Recurrent unemployment, welfare benefits and heterogeneity

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Recurrent Unemployment and Welfare System.

José M. Arranz[a] and Juan Muro[b].

Abstract*

State dependence in recurrent paid unemployment spells influences the type of labour policy measures to be adopted to preserve the Welfare System. In this paper we use a Spanish longitudinal database to estimate a multivariate mph model to assess the determinants of state dependence. We find a small but significant lagged duration dependence with a gamma specification for heterogeneity. Human capital decay, intensity of job search and local labour market conditions are among the elements that explain this state dependence. Our data does not support the stigma hypothesis.

JEL classification: J64.
Key words: Unemployment spells, unemployment insurance, multivariate duration models, state dependence.

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1. Introduction.

One element that weights on the possible crisis of the Welfare System is the joint effect of the growing flow of workers into the Unemployment Compensation System and the magnitude of duration and benefits of paid unemployment spells. In this paper we focus ourselves in the study of the influence of recurrent paid unemployment spells on the Welfare System. If longer duration of past paid unemployment spells are correlated with longer duration of current and future paid unemployment spells, then labour policy measures adopted to reduce unemployment will be affected by the determinants of this state dependence between paid unemployment spells duration. In the literature, two types of explanations for this unemployment dependence can be found: individual heterogeneity and labour history effects.

If individual's heterogeneity is the factor that explains state dependence between past and future paid unemployment spells duration then we are in presence of spurious state dependence. Individual's labour history, conditional on observed and unobserved heterogeneity, is a realization of independent failure times. In this situation, traditional training programs targeted towards the chronically unemployed would be the right policy. On the contrary, if individual's labour history is the main source of the observed correlation between past and future duration of paid unemployment spells, we may think in a class of proneness to unemployment that derives from the individual unemployment experience. This proneness may be due to human capital decay or to stigma, Piore (1971). When unemployment experience conduces to loss of human capital we may suggest, in the line of Phelps (1972), that short-term macroeconomic policies, which diminishes unemployment in the short run will also lower unemployment rates in the future. When stigma is the main factor, information

policies designed for sending positive signals to firms about the quality of stigmatized workers should be in the agenda.

Our paper is in the line of event history analysis. We use a multivariate mixed proportional hazard (mph) model for explaining successive paid unemployment spells duration that allows for state dependence through lagged duration dependence. The mph model, introduced by Lancaster (1979), is now very popular in applied econometrics. Multivariate versions of the model has been used for empirical analysis in unemployment studies by Heckman and Borjas(1980), Lynch (1985, 1989), Trivedi and Alexander(1989), Meyer (1990), Bonnal et al. (1997), Omori (1997), among others[1]. Heckman and Borjas (1980) find no effect of past nonemployment duration on current nonemployment duration. Lynch (1985, 1989) finds no effect or negative influence of past unemployment duration on the reemployment hazard of current spell of unemployment, depending on the specification adopted for the true duration dependence. Trivedi and Alexander (1989) use a Cox model and do not control for unobserved heterogeneity. Finally, unlike previous studies, Omori (1997) uses a sample of nonemployment individuals. He allows for work history effects on the current reemployment hazard and finds that both stigma effect and unobserved heterogeneity explain the negative influence of past nonemployment duration on the reemployment probability of future nonemployment spells.

The main problem we face in introducing labour history effects in state dependence analysis is the way we utilize to disentangle the stigma and human capital decay components. In the literature, Flinn and Heckman (1982), Vishwanath (1989), Lockwood (1991) and Omori (1996, 1997) model stigma effects in the labour market by extending search models. In Lockwood´s theoretical model, the market is assumed

to consist of high and low quality workers. The quality of labour market entrants is unknown to firms, but they may imperfectly test potential hires. Their hiring decisions are based on the results of these tests. Firms can avoid workers whose time spent in unemployment exceeded a particular cut-off value. Workers with relatively long periods of unemployment are stigmatized in the sense that using a less stringent cut-off value to test and hire they would be socially optimal. The model predicts that the reemployment hazard declines with the duration of current unemployment and that the degree of duration dependence varies with the business cycle, being less severe following adverse shocks because screening on duration becomes less tight in recessions. Although the employed workers could remain employed forever, Lockwood (1991) and Omori (1997) state that the model can be extended assuming that the duration of previous spells of unemployment would contain valuable information about worker types, with the result being that the durations of previous spells would lower the current reemployment hazard. Omori's model contains two empirically testable hypothesis: the reemployment hazard (1) decreases with the duration of past and current unemployment holding the circumstances (or demand shocks) under which unemployment was experienced constant, but (2) decreases by more if unemployment was experienced in a labour market more favourable to workers. Although the first prediction is shared by the effect of human capital decay, the second is unique to models that rely on the existence of stigma. The first prediction can be empirically tested by a pure lagged duration term. The stigma effects can be specified by interaction terms between lagged unemployment duration and the local labour conditions when unemployment was experienced.

We utilize in our empirical analysis a longitudinal database that comes from administrative records contained in the Historical Integrated Benefits System (HSIPRE= Histórico del Sistema Integrado de Prestaciones) collected by the Spanish Employment Agency (INEM). With Spanish data we only have a couple of studies on single unemployment spell duration with longitudinal data. Cebrian et al. (1996) use a temporal reduced version of the HSIPRE database, a sample that only contains unemployment beneficiaries, and find that unemployment benefits do not exert a clear negative influence on the job search behaviour of the unemployed. Bover et al. (1997) use a sample from the EPA (Spanish Labour Force Survey), a sample of all unemployed but without information about the amount of benefits, and find a negative influence of receiving benefits on the probability of leaving unemployment. Therefore there are no studies on state dependence in the Spanish labour market.

The paper is organized as follows. In section 2 we outline the stylized facts. We present our model and our data set in sections 3 and 4. In section 5 we summarize the main results of the empirical analysis and, finally, we conclude in section 6.

2. The stylized facts.

In the period 1987-1995 Spanish economy suffered what can be considered a massive unemployment with rates over 20 per cent in mean. The overall unemployment rate was accompanied by persistent differences in regional unemployment rates. To provide just but a glimpse in the subject we present in Figure 1 the inflow of workers to the Unemployment Compensation System and the Gross Domestic Product (GDP) growth rate in the months of February, June and November

every year. Table 1 reports the share of first and successive unemployment spells in the whole inflow of recipients for the month of February every year.

As can be observed in Figure 1, if we name 100 to the inflow of workers to the System in February 1987, the average inflow of workers to unemployment under benefits is of 147 units in the period. The inflow has a clear seasonal component and has a peak in February 1992. Since that date the inflow diminishes reflecting the effects of 1992's Spanish unemployment policy measures that changed the conditions to be entitled for paid unemployment. These policy measures will be described in section 3 below. Besides, we observe that November's seasonal component is always relatively high as a consequence of the end of summer seasonal temporal contracts in agriculture and services. Concerning the relationship between the inflow and the business cycle, we observe that the inflow of unemployed to the System has a clear anticyclic behaviour, with a down step in June 1992 which may be explained as above by 1992´s labour measures.

If we now pass to Table 1 we see that the share of recurrent unemployed in total inflow evolves from a 31.8 per cent at the start to a 33 per cent at the end of the period. This shows that, if seasonal is accounted for, a persistent percentage of the monthly inflow comes from recurrent paid unemployment. As above, a break can be distinguished in 1993. In this year's figure we may see the impact of the 1992's regulation of the Unemployment Benefits System. However, it must be emphasized that recurrent unemployment share figures recovered in 1995.

Finally, in Table 2 we show the temporal pattern of paid unemployment recurrence during the period 1987-1995 for workers who enter the System in 1987. As can be seen, only a 40.9 per cent of the workers that experience a paid unemployment spell

starting in 1987 did not suffer another paid unemployment spell. A 33.4 per cent had two unemployment spells while a 16 per cent had three unemployment spells and a 9.7 per cent had more than two recurrences in the time period. To offer a descriptive measure of the intensity of recurrence along the 9 years period we have divided it in two years intervals. In the first two years, there is a relatively high paid unemployment recurrence frequency with a 28.8 per cent of workers that enter again the System. This high frequency decreases continuously along the period until a percentage of 47.05 of recurrence at the end of the period. It must be remembered that 1992's unemployment policy measures have an important influence on the inflow of workers to the System and, in the same way, on the falling of recurrence frequency figures.

The description above suggests the interest of the study of possible state dependence between successive paid unemployment spells duration in the Spanish economy, whose determinants we know very little about. For that purpose, we study the factors underlying recurrent paid unemployment duration in sections 4, 5 and 6. Before doing that, we describe in next section the main features of the Spanish Unemployment Compensation System.

3. The Spanish Unemployment Compensation System.

Before carrying out our analysis, it appears convenient to briefly present the main features of the Spanish unemployment compensation system. As in most OECD countries (OECD, 1991), there are basically two types of benefits in Spain. Insurance benefit (unemployment insurance, UI) and assistance benefit (unemployment assistance, UA). Workers are entitled to UI through having contributed during their previous job. The most recent regulation of the system dates from 1992 when

eligibility to UI benefits was tightened and UA widened. Then we focus on pre-1992 period and post-1992 period.

Before 1992, a minimum contribution period of 6 months during the last 48 months is required, and duration is calculated by dividing by 2 the number of months contributed. After 1992, it is modified and the minimum contribution period is of 12 months during the last 72 months, and duration is calculated by dividing by 3 the number of months contributed, with the constraint that the result has to be an integer multiple of 2. The maximum duration has not been changed. Tables 3 and 4 show the entitlement duration according to the period of contribution.

Workers having contributed less than 6 months in pre-1992 period or 12 months in post-1992 period were not entitled to UI benefits but they could claim UA if they had contributed at least 3 months and had family burdens.

As for the level of income provided for the unemployed, it was determined by multiplying the gross replacement rate by the average of the "regulatory base" (i.e. the wage base used to calculate contributions and equal in principle to total wages) in the six months before entering unemployment. The following rates applied:

- 80 per cent during the first six months of benefits (70% after 1992).
- 70 per cent from the seventh to the twelfth month (60% after 1992).
- 60 per cent from the thirteenth month onwards (60 % after 1992).

Unemployment benefits were exempt from income tax until a royal decree in 1994. They were also subject to a floor equal to the statutory minimum wage (SMW) and a ceiling equal to 170 per cent of the SMW, which could be increased to 190 and 210 percent if the unemployed person had one child or more than one dependent children. These two factors implied that the "net" (i.e. after-tax) replacement rate could be

much higher than the gross rates above, the difference being dependent upon the actual wages received while working. Since 1994 the minimum has been reduced to 75% of the SMW unless the recipient has dependent children in which case it is still 100 % of the SMW.

Assistance benefits were mostly paid to unemployed having exhausted their insurance benefit and with “family burdens”. The latter were defined in a rather loose way, including any relative up to the second degree. A family income criterion was also used whereby per capita family income could not exceed the SMW. A flat benefit equal to 75 per cent of the SMW was paid to all beneficiaries. Since 1993, these criteria have been tightened, as the notion of family has been restricted and the per member income requirement lowered to 75% of the SMW.

4. The HSIPRE database.

The data set we use in this paper contains information on registered unemployed that receives all types of unemployment benefits from INEM (Spanish Employment Agency). It registers claims of insurance and assistance benefits by all fully unemployed workers as well as some of those partially unemployed (i.e. on short time work).

The original administrative data can be defined as cross-section, as it comes from the monthly payroll computer tapes of unemployment recipients. From those monthly tapes information on individual entries to the benefit system were extracted so that their evolution therein could be followed. This was undertaken by INEM with the purpose of facilitating the management of the system, thus allowing a complete month

by month follow-up of recipients. This new longitudinal data set has been named the historical HSIPRE.

HSIPRE thus give information on spells of benefit receipt for each individual. However, these spells are defined with administrative criteria. For INEM a so- called "occurrence" is equivalent to the recipient's legal claim periods or spells in which he or she receives various types of benefits. For example, an individual with an unemployment insurance claim of 24 months, followed by an assistance benefit of 18 months is counted as someone with two "occurrences", each corresponding to a different administrative situation. However, this individual has only one period of unemployment, 24+18 months, and one incidence in unemployment. The use of the data for economic analysis must then be carefully extracted so that we only have those individuals who have just entered unemployment and claim benefits.

In fact, we have centred our study in three recurrences and in the insurance and assistance part of the system, but we only consider assistance benefits when the individual exhausted insurance benefits. In future studies we will deal assistance benefits of workers who having contributed less than 6 months (12 months after 1992) were not entitled to UI benefits buy they could claim UA if they had contributed at least 3 months. Thus, we consider a cohort of individuals entering the system at the same time, in 1987.

4.1 Variables.

The following variables are available in the data set:

Personal Data: date of birth and gender.

Data for each occurrence:

Personal data: number of children; whether or not claimants have “family burdens” (which can be children or other adults); province where benefit is paid (a close proxy for residence).

Benefits: Type of benefit; date of claim and date of end of claim; entitlement period (in days); reason for entering (which can be used to determine whether the person had a permanent or fixed term contract in her/his previous job); and reason for exiting the system (basically finding a job or exhausting entitlement period).

Data on the last job: ”regulatory base” (the amount used to calculate the amount of benefit, closely related to previous earnings); contribution period; and job category (a proxy for occupation).

Data on marital status, education status, industry and size of firm in previous job is, unfortunately, not available in the data set.

4.2 Descriptive analysis.

Our database is a sample of young workers, male and female, aged between 18 a 35 years in 1987 (greater than or equal to 18 and less than or equal 35), who first enter the Spanish benefit system during 1987 and experience at least three unemployment under benefits spells in 1987-1997 period. This sample restricts our total sample to be a set of the unemployment prone people under 35, so as to increase our information on the determinants of unemployment under benefits dependence and to reduce the effect of the error in initial conditions. We observe, for each individual in the sample and every paid unemployment spell, a set of characteristics of the current spell, the last employment spell and the last unemployment spell. Aside

common personal and last employment variables we include in second and third unemployment spells duration as covariates characteristics of past unemployment spell. Table 5 contains descriptive statistics for the variables we have introduced in our models.

We may comment that in this case 68.9 per cent of the recipients are entitled to short spells, under 6 months, and that a high percentage, 59.3, of unemployed exhausts their benefits. The sample mean of the first paid unemployment spell duration is 5.58 months while the entitlement average is 8.33 months. Concerning the percentage of completed paid unemployment spells in the second paid unemployment spell comes down to a 55.5, and both the mean duration and the entitlement period lessen to 5.44 and 8.3 months, respectively. Finally in the third spell the downfall stops. The percentage of censored observations is 67.4 and the mean spell duration and entitlement period goes to 6.86 and 8.75 months, respectively.

The average unemployed that first enters the System is 24 years old and has his recurrences with 26.2 and 28.5 years. He pass from an average wage in his last employment of 2.36 thousands pesetas per day to 3 and 3.8 thousand pesetas per day.

The following variables are dummies: gender, regions, family burdens, entitlement duration, replacement rate, cause of unemployment, exit of the Unemployment Compensation System, job category and regional unemployment rate. Their mean and their sample percentage can be found in table 5. We describe them in short.

Regions variable is a dummy that classifies Spanish regions by its economic structure. We have considered only three categories: agricultural, services and industrial. Replacement rate is a dummy variable that arranges workers in three classes defined by its replacement rate: mode, more than mode and less than mode.

Regional unemployment rate is another dummy variable. We have been obliged to construct the last two variables as dummies due to their small variability in the sample.

5. The model.

In job search theory the exit probability of unemployment depends on choice and chance, Mortensen and Neuman (1989). In other words, it depends on the probability of receiving a job offer and the probability that such offer will be accepted by an unemployed. The probability of receiving job offers will depend on personal characteristics, local labour market conditions and intensity of job search. The probability that a worker may accept a job offer will depend on the factors that affect his reservation wage.

Job search theory predicts a double effect of unemployment benefits on intensity of search, and on the probability of leaving unemployment. First, the disincentive effect occurs when the value of being unemployed is high because the unemployed receives benefits. This effect lowers the exit rate. Secondly, the entitlement effect increases the exit probability when unemployed are close to benefits exhaustion. In this case the value of being employed grows due to the utility associated to the future possibility of being laid off.

In the analysis of multiple unemployment spells, the exit rate in subsequent unemployment spells is affected not only for the choice and the chance but also for the possible existence of state dependence between past and current unemployment spells duration. This state dependence may be due either to unobserved heterogeneity or to individuals' labour history effects.

If we model the state dependence between unemployment spells duration exclusively through unobserved heterogeneity then current unemployment spell duration, conditional on observed and unobserved heterogeneity, is independent of past unemployment spell duration.

When individual's labour history matters in explaining state dependence we may incorporate in our model the effect of human capital decay through lagged duration dependence. Perhaps the easiest way to do this is to allow the durations of current and past unemployment to lower the mean of the wage offer distribution because the workers have loss of valuable work experience in the unemployment. A decrease in the mean of the offer distribution lowers the reservation wage by less than the change in the mean offer distribution as Lippman and McCall (1976) show. Following the above reasoning we predict that in the presence of human capital decay, the current and lagged unemployment spells duration diminishes the reemployment hazard rate, from now on we call it exit rate from unemployment**.**

Concerning the influence of stigma on the exit rate, Lockwood (1991) presents a model extended by Omori (1997). The latter builds a multiperiod, game-theoretic stigma model of employers' wage offers and workers' employer selection that makes a testable prediction for the existence of stigma: the reemployment exit decreases by more if unemployment was experienced in a labour market more favourable to workers.

To analyze if subsequent unemployment spells duration, conditional on observed and unobserved heterogeneity, are independent or not and, in the latter case, which are the main sources of dependence we use a reduced form model that allows for lagged duration dependence. The model is of the class of mph model with multiple

spells or a multivariate mph. The exit rate is modelled by means of a multiplicative separable function of three terms: baseline exit, covariates and unobserved heterogeneity.

Let T_i be a non-negative random variable and t_i the duration of i'th unemployment spell. The exit rate, from paid unemployment, or unemployment under benefits, spell i into employment j is:

$$h_{ij}(t_{ij} \mid X, q) = \lim_{\Delta \to 0} \frac{P(t_i < T_i < t_i + \Delta \mid T_i > t_i)}{\Delta} = h_{0ij}(t_i) \exp(b'_i X) \Phi_{ij}(q). \qquad [1]$$

Where in (1):

- h_{0ij} is the unknown baseline exit, which captures the effect of the duration on the exit rate from paid unemployment into employment when all other factors are constant.
- exp (β'_i X) express the influence of covariates (time invariant or time varying covariates, including lagged duration), or observed individual heterogeneity on the exit rate.
- Φ_{ij} (θ) is a function of the time invariant unobserved individual specific heterogeneity.

In the empirical analysis below we only consider the first three paid unemployment spells, then in (1) i=1,2,3.[2] Given that we only consider paid unemployment-employment transitions, j=1 in our study. Then, so far we eliminate this subindex. Concerning the function of individual heterogeneity, it is usually assumed to be equal to $c_{ij}\theta$, where c_{ij} represents specific transition intensities between different states. In our case we analyze only transitions between paid unemployment and employment and we make c_{ij}=1 by normalization.

The conditional survival function corresponding to (1) is:

$$S_i(t_i \mid X, q) = \exp\left(- \int_0^{t_i} h_{0i}(u) \exp(b'_i X) q \, du \right) \quad [2]$$

The conditional probability density function (pdf) of paid unemployment spell i duration is:

$$f_i(t_i \mid X, q) = h_i(t_i \mid X, q) S_i(t_i \mid X, q). \quad [3]$$

And the conditional distribution function

$$F_i(t_i \mid X, q) = 1 - \exp\left(- \int_0^{t_i} h_{0i}(u) \exp(b'_i X) q \, du \right) \quad [4]$$

5.1 Identification issues.

Identification of mph models has been widely studied in the literature. For single spell models Elbers and Ridder (1982), Flinn and Heckman (1982, 1983), Ridder (1990). Extensions for multiple spells and multiple states can be found in Flinn and Heckman (1982, 1983), Aalen (1987) and Honoré (1993). If we see (1) as a panel data model, we dispose of three observations of unemployment spells for each realization of θ. The joint survival function of T_1, T_2, T_3 with exit rate in (1), conditional on covariates X, is:

$$S(t_i, t_2, t_3 \mid X) = \int_0^{\infty} e^{-q[Z_1(t_1, X) - Z_2(t_2, X) - Z_3(t_3, X)]} dG(q, X). \quad [5]$$

Where G(.) is the distribution function for θ which may depend on X; Z(.) is integrated hazard as a function of covariates and duration whose equivalence in (1) is straightforward. Our model satisfies Theorem 1 in Honoré (1993) and, conditional on X, Z(.) and G(.) are identified up to a common scale, i.e. under those conditions the heterogeneity term and the duration dependence (baseline exit) can be identified.

5.2 Likelihood function and estimation method.

We allow for completed and uncompleted durations in our model. Our database[3] that will be described in section 4 comes from administrative records of benefit recipients. When an unemployed exhausts his entitlement period he disappears from the records and we do not know if exit to employment, unpaid unemployment or out of the labor force. We only know that in the time interval between two paid unemployment spells he has been employed at least for a duration that allows him to be entitled for a new paid unemployment spell. Then for all observed unemployment under benefits spells our database contains both types of observations. We assume an independent censoring mechanism.

As usual, we derive the contribution of individual duration times to the likelihood function through expressions in (2) and (3) above. Considering only the first three paid unemployment spells for each individual, we have a completed duration or a censored duration for each paid unemployment spell. Their contributions to the likelihood are respectively their pdf in (3) and their survival function in (2).

The contribution to the likelihood function for the three individual's unemployment spells duration, conditional on covariates and individual heterogeneity, can be expressed as:

$$g(t_1,t_2,t_3 \mid X,q)=\prod_{i=1}^{3} f_i(t_i \mid X,q)^{d_i} \times \prod_{i=1}^{3} S_i(t_i \mid X,q)^{(1-d_i)}. \qquad [6]$$

Where d_i is a dummy variable that discriminates censored and uncensored observations.

As can be seen in (6), we have distinguished between the first and successive spells because we have tried to select in our sample the first entry into paid unemployment of the workers. We have reduced the possible bias due to initial conditions trough selecting a sample of young workers that first enter the System at the start of the flow sample [4].

The individual contribution to the likelihood is obtained by integrating out θ. Its expression is:

$$g(t_1, t_2, t_3 \mid X) = \int_{\Theta} \prod_{i=1}^{3} f_i(t_i \mid X, q)^{d_i} \times \prod_{i=1}^{3} S_i(t_i \mid X, q)^{(1-d_i)} \, dG(q). \qquad [7]$$

We estimate the multivariate mph model with a random effect maximum likelihood estimator based in the marginal likelihood in (7) with a mixed distribution of Weibull and parametric gamma distribution for the unobserved heterogeneity term.

6. Empirical analysis.

We have included in our model a set of covariates that may capture the impact of the different sources, which influence the probability of exiting paid unemployment, outlined in section 4. We now describe the expected effect of our covariates on the paid unemployment spells duration before presenting the estimation results.

First, we have personal variables: gender, age, family burdens, earnings in the past employment, and benefits received in current paid unemployment spell. We also have the replacement rate that has been calculated from benefits earnings ratio. As we have already said the probability of receiving job offers depends on gender, age and education (this last not available in our sample), the intensity of search is influenced by family burdens and earnings and, finally, earnings and benefits influence the

reservation wage. We must point out that in the absence of labour history effects the exit probability will be independent of past unemployment duration.

Second, the region where the individual is registered and the cause of individual's unemployment (end of contract against any other cause) represents the local labour market conditions that affect current unemployment duration.

Third, past employment spell variables include job category and entitlement period. The first variable describes job conditions and has a strong correlation with certain educational levels. The entitlement period is a proxy for past employment spell duration. As we have already said workers are entitled to paid unemployment in function of the last employment spell duration.

Finally, we have included in the models that explain second and third paid unemployment spell duration three covariates to capture the effect of labour history. First variable is lagged paid unemployment spell duration that incorporates the effects of human capital decay. Workers suffer a loss of human capital when they experience an unemployment spell whatever the circumstances. Then our model predicts that lagged unemployment duration has a negative effect on the exit rate.

Our second variable is an interaction term between lagged paid unemployment spell duration and regional unemployment rate dummies that correspond with the period in which individuals suffered this lagged unemployment spell. If stigma is present we expect that the differential effect between the highest regional unemployment interaction term and the others will have a negative influence on the exit rate. This reflects the fact that unemployed workers who have an unemployment experience with high regional unemployment rate are less stigmatized.

Finally, the third variable is an interaction between lagged unemployment spell duration and the variable that indicates if the worker exhausted his entitlement period in the past. This variable tries to capture the effect of differences in intensity of job search. We expect that this variable will have a positive effect on exit rate.

We have also included in our model GDP growth rate (quarterly) to control for business cycle influence and a dummy variable to capture the effect of 1992´s Spanish labour policy measures. We expect that GDP will have a positive effect on the exit rate. The expected influence of 1992´s policy measures is unknown.

Previous work on our sample, Cebrian et al. (1996) has identified gender and entitlement period as important sources of heterogeneity in the sample of benefits recipients we use in the estimation. Gender has a significance effect on unemployment spell duration that empirically shows a negative effect on exit rate. With reference to the entitlement period the sample shows a clear heterogeneity because we can not observe a true duration longer than entitlement.

We have estimated by maximum-likelihood the model in (7) for the whole sample and by gender without heterogeneity term and with a flexible parametric specification, a gamma pdf, for unobserved heterogeneity. In Tables 6 and 7 we report the estimation results for a duration model.

We have focussed our analysis on state dependence and will first present our results concerning lagged terms in our estimation in table 7 and then we report the rest of the results.[5]

In reference to state dependence we remark that with our database all estimates show a small but significant positive lagged duration dependence**.** This indicates that

in our models past unemployment spell duration has a negative effect on the exit rate from unemployment.

The interaction terms between lagged duration and lagged regional unemployment rate present a small but significant negative effect on current paid unemployment spell in the model for females. Then in contrast with the stigma hypothesis prediction, this effect may be explained by the persistent differences in Spanish regional unemployment rates. Unemployment spells experienced in regions with lower unemployment rates increases the exit rate because the probability of receiving offers is higher than in regions with higher unemployment rates where the number of vacancies and the probability of receiving job offers are smaller.

The interaction between lagged duration and lagged exit to job shows a small but significant negative effect on current paid unemployment spell duration in our models. This reflects the influence of the intensity of search on state dependence. Workers with high job search intensity in past unemployment spell increase the exit rate in current unemployment spell.

We present now the main results on the effect of variables of current unemployment spell on the exit rate. Concerning the effect of business cycle on unemployment spell duration, the coefficient of GDP rate is significant in the models for second and third paid unemployment spell and shows a positive effect on the probability of exiting from paid unemployment to employment as expected. We do not include GDP rate in the first unemployment under benefits spell model due to lack of variability in the sample.

The economic structure of the region where individuals work has only effect on unemployment spell duration for females. This may be interpreted as a consequence of

spatial segmented labour markets for women. Differences in spell duration between industrial and services regions and between agricultural regions and services regions are positive. In regions where services dominate the economic structure workers have a relatively higher turnover, with short employment spells that allows only for relatively short entitlement periods.

As has been explained above the entitlement period covariates must be considered as the main source of individuals' heterogeneity in our sample. Their inclusion in our models tries to eliminate the heterogeneity bias in our estimates. In this case we can not extract any conclusions about their coefficients.

While replacement rate is not significant in our models, past employment wage has a positive effect on the exit rate from paid unemployment. Personal characteristics of workers with higher earnings in past employment are associated with an increase of the probability of receiving job offers and, ceteris paribus, with a positive effect on the exit rate.

The dummy variable specified to capture the effect of 1992's Spanish labour policy measures on paid unemployment spell duration is non significant and when it is significant shows a negative impact on the probability of exiting. This effect can be explained in the following way. Labour policy measures has tightened in 1992 the capacity of being entitled for a paid unemployment period and at the same time has lengthen the entitlement period when a worker is entitled to. Given that in our sample we only observe paid unemployment spells duration, ceteris paribus, the longer is entitlement period the longer is the observed paid unemployment spell duration. The sign of the coefficient of the dummy variable seems to confirm the above argument and shows a positive effect on the spell duration.

Gender has as expected a strong influence on exit rate. The variable representing age is non-significant in our models.

Lastly, we observe that accounting for observed and unobserved heterogeneity the baseline Weibull in our models shows positive duration dependence. It seems that workers improve their intensity of search and lower their reservation wage when entitlement period is close to exhaustion.

7. Conclusions.

In this paper we have analyzed the impact of paid recurrent unemployment spell and his determinants on the Welfare system. We have used a multivariate mph model that allows for state dependence through lagged duration dependence. Using longitudinal data that comes from a sample of workers, under 35 years old, that first enter the Spanish Unemployment Compensation System during 1987 selected from HSIPRE we have estimated a couple of models, without individual heterogeneity and with a gamma heterogeneity term, for the whole sample and selecting by gender. We have found lagged duration dependence that seems to support the theory that not only unobserved individual effects but also individual's labour history matters in explaining unemployment state dependence.

Aside the human capital decay, that unemployed suffer in their unemployment experience whatever the circumstances, the significance of interaction terms in our models suggests other elements that affect state dependence. First, including an interaction term between past unemployment spell duration and the condition of being or not censored in the past unemployment spell we have found that the positive lagged duration dependence is affected by individual's intensity of search. The impact

of individuals' intensity of job search in past unemployment spell, is a positive influence on the probability of exiting unemployment reducing the negative influence of human capital decay.

Second, we have introduced an interaction term between past unemployment spell duration and regional unemployment rates dummies. In the models where this parameter is significant, it has a sign that is in contradiction with the positive stigma effect prediction. In the regions with a relative lower lagged unemployment rate there are a positive effect on the exit rate. It seems to reflect the persistency of better local labour market conditions.

From the above findings, it seems that, at least in the conditions of an economy like the Spanish economy, with high overall rates of unemployment and persistent differences in regional unemployment rates, a combination of short-term macroeconomic policies and microeconomic policies targeted towards specific collectives, e.g. young people, females, unskilled workers, may be an effective cocktail of unemployment measures that could contribute to reduce recurrent unemployment and his effect over the possible crisis of welfare System. Our data does not support the need of information policies that overcome the resistance of employers to hire workers with negative unemployment records.

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FOOTNOTES.

1. It has also been used in demography and marketing- Flinn and Heckman (1982), Flinn and Heckman (1983), Newman and Mc Culloch (1984), Heckman et al. (1985)- and in marketing – Jain and Vilcassim (1991), Vilcassim and Jain (1991), among others.

2. Under the assumption of no feedback, the equation for h_{11} does not include any lagged duration as covariate.

3. For a thorough description see Cebrián et al. (1996).

4. We do not analyzes the bias problem arising from aggregate duration data because in our data base paid unemployment spells duration is measured in days so it can be known precisely.

5. The reference individual is an unskilled clerical or unskilled production worker, who has his residence in a services region, without family burdens, with a replacement rate equal to mode, with an entitlement period from 6 to 15 months, that enters unemployment for other reasons (not end of contract), with a past unemployment spell in a region with high unemployment rate and exhausting his benefits in this past unemployment spell.

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Table 1. Percentage of first and subsequent paid unemployment spells. February. 1987-1995.

	1987	**1988**	**1989**	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**
1ª	68.2	65.4	60	62.8	61.3	62.9	79.7	72.5	67
Recurrences(Total)	31.8	34.5	39.9	37.1	38.5	37	20.3	27.5	33
2ª	29.7	29	28.6	25.6	25.5	23.6	14.6	19.4	23.2
3ª	2.1	5.1	8.7	7.9	8.5	8.5	4	5.5	6.5
4ª		0.4	2.4	2.9	3.4	3.5	1.1	1.7	2.2
5ª		0	0.2	0.7	1	1.1	0.5	0.7	0.7
6ª			0	0	0.1	0.3	0.1	0.2	0.3
7ª				0	0	0	0	0	0.1
8ª						0	0	0	0
9ª								0	
Sample Size	15332	18006	20974	21752	26177	31394	24629	16813	18064

Table 2. Temporal pattern of paid unemployment recurrence. (1987-1995).

Two years interval / Recurrences	**1987→1989**	**1989→1991**	**1991→1993**	**1993→1995**
0	24451(71.1%)	18511(53.8%)	15379(44.7 %)	14049(40.9 %)
1	8154(23.7%) (6524)(80%)	10799(31.4%) (9048)(83.78%) (5411;5388)	11552(33.6 %) (9796)(84.79%) (3057;8495)	11481(33.4%) (9840)(85.70%) (1304;10177)
2	1662(4.8%) (1480)(89%)	3658(10.6%) (3136)(85.72%) (516;2340;802)	4891(14.2%) (4068)(83.17%) (74;2187;2630)	5519(16.0 %) (4707)(85.28%) (25;1342;4152)
3	118(0.3%) (103)(87.28%)	1107(3.2%) (983)(88.79%) (13;406;638;50)	1677(4.9%) (1223)(72.92%) (1;114;894;668)	2048(6.0%) (1624)(79.29%) (1;30;702;1315)
4	3(0.0%) (3)(100%)	283(0.8%) (258)(91.16%) (0;20;212;50;1)	624(1.8%) (332)(53.20%) (0;3;128;340;153)	767(2.2%) (487)(63.49) (0;3;36;324;404)
5		26(0.1%) (17)(65.38%) (0;0;9;16;1)	209(0.6%) (87)(41.62%) (0;0;6;9796;10)	307(0.9%) (145)(47.23%) (0;0;1;37;163;106)
6		3(0.0%) (3)(100%) (0;0;1;1;1)	47(0.1%) (24)(51%) (0;0;0;2;32;13;3)	150(0.4%) (46)(30.66%) (0;0;0;1;57;73;19)
7		1(0.%) (1)(100%) (0;0;0;1;0)	7(0%) (5)(71.42%) (0;0;0;0;5;2;1)	58(0.2%) (23)(39.65%) (0;0;0;0;0;29;22;7)
8			2(0%) (0)(0%) (0;0;0;0;0;2)	9(0%) (0)(0%) (0;0;0;0;0;1;6;0;2)

Legend. In rows, number of recurrences. In columns, two years intervals. Each cell contains in the first row the number of cases and the percentage for columns in brackets; in the second row the number of completed paid unemployment spells duration and the percentage in brackets; finally, in the third row $(r_1;r_2;r_3....;r_n)$ the chain of the unemployment spells.

Table 3. Pre-1992 period.

Contribution period (Over the last 4 years)	**Entitlement U.I. (months)**	**Unemployment assistance after exhausted U.I. months)**			
		With family burdens		**Without family burdens**	
		< 45 years	**>45 years**	**<45 years**	**>45 years**
From 6 to 12months	3	18	24	-	-
12 to 18 months	6	24	30	-	-
18 to 24 months	9	24	30	-	-
24 to 30 months	12	24	30	-	6
30 to 36 months	15	24	30	-	6
36 to 42 months	18	24	30	-	6
42 to 48 months	21	24	30	-	6
> 48 months	24	24	30+6	-	6+6

Table 4. Post-1992 period.

Contribution period.	**Entitlement UI (Months)**	**Unemployment assistance after exhausted U.I. (months)**			
		With family burdens		**Without family burdens**	
		< 45 years	**>45 years**	**<45 years**	**>45 years**
3 months	-	3	3	-	-
4 months	-	4	4	-	-
5 months	-	5	5	-	-
6-11 months	-	21	21	6	6
12-17 months	4	18	24	-	-
18-35 months	2×int(C/6)=6,8,10	24	30	-	-
36-71 months	2×int(C/6)=12,14,..,22	24	30	-	6
72 months	24	24	6+30	-	6+6
> 52 years	-	Up to retirement			
Others	-	18			

Table 5. Descriptive Statistics for variables in first, second and third paid unemployment spell.

		First Spell.			Second Spell.			Third Spell.		
Covariates.	**Dummy.**	**Mean.**	**Std.**	**%.**	**Mean.**	**Std.**	**%.**	**Mean.**	**Std.**	**%.**
Gender.										
Male.				60,9			60,9			60,9
Female.				39,1			39,1			39,1
Age.										
Entry age.		24,17	4,04	100	26,24	4,20	100	28,51	4,37	100
Exit age.		24,63	4,12	100	26,69	4,27	100	29,08	4,44	100
Exit age square.		623,75	214,4	100	730,65	239,69	100	865,52	269,23	100
Regions.										
Agricultural regions.	*			31,58			31,61			31,65
Services regions.	*			30,74			29,91			29,71
Industrial regions.	*			37,68			38,48			38,64
Family Burdens.										
With.	*			11,1			11,5			6,5
Without.	*			88,9			88,5			93,5
Type of Observation.										
Uncompleted Duration.	*			59,3			55,5			67,4
Completed duration.	*			40,7			44,5			32,6
Entitlement Period.										
From 0 to 6 months.		3,62	1,21	68,9	3,69	1,26	65,57	3,91	1,26	58,21
From 6 to 15 months.		11,00	2,28	11,0	11,03	2,30	17,06	10,65	2,15	24,71
From 15 to 24 months.		21,10	2,18	17,4	20,20	1,81	13,44	19,90	2,09	13,49
More than 24 months.		35,74	7,57	2,7	32,68	3,47	3,93	32,34	3,16	3,59
Duration (months).										
Current True duration.		5,58	5,97	100	5,44	5,31	100	6,86	6,34	100
Current Entitlement dur.		8,33	8,27	100	8,30	7,77	100	8,75	7,36	100
Wage per day (thousands)		2,36	0,78	100	3,03	1,18	100	3,80	1,55	100
Replacement Rate.										
Less than mode.		0,64	0,10	6,68	0,64	0,10	16,25	0,66	0,08	49,09
Mode (0,79).		0,79	0,00	58,18	0,79	0,00	65,06	0,79	0,00	41,02
More than mode.		0,95	0,12	35,14	0,92	0,10	18,69	0,93	0,11	9,89
Cause of Unemployment.										
End of Contract.	*			99,0			98,9			98,5
Other.	*			1,0			1,1			1,5
Exit of the System.										
Job.	*			40,7			44,5			32,6
Benefits Exhausted.	*			59,3			55,5			67,4
Job Category.										
1	*			5,1			6,39			7,21
2	*			6,8			9,24			10,93
3	*			34,6			27,43			23,22
4	*			14,2			13,15			12,46
5	*			39,3			43,79			46,18
Economic Variables.										
GNP rate (quarterly).		5,61	0,55	100	4,04	1,59	100	2,37	1,91	100
Regional Unempl. Rate.										
Low.		13.02	0.47	19.11	12.73	1.07	39.71	12.53	1.12	32.87
Low Intermediate.		16.84	0.50	32.31	16.78	0.81	25.82	16.60	0.83	19.38
Intermediate.		19.90	0.72	20.48	19.53	0.78	7.76	19.54	1.05	17.31
High.		29.68	2.53	28.1	27.12	2.31	26.71	26.90	3.55	30.44

Legend for Job Category.

1. High level and associate professional technicians. Foremen and supervisors.
2. Technical assistants and skilled clerical workers.
3. Unskilled clerical workers and unskilled production workers.
4. Semi-skilled clerical workers.
5. Skilled production workers and semi-skilled production workers.

Table 6. Estimation results. Weibull and gamma heterogeneity. Entire sample.

	First spell		Second spell		Third spell	
Covariate	Parameter	Sig.	Parameter	Sig.	Parameter	Sig.
Intercept	2,809	***	1,981	***	1,932	***
	(4,517)		(3,355)		(2,58)	
Gender (Female)	0,082	***	0,148	***	0,246	***
	(2,28)		(4,386)		(5,72)	
Exit age	-0,06		-0,239		-0,047	
	(-1,326)		(-0,599)		(-0,1)	
Exit age square	0		0,073		0,052	
	(1,622)		(1,044)		(0,65)	
Job Category						
1	-0,1		-0,034		-0,161	*
	(-1,133)		(-0,463		(-1,82)	
2	0,04		0,142	**	0,137	*
	(0,541)		(2,414)		(1,85)	
4	0,133	**	-0,012		0,056	
	(2,409)		(-0,24)		(0,81)	
5	-0,072	*	0,022		-0,008	
	(-1,93)		(0,63)		(-0,16)	
Agricultural Regions	0,05		0,086	**	0,128	**
	(1,101)		(1,978)		(2,24)	
Industrial Regions	0,06		0,042		0,198	***
	(1,418)		(1,027)		(3,6)	
Family burdens (With)	-0,317	***	-0,214	***	-0,199	**
	(-6,29)		(-4,631)		(-2,58)	
Replacement Rate						
Less than mode	-0,250	***	0,084		-0,059	
	(-2,468)		(1,304)		(-0,81)	
More than mode	-0,07		-0,016		-0,052	
	(-1,565)		(-0,371)		(-0,74)	
GDP rate (quarterly).			-0,001		-0,066	***
			(-0,101)		(-5,28)	
1992 Dummy			0,072		0,247	***
			(0,847)		(3,32)	
Entitlement period						
From 0 to 6 months	-0,08		-0,183	***	-0,325	***
	(-1,616)		(-4,636)		(-6,62)	
From 15 to 24 months	0,272	***	0,179	***	0,141	**
	(5,166)		(3,805)		(2,36)	
More than 24 months	1,254	***	0,933	***	1,210	***
	(9,376)		(10,22)		(11,1)	
End of contract	-0,233	*	0,135		0,104	
	(-1,826)		(1,0)		(0,76)	
Wage per day (current	0,03		-0,072	***	-0,079	***
thousands pts)	(0,672)		(-3,516)		(-4,77)	
Lagged true duration (months).			0,032	***	0,062	***
			(6,712)		(8,1)	
Interaction terms						
TPMESC11			-0,019	***	-0,022	***
			(-3,177)		(-2,66)	
TPMESC12			-0,010	*	-0,028	***
			(-1,927)		(-3,27)	
TPMESC13			-0,011	**	-0,037	***
			(-2,015)		(-3,07)	
MESBAJ11			-0,022	***	-0,023	***
			(-6,272)		(-4,28)	
Gamma	0,956	***	1,053	***	2,073	***
	(7,591)		(8,661)		(7,75)	
Duration Dependence	1,60394		1,75216		1,70259	
Sample Size(% censored)	6393(59.3)		6393(55.4)		6393(67.3)	
Log likelihood	–5822,778		-6008,106		-5389,683	

Legend. *** (0,01 significant); ** (0,05 significant);* (0,1 significant). In brackets t-student. Job category in table 5. TPMESC11: Interaction between lagged duration and dummy for low regional unemployment rate. TPMESC12: Interaction between lagged duration and dummy for low-intermediate regional unemployment rate. TPMESC13: Interaction between lagged duration and dummy for intermediate regional unemployment rate.TPMESC14: Interaction between lagged duration and dummy for high regional unemployment rate. MESBAJ11: Interaction between lagged duration and dummy for lagged exit to job.

Table 7. Estimation results. Weibull and gamma heterogeneity. Male and female.

	First spell.				Second spell.				Third spell.			
	Male.		Female.		Male.		Female.		Male.		Female.	
Covariates.	**Param.**	**Sig.**	**Param.**	**Sig.**	**Param.**	**Sig.**	**Param.**	**Sig.**	**Param.**	**Sig.**	**Param.**	**Sig.**
Intercept.	3,628	***	2,220		1,221		3,000	***	1,639	**	1,966	*
	(4,502)		(2,298)		(1,591)		(3,228)		(1,688)		(1,639)	
Exit age.	-0,095		-0,050		0,249		-0,801		0,194		0,0001	
	(-1,603)		(-0,691)		(0,480)		(-1,263)		(0,309)		(0,000)	
Exit age square.	0,002	**	0,001		-0,009		0,175		0,019		0,036	
	(1,823)		(0,927)		(-0,104)		(1,539)		(0,182)		(0,271)	
Job Category.												
1	-0,094		-0,086		0,035		-0,122		-0,063		-0,179	
	(-0,733)		(-0,665)		0,319)		(-1,156)		(-0,536)		(-1,280)	
2	-0,077		0,167		0,107		0,117		0,106		0,190	*
	(-0,815)		(1,610)		(1,343)		(1,321)		(1,081)		(1,658)	
4	0,095		0,168	*	0,010		-0,064		-0,030		0,095	
	(1,032)		(2,286)		(0,121)		(-0,911)		(-0,260)		(1,003)	
5	-0,092	**	-0,022		0,027		-0,006		-0,037		0,075	
	(-2,040)		(-0,326)		(0,644)		(-0,091)		(-0,653)		(0,826)	
Agricultural Regions.	-0,004		0,117	*	0,046		0,142	*	0,041		0,269	***
	(-0,073)		(1,781)		(0,828)		(2,017)		(0,583)		(2,748)	
Industrial Regions.	-0,010		0,171	**	-0,035		0,163	***	0,130	**	0,333	***
	(-0,203)		(2,571)		(-0,675)		(2,369)		(1,927)		(3,454)	
Family burdens (with).	-0,352	***	-0,201	**	-0,238	***	-0,122		-0,141		-0,444	***
	(-5,906)		(-2,070)		(-4,523)		(-1,239)		(-1,576)		(-2,824)	
Replacement Rate.												
Less than mode.	-0,274	**	-0,186		0,145	*	-0,030		-0,015		-0,068	
	(-2,157)		(-1,131)		(1,780)		(-0,280)		(-0,166)		(-0,574)	
More than mode.	-0,076		-0,061		-0,051		0,036		-0,018		-0,055	
	(-1,262)		(-0,810)		(-0,899)		(0,542)		(-0,189)		(-0,520)	
GDP rate (quarterly).					0,004		-0,002		-0,066	***	-0,055	***
					(0,222)		(-0,101)		(-4,245)		(-2,605)	
1992 Dummy.					0,085		0,087		0,164	**	0,422	***
					(0,797)		(0,606)		(1,775)		(3,387)	
Entitlement Period.												
From 0 to 6 months.	-0,073		-0,104		-0,153	***	-0,270	***	-0,310	***	-0,287	***
	(-1,266)		(-1,332)		(-3,176)		(-3,849)		(-5,204)		(-3,296)	
From 15 to 24 months.	0,243	***	0,301	***	0,166	***	0,161	**	-0,002		0,385	***
	(3,761)		(3,385)		(2,894)		(1,952)		(-0,029)		(3,787)	
More than 24 months.	1,121	***	1,379	***	0,811	***	1,070	**	1,063	***	1,453	***
	(6,298)		(7,152)		(6,902)		(7,500)		(7,336)		(9,050)	
End of contract.	-0,436	**	-0,016		0,280	*	-0,116		0,131		-0,033	
	(-2,482)		(-0,084)		(1,792)		(-0,507)		(0,816)		(-0,123)	
Wage per day (current thousands pts.)	0,028		0,025		-0,082	***	-0,047		-0,072	***	-0,092	***
	(0,579)		(0,390)		(-3,283)		(-1,356)		(-3,577)		(-3,146)	
Lagged true duration. (months).					0,041	***	0,017	**	0,065	***	0,051	***
					(6,111)		(2,471)		(6,378)		(4,423)	
Interaction terms.												
TPMESC11.					-0,020	***	-0,010		-0,014		-0,030	**
					(-2,574)		(-1,159)		(-1,315)		(-2,313)	
TPMESC12.					-0,009		-0,009		-0,027	**	-0,025	*
					(-1,137)		(-1,196)		(-2,504)		(-1,906)	
TPMESC13.					-0,009		-0,010		-0,040	**	-0,034	*
					(-1,229)		(-1,196)		(-2,428)		(-1,896)	
MESBAJ11.					-0,029	***	-0,015	**	-0,022	***	-0,023	***
					(-6,051)		(-2,900)		(-3,013)		(-2,941)	
Gamma.	0,646	***	1,494	***	0,769	***	1,585		1,515	***	3,030	***
	(4,761)		(5,788)		(5,669)		(6,628)		(5,226)		5,521)	
Duration dependence.	1,46841		1,87216		1,62930		2,01667		1,58017		1,94048	
Log Likelihood.	-3731,71		2497(63)		-3863,11		2497(61)		-3487,53		2497(71)	
Sample (% censored).	3896(56)		-2074,07		3896(52)		-2120,85		3896(64)		-1878,85	

Legend. See Table 6.

Figure 1. Inflow of workers to the Spanish Unemployment Compensation System and GDP growth rate. February, June, November. 1987-1995. (Feb. 87=100)

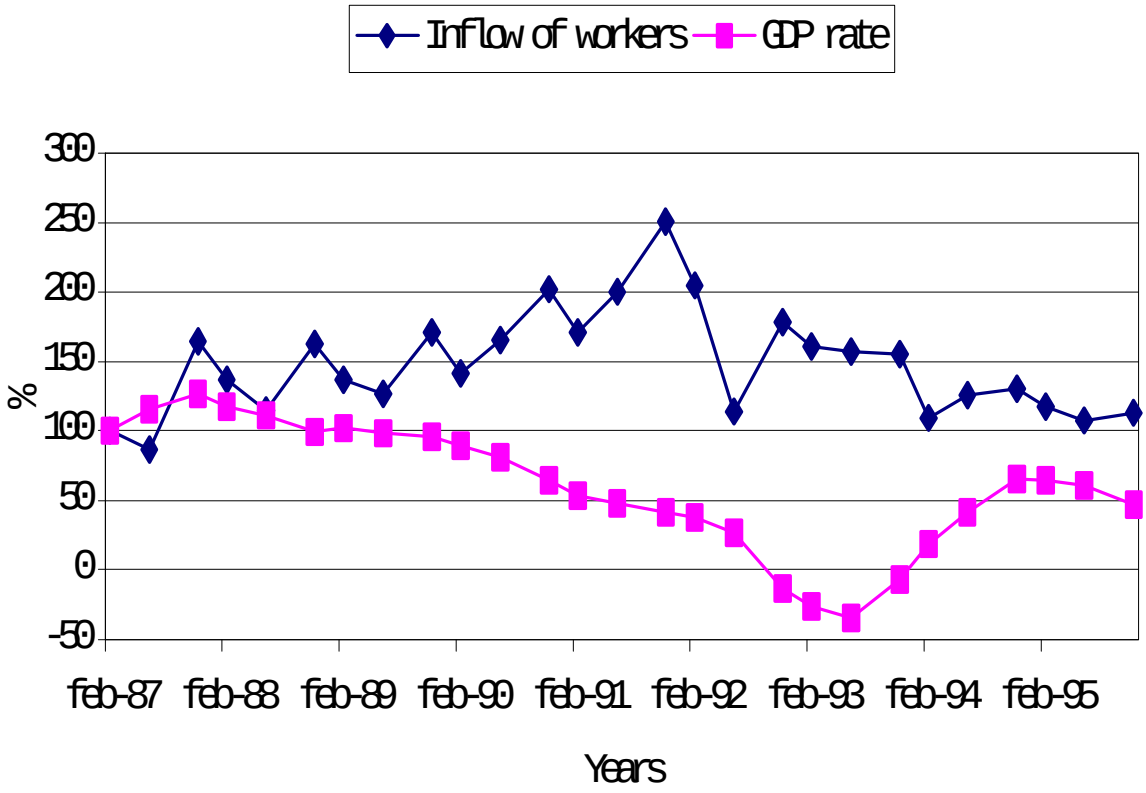

Figure 2. Kaplan-Meier estimates cumulative survival function. First, second and third paid unemployment spells (p.u.s)