

DO UNEMPLOYMENT BENEFIT LEGISLATIVE CHANGES AFFECT JOB FINDING? EVIDENCE FROM THE SPANISH 1992 UI REFORM ACT*

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January, 2008

Abstract

Using a rich administrative dataset on unemployment insurance benefit recipients, the current work analyses the Spanish 1992 Reform Act implemented to reduce the generosity of the unemployment compensation system—in particular, a decrease in the level of unemployment insurance benefits and in entitlement duration. For this purpose, we compare unemployment insurance exit rates for two large sub-samples of individuals: the first sub-sample includes those who started receiving unemployment insurance benefits in 1991 (the pre-reform sub-sample) and the second sub-sample includes those who did so during 1993 (the post-reform sub-sample). Results indicate that these legislative changes had a positive though modest effect on individuals' exit rate from unemployment: the 10-percent decrease in unemployment insurance benefit levels was associated with a 5-percent increase in the transition rate out of unemployment, while the reduction implemented in the potential unemployment insurance duration implied a 2-percent increase in the hazard rate out of unemployment.

JEL Classification Numbers: J64, J65.

Keywords: labour reforms, benefit cuts, unemployment insurance, discrete-time duration models, administrative dataset

* The authors thank funding support from the *Instituto de Estudios Fiscales (IEF)* for this research. We are indebted to Richard Blundell for their comments and suggestions in previous versions of this paper. We would also like to thank Luis Toharia and the Spanish Public Employment Agency (INEM) for providing the data set used, as well as participants at the *VII Jornadas de Economía Laboral* (Gran Canaria, 2007). The usual disclaimer applies.

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1. Introduction

In 1992, the Spanish Government decided to implement a significant reform of the unemployment protection system (22/1992 Reform Act). The Government was convinced that the possibility of linking short-term employment contracts with unemployment benefit periods was one reason for the financial strains experienced by the system, along with the idea that the latter was too generous, and that this explained the resistance of the unemployment rate against any downturn despite employment growth—the unemployment rate was less than 5 percent in 1973, but it had already reached levels above 15 percent after the 1992 crisis. In particular, the Reform reduced both the level of benefits—from 80 percent to 70 percent during the first six months of benefits receipt, and from 70 percent to 60 percent from the seventh to the twelfth month of benefit receipt—and unemployment insurance (UI) entitlement, apart from lengthening its minimum contribution period. While before the reform job losers with at least 6 months of contribution to Social Security along the prior 48 months were entitled to UI—and each successive period of 6 months' contributions implied 3 additional months of UI benefit receipt—after the reform the minimum contribution period was raised to 12 months during the prior 72 months (the new reference period), and each successive period of 6 months' contributions was to provide 2 additional months of benefits. As a result, for example, before the reform, workers with 25 to 30 months of work experience were eligible for benefits for up to 12 months; after the reform, these workers were eligible either for 8 months (if work experience was below 30 months) or for 10 months (for those with 30 months of experience).

What have been the labour market effects of this reform? In principle, one would expect it to have increased the outflow from unemployment, or, more precisely, to have increased the beneficiaries' probability of exiting from unemployment compared with those not enjoying such benefits. Figure 1 shows annual mean coverage rates of the UI system and unemployment rates from 1990 to 2006. As can be observed, after the reform, the coverage rate experienced a decrease of around 20 percent and, across the period 1994-1998, it reached levels similar to the period before the reform (of around 50 percent).

[FIGURE 1]

Based on this change in Spanish UI benefit law, the current contribution is the first one to analyse the effects of this reform on individuals' job finding rates, by providing evidence on the effectiveness of both a cut in UI benefit levels and a reduction in UI entitlement. We study the length of UI spells before and after these legislative changes with an administrative dataset from the Spanish Public Employment Agency (INEM, Instituto Nacional de Empleo), which provides information on the length of individual UI benefit spells and various relevant individual and labour market characteristics in order to identify the impacts of the reform on UI recipients' unemployment duration.

A well-known result in the literature on the unemployment compensation system is the fact that such system provides a disincentive effect for job-seeking, which is affected by the level of UI (relative to the expected wage) and by the potential UI duration (Mortensen, 1977). On the one hand, the duration of an unemployment spell is expected to increase with the level of unemployment benefits because the cost of rejecting a job offer decreases—see Atkinson (1987), Atkinson et al (1991) or Layard et. al (1991) for excellent surveys on this issue. Strong incentive effects arising from benefit cuts have been found, for instance, by Abbring et. al (2003) and Van den Berg et al (1998) in the

Netherlands, and by Carling et al. (2001) in Sweden. In contrast, Hunt (1995) finds no robust effects of benefit cuts in Germany. On the other hand, the disincentive effect provided by UI is also determined by the potential duration of benefits. As the date approaches when benefits will expire, the reservation wage decreases, unemployed workers tend to increase the intensity of their job search and the rate of job finding increases. Thus, establishing a limit to the duration of benefits tends to speed up the job search process. Evidence on the effect of extended benefit entitlement is mixed. While Hunt (1995) for Germany, Lubyova and Van Ours (1997) for Slovakia and Lalive et al. (2007) for Austria find substantial disincentive effects of extended benefit entitlement periods, most of research has found notable incentive effects arising from fixed UI periods —see, e.g., Meyer (1990), Katz and Meyer (1990) or Card and Levine (2000) for the U.S., Carling et al. (1996) for Sweden, Adamchik (1999) for Poland and Roed et al. (2003) for Norway. However, other streams of research find no clear evidence of increases in the hazard out of unemployment as exhaustion of benefits approaches such as e.g. Stancanelli (1999) for Britain, Puhani (2000) for Poland, Bratberg and Vaage (2000) for Norway.

In contrast to this research, however, in Spain there exist very few studies on the effects of UI on unemployment duration, and none on the impact of the 22/1992 Reform Act (which is the latest reform on the unemployment compensation system in this country¹). Therefore, by focusing on the legislative changes implemented in this Act, the present paper adds to the knowledge of the potential disincentive effects arising from unemployment benefits. Some previous works on the disincentive effects arising from the Spanish unemployment compensation are Alba-Ramirez (1999) or Bover et al. (2002). With the Spanish Labour Force Survey (EPA), they find a negative impact on the probability of leaving from unemployment arising from benefit receipt. Other studies, such as Cebrián et al. (1996) using data from the Spanish Public Employment agency, find that the benefit level exerts no clear negative influence on the job search behaviour of the unemployed. Finally, with the same dataset Jenkins and Garcia-Serrano (2004) find a small disincentive effect from UI benefits levels on the re-employment hazard on average, while Arranz and Muro (2004, 2007) find that the UI benefit level increases the unemployment hazard rates temporarily. In addition, both Jenkins et al. (2004) and Arranz et al. (2004, 2007) find that the hazard rates dramatically rise as the time to UI benefits exhaustion approaches.

Our results show that the 1992 changes in the UI system had a positive effect on the exit rate from unemployment. In particular, we find that the 10 percent reduction in the UI benefit level increased the transition rate out of unemployment by 5 percent. We also find that the reduction of the potential duration of UI benefits had a positive effect on the exit rate from unemployment. These results are in line with many others in the aforementioned literature regarding the changes in survival and hazard rates associated with changes in the UI system.

In the next section we describe the change in the Spanish UI system. In Section 3, we describe our data set, the variables and present the descriptive analysis. The econometric model is presented in Section 4. Section 5 shows the results and the last section concludes.

¹ Table B in the appendix presents labour reforms on the Unemployment Compensation System (UCS) in Spain across the 80s and 90s. As can be observed, the 1992 reform is the last one that changed both UCS parameters (level and entitlement duration).

2. The change in the Spanish UI system: the 1992 UI Reform Act

As in most OECD countries, Spain provides income support to the unemployed via a social insurance program consisting of a combination of unemployment insurance and unemployment assistance benefits. Eligible for UI are workers whose unemployment situation is recognized according to law by the labour authority; i.e., the job was lost involuntarily, including end of a fixed-term contract. The UI is financed with a payroll tax of about 7 percent, of which approximately 80 percent is charged on the employer and 20 percent on the employee; and it is not experienced rated. In April 1992, Spain reformed its unemployment benefit system by tightening eligibility to UI benefits in order to encourage UI recipients to leave from unemployment².

[TABLE 1]

Whereas before the reform, eligibility required Social Security contributions for a minimum of six months during the four years preceding unemployment, under the new rules, eligibility requires Social Security contributions for a minimum of twelve months during the six years preceding unemployment. Moreover, after the reform, UI entitlement periods were shortened for all groups of recipients. Before the reform workers making contributions for 6-12 months were eligible for 3 months; a contribution of 13-18 months entailed 6 months, and so on to a maximum of 24 months for those who contributed to Social Security for more than 48 months (Table 1). In contrast, after the amendments, workers who made contributions for 12-17 months are eligible for 4 months; a contribution of 18-23 months entails 6 months, and so on to a maximum of 24 months for those contributing to Social Security for 72 months or longer.

The amount of UI is determined as a fraction of the average “regulatory base” during a determined period of time preceding unemployment, where the regulatory base is the gross earnings used to calculate contributions to UI. Apart from enlarging the period for which this average wage is computed (6 months before the reform and 12 months after the reform), a second notable feature of the reform is a reduction in the level of UI benefits during the first 12 months of UI receipt. Before the reform, it was 80 percent during the first six months of unemployment, 70 percent from the seventh to the twelfth month of unemployment, and 60 percent from the thirteenth month onwards. After the reform, on the contrary, the amount of UI is 70 percent during the first six months of unemployment, and 60 percent the remaining period of eligibility.

UI receipts were exempt from income tax until 1994. However, in this year, UI was made liable to income tax. Moreover, the notion of family responsibility was tightened, and more restrictive instructions were given to unemployment benefit officers. The result of these changes was a severe drop in the system’s coverage rate. As Figure 1 shows, by 1995, such a rate was almost back to its 1990 level, although it appears to have increased from then on. Finally, the minimum and maximum UI benefits were changed; prior to 1994, UI were subject to a minimum equal to the statutory minimum wage (SMW, around 40 percent of the average wage) and a maximum equal to 170 percent of the SMW for those with no dependent children, which could be increased to 190 percent and 220 percent if the unemployed had one or more dependent children.

² At the same time, support to unemployed through the UA system was widened. Given that in the current work we exclusively focus on the effects arising from the 1992 UI changes, we refer the reader to Appendix A for a description of the changes introduced in the UA benefit system through the 1992 reform.

From 1994, the minimum amount of UI was established at 75 percent of the statutory minimum wage (SMW) if the worker has no dependent children, unless the beneficiary had dependent children, in whose case a 100 percent of SMW remained.

[TABLE 2]

As a general assessment, before 1992, the Spanish UI system was rather generous. Indeed, the maximum replacement rate among workers eligible for UI amounted to 80 percent of previous earnings. This figure was among the most generous replacement rates in Europe (only behind that of Sweden, with a 90 percent replacement rate in the early nineties). Table 2 shows the distribution of net replacement rates before and after 1992³. As expected, replacement rates were substantially higher in the pre-reform sub-sample; while 87.16 percent of individuals enjoyed a net replacement rate above 85 percent in such sub-sample, this only occurred for 15.63 percent of individuals in the post-reform sub-sample. In addition, as can be observed in Figure 1, from 1990 to 1993, the coverage rate experienced a substantial increase, which is noticeably larger than the increase in unemployment rates for such a three-year period.⁴ Such generosity accentuates if we compare the Spanish UI system to other EU and OECD countries. This is suggested by the cross-country analysis by the OECD (1991) of gross replacement rates for ‘average production worker levels of 1988 earnings’ for a new entrant to UI. Of the countries considered, only Denmark, Sweden and the Netherlands had similar or higher rates to Spain (OECD, 1991, p. 201). Spanish UI coverage was also substantial from a cross-national perspective: Blanchard et al. (1995, pp. 135) report that ‘along with France, Holland, Belgium and Germany, Spain had the highest gross coverage rate in the EU in 1992’. Another relevant factor is the relatively non-stringent requirements for job search during the UI receipt period: signing-on to confirm unemployment status is required in person, but only every 3 months (OECD, 1991, p. 214). Blanchard et al. (1995, pp. 135) also state that ‘individuals that repeatedly turn down [job] offers retain their rights to continue claiming unemployment benefits, which clearly acts as a disincentive for leaving unemployment’.

3. Data, variable definitions and descriptive analysis

3.1. The data

The data have been extracted from the HSIPRE (*Histórico del Sistema Integrado de Prestaciones*), a Spanish administrative data set from the Spanish Public Employment Agency that provides information on unemployment benefits received by each worker⁵. It registers claims of UI and UA by unemployed workers—including some individuals partially unemployed (i.e. on short time work). The dataset contains information on individual spells of benefit receipt collected at the moment of entry into the UCS. Information refers not only to individual characteristics (age, gender, family burdens, and region where the benefit is paid) and benefit parameters (starting and ending dates of

³ Gross replacement rates have also been computed and are available from the authors upon request.

⁴ According to Government’s own calculations coverage rates were over 100 per cent in early 1993. The reason for this may be attributed to the fact that some unemployment beneficiaries were not counted as registered unemployed (that such a rate is defined as the proportion of UI beneficiaries over registered unemployment). In any case, it provides an indication that the coverage of the system was high, certainly higher than it had been a few years before (see Toharia et al., 2000).

⁵ HSIPRE data have also been used to analyse the exit from unemployment by Cebrián et al. (1996), and García-Serrano (1997). However both studies focus on a single cohort of UI entrants in June 1990. Other works using the HSIPRE data are Jenkins and García-Serrano (2004) for the period 1987-1993, and Arranz and Muro (2004) for the period 1987-1997.

registered unemployment, the number of days granted for benefits, the number of days of benefit receipt and the benefit level), but also to some important features of former employment relationships: the duration of the previous job, the reason for leaving the last job, the former job category (i.e., a proxy for the occupation held and the level of education), and the individual's former wage.

The data we have is a 40-per cent representative random sample of all unemployed workers who started their UI spell either in February, June, or November along the period 1987-1997. We have only selected individuals fully unemployed, in the sense that those who entered unemployment due to either temporary layoffs or short-time work have been excluded from the analysis. Moreover, individuals included have an entitlement period consistent with the legal provisions, and non-missing data on regression covariates. Finally, we have excluded self-employment (so as to avoid problems associated with previous employment status).

From this dataset, given its large size and the object of our analysis, we extracted two random sub-samples by selecting individuals between 18 and 59 years-old⁶ who started receiving UI in 1991 (for the first sub-sample) and in 1993 (for the second sub-sample). Thus, we compare a group of unemployed who were affected by the UI rule change with another consisting of individuals who were not. The reason for excluding the year 1992 is to avoid a potential selection bias in choosing “before and after” comparison groups⁷. Thus, in order to avoid biased estimates, we do not consider data for the year 1992 (see, in this respect, van Ours and Vodopivec, 2006).

Therefore, the final sub-samples include every spell of UI benefits receipt for two groups of individuals, one of which started receiving UI benefits in 1991 (amounting to 42,029 individuals), whereas the other one did so in 1993 (which includes 35,845 individuals). Due to its administrative nature, the dataset is free of problems common in survey data (such as non-response and interviewer bias). Thus, its quality is deemed to be high (Jenkins et al., 2004; Arranz and Muro, 2004, 2007). In addition, it is the only Spanish administrative dataset with information about UI benefit level, previous earnings, entitlement periods and elapsed UI duration. One limitation, however, is that there is no information on the period after benefits are expired, but only on the period during which workers are receiving UI. Thus, we follow individuals until they the escape from covered unemployment or, at most, exhaust UI.

[TABLE 3]

Table 3 shows main descriptive statistics for both sub-samples (individual and spell characteristics). Individuals belonging to the post-1992 sub-sample (i.e., those making up the treatment group) are mainly men (55.8 percent) whereas in the pre-reform sub-sample the proportion of males is 49.8 percent. In addition, although the average age is rather similar across sub-samples (30.94 for the former versus 29.20 for the latter), the main difference lies on the distribution for the first and the last age intervals: in the post-reform sub-sample there exists a lower proportion of individuals in the 18-25 age interval (36.1 percent versus 42 percent) and a larger proportion among those beyond 50 years-old. As regards former job category, individuals in the post-reform sub-sample are more likely to having been hired in skilled positions (i.e., in job categories 1, 2 and 5),

⁶ This age limit is established in order to avoid complications associated with early retirement.

⁷ Arranz and Muro (2004) find that while an increase in inflows into unemployment occurred just before 1992, a substantial reduction in inflows was observed in such a year. This suggests that expectations of the law's introduction affected flows from employment into unemployment.

while the opposite occurs for the pre-reform sub-sample. As a consequence, net wages earned in the last job are slightly larger for the former (20.88 € per day as opposed to 18.91 € per day). Finally, UI benefit levels are rather similar across sub-samples (although slightly larger in the pre-reform sub-sample), and in both groups individuals enter into unemployment mainly due to the end of the previous contract⁸.

As regards UI spell characteristics, both average elapsed unemployment duration (289.38 days) and entitlement duration (363.19 days) are larger in the post-1992 sub-sample. Moreover, UI entitlement spells are mainly shorter than 6 months in both sub-samples, although this frequency is lower for the post-1992 sub-sample (35.7 per cent versus 48.2). As regards the exit from covered unemployment, the percentage of censored observations (for which UI exhaustion takes place) is substantially high in both sub-samples: 77.5 percent for the pre-reform group and 73 percent for the post-reform sub-sample.

3.2. Variable definitions

3.2.1. Benefit-related variables

We include as a covariate a dummy variable which indicates spells from the post-reform sub-sample (i.e., with 1993 as the inflow year into unemployment). Thus, the reference group refers to individuals becoming unemployed during the year 1991 (prior to the reform). This variable —referred to as “*After change of law*”— measures any differences in UI leaving rates between post-reform UI spells and those in the comparison sub-sample (prior to the reform), during all months of these spells, and, therefore, the effect of the law change. Note that since we also control for changes in business cycle/labour market conditions—see below— the “pure” effect of the 1992 Law Act on UI leaving behaviour will be captured with this dummy variable. And any unobserved factors that happened to shift UI leaving rates after the policy change relative to the average rate in 1991 will be absorbed by the unobserved heterogeneity component.

Entitlement duration is likely to affect individuals’ job search effort and, therefore, their hazard rates out of unemployment —see, e.g., Mortensen (1977, 1990), Van den Berg (1990) and Fredriksson and Holmlund (2003) for surveys on this issue. First, as the worker is interested in maintaining her living standard, the absence of unemployment benefits will make her search for and accept jobs. Second, since the worker is no longer eligible, she has an additional interest in being hired and in remaining employed until she can re-qualify for unemployment benefits. Thirdly, since the moment at which one finds a job is not deterministic, workers will alter their behaviour well in advance of UI exhaustion: in anticipation of benefit exhaustion, workers will start searching for a job beforehand so as to preclude the income loss in the event that a job is not timely found. Thus, the likelihood of exiting from unemployment may be constant or decreasing during the earlier unemployment months, while substantially rising prior to benefit exhaustion (Meyer, 1990). In short, anticipation will gradually increase the employment hazard as one approaches the expiration rate. Thus, a disincentive effect may occur at the beginning of the unemployment period, whereas an incentive effect may arise at the

⁸ The prevalence of temporary contracts is a notable feature of the Spanish labour market. These contracts were introduced in 1984 in order to increase labour market flexibility, and imply low firing costs (redundancy payments are lower than those for open-ended contracts). The use of fixed term contracts spread rapidly: “Between 1986 and 1990, 80% of all contracts registered at employment offices were fixed-term. By 1991, fixed-term and temporary employment accounted for nearly a third [...] of total employment” (Blanchard et al. 1995, p. 128). See also Alba-Ramírez (1998).

end of such a period. In order to capture these effects, we use functions of the time until benefits lapse (see Models 1 and 2 in Table 7). We include time until benefit exhaustion dummy variables for a number of intervals covering months before benefits are expired. These variables are designated as “UI 19 to 24” through “UI 0”. Each of these time-varying exhaustion dummies takes on the value one in its designated interval and takes on the value zero in any other period—for instance, “UI 19 to 24” takes on the value one when the individual is 19 to 24 months until exhaustion.

In another specifications of the model (see Models 3 and 4, in Table 7) instead of including these functions, we have included an interaction term between the dummy “*After change of law*” and a variable which has been worked out as the difference between the pre-reform UI entitlement period and the post-reform UI entitlement period. This variable is named as “*UI Entitlement Difference*”. This variable along with the estimated impact from a variable named as “*Pre-reform entitlement duration*”—which collects the potential entitlement duration according to the period before the Reform for both sub-samples—gives the impact on the hazard arising from a change in potential entitlement periods after the 1992 UCS Reform Act. In those specifications of the model, therefore, it is changes in entitlement duration that matter for UI recipients’ behaviour.

The income received while in unemployment is also expected to have some influence on individuals’ job search effort. On the one hand, search effort may decrease as reservation wages increase when UI benefit levels are raised. This is the conventional disincentive effect: the receipt of UI benefits weakens search incentives, and increases the utility of unemployment (assuming that consumption and leisure are complements; see Mortensen’s (1977) dynamic stationary search model). On the other hand, an increase in UI benefit levels may lead to an increase in search effort, since UI might encourage the unemployed worker to allocate greater market expenditure on search activities, and may also increase the value of future unemployment spells (see, for instance, Tannery, 1983, or Ben Horim and Zuckerman, 1987). Thus, a two-fold impact is to be expected. In the estimations, we have included the level of benefits as a time varying covariate⁹. For the unemployed in the control group, the benefit level has been calculated by applying UI rules before the 1992 Reform Act—i.e. 80 percent of previous average wage during the first six months of unemployment, 70 percent from the sixth to twelfth month of unemployment, and 60 percent for the remaining period of eligibility. For the unemployed in the treatment group, benefit levels were calculated by applying the UI rules after the 1992 Reform Act—i.e., 70 percent of the average wage during the first six months of unemployment, and 60 percent the remaining period of eligibility (see previous section 2). In both cases, the benefit level was converted to 1990 prices by using the retail price index (IPC, *Índice de Precios al Consumo*). Since the probability to accept a job depends on variables that affect reservation wages, we have included the net wage per month received in the last job. The use of this variable is common practice in studies based on administrative data (Meyer, 1990). Although it has some disadvantages (Narendranathan and Stewart, 1993, pp. 72), it is the only measure we could feasible derive. We calculate net wages from the gross wage (‘regulatory

⁹ Identification of UI benefit level effects separately from wage effects is possible even though UI receipts are related to previous earnings (given the rules described earlier). There are two potential sources of variation providing identification in addition to the usual functional form ones. First the proportionate relationship between earnings and benefits does not apply below the UI payment floor or above the UI payment ceiling. These bounds are relatively wide, however, and so the number of workers outside the cut-offs is not large. Therefore, we would like therefore to emphasise the separate time-series variation in each of the two series as a second source of identification.

base') information on the files by applying the tax rates applicable for a single person. This is justifiable since Spain has an independent taxation system. Figures were converted to prices by using the retail price index (IPC, *Índice de Precios al Consumo*). This variable reflects the incentive or disincentive effect on search and acceptance of job offers by the unemployed (see Lancaster, 1979; Hagen, 2003). The unemployed with a high (low) wage in the last job are expected to have a negative (positive) effect on the job finding rates, since they have a higher reservation wage (i.e., unemployed persons may prefer to wait for a suitable job). Hence, individuals with previous high-wage jobs may have longer unemployment duration and a reduced likelihood of re-entering into employment. In addition, previous high wages may also be associated to larger exit rates from UI: the reason being that previous income can be taken as a proxy for the cost of rejecting a job offer. Thus, a positive and significant effect from previous wages may be obtained, which would give support for the use of past wages as an opportunity cost proxy (see Bratberg and Vaage, 2000, pp.169).

Finally, since changes in benefit levels are one of the key reform features, in another specifications of the model (see Models 3 and 4 in Table 7), we have included these changes (instead of the benefit level), through an interaction term between the dummy "After change of law" and a variable which has been worked out as the difference between the pre-reform level of benefits and the post-reform level of benefits. This variable —named as "UI Benefit Difference"— collects the 10-percent reduction in benefits level during the first twelve months of covered unemployment. Thus, this variable along with the estimated impact from a variable named as "Pre-reform UI Benefit level" —which collects the level of benefit levels according to the period before the Reform for both sub-samples— gives the impact on the hazard arising from a change in benefit levels after the 1992 UCS Reform Act.

3.2.2. Control variables

We control for demographic variables such as age at the start of the unemployment spell, using a non-linear specification distinguishing four age groups (18-25; 26-35; 36-50 and above 50 years-old). We also control for gender.

The reason for entering unemployment may be an important explanatory factor of the job finding rate, since individuals who become jobless because of a temporary contract termination may start searching for a new job before entering into unemployment (as the date of contract expiry is known in advance). Moreover, they may be more accustomed to move from jobs. For these reasons, they are expected to leave unemployment earlier. In addition, the level of education and the occupation held in the last job are captured through seven professional category level from the National Insurance contribution group. These categories have been classified in four groups: white collar skilled workers —category 1, (WCHS); clerical workers —categories 2, 3 and 4 (WCLS); blue collar skilled workers —category 5 (BCHS); and blue collar unskilled workers —categories 6 and 7 (BCLS). Workers with higher qualification levels are expected to exit sooner from unemployment, since they may receive more job offers.

Household conditions are taken into account through the existence of family burdens, which may be relevant in so far as they may affect reservation wages. On the one hand, having family burdens may increase job search effort and the willingness to accept a job offer. On the contrary, given that individuals who have family burdens may be entitled to UA once UI are exhausted, having family burdens may exert a negative impact on the

job finding rate, as long as unemployed are able in this way to enlarge their unemployment compensation benefits. Family burdens are a rather broad concept, including any relative “of the second degree” as long as total per capita household income (i.e., the ratio between household income and the number of household members) is below the minimum wage. However, in 1993, this definition was restricted to the individual’s spouse and dependent children (and, therefore, for instance, beneficiary’s parents were excluded).

Dummies for the seventeen Spanish Autonomous Communities capture the different regional labour markets in this country. Moreover, the influence of the business cycle is taken into account through the quarterly regional unemployment rate and the gross domestic product (GDP) growth rate, as time varying covariates. Workers in regions with lower regional unemployment rates (and therefore, a larger number of vacancies) are expected to enjoy a higher probability of finding a job; and a positive impact of the GDP growth rate on the exit rate from unemployment is expected. Seasonal effects are captured through a set of dummy variables which collect whether workers entered into unemployment in February, June and November. Finally, we control for the duration (in months) of the unemployment period by including dummy variables: i.e., the baseline hazard is estimated non-parametrically for each month (Appendix B presents estimates of the baseline hazard).

3.3 Non-parametric analysis

As a first approximation to the relationship between UI reform and unemployment duration, we present a non-parametric estimation of the time profile of the empirical hazards. Our analysis focuses on exits from UI to a job, and treats spells which end because of exhaustion of entitlement as censored. We compare the job-finding rates before and after the policy change in April, 1992. Figure 2 shows the empirical hazard for the entire sample, separating pre-reform spells (beginning before the policy change) and post-reform spells (beginning after the policy change). Figure 3 displays hazard rates for males and females separately¹⁰.

[FIGURE 2]

As Figure 2 shows, the policy change is associated with an increase in the hazard. Moreover, there are several periods where the empirical hazard is noticeably higher than surrounding periods in both figures. There is a high hazard in the first months, up to approximately 3-4 months, probably caused by the high concentration of short entitlement periods mentioned above. Jumps in months which are multiple of three are observed for the pre-reform sub-sample. These hazards are likely to be driven by the risk of benefit exhaustion. After Law changes, in contrast, peaks in the empirical hazard are obtained in months multiple of 2 (certainly due to the fact that entitlement periods are multiple of 2 in this case). In addition (Figure 3), males always present higher hazard rates than females independently of the time period considered. Therefore, as a first impression, the changes implemented in 1992 are associated with individuals increasing their escape route out of unemployment.

¹⁰ Though not shown, Kaplan-Meier estimates have also been computed by age groups (they are available from the authors upon request). Young unemployed (between 18 and 25 years old) present higher hazard rates when compared both to the unemployed in the 26-35 and 36-50 year-old intervals, and to the eldest individuals (above 50 years-old). We also appreciate that the unemployed after the 1992 reform present higher empirical hazard rates than those before the 1992 reform for whatever age group considered, except for those below 50 years old (for whom the rise in the hazard is only observed from the third month in unemployment onwards).

[FIGURE 3]

Table 4 shows the “old” and “new” benefit entitlement periods, as well as the mean UI duration for individuals belonging to each contribution period. Thus, it shows how the reform affected the duration of unemployment under benefits —except for the first contribution period (from 6 to 11 months), given that individuals in this interval lost entitlement to benefits after the rule change. After the reform, the mean UI duration is shorter for any contribution period considered. Moreover (as expected), the larger the reduction in UI entitlement, the more intense the reduction in mean UI duration is. Similar information is provided in Table 5. This table shows the cumulative probability of outflow from UI after 3, 6, 9, 12, 15, 18, 21 and 24 months of unemployment, before and after the change in the unemployment benefits law. The cumulative probability of having found a job within 3 and 6 months is slightly lower after the reform. However, it exponentially increases after Law changes for the remainder period of unemployment considered (both for men and for women).

[TABLE 4]

When interpreting these figures it is important to recognise that we compare two time periods with somewhat different labour market conditions for two different groups of individuals. The period 1987-1991 was characterised by an economic expansion, during which the number of salaried workers considerably increased in absolute terms (almost 1.5 millions in four years); whereas between 1992 and 1994, a brief though intense recession took place (the total number of salaried workers reduced by almost half a million). In fact, regional unemployment rates in Spain subsequently fell from 1987 to 1991, to the extent that in most regions they were 5 percentage points lower in 1991 than in 1987. However, unemployment rates then increased again and reached 1987 levels by April 1993 (Jenkins and García-Serrano, 2004). Given these macroeconomic conditions, some decline in job finding rates should be expected. In spite of this, the opposite is observed in the post-reform period: an increase in job-finding rates. Therefore, the evidence suggests that the policy change may have caused an increase in job-finding rates. This result should be tempered by stressing the importance of controlling for the observed and unobserved characteristics of UI claimants in each subsample. In particular, one cannot rule out the effect of changes in underlying conditions in the labour market.

[TABLE 5]

To give a clear picture of how the potential duration of benefits affects the hazard rates before and after the reform, figure 5 plots both empirical hazards by time remaining to exhaustion of benefits. As job search theory predicts the hazard to rise as time to benefit exhaustion approaches, one would expect the percentage of unemployed exiting from unemployment to increase as UI exhaustion approaches, and those who do so after the reform to be a larger proportion of those before the reform. This, indeed, is observed in Figure 5. It shows the empirical hazards before and after the reform for the entire subsample, and for the following subgroups: individuals with entitlement durations less or equal than 6, 12 and 18 months. As can be observed, both before and after the reform the hazard tends to rise as benefits expiration occurs. This occurs for whatever

entitlement groups are considered. The pre-reform and post-reform sub-samples do not markedly differ as regards these empirical hazards¹¹.

[FIGURE 5]

Figure 6 repeats the same exercise without aggregating entitlement periods. The empirical hazards are plotted for the following entitlement periods: 6, 12, 18 and 24 months. In this case, the increase in the hazard is only detected for entitlement periods of 6 months. For longer entitlement periods, the figure does not provide clear evidence of increases in the hazards as exhaustion of benefits approaches. Indeed, for the groups of 12 and 24 months of entitlement, the percentage of unemployed who exit from unemployment decrease as the UI exhaustion approaches.

[FIGURE 6]

4. Econometric approach: a discrete-time duration analysis

The exit rates from unemployment (under UI) are analysed using discrete hazard model techniques¹². The hazard rate out of unemployment into employment may be defined as the limit of the conditional probability of a transition taking place in a small interval dt after time t if no transition occurs until t , when that interval approaches to zero. Formally, let T_i be the length of individual i 's UI spell. Then the hazard for individual i at time t , $h_i(t)$, is defined by the equation

$$h_i(t_i, X_i(t), \theta_i) = \lim_{dt \rightarrow 0} \frac{\Pr(t + dt > T_i \geq t \mid T_i \geq t)}{dt} = \lambda_0(t) \exp\{X_i(t)' \beta\} \theta_i \quad (1)$$

where $\lambda_0(t)$ is the interval-specific baseline hazard rate at time t , which is unknown; $X_i(t)$ is a vector of time-invariant and time-varying covariates for individual i , β is the vector of unknown parameters to be estimated, $i=1 \dots N$ are individuals-month observations, and finally θ_i captures unobserved individual characteristics that affect the hazard in theory but are unobservable in the data, such as acquired skills, attitudes, motivation, inherent ability, and so on.

Now, we define the probability of surviving through any interval dt after having survived the preceding j interval as $(1-h_{ij})$. Therefore, the likelihood contribution of unemployed individuals who receive an UI and quit the system to work in the j th interval is¹³:

$$\Pr[T_i = t] = h_{ti} \prod_{j=1}^{i-1} (1-h_j) \quad (2)$$

¹¹ In this figure we omit the percentage of individuals who exhaust benefits. The highest percentage of censored observations are for unemployed entitle to 6 months: slightly lower in the pre-reform period (81.5) than in the post-reform period (84). The rest of entitlement groups are always higher during the pre-reform period: entitlement periods of 12 months (71 pre-reform, 67 post-reform), 18 months (60 pre-reform, 52 post-reform), 24 months (69.5 pre-reform, 57 post-reform).

As regards the exit from covered unemployment, the percentage of censored observations (for which UI exhaustion takes place) is substantially high in both sub-samples: 77.5 percent for the pre-reform group and 73 percent for the post-reform sub-sample.

¹² See Allison (1982) or Jenkins (1997) for a survey. This type of models is common in the analysis of exits from covered unemployment (see, e.g., Bratberg, *et al.* (2000), Carling *et al.* (2001), Jenkins and García-Serrano (2004), Arranz and Muro (2004, 2007), Van Ours and Vodopivec (2006).

¹³ In order to simplify notation, t , X and θ are omitted.

and if we assume that censoring takes place at the beginning of the intervals, the likelihood contribution of unemployed individuals who exhaust their unemployment insurance benefit at the start of the j th interval is:

$$\Pr[T_i > t] = \prod_{j=1}^{t_i} (1 - h_j) \quad (3)$$

Then, defining $d_i=1$ if individual i 's spell ends in a transition to a job (0 otherwise), the likelihood contribution of the i 's individual can be written as:

$$L_i = \left[\Pr(T_i = t_i) \right]^{d_i} \left[\Pr(T_i > t_i) \right]^{1-d_i} = \left\{ h_{t_i} \prod_{j=1}^{t_i-1} (1 - h_j) \right\}^{d_i} \left\{ \prod_{j=1}^{t_i} (1 - h_j) \right\}^{1-d_i} \quad (4)$$

where the discrete time hazard in the j th interval for each individual is:

$$h_j = 1 - \exp[-\exp(\beta X_i(t) + \gamma_t(t) + \theta_i)].$$

This specification allows for a fully non-parametric baseline hazard with a parameter for each duration interval, capturing duration dependence. The specification of the baseline hazard is very important. A common but restrictive approach consists of specifying a parametric form for the baseline hazard. This approach is rather strong because the assumptions over the form are difficult to justify from an economic point of view, and, thus it provokes a misspecification problem. Instead, we choose a semi-parametric approach (a piecewise constant hazard) by specifying monthly dummies $\gamma(t)$ for the baseline hazard. This method presents the advantage of being flexible and it is very common in the literature (see Bratberg *et al.*, 2000; Carling *et al.*, 2001; Alba-Ramirez *et al.*, 2007). Finally, we assume a finite-mixture unobserved heterogeneity distribution with unknown support points¹⁴. Then, the likelihood function for any individual may be obtained by integrating the following conditional likelihood distribution:

$$L_i(\beta, \gamma, \varepsilon, \pi) = \prod_{s=1}^S L(\beta, \gamma | \theta = s) \pi(s) \quad (6)$$

where θ are the location points, π the probability associated to them, and s the number of support points.

5. Empirical analysis

5.1 General results

¹⁴ A common procedure is to specify a parametric distribution for the unobserved heterogeneity such as a normal, gamma distribution, etc. However, this approach has been criticised by Heckman and Singer (1984), as the unobserved heterogeneity distribution is unknown. These authors show that parametric-form assumptions for unobserved heterogeneity might be biased when the chosen distribution is incorrect. This explains why they avoid this problem by assuming that unobserved heterogeneity is discretely distributed with unknown support points. We would like to underline that the arguments provided by Heckman *et al.* (1984) against the use of parametric mixing distributions have been criticized by other authors (e.g., Trussell and Richards, 1985). These authors claim that the sensitivity of the results to the choice of the mixture distribution was attributed to the fact that the Heckman *et al.* (1984) miss-specified the duration dependence. Anyway, we have also estimated a piecewise constant baseline hazard function which controls for unobserved heterogeneity through the gamma distribution. Estimations results are similar to those presented in the text, and the gamma unobserved heterogeneity is also non-significant (these results are not shown, but are available from the authors on request).

In this section, we present the empirical results from the estimations of the model outlined in Section 4. Our objective is to compare job finding rates between pre-reform and post-reform UI entrants. The reference individual in our estimations is a male, blue collar unskilled worker, aged between 26 and 35 years-old, without family burdens and who enters unemployment reasons different from the end of his previous contract. Estimations have been obtained based on the likelihood function (6) by the maximum likelihood estimator. For simplicity, we discuss only the estimates of the entire sample in Table 7. The pattern of duration dependence is shown in Appendix B, and Appendix C collects estimation results separately for the pre-reform and the post-reform sub-samples¹⁵.

We have experimented with different specifications in order to check for parameter estimates sensitivity (Table 7). Specifications in columns 3 (model 3) and 4 (model 4) allow us to assess the impact of the changes in potential duration and benefit levels. They include variables capturing reductions in the potential duration of benefits (“*UI Entitlement Difference*After change of law*”) and in UI benefit levels (“*UI Benefit Difference*After change of law*”).

To check whether the number of mass points is robust as regards the specification with unobservables in the model, three alternative information criteria were applied: the Akaike information criterion (AIC), the Hannan-Quinn criterion (HQ) and the Bayesian info criterion (BIC). Table 6 reports the values of each of these information criteria (the preferred model is the one yielding the lowest information criterion value). As can be observed, any information criterion leads to the same conclusion: in any model specification where individual unobserved heterogeneity is taken into account, including two mass points does not improve the model fit. Thus, the best model should not include any mass point¹⁶.

TABLE 6

Parameters representing incentive effects are significantly different from zero (Table 7). Therefore, as is expected, they are important in explaining the probability that an unemployed receiving UI benefits finds a job. The estimated coefficients for “*UI Benefit Difference*After change of law*” vary between 0.041 and 0.054; the estimated effect of the benefit cut on the job finding rate is, thus, roughly 5.54 percent. How large is the estimated effect of the benefit cut compared to prior studies? Although estimates as low as zero (e.g., Atkinson et al., 1984) and as large as 3.3 (e.g., Ridder and Gorter, 1986) might be found, in general the elasticity of unemployment duration with respect to benefits is generally ranging from 0.1 to 1.0 —see Atkinson and Micklewright (1991). Our implied elasticity¹⁷ of the hazard rate with respect to benefits is around 0.8, which

¹⁵ The estimated effects by sub-samples are, by and large, rather similar to those of the entire sample, particularly as regards the effects of gender, age, job category, GDP rate and quarterly regional unemployment rate (see Appendix E). In addition, higher benefit levels have a disincentive effect (though not always significant), and the elasticity of the hazard rate with respect to UI levels depends on duration in unemployment —interaction terms between the level of benefits and entitlement duration have been included.

¹⁶ We have also estimated a third order polynomial specification for the baseline hazard function with two support points for the unobserved heterogeneity —which was significant (results are not shown, but are available from the authors on request). Although the likelihood ratio tests cannot be used to differentiate between both specifications (given that these models are not nested) we have finally chosen a piecewise constant baseline hazard function, given that it provides a more flexible representation of the baseline hazard function. In addition, results with this polynomial are very similar to those shown in the text.

¹⁷ The 10 per cent cut in the UI benefit level corresponds to a 12.5 per cent reduction in benefits (10/80=0.125). For a 10 per cent increase in the hazard rate, the implied elasticity is 0.8 (10/12.5=0.8).

lies on the range of previous studies. For instance, in their analysis of cuts in replacement rates from 80 per cent to 75 per cent in Sweden in 1995, Carling et al. (2001) found elasticities of around 1.6; similarly, Bennmarker et al. (2004) reported elasticities of around 0.6 for Sweden as regards changes in the UCS along the 1990s; finally, Roed and Zhang (2003) for Norway encountered elasticities of 0.95 for males and 0.35 for females.

Analogously, the reductions in potential entitlement duration after 1992 are associated with an increase of 0.025 and 0.019 (models 3 and 4) in job finding rates. Therefore, although the effect of benefit cuts on the hazard rate is higher than the effect of reductions in UI entitlement, estimates suggest that reductions in UI levels and/or in potential UI durations are associated to increases in the outflow from unemployment (*ceteris paribus*).

[TABLE 7]

In specifications in columns (1) and (2) the effect of the policy change is not presupposed to lie on *changes* in UI levels and potential entitlement. Instead, controls for the time until exhaustion and for UI benefits are included, and the effect of the reform is then given by the coefficient of the dummy variable “*After change of law*”. As regards time until exhaustion dummy variables, since the worker’s reservation wage declines as she approaches the date at which benefits expire, the exit rate is expected to increase over the spell of (insured) unemployment. This expectation is confirmed in results from the model in column (2): the job-finding rate decreases monotonically up to the moment when six months remain for exhaustion, and slightly increases thereafter. Thus, individuals for whom the potential duration of benefits is long are more likely to remain unemployed, and a significant increase in the exit rate from unemployment at the time of benefit exhaustion cut is observed. Note, also, that relative to the moment of benefit exhaustion (“UI 0”), the job-finding rate is significantly lower for whatever remaining period of benefits. These results provide evidence of a large spike at the point of benefit exhaustion, which is consistent with Lalive et al. (2007) or Card et al. (2007) for Austrian job losers.

As models 1 and 2 in Table 7 show, the variable “*After change of law*” —which is the main variable of interest— has a positive effect on the probability of workers leaving unemployment. Its estimated coefficient ranges from 0.138 to 0.234 (see models 2 and 1, respectively). Specifically, the positive coefficient for 1993 spells suggests that prior to passage of the reform, UI-leaving rates were lower than those in 1993. Thus, after 1992 the unemployed present a higher exit rate from covered unemployment when compared to covered unemployed before the reform. Overall, the rise in job-finding rates associated with the reform changes (both UI levels and entitlement duration) amounts to roughly 14.79 percent. This result confirms the picture given already by the raw hazards in Figure 2 (after Spain’s UI law changed, the unemployed tended to leave unemployment sooner). That is, if an unemployed worker receives a benefit under the new system but not under the old, there is an incentive to find a job quickly because both the benefit level and the potential entitlement expire sooner.

Note that these overall effects from policy changes (i.e., the estimated coefficients of the variables: “*UI Benefit Difference*After change of law*”, “*UI Entitlement Difference*After change of law*”, and “*After change of law*”) are net from macroeconomic

However, the elasticity of the expected duration is equivalent to the elasticity of the hazard rate only in the absence of duration dependence in the hazard —see Carling et al. (2001).

conditions, since the evolution of labour market is explicitly taken into account by the inclusion of the regional unemployment rate, the GDP growth rate and the regional dummies. In fact, changing conditions in the labour market also affect the job-finding rate. The quarterly regional unemployment rate presents a negative effect on the probability of finding a job. As expected, therefore, in regions with higher unemployment rates workers receive UI benefits for longer, as they might be receiving less job offers. And the GDP growth rate exerts a positive effect on the probability of exiting out of the UI system. Given that with high GDP rates firms may create new vacancies and may be able to offer better wages, an increase in the exit from unemployment is observed.

As regards the impact of variables related to the UI system, the elasticity of the hazard rate with respect to UI benefits is around -0.117 (column 2 in Table 7). Therefore, a 1 percent increase in UI levels is associated to a 0.12 percent reduction in the probability of finding a job. This figure is of the expected sign, but it is smaller than the estimates found in the US (Meyer, 1990) and British studies (Narendranathan and Nickell, 1989, Narendranathan and Stewart, 1993), whereas it is similar to the ones found by Jenkins et al. (2004)¹⁸.

Turning to the rest of the covariates, the effects are very much as one would expect. Although the dataset lacks variables related to the individual's educational attainment and occupation, it does include a variable collecting the workers' job category with his former employer. This allows us to distinguish (in a broad sense) between non-manual and manual occupations (i.e., skilled or unskilled workers). As can be observed, highly educated workers —white collar skilled ones— enjoy a roughly 56.5 percent higher probability of exiting from unemployment than the remainder of individuals. On the contrary, blue collar unskilled workers are relatively less likely to exit from unemployment under benefits.

Finally, the demographic variables have, in general, significant coefficients. The hazard rate is decreasing with age: younger workers enjoy the largest job-finding rates, while individuals above 50 years-old suffer the greatest difficulties in exiting from unemployment. In particular, when compared to individuals in the interval 26-35, among unemployed between 18 to 25 years-old, the job finding hazard rate increases by roughly 27 percent, whereas it decreases by 34 (66) percent for unemployed between 36-50 (50 and beyond) years old.

Women have substantially lower escape rates than men. Thus, either females are less likely to receive job offers, or they are being discriminated by employers, or they may be more restrictive as regards job acceptance than males. The difference is around 50 percent.

[FIGURE 4]

To further show the effects from the reform, we calculated the difference in exit rates before and after the law changed for a mean unemployed worker (i.e., at means of covariates used in specification 1, Appendix C); see Figure 4. As can be observed, before the law changed, that individual had a 2.98 percent probability of finding a job

¹⁸ These low elasticities encountered for Spain (as opposed to the USA) may be due to the fact that many Spaniards who exhaust UI receive a different form of benefit —unemployment assistance benefits— which usually pays less than UI. Hence, their sensitivity to changes in UI duration may be lower than that of Americans (who receive nothing when UI is exhausted).

within 4 months of becoming unemployed (which is the maximum predicted pre-reform probability for his entire unemployment period). The corresponding percentages after that month substantially reduce. For instance, at the seventh month of unemployment, the estimated conditional probability of exiting from UI is only 2.32 percent. After the employment benefit law changed, such worker's probability of finding a job — conditional on remaining unemployed up to that moment— within 4 (7) months jumped to 4.75 (3.72) percent. This implies an increase of 59.44 (60.08) percentage points. Thus, a fast exit from unemployment is observed after law changes. This difference in exits from UI for the average individual in the dataset remains basically constant for the whole period of unemployment under benefits.

5.2 Results by gender

The fact that women appear to have much lower exit rates than men has induced us to estimate separate models for men and women (Table 8). The reform effects are then, significantly different between men and women: the reduction in benefit levels implies a roughly 9 percent higher exit rate for men (while being non-significant for women). And the reduction in entitlement periods implies a 5.44 percent higher exit rate for women, but it is non-significant for men.

[TABLE 8]

The variable “*After change of law*” has a positive effect on the probability of women and men leaving unemployment. In particular, the rise in the probability of exiting from unemployment associated with the reform changes is 12 per cent in males and slightly higher with a 14 per cent for women.

The remainder coefficients in Table 8 are qualitatively similar to Table 7, except for the effects (in magnitude) of family conditions and previous wages. The effect of family conditions differs for males and females. Males who have dependent family members have a lower job-finding rate than males who do not and the same happens for females. However, in the latter case, this negative effect is much stronger: having family burdens means a 35 percent lower hazard rate for women, but only a roughly 14 percent lower rate for men. Apparently, having dependent family members is particularly an important handicap for women to leave unemployment. Finally, wage in the last job has a positive effect, whose magnitude is particularly large for women (when compared to men).

5.3. Results by age

Table 9 estimates the same specification as that in Table 7 for four age groups: 18-25, 26-35, 36-50 and more than 50 years-old. The benefit cut appears to have a larger positive impact on exits from unemployment among the youngest individuals (those between 18 to 25 years-old and 26 to 35 years-old), and the eldest ones (those above 50 years-old). The benefit effect for the latter is around 12 per cent, while as regards the former, the effect ranges between 4 and 7 per cent. No significant effect is found, however, among unemployed aged 36 to 50 years-old.

The reduction in potential entitlement duration after 1992 is associated with an increase in exits from unemployment for whatever age group. The eldest the unemployed is, the higher hazards out of unemployment are obtained. Finally, the variable “*After change of law*” has a positive impact on the probability of workers leaving unemployment for whatever age groups. Nevertheless, the reform has a lower impact among young

individuals, while among the eldest ones it exerts a 12 per cent impact (i.e., six times as much the effect on the former).

[TABLE 9]

5.4. Results by entitlement duration

Table 10 shows estimation results by entitlement duration. As can be observed, the benefit cut implies a non-significant impact among recipients entitled to 6 or less months. However, the benefit cut presents a significant impact (of around 22 per cent) among unemployed entitled to 12 months, and a positive (though lower in magnitude) effect among those entitled to 24 months. In addition, the reform changes do not affect the hazard rate among those entitled to short periods (see the estimated coefficient of the variable “*After change of law*”), and the longer the entitlement period is the lower is the impact of the reform.

[TABLE 10]

6. Conclusions

In this paper we analyse to what extent the 22/1992 UI Reform Act had any significant influence on the job finding rates of UI recipients in Spain. This reform restricted access to UI benefits at the same time that reduced entitlement duration and the level of benefits by a 10 percent. For this purpose, we use two random sub-samples of workers who get unemployed and receive UI benefits, one of them before and the other after the 1992 changes in the UCS. The analysis was performed within the framework of a discrete proportional hazard model with a flexible baseline hazard rate controlling for both observable and unobservable individual characteristics.

Our results confirm expectations on the incentive effects arising from the abovementioned Law changes. We found that the unemployed after the 1992 law present a higher exit rate from unemployment when compared to unemployed before the reform. Thus, unemployed workers receiving UI benefits under the new system are found to have stronger incentives to find a job sooner (as both UI benefit levels and their potential UI entitlement will expire sooner than under the old system). The overall rise in job-finding rates associated with the reform changes (both UI levels and entitlement duration) amounts to roughly 15 percent.

We have additionally found that the outflow from unemployment is stimulated both through reductions in benefit levels and in entitlement periods. On the one hand, shortening the duration of UI benefits makes the unemployed find a job more quickly, as this reduction exerts a significant (though modest) impact on the job-finding rate (a 2 percent increase). The reduction in entitlement periods implies around 5 percent higher exit rates for women, while being is non-significant for men. In addition, unemployed exit from unemployment sooner as their age increases. Finally, while the benefit cut exerts a non-significant impact among individuals with short entitlement periods (6 months or less), a significant and positive impact on the hazard rate is obtained for individuals with 12 and 24 months of entitlement.

On the other hand, the 10-percent reduction in UI benefit levels exerts a 5-percent positive impact on the job-finding rate. Our implied elasticity of the hazard rate with respect to benefit is around 0.8, which lies on the range of previous studies on UCS reforms in other European countries. The reduction in benefit levels implies a roughly 9 percent higher exit rate for men while it is non-significant for women. The benefit cut had a positive significant impact on the exits from unemployment for all age groups, except for workers aged 36-50 years old (for whom the reduction implies no significant change in the hazard out of unemployment).

Finally, we have found additional significant disincentive effects associated to the UI system. Not only does the probability of finding a job increase whenever benefit levels or entitlement periods are shortened, but also the rate of job finding when benefit expiration approaches is higher than at the beginning of the unemployment spell. These results are in line with previous research, even though the incentive effects found are lower than the ones in US studies. We should be cautious, however, because this result is not observed for unemployed with long entitlement periods (e.g., those near to 24 months of entitlement). Indeed, it is mainly unemployed entitled to 6 months or less who exit from unemployment as benefit expiration approaches (this is the group which mainly constitutes our dataset).

As an overall assessment, the evidence provided indicates that the Law change under analysis had a modest effect on the exit rate from unemployment to employment in Spain. Many issues remain open for future research, however. In particular, the estimated positive impacts must be weighted against the likely additional precariousness of the recipients in terms of job stability in their post-unemployment periods, due to the shortening of both UI levels and entitlement periods. This constitutes a promising avenue for future research in this respect, and will allow a more thorough assessment of future legislative changes.

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Appendix A. Changes introduced in the Unemployment Assistance (UA) benefit system through the 1992 reform.

UA is financed through transfers from the public budget and it is granted to unemployed persons whose total income does not exceed the minimum wage and are in one of the following situations: (1) exhausted UI and have family dependents; (2) aged 45 years or older and received UI for at least 12 months; (3) did not meet the minimum contribution period for eligibility; (4) returned from foreign migration; (5) was released from prison; (6) an invalidity spell ended by the labour authority declaring the worker able to take a job; (7) aged 52 or older — in addition, special UA benefits are available to workers of the agricultural sector who have residence in the autonomous communities of Andalusia and Extremadura.

The amount of UA has no relation with the previous monthly wages. A family income criterion is also used whereby per capita family income could not exceed the SMW. A flat rate equal to 75 percent of the SMW is paid to all beneficiaries, except for workers aged 45 or older who received UI for 24 months. Their benefits vary with the number of family dependents: 75 percent of the SMW if one or no family dependents, 100 percent if two family dependents and 125 percent if three or more family dependents.

UA is time limited and it is conditioned on which of the above indicated situations the worker is, of being 45 or older, and on having or not family dependents (see Table 1). As regards unemployed who had exhausted their UI entitlement, before the 1992 reform, those with family burdens had the right to receive UA benefits for a period ranging from 18 to 24 months or between 24 and 36 months, in case they were below 45 years-old or above 45 years old, respectively. The non-existence of family burdens implied that only those aged above 45 who had exhausted a UI entitlement period longer than 24 months were entitled to receiving UA benefits for a period between 6 and 12 months. After the reform, there has been no change in UA entitlement period for unemployed who exhaust their UI benefits.

As regards unemployed who receive UA because they have not met the minimum contribution period for UI eligibility, before the reform only those with family burdens and who have contributed for 3 to 5 months were entitled to 3 to 5 months of UA benefits. After the reform, these individuals were eligible for these same periods of UA receipt. The only change introduced refers to those with family burdens, who have contributed for 6 to 11 months, for whom UA entitlement actually amounts to 21 months (in case of having family burdens) or to 6 months (in case of not having family burdens).

Appendix B. Reforms on the Unemployment Compensation System along the 80s and 90s.

Years	1980	1984	1989
UNEMPLOYMENT INSURANCE			
Entitlement Duration	3, 6, 9, 12, 15, 18, 24 months	3, 6, 9, 12, 15, 18, 21, 24 months	The same as in 1984
Amount of Benefit	From 0 to 6 months → 80% wage in prior 6 months. From 6 to 12 months → 70% wage in prior 6 months. More than 12 months → 60% wages in prior 6 months.	The same as in 1980 except for: Maximum: 170 % SMW without children 195 % SMW with one children 220 with more than one. Minimum: 100% SMW.	The same as in 1984
Tenure required to have access to U.I.	> 6 months	≥ 6 months	The same as in 1984
UNEMPLOYMENT ASSISTANCE			
Entitlement Duration	6 + 3 months in case that the unemployed has exhausted UI and has family burdens	The same as in 1980 but with 18 months as maximum entitlement duration	The same as in 1984, except for: - > 45 years old, without family burdens and: - Exhausted U.I. ≥ 12 months → 6 months. - Exhausted U.I. ≥ 24 months → 6+6 months - With family burdens: - Exhausted U.I. ≥ 3 months: - > 45 years old → 24 months. - < 45 years old → 18 months. - Exhausted U.I. ≥ 6 months - > 45 years old → 30 months. - < 45 years old 24 months.
Amount of Benefit	75% of Statutory Minimum Wage	The same as in 1980	The same as in 1984, except for: - > 45 years old, without family burdens and exhausted U.I. of more than 24 months: - 100 % SMW with 2 family burdens - 125% with more than 3 family burdens.
Tenure required to have access to U.A.	Not possible	From 3 to 5 months, with family burdens, or more 55 years up to the retirement.	The same as in 1984.
OTHERS ISSUES			
Income tax	Exempted	Exempted	Exempted
Capitalisation of Benefits if recipients exit from the system in order to enter self employment	Not possible	Yes	Yes
Pre-Retirement Age.	55 Years-old	55 years-old	52 years-old

Appendix B. (Cont.)

Years	1992	1993
UNEMPLOYMENT INSURANCE. (U.I.)		
Entitlement Duration	4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24 months.	The same as in 1992.
Amount of Benefit	The same as in 1980 but: From 0 to 6 months → 70 % wage last 6 months More than 12 months → 60 % wage last 6 months	The same as in 1992 but: Minimum: 75 % SMW without children
Tenure required to have access to UI	≥ 12 months	The same as in 1992.
UNEMPLOYMENT ASSISTANCE. (U.A.)		
Entitlement Duration.	With family burdens → 21 months Without family burdens → 6 months	The same as in 1992.
Amount of Benefit.	The same as in 1989	The same as in 1989.
Tenure required to have access to UA	≥ 6 months	The same as in 1992.
OTHERS ASPECTS		
Income tax	Exempted	No
Capitalisation of Benefits if recipients exit from the system in order to enter self employment	Not possible	Not possible
Pre-Retirement Age.	52 years-old	52 years-old

Appendix C. Estimates of the baseline hazard.

Spell month	Model 1			Model 2			Model 3			Model 4		
	Param.	S.E.	Sign.	Param.	S.E.	Sign.	Param.	S.E.	Sign.	Param.	S.E.	Sign.
1	-0.028	0.047		0.005	0.048		0.034	0.047		0.050	0.047	
2	0.355	0.045	***	0.384	0.046	***	0.411	0.045	***	0.427	0.045	***
3	0.462	0.045	***	0.492	0.045	***	0.546	0.045	***	0.564	0.045	***
4	0.493	0.045	***	0.516	0.046	***	0.569	0.045	***	0.581	0.045	***
5	0.236	0.048	***	0.254	0.048	***	0.290	0.048	***	0.301	0.048	***
6	0.080	0.049		0.099	0.049	**	0.119	0.049	**	0.130	0.049	***
7	0.254	0.049	***	0.260	0.049	***	0.240	0.049	***	0.242	0.049	***
8	-0.035	0.052	*	-0.037	0.052		-0.037	0.052		-0.040	0.052	
9	-	-	-	-	-	-	-	-	-	-	-	-
10	-0.022	0.056	*	-0.026	0.056		-0.032	0.056		-0.036	0.056	
11	-0.078	0.059	*	-0.095	0.059		-0.109	0.059	*	-0.119	0.059	**
12	0.264	0.055	***	0.247	0.055	***	0.250	0.054	***	0.241	0.054	***
13	-0.095	0.067	*	-0.111	0.067	*	-0.117	0.069	*	-0.108	0.070	
14	-0.148	0.069	**	-0.170	0.069	**	-0.162	0.070	**	-0.155	0.072	**
15	-0.068	0.069		-0.088	0.069		-0.076	0.071		-0.067	0.072	
16	0.228	0.066	***	0.204	0.066	***	0.206	0.068	***	0.214	0.070	***
17	-0.271	0.081	***	-0.291	0.081	***	-0.303	0.082	***	-0.294	0.084	***
18	-0.264	0.082	***	-0.286	0.082	***	-0.297	0.083	***	-0.289	0.084	***
19	-0.296	0.091	***	-0.321	0.092	***	-0.368	0.093	***	-0.360	0.094	***
20	-0.154	0.087	*	-0.182	0.088	**	-0.218	0.089	***	-0.210	0.090	**
21	-0.213	0.089	**	-0.242	0.090	***	-0.194	0.091	**	-0.185	0.092	**
22	-0.401	0.100	***	-0.428	0.101	***	-0.383	0.102	***	-0.375	0.103	***
23	-0.136	0.096		-0.168	0.096	*	-0.131	0.097		-0.121	0.099	
24	0.191	0.084	**	0.160	0.085	*	0.329	0.084	***	0.340	0.085	***

Note: This table shows estimation of duration-specific coefficients from specifications in Table 7.

Appendix D. Hazard rates from UI receipt, by sub-samples.

	PRE-REFORM						POST-REFORM					
	Model 1			Model 2			Model 1			Model 2		
	Param.	S.E.	Sign.	Param.	S.E.	Sign.	Param.	S.E.	Sign.	Param.	S.E.	Sign.
Gender												
Women	-0.729	0.024	***	-0.733	0.024	***	-0.673	0.025	***	-0.680	0.025	***
Group of age												
18-25	0.262	0.026	***	0.264	0.026	***	0.211	0.030	***	0.231	0.030	***
26-35	-	-	-	-	-	-	-	-	-	-	-	-
36-50	-0.389	0.032	***	-0.377	0.032	***	-0.453	0.029	***	-0.427	0.029	***
51-59	-1.289	0.057	***	-1.268	0.057	***	-1.030	0.042	***	-0.999	0.042	***
Job category												
White collar skilled	0.429	0.045	***	0.426	0.045	***	0.445	0.042	***	0.441	0.042	***
White collar unskilled	0.167	0.026	***	0.169	0.026	***	0.128	0.028	***	0.128	0.028	***
Blue collar skilled	0.160	0.033	***	0.160	0.033	***	0.314	0.031	***	0.310	0.031	***
Blue collar unskilled	-	-	-	-	-	-	-	-	-	-	-	-
Family burdens (1=Yes)	-0.077	0.057		-0.070	0.057		-1.804	0.269	***	-1.793	0.269	***
End of contract (1=Yes)	-0.015	0.050		-0.023	0.050		-0.008	0.034		-0.016	0.034	
GDP growth rate (tvc)	0.057	0.032	*	0.057	0.032	*	0.018	0.020		0.017	0.020	
Regional unemployment rate (tvc)	-0.010	0.012		-0.008	0.012		0.034	0.011	***	0.037	0.011	***
Time until exhaustion (months)												
UI 19 to 24	-0.127	0.055	**	-0.165	0.056	***	0.214	0.058	***	0.136	0.059	0.021
UI 13 to 18	-0.195	0.048	***	-0.188	0.048	***	-0.142	0.053	***	-0.129	0.054	0.016
UI 7 to 12	-0.263	0.045	***	-0.252	0.045	***	-0.123	0.047	***	-0.101	0.047	0.033
UI 4 to 6	-0.326	0.047	***	-0.324	0.047	***	-0.174	0.048	***	-0.161	0.048	***
UI 1 to 3	-0.126	0.044	***	-0.127	0.044	***	-0.183	0.048	***	-0.180	0.048	***
Log net wage	0.467	0.084	***	0.471	0.084	***	0.559	0.085	***	0.587	0.085	***
Log benefits (tvc)	-0.108	0.116		-	-	-	-0.216	0.100	**			
Entitlement Duration * log(UI benefits)												
From 1 to 6 months	-	-	-	0.467	0.116	***	-	-	-	0.465	0.084	***
From 7 to 12 months	-	-	-	0.223	0.177		-	-	-	0.296	0.131	**
From 13 to 18 months	-	-	-	-0.622	0.182	***	-	-	-	-0.764	0.147	***
More than 18 months	-	-	-	-0.210	0.260		-	-	-	-0.628	0.174	***
Constant	-4.475	0.249	***	-3.728	0.342	***	-5.261	0.276	***	-4.756	0.315	***
Regional dummies												
YES				YES			YES			YES		
Dummies for the quarter of inflow												
YES				YES			YES			YES		
Observations (indiv.-spell)	371751			371751			350052			350052		
Log Likelihood function	-42047.695			-42032.831			-42707.958			-42677.22		

Notes:

- All variables derived from HISPRES database, except quarterly regional unemployment rate (source: Spanish Labour Force Survey, EPA), and tax liabilities on earnings to give net wages rather than gross earnings (authors' estimates).
- *** significant at 1% level, ** significant at 5 % level.

Table 1. The UCS in Spain before and after 1992

UNEMPLOYMENT COMPENSATION SYSTEM BEFORE 1992*					
Contribution period (C) (Over the last 4 years)	UI entitlement (2 × integer (C/3))	UA entitlement after UI exhaustion			
		With family burdens		Without family burdens	
		< 45 years	≥ 45 years	<45 years	≥45 years
3 months	-	3 months	3 months		
4 months	-	4 months	4 months		
5 months	-	5 months	5 months		
From 6 to 11 months	3 months	18 months	24 months	-	-
From 12 to 17 months	6 months	24 months	30 months	-	-
From 18 to 23 months	9 months	24 months	30 months	-	-
From 24 to 29 months	12 months	24 months	30 months	-	6 months
From 30 to 35 months	15 months	24 months	30 months	-	6 months
From 36 to 41 months	18 months	24 months	30 months	-	6 months
From 42 to 47 months	21 months	24 months	30 months	-	6 months
More than 48 months	24 months	24 months	6+30 months	-	6+6 months
UNEMPLOYMENT COMPENSATION SYSTEM AFTER 1992**					
Contribution period (C) (over the last 6 years)	UI entitlement (2 × integer (C/6))	UA entitlement after UI exhaustion			
		With family burdens.		Without family burdens	
		< 45 years	≥45 years	<45 years	≥45 years
3 months	-	3 months	3 months	-	-
4 months	-	4 months	4 months	-	-
5 months	-	5 months	5 months	-	-
From 6 to 11 months	-	21 months	21 months	6 months	6 months
From 12 to 17 months	4 months	18 months	24 months	-	-
From 18 to 23 months.	6 months	24 months	30 months	-	-
From 24 to 29 months.	8 months	24 months	30 months	-	-
From 30 to 35 months.	10 months	24 months	30 months	-	-
From 36 to 41 months.	12 months	24 months	30 months	-	6 months
From 42 to 47 months.	14 months	24 months	30 months	-	6 months
From 48 to 53 months.	16 months	24 months	30 months	-	6 months
From 54 to 59 months.	18 months	24 months	30 months	-	6 months
From 60 to 65 months.	20 months	24 months	30 months	-	6 months
From 66 to 71 month.	22 months	24 months	30 months	-	6 months
72 months or longer	24 months	24 months	6+30 months	-	6+6 months

Notes: (*) Eligibility to UI requires Social Security contributions for a minimum of six months during the four years preceding unemployment. UI entitlement duration was the result of dividing by 2 the number of months of contribution, with the constrain that the result has to be an integer multiple of 3 (ranging from 3 to 24 months).

(**) Eligibility to UI required Social Security contributions for a minimum of twelve months during the six years preceding unemployment. UI entitlement duration was the result of dividing by 3 the number of months of contribution. The result was constrained to be an integer multiple of 2 (ranging from 4 to 24 months).

Table 2. Distribution of net UI replacement rates before and after 1992

Replacement rate	Pre-reform		Post-reform	
	Freq	%	Freq	%
≥ 0.45 & < 0.5	328	0.78	609	1.7
≥ 0.5 & < 0.6	747	1.78	1,304	3.64
≥ 0.6 & < 0.7	1,102	2.62	1,573	4.39
≥ 0.7 & < 0.75	591	1.41	3,031	8.46
≥ 0.75 & < 0.8	857	2.04	10,280	28.68
≥ 0.8 & < 0.85	1,772	4.22	13,440	37.49
≥ 0.85 & < 0.9	14,137	33.64	3,998	11.15
≥ 0.9 & < 0.95	14,108	33.57	740	2.06
≥ 0.95 & < 1	2,755	6.55	145	0.4
≈ 1	5,632	13.4	725	2.02
Total sample	42,029	100	35,845	100

Source: HSIPRE and own authors' calculations

Table 3. Main descriptive statistics, by sub-samples.

SAMPLE CHARACTERISTICS	Pre-reform			Post-reform		
	Mean	Std	Sample (%)	Mean	Std	Sample (%)
Sex						
Male			49.8			55.8
Female			50.2			44.2
Job Category						
1. High levels & associate professional technicians, foremen & supervisors			6.9			8.9
2. Technical assistants and skilled clerical workers			10.9			13.7
3. Semi skilled clerical workers			3.4			3.2
4. Unskilled clerical workers			17.2			16.1
5. Skilled production workers			13.2			15.7
6. Semi skilled production workers			17.5			16.7
7. Unskilled production workers			30.9			25.6
Family burdens						
With			2.9			0.8
Without			97.1			99.2
Reason for leaving the last job						
End of contract			96.4			91.2
Other reasons			3.6			8.8
Age	29.20	10.12		30.94	10.89	
Age by groups						
≥18 & ≤25 years			42			36.1
>25 & ≤35 years			33.8			33.0
>35 & ≤50 years			17.4			21.8
>51 years			6.8			9.1
Benefits (euros per day, 1990 prices)	16.59	3.88		16.06	5.07	
Net wage (euros per day, 1990 prices)	18.91	6.84		20.88	8.70	
Gross wage (euros per day, 1990 prices)	22.06	9.73		25.33	12.69	
Economic variables						
GDP quarterly rate	1.17	1.31	100	0.96	1.64	100
Unemployment regional rate	17.77	5.84	100	22.43	5.45	100
SPELL CHARACTERISTICS						
Type of observation						
Censored duration			77.5			73
Completed duration			22.5			27
Duration (days)						
Elapsed unemployment duration	262.27	215.03	100	289.38	209.82	100
Duration until exhaustion	56.57	143.15	100	73.80	163.53	100
(Duration until exhaustion /10) ²	236.94	779.82	100	321.90	918.14	100
Entitlement Period						
Average duration (days)	318.84	227.92	100	363.19	225.70	100
> 0 & ≤ 6 months	4.08	1.44	48.2	4.73	0.96	35.7
> 6 & ≤ 15 months	11.50	2.38	25.4	10.43	2.08	32.7
> 15 & ≤ 24 months	21.74	2.62	26.4	22.19	2.75	31.5
Number of individuals			42,029			35,845

Source: HSIPRE and own authors' calculations

Table 4. UI entitlement duration and average duration of UI spells, by sub-samples

Contribution period	UI Entitlement duration (months)		Mean duration of UI (months)		Difference (months)
	Pre-reform	Post-reform	Pre-reform	Post-reform	
From 6 to 11 months	3	-	2.88	-	-
From 12 to 17 months	6	4	5.46	3.86	-1.60
From 18 to 23 months.	9	6	7.88	5.57	-2.30
From 24 to 29 months.	12	8	10.10	7.22	-2.88
From 30 to 35 months.	15	10	12.12	8.95	-3.17
From 36 to 41 months.	18	12	13.60	9.83	-3.77
From 42 to 47 months.	21	14	14.97	11.24	-3.73
From 48 to 53 months.	24	16	19.20	11.83	-7.37
From 54 to 59 months.	24	18	19.20	13.49	-5.71
From 60 to 65 months.	24	20	19.20	14.46	-4.74
From 66 to 71 month.	24	22	19.20	14.74	-4.46
72 months or longer	24	24	19.20	17.73	-1.47

Source: HSIPRE and own authors' calculations

Table 5. Cumulative probability of exiting from UI benefit receipt, by sub-samples and by unemployment duration (in percentages)

Duration of Unemployment	Before change of Law	After Change of Law
TOTAL SAMPLE		
<=3 months	10.44	8.34
<=6 months	18.73	17.32
<=9 months	24.23	23.87
<=12 months	28.53	30.68
<=15 months	32.08	35.10
<=18 months	35.06	39.52
<=21 months	37.24	42.98
<=24 months	39.84	49.27
MEN		
<=3 months	7.96	5.72
<=6 months	13.38	11.93
<=9 months	17.28	16.24
<=12 months	20.41	21.28
<=15 months	22.67	24.18
<=18 months	25.02	27.58
<=21 months	26.36	29.99
<=24 months	27.97	35.60
WOMEN		
<=3 months	12.89	10.42
<=6 months	23.76	21.41
<=9 months	30.63	29.46
<=12 months	35.98	37.26
<=15 months	40.70	42.38
<=18 months	44.25	47.16
<=21 months	47.10	50.98
<=24 months	50.44	57.28

Source: HSIPRE and own authors' calculations

Table 6. Specification tests for mass points (unobserved heterogeneity).

	Model 1	Model 2	Model 3	Model 4
Information Criteria				
AIC	IC	IC	IC	IC
No mass points	0.23612225	0.23566645	0.23619161	0.23575316
Two mass points	0.23613339	0.23567721	0.23620236	0.23576297
BIC				
No mass points	0.23634676	0.23598718	0.23640009	0.23605786
Two mass points	0.23636859	0.23600864	0.23642153	0.23607835
HIQ				
No mass points	0.23609522	0.23562785	0.23616652	0.23571649
Two mass points	0.23610507	0.23563732	0.23617598	0.235725

Notes: AIC is Akaike info criterion = $\frac{-2(l + 2 \cdot K)}{N}$; SC is Schwarz criterion = $\frac{-2(l + K \cdot \log(N))}{N}$;

HQ is Hannan-Quinn criterion = $\frac{-2(l + 2 \cdot K \cdot \log(\log(N)))}{N}$

Let “l” be the value of the log of the likelihood function with the “K” parameters estimated using “N” observations.

Table 7. Hazard rates from UI receipt. Entire sample.

	Model 1			Model 2			Model 3			Model 4		
	Param.	S.E.	Sign.	Param.	S.E.	Sign.	Param.	S.E.	Sign.	Param.	S.E.	Sign.
Gender												
Women	-0.687	0.017	***	-0.698	0.017	***	-0.683	0.017	***	-0.693	0.017	***
Group of age												
18-25	0.235	0.019	***	0.239	0.019	***	0.232	0.019	***	0.237	0.019	***
26-35	-	-	-	-	-	-	-	-	-	-	-	-
36-50	-0.427	0.021	***	-0.421	0.021	***	-0.423	0.021	***	-0.416	0.022	***
51-59	-1.106	0.033	***	-1.104	0.033	***	-1.101	0.033	***	-1.097	0.033	***
Job category												
White collar skilled	0.442	0.030	***	0.444	0.030	***	0.445	0.030	***	0.448	0.030	***
White collar unskilled	0.146	0.019	***	0.150	0.019	***	0.146	0.019	***	0.151	0.019	***
Blue collar skilled	0.242	0.022	***	0.250	0.022	***	0.241	0.022	***	0.248	0.022	***
Blue collar unskilled	-	-	-	-	-	-	-	-	-	-	-	-
Family burdens (1=Yes)	-0.173	0.052	***	-0.244	0.053	***	-0.125	0.053	**	-0.195	0.054	***
End of contract (1=Yes)	-0.019	0.027		-0.011	0.028		-0.012	0.027		-0.006	0.028	
GDP growth rate (tvc)	0.089	0.005	***	0.106	0.006	***	0.084	0.007	***	0.102	0.007	***
Regional unemployment rate (tvc)	-0.023	0.001	***	-0.005	0.006		-0.023	0.001	***	-0.019	0.005	***
Time until exhaustion (months)												
UI 19 to 24	0.062	0.038	*	0.061	0.038		-	-	-	-	-	-
UI 13 to 18	-0.145	0.034	***	-0.147	0.034	***	-	-	-	-	-	-
UI 7 to 12	-0.185	0.031	***	-0.189	0.031	***	-	-	-	-	-	-
UI 4 to 6	-0.241	0.033	***	-0.243	0.033	***	-	-	-	-	-	-
UI 1 to 3	-0.135	0.031	***	-0.134	0.031	***	-	-	-	-	-	-
UI 0	-	-	-	-	-	-	-	-	-	-	-	-
Log net wage	0.470	0.057	***	0.486	0.058	***	0.489	0.056	***	0.495	0.056	***
Log UI benefits (tvc)	-0.081	0.071		-0.117	0.072	*	-	-	-	-	-	-
Pre-reform UI benefit level	-	-	-	-	-	-	-0.010	0.004	**	-0.012	0.004	***
UI Benefit Difference* After change of law	-	-	-	-	-	-	0.041	0.014	***	0.054	0.016	***
Pre-reform entitlement duration	-	-	-	-	-	-	-0.001	0.002		0.000	0.002	
UI Entitlement Difference* After change of law	-	-	-	-	-	-	0.025	0.004	***	0.019	0.004	***
After change of law	0.234	0.019	***	0.138	0.037	***	-	-	-	-	-	-
Constant	-4.302	0.109	***	-4.695	0.144	***	-4.592	0.129	***	-4.845	0.152	***
Regional dummies		NO			YES			NO			YES	
Dummies for the quarter of inflow		NO			YES			NO			YES	
Observations (persons-spell)		721,803			721,803			721,803			721,803	
Log Likelihood function		-85,174.874			-84,992.376			-85,202.907			-85,026.671	

Notes:

- All variables derived from HISPRES database, except quarterly regional unemployment rate (source: Spanish Labour Force Survey, EPA), and tax liabilities on earnings to give net wages rather than gross earnings (authors' estimates).
- *** significant at 1% level, ** significant at 5 % level.

Table 8. Hazard rates from UI receipt, by gender.

	MEN			WOMEN			MEN			WOMEN		
	Param	S.E.	Sign.	Param	S.E.	Sign.	Param	S.E.	Sign.	Param	S.E.	Sign.
Group of age												
18-25	0.123	0.025	***	0.444	0.032	***	0.126	0.025	***	0.443	0.032	***
26-35	-	-	-	-	-	-	-	-	-	-	-	-
36-50	-0.429	0.026	***	-0.418	0.039	***	-0.419	0.026	***	-0.425	0.039	***
51-59	-1.184	0.037	***	-0.949	0.086	***	-1.175	0.037	***	-0.950	0.086	***
Job category												
White collar skilled	0.286	0.036	***	0.734	0.055	***	0.290	0.036	***	0.742	0.055	***
White collar unskilled	0.057	0.025	**	0.249	0.032	***	0.058	0.025	**	0.242	0.032	***
Blue collar skilled	0.212	0.025	***	0.002	0.058		0.209	0.025	***	-0.001	0.058	
Blue collar unskilled							-	-	-	-	-	-
Family burdens (1=Yes)	-0.186	0.058	***	-0.492	0.137	***	-0.151	0.058	***	-0.434	0.137	***
End of contract (1=Yes)	-0.011	0.032		0.003	0.057		-0.012	0.032		0.020	0.058	
GDP growth rate (tvc)	0.103	0.007	***	0.112	0.011	***	0.108	0.008	***	0.098	0.013	***
Regional unemployment rate (tvc)	-0.002	0.007		-0.010	0.011		-0.017	0.006	***	-0.021	0.010	**
Time until exhaustion (months)												
UI 19 to 24	0.369	0.048	***	-0.487	0.069	***	-	-	-	-	-	-
UI 13 to 18	0.050	0.043		-0.441	0.059	***	-	-	-	-	-	-
UI 7 to 12	-0.080	0.040	**	-0.309	0.051	***	-	-	-	-	-	-
UI 4 to 6	-0.207	0.042	***	-0.246	0.053	***	-	-	-	-	-	-
UI 1 to 3	-0.125	0.039	***	-0.124	0.049	***	-	-	-	-	-	-
UI 0	-	-	-	-	-	-	-	-	-	-	-	-
Log net wage	0.351	0.069	***	0.917	0.105	***	0.371	0.067	***	0.804	0.105	***
Log UI benefits (tvc)	-0.149	0.086	*	-0.412	0.131	***	-	-	-	-	-	-
Pre-reform UI benefit level	-	-	-	-	-	-	-0.016	0.005	***	-0.019	0.008	**
UI Benefit Difference* After change of law	-	-	-	-	-	-	0.084	0.020	***	0.043	0.031	
Pre-reform entitlement duration	-	-	-	-	-	-	0.019	0.002	***	-0.028	0.003	***
UI Entitlement Difference* After change of law	-	-	-	-	-	-	-0.009	0.005		0.053	0.008	***
After change of law	0.110	0.045	***	0.133	0.069	**	-	-	-	-	-	-
Constant	-4.223	0.174	***	-5.899	0.256	***	-4.634	0.183	***	-6.035	0.275	***
Regional dummies		YES			YES			YES			YES	
Dummies for the quarter of inflow		YES			YES			YES			YES	
Observations (persons-spell)		380,032			341,771			380,032			341,771	
Log Likelihood function		-55,554.100			-29,077.426			-55,585.763			-29,076.036	

Notes: See Table 7.

Table 9. Hazard rates from UI receipt, by age groups.

	18-25			26-35			36-50			51-59														
	Param	S.E.	Sign.	Param	S.E.	Sign.	Param	S.E.	Sign.	Param	S.E.	Sign.	Param	S.E.	Sign.									
Pre-reform UI benefit level	-	-	-	-0.021	0.011	**	-	-	-	-0.003	0.007		-	-	-	-0.036	0.008	***	-	-	-	-0.011	0.014	
UI Benefit Difference* After change of law	-	-	-	0.066	0.036	*	-	-	-	0.044	0.027	*	-	-	-	-0.019	0.033		-	-	-	0.124	0.061	**
Pre-reform entitlement duration	-	-	-	0.016	0.003	***	-	-	-	-0.006	0.002	***	-	-	-	-0.006	0.003	*	-	-	-	-0.025	0.007	***
UI Entitlement Difference* After change of law	-	-	-	0.017	0.010	*	-	-	-	0.028	0.007	***	-	-	-	0.031	0.009	***	-	-	-	0.065	0.016	***
After change of law	0.118	0.075		-	-	-	0.195	0.061	***	-	-	-	0.167	0.077	**	-	-	-	0.570	0.128	***	-	-	-
Log-likelihood	-29194.200			-29194.260			-31188.700			-31206.740			-17918.810			-17932.000			-6162.502			-6165.463		
Observations (persons-spell)	205,702						249,586						177,590						88,925					

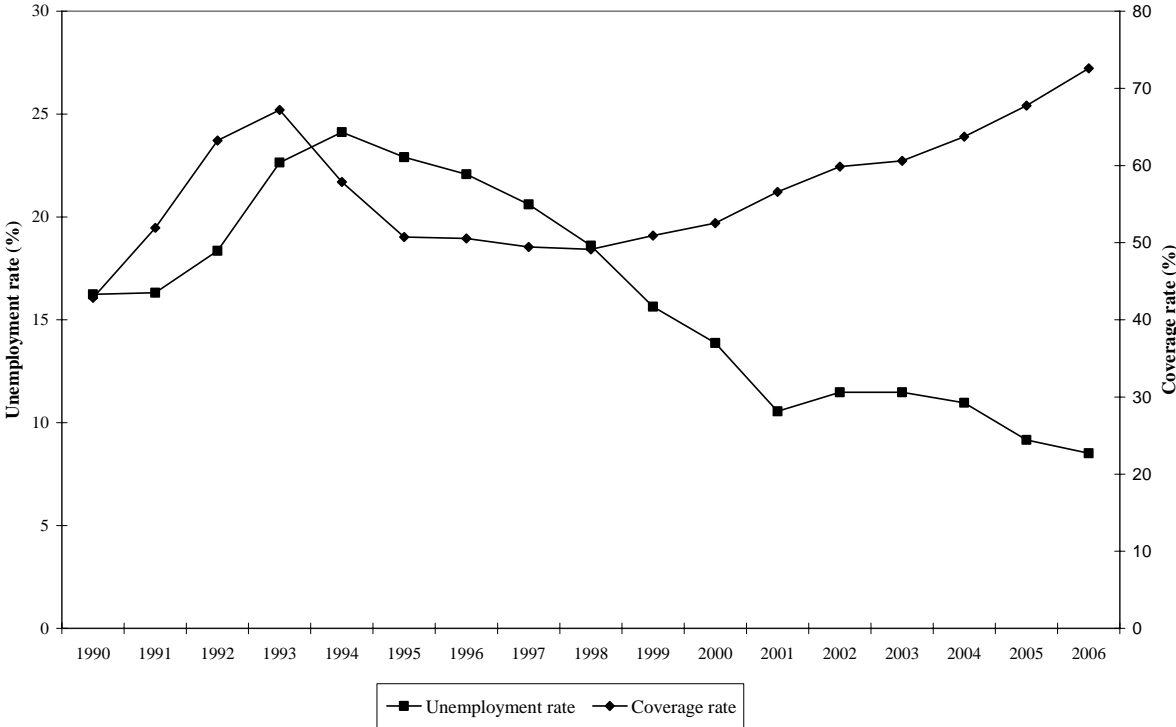
Notes: The other covariates are those included in models 2 and 3 in Table 7.

Table 10. Hazard rates from UI receipt, by entitlement duration.

	6 months			Less than or equal 6 months			12 months			24 months														
	Param	S.E.	Sign.	Param	S.E.	Sign.	Param	S.E.	Sign.	Param	S.E.	Sign.	Param	S.E.	Sign.									
Pre-reform UI benefit level	-	-	-	0.003	0.016		-	-	-	0.019	0.012	*	-	-	-	-0.043	0.016	***	-	-	-	-0.044	0.007	***
UI Benefit Difference* After change of law	-	-	-	0.032	0.064		-	-	-	0.031	0.047		-	-	-	0.219	0.055	***	-	-	-	0.097	0.025	***
After change of law	-0.040	0.182		-	-	-	0.046	0.140		-	-	-	0.470	0.140	***	-	-	-	0.323	0.064	***	-	-	-
Log-likelihood	-9,052.227			-9,052.082			-17,502.800			-17,502.390			-9,193.560			-9,192.719			-22,292.320			-22,299.150		
Observations (persons-spell)	67,039						136,566						69,378						243,661					

Notes: The other covariates are those included in models 2 and 3 in Table 7 except for *Pre-reform-entitlement duration* variable and *UI entitlement difference*after change of law* variable.

Figure 1. Unemployment rate and unemployment insurance coverage rate (annual means)



Source: Labour Force Survey (EPA), *Boletín de Estadísticas Laborales*, and authors' own elaboration.

Figure 2. Empirical hazard out of unemployment (Kaplan-Meier estimates) by sub-samples.

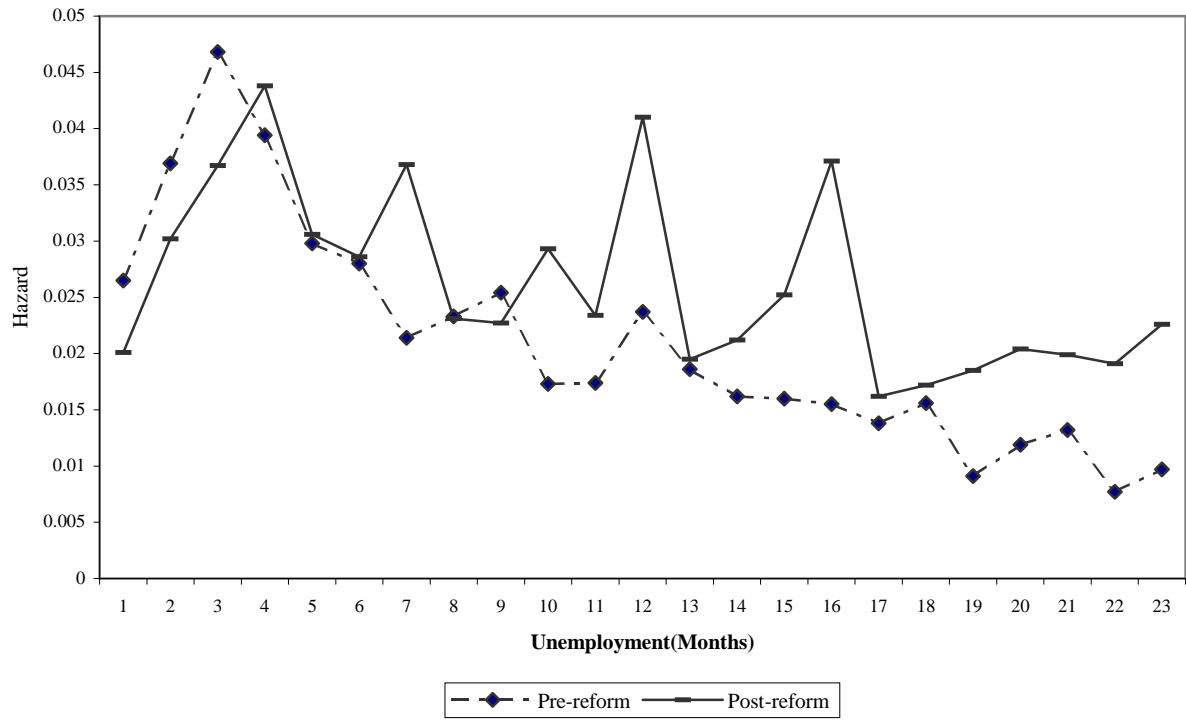


Figure 3. Empirical hazard out of unemployment (Kaplan-Meier estimates) by sub-samples and gender.

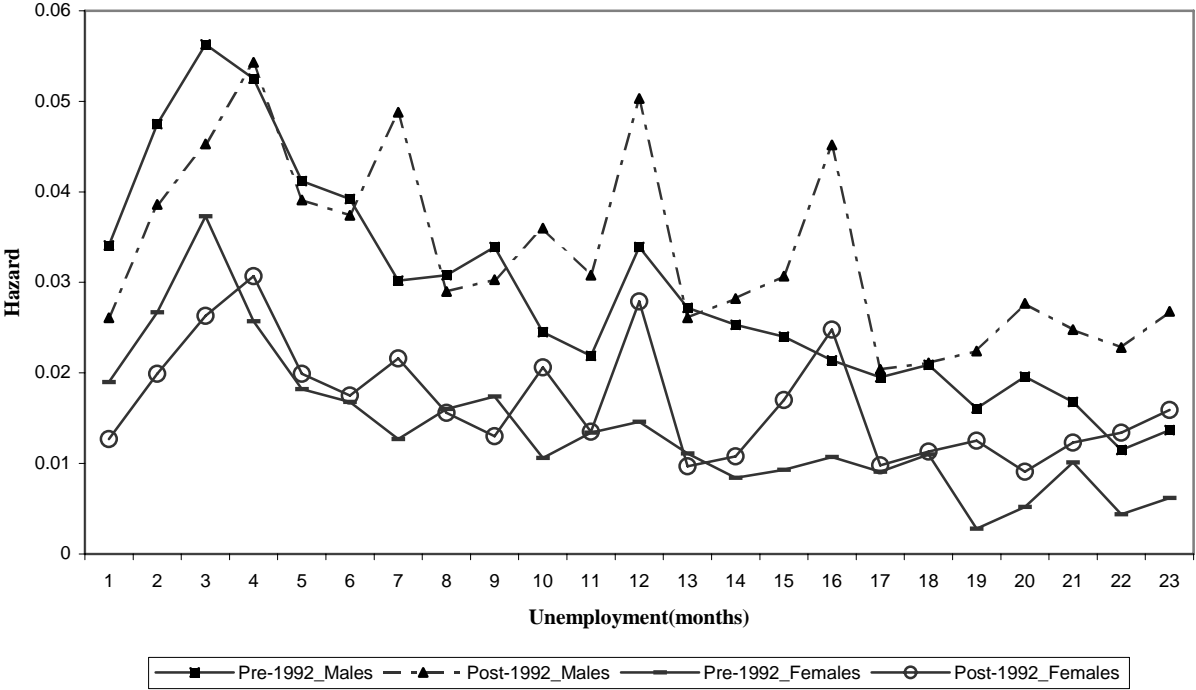


Figure 4. Estimated hazard rate from unemployment after controlling for observed and unobserved heterogeneity. Predicted values are obtained at the means of covariates from table in Appendix C (specification number 2).

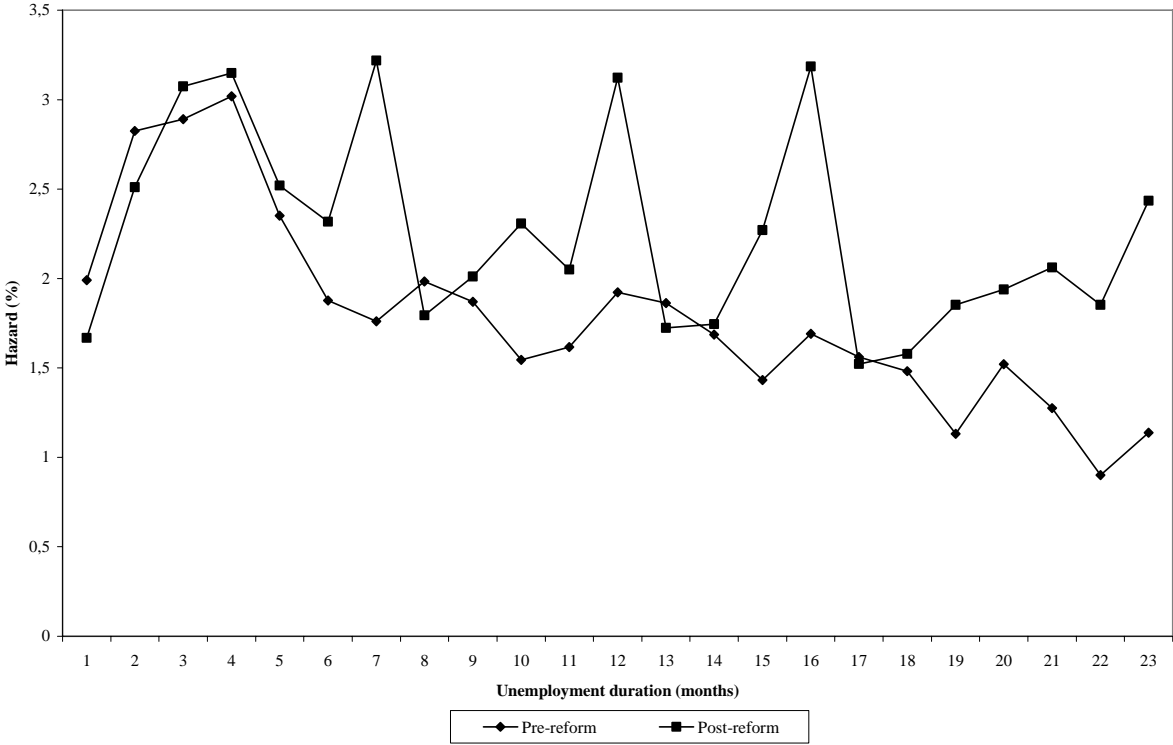


Figure 5. Benefit expiry effect on the empirical hazard rates, by groups of entitlement duration (less than or equal 6, 12, 18 and 24 months).

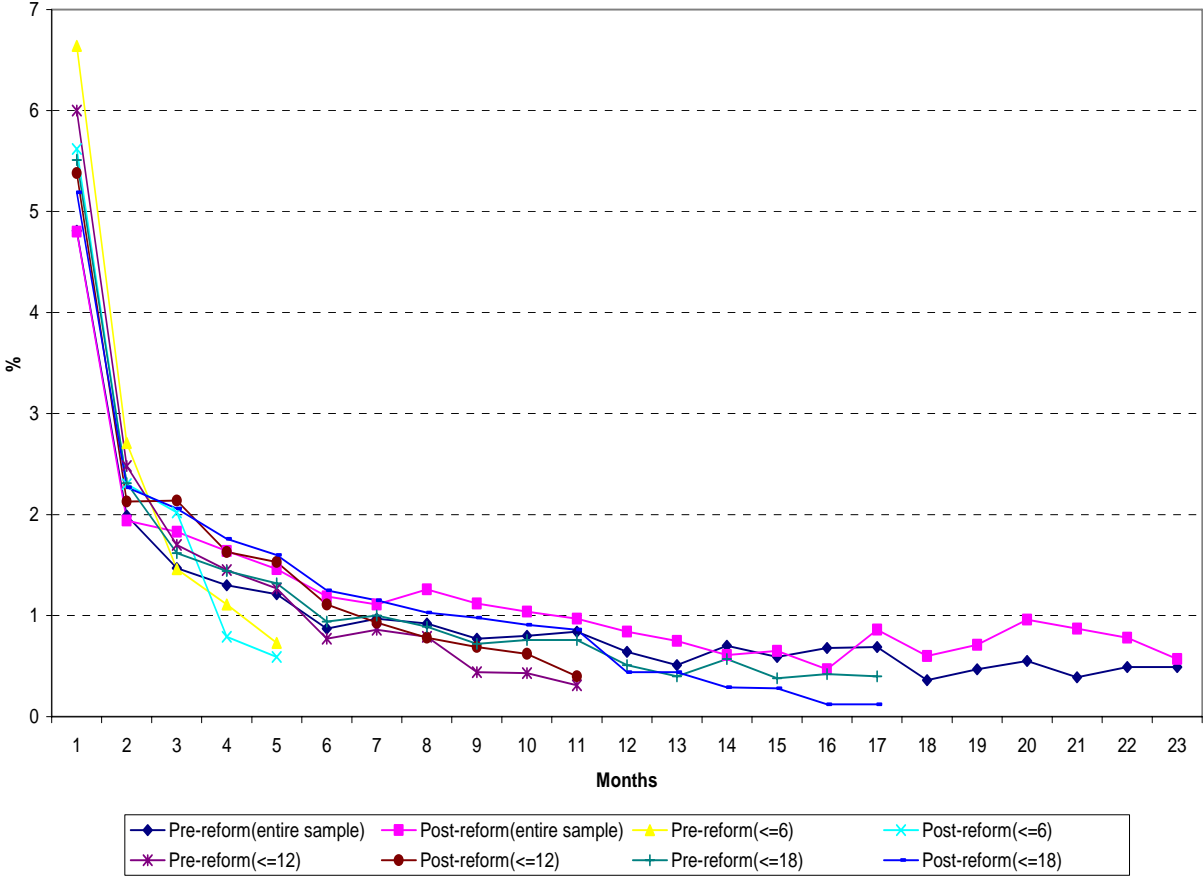


Figure 6. Benefit expiry effect on the empirical hazard rates, by entitlement duration (6,12, 18 and 24 months).

