erbenova *et al.* (1998) for Czech Republic and Earle and Pauna (1998) for Romania observe a work disincentive effect of UA entitlement duration on the hazard rates.

The main idea of the paper can be summarised in figure 1, that represents the unemployment durations of the unemployed in our administrative database. Let us consider an inflow, or a cohort, of newly unemployed that enters into the UCS (see appendix A for a further discussion about UCS in Spain) at the same time, the black zone in the left side of the figure. As time goes by a part of the cohort, we observe that there are unemployed «n_1» (unbroken line with arrow) who receive UI and quit the UCS to work or exhaust UI «m_1» (broken line with arrow) in a ruled period disappearing from our database. The only thing we know about individuals such as «m_1» is that they remain unemployed at least E_1, where E_1 is UI entitlement duration. As they are not eligible for an additional UA entitlement duration, they disappear from our administrative records (censored observation at E_1). But there is also a group of UI unemployed eligible for an additional UA period after UI lapse. They are represented in the figure by rhombus arrows (with unbroken and broken lines). The unbroken line with a rhombus arrow portrays those unemployed (n_2) who exit out of unemployment under UA to a job; and finally, the broken line with a rhombus arrow those (m_2) who reach the maximum length of UA. This last observation is censored at E_2, being E_2 UA entitlement duration.

Faced with that kind of data we have the opportunity of making a traditional approach to measuring exit rates of finding a job utilising only information of UI (TDM) or dealing with UA as a mere extension of UI (CBM) without separating their effects. How-

ever, we think that both approaches do not account for biases stemming from differences between sequential exits hazard rates, one for the unemployed who receive UI and another for UA recipients after UI has expired. On the one hand, we do not suggest estimating the unemployment benefits effect jointly because hazard rates arise sequentially during two periods (ruled and extra) that correspond to different unemployment benefits schemes whose characteristics and objectives differ: characteristics are different because while UI is received by the unemployed who worked a minimum contribution period and its level is a percentage of the worker's previous earnings; UA is received by the unemployed who exhausted UI whose entitlement duration depends on age (less or more than 45 years old) or mainly on having or not family burdens, and moreover the UA level is based on the National Minimum Wage. Objectives stands out because while UI allows job seekers to receive offers with more attractive wages, and thus, in theory, to secure more productive jobs; UA is granted to the unemployed with low incomes to reconcile the objective of social equity in society. On the other hand, if we measure the hazard rates of finding a job with only UI data, we will undervalue the current unemployment duration because we do not take account of UA duration in those unemployed who exhausted UI. A simple analysis with our data helps to appreciate this evidence. We see looking at table B1 in the appendix B that the current unemployment duration of the unemployed who receive UI was 8.69 months in 1991 that is prolonged to approximately 15.59 months adding UA data of the unemployed who exhausted UI. Therefore, the current unemployment duration is undervalued 6.9 months in our analysis because there is a percentage (78.5-42.2=36.3%) of the unemployed that remained in unemployment receiving UA after UI has expired. This evidence is also apparent in the rest of the years.

The rest of the paper is organised as follows. A theoretical framework about the effect of UI and UA on the behaviour of the unemployed is developed in section 2. The empirical model and likelihood function are presented in section 3. The data in section 4. Variables and empirical results appear in section 5. Finally, we summarise our findings in the last section.

2. Theoretical framework

In this section we model the impact of UI and UA on unemployment duration. To model the effect of the duration of benefits —as well as the more usual effect of the level of benefits— we formulate the problem within the standard labour-leisure framework developed by Moffitt and Nicholson (1982) rather than within the usual job search framework. We first estimate the effect of UI on unemployment duration and, later the impact of UA after the exhaustion of UI. Because we wish to examine the effect of potential UI and UA durations and because we intend to apply our model to a set of unemployed who have experience lengthy periods of unemployment, we suppose that unemployed make fairly long-run decisions regarding the uses of their time.

In that context following to Moffitt and Nicholson (1982) we assume that a newly unemployed considers his or her budget constraint over a long planning horizon and chooses the number of days he or she wants to work or to be unemployed. The unemployed is assumed to maximise utility, which is a function of total net income over the period and number of days of unemployment. Unemployment provides utility for two reasons: leisure time and opportunity for productive job search. For most purposes we will not differentiate between these two uses of non-employed time. Hence our model of unemployment is more closely related to labor-leisure choice models of labor supply than it is to search-theoretic models.

Figure 2 shows the budget constraints. Lines AZ and ACD show the trade-off between months of unemployment (U) and total net income (Y) in the absence and presence of *UI.* Utility is maximized subject to these tradeoffs. In the absence of *UI,* an additional day of unemployment decreases income by net wage (W), the result is portrayed by line AZ. However, in presence of *UI,* each additional day of unemployment, starting at point A, reduces income by W-B_{UI}, where B_{UI} is the daily UI level. This expression can be written as $W(1–R_{UI})$, where R_{UI}=B_{UI}/W is the UI replacement ratio. The budget constraint has a convex kink in point C, the month of unemployment benefit exhaustion, because the unemployed ceases to be subsidised. After the exhaustion of UI (E_1) an additional day of unemployment reduces the individual's income by the potential net wage W, line CD. Prior to the exhaustion of *UI,* an additional day of unemployment reduces income by less than W, because UI is received and $W(1–R_{UI}) < W$.

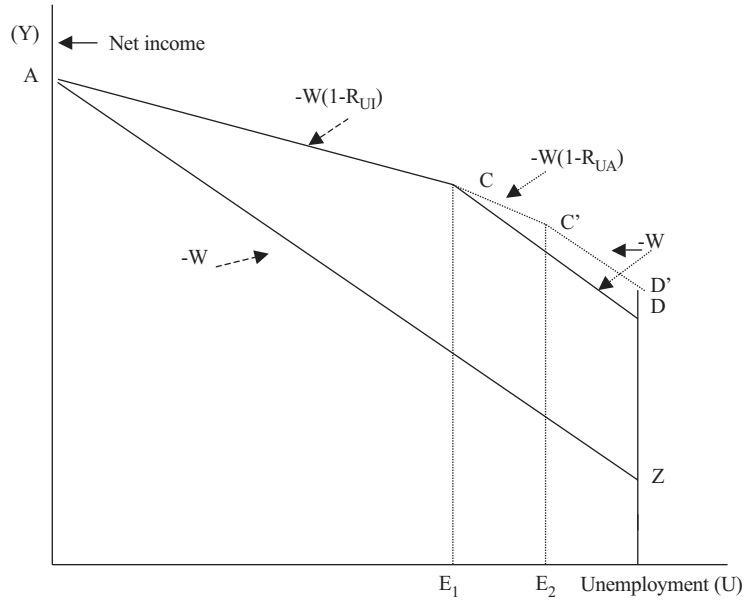

Figure 2. Budget constraint for the unemployed who receive UI and UA

Utility maximization subject to the kinked budget line ACD will differ according to the shape of the individual preference map. For a nonexhaustee of *UI,* a tangency will occur along segment AC, facing a marginal daily wage of $W(1–R_{UI})$ and leave the UI before benefits are exhausted. For those exhaustees of *UI,* a tangency will occur along segment CD, remaining unemployed for some time beyond the maximum duration.

On that situation, how does the budget constraint of Figure 2 change when some unemployed access UA after UI has expired around point C? We may make some comments informally following Moffit and Nicholson's model. Firstly, there is a new budget constraint, ACC'D' that captures the behaviour of the unemployed who receive UI (budget AC), UA (budget CC') or non receivers of unemployment benefits (budget C'D'). Secondly, the slope of UA recipients, $W(1–R_{UA})$, is higher than the slope of UI recipients, $W(1–R_{UI})$, because $R_{UA} < R_{UI}$. Finally, the new budget presents two kink points (C,C').

The behaviour of the unemployed under all these new additional features is the following: (1) A nonexhaustee of UI, without eligible conditions to access UA, is unaffected by the change of adding UA data, remaining along AC. It is uncertain when he or she will find a job and what the wage will be but he or she face income and leisure in the same direction as when we only consider UI data. (2) A nonexhaustee of UI, eligible for UA, prefers more income than leisure due to the pay fall that he or she will experience when passing from UI to UA, reducing his or her unemployment duration. (3) An exhaustee of UI at the initial kink C will either stay at the kink and move to C' (if he or she is eligible for UA), or locate along CC' or C'D', increasing unemployment in either case. Finally (4) an exhaustee of UI and UA will experience various combinations of income and substitution effects increasing unemployment in either case.

3. The empirical model.

The empirical model used to study the transition rates from unemployment benefits to work of the unemployed receiving UI and those receiving UA is a continuous mixed proportional hazard (mph). The hazard representation for the mph [3] is the following:

$$h_{ij}(t_{ij} \mid X,\theta) = \lambda_{0ij}(t_{ij})\varphi_{ij}(X'\beta_{ij})\Phi_{ij}(c_{ij}\theta) \qquad i \neq j,\ i = 1,2..N;\ j = 1,2 \qquad [1]$$

where subscript i and j show the individual and the period of unemployment under benefits (j=1=*UI,* j=2=*UA*), respectively. The term t_{ij} is the current duration of i's j'th unemployment benefit period. This equation asserts that the hazard rate out of unemployment under benefits into employment is influenced by three factors: The function $\lambda_{0ij}(t)$, named the baseline hazard function, captures the effect of the time elapsed in the unemployment state on the instantaneous conditional probability of finding a job when all the factors hold constant. The function $\varphi_{ij}(X)$ presents the influence of time invariant and time varying variables on the hazard rate of finding a job. Finally, the function $\Phi_{ij}(\theta)$ accounts for the effects of unobserved heterogeneity components such as ability, attitudes, skills, etc. on the hazard rate of finding a

job. This function is usually assumed to be equal to $c_{ij}\theta$, where c_{ij} represents specific transition intensities between different states. In our case we analyse only transitions between unemployment benefits and employment and therefore we make c_{ij}=1 by normalisation. We also assume θ to be fixed across periods for a given individual and to have a distribution G(.) across individuals. All the three functions must assure that expression [1] is non-negative. We guarantee this property using an exponential representation for each function.

3.1. The likelihood function and the estimation method

The specification of a traditional likelihood function for a sample of unemployed that enters at the same time into the Spanish UCS contains complete and censored unemployment observations making use of UI or UI+UA data. Complete observations refer to the unemployed who quit the UCS to work. Censored observations correspond to the unemployed who exhaust UI making use of UI data, or exhaust UI or UA managing UI+UA data. The specification of the traditional likelihood function is given by:

$$L(\vartheta \mid X,\theta) = \prod_{i=1}^{n} \left[f(t_{i1}, X_{i1}, \theta) \right]^{d_{i1}} \times \left[S(t_{i1}, X_{i1}, \theta) \right]^{(1-d_{i1})} \qquad [2]$$

where $\vartheta = \beta_{ij}$; the contribution to the likelihood function of the complete and censored observations are the density function $f(t_{i1})$ and survival function $S(t_{i1})$, respectively; d_{i1} is a dummy variable that takes value 1 when the unemployed quits the UCS to work, otherwise zero.

We think that this likelihood function would be incomplete and estimations obtained by maximising [2] may be biased due to two reasons. Firstly, there are censored observations making use of only UI data that are complete because there are some unemployed that access UA after UI has expired. Secondly, if we treat UA duration as a mere extension of UI duration (using UI+UA data) data, we will not account for differences between sequential exits, one for the unemployed who receive UI and another for UA recipients. Accordingly, we develop the following extra time likelihood function to cover this bias:

$$\begin{aligned} L(\vartheta \mid X,\theta) = & \prod_{i=1}^{N} \underbrace{\left[f(t_{i1}, X_{i1}, \theta) \right]^{d_{i1}}}_{n_1} \times \underbrace{\left[S(t_{i1}, X_{i1}, \theta) \right]^{d_{i2}(1-d_{i1})}}_{m_1} \times \\ & \times \underbrace{\left[\left\{ f(t_{i2}, X_{i2}, \theta) \right\} \times \left\{ S(t_{i1}, X_{i1}, \theta) \right\} \right]^{d_{i3}(1-d_{i1})(1-d_{i2})}}_{n_2} \times \\ & \times \underbrace{\left[\left\{ S(t_{i2}, X_{i2}, \theta) \right\} \times \left\{ S(t_{i1}, X_{i1}, \theta) \right\} \right]^{(1-d_{i1})(1-d_{i2})(1-d_{i3})}}_{m_2}. \end{aligned} \qquad [3]$$

This likelihood function contains four components: the first component captures the likelihood (density function $f(t_{i1})$) that the unemployed quits the UCS to work receiving UI (n_1, see also figure 1 to understand our terminology) in time t_{i1}; the second component measures the likelihood (survival function $S(t_{i1})$) that the unemployed exhausts UI (m_1) disap-

pearing from the records forever; the third and fourth component account for the likelihood that the unemployed who has access to UA (after UI has expired) may find a job (n_2) or exhaust UA (m_2). Those last two components cover the bias of equation [2] and are composed of the product of the density function $f(t_{i2})$ and $S(t_{i2})$ by the survival function $S(t_{i1})$.

In [3] d_{i1} d_{i2}, d_{i3} are dummy variables; d_{i1} takes value 1 when the unemployed exits to a job receiving UI (0 for the rest); d_{i2} is equal to 1 when the unemployed exhausts UI disappearing from the records for ever (0 for the rest), and finally, d_{i3} separates the uncensored and censored durations of recipients who get UA after the UI exhaustion. It takes value 1 when the unemployed exit to a job (0 for the rest).

The parameter estimates are obtained by maximising the next likelihood function across all N unemployed:

$$L(\vartheta \mid X) = \prod_{i=1}^{N} \left[\int_{\Theta} L_i(\vartheta \mid X, \theta) dG(\theta) \right] \qquad [4]$$

where $G(\theta)$ is the distribution function for θ, Θ is the range of θ and $L(\vartheta|X,\theta)$ is given by [3]. To complete the specification of this likelihood function, we specify the distribution function $G(\theta)$ for the unobserved heterogeneity. Thus, following Heckman and Singer (1984c), we use a non-parametric method that approximates the unknown probability distribution for a finite number of support points, and uses the data to estimate the location and the probability mass associated with each support point. The basic procedure is to estimate a model with a finite number of support points, starting with one (which is just a model without heterogeneity), and adding support points until the estimated model becomes singular. In particular, we restrict all the points to being on the unit interval, and we constrain one point of support to be 0 and one to be 1 and estimate the location and probability mass associated with each support point noting that the cumulative mass over all support points must add up to 1. The rest of the points will be estimated on the interval (0,1).

We used the CTM computer programme to estimate the parameters of the model (see Yi, Honoré and Walker, 1987). This programme estimates jointly the values of the parameter vector ϑ and the support points that characterise the underlying distribution of the unobserved heterogeneity component θ by an iterative maximum likelihood method. The maximum likelihood estimates of ϑ conditional on the number of support points have all the properties of an extremum estimator (consistency and asymptotic normality). This estimation procedure has been used before, among others, by Heckman, Hotz and Walker (1985) with demographic data, and Vilcassim and Jain (1991) with marketing data.

4. The data

The data used in this analysis come from the HSIPRE (Histórico del Sistema de Prestaciones por Desempleo) administrative database. It contains information of the unemployed that receive UI and UA from the Spanish Employment Agency (INEM, Instituto

Nacional de Empleo). A thorough description of this database can be found in Cebrián *et al.* (1996). The advantage of the HSIPRE database is that it provides accurate information of the level of benefits, the current and the entitlement unemployment benefit periods (in days) and information of several unemployment benefit periods for the same individual. The disadvantage is the lack of information about the labour force status the days after UI and UA are exhausted by the unemployed and, unfortunately, it does not include information about marital status, labour market situation of the spouse, industry, size of the firm in the previous job and workers who quit (and therefore are not entitled to access UCS) or have never been involuntarily separated from their jobs.

Our sample is drawn from the inflow to the register of unemployment of the unemployed with ages between 18 and 59 years old [4] that entered the Spanish UCS during February 1987. We focus our analysis on the unemployed entitled to UI and UA, where UA is received by the unemployed who exhausted UI. We follow those unemployed until they escape from unemployment or exhaust the unemployment benefit periods. The resulting sample contains 11,668 unemployed who received UI of whom 3,077 unemployed received UA.

Table 1 gives descriptive statistics on a variety of characteristics for the unemployed of this sample. The first column of table 1 presents characteristics of the unemployed who receive UI or both types of unemployment benefits using UI+UA data. The second column separates characteristics of the unemployed who receive UI or UA. We compare the results of both columns, and we show the advantages of using UA in a proper way by presenting the data as in the second column. The conclusions about the characteristics of those unemployed may present outstanding alterations making use of unemployment benefit data separately or jointly. For example, we may say that the unemployed remain in longer current unemployment periods on UA (461.15 days) than on UI (217.69 days), and receive lower UA level (219.37€) than UI level (363.25€); however, those evidences are not perceived using data jointly because the current unemployment duration (339.95 days) and the level of benefits (328.63€) are a mixture of both types of unemployment benefits. Furthermore, the percentages of the unemployed who exit from the UCS will be very different using the data in a wrong way. Thus, 58.8 percent of the unemployed exhaust unemployment benefit periods and 41.2 percent get a job making use of unemployment benefit data jointly; however, if we use unemployment benefit data separately: 31.4 percent of the unemployed get a job receiving UI and only 42.2 percent exhaust UI because 26.4 percent access UA. Concerning this last group of the unemployed who remain longer on the UCS thanks to the UA, 37.1 percent (9.8 percent of the entire sample) get a job receiving UA and 62.9 percent (16.6 percent of the entire sample) exhaust UA. Making a proper reading of table 1, we may say that the unemployed who receive UI [5] are on average younger, a higher fraction of males, have higher net wages in the last job as well as a higher level of benefits, have less family burdens and remain shorter periods in unemployment than those unemployed who receive UA.

Now, we show in figure 3 the habitual empirical hazard with the Kaplan-Meier estimation. In this figure, the empirical hazards of the unemployed on the TDM are overvalued compared to the ETDM for UI data (UI seq). This empirical evidence justifies a theoretical

Table 1
Descriptive statistics on variables of the unemployed who receive benefits

Variables	UI+UA data			Benefits separately					
				UI			UA		
	Mean	Std	Sample (%)	Mean	Std	Sample (%)	Mean	Std	Sample (%)
Gender									
Male			65.8			65.8			53.7
Female			34.2			34.2			46.3
Age (years)									
Entry age	31.80	10.23	100	31.80	10.23	100	33.64	9.91	100
Exit age	32.75	10.41	100	32.4	10.36	100	34.92	9.90	100
Exit age square	1180.8	793.95	100	1157.6	785.28	100	1317.9	772.9	100
Family burdens									
With			40.4			27.3			86.9
Without			59.6			72.7			13.1
Unemployment duration (days)									
Current	339.95	360.17	100	217.69	215.44	100	461.15	205.82	100
Entitlement	447.83	369.08	100	294.72	242.46	100	577.52	96.25	100
Duration until the exhaustion	107.88	183.58	100	77.03	165.06	100	116.36	179.83	100
(Duration until the exhaustion /10)^2	453.37	1001.6	100	331.77	922.54	100	458.70	850.55	100
Net wage (€/ month)	401.18	131.80	100	401.12	131.80	100	379.66	98.99	100
Level of benefits(€/ month)	328.63	101.93	100	363.25	86.31	100	219.37	32.51	100
Cause of unemployment									
End of contract			95.9			95.9			95.7
Others			4.1			4.1			4.3
Exit from the UCS									
Get a Job			41.2			31.4			37.1 (9.8)*
Exhaust benefits			58.8			42.2			62.9 (16.6)*
Job category									
1			7.7			7.7			3.2
2			8.9			8.9			8.4
3			4.5			4.5			3.6
4			12.0			12.0			12.1
5			21.7			21.7			20.2
6			18.2			18.2			18.5
7			27.1			27.1			34.2
Sample		11,668			11,668			3,077	

Legend. Job category variable: 1. High levels and associate professional technicians, foremen and supervisors; 2. Technical assistants and skilled clerical workers; 3. Semi-skilled clerical workers; 4. Unskilled clerical workers; 5. Skilled production workers; 6. Semi-skilled production workers; 7. Unskilled production workers.

* We present in brackets the percentage of the unemployed who access UA: 9.8 percent (of 11,668 unemployed) get a job receiving UA and 16.6 percent exhaust UA.

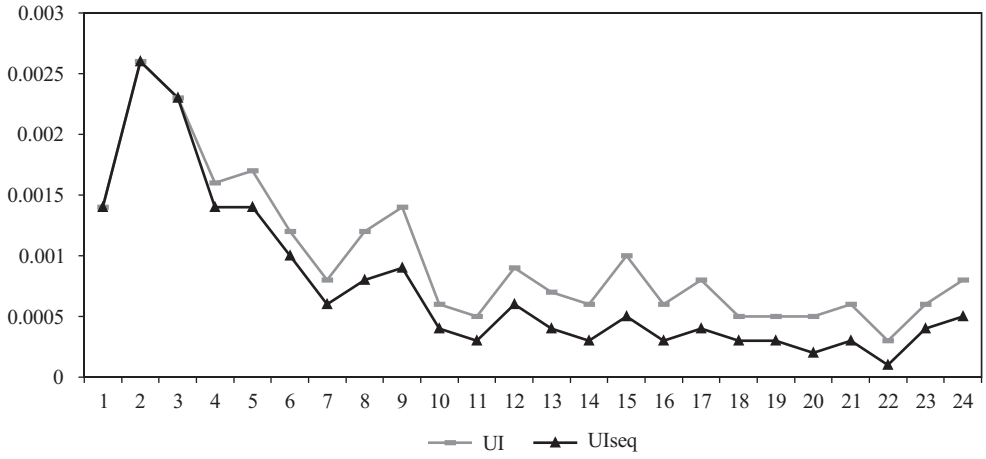

Figure 3. Empirical hazard rate of the unemployed making use of a traditional UI duration model (UI) and an extra time duration model for UI recipients (UI seq)

bias outlined through the mentioned likelihood specifications: the traditional hazard rates are overvalued and therefore the expected unemployment duration is undervalued. We also observe in figure 3 a phase with increasing exit rates during the first months of unemployment approximately until the second month (a positive duration dependence), followed by a phase of declining rates until the ninth month (a negative duration dependence) and constant from the tenth month onwards.

5. Empirical results

The discussion in this section is separated into two parts. Firstly, we examine the expected influence of variables of the unemployed on the hazard rates of finding a job. Secondly, we deal with the estimation effects of variables on the hazard rates using the three models previously described.

5.1. The expected influence of variables on the hazard rates

Before going on to the estimations results, a look at the expected influence of variables on the hazard rates of finding a job is instructive. Specifically, we are interested in trying to assess if the unemployed face different probabilities and if there are variables that may explain this. In the context of the search theory, the hazard rates of finding a job depend on the probability of receiving a job offer and the probability of accepting such offer.

The probability of receiving a job offer depends on variables such as gender, age, educational levels, the state of the labour market demand and the parameters of the UCS (i.e. the level

and entitlement duration of benefits). The age variable is related to the hazard rate of finding a job with an inverted U form if the youngest and the oldest group have lower productivity with respect to the wages paid. Eight dummy age variables are introduced in our models by intervals of five years to capture this inverted U form on the hazard rates. Seven job category dummy variables are introduced in the models as a proxy of educational levels. We expect that the unemployed with better qualifications have higher hazard rates of finding a job than unskilled workers because they may receive more and better job offers. We think that *ceteris paribus* the expected theoretical effect of the gender variable on the hazard rates of finding a job, in absence of gender discrimination, is ambiguous. Even so higher female unemployment rate and lower female labour supply are arguments in favour of the unchallenged empirical evidence on the fact that males present higher hazard rates of finding a job than females.

The state of the labour market demand is measured in our models with two variables: the quarterly regional unemployment rate and the cause of unemployment (end of contract or others —layoffs, etc.—). The quarterly regional unemployment rate indicates the local labour market conditions of the unemployed. We expect that those who live in regions with lower regional unemployment rates have a higher hazard rate of finding a job because there are more vacancies in the firms. To have been registered at the UCS because of the end of the contract has a positive effect on the hazard rate of the unemployed because they may start to search for a new job before the end of the contract due to they know the date of the extinction of their job.

The income that an unemployed earns in unemployment and the entitlement duration are variables that have an influence on the search effort and therefore, the hazard rates of finding a job. The hazard rates would be lower among workers who have longer entitlement duration because they have more time to search, to assess and to accept job offers. However, some empirical studies, among them Meyer (1990), consider that the hazard rates are constant or decreasing in the earlier unemployment months and rise dramatically just prior to when unemployment benefits lapse because the value of being unemployed and the reservation wage decrease. A disincentive effect is produced at the beginning of the unemployment benefit period and an incentive effect at the end. This tendency to leave unemployment in the days before the entitlement period expires is captured in our models by a variable that is a subtraction between entitlement and current unemployment benefit duration. Furthermore, we have included a quadratic form to get a non linear effect on the hazard rates of finding a job.

In relation to the income of the unemployed, we may obtain the replacement rate dividing the level of benefits during the unemployment period by the income received during the last employment period. However, we analyse separately the effect of the level of benefits and the net wage of the last job because we have found a short variability of the replacement rate variable. The level of benefits predicts a double effect on the intensity of a job search by the unemployed. Firstly, an incentive effect occurs because the level of benefits increases the intensity of a job search by the unemployed and the probability of finding a job on the unemployed (see Tannery, 1983). Secondly, a disincentive effect is produced because a high benefits level causes the unemployed to be less willing to accept jobs. Four variables, interactions

between UI level and to be unemployed with a specific unemployment duration (0-6, 7-12, 13-18 and more than 18 months) are included in our estimations. With those variables, we try to measure the impact of UI level on the escape from unemployment across unemployment benefit periods. The level of UA is not included as an interaction with the unemployment duration variable because there is a short variability across periods.

The probability that an unemployed accepts a job offer depends on variables that affect his reservation wage. Among those variables, we have information on the net wages in the last job and family burdens variable. On the one hand, the net wage of the last job reflects the incentive or disincentive effect on search and acceptance of job offers by the unemployed (see Lancaster, 1979). So, the unemployed with higher (lower) net wages in the last job have a negative (positive) effect on the hazard rate of finding a job because they have a higher reservation wage. On the other hand, to have family burdens may have an incentive or disincentive effect on the hazard rates of finding a job. A disincentive effect is produced when the unemployed with family burdens reduce the hazard rates because they know that they may obtain a new unemployment benefit (UA) in the future and therefore they do not accept uninteresting jobs. In the opposite sense, if we attend to a simple household allocation model where the leisure of wives and husbands may be substitutable through home production, the presence of family burdens means that wife's market work will require the purchase of child care, lowering his/her net wage, increasing the search effort and the acceptability of a given offer by the unemployed to escape from unemployment, see Cullen and Gruber (2000) [6].

Finally, we have included in our models a variable ((UI^e – UA^e benefits) that represents the gap between the expected UI and UA level to capture why there are unemployed qualified to get UA that decided to quit the UCS while they were receiving UI. We expect the higher the gap between the expected UI and UA level the higher the hazard rates of leaving the UCS of this type of unemployed because they increase the intensity of a job search due to the big loss that they experience when they pass from UI to UA.

5.2. Results

The estimation results of a TDM, CBM and ETDM are analysed in this sub-section. The first two models are estimated through the traditional approach (likelihood function [2]) that measures the hazard rates of finding a job using only UI data (TDM) or UA data as extension of UI data (CBM). The third model, estimated through the likelihood function [3], accounts separately for transition rates from UI and UA to work (ETDM). Table 2 presents the estimations results of those models with unobserved heterogeneity effects. Just to offer a simple and intuitive way of interpreting our results in these estimations we assume an exponential distribution for the baseline function. Although it implies no duration dependence this restricted model lets us illustrate with a simple distribution (only one parameter for the baseline) that the parameters of the covariates in the TDM are always higher (overvalued in magnitude) than in the ETDM (for UI recipients) [8]. The unobserved heterogeneity terms are controlled by the non parametric procedure described in section 3.1. The method of estima-

Table 2
Parameters estimates with unobserved heterogeneity and standard errors. TDM, CBM and ETDM

	TDM			CBM			ETDM					
	UI			UI+UA			UI			UA		
Variables	**Param.**	**S.E.**	**Sign.**	**Param.**	**S.E.**	**Sign.**	**Param.**	**S.E.**	**Sign.**	**Param.**	**S.E.**	**Sign.**
Intercept[a]	–4.331	0.611	***	–5.994	0.486	***	–5.328	0.557	***	—	—	—
Gender (female)	–0.792	0.046	***	–0.754	0.041	***	–0.528	0.043	***	–1.064	0.079	***
Age												
>=18 & <=25	0.288	0.074	***	0.066	0.067		0.173	0.070	**	0.465	0.131	***
>25 & <=30	0.258	0.068	***	0.136	0.062	**	0.168	0.065	**	0.327	0.120	***
>30 & <=35	0.080	0.076		–0.001	0.066		0.024	0.071		0.112	0.127	
>35 & <=40 (&)	—	—	—	—	—	—	—	—	—	—	—	—
>40 & <=45	–0.061	0.086		–0.023	0.075		–0.062	0.079		–0.060	0.144	
>45 & <=50	–0.292	0.096	***	–0.074	0.084		–0.092	0.091		0.064	0.167	
>50 & <=55	–0.264	0.094	***	–0.100	0.085		–0.114	0.090		–0.230	0.183	
>55	–1.023	0.104	***	–0.692	0.096	***	–0.623	0.099	***	–0.580	0.211	***
Job category												
1	0.397	0.075	***	0.275	0.067	***	0.272	0.071	***	–0.122	0.168	
2	–0.183	0.071	***	–0.138	0.063	**	–0.138	0.067	**	–0.193	0.144	
3	0.009	0.097		0.043	0.086		0.029	0.092		0.241	0.166	
4	–0.175	0.072	**	–0.106	0.064		–0.124	0.068		0.031	0.128	
5(&)	—	—	—	—	—	—	—	—	—	—	—	—
6	–0.173	0.059	***	–0.147	0.052	***	–0.112	0.054	**	–0.246	0.117	**
7	–0.201	0.054	***	–0.250	0.047	***	–0.152	0.050	***	–0.307	0.093	***
Family burdens (with)	–0.661	0.073	***	–0.225	0.051	***	–0.131	0.062	**	0.025	0.096	
End of the contract	0.098	0.085		–0.144	0.072	**	0.140	0.079		0.244	0.180	
Reg. unemployment rate[b,c]	–0.009	0.003	***	–0.009	0.003	***	–0.006	0.003	**	–0.011	0.006	
Duration until exhaustion (days/100)[b]	0.161	0.031	***	0.299	0.028	***	–0.324	0.029	***	0.288	0.077	***
(Duration until exhaustion)^2 (days/10000)[a]	–0.028	0.005	***	–0.068	0.004	***	0.039	0.005	***	–0.044	0.012	***
Log net wage (€/month)[c]	–0.455	0.139	***	0.046	0.078		–0.256	0.129	**	1.257	0.135	***
Log benefits (€/month)[b]	—	—	—	—	—	—	—	—	—	–2.788	0.154	***
Duration & log level of benefits[b]												
From 0 to 6 months	0.144	0.010	***	0.143	0.008	***	0.069	0.009	***	—	—	—
From 7 to 12 months	0.031	0.015	**	0.046	0.011	***	0.020	0.014		—	—	—
From 13 to 18 months	0.032	0.020		0.036	0.012	***	–0.028	0.017		—	—	—
More than 18 months	–0.152	0.194		–0.271	0.089	***	0.034	0.181		—	—	—
Log ((UI^c – UA^c) level)) (€/month)[b]	0.271	0.016	***	0.065	0.011	***	0.136	0.014	***	—	—	—
Sample (% censored)	11,688(68.7)			11,688(58.9)			11,688(42.2)			3,077(63.2)		
Negative log – likelihood	26,470.102			35,071.733			58,059.396					

Legend. Job category in Table 1; & Indicates the characteristics of the reference individual; *** significant at 1 percent level, ** significant at 5 percent level.

[a]: We have not included an intercept in the ETDM for UA data because there is collinearity with the UA level that is 0.75 percent of the SMW.

[b]: time varying covariate. All variables derived from HISPRE database, except [c]: quarterly regional unemployment rate (source: Spanish Labour Force Survey, EPA), and tax liabilities on earnings to give net wages rather than gross earnings (authors' estimates).

tion is the non-parametric maximum likelihood estimator (NPMLE) developed by Heckman and Singer (1984c) [7].

The estimation [9] coefficients of table 2 confirm our expectations. The impact of variables on the hazard rate changes in magnitude and significance across the three models. We first compare estimation results among models. Later, we describe transitions from UI and UA to a job using the ETDM.

Considering results of the TDM and ETDM for UI recipients, we see that most variables present overvalued hazard rates on the TDM. Other variables disclose strong sensitivity. We comment on the results of a few variables. For example, being a woman in the UCS decreases the logarithm of the hazard rate by 0.792 in the TDM and by less in the ETDM, around 0.528. Likewise, the age interval between 18 and 25 years increases the logarithm of the hazard rate by 0.288 (relative to an unemployed aged between 35 and 40 years) in the TDM and by a lower magnitude (0.173) in the ETDM. Another way to observe the overvalued effect of parameters in the TDM appears when we calculate elasticities in table 3. The probability of exiting from unemployment of females is 54.71 percent lower than males making use of the TDM; however, this magnitude continues to be overvalued, around 13.69 percent the lesser effect of hazard rates of females compared to the ETDM. In the same way, the remaining variables present overvalued

Table 3
The elasticity of the variables corresponding to estimations of table 2

	TDM		CBM		ETDM		
	UI		UI+UA		UI		UA	
	Elast.	Sign.	Elast.	Sign.	Elast.	Sign.	Elast.	Sign.
Gender (female)	–54.71	***	–52.93	***	–41.02	***	–65.48	***
Age (years)								
>=18 & <=25	33.42	***	6.86		18.92	**	59.15	***
>25 & <=30	29.48	***	14.61	**	18.26	**	38.73	***
>30 & <=35	8.35		–0.14		2.39		11.82	
>35 & <=40 (&)	— —	—	— —	—	— —	—	— —	—
>40 & <=45	–5.89		–2.25		–6.03		–5.85	
>45 & <=50	–25.34	***	–7.12		–8.75		6.63	
>50 & <=55	–23.17	***	–9.49		–10.79		–20.51	
>55	–64.03	***	–49.94	***	–46.36	***	–43.99	***
Job category								
1	48.74	***	31.7	***	31.26	***	–11.48	
2	–16.70	***	–12.9	**	–12.88	**	–17.58	
3	0.91		4.35		2.96		27.31	
4	–16.04	**	–10.07	*	–11.69	*	3.18	
5(&)	— —	—	— —	—	— —	—	— —	—
6	–15.91	***	–13.69	***	–10.63	**	–21.83	**
7	–18.20	***	–22.09	***	–14.13	***	–26.47	***
Family burdens (with)	–48.38	***	–20.13	***	–12.28	**	2.51	
End of the contract	10.30		–13.41	**	15.08	*	27.68	

Legend. Job category in Table 1; & Indicates the characteristics of the reference individual; *** significant at 1 percent level, ** significant at 5 percent level and * significant at 10 percent level.

effects of elasticities in the TDM. For example, the unemployed aged between 18 and 25 years have higher hazard rates of finding a job than the reference individual overvalue of 14.5 percent in the TDM, 11.22 percent the unemployed aged between 25 and 30 years old, etc. Therefore, if TDM overvalues the hazard rates of finding a job, it will undervalue the expected unemployment duration.

There are two variables that present strong sensitivity in the estimations: the days before the exhaustion of the benefits and its square form. Those variables and the hazard rates present an inverted-U and U form relation using the TDM and the ETDM for UI recipients, respectively. The TDM says that the unemployed increase the hazard rates up to 287.5 days before the exhaustion of UI and thereafter decrease them. However, the ETDM argues that the unemployed decrease the hazard rates at the beginning and increase (from 415.4 days before the end) when UI exhaustion approaches.

Comparing the effects of variables on the hazard rates using the CBM and ETDM, we see that both models display differences based on the different specification of the likelihood function. While the ETDM captures sequential exits, one for the unemployed who receive UI and another for UA recipients after UI has expired, the CBM model measures the hazard rates of the unemployed who receive unemployment benefits without separating the effects. This different way of making use of unemployment benefits data causes the hazard rates of both models to change considerably. For example, making use of the CBM we may say that the level of benefits motivates the intensity of a job search by the unemployed during eighteen months and demotivates afterwards; where we do not know if this effect is produced by the UI or UA level. However, separating the effects of each type of unemployment benefits thanks to the ETDM we observe that while the UI level increases the hazard rates of the unemployed during six months disappearing afterwards, the UA level demotivates the intensity of a job search by the unemployed.

There are more variables that present mistaken reading of hazard rates effects comparing the estimation results of the CBM and ETDM. For example, those unemployed that enter the UCS because of the end of a contract decrease the hazard rates of finding a job using the CBM; nevertheless, this effect is not perceived either on recipients of UI or on recipients of UA using the ETDM. Other variables significantly affect the hazard rates on the ETDM but not on the CBM. Thus, recipients of UI and UA aged between 18 and 25 years present higher hazard rates than the reference individual making use of the ETDM; this effect is not seen on the CBM.

Now, we comment on the transition rates from UI and UA to a job using the ETDM. Overall, recipients of UI and UA present similar effects on the hazard rates of variables such as gender, age group and job category but asymmetric effects on the level of benefits, the net wage of the last job and the days before the exhaustion of the unemployment benefits variable. For example, gender has a strong effect on the hazard rate. In particular, being a woman [10] reduces the conditional probability of leaving unemployment under benefits in a 41 percent for UI recipients and even more for UA recipients: a 65.48 percent. Age variable and hazard rates present a negative association when the unemployed receive UI and UA:

while younger unemployed (between 18 and 30 years) have shorter unemployment periods than the reference individual; older people (more than 55 years) present less probability of finding a job. So, we do not detect a demotivating effect of unemployment benefits on the probability of young persons exiting to employment [11]. The pattern of job category coefficients (proxy of qualifications or educational level) indicates that UI has an incentive effect on recipients with the highest qualifications; while it has a disincentive effect on UI and UA recipients with the worst qualifications. For UI recipients, the hazard rates of finding a job of those with the highest level of qualifications (high levels and associate professional technicians, foremen and supervisors) are 31.26 percent higher than the hazard of the reference job category group (skilled production workers); whereas the hazard rates of the semi-skilled and unskilled production workers are lower at around 10.63 percent and 14.16 percent, respectively. For UA recipients, the results show that the best qualified unemployed do not affect the hazard rates; however, the effect of the unemployed with the lowest educational level presents a negative impact on the hazard rates, around 21.83 percent and 26.47 percent for semi-skilled and unskilled production workers, respectively.

With respect to the parameters of the UCS, we show a couple of figures. Figure 4 shows the elasticity of the exit rate out of welfare with respect to the level of benefits in terms of entitlement. For UI recipients, the exit rate is inelastic. The elasticity value varies with entitlement. It goes from a weak positive effect for a potential duration of benefits up to twelve months to a negative effect for entitlement periods between 13 and 18 months and positive

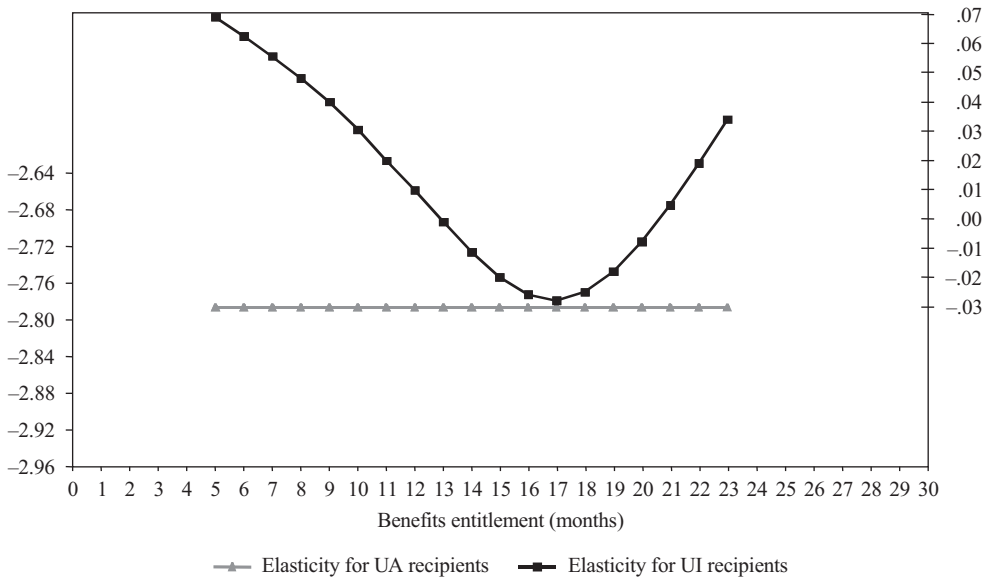

Figure 4. Elasticity of the exit rate out of welfare with respect to the level of benefits in terms of entitlement

for periods longer than 18 months. We must point out those elasticity values over six months either have a low level of statistical significance (significant only at a 10 per cent level) or are statistically insignificant. For UA recipients, the hazard rate is elastic. The interaction between elasticity and entitlement does not exist and the level of benefits has a strong negative effect on the conditional probability of leaving welfare.

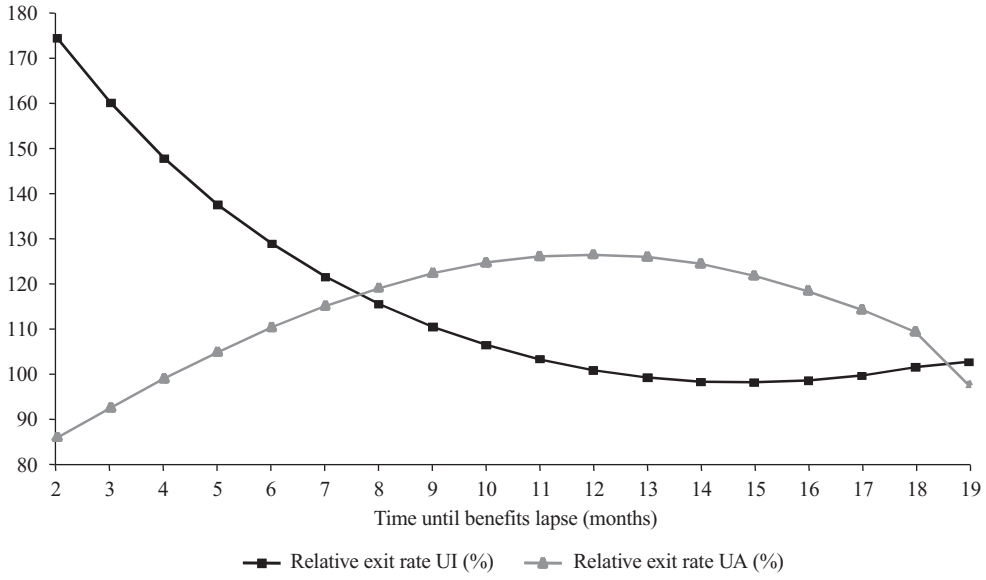

Figure 5. The hazard rate and time until benefits lapse for UI and UA recipients

Figure 5 shows the relationship between the hazard rate and time until benefits lapse for UI and UA recipients. As you can see, for UI recipients the hazard rate rises dramatically when UI benefits lapse approaches. As is well known this behaviour reflects the joint effect of falling reservation wage and rising job search intensity. On the contrary, for UA recipients the hazard rate remains flat or even has a slight fall nearby the UA lapse.

Finally, we say a few words on the possible existence of an UA trap. Following solid empirical evidence on the fact that what really matters is the duration of benefits some authors talk about an UA trap. In other words, some authors say that the unemployed eligible for an additional UA period are damned to exhaust their UI benefits. Our findings do not support this intuition. We find the level of benefits plays an important role among the determinants of the conditional probability of leaving welfare for people potentially qualified for UA. Our estimation results say that the larger the size of the gap between UI and expected UA level of benefits the higher the job search intensity that in turn brings on a jump in the exit rate out of welfare. In consequence, a group of unemployed potentially qualified for UA quits UCS while receiving UI.

6. Conclusions

This paper has used an administrative data set from the Spanish Employment Agency to show that the information about UA matters in the explanation of the conditional probability of leaving unemployment under benefits. In fact, traditional approaches to model hazard rates from unemployment under benefits to a job that uses only UI data, or deals with UA data as a mere extension of UI, instead of an extra time duration model that accounts separately for transition rates from unemployment benefits to work of the unemployed who receive UI and those receiving UA after UI has expired, do not handle UCS data in a right way leading thus to biased estimation of the parameters of the exit rate out of unemployment receiving benefits. Specifically, traditional approaches overestimate UI hazard rates and hence underestimate the expected unemployment benefit duration.

Among other results of the paper, we observe that there are characteristics of the unemployed such as gender, qualifications and age that present similar effects on the hazard rates. Thus, unemployed female, worse qualified unemployed and older unemployed present less probability of finding a job when they receive UI and UA. However, the level of benefits and the entitlement duration variable affects asymmetrically the hazard rates: while UI levels motivates the hazard rates during the first six months and are insignificant afterwards; UA level affects negatively the transition rates from UA to a job. Concerning the tendency to leave unemployment in the days before the end of unemployment benefits, the unemployed who receive UI increase the hazard rates when UI exhaustion approaches; while UA recipients present a low and flat exit rate out of benefits while reaching the UA lapse.

Finally, we have detected that there is a group of unemployed potentially qualified for UA that decided to quit UCS while receiving UI. This can be explained by means of an incentive effect cause of the gap between the current level of UI and the expected level of UA. The larger the size of this gap, the larger the magnitude of the incentive effect.

In conclusion, welfare recipients with a long history of unemployment have a low and flat exit rate out of benefits while reaching the UA lapse. This low and flat exit rate out of benefits is relatively independent of their job search intensity. Then, labour market policy measures targeted towards this collective of welfare recipients must be designed with another objective different from increasing job search intensity through reservation wage depletion. We think that public policies must be defined twofold as a combination of training programs for unemployed specific collectives (e.g. older workers, females, unskilled workers) and information programs for employers so as to reduce the negative impact of long histories of unemployment in the hiring process.

Notes

1. There are not many studies in the Spanish literature that give information about the type of unemployment benefit that the unemployed are receiving in the Spanish UCS. In fact, they only focus on the impact of UI such as Cebrián *et al.* (1996) or do not contain information about the level and the entitlement duration effect of unemployment benefits, such as Alba-Ramírez (1999) and Bover *et al.* (2002). Thus, Cebrián *et al.* (1996) use a tem-

poral reduced version of the HSIPRE database, a sample that only contains UI beneficiaries, and find that UI do not exert a clear negative influence on the job search behaviour of the unemployed. Bover *et al.* (2002) appreciate a negative influence of receiving benefits on the probability of leaving unemployment making use of a sample from the Spanish Labour Force Survey (EPA) that contains information of all the unemployed but no about parameters of the UCS as the level and entitlement duration of UI and UA. Alba-Ramírez (1999) also finds with the EPA a negative effect of UI receipt on the re-employment probability and on withdrawal from the labour force.

2. This prediction is based on two theories of the labour market: the job search and the efficiency wage theory. The job search theory predicts that unemployment benefit causes the unemployed are less eager to search for accepting jobs, increasing the unemployment duration. The efficiency wage theory says that unemployment benefits reduce the cost of being unemployed and the demand for labour decreases because workers ask for higher wages.

3. The identification of this model has been studied by Lancaster (1979) and Heckman and Singer (1984 a,b).

4. The reason for the age limit is to exclude older unemployed (aged 59 or older) that may register problems because they may possibly access to retirement receiving benefits. Moreover, we want to clear up that we are not considering the regime of early retirement that exists for workers aged more than 52 in the Spanish UCS.

5. The descriptive statistics variables of UI recipients are the same in a sample with only UI data and another that separates UI and UA data except for the exit of the UCS variable.

6. Therefore, the elasticity of response to income flows during unemployment will be highest when there are family burdens present. Alternatively, this prediction is also consistent with richer models of household allocation. For example, having children in the household may increase the responsiveness of labour supply to family income because family consumption is less flexible with respect to variations in income (due to the fixed consumption needs that are tied to children), so that leisure must be more flexible, see Mincer (1962).

7. Three support points are sufficient to approximate the probability distribution of the unobserved heterogeneity components. The estimated support points for the TDM (CBM in brackets) are 0 (0), 0.1 (0.71) and 1(1) with associated probability masses of 0.3 (0.5), 0.24 (0.2) and 0.46 (0.3), respectively. For the ETDM, the estimate support points are 0, 0.43 and 1 having probability masses of 0.5, 0.2 and 0.3.

8. In previous versions of this paper, we estimated our three models with more complex and flexible continuous distributions for the baseline hazard function. With these alternative specifications is difficult to appreciate the upward bias of TDM parameters in relation to ETDM parameters cause of the mixed nature of the model specification.

9. The reference individual is a male, aged between 35 and 40 years, skilled clerical worker, without family burdens, who entered the UCS for other reasons (not end of contract).

10. The fact that males appear to have different hazard rates from females has motivated us to estimate separate models for males and females. The precision of these estimates (not reported) is the same as for the entire sample.

11. This result is not a surprise because Lynch (1985) detected no evidence of a significant benefit effect on the behaviour of London youth.

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Appendix A

The Unemployment Compensation System in Spain

In this appendix we present the main features of the UCS in Spain concisely. As in most European and transition countries, there are basically two types of unemployment benefits in Spain: UI and UA. The most recent regulation of the UCS dates from 1992 when eligibility for UI benefits was tightened and UA widened. Thus, we focus our comments on the pre-1992 and the post-1992 period.

Before the 1992 period, an unemployed person who lost a job and had a minimum contribution period of 6 months during the previous 48 months received UI of which the entitlement duration was calculated by dividing by 2 the number of months contributed, with the

constraints that the result had to be an integer multiple of 2. After the 1992 period, the minimum contribution period was modified to 12 months during the last 72 months, and the entitlement duration was calculated by dividing by 3 the number of months contributed, with the same constraint as before 1992. The level of income provided for the unemployed is determined by multiplying the gross replacement rate by the average of the «regulatory base» (i.e. the gross earnings used to calculate UI contributions) in the six months before entering unemployment. The monthly amount to be received is equivalent to 80 percent of the person's last salary during the first six months of benefits (70 percent after 1992), 70 percent from the seventh to the twelfth month (60 percent after 1992) and 60 percent from the thirteenth month onwards (60 percent after 1992). UI is subject to a minimum equal to the Statutory Minimum Wage (SMW) and a maximum equal to 170 percent of the SMW, which could be increased to 190 percent and 220 percent if the unemployed has one child dependant or more than one. Since 1993 the minimum has been reduced to 75 percent of the SMW, unless the recipient has dependant children in which case it is still 100 percent of the SMW.

The unemployed who have worked a period not long enough for UI or have exhausted UI may access UA. UA payments have no relation with the previous monthly wages. A family income criterion was also used whereby per capita family income could not exceed the SMW. A flat unemployment benefit equal to 75 percent of the SMW is paid to all beneficiaries. Since 1989, these criteria have been tightened because the notion of family has been restricted and the per member income requirement is lowered to 75 percent of the SMW for the unemployed with age less than 45 years old with one dependant. For those more than 45 years old, 100 percent and 125 percent of the SMW is given if they have two dependants or more than two, respectively.

The UA entitlement duration varies according to the UI entitlement duration exhausted, having or not having family burdens and being more or less than 45 years old. Before the 1992 period, the unemployed with family burdens who exhausted entitlement UI periods multiple of 3 months (up to 24 months) could access a UA entitlement duration between 18 and 24 months (with age less than 45 years old) or between 24 and 36 months (with age more than 45 years old). Nevertheless, if they did not have family burdens, only the unemployed with age greater than 45 years old who exhausted a UI entitlement period longer than 12 months received between 6 and 12 months. In relation to the UA entitlement duration of the unemployed who were not qualified for UI because they did not have a minimum contribution period of 6 months before 1992 (or 12 months after 1992), the entitlement duration changed to between 3 and 5 months before 1992 to between 3 and 21 months after 1992 for those with family burdens, and after 1992 to 6 months for those without family burdens.

Appendix B

Table B1.
Descriptive statistics variables of recipients aged between 18-59 years who receive UI and UA after UI has expired. Years 1991-93

UI data	Year 1991			Year 1992			Year 1993		
	%	Mean	Std	%	Mean	Std	%	Mean	Std
Unemployment duration (months)									
Current		8.69	7.13		9.62	6.77		9.55	6.98
Entitlement		10.42	7.50		11.48	7.06		11.98	7.52
***UI level* (€/month)**		475.40	110.05		465.49	142.98		503.77	158.43
Type of observation									
Get a job under UI (uncensored)	21.5			21.8			26.9		
Exhaust UI (censored)	78.5			78.2			73.2		
UI and UA data									
Unemployment duration (months)									
Current (UI+UA)		15.59	13.40		15.96	12.67		12.97	10.36
Entitlement (UI+UA)		18.30	13.28		18.95	12.64		16.13	10.73
Current UA		18.96	7.21		18.85	7.71		16.17	8.24
Entitlement UA		21.69	4.64		22.19	5.00		19.63	6.83
Level of benefits (€/month)									
UI		475.40	110.05		465.49	142.98		503.77	158.43
UA		292.09	43.99		316.73	45.31		328.87	60.04
UI+UA		432.61	135.83		423.85	144.18		482.25	162.21
Type of observation									
Get a job under UI (uncensored)	21.5			21.8			26.9		
Exhaust UI (censored)	42.2			44.6			52		
Get a job under UA (uncensored)	8.2			9.1			6.1		
Exhaust UA (censored)	28.1			24.5			15.1		
Sample		61,019			47,875			44,558	

Source: HSIPRE database.

Resumen

Este artículo muestra que el efecto de las prestaciones por desempleo sobre la probabilidad de abandonar el desempleo en los parados cambia considerablemente cuando se emplea un modelo de duración tradicional que contiene sólo información de prestaciones contributivas (UI), o de prestaciones asistenciales (UA) como una mera prolongación del efecto de UI, en lugar de un modelo de duración con un período de prórroga que recoge secuencialmente el efecto de UI y UA. Se observa que mientras la tasa de salida de los perceptores de UI aumenta considerablemente cuando ésta llega a su fin, la tasa de los perceptores de UA permanece constante o incluso cae ligeramente al finalizar UA. Hay un grupo de parados elegibles para UA que abandonan el desempleo mientras perciben UI debido a la pérdida de ingreso que experimentarán cuando transiten de UI a UA.

Palabras clave: prestaciones contributivas, prestaciones asistenciales, modelo mixto de riesgos proporcionales, salidas secuenciales, heterogeneidad inobservada.

Clasificación JEL: J64.