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ABSTRACT

Reliable empirical evidence about the effects of unemployment insurance benefits (UIB) on individuals' labour market paths is crucial for designing appropriate labour market policies. In particular, medium and long-run effects of the UIB system can differ markedly from short-term impact when job stability depends on previous labour market history. This paper addresses the effect of the UIB entitlement length on employment stability by taking into account benefits endogeneity, dynamic selection issues and occurrence dependence. The analysis is undertaken for dual labour market, as the one in Spain, where temporary and permanent workers differ in quite many individual and labour market characteristics. We find that the UIB entitlement period lengthens the unemployment spell of all workers but it also has a positive effect on the quality of subsequent job matches, particularly for temporary workers, and when job entrance takes place by the end of benefits entitlement. We use our estimates to simulate alternative UIB designs and conclude that shortening the benefit entitlement length does not seem to lead to significant gains in overall employment stability which increases by 4.3% at most. But at the same time, we find that job turnover also increases so the overall effect is that workers are employed a bit more but at the expense of suffering more job interruptions.

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Keywords: Unemployment insurance; Multivariate Mixed Proportional Hazard Model; Job Turnover; Employment Stability; Employment Dynamics

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1 Introduction

It is well established that labor market institutions that encourage stable employment paths are desirable not only for equity but also for efficiency reasons. The efficiency properties of the unemployment insurance system, in terms of employment stability¹, are theoretically ambiguous, so they need to be empirically tested. Typically, previous empirical studies have focused on a short-term perspective as they assess the role of benefits in single employment and unemployment duration episodes. However a medium-term perspective, which is related to the role of UIB over individuals' labour market paths, is also highly relevant. Medium and long-run effects of the UIB system can differ markedly from short-term impact when current employment duration depends on previous labour market history. Thus, a proper evaluation of the UIB system should consider its effects on both duration and subsequent occurrence of employment and unemployment spells. This paper sheds light on one aspect of this debate and proposes an analysis of the effects of UIB entitlement length on job turnover and labour market stability, taking into account endogeneity of benefits, dynamic selection and occurrence dependence issues.

This paper also contributes to the empirical literature by analysing the potential interactions of the UIB system with a segmented labour market characterised by two types of workers: stable versus unstable ones. In this regard, we make our assessment for Spain given that employment duality is key in understanding the functioning of its labour market and given the different responses of its labour market outcomes compared to those in other European economies (see Bentolila et al., 2010). In particular, we wonder whether the UIB system might favour stable labour markets paths not only through the pure matching effect (it increases job match quality by allowing individuals to wait for better job offers) but also by favouring the transitions from unstable to stable jobs.

Our empirical analysis rests on duration models which are closely related to the timing-of-events approach developed in Abbring and Van den Berg (2003). Formally, the model has two states: employed and unemployed. However, in order to consider the potential endogeneity of each transition and its relation to UIB parameters, we model each state following a competing risk approach. For the employment equation, we model separately layoff, quit, job-to-job transitions into a fixed-term contract and those into an open-ended contract. Similarly, for the unemployment equation we model separately the exit to employment in a job with a fixed-term contract versus a job with an open-ended contract. Differentiating by type of contract offers a new dimension to the analysis which is crucial to understanding the interaction between the UIB system and dual labour

¹ See Dolado et al. (2013) for recent empirical evidence on the positive relationship between stable employment and productivity.

markets², particularly because in this type of labour market the arrival rate of job offers as well as job duration differs markedly by previous and current contract type. Moreover, in the empirical model we allow for heterogeneous effects of the UIB system by type of contract.

In this paper we use the information provided by the longitudinal working life sample (LWLS), an Spanish administrative database extracted from social security records. The analysis will focus on labour market transitions along the period 1995-2007 for a sample of male workers. That is, we are analysing only a expansionary period for the Spanish economy because we think in this time span the arrival rate of job offers could be assumed to be close to one (or at least very large for temporary job offers). Hence, in terms of the exit from unemployment, we can better interpret our results as depending basically on reservation and offered wages. The big recession of 2008-2012 is the most severe recession in developed countries since World War II and we think it deserves a special analysis.³

In accordance with previous literature, our findings show that non-insured unemployed workers face larger inflows to employment than insured ones except at the time benefits run out. As a novelty, we find that benefits might encourage job stability for temporary workers not only by increasing subsequent job tenure -the pure matching effect- but also by increasing the entrance probability into a permanent contract, either directly from unemployment or from a temporary contract. Finally, our simulation exercise shows that reducing the entitlement period of benefits does not lead to substantial increase in employment stability because job turnover also increase if unemployment benefits are cut. Hence, the overall effect of this policy measure is that workers are employed only a bit more but at the expense of suffering more transitions from employment to unemployment.

Our paper starts with a brief description of the Spanish UIB system. In the third section we present the data and main sample characteristics. Section four describes our empirical model and sections five and six contain our main results. The last section presents our basic conclusions.

2 The Spanish Unemployment Insurance Benefit System

All employees who involuntarily become unemployed⁴ are entitled to UIB, provided that they have been employed for at least 12 months over the previous 72 months. Individuals receiving full-time disability benefits, voluntary job quitters and anyone over the age of 65 are excluded from these

² See Guell and Petrongolo (2007) or Rebollo (2011) for recent empirical evidence related to the role of temporary contracts as a stepping stone in Spain. Both papers show that the predominance of temporary contracts accounts for the majority of employment-unemployment transitions and that most firms hire workers initially on fixed-term contracts and some of them subsequently become permanent.

³ In any case, results for the complete 1995-2012 period or just for the 2008-2012 period are available upon request and commented below.

⁴ For more details of the UIB system in Spain see Bover *et al.* (2002).

benefits. Benefits end when individuals cease to be unemployed or complete the maximum entitlement period. The amount of income provided for the unemployed is determined by multiplying the gross replacement rate by the average basic pay over the 12 months preceding unemployment. The monthly payment is 70% of the previous wage for the first six months of benefits and 60% from the seventh month onwards. The UIB entitlement length depends on previous employment duration. These benefits last for a period of at least 4 months, extendable in 2 monthly periods up to a maximum of 2 years, depending on the worker's employment record. Unemployment Assistance benefits are available for those who have not been in work long enough to qualify for UIB or for those who have exhausted them.

3 Data and Descriptive Statistics

We work with an event history data set that comes from the Spanish Social Security records (Longitudinal Working Lives Sample, LWLS).⁵ The LWLS, which is compiled annually, consists of a sample of over one million worker case-histories. The initial database includes all individuals who came into contact with the Social Security system - either as employee or as unemployed and receiving unemployment benefits - at least one day between 2005 and 2012. This database provides highly detailed information about the workers' past and present labour activities, including type of contract, receipt of UIB, and reasons for job termination. Individual characteristics such as age and nationality are also present in the database.

The sample used in our analysis includes only workers who are in regular employment.⁶ We consider two labour market statuses: employed and unemployed. The duration of each job spell is based on the specified start and end contract dates provided by the dataset. Likewise, we compute the duration of each unemployment episode by measuring the time lapse between the end date of a worker's previous contract and the start date of the new one. The unemployment state includes registered unemployment with or without receiving benefits and we control whether it was due to a layoff or to a quit. For the purpose of this paper it is interesting to highlight that with our database, we can compute unemployment duration when workers are covered by UIB (either contributive or assistant benefits) but also the period after benefits run out. This is in contrast to other administrative datasets where unemployment is truncated at the point benefits run out. Indeed,

⁵ For a detailed description of this sample, see Duran, (2007) and García-Pérez (2008).

⁶ In Spain, self-employed workers are not entitled to receive unemployment benefits

Card *et al.* (2007) posit that the incidence of potential benefit duration on the unemployment exit rate is conditional on the way the researcher measures the end-of-benefit spike phenomenon.⁷

We track each spell to the point of transition or to the end of the observation period. For the case of the employment spells⁸, each uncensored job spell is identified either as a layoff, a quit, a job-to-job transition to a permanent contract (JJ-PC, hereafter) or a job-to-job transition to a temporary contract (JJ-TC, hereafter). Within these job-to-job transitions we include those transitions with an observed unemployment spell of 15 days or less. To avoid odd behaviour in the estimated baseline hazard functions due to the scarcity of observations for longer durations, we right-censored any observed spells of unemployment longer than or equal to 36 months and any observed spell of employment longer than or equal to 120 months.

The sample selection criteria are designed to minimize the incidence of the initial conditions problem in the econometric analysis. In particular, the first observation of each worker corresponds with the first employment spell and then the worker is followed over time. Hence, we can compile individual UIB claim histories at any point in time. For instance, we compute the UIB entitlement length for each individual by combining the information on her previous and current employment duration and previous unemployment duration, if any (with or without benefits), according to the rules laid out in the Spanish UIB System. The database includes the date of the last UIB claim, thus enabling us to determine the number of weeks of insured unemployment already accumulated at the start of a new employment spell. It is important to stress that the administrative source and the comprehensive nature of the dataset reduce measurement errors of these two parameters of interest to a negligible level.

The final data used covers the working history for male⁹ Spanish workers aged between 18 and 55 over the period 1995-2007. We select this period of analysis because during these years the favourable macroeconomic context favoured job creation. That is, in this period the arrival rate of job offers can be assumed to be close to one (or at least very large for temporary job offers),¹⁰ which enables us to better interpret the results from the duration model presented in the paper.

Tables 1 and 2 provide a descriptive overview of the main sample characteristics and the events recorded in our dataset, with the sample split according to the labour market status: employment

⁷ In particular, they point out that this effect is notably lower when measuring the incidence of UIB Systems over employment entrance than when measuring the incidence on the unemployment outflow, and the unemployment spell is censored upon the exhaustion of UIB benefits.

⁸ Employment spells shorter than a month are not considered in the analysis.

⁹ We only consider male workers since female ones have a more interrupted professional career due to inactivity reasons such as maternity leave and childcare which are not always well identified in the dataset.

¹⁰ Silva and Vázquez-Grenno (2012) study the dynamics of the Spanish Labour Market for the period 1987-2010 and obtained that during recessions the separation rate drives unemployment whereas in periods of moderation the role played by the job finding rate acquires greater relevance.

and unemployment. Firstly, the data reveals a large degree of job turnover within the sample timeframe. Average employment duration is 21 months. However, median contract duration is 6 months and 25% of the employment spells lasts no longer than 2 months. Average unemployment duration is 6.5 months while median unemployment duration is 3 months. The average number of employment and unemployment spells along the analysed period is 4.27 and 2.23, respectively. Finally, the average share of time spent employed over the total timeframe is 71%. Notice that for one out of any four workers in the sample this ratio drops to 27%. Hence, the large divergence between the mean and the median show that there are individuals with a large degree of job mobility, that is with below average durations of both unemployment and employment spells. The existence of this group of workers suggests the possibility of substantial unobserved heterogeneity, possibly correlated across spells and states, affecting the selection into employment and unemployment. Such sample selection may induce some correlation of the unobserved heterogeneity component with the UIB System variables because eligibility rules make such variables depend on workers' labour market histories. This issue will be addressed in the econometric analysis.

[Insert Table 1 here]

Table 2 offers an overview of the recorded events. The data reveals that for the sample of employees, layoff is the most common exit alternative when employed since 34.9% of employment spells end due to this reason. It is also worth noting that mean employment duration is the shortest for this employment transition (7.1 months) whereas it is the largest for the case of JJ-PC transitions (15.1 months). Turning our attention to the sample of unemployed workers, we can observe that the most common exit is to a job holding a temporary contract. Most noteworthy is the huge difference among the proportion of unemployment spells ending in a temporary contract (91%) versus a permanent one (1.8%).

[Insert Table 2 here]

3.1 Interactions between the UIB system and labour market paths: some stylized facts

In this paper we are interested in the effects of the benefit entitlement length on employment stability. Basically, unemployment and employment duration might be correlated with unemployment benefit entitlement length.

3.1.1 The matching effect

Let's start looking at whether the benefit entitlement length is positively correlated with subsequent employment duration. In this paper, as a measure of job match quality we consider job duration¹¹. Table 3 presents mean employment duration for three alternative job entry paths: i) job-to-job transition; ii) an insured unemployment spell; iii) un-insured unemployment spell. In this table it is observed that job-to-job transitions tend to be the ones with the lengthiest job spell, followed by benefit receivers. For this last group, job duration increases with the benefit entitlement length. Though in this statistical analysis we have focused on the relationship between UIB and subsequent employment stability as an indicator of a good match, one could also analyze the influence of benefits on the type of transition experienced. In particular, the data also show that employees who received benefits have a larger chance of entering into a new job with a permanent contract. For instance, the share of insured workers that holds a permanent contract in the subsequent job is 29%. For the case of un-insured workers this ratio is just 21%.

[Insert Table 3 here]

3.1.2 The Exhaustion Effect

Turning our attention to the sample of unemployed workers, in Table 4 we show unemployment outflows in relation to the benefit entitlement length by type of contract in the previous and new job. Notice that this exit probability differs notably among the different cases considered. Some salient points should be noted. Firstly, the correlation between unemployment duration and entitlement length is positive. That is, insured workers face longer periods of unemployment than other workers. Secondly, it is noticeable the importance of the exhaustion effect. The unemployment exit probability displays large spikes at the time the worker exhausts her benefits. For instance, a temporary contract worker entitled to 4 months of benefits experiences an unemployment exit probability at month 4 of 42.33% that decreases by more than 20 percentage points once benefits are exhausted. The same pattern is observed for the rest of UIB entitlement lengths and for workers who previously held a permanent contract.

[Insert Table 4 here]

¹¹ Match quality is difficult to quantify empirically. In this paper, we rely on theory to identify job tenure with match quality. The idea of representing a good match by a lengthy duration comes from Jovanovic (1979), where a match is a pure experience good: the quality of a match is not known ex ante, but must be experienced. We consider that this approximation of match quality is especially relevant for highly segmented labour markets like the Spanish one.

The statistical analysis just presented shows some interesting insights into the labour market paths of workers and their relation with the Spanish UIB system¹². It seems that employment and unemployment duration are both related with the UIB entitlement length. This empirical evidence will be considered in our econometric model in order to evaluate the relationship between the Spanish UIB and the individuals labour market stability.

4 Methodology

To investigate whether Unemployment Benefits affect job stability it is crucial to take into account dynamic selection and endogeneity issues (i.e. the endogeneity of previous unemployment duration on subsequent employment duration). For this goal, we use duration models that are closely related to the timing-of-events approach of Abbring and Van den Berg (2003). This approach is able to solve the endogeneity problem caused by selective treatment by exploiting the variation in the timing of each transition. In particular, we set up a multivariate mixed proportional hazard rate model (MMPH) that combines information related to the individual's use of the UIB system (potential for the employee or real for the unemployed) with information on employment and unemployment dynamics.

Our evaluation setup implies that we have to deal with the issue of multiple selectivity. As a base for the analysis, we model the event history of an individual since the flow of first-time entrants into the state of employment $\{T_e\}$. The first selection relevant in our study is the exit from the current employment spell and how the design of the UIB might influence the type of exit (layoff, quit, JJ-TC, JJ-PC). In this first employment spell, benefits might affect job duration through the "eligibility effect". That is, the layoff probability might increase once the individual becomes eligible for benefits. On the contrary, quit rates should decrease and job-to-job transitions should not be affected. Summing up, from this first state the worker can end up in a new job or in an unemployment spell. Notice that since the exit from employment to each competing risk is driven by observed and unobserved characteristics and therefore, by a non-random process, the composition of the subsample of job seekers with respect to observables and non-observables is different from the subsample of job-to-job movers.

Once the individual is unemployed $\{T_u\}$, the second selection process takes place. The unemployed worker can enter again into employment when she receives a job offer and accepts it. In Spain, the job offer arrival rates strongly differ between permanent and temporary contracts, the first one being notably lower than the second. Again, the design of the UIB might influence the timing and the

¹² In Rebollo (2012) one can also find empirical evidence of the importance of the eligibility requirement effect on employment outflows. Given the aim of the paper and for sake of concreteness we decided to omit these statistics although they are available upon request.

type of exit. However, in this case we have two competing effects. Firstly, with lengthier benefit entitlements the worker experiences longer unemployment spells. This may affect negatively the arrival rate and the type of job offers she receives (depreciation of general human capital skills, negative signalling and so on). Secondly, the larger the UIB entitlement and the corresponding lengthier unemployment spells might give the time needed to search for and find a good and durable job offer (i.e. employment with a permanent contract). Hence, again there is a selection process where the composition of the subsample of job seekers with respect to observables and non-observables is different from the subsample of new job entrances.

Once the worker exits from unemployment, we move back to the previous selection process but in this case, the duration of the employment spell $\{T_e\}$ will also be affected by the “matching effect”. That is, lengthier UIB might help to find the right “match” and hence will guarantee job stability, or at least it may favour lengthier employment spells. From the descriptive analysis already presented, one could infer that this effect should be particularly relevant for workers who start with a temporary contract and get a permanent one after the spell of unemployment.

Handling the selection problems outlined above implies the control of observable and unobservable individual differences as well as allowing for a correlation between different unemployment spells and employment processes. This is done by simultaneous estimation of employment and unemployment spells with correlated unobservable characteristics. The non-random selection process due to observed characteristics is controlled by the inclusion of covariates that comprise current and past individual and job characteristics. To take into account selectivity in the level of unobserved characteristics we specify unobserved heterogeneity specific to each transition allowing for correlation between the different states of the individual’s history due to their time-invariant unobserved characteristics.

Combining such a design and our precise data, the effect of interest can be separated from selectivity issues. Assuming, for reasons of tractability and interpretation, that the hazard rates are proportional, and given the characteristics of the dataset, this paper uses discrete time duration models in which the proportional hazard assumption¹³ implies that each hazard takes the complementary log-log form (Jenkins, 2005) $\{h_k^s(j/\Omega)\}$, where the index s denotes the type of spell ($s=e,u$ that is the state employment or unemployment), the index k_s denotes the type of transition which is specific to each state s ($k_e=4$ for the employment state and $k_u=2$ for the unemployment state) and the index j denotes time along the corresponding spell. Expanding this, using the parameters involved in our analysis, gives:

¹³ The model is proportional in the sense that unobserved as well as most observed characteristics are assumed to affect individual hazard rates multiplicatively.

$$h_k^s(j/\Omega) = 1 - \exp\left(-\exp\left(UB_{(j)}^s \rho_k^s + lh^s \gamma_k^s + x_{(j)}^s \beta_k^s + d_{(j)}^s \delta_k^s + v_k^s\right) \lambda_{(j)k}^s\right) \quad (1)$$

We define six sets of explanatory variables: $UB_{(j)}$ contains the individual economic incentives embedded in the UIB System. These variables all interact with the type of contract. lh consists of several variables that control for occurrence dependence issues including the number of previous unemployment spells and employment spells holding a permanent contract. $x_{(j)}$ is based on observed individual and job control variables including but not limited to age, nationality, part-time job, hired by a temporary work agency, type of contract, sector of activity, firm size, job qualification, and firm ownership structure. $d_{(j)}$ contains variables to control for aggregate and regional demand side effects, including the quarterly regional unemployment rate and the quarterly GDP growth rate. $\lambda_{(j)}$ is the integrated baseline hazard. Finally, v_k^s covers unobserved individual characteristics, assumed to be specific to the origin and destination states¹⁴.

Even though we apply a proportional hazard rate model, we emphasize that non-parametric identification does not rely on the proportionality assumption. Additional sources of identification are the existence of repeated job and unemployment spells (Abbring and Van den Berg, 2003) and more importantly, the abundance of exogenous time-varying covariates¹⁵ (McCall, 1994; Eberwein et al. 1997; Brinch, 2007; Gaure et al. 2007).

4.1 Parameterization of the UIB effects

4.1.1 The Unemployment hazard

For the unemployment equation the effect of the UIB entitlement period by type of contract is modelled as follows:

$$UB_{(j)}^{k_u} = DurUB_{(j)} * \rho_1^{k_u} + ExUB_{(j)} * \rho_2^{k_u} + (DurUB * DurU)_{(j)} \rho_3^{k_u} + (ExUB * DurU)_{(j)} * \rho_4^{k_u},$$

where, $DurUB$ represents the number of insured months left before benefit exhaustion and $ExUB$ is a dummy variable that takes value one when the worker exit from unemployment at the time benefits run out, and zero otherwise. These variables capture the non-stationary effect inherent in the UIB system. One could claim that a worker's search effort and/or job acceptance probability will increase as the month of benefit exhaustion draws closer. From a firm's perspective, assuming as

¹⁴ That is, all the five hazard rates, are tied together through the joint distribution of unobserved heterogeneity. The estimated correlation between unemployment duration and subsequent employment duration through the UIB system could be spurious if individual unobserved heterogeneity affecting unemployment duration is correlated with the unobserved heterogeneity affecting job duration.

¹⁵ As pointed out by Eberwein et al. (1997), time-varying variables naturally provide an exclusion restriction in the sense that past values of these variables affect the current outcomes only through the already realized selection process. Hence they facilitate the disentanglement of causal treatment and duration effects from impacts of unobserved sorting.

given this behaviour by the worker, the probability of hiring the worker will also increase as the month of exhaustion of benefits approaches, with this effect being tougher for workers with a strong attachment to the labour market. The third ($DurUIB * DurU$) and fourth ($ExUIB * DurU$) terms of the above expression are interactions of the unemployment duration with the first two variables to allow for heterogeneous effects of these covariates.

With this specification we identify the exhaustion effect since we have unemployed workers with and without UIB, but more importantly, we have workers with the same observed unemployment duration but with different entitlements lengths. The limited duration of benefits implies that individuals with different entitlement lengths should have different optimal paths of reservation wage and search effort over time. This non-stationarity is the way to identify the effects of the UIB entitlement length on unemployment duration.

Since all UIB parameters interact with the type of contract held by the worker in the previous job, from this model specification we can assess some new ideas. In particular, since benefits offer financial support to keep searching for better job offers, we wonder whether insured workers face a larger probability of entering into a new job holding a permanent contract versus a temporary one.

4.1.2 The employment hazard

In the employment equation we model the economic incentives embedded in the UIB System (UIB variables in equation 1), also by type of contract, as follows :

$$UIB_{(j)}^{k_e} = \left[(1-U)\rho_1^{k_e} + U * (DurU * \rho_2^{k_e} + DurUIB * \rho_3^{k_e} + ExUIB * \rho_4^{k_e}) \right] + \left[ElUIB_{(j)} * \rho_5^{k_e} \right].$$

This expression contains two brackets which are related with two different effects of the benefit system. In the first bracket, the term U is a dummy variable that takes value one for workers who had an unemployment spell before the current job and zero otherwise¹⁶. The covariate $DurU$ represents the duration of the previous unemployment spell, $DurUIB$ represents the UIB entitlement length and $ExUIB$ is a dummy variable that takes value one when the worker exhausted her benefits at the time she entered into the current job. Hence, the first part of the above expression shows that the distribution of job duration depends on previous unemployment duration and the dependence is specified such that benefit entitlement duration and unemployment duration effects can be distinguished. The idea is to identify any heterogeneous effects of benefits on employment stability for alternative unemployment experiences. In particular, the identification of the matching effect relies on the fact that the difference in the optimal job search behaviour of unemployed individuals

¹⁶ Additionally, in the empirical model there is a dummy variable that takes value one if the previous unemployment spell was due to a quit instead of a layoff.

with different entitlement lengths should lead to different realized distributions of subsequent job quality. That is, individuals with a given length of unemployment, the same level of benefits, but a longer period of remaining benefit entitlement may keep searching and wait for job offers which are better in terms of employment stability. With the above model specification, we allow the matching effect to be different in cases where the exit from unemployment takes place before and after benefits end. We have chosen this model specification in accordance with the specification of the unemployment hazard. Moreover, previous empirical evidence has shown that the unemployment exit rate sharply increases at the time benefits run out (See, for example, (Meyer, 1990; Meyer and Anderson, 1990; Belzil, 2001; Roed et al., 2003; Tatsiramos, 2009; Bonn et al. 2009). This result has traditionally been interpreted as an evidence of the disincentive effect of benefits on labour supply. However, an alternative interpretation based on efficiency issues could be considered whenever the matching effect becomes empirically relevant and especially when this effect reaches a maximum while receiving benefits.

As for the case of the unemployment equation, all the parameters in the employment equation interact with the type of contract held by the employee. Hence, we can measure whether the matching effect differs by contract type and whether benefits (indirectly) favour job stability by increasing the chances to enter into jobs with permanent contracts.

In the second bracket of the previous expression we include the variable *EIUB* that takes value one when the employee becomes eligible for benefits –in case of unemployment- and zero otherwise. That is, we test whether the distribution of employment duration depends on the monthly accumulated entitlement for UIB benefits. The identification of this effect rests on the fact that there are employees with the same current employment duration but with different labour market trajectories (i.e. different number of accumulated months of employment). Conditional on certain employment duration, the access to UIB will shift the employment exit rate. The size of this shift provides an estimate of the respective treatment effect. Intuitively, this identification strategy implies that the hazards are equal before the eligibility date, and conditional on observables and unobservables. Though this effect is not analysed in detail in the paper, we have found relevant to consider it because previous empirical evidence has shown that eligibility requirements might affect job duration and the number of job interruptions (see Rebollo 2012 for the Spanish case).

4.2 The Likelihood function

To estimate this discrete-time duration model, we construct a panel dataset such that the spell length of any given individual determines a vector of binary responses. We define $\delta_{jk_s}^s$ as a binary

indicator variable denoting transitions to potential destination upon exit through one of the competing alternatives k , i.e., $\tau_{jks}=1$ if individual i transits from s to one of the competing k_s alternatives and zero otherwise. Let L_i be the complete set of outcome indicators available for individual i (multiple-spells). The contribution to the likelihood function formed by the event pattern of a particular individual, conditional on the vector of unobserved variables $\nu_i=(\nu_1, \nu_2, \nu_3, \nu_4, \nu_5)$, can then be formulated as:

$$L_i(\nu_i) = \prod_{y_{isk} \in Y_i} \left[\prod_{s=1}^S \prod_{j=1}^J \prod_{k_s=1}^{K_s} (h_{jk_s}^s)^{\tau_{jks}^s} (1-h_{jk_s}^s)^{1-\tau_{jks}^s} \right] \quad (2)$$

We introduce unobserved heterogeneity non-parametrically by means of the non-parametric maximum likelihood estimator (NMPLE). In practice, this implies that the vectors of the unobserved attributes specific to each type of transition are jointly discretely distributed. The number of mass-points is determined by adding location vectors until it is no longer possible to increase the likelihood function (Heckman and Singer, 1984; Gaure *et al.*, 2007). Assuming that the unobserved covariates are jointly discretely distributed with Q number of support points, the data likelihood function can be written as:

$$L = \prod_{i=1}^N \left[\sum_{l=1}^L q_l L_i(\nu_i) \right], \quad \text{with} \quad \sum_{l=1}^L q_l = 1 \quad (3)$$

where $\{\nu_l, q_l\}$, $l=1, \dots, L$, are the location vectors and probabilities characterising the heterogeneity distribution. The mass points (or combinations of mass points) and their associated probabilities are estimated together with other model parameters. Since each hazard rate contains a constant term, for identification purposes the unobserved heterogeneity is modelled by normalizing the first 5-tuple of location parameters to zero so that the estimated coefficient for the remaining unobserved types of individuals denotes the deviation from the constant term. For the estimation procedure, the probabilities q_l are specified as logistic probabilities.

5 Results

The estimated model contains a large number of parameters, most of which are included solely for control purposes and are secondary to the topics discussed in this paper. Hence, although the full results are reported in Table A1 (Appendix), they are not all discussed in the text. The focus in this section is on key results regarding the impact of the UIB System on employment and unemployment

duration. The main results are presented in terms of individual parameter estimates (relative hazard rates) and some post-estimation exercises.

Overall, our MMPH model shows its relevance in the significant differences between the patterns of duration dependence and the effects of the explanatory variables on each hazard rate. The likelihood function obtained its maxima at three mass-points in the distribution of unobserved heterogeneity. These support points were robustly identified on the basis of a large number of estimators with different starting values. The results are also highly robust as long as the number of support points lies between two and three.¹⁷ This may imply that the information content in the data relating to the distribution of the unobserved heterogeneity term is sufficient to ensure robust identification of the structural duration dependence in the hazard rates, as well as the effects of the benefits on spell duration.

The MMHP model is estimated using a polynomial baseline for each hazard¹⁸ and we additionally use some dummy variables to control for the spikes observed at certain spell durations (basically, months 3, 6, 9, 12, 24 and 36 for employment spells and 6 and 10 for unemployment spells). For the sake of brevity we do not display the predicted hazards in this section since in the robustness checks of the model we will present them together with the results of our simulations. The estimated layoff, quit and JJ-TC hazard rates show negative duration dependence. The estimated JJ-PC hazard rate shows positive duration dependence during the first two years of the contract. With the exception of the quit hazard rate, all the hazard rates show spikes at specific contract durations, the largest at months 6 and 12. The estimated unemployment hazard rates show also a clear negative duration dependence.

5.1 Unobserved Heterogeneity and selection effects

Unobserved heterogeneity is responsible for a substantial degree of variation in all the estimated hazard rates. Moreover, the multivariate mixed proportional hazard model used conceals some interesting results which would remain unknown when estimating the model separately for each labour market state. In Table 5 we display average estimated exit probabilities for each unobserved heterogeneity component (e.g. worker type). From the information provided by this table we observe that 39% of the individuals in our sample are *high turnover workers*, meaning that they face higher employment and unemployment exit probabilities than the other individuals (mainly Type III workers in our analysis). Notice that these workers face employment and unemployment exit

¹⁷ We have also tried to estimate the model with four points of support, but there was no convergence in any of the estimations.

¹⁸ We have also tried to estimate the model with a piece-wise constant specification of the baseline hazard in order to allow for greater flexibility. However, many of the duration variables were not identified for certain months as there were not enough exits observed to one of the competing exits.

probabilities that at least double the ones observed for the rest of workers. The differences between the other two types of workers are smaller, though Type I individuals seem to be more stable since their employment exit probabilities are lower, whereas their unemployment exit probabilities are higher than those of Type II workers.

[Insert Table 5 here]

5.2 *UIB System incidence on employment duration*

The empirical analysis presented in this section is based on the notion that the UIB System might affect employment duration. Nevertheless, from a theoretical perspective, the sign of the predicted effect is ambiguous. Firstly, employment duration might be negatively related with previous UIB length. Benefits allow lengthier unemployment spells with the negative consequences in subsequent employment duration due to human capital depreciation or negative signalling effects. Secondly, employment duration might be positively related with benefits through the “matching effect”. That is, benefits allow the worker to devote more time to find a good, and therefore, durable match. Moreover, we add a new dimension to the analysis and we wonder whether these effects could vary between workers with different degrees of labour market stability; temporary versus permanent workers. In particular, we wonder whether benefits might favour job stability encouraging the transition from temporary to permanent contracts.

5.2.1 *Incidence of Unemployment Duration on Subsequent Job Duration*

Coefficient estimates (in table A1, Appendix) lead us to conclude that unemployment duration negatively affects subsequent employment stability since outflows to unemployment increase with previous unemployment duration (either as layoffs or quits) whereas job-to-job transitions decrease. These last results hold mainly for temporary workers whereas for workers with permanent contracts the results are less evident. For the latter, quits and job-to-job transitions into permanent contracts increase with previous unemployment duration but coefficients are not statistically significant for the rest of the competing alternatives.

To illustrate these results, we display in Table 6 the estimated employment exit probability in relation to previous unemployment duration for three situations: i) UIB receipts (UIB), ii) non-receipts (NO UIB), and iii) Job-to-job movers (unemployment duration=0). We focus on temporary employees to illustrate the results. The information provided in this table confirms that job-to-job movers are the ones with the largest stability records since they face the lowest unemployment exit rates whereas

job stability notably decreases for employees who entered from unemployment, either insured or non-insured. Notably, the incidence of having a job interruption is significantly large for temporary workers and it especially increases the layoff probability. For these workers, the layoff exit probability increases from 14.4%, in the case of accessing the current job by a job-to-job transition, to 23.7% or to 22.1% in case of experiencing a short unemployment episode without or with benefits, respectively. Table 6 also shows the incidence of the duration of the unemployment episode on job stability. The estimated layoff exit probability is 23.7% or 22.1% when previous unemployment episode lasted three months, with or without benefits, respectively. These rates move up to 26.7% and 24.9% when previous unemployment duration increases to 12 months. The quit rate also increases but to a much lesser extent than the layoff rate. The probability of job-to-job transitions to a permanent or to a temporary contract decrease between 1 and 2 percentage points. The results obtained for employees holding a permanent contract are slightly different from those with temporary ones as we do not get a strong negative effect of unemployment duration on subsequent job stability for these employees.

[Insert Table 6 here]

The last two columns of Table 6 show the relative difference in average employment duration for UIB receivers and non-receivers, the reference case being the average expected duration for job-to-job entries. From these two columns we can see that having a job interruption significantly reduces employment duration and this effect increase with the duration of the unemployment for non UIB receivers. On the contrary, for UIB receivers this last effect is not as evident as for non-benefit receivers since it depends on the benefit entitlement length. For instance, temporary employees who experienced a short unemployment spell (3 months) face a drop in average employment duration of 24% for non-insured ones and of 10% for insured ones (with an entitlement length of 6 months).

Summing up, we find that job interruptions negatively influence subsequent job stability, mainly for temporary workers, and this negative effect increases with the duration of the unemployment episode for non UIB recipients whereas for UIB recipients this effect depends on the UIB entitlement period. Interestingly, once the worker has obtained a permanent contract, previous unemployment duration becomes much less relevant to understand current employment stability.

5.2.2 Incidence of the UIB entitlement Length on Subsequent Job Duration

Coefficient estimates point out that the UIB entitlement length might also be important in understanding job stability. This variable is statistically significant in almost all competing risks and for both contract types. In general, we find that previous UIB entitlement length is positively correlated with subsequent employment duration¹⁹. These results are in accordance with the models of Marimon and Zilibotti (1999) and Acemoglu and Shimer (2000) and the results presented in Belzil (2001), Centeno (2004) and Tatsiramos (2006).²⁰ On the contrary, Van Ours et al. (2008) obtain results showing that the potential duration of unemployment benefits had no detectable effect on the duration of the post-unemployment job.

In Figure 1 we depict the estimated employment exit probability in relation to benefits entitlement length for three situations: i) employees who were un-insured and whose unemployment spell lasted 12 months; ii) employees who were insured and whose unemployment episode lasted 12 months and iii) employees who were insured and whose unemployment spell lasted 24 months. The straight line represents the employment exit probability for former non-UIB recipients (first case). Comparing the horizontal distance between the non-UIB recipient line with the other two cases, one can see that the receipt of unemployment benefits favour lengthier subsequent job spells. Moreover, the decreasing pattern of the employment exit probability for UIB recipients also indicates that lengthier entitlements influence positively on employment duration. Interestingly, Figure 1 also shows that the matching effect is relatively more important for previously insured temporary workers who exited from unemployment while receiving benefits (which is in accordance what it is found in Belzil, 2001 and Tatsiramos et al., 2009). This result is represented in Figure 1 by the drop in the employment exit probability for temporary workers when the benefit entitlement length equals previous unemployment duration. This happens at months 12 and 24 for the cases represented in Figure 1. For permanent workers this coefficient is not statistically significant.

Nevertheless, Figure 1 does not offer a comprehensive assessment of the effect of the UIB entitlement length on job stability since information relative to job-to-job transitions is omitted. It could be that benefit recipients are favoured by greater chances to obtain permanent job offers once employed, than non-recipients²¹. The matching effect could be of significant importance for a worker

¹⁹ We find that employment duration for benefit receipts can be between 10-20% lengthier than for non-receipts when the worker enters into a temporary contract. Hence, jobs that are found when receiving benefits last longer compared to jobs found for non- UIB receivers. These differences are lower for workers who obtain a permanent contract in the new job.

²⁰ Centeno (2004) finds that a more generous unemployment insurance system is positively related to post-unemployment job tenure, and Tatsiramos (2006) reaches the same conclusion using data for ten European countries. Belzil (2001) explores a reduction in the initial entitlement period rule in Canada and reports a weak but positive impact of the maximum benefit duration on subsequent job duration, for a sample of young Canadian male workers.

²¹ Our sample includes transitions from a temporary to a permanent contract within the same or different firm.

that ends a temporary contract, and enters into a permanent contract. These possibilities are represented in Table 7.

[Insert Figure 1 here]

We focus on the results for temporary workers since they represent the majority of employment outflows. The reference individual is a worker who had an unemployment episode of 12 months. Apparently, as can be seen in this table, the matching effect does not seem to be too strong since increasing the entitlement length from 4 to 24 months reduces the exit probability to unemployment (layoff and quit) no more than three percentage points. In particular, from our estimation we obtain a layoff probability decrease from 26.7% for previously un-insured workers to 25.3% for the insured ones whose entitlement was four months. The quit probability also drops from 2.2% to 1.5%. Interestingly, the job-to-job transition probability to a permanent contract slightly increases from 10.5% to 10.9%, whereas the job-to-job transition probability to a temporary contract decreases from 12.9% to 12.5%. These effects become larger as the length of the entitlement increases. For instance, for entitlement lengths of 8 months, the aforementioned transition probabilities move further down to 24.6%, 1.3%, and 12.3% for layoffs, quits, and JJ-TC respectively, and move further up to 11.1% for JJ-PC. For entitlements of 24 months these transition probabilities become 23.6%, 0.9%, and 12.0% for layoffs, quits and JJ-TC respectively, and 11.4% for JJ-PC. Hence, from the above results it seems that insured workers benefit with longer employment durations as compared to un-insured ones, though the magnitude of the effect of benefit lengths is small.

[Insert Table 7 here]

So far we have not commented on the results with respect to an entitlement of 12 months since this case combines two effects. The estimated transition probabilities shown in Table 7 are computed for employees whose previous unemployment spell lasted 12 months. Hence, the estimated transition probabilities corresponding to 12 months of entitlement also captures the importance of the matching effect when the employee accepted the new job offer at the time of benefit exhaustion. This point corresponds with the dip observed in the estimated employment exit probability of Figure 1. The information provided in Table 7 allows us to better quantify the importance of this effect. When jobs are accepted at the time benefits run out, the drop in the exit to unemployment and the increase in the job-to-job transitions to permanent contracts become the largest of the changes represented in Table 7. That is, a temporary worker whose entitlement was 12 months, but accepted

a new temporary job offer at month 4, faced a layoff probability of 25.3%, whereas this probability dropped to 19.7% when she remained unemployed until the last month of receiving benefits (at month 12). The transition probability to a new job with a permanent contract increases from 10.9% to 12.1% for the same case. Hence, employment stability significantly improves for temporary workers who keep searching and find and accept job offers at the time benefits run out.

Hence, our results show that benefits might improve employment stability for temporary workers and this increase comes from a pure matching effect - larger job tenure than un-insured workers - and from a greater chance of entering into a new job holding a permanent contract.

5.2.3 The Entitlement Requirement Effect

The results obtained for this effect are in accordance with previous empirical studies²². The coefficients associated with the Entitlement Requirement Effect are statistically significant for those workers holding a temporary contract whereas for permanent ones, only the risks of layoff and to transit to other permanent contract result as statistically significant. One useful way of illustrating the impact of the entry requirement on employment exit rates is to plot these variables against the benefit qualifying period (Figure 2). Again we focus on the results for temporary workers.

[Insert Figure 2 here]

Figure 2 shows that the impact of the UIB eligibility requirement on employment duration is relevant for the case of the layoff competing risk. The layoff rate records a spike at the point the worker qualifies for benefits, whereas the quit and job-to-job hazard rates hardly vary at any point with this parameter. The sharpest spikes are found for workers holding temporary contracts: their layoff hazard increases by around 0.2 percentage points when qualifying for benefits and falls by 0.4 percentage points afterwards; both cases being compared to the previous month. The results presented so far reveal an effect of the Entitlement Effect of UIB benefits on layoffs that is not found for quits neither for job-to-jobs.

5.3 *UIB System incidence on Unemployment Duration*

In general terms, all the UIB variables in the unemployment equation are statistically significant (see Table A1), which suggests that UIB affect the timing of the outflow to employment and that this effect varies with unemployment duration. The common findings that unemployment duration increases with the UIB entitlement and that the unemployment hazard rate rises as benefit

²² This effect is included in the analysis but it is not deeply commented in the results. For a detailed analysis of the effect of the eligibility requirement of benefits on employment duration in Spain see Rebollo (2012). Additional international evidence of this effect can be found in Christofides et al (1996), Green et al. (1997), Baker et al. (1998) Belzil, (2001), Jurajda, (2002).

exhaustion approaches (Meyer, 1990; Meyer and Anderson, 1990; Belzil, 2001; Roed et al., 2003; Tatsiramos, 2009; Bonn et al. 2009; Rebollo 2012) are also obtained in this estimation²³. This result immediately suggests that the net effect of the UIB system on unemployment and employment duration depends crucially on the length of the UIB²⁴.

Figure 3 shows the estimated unemployment exit probability in relation to unemployment duration for three alternative situations: i) non-insured workers (UIB=0); ii) insured workers with 4 months of entitlement (UIB=4) and; iii) insured workers with 8 months of entitlement (UIB=8). Basically, our results show that the behavioural impacts of UIB benefits on unemployment duration are large. We can observe that the unemployment exit probability decreases with the benefit entitlement length and that it sharply increases around the time benefits run out. Notice that for the cases represented in Figure 3, the unemployment exit probability increases around 8-11 percentage points at the time the benefits are exhausted. This exhaustion effect is larger than the one found in other countries which may be related to the fact that workers lose their benefits entitlements when the new job lasts more than one month, a special characteristic of the Spanish UIB design.

[Insert Figure 3 here]

This figure also shows that for insured workers the exit to employment probability slowly decreases until the time of benefit exhaustion approaches. That is, either the insured worker exits at the beginning of the unemployment spell or waits to exhaust benefits - this second option being more common. This differential behaviour could be due to differences in the expectation of getting “good” job offers. A deeper understanding of the results can be obtained by looking at the influence of the benefits to each competing risk and taking into account whether the worker previously held a permanent or a temporary contract. Table 8 displays the estimated unemployment exit probability by previous type of contract and for each competing risk at three specific unemployment durations and for non-insured and insured workers. For this last group we display the exit probability for three entitlement lengths (entitlements of 4, 8 and 12).

Using the results presented in Table 8, we find evidence that benefits favour the exit to jobs holding a permanent contract, particularly for temporary workers. Insured workers typically have a lower unemployment exit probability than un-insured ones. However, if we compare such a drop by

²³ In a previous paper (Rebollo, 2012) we offer a deeper analysis of the exhaustion effects in the Spanish Labour Market. In that paper the focus is on differentiating the effect of benefits between recalls versus new jobs.

²⁴ We tried to estimate a similar model for the crisis period 2008-2012, however some of the parameters of interest could not be identified for lack of sufficient sample variability. Alternatively, we estimated a model for the period 1995-2012. In some instances, we obtained different results which are not a surprise given the special characteristics of the current economic crisis. These differences are mainly found for the exhaustion effect. This effect is notably lower for this second sample. Evidently, during 2008-2012 there has been a strong rate of job destruction in Spain, and the arrival rate of job offers has been one of the lowest in the last thirty years.

competing risks we observe that the relative drop in the unemployment exit rates is larger for exits to temporary than to permanent contracts.

[Insert Table 8 here]

For instance, at the first month of the unemployment spell, the exit to a temporary contract drops by around 40%, 52% and 67% for insured workers (versus non-insured ones) with entitlements of 4, 8 and 12 months, respectively. On the contrary, the exit probability to a permanent contract for the same workers drops less: by around 38%, 47% and 63%, with entitlements of 4, 8 and 12 months, respectively. When we look at the differences in the unemployment exit rate at benefit exhaustion, a similar pattern emerges. The increase in the exit probability for an insured worker versus an un-insured one is larger for permanent than for temporary jobs. For an insured worker with an entitlement of 4 months, the exit probability to a temporary contract increases by 20%, whereas the exit probability to a permanent contract increases by 27%, relative to un-insured ones. For entitlements of eight months, the increase in the exit probability between insured and un-insured workers at benefit exhaustion are 51% and 79%, for exits to a temporary contract and a permanent one, respectively. Finally, for entitlements of 12 months this relative change moves up to 72% and 117%, respectively. Thus, our results point out that unemployment benefits seem to favour job stability by allowing temporary workers to keep searching for a good match. Moreover, insured temporary workers are more reluctant to reject a job offer before benefits are exhausted when this offer is a permanent one than when it is a temporary one.

5.4 Labour market history variables: occurrence dependence

The covariates used to control for occurrence dependence (number of previous permanent contracts and number of unemployment spells), are statistically significant and with the expected signs. The corresponding estimated employment and unemployment exit probabilities for different accumulated, open-ended contracts and job interruptions are displayed in Tables 9 and 10, respectively. In particular, in Table 9 we can observe that the number of previous open-ended contracts initially favours job stability since it influences negatively the inflows to unemployment and positively the probability of entering into a job associated with a permanent contract. However, as the worker obtains additional open-ended contracts the positive effects on job stability diminish since job duration becomes negatively affected.

[Insert Table 9 here]

From Table 10 we also see, as expected, that the number of job interruptions negatively affects future employment stability since the outflow from unemployment decreases, whereas the

probability of being laid off or experiencing a job-to-job transition to a new temporary contract notably increases. It is worthy of note that the magnitude of the effect of these variables on employment and unemployment outflows is larger than the one found for some of the UIB parameter estimates.

[Insert Table 10 here]

Additionally, in our estimation, the entitlement and length of benefits affect the probability of having a job interruption and the number of job interruptions affects subsequent employment stability. Hence, in order to understand the dynamic effects of the entitlement length on employment stability, the number of job interruptions and open-ended contracts should be taken into account.

6 Simulations

The analysis presented in Section 5 does not result in a complete understanding of the overall effect of UIB entitlement length on labour market stability. The medium and long-run effects of the UIB system can differ from short-term impact when employment duration depends on previous labour market history. To obtain insights into the dynamics of the effects and also about which of the different UIB effects on employment stability seem to dominate, we propose to use some simulation exercises.

As the reliability of these simulations depends on the capacity of our event history model to predict the realized labour market transitions, we have previously made a report of goodness-of-fit checks of the estimated model. The description of the simulation performed for this goodness-of-fit analysis and its results are included in Appendix B. The main conclusion from them, however, is that our empirical model is well able to reproduce sample transitions and average employment and unemployment spell durations.

6.1 Simulations of policy interventions

In a majority of countries, a long-term declining of unemployment benefits presents a major structural change for unemployment compensation systems (OCDE Employment outlook, 2013). Hence, we propose an exercise that consists of analysing the effect of reducing the UIB entitlement length over not only unemployment duration but also other elements influencing employment stability. We are aware that our reduced-form duration model cannot offer an answer in terms of causal evaluation but still we think it is interesting to perform it to get a deeper insight into the different results presented so far. Summing up, we have found that previous job interruptions negatively affect job stability and this effect increases with unemployment duration for non-benefit

recipients. On the contrary, UIB receivers might have lengthier employment spells than non-UIB receivers but this effect depends on previous unemployment duration, entitlement length and on the time the new job is accepted. Besides, becoming eligible for benefits may increase the outflows from employment. These results do not offer a clear answer in terms of the capacity of the UIB to encourage stable labour market paths. For that purpose we simulate the estimated model for alternative UIB regimes.²⁵ Thus, the policies we are going to simulate are the following: i) Current design of the UIB system in Spain; ii) Drop in the maximum benefit entitlement length from 24 to 12 months; iii) Drop in the entitlement length of 50%; iv) Total withdrawal of unemployment benefits.²⁶

The simulation process is similar to the one performed for the goodness-of-fit exercise described in Appendix B. In particular, from model estimation we can construct individual labour market histories for the alternative UIB designs above commented, which are then used to predict effects of the policy change on two main parameters: job turnover and overall employment duration. This simulation is executed for certain individual types defined by specific observed characteristics. In particular we divide the sample by age (<30, 30-45, >45), qualification at first job spell (low and high skills), and type of contract at first job spell (temporary versus permanent). In all cases we assume the individual is a full-time worker in the private sector. The variables related with the UIB system and those that control for labour market paths are endogenously determined whereas the rest of individual (exogenous) observed characteristics are computed at the sample averages specific for each group. Each worker's monthly labour market history is simulated 1000 times along a 60 month period. The present simulation study therefore accounts for medium-run effects²⁷.

From our simulations we compute the average number of unemployment and employment episodes, mean employment and unemployment duration and total months of time employed along the sample frame (60 months). In Table 11 we present the results as relative changes with respect to the situation under the current UIB design. For the sake of brevity we only present the results of workers who started the labour market with a temporary contract, since they represent more than 85% of the individuals and are the ones who suffer larger degrees of job turnover, and therefore are more

²⁵ In order to get a better understanding of the functioning of the model, we have performed an additional simulation which consists of increasing the chances of getting stable job offers either from employment or from unemployment (i.e. we increase the arrival rate of job offers associated with an open-ended contract and we decrease in the same proportion the arrival rate of job offers related with a fixed-term contract). As expected, in this simulation overall job stability greatly increased. For instance, increasing the arrival rate of permanent job offers by 20% could increase job stability between 10-30% depending on the worker type. This result clearly points to the need for considering a general perspective when addressing the reform of Spanish labour market institutions.

²⁶ We have also simulated the model increasing the entitlement length from 24 to 36. The results obtained from these simulations are in line with those obtained from the simulations presented in the paper. In this case, we find that overall employment stability slightly decreases, whereas the job turnover rate decreases.

²⁷ We have also performed the simulation for a 10 year period. Since the results do not change qualitatively we have opted to omit them although they are available upon request.

affected by the UIB system design. The results for those with a permanent contract in their first employment spell are quite similar to the ones shown here although much lower in absolute value.

[Insert Table 11 here]

A central conclusion from our simulation exercises is that the effect of reducing UIB length is heterogeneous depending on the type of policy reform and the type of worker we consider. This heterogeneity of results is due to the different employment dynamics that emerge for each worker type and policy change, which are endogenously determined by the model. Let's focus on the more general results. We see that when UIB entitlement length drops, overall time spent employed increases, but it also coincidentally increases labour market turnover. Notably, the results on overall time spent employed are mainly driven by the drop in unemployment duration caused by shorter UIB entitlement lengths. For instance, for Policy 2 (drop of 50% of the entitlement length), unemployment duration drops between 7% and 19%. However the information provided in Table 11 shows that the effects on job stability do not seem large, as the total number of months employed over the 60 month span we have simulated does not increase much. For example, in the case of Policy 2, job stability increases by 2.43% at most²⁸. In the case where unemployment benefits are totally eliminated, job stability only increases by 4.18%, as maximum. On the contrary, we find that the level of job turnover, measured by the number of unemployment spells the worker have on average over the period of five years we simulate, increases more than it is the case for the total number of months employed, so we can conclude that reductions in UIB entitlement seem not to increase job stability of workers. More on the contrary, workers are predicted to be employed a bit more but at the expense of suffering more transitions from employment to unemployment.

7 Summary and Conclusions

The design of the Unemployment Insurance Benefit system may have important implications for individuals' labour market paths. Initially, empirical papers focused on the effect of the UIB entitlement period over unemployment duration and showed that lengthier benefits favour larger unemployment episodes and that these benefits tend to be exhausted before getting back to employment. Later on, the interest was devoted to the impact of UIB on employment duration. On one hand, the benefit entitlement period is positively correlated with unemployment duration which might worsen subsequent job duration: the unemployment scarring effect. On the other hand, previously insured workers might have lengthier employment spells since benefits finance the search

²⁸ These results hold independently of the type of worker in terms of unobserved heterogeneity.

for a good and therefore durable match. Hence, given these three competing effects, the incidence of benefits on job duration and overall employment stability is uncertain. In this paper we have attempted to go a step further from previous empirical analysis and we offer an assessment of the influence of the UIB entitlement length on overall employment stability taking into account simultaneously the competing effects of the benefits on unemployment and employment duration, as well as considering occurrence state dependence. Additionally, we take advantage of the Spanish labour market, since it allows assessment of whether the effects of the benefit entitlements differ between stable and unstable labour market workers. To do so, our multivariate mixed proportional hazard model includes two system parameters: the entry requirement and the entitlement length.

We find evidence of the positive effect of benefits on subsequent job duration especially for temporary workers, through two main channels. Firstly, insured workers have subsequent lengthier job spells than un-insured ones, this effect being stronger as the entitlement period increases. Secondly, previously insured workers holding a temporary contract might face larger transition probabilities to permanent contracts than un-insured ones. Hence, previously insured workers might benefit from better employment prospects than un-insured ones either remaining in the same job or moving directly to a new permanent job. We illustrate our results by a simulation of the processes of finding and losing work, starting with an initial spell of employment and spanning the sample frame for each individual in the data. These simulations are used to predict effects of a policy change on the group of workers in our sample. The main conclusion drawn from this simulation exercise is that reducing the duration of unemployment benefits seems to have little effect on time spent employed while it increases job turnover rates. Evidently, these results may be important from a policy perspective. It is interesting to attempt an analysis of the trade-off in terms of social welfare, between the costs of having shorter employment spells or a more generous UI benefit system (a discussion re-examined in Marimon and Zilibotti, 1999). In particular, for a segmented labour market such as the Spanish one, it is interesting to take into account the ability of the UIB to foster or limit the negative effect of job turnover, which opens up new perspectives on the UIB system.

References

- Abbring, J.H. and G.J. van den Berg (2004), "Analyzing the effect of dynamically assigned treatments using duration models, binary treatment models, and panel data models", *Empirical Economics*, vol. 29, pp. 5-40.
- Anderson, P. M. and Meyer, B.D. (1993): "Unemployment Insurance in the United States: Layoff Incentives and Cross Subsidies", *Journal of Labour Economics*, University of Chicago Press, vol. 11(1), pp.70-95.
- Anderson, P. M. and Meyer, B.D. (2000): "The effects of the unemployment insurance payroll tax on wages, employment, claims and denials" *Journal of Public Economics*, Vol. 78(1-2), pp. 81-106
- Belzil, C. (2001): "Unemployment insurance and subsequent job duration: job matching versus unobserved heterogeneity", *Journal of Applied Econometrics*, Vol. 16(5), pp. 619-636.
- Boone, J. and Van Ours, J. C. (2009): "Why is there a spike in the job finding rate at benefit exhaustion?," CEPR Discussion Papers 7525.
- Bover, O., Arellano, M. and Bentolila, S. (2002): "Unemployment duration, benefit duration and the business cycle", *The Economic Journal*, 112, pp. 223-265.
- Bover, O. and Gomez, R. (2004): "Another look at unemployment duration: exit to a permanent vs. a temporary job", *Investigaciones Económicas*, vol XXVIII (2), pp. 285-314.
- Caliendo, M. Tatsiramos, K. and Uhlendorff, A. (2009): "Benefit Duration, Unemployment Duration and Job Match Quality: A Regression-Discontinuity Approach", IZA Discussion Papers 4670.
- Centeno, M. (2004): "The match quality gains from Unemployment Insurance", *Journal of Human Resources* Vol. 39(3).
- Card, D. and Chetty, R. and Weber, A. (2007): "The Spike at Benefit exhaustion: leaving the unemployment system or starting a new job?", *American Economic Review*, 97, pp.113-118.
- Dolado, J.J., Ortigueira, S. and Stucchi, R. (2013): "Does dual employment protection affect TFP? Evidence from Spanish manufacturing firms", [Economics Working Papers](#) we1137, Universidad Carlos III, Departamento de Economía.
- Duran, A. (2007): "La Muestra Continua de Vidas Laborales de la Seguridad Social", *Revista del Ministerio de Trabajo y Asuntos Sociales*, Nº1, pp.231-240
- García Pérez, J.I (2008): "La Muestra Continua de Vidas laborales (MCVL): una guía de uso para el análisis de transiciones laborales", *Revista de Economía Aplicada*, XVI(E-I), pp.5-28.
- Gaure, S., Roed, Kr. and Zhang, T. (2007): "Time and Causality: a Monte Carlo assessment of the timing-of-events approach", *Journal of Econometrics*, Vol 141, pp. 1159-1195.
- Green, D.A and Riddell, W C. (1997): "Qualifying for Unemployment Insurance: An Empirical Analysis", *Economic Journal*, Royal Economic Society, vol. 107(440), pp. 67-84.
- Güell, M. and Petrongolo, B. (2007): "How Binding Are Legal Limits? Transitions from Temporary to Permanent Work in Spain", *Labour Economics*, Vol 14, 153-183.
- Heckman, J.J. y Singer, B. (1984): "The Identifiability of the proportional hazard model", *Review of Economic Studies*, 51, pp.231-241.
- Jenkins, S. (1995): "Easy Estimation Methods for Discrete Time Duration Models", *Oxford Bulletin of Economics and Statistics*, 57(1), pp.129-137.
- Jurajda, S., (2002): "Estimating the effect of unemployment insurance compensation on the labor market histories of displaced workers", *Journal of Econometrics*, vol. 108(2), pp. 227-252, June.

Katz, L.F. y Meyer, B.D (1990): "Unemployment Insurance, Recall Expectations and Unemployment Outcomes", *Quarterly Journal of Economics*, 105, pp. 973-1002.

Lalive, R. and Zweimuller, J. (2004). Benefit Entitlement and Unemployment Duration, The Role of policy endogeneity" *Journal of Public Economics* 88, pp. 2587-2616.

Lalive, R. (2007). "Unemployment Benefits, Unemployment Duration, and Post-Unemployment Jobs: A Regression Discontinuity Approach." *American Economic Review*, 91(2), pp. 108-112.

Meyer, B. D., (1990): "Unemployment Insurance and Unemployment Spells" *Econometrica*, vol. 58(4), pp. 757-782.

Niedergesäss, M. (2012): "Duration dependence, lagged duration dependence, and occurrence dependence in individual employment histories" Working Papers in Economics and Finance Nº 26, University of Tuebingen, Faculty of Economics and Social Sciences

Petrongolo, B. (2009): "The long-term effects of job search requirements: Evidence from the UK JSA reform" *Journal of Public Economics*, vol 93, pp. 1234-1253.

Rebollo, Y.F. (2011): "The role of job interruptions, temporary contracts and multi-firm experiences in the temporality trap in Spain" *The Manchester School* Vol. 79, Nº6 pp. 1197-1236.

Rebollo, Y.F. (2012): "Unemployment Insurance and Job Turnover in Spain" *Labour Economics*, Nº 10-08

Roed, K. and Zhang, T. (2003): "Does unemployment compensation affect unemployment duration?" *Economic Journal*, 113, pp. 1-19.

Tatsiramos, K. (2009): "Unemployment Insurance in Europe: Unemployment Duration and Subsequent Employment Stability," *Journal of the European Economic Association*, MIT Press, vol. 7(6), pages 1225-1260, December.

Tatsiramos, K. and Van Ours, J.C (2012): "Labour Market Effects of Unemployment Insurance Design," CEPR Discussion Papers 9196, C.E.P.R. Discussion Papers.

Van Ours, J. and Vodopivec, M. (2006): "Shortening the potential duration of unemployment benefits does not affect the quality of post-unemployment jobs: evidence from a natural experiment" IZA discussion paper 2171.

Van Ours, J. C. and Vodopivec, M. (2008): "Does reducing unemployment insurance generosity reduce job match quality?," *Journal of Public Economics*, Elsevier, vol. 92(3-4), pages 684-695, April.

Tables

Table 1: Main Characteristics of the Sample of Workers (1995-2007)

	<u>Mean</u>	<u>Median</u>	<u>P25</u>
Contract Duration	21.19	6	2
Duration of Unemployment	6.55	3	1
Number of Employment Spells	4.27	3	1
Number of Unemployment Spells	2.23	1	0
Share of time spent employed (1995-2007)	71%	62%	27%
Sample size (Workers)	193,797		

Note 1: Mean and Median duration in months

Table 2: Overview of recorded events/outcomes (1995-2007)

	<u>Transitions</u>	<u>Average spell duration</u>
Employment Spells		
Censored employment Spells	22.93%	49.60
Layoffs	34.90%	7.18
Quits	10.37%	7.58
Job-to-job to a PC	11.54%	15.13
Job-to-job to a TC	20.26%	8.33
Sample Size (spells)	1,262,004	
Unemployment Spells		
Censored	6.81%	6.05
Exit to TC	91.40%	5.92
Exit to PC	1.80%	12.59
Sample Size (spells)	311,699	

Note 2: TC=Temporary Contract; PC=Permanent Contract;

Table 3: Mean Observed Employment Duration (months)

Entry from:	<u>Current Contract</u>	
	<u>TC</u>	<u>PC</u>
Unemployment (without UIB)	10.22	34.09
Insured Unemployment	13.00	37.83
Months of entitlement		
4	11.19	35.53
5-8	12.80	38.52
9-12	14.90	43.34
13-18	15.61	38.62
>18	14.17	35.21
Job-to-job	14.97	40.75

Same as Note 2

Table 4: Unemployment Exit Probability and the length of the UIB entitlement: (%)

		<u>Current Unemployment Duration (months)</u>					
		Previous Contract was:					
		TC			PC		
		4	8	12	4	8	12
		Exit to TC					
<u>UIB Entitlement length</u>	4	42.33%	20.45%	18.54%	46.15%	12.42%	15.38%
	8	24.95%	44.77%	13.92%	14.69%	45.83%	20.83%
	12	18.77%	20.16%	41.88%	15.42%	10.53%	59.65%
		Exit to PC					
<u>UIB Entitlement length</u>	4	0.65%	0.40%	0.98%	2.02%	0.02%	0.01%
	8	0.38%	0.65%	0.01%	0.18%	1.67%	0.02%
	12	0.37%	0.38%	0.01%	0.15%	0.01%	0.01%

Same as Note 2

Table 5: Predicted Mean Exit Rates by Unobserved Heterogeneity

Contract type	Unobserved Heterogeneity	Layoff	From Employment			From Unemployment	
			Quit	JJ to PC	JJ to TC	To TC	To PC
TC	Type I	7.37%	1.41%	2.90%	3.86%	9.76%	0.21%
	Type II	7.97%	1.53%	3.15%	4.18%	4.16%	0.00%
	Type III	18.37%	3.71%	7.37%	9.99%	19.25%	0.11%
PC	Type I	0.25%	0.27%	0.60%	0.46%	6.52%	0.21%
	Type II	0.27%	0.29%	0.65%	0.50%	2.27%	0.00%
	Type III	0.67%	0.72%	1.58%	1.23%	13.10%	0.11%

Note 3: These exit probabilities are computed at sample means ;

Note 4: TC=Temporary Contract; PC=Permanent Contract;

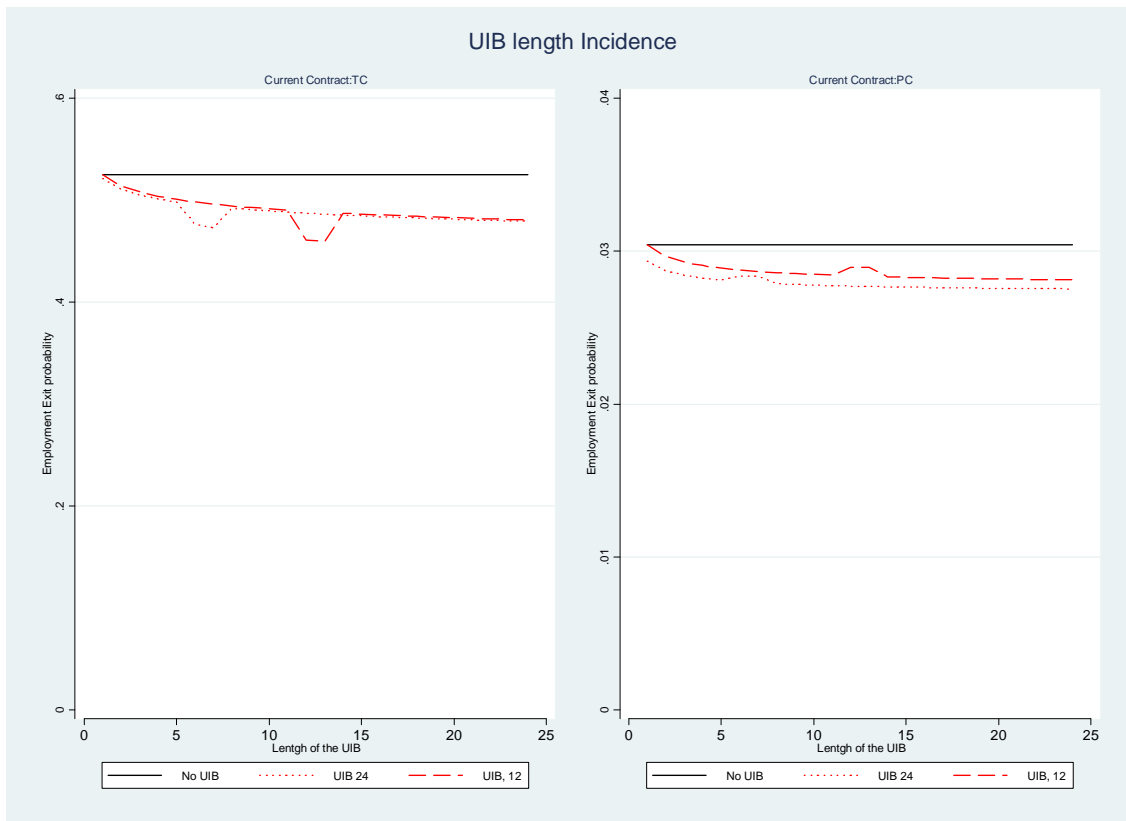
JJ PC=Job-to-job transition to a PC; JJ TC=Job-to-job transition to a TC

Table 6: The Estimated Employment Exit Probability in relation to previous Unemployment Duration

Unempl. Duration	Layoff		Quit		JJ to PC		JJ to TC		Mean Empl. Duration (Variation relative to JJ)	
	NO UIB	UIB	NO UIB	UIB	NO UIB	UIB	NO UIB	UIB	NO UIB	UIB
Current Contract: TC										
0	14.44%	-	1.24%	-	13.72%	-	16.05%	-	5.89	-
3	23.71%	22.09%	1.88%	1.19%	11.78%	12.30%	14.51%	13.92%	-24.5%	-10.3%
6	25.18%	20.22%	2.05%	1.16%	11.15%	12.34%	13.73%	13.89%	-29.1%	-6.7%
12	26.71%	24.93%	2.24%	1.42%	10.54%	11.02%	12.99%	12.45%	-34.2%	-13.7%
24	28.32%	26.45%	2.45%	1.55%	9.97%	10.42%	12.28%	11.77%	-39.9%	-21.7%
Current Contract: PC										
0	0.62%	-	0.32%	-	0.87%	-	0.52%	-	29.61	-
3	0.95%	1.09%	0.51%	0.35%	0.82%	0.77%	0.54%	0.49%	-4.8%	-2.6%
6	0.94%	1.16%	0.57%	0.38%	0.83%	0.83%	0.58%	0.45%	-6.3%	-3.7%
12	0.92%	1.06%	0.64%	0.45%	0.83%	0.79%	0.63%	0.57%	-7.9%	-2.5%
24	0.91%	1.04%	0.72%	0.50%	0.84%	0.79%	0.67%	0.61%	-9.7%	-6.3%

Note 5: This exit probability is computed at the average of observed characteristics and for a UIB entitlement length of 12.
Same as Note 4

Figure 1: Estimated Exit Probability from Employment in relation to the UIB entitlement length



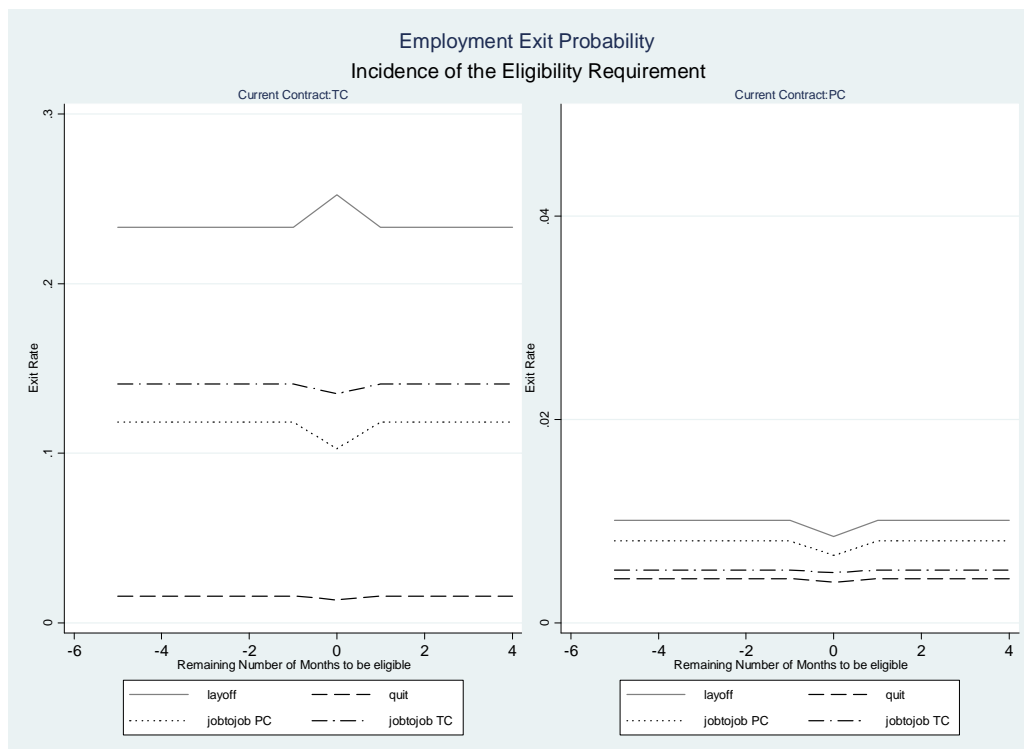
Note 6: UB 24= UIB Entitlement of 24 Months; UB 12=UIB Entitlement of 12 Months

Table 7: The Estimated Employment Exit Probability in relation to UIB entitlement length

	Unemployment (Layoff)	Unemployment (Quit)	Job-to-Job to PC	Job-to-Job to TC
Contract Type: TC				
Non-insured	26.71%	2.24%	10.54%	12.99%
UIB entitlement length:				
4	25.32%	1.57%	10.91%	12.57%
8	24.65%	1.32%	11.09%	12.36%
12	19.72%	1.01%	12.14%	13.20%
24	23.61%	0.99%	11.39%	12.05%
Contract Type: PC				
Non-insured	0.92%	0.59%	0.85%	0.66%
UIB entitlement length:				
4	1.03%	0.48%	0.80%	0.58%
8	1.08%	0.42%	0.78%	0.56%
12	1.23%	0.37%	0.84%	0.44%
24	1.18%	0.34%	0.76%	0.53%

Note 8: This exit probability is computed at the average of observed characteristics and for an unemployment duration of 12 months. Same as note 4.

Figure 2: The effect of the Eligibility Requirement by exit type



Note: The worker becomes eligible at time "0"

Figure 3: The Estimated Unemployment Exit Probability in relation to the UIB entitlement length

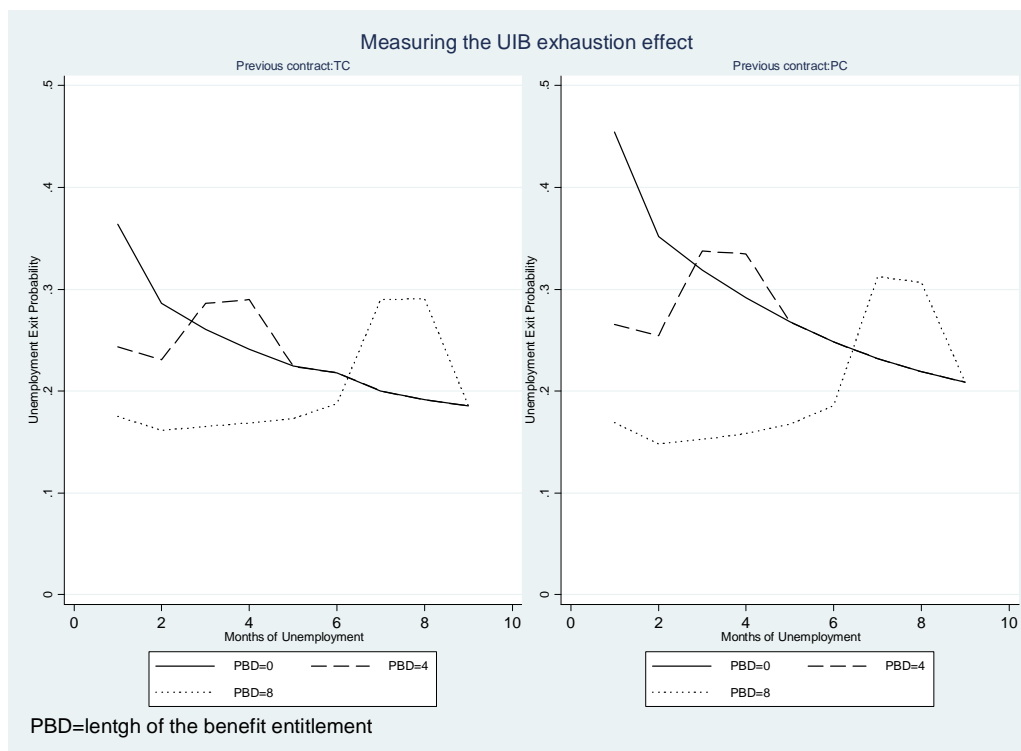


Table 8: The Estimated Unemployment Exit probability in relation to unemployment duration and UIB entitlement length

	<u>Exit To TC</u>				<u>Exit To PC</u>			
	Unemployment Duration (months)				Unemployment Duration (months)			
	1	4	8	12	1	4	8	12
Previous Contract : TC								
Non-insured	38.34%	23.38%	18.44%	16.84%	1.02%	0.70%	0.71%	0.80%
Insured: UIB Entitlement Length								
4	23.14%	28.10%	18.44%	16.84%	0.63%	0.89%	0.71%	0.80%
8	18.45%	16.43%	27.78%	16.84%	0.54%	0.43%	1.27%	0.80%
12	12.45%	13.69%	14.11%	28.93%	0.38%	0.34%	0.50%	1.74%
Previous Contract : PC								
Non-insured	45.16%	27.07%	19.97%	17.36%	2.54%	2.10%	1.91%	1.84%
Insured: UIB Entitlement Length								
4	28.15%	32.07%	19.97%	17.36%	1.25%	1.39%	1.91%	1.84%
8	18.94%	15.12%	28.94%	17.36%	0.75%	0.70%	1.73%	1.84%
12	10.14%	11.11%	11.72%	28.36%	0.40%	0.40%	0.70%	2.00%

Figure 4: Estimated Average Unemployment Duration

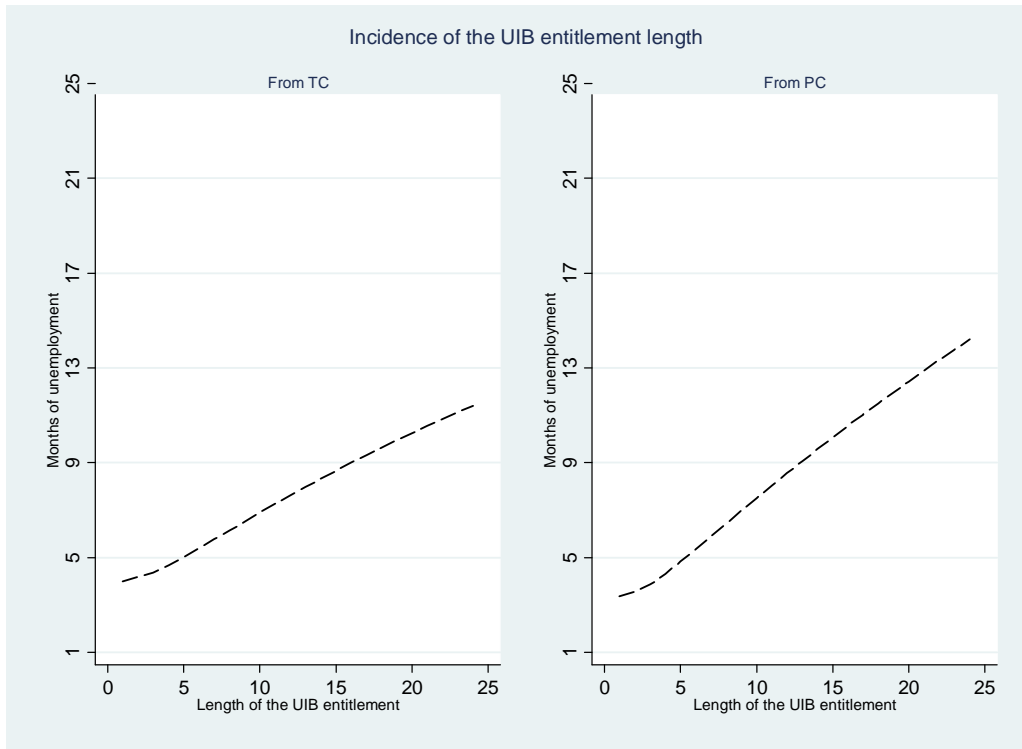


Table 9: Incidence of accumulated open-ended contract on employment and unemployment outflows

	Employment Exit Probability					Unemployment Exit Probability		
	Layoff	Quit	JJ-PC	JJ-TC	Total	PC	TC	Total
Current Contract: TC								
1	23,56%	2,49%	14,62%	15,72%	56,40%	21,36%	0,67%	22,03%
2	23,04%	2,50%	16,49%	14,84%	56,87%	21,09%	0,89%	21,98%
3	22,53%	2,52%	18,57%	13,99%	57,61%	20,82%	1,17%	21,99%
4	22,02%	2,53%	20,87%	13,20%	58,62%	20,56%	1,55%	22,11%
5	21,53%	2,55%	23,40%	12,44%	59,92%	20,29%	2,05%	22,34%
6	21,05%	2,56%	26,17%	11,72%	61,50%	20,03%	2,70%	22,74%
Current Contract: PC								
1	0,45%	0,48%	0,85%	0,64%	2,42%	8,44%	0,46%	8,90%
2	0,44%	0,49%	0,97%	0,60%	2,49%	8,33%	0,61%	8,93%
3	0,42%	0,49%	1,11%	0,56%	2,59%	8,21%	0,80%	9,01%
4	0,41%	0,49%	1,27%	0,53%	2,70%	8,10%	1,06%	9,16%
5	0,40%	0,49%	1,45%	0,49%	2,84%	7,98%	1,41%	9,39%
6	0,39%	0,50%	1,66%	0,46%	3,01%	7,87%	1,86%	9,73%

Table 10: Incidence of accumulated job interruptions on employment and unemployment outflows

	Employment Exit Probability					Unemployment Exit Probability		
	Layoff	Quit	JJ-PC	JJ-TC	Total	PC	TC	Total
Current Contract: TC								
1	22,20%	2,27%	14,13%	16,78%	55,39%	21,25%	0,78%	22,03%
2	24,10%	2,48%	12,94%	16,65%	56,17%	20,98%	1,03%	22,01%
3	26,11%	2,70%	11,85%	16,52%	57,18%	20,71%	1,37%	22,08%
4	28,26%	2,94%	10,84%	16,40%	58,43%	20,45%	1,81%	22,25%
5	30,54%	3,20%	9,91%	16,27%	59,92%	20,18%	2,38%	22,57%
6	32,95%	3,48%	9,05%	16,14%	61,63%	19,93%	3,14%	23,07%
Current Contract: PC								
1	0,46%	0,48%	0,75%	0,68%	2,37%	8,41%	0,37%	8,78%
2	0,51%	0,52%	0,68%	0,67%	2,38%	8,29%	0,50%	8,79%
3	0,56%	0,57%	0,62%	0,67%	2,41%	8,17%	0,66%	8,83%
4	0,61%	0,62%	0,56%	0,66%	2,46%	8,06%	0,87%	8,93%
5	0,67%	0,68%	0,51%	0,66%	2,52%	7,95%	1,15%	9,10%
6	0,74%	0,74%	0,46%	0,65%	2,60%	7,84%	1,52%	9,36%

**Table 11: Main Simulation Results: effect of changing the UIB entitlement length
(Sub-Sample: Those beginning working under a Temporary Contract)**

		Relative Change from the status quo			
		Status quo	Policy 1	Policy 2	No benefits
Low Skill Workers					
Aged <30	Nº of Employment Spells	5.74	0.12%	1.87%	4.60%
	Nº of Unemployment Spells	2.82	-0.07%	1.31%	7.01%
	Mean Employment Duration	5.36	0.81%	2.69%	2.98%
	Mean Unemployment Duration	4.32	-1.34%	-7.29%	-18.34%
	Total Months Employed (max: 60 months)	47.92	0.17%	1.24%	1.91%
Aged 30-45	Nº of Employment Spells	5.56	1.00%	3.11%	9.24%
	Nº of Unemployment Spells	2.90	1.68%	3.68%	12.55%
	Mean Employment Duration	7.01	1.79%	1.64%	0.80%
	Mean Unemployment Duration	4.13	-6.05%	-12.72%	-30.15%
	Total Months Employed (max: 60 months)	48.25	0.77%	1.97%	4.29%
Aged >45	Nº of Employment Spells	4.69	1.04%	2.62%	20.96%
	Nº of Unemployment Spells	2.00	1.55%	2.10%	12.55%
	Mean Employment Duration	9.18	2.27%	1.89%	-3.43%
	Mean Unemployment Duration	4.44	-9.70%	-14.91%	-32.86%
	Total Months Employed (max: 60 months)	51.80	1.43%	2.17%	3.09%
High Skill Workers					
Aged <30	Nº of Employment Spells	4.12	0.17%	1.14%	2.48%
	Nº of Unemployment Spells	1.58	-0.25%	0.82%	3.78%
	Mean Employment Duration	7.76	2.51%	5.46%	9.15%
	Mean Unemployment Duration	4.71	-2.40%	-7.05%	-15.25%
	Total Months Employed (max: 60 months)	52.47	0.26%	0.69%	1.61%
Aged 30-45	Nº of Employment Spells	4.01	0.25%	1.40%	4.86%
	Nº of Unemployment Spells	1.54	0.71%	1.94%	11.79%
	Mean Employment Duration	8.92	5.06%	4.62%	5.80%
	Mean Unemployment Duration	5.17	-13.73%	-17.18%	-34.96%
	Total Months Employed (max: 60 months)	52.08	2.02%	2.43%	4.18%
Aged >45	Nº of Employment Spells	3.37	1.78%	2.22%	8.66%
	Nº of Unemployment Spells	0.97	3.28%	3.48%	6.31%
	Mean Employment Duration	12.66	2.02%	2.01%	1.10%
	Mean Unemployment Duration	5.31	-17.71%	-19.33%	-42.96%
	Total Months Employed (max: 60 months)	54.74	1.44%	1.58%	2.78%

months)

Note: **Policy 1:** Reducing the maximum UIB entitlement length to 12 months; **Policy 2:** Reducing the complete entitlement structure by 50%.

Appendix A: Table of Results

Table A.1 Estimation Results for the Employment State

Competing Risks	Layoff		Quit		JJ-PC		JJ-TC	
	Coeff.	z-stat	Coeff.	z-stat	Coeff.	z-stat	Coeff.	z-stat
Individual Characteristics								
Age	-0.1509	-27.52	-0.5824	-42.4	-0.1516	-15.86	-0.1339	-17.25
Immigrant	0.0420	4.61	0.4927	28.24	-0.0144	-0.66	0.4029	26.71
Seniority	-0.0742	-42.68	-0.0697	-21.29	0.0573	14.71	0.0355	12.47
First job spell	-0.6613	-28.86	-0.1799	-4.32	0.4814	9.42	0.1700	4.59
Number of PC	-0.0403	-8.09	-0.0151	-1.90	0.1213	17.19	-0.0664	-9.27
Number of Spells of Unemployment	0.0810	72.61	0.0870	37.66	-0.0864	-32.8	0.0064	3.9
Job Characteristics								
Part-time	0.2336	23.25	0.5400	33.24	0.0284	1.39	0.4283	30.74
High skill job	-0.3519	-36.25	-0.4796	-26.75	0.1093	7.95	-0.4290	-31.97
Construction	-0.2283	-23.43	-0.2787	-16.46	-0.8324	-43.33	-0.0153	-1.21
Industry	-0.1439	-13.21	-0.5353	-25.32	-0.3526	-20.99	-0.3266	-21.2
Small firm (<20)	0.0649	8.59	0.1243	9.08	0.0832	6.7	0.1206	11.8
public firm	0.1452	10.35	-1.3562	-26.22	-0.9441	-28.67	-0.3520	-14.01
temporary help agency	0.6881	44.87	0.0714	2.04	1.0572	37.71	1.2036	62.89
PC	-2.3654	-48.85	-1.3732	-27.58	-1.3156	-22.9	-2.9381	-49.82
Aggregate Variables								
Regional unemployment rate	0.0374	5.31	-0.3991	-25.76	-0.3117	-23.11	-0.0477	-4.74
National GDP growth rate	-0.0542	-3.6	0.0177	0.6	0.3163	12.29	0.1088	5.41
Duration Dependence (logs)								
duration*TC	-0.3476	-15.11	0.4487	6.44	0.3733	3.93	-0.4307	-14.14
duration^2*TC	0.1898	10.27	-0.5632	-6.07	-0.4561	-4.31	0.2606	11.87
duration^3*TC	-0.0542	-16.16	0.1839	4.51	0.2564	6.39	-0.0608	-14.94
duration^4*TC			-0.0251	-4.47	-0.0423	-8.66		
duration*PC	-1.2424	-14.47	-0.7976	-9.17	-0.9044	-10.67	0.7127	15.53
duration^2*PC	0.7692	17.29	0.5443	11.4	0.7400	17.7	-0.2073	-23.04
duration^3*PC	-0.1319	-20.49	-0.1069	-14.54	-0.1371	-23.13	0.1919	11.36
(Duration=3)*TC	0.4183	35.98	-	-	0.3515	12.12	0.8830	52.94
(Duration=6)*TC	0.9577	77.42	-	-	1.2461	50.2	0.3374	12.61
(Duration=9)*TC	0.4451	22.08	-	-	0.4714	12.57	1.4133	60.56
(Duration=12)*TC	1.3315	73.04	-	-	1.7321	61.36	1.0098	18.75
(Duration=24)*TC	1.0607	23.55	-	-	1.5384	33.33	0.9392	10.11
(Duration=36)*TC	0.8272	10.65	-	-	0.9654	10.81	-0.1913	-2.72
(Duration=6)*PC	0.3306	6.47	-	-	0.1617	2.71	-0.1975	-2.85
(Duration=12)*PC	0.3721	6.35	-	-	0.1334	2.32		
(Duration=24)*PC	0.2789	3.91	-	-	0.2244	3.42	0.5469	6.75
UIB system variables								
<i>Entitlement Requirement Effect</i>								
Eligible UIB*PC	-0.2990	-3.36	-0.0805	-1.10	-0.2405	-2.45	-0.0774	-0.85
Eligible UIB*TC	0.1085	7.06	-0.2157	-6.65	-0.1984	-6.04	-0.0605	-3.15
<i>Previous Unemployment Duration (logs)</i>								
Unemployment Duration*PC	-0.0038	-0.76	0.1786	10.50	0.0169	1.09	0.0938	5.74
Unemployment Duration*TC	0.1254	25.11	0.1389	13.34	-0.0856	-8.66	-0.0652	-6.48
<i>Matching Effect</i>								
Entitlement Length*PC (logs)	0.0273	1.66	-0.1768	-5.36	-0.0056	-0.33	-0.0445	-2.68

Continued overleaf

Entitlement Length *TC (logs)	-0.0838	-13.540	-0.2240	-11.66	0.0346	3.22	-0.0236	-3.33
Exited from unemployment when Benefits run out*PC	-0.0663	-1.5200	-0.0507	-0.75	0.0299	0.68	-0.0485	-0.82
Exited from unemployment when Benefits run out*TC	-0.0876	-5.6400	-0.0171	-0.48	0.0342	1.26	0.055	2.83
<i>Previous state characteristics</i>								
Job-to-Job	-0.4843	-45.800	-0.2631	-11.38	0.0665	3.34	0.0528	3.8
Unemployed due to a quit	-0.1735	-13.010	0.2752	14.36	0.1050	3.98	0.0284	1.50
Recieved assistant benefits	0.1178	6.13	-0.3536	-4.89	0.0303	0.56	0.0108	0.32
Constant	-1.0630	-34.4	-0.7525	-13.56	-2.9464	-56.23	-1.8941	-50.41

Note: TC=Temporary Contract; PC=Permanent Contract

Table A.2 Estimation Results for the Unemployment State

Competing Risks	TC		PC	
	Coeff	z-stat	Coeff	z-stat
Individual Characteristics				
Age	-0.0840	-16.91	-0.0549	-1.76
Inmigrant	0.4152	31.1	-0.1015	-1.47
Number of PCs	-0.0135	-2.57	0.2354	11.292
Number of Spells of Unemployment	0.0060	4.92	0.2301	0.0247
Seniority	0.2567	61.56	0.4934	20.73
Job Characteristics				
Part-time	-0.1483	-15.41	0.1051	2.19
High skill job	-0.0170	-2.18	0.2785	6.18
construction	0.1413	14.65	-0.6891	-9.71
industry	0.0587	5.38	0.0793	1.45
Small firm (<20)	0.0101	1.35	-0.0600	-1.49
public firm	-0.1881	-12.85	-0.5460	-6.29
temporary help agency	0.2542	16.32	-0.0248	-0.25
PC	0.0214	1.06	0.1173	1.27
Aggregate Variables				
Regional unemployment rate	-0.0057	-0.78	-0.1264	-3.15
National GDP growth rate	0.0981	6.56	0.3785	2.10
Duration Dependence (logs)				
log(duration)*TC	-0.7105	-15.62	-0.8284	-12.07
log(duration)^2*TC	0.5895	8.3	0.2453	10.27
log(duration)^3*TC	-0.3431	-9.75	-	-
log(duration)^4*TC	0.0672	12.32	-	-
log(duration)*PC	-0.8951	-7.24	-0.2884	-2.26
log(duration)^2*PC	0.7624	3.98	0.0426	0.97
log(duration)^3*PC	-0.4623	-4.85	-	-
log(duration)^4*PC	0.0906	6.08	-	-
(Duration=6)*TC	0.0304	1.73	-	-
(Duration=12)*TC	0.5613	26.99	-	-
(Duration=12)*PC	0.1227	1.82	-	-
UIB variables				
Exhaustion Effect				
Months to exhaust benefits*PC	-0.5950	-35.51	-0.9530	-12.36
Months to exhaust benefits*TC	-0.4340	-44.2	-0.5035	-10.3
Exhaustion of Benefits*PC	-0.2372	-3.85	-1.0632	-3.79
Exhaustion of Benefits*TC	-0.2893	-8.79	-0.4493	-2.72
Months to exhaust benefits*PC*log(duration)	0.0924	7.7	0.1072	2.21
Exhaustion of Benefits*PC*Log(duration)	0.3392	9.65	0.4628	3.1
Months to exhaust benefits*TC*log(duration)	0.1085	13.43	0.1189	2.97
Exhaustion of Benefits*TC*Log(duration)	0.3806	16.32	0.4993	4.4
Receives assistan benefits	-0.8416	-39.72	-1.2888	-9.53
unemployed due to a quit	-0.1048	-10.51	0.0384	-0.47
Constant	-1.6378	-62.44	-6.8789	-43.6

Table A.3 Estimation Results for the Individual Heterogeneity Distribution

		Individual Heterogeneity Distribution (M=3)			
		Coef	Z-stat	Coef	Z-stat
Points of Support		Type I		Type II	
Employment	Layoff	-0.8954	-62.12	-0.9944	-47.63
	Quit	-1.1249	-40.77	-1.248	-39.9
	JJ- PC	-0.7852	-27.91	-1.1298	-40.98
	JJ-TC	-0.6599	-26.2	-1.569	-71.18
Unemployment	TC	0.6342	32.97	-0.1945	-8.42
	PC	2.5694	19.47	0.5564	3.7
Probability Masses (logistic transformation)		0.5787	12.45	1.006	21.43
Resulting Probabilities		32.31%		49.56%	

Appendix B

Goodness of fit

To check how well the model fits the main characteristics of the data, no simple test is available. Rather, employment histories have to be simulated and then compared to the original data. For a given sample of individuals, we conduct the simulations dynamically from the beginning of their first spell in the sample until the end of their fifth year in the labour force. Thus, we simulate their first sixty months in their labour market career. The steps followed in the simulation are now described. For these simulations, the exogenous variables are taken from the observed data (i.e. the characteristics of the first spell are given by the original data), whereas the endogenous ones are constructed by using the parameters in our estimated model. In the first spell, we randomly assign each individual in the sample a value of the individual unobserved heterogeneity coefficient (i.e. we determine of which type the individual is). This assignment of “individual types” is driven by the estimated distribution of unobserved heterogeneity. The second step is to assign to each individual their transition intensities and destination states. Given the set of exogenous explanatory variables, the individual random effect and the endogenous variables, we compute the hazard rates for each individual. The destination states in the following period are determined by the estimated hazard rates and by an exogenous shock. Whenever the hazard exceeds the exogenous shock, a transition into another state takes place and we start evaluating the hazards out of the new state, conditional on the individual’s labour market history. After a transition has taken place, the record of the individual is updated to reflect changes in employment history and in the UIB parameters. This process is repeated until each worker is simulated over the periods which are observed. The resulting data set is a random history, which is compatible with the exogenous and endogenous variables. The simulation results we present are averaged over the distribution of unobserved heterogeneity. The result of this exercise is then compared to the raw data. Figures B.1 and B.2 compare empirical hazard rates to simulated hazard rates and Table B.1 presents main summary statistics for both the simulated data and the raw data. These statistics are mean employment and unemployment duration as well as time spent employed during the simulated period. As can be seen from these figures and table the model fits the data relatively well.

Table B.1: Goodness of fit

	Raw Data	Simulated Data
Mean Employment Duration (Current Contract: TC)	6.20	5.50
Mean Employment Duration (Current Contract: PC)	33.23	30.16
Mean Unemployment Duration	4.90	4.59
Time spent Employed	36.07	38.45

Figure B.1: Goodness of fit for the Employment Hazard²⁹

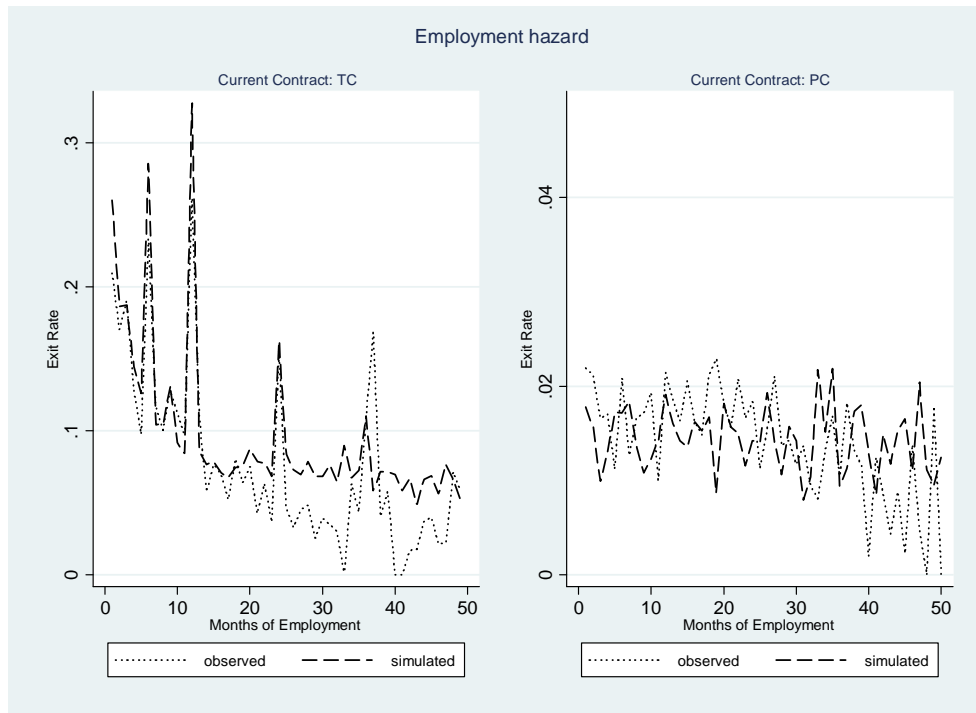
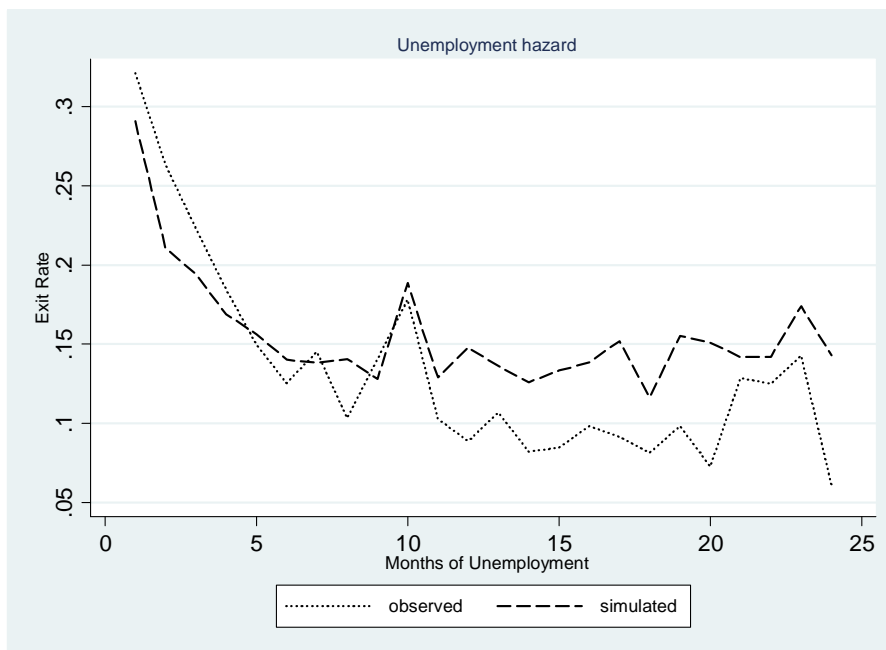


Figure B.2: Goodness of fit for the Unemployment Hazard



²⁹

Notice that temporary contracts with duration lengthier than 36 months are not common given the regulation of temporary contracts in Spain. Those cases correspond with workers who remained in the same firm with different temporary contracts but had job interruptions shorter than 15 days.