Unemployment Insurance and Job Turnover in Spain

Yolanda Rebollo Sanz* (Universidad Pablo de Olavide)

Abstract

The aim of this paper is to shed some light on the potential relationships between the unemployment insurance system and the labour market turnover trying to move further the traditional view that this system has only behavioral consequences from the labour supply side of the labour market. This study assumes heterogeneity in the impact of the incentives embedded in the unemployment insurance system, depending on the type of labour market transition (quits versus layoffs and recalls versus new job entrances) and the worker's attachment to the labour market (gender and type of contract). The results show that unemployment benefits appear to favour job turnover and firms and workers´s decisions seem to matter on job turnover. The layoff hazard rate increases as workers qualify for unemployment benefits while the quit hazard rate remains stable. Similarly, employment inflow increases sharply after exhaustion of unemployment benefits. The timing and importance of the exit differs between recalls and new job entry and it depends on the worker's attachment to the labour market. These differences also call into evidence that firm´s and worker´s decisions matter in the duration of unemployment.

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* Dpto de Economía, Métodos Cuantitativos e Historia Económica. Universidad Pablo de Olavide, Carretera de Utrera s/n, 41018 Sevilla Tlfno: 954 977978. Mail: yfrebsan@upo.es

1 Introduction

The labour market is in a constant state of flux. There is a continuous flow of workers into and out of employment, and from one job to another. Understanding job turnover is the key to understanding how the labour market operates. Turnover is necessary because it helps allocate workers to those jobs where they are most productive and allows employers to hire and fire according to economic conditions. It is not always optimal, however. Some groups of workers experience high layoff rates without ever advancing to better positions (Rebollo 2010; Gagliarducci, 2005). And some groups of firms face high firing rates without improvements in their productivity levels[1] (Dolado and Stucchi, 2008; Bassanini *et al.* 2008). One of the factors that has been blamed for excessively high turnover in the labour market is the Unemployment Insurance System, (UIS) which is a key element of the social security systems of OECD countries. Nowadays several governments are reconsidering the design of the UIS, with the dual objectives of increasing employment and reducing social expenditure. Among the traditional reform proposals are the reduction in the replacement rate and/or the reduction in potential benefit duration. Nevertheless, uniform payroll taxes, the method used by most UIS to finance unemployment benefits, is frequently criticised for distorting firms' layoff decisions because the absence of layoff taxes leads firms not to internalize the costs of insurance when dismissed workers enter unemployment and begin to receive benefits, and, by increasing labour costs, the presence of payroll taxes gives incentives to firms to lay workers off[2]. This gives rise to too many layoffs reducing mean employment duration and increasing unemployment incidence (see Anderson and Meyer, 2000; Cahuc and Malherbet, 2004; Fath and Fuest, 2005; Blanchard and Tirole, 2008)[3].

The aim of this paper is to shed some light on the potential relationships between the UIS and the labour market turnover trying to move further the traditional view that the UIS has only behavioural consequences from the labour supply side of the labour market. For this aim we analyse the Spanish labour market for the period 2000-2007. Several features distinguish the Spanish labour market from other European labour markets. Firstly, it has a generous UIS financed by uniform payroll taxes. Secondly, employment turnover is notably higher than in other European countries, with

[1] A rise in the turnover rate decreases the probability of investing in specific human capital or receiving specific training at the firm and, therefore, may decrease labour productivity and Total Factor Productivity (TFP).

[2] Because of these perverse financial incentives, some countries like Spain have put in place a system of employment protection based on heavy judicial intervention. In Spain, judges have the authority to decide whether a layoff is justified on economic grounds or not.

[3] Blanchard and Tirole, (2008) suggests that at least a partial shift from payroll to layoff taxes, accompanied by limits on judicial intervention, would lead to a better allocation. Firms, once forced to internalize the costs of unemployment insurance, are in a much better position than judges to assess whether layoffs are economically justified. Cahuc and Malherbet (2004), show that the inclusion of the experience rating increases employment and the welfare of low-skilled workers. Fath and Fuest (2005) find that experience rating reduces labour turnover and increases employment.

recent figures showing that nearly 50% of workers have held their current job for six months or less and almost 30% for no more than a year. Thirdly, more than 80% of newly signed contracts are temporary, Spain's temporary employment rate has remained above 30% since 1995 and is currently one of the highest in Europe. Fourthly, more than a third of the unemployed who find a job return to their former employer.

The effects of UI benefits on job turnover compound labour supply and demand forces and their relative importance continues to be an empirical issue. A number of empirical studies have already examined how certain characteristics of the UIS play out with respect to the duration and outcome of unemployment spells. Typically, these studies focus on the behavioural consequences of the UIS on the labour supply side of the labour market and their findings show that higher replacement ratios lead to longer unemployment spells and that the probability of escaping unemployment increases as unemployment benefits entitlements are exhausted. Nevertheless, to understand whether demand or supply incentives are behind this effect the researcher must take into account whether the unemployment spell finally ends in recalls or in a new job entrance. The outcome of transition from unemployment –recall versus entry into a new job- may involve several different causal mechanisms, all requiring explicit consideration in the analysis of the effect of the UIS on job turnover (Katz, 1986, Juradja, 2002). The empirical relevance of this issue is doubtful in a country like Spain where more than a third of the unemployed who find a job return to their former employer. Besides, as Juradja (2002) has shown, evaluating the UIS based on only its effects on unemployment duration may result in underestimation of the total impact of the UIS on job turnover and hence on the unemployment rate. The influence of UIS eligibility parameters on employment duration, in contrast, has received scant attention and none of the empirical studies found take into account the potential behavioural differences between layoffs and quits. These distinctions between different types of employment inflow and outflow are key to determining whether the UIS also affects firms' hiring and firing decisions (as implicit contract theory shows, see Feldstein, 1976) and not only workers' decisions as assumed in traditional analysis. For instance, one could easily argue that layoffs are triggered by productivity shocks while quits are triggered by reservation wage shocks (Blanchard and Tirole, 2008). Finally, it is also important to remark that, though dynamic selection effects might be important in these types of analysis[4], few empirical papers take them into account.

The aim of this paper is to offer a more comprehensive analysis of the potential effects of the UIS on job turnover trying to illustrate that demand and labour supply forces are both important. We

[4] See Ham and LaLonde (1996) for a discussion of dynamic sample selection in multiple-state, multiple-spell data.

depart from previous research in several dimensions. Firstly, we take into account dynamic potential selection effects. In particular, the analysis considers three distinct initial states: employment, involuntary unemployment, and voluntary unemployment. Secondly, we define a competing risk model for employment and unemployment spells as follows: within the state of employment, the analysis differentiates between quits (leading to voluntary unemployment) and layoffs (leading to involuntary unemployment). Within the involuntary unemployment state, we consider whether the spell ends in recall or the worker's entry into a new firm. Within the voluntary unemployment state we only consider exit to employment since job quitters probably face zero recall expectations. Thirdly, given the strong duality of the Spanish labour market we allow for heterogeneous effects of the UIS system between permanent and temporary contracts.

Although several dimensions of the UIS can affect the labour market, I shall concentrate on two of its key components: Entry Requirement (ER) and Potential Benefit Duration (PBD). The ER refers to the minimum number of weeks that individuals have to work over a specified period in order to qualify for UI benefits. The PBD refers to the maximum number of weeks the unemployed worker is entitled to draw UI benefits. Both parameters (ER and PBD) depend on the number of weeks worked over the six years prior to the onset of unemployment. The empirical method is to look for spikes in the employment and unemployment hazard profiles exploiting cross-sectional and longitudinal variation in ER and PBD, respectively, parameters. Given the strong duality of the Spanish labour market, we allow UIS parameters to differ between temporary and permanent contracts. Notice that, the influence of UI benefits on search behaviour and reservation wage policy might differ depending on the type of contract.

Another key feature of this analysis is the use of an administrative dataset (Longitudinal Working Life Sample, LWLS) that allows to construct full employment histories and analyze the distribution of employment and unemployment durations as affected first by the ER and then by the PBD. The importance of using an administrative dataset in this type of analysis is large since it avoids the existence of seam bias[5], a serious problem for estimating duration models.

In the present paper, we use a discrete-time multivariate hazard model –multiple spell and multiple states with competing risks- allowing for jointly-distributed unobserved heterogeneity. In order to take into account differences in labour supply decisions, the whole analysis is performed on separate gender groups.

[5] With seam bias, transitions or changes in status within reference periods are underreported while too many transitions or changes are reported as occurring between reference periods. The seam bias is an important issue in duration models since it affects the timing of transitions. See Moore (2008) for a summary of seam bias research.

The analysis presented points to various behavioural consequences of the UIS on job turnover. Firstly, we obtain that employment inflow and outflow is influenced by the UIS varying the intensity of the effect by gender, type of contract and type of transition. In general, these effects stand out for workers with loose attachment to the labour market such as women and temporary workers. Secondly, we show that employers might play an important role in the timing of the layoff as well as in the timing of the outflow from unemployment. Thus, the layoff hazard rate increases when the worker qualifies for UI benefits, while job quit decisions remain unaffected. We also obtain sharp increases in the rate of escape from unemployment for unemployment recipients around the time that benefits run out. Interestingly, we find that the recall hazard rate reaches its maximum one month prior to the exhaustion of benefits for workers previously on permanent contracts. Meanwhile, the new job hazard rate reaches its maximum at the time UI benefits run out. In light of these findings, it can be concluded that the observed 'moral hazard' effects of the UIS on employment and unemployment duration cannot all be attributed to worker reactions alone. Note that the importance of these results resides in the discovery that the UIS tends to reduce the time an individual spends in employment throughout his or her labour market career.

The rest of the paper is organized as follows. Section 2 describes the main characteristics of the Spanish UIS and Section 3 outlines the theoretical framework and the existing empirical literature. The data and the econometric model are presented in Sections 4 and 5, respectively. The results of the empirical analysis are given in Section 6. The conclusions of the study are summarized in the final section.

2 Institutional Background

As in most OCDE countries, there are two basic types of unemployment benefits in Spain[6]: Unemployment Insurance (UI) and Unemployment Assistance (UA). All employees who involuntarily become unemployed are entitled to UI benefits, provided that they were employed for at least 12 months over the 72-month period prior to unemployment. Individuals receiving full-time disability benefits, voluntary job quitters and anyone over the age of 65 are excluded from UI benefits. Benefits end when individuals cease to be unemployed or complete the maximum benefit period. The amount of income provided for the unemployed is determined by multiplying the gross replacement rate by the average basic pay over the 12 months preceding unemployment. The monthly payment is 70% of average basic pay for the first four months of benefits and 60% from the fifth month onwards. Unemployment insurance is also subject to a floor of 75% of the statutory

[6] For more details of the UIS in Spain see Bover, Arellano and Bentolila (2002).

minimum wage (SMW) and a ceiling of between 170% and 220% of the SMW depending on the worker's family circumstances. The last two factors imply that the net replacement rate could be much higher than the gross rate quoted above. The potential benefit duration (PBD) and the amount of benefit received depend on previous employment duration and wage levels, respectively. These benefits last for a period of at least 4 months extendable in 2-monthly periods up to a maximum of 2 years, depending on the worker's employment record. For those who have been in work but not long enough to qualify for UI, or who have exhausted their UI benefits, UA benefits are available.

Relative to the financing of the Spanish UIS, it is worth to point out that is financed by uniform payroll taxes. In particular, employers and employees both pay UI contributions. The government pays the balance outstanding. In the case of a permanent contract, the contribution rate is 7.55% (employees: 1.55%, employers: 6%). For fixed-term contracts, employees pay 1.6% and employers pay 6.7% for full-time work and 7.7% for part-time work or if the employer is a temporary job agency.

During the sample period two labour market reforms took place in the Spanish labour market. They are relevant to be considered because these reforms introduced new exogenous variations in the assignment between temporary and permanent contracts in the period of study. For the 2001 reform, the most important aspect of the decree is that the prevailing programme of permanent employment promotion was extended to many new cases. The decree also introduced limited compensation for the dismissal of workers on temporary contracts, amounting to eight days' pay per year worked[7]. However, the most important change was the abolition of the firm's obligation to pay *interim* wages when dismissed workers appealed to labour courts, as long as the firm acknowledged the dismissal as being unfair and deposited the severance pay (45 days' wages per year of service) in court within two days of the dismissal. In the 2006 reform new restrictions in the use of temporary contracts were introduced. For instance, this reform limited the repeated renewal of employment contracts within the same company by obliging companies to offer a permanent contract to any worker who has had two or more fixed-term contracts and has worked in the same job for over two years within a period of 30 months. The permanent employment promotion policy also suffered important changes. It created incentives to companies to provide permanent employment contracts and establish fixed quotas (instead of the former percentage of contributions) for the target groups for these incentives, namely women, young workers, disabled workers and persons on job training contracts; It provided a fixed yearly subsidy (with a maximum duration of three years) for

[7] Considering that the average temporary contract is for less than six months, the compensation of four days' pay is far less than the company saves through social security contribution reductions

temporary contracts that are converted into permanent contracts before 31 December 2006, and to allow temporary contracts prior to 2008 to be converted into permanent ones.

3 The literature and debate on the UIS:

The theoretical analysis of the potential effects of UI benefits on workers has traditionally focused on the exit rate from unemployment and has been based on job search models (Mortensen 1990). In this framework, higher benefits drive up the reservation wage and reduce job search effort, thus reducing the exit rate from unemployment and extending unemployment duration. Close to the time of benefit exhaustion the unemployment exit rate increases as the value of being unemployed declines, such that the marginal benefit from job-search increases and the reservation wage falls. The worker´s search intensity can depend, among other factors, on the expected probability of recall. Job offers are related to wage and type of contract. Summarizing, the determinants of unemployment duration depend on wage offered, type of contract, unemployment benefits and recall expectations.

Although this disincentive effect of the UIS has been the conventional wisdom in modern labour economics, it might also depend on the type of unemployment, that is, whether it is due to a quit or a layoff and if the latter is the case, whether the unemployment spell ends up in recall or in new job entry. One could easily argue that layoffs are triggered by productivity shocks while quits are triggered by reservation wage shocks[8] (Blanchard and Tirole, 2008). Similarly, while worker economic incentives embedded in the UIS are determinant in the search for a new job, firm incentives might play a significant role in the timing of recalls (Katz, 1986; Jensen and Nielsen, 1999; Roed and Nordberg, 2003). Katz (1986) suggests that the UIS financed by uniform payroll taxes may increase the impact of unemployment through temporary layoff by allowing firms to lay off workers who are less likely to be lost to other employers. More recently, Jurajda (2003) developed a dynamic model of layoff and recall decisions, showing that they might both depend on the amount of unemployment remaining to the worker. The main interest of his theoretical approach is that it explicitly links the firm's firing decisions with the probability of recall. The author assumes firms to be aware that unemployed workers with generous UI benefits will search less intensively than in an alternative scenario. In this scenario, he shows that in the presence of demand fluctuations and firm-specific human capital, the optimal strategy for the firm will be to lay off

[8] It is true that there might be incentives to harass (actions by firms to induce workers they would like to lay off to quit instead), shirk (actions by workers to induce firms they would like to quit to lay them off instead), or cooperatively misreport. For instance, a worker with a positive probability of layoff, delaying a quit will provide the worker with a chance of getting laid off and obtaining UI coverage. All these actions will depend very much in each case on the contribution rate. Blanchard and Tirole (2003) have informally explored these issues.

workers with high benefit entitlements and recall those approaching the expiry of their benefits. All these arguments, motivates a separate analysis for quits versus layoffs and recalls versus new job entry in a multi-state competing risk duration model where employment and unemployment outflows are explicitly considered.

Implicit contract models also offer a framework to understand the potential effects of the UIS on job turnover. These models describe the determinants of dismissals taking into account firm behaviour and were based on the idea that the relationship between workers and firms is defined through "*implicit contracts*" (Feldstein, 1976, 1978; Bailey, 1977; Burdett and Wright, 1989), due to the economic uncertainty faced by both parties. In these models, both workers and firms see the advantage of including temporary dismissals as part of the contract, because it enables them to hand over the cost of economic uncertainty to the UIS. Feldstein (1976) and Bailey (1977), support the idea that the greater the generosity of the UIS, the higher the unemployment rate due to temporary dismissals while Burdett and Wright (1989), using a more general model, conclude the opposite, that is, a more generous UIS may reduce the unemployment rate. The main shortcoming of these models is that they assume the worker to be strongly attached to the firm, thus inaccurately describing the search behaviour of the unemployed worker. Nevertheless, a main interest of these models is that they have been used to consider the consequence of experience rating on temporary layoffs. Generally, empirical analysis of experience rating yields support to Feldstein´s analysis (Topel, 1983; Anderson and Meyer, 1993, 2000)[9].

Recently, new theoretical work has shown that the entitlement effects of the UIS might also differ by the nature of the job and the degree of worker´s attachment to the labour market. For instance, Boone and Van Ours (2009), present a theoretical model in which to explain the spike on the unemployment hazard rate at UI benefit exhaustion, one must take into account the type of contract. They propose a model where firm and workers are matched and then decide on the wage and the starting date of the job. They show that a delay in the starting date requested from the worker and linked to his potential unemployment UI benefit duration, generates a spike in the outflow rate. They argue that since permanent jobs are more stable, the firm´s propensity to accept the delay proposed by the worker will be higher than for a temporary job. Hence, spikes at benefit expiration should be larger when the new job is a permanent contract than when it is a temporary one.

Notice that using Jurajda´s approach, one could also offer an alternative way of arguing that the timing of the recall could differ between permanent and temporary workers for the following.

[9] Anderson and Meyer (2000) is of particular interest since the authors provide a detailed analysis of the 1984 Washington state legislation switch from a payroll tax system to a experience-rated system.

Firstly, firm-specific human capital –the main argument behind the recall policy of firms in Jurajda´s model-, should be more relevant for a permanent worker. Secondly, notice that when the arrival rate of job offers for permanent workers is larger than for temporary ones[10], the influence of UI benefits on the individual reservation wage may be less negative if the offered job is permanent rather than temporary, given the likely higher utility attached to higher job stability of a permanent contract. In this framework, it can be optimal for the firm to recall the permanent worker before the exhaustion of UI benefits.

Notice that this distinction might be relevant to explain differences in the timing of the recalls. The idea is that, since firms know that an unemployed worker who previously held a permanent contract faces a larger probability of receiving a job offer associated to a permanent contract they will not wait until exhaustion of UI benefits to recall the worker.

The empirical literature describing the effects of UIS on unemployment and employment duration controlling for dynamic selection effects is rather limited due to the scarcity of large micro data sets with information on labour market histories and unemployment benefits. Typically, the analysis has focused on studying the effects of the UIS on unemployment duration and to a lesser extent on job duration. Common findings are that the hazard rate increases as unemployment benefits run out[11]. For instance, Roed and Nordberg (2003) using Norwegian data show that the recall hazard rate increases by a factor of 3.5 when UI benefits are fully exhausted, compared to a situation with at least 7 months left of these subsidies. Meyer (1990) analyses administrative unemployment insurance records from the Continuous Wage and Benefit History database and find that the unemployment exit rate is 2 times the exit rate one month before benefit expiration. Katz and Meyer (1990) using the same data but supplemented with telephone interviews find that the job finding rates in the exhaustion week are 2.2-2.3 times the usual job finding rate, both for recalls and new jobs. Boone and Van Ours (2009) obtain that the job finding rate concerning permanent jobs in a month of benefit expiration is about 3 times as high for males and 3.7 times as high for females as in the same month without benefit exhaustion. For the case of transitions to temporary contracts, they find spikes which are about 50% (males) and 75% (females) higher than regular job finding rates. For the Spanish economic, Alba-Ramirez *et al* (2007) investigate exists from unemployment of benefit recipients in Spain and obtained that recall and new job hazard rates increase around the time benefits run out.

[10] Bover and Gómez (2004) find that in Spain exit rates to temporary jobs are ten times larger than exit rates to permanent jobs, though this difference decreases with unemployment duration.
[11] See Caliendo *et al* 2009, for a recent summary of the main results in this respect.

The empirical evidence for the potential impact of UIS on employment spells is sparse and based on estimates of whether long unemployment periods financed with unemployment benefits might increase job match quality by allowing individuals to wait for better job offers[12]. Little empirical research, in contrast, has focused on the direct impact of UIS on the timing of layoff decisions and hence on employment duration. Christofides and McKenna (1996), Green and Ridell (1997), Baker and Rea (1998) and Green and Sargent, (1998) used employment hazards to study Canadian UIS incentives in job spell duration. They all find that entry requirements variations in the UIS have a significant impact on employment durations. In particular, Baker and Rea (1998) find a significant increase in the employment hazard rate (varying from 1.4 to almost 2 times depending on the model estimation) in the week the worker qualifies for UI benefits[13]. Only in Jurajda (2002) we find a joint estimation of the effects of the UIS on both unemployment inflow and outflow employing a data set of labour market histories of displaced US workers. He finds that although entitlement to UI benefits significantly increases the layoff hazard, the quit hazard is not affected by any of the UIS parameters.

These papers point that the effects of UI benefits on employment and unemployment duration are important and they might compound labour supply and demand forces. This paper extends the existing literature by analyzing the effect of the UI on labour market transitions considering quits versus layoffs as the reason for entry into unemployment and recall versus new job acceptance as the means of exit from unemployment. Moreover, it takes into account one important singularity of the Spanish labour market, i.e the strong segmentation due to the existence of temporary and permanent contracts.

4 The Data and descriptive statistics

The analysis is based on individual data from the Social Security records called the Longitudinal Working Lives Sample (for a detailed description of this sample, see Duran, 2007 and García-Perez, 2008). The LWLS, which is compiled annually, consists of a sample of over one million worker case-histories. The initial sample includes all individuals who came into contact with the Social

[12] So far, this literature has failed to provide any overwhelming evidence that the UIS actually improves job matches (Belzil 2001; Centeno 2004 ; Van Ours and Vodopivec,2008; Caliendo, *et al* 2009)

[13] One branch of the empirical literature of the UIS effects on layoff behaviour has been motivated by imperfect experience rating and has tended to use cross-sectional data. However, longitudinal data offer a better framework for the analysis of this effect since, UI benefit entitlement, which may also affect the decision to lay off workers, varies over the duration of the period of employment.

Security system at least once between 2005 and 2008[14]. This database provides highly detailed information about their past and present labour activities, including monthly wage, type of contract receipt of UI benefits, and reasons for job termination, as well as several characteristics of the hiring firms, such as size, age, ownership, location and sector of activity. Individual characteristics such as age, gender and nationality are also present in the database.

The characteristics that make the LWLS relevant for this study are several. Firstly, it is an administrative dataset which provides high accurate information on employment and unemployment transitions; The data do not only cover the period when workers were covered by unemployment benefits but also the period of transition from unemployment to employment after benefits run out. Notice that a main disadvantage of other administrative datasets used in this type of analysis is that unemployment is truncated at the point benefits run out. Thus, Card et al. (2007) point that the incidence of potential benefit duration on the unemployment exit rate is conditional on the way the researcher measures the end-of-benefit spike phenomenon. In particular, he points out that this effect is notably lower when the researcher measures the incidence of UIS on employment entrance than when she measures the incidence on unemployment outflow and the unemployment spell is censored at exhaustion of UI benefits.

Secondly, the possibility of viewing the entire labour market history of each worker enables identification of the point at which the employee qualifies for UI benefits and hence computation of her potential benefit duration when unemployed. The resulting multiple-period, event history data set is unusually rich in terms of the variation of entitlement and unemployment benefit levels. Thirdly, the database assigns each job spell with an employer identification code, thus enabling the detection of recalls versus new job entrances; fourthly, since the reasons for the separation are known, it is possible to distinguish layoffs from quits;

We track each employment/unemployment spell to the point of transition or to the end of the observation period. For employment spells, in the case of a transition to another job with no intervening spell of unemployment, for sake of simplicity, the spell is treated as censored. Each uncensored job spell is identified either as a layoff or a quit[15] using the reasons of ending the contract provided by the database. Following the competing alternatives defined for the employment spell, we sort the pool of unemployed into involuntary unemployment (due to a layoff) and voluntary unemployment (due to a quit). All unemployment spells lasting beyond the end of

[14] Currently, the social security system offers five samples for the years between 2004 and 2008. For the purposes of this paper, the four most recent databases were merged (LWLS, 2005-2008) and omitted the LWLS -2004, since the information it offers barely differs from that available for subsequent years.
[15] Transitions from employment to inactivity are omitted.

2007, which is the last observation in the calendar, are treated as right censored. Here, we are only interested in job finding rates. Hence, a terminated spell of unemployment is identified as a recall or entrance into a new firm using the firm code provided by the dataset.

We measure the duration of each contract in months based on the specified start and end dates. Likewise, we compute the duration of each spell of unemployment by measuring the time lapse between the end date of the worker's previous contract and the start date of the new one. To avoid odd behaviour in the estimated baseline hazard functions due to the sparsity of observations at longer durations, we right-censored any observed spells of unemployment longer than or equal to 18 months[16] and any observed spell of employment longer than or equal to 37 months.

We draw individual UI claim histories from the full labour market histories. We identify the exact month of employment in which the individual qualifies for UI benefits by combining the data on duration of employment and duration of previous unemployment receiving these benefits according to the rules laid out in the Spanish UIS. These state that UI benefits recommence at the end of any preceding benefit claim as long as it has been exhausted. The database includes the date of the last UI benefit claim thus enabling us to determine the number of weeks of insured employment already accumulated at the start of an employment spell. The PBD, that is, the maximum number of months the employee is entitled to UI benefits when unemployed is computed analogously. In both cases, we allow for benefits ceasing when a new job is found. It is important to highlight that the richness of the dataset reduces measurement errors to a negligible level.

The final data used in the present analysis include all observed and recorded spells of employment (not including self- employment) and unemployment of Spanish workers aged between 18 and 55 over the period 2000-2007[17]. Table 1 provides a descriptive overview of the events record, with the sample split into three groups by labour market status: employment, involuntary unemployment (due to a layoff) and voluntary unemployment (due to a quit). A key point to note is that the majority of the uncensored employment spells are layoffs: 75% for male workers and 80% for females. Between 34% (males) and 44% (females) of involuntary unemployment spells end in recall. Hence, the data reveal that the probability of layoff and the probability of recall are both important and greater for female than for male workers. It is also worth noting that mean duration of unemployment is shorter for laid off workers returning to the same firm than it is for the rest. For instance, the average duration of unemployment is 3.4 for female workers who are temporarily laid off and 5.3 for those who move to a different firm. This might be the first evidence that the

[16] Notice that transitions from unemployment to inactivity are not identified in the sample.
[17] The analysis is restricted to this period because it coincides with a period of major economic growth in Spain.

behavioural impact of UI on time spent unemployed might differ with the type of transition, because firms' hiring decisions also matter, especially in the case of recall transitions.

Finally, the percentage of job quitters eventually re-entering employment is higher than of laid off workers. Though it is not shown in the Table, is also interesting to note that around only 5% of these transitions involve a return to the previous firm. This observation is important, since it highlights the uniqueness of this part of the unemployment sample and its need for special treatment in the econometric model.

Though not shown, it is important to note that on average workers experience three employment spells and four unemployment spells within the sample frame. These individuals have lower than average durations of both unemployment and employment spells. The existence of this group of workers suggests the possibility of substantial unobserved heterogeneity correlated across spells and states affecting the selection into multiple spells. Such dynamic sample selection fact may correlated unobserved heterogeneity with the UIS variables because eligibility rules make UIS variables depend on worker´s labour market histories. This issue will be considered in the econometric analysis.

4.1 Main Descriptive Statistics: some stylized facts

Figure 1 plots the outflow from employment taking into account the competing risks described previously and as a function of elapsed duration of employment. The trend differences between layoffs versus quits are very clear; hence, the need to estimate them separately. The layoff profile shows spikes at certain contract durations[18] (3, 6, 9 and 12 months), the sharpest taking place at month 12.

To offer some hint of the UI qualifying effects on job exit rates, the following Figure 2 depicts the layoff and quit outflow rates taking into account the individual heterogeneity in the UI benefit-qualifying periods. Recall that people enter employment spells with different labour histories and have therefore accumulated different numbers of weeks of insured unemployment from past spells[19]. Layoff and quit employment outflows are depicted for two different cases: the first for workers having started the current contract with zero months' entitlement to UI benefits (i.e., having exhausted previously earned benefits); the second, for workers starting the current job spell with a positive number of months' entitlement to benefits (i.e., after a job-to-job transition). By

[18] Previous empirical evidence has already shown that these peaks mainly involve temporary contract durations (see, Rebollo 2010).

[19] For instance, a worker starting employment with 6 months of insured employment earned in a previous job spell would be entitled to unemployment benefits from the sixth month of the current job spell.

comparing these two cases it is possible to check whether the timing of the layoff is related to the date of entitlement to UI benefits. These figures show that although the date of entitlement to UI benefits might influence the timing of layoffs, the timing of quits appears to be independent of this influence. The spikes in exit through layoff at month 12 are much sharper for the first of the above groups than for the second, but no such difference is observed at months 3 and 6. Moreover, the rate of voluntary exit from employment is similar for both groups.

Turning our attention to the sample of unemployed workers, we now present the plots of outflow from unemployment as a function of elapsed duration of unemployment for the subsamples of workers who received UI benefits and for workers who did not (Figure 3), taking into account recall versus new job entry transitions. Some points are worth noting. Firstly, the outflow rate from unemployment decreases more steeply over the unemployment spell for non-receivers. Hence, as shown in the literature, workers having received UI benefits face longer periods of unemployment than other workers. Secondly, the hazard rate from unemployment varies according to whether or not the spell ends in recall, which calls for a different specification for each type of transition. Observation of benefit receivers shows that the exit rate from unemployment is steeper for new job entrances than for recalls. This difference might be linked to lower job search intensity in workers expecting to be rehired.

To show that the UIS also affects the timing of the exit from unemployment and that the effect varies with the type of transition, we compute the outflow from unemployment for UI receipts with two PBDs: four and six months (Figure 4). If the PBD does not affect the timing of exit from unemployment, then there should be no relevant differences between recalls and new job exit rates. Two main points can be drawn from Figure 4; i) that the involuntary unemployment hazard rate increases around the time of benefit exhaustion; ii) it has a different slope between recalls and new job entrances. Specifically, for recalls the unemployment hazard rate increases just prior to UI benefit exhaustion, whereas for new job entrances such increase takes place after benefit exhaustion.

This statistical analysis provides a benchmark for the more complex econometric model that follows and enables us to carry out some basic consistency checks. In general, examination of the empirical hazard rate does not reveal the causal effects of the ER on duration of employment or the impact of the PBD on duration of unemployment. Nevertheless, this previous statistical analysis reveals that the UIS may affect unemployment and employment durations and that this influence depends on the reasons of the inflow and outflow from employment.

5 The Econometric Model

To analyze the effects of the UIS on employment and unemployment duration, we estimate a multivariate mixed proportional hazard rate model (MMPH) using the timing-of-events approach formalized by Abbring and Van den Berg (2003). Our MMPH model considers five events (i) employment spells ending through layoff; (ii) employment spells ending through a quit; (iii) involuntary unemployment spells ending in recall; (iv) involuntary unemployment spells ending in entry into a different firm; (v) voluntary unemployment (or quit) spells ending in recall or entry into a different firm[20].

Assuming, for reasons of tractability and interpretation, that the hazard rates are proportional, and given the characteristics of the dataset, this paper uses discrete time duration models, in which the proportional hazard assumption implies that each hazard $h^s_k(j)$ {s=initial state; k=destination state; j=duration} takes the complementary log-log form (Jenkins, 2005). Thus, the general specification of the hazard rate to be estimated is as follows:

$$h_k^s\left(j / z_k, x_k, d_k, \upsilon_k\right) = 1 - \exp\left(-\exp\left(z\left(j\right)\rho_k^s + x\left(j\right)\beta_k^s + d\left(j\right)\delta_k^s + \upsilon_k^s\right)\lambda_k^s\left(j\right)\right) \qquad (2)$$

We define five sets of explanatory variables. The first contains the individual economic incentives embedded in the UIS $\{z(j)\}$, that is, PBD for individuals who are involuntarily unemployed and ER for those in jobs. In both cases, we measure the effect of these parameters distinguishing by the type of contract. We also include the wage -in the previous job for the case of unemployment spells-, as a proxy of the UI benefit level. Notice that these economic incentives are omitted in the estimation of the quit hazard rates[21]. The second is a set of observed individual and job control variables $\{x(j)\}$ such as age, nationality, total labour market experience, part-time job, hired by a temporary help agency, type of contract, sector of activity, firm size, job qualification, firm ownership structure, etc. The third set contains observed aggregate variables $\{d(j)\}$, to control for aggregate and regional demand side effects, such as the quarterly regional unemployment rate, the quarterly growth rate of production and quarterly dummies. In the fourth, the term $\{\lambda(j)\}$ stands for the integrated baseline hazard. The fifth covers unobserved individual characteristics $\{\upsilon^s_{k,}\}$, assumed to be specific to the origin and destination states. Notice that the consideration of the unobserved heterogeneity term is especially relevant in this framework. Firstly, we have multiple spells which raises the possibility of selection biases: the workers who have multiple employment spells may be a non-random sample.

[20] Due to small sample issues, for voluntary unemployment spells we make no distinction between recall and entry into a different firm. In fact, less than 6% of voluntary unemployment spells end in recall.
[21] Given the rules that govern the UIS in Spain, job quitters can not received UI benefits.

Secondly, in the present study, the level and availability of UI benefits depends on workers´s employment histories. To the extent that employment histories are driven by unobservables, this may introduce dependence between UI benefits and unobservable heterogeneity biasing the estimation of the UIS effects.

Apart from the assumption of proportionality, the specification of each hazard rate is highly flexible. There are no parametric restrictions on the effects of spell length, since duration dependence is defined as a monthly step function. The UIS parameters are also modelled as dummy variables and many of the remaining individual and job variables are dummy-coded to overcome arbitrary functional form restrictions.

Several characteristics of the database and model specification have shown to be relevant to identify separately the transition pattern arising from unobserved heterogeneity, the form of true duration dependence and the causal effects of the UIS on spell duration. Mainly, they are random variation in the observed moment of spell transition[22] (Abbring and Van den Berg, 2003), multiple spells[23] (Gaure *et al.*, 2007), lagged variation in the exit rates[24] (Van den Berg and Van Ours, 1994,1996), and variation in lagged explanatory variables[25](Brinch, 2000). Hence the mixed proportional hazards assumption is not crucial in the present analysis.

Notice that the identification of the effects of the UIS parameters on spell duration does not rest exclusively on cross-sectional variation but also on longitudinal variation. An important source of identification of the effect of the ER parameter on employment transitions is its dependence on total employment rather than time in current job. That is, people enter employment spells with different labour histories, and thus have accumulated different numbers of weeks of insured unemployment from past employment spells. Similarly, we identify the UI benefit exhaustion parameter from the fact that the PBD varies among workers with different accumulated amounts of job tenure. Hence, I can compare the probability of exit from unemployment for two workers who have both received benefits but have different PBD.

[22] For instance, the existence of time variation at the onset of each spell ensures that people with exactly the same spell lengths have been exposed to different macroeconomic conditions earlier in the spell and hence to different selection forces.
[23] Comparison of the total number of spells with the number of individuals reveals that multiple spells have a non-trivial impact within the sample.
[24] The basic idea is that the conditional expectation on unobserved heterogeneity (conditional on observed individual and job characteristics, spell duration and aggregate variables) depends on the exit rate affecting the earlier part of the spell, while true duration dependence does not The higher the past exit rates, the higher the selection in any given spell duration and the lower the expected value of the unobserved covariate.
[25] Brinch (2000) proves that variation in covariates over time combined with covariates across individuals is sufficient for non-parametric identification of structural duration dependence and unobserved heterogeneity without the assumption of proportional hazards.

To estimate this discrete-time duration model, we construct a panel data set such that the spell length of any given individual determines a vector of binary responses (see Jenkins 2005). Let y_{ik} be a binary indicator variable denoting transitions to potential destination states upon exit, i.e. y_{ik}=1 if individual i transits to state k and zero otherwise, and let Y_i be the complete set of outcome indicators available for individual i (multiple-spells). The contribution to the likelihood function formed by the event pattern of a particular individual, conditional on the vector of unobserved variables $v_i=(v_1,v_2, v_3, v_4, v_5)$ can then be formulated as:

$$L_i(\upsilon_i) = \prod_{y_{isk} \in Y_i} \left[\prod_{s=1}^{S} \prod_{j=1}^{J} \prod_{k_s=1}^{K_s} \left(h_{jk_s}^{s}\right)^{\delta_{jk_s}^{s}} \left(1-h_{jk_s}^{s}\right)^{1-\delta_{jk_s}^{s}} \right] \tag{3}$$

Where $\delta_{jk_s}^{s}$ takes value one if the individual transits from state s to state k during the period j and zero otherwise. We introduce unobserved heterogeneity non-parametrically by means of the non-parametric maximum likelihood estimator (NMPLE). In practice, this implies that the vectors of the unobserved attributes specific to each type of transition are jointly discretely distributed, the number of mass-points being determined by adding location vectors until it is no longer possible to increase the likelihood function (Heckman and Singer, 1984; Gaure *et al*, 2007). Assuming that the unobserved covariates are jointly discretely distributed with Q number of support points, the data likelihood function can be written as:

$$L = \prod_{i=1}^{N} \left[\sum_{l=1}^{L} q_l L(\upsilon_l) \right], con \sum_{l=1}^{L} q_l = 1 \tag{4}$$

where $\{v_l,q_l\}$, l=1….L, are the location vectors and probabilities characterising the heterogeneity distribution. Notice that, unobserved heterogeneity is a source of interdependency between the hazard rates because the unobserved variables specific to each transition state might be correlated. These mass points (or combinations of mass points) and their associated probabilities are estimated together with the other parameters of the model. Since each hazard rate contains a constant term, for identification purposes, the unobserved heterogeneity is modelled by normalizing the first 5-tuple of location parameters to zero so that the estimated coefficient for the remaining unobserved types of individuals denotes the deviation from the constant term. For the estimation procedure, the probabilities q_l are specified as logistic[26] probabilities[27].

[26] This means that probabilities can be reduced but never set exactly to zero.
[27] Standard errors for all the probabilities are obtained using the delta method.

6 Estimation and Results

The estimated model contains a large number of parameters, most of which are included solely for control purposes and are unimportant for the topics discussed in this paper. Table 2 summarizes the descriptive statistics of the variables considered in the estimation. Hence, although the full results are reported in Table 3, they are not discussed in the text. The focus in this section is on key results regarding the impact of the UIS on employment and unemployment duration[28]. The results are presented in terms of individual parameter estimates (relative hazard rates) and some post-estimation exercises. Unless otherwise specified, all the estimated exit probabilities were evaluated at the mean of the regressors.

Overall, the estimation of a MMPH model for employment and unemployment transitions that explicitly considers layoff versus quit transitions and recall versus new job entry, respectively, shows its relevance in the significant differences between the effects of the explanatory variables on each hazard rate. For the same reasons, the separate estimation of voluntary and involuntary unemployment spells also proves relevant.

The likelihood function for the MMPH model obtained their maxima at three mass-points in the distribution of unobserved heterogeneity. These support points were robustly identified on the basis of a large number of estimators with different starting values. The results are highly robust as long as the number of support points lies between 2 and 3[29]. This may imply that the information content in the data relating to the distribution of the unobserved heterogeneity term is sufficient to ensure robust identification of the structural duration dependence in the hazard rates as well as the effects of the UIS on spell duration. In the final specification, unobserved heterogeneity is responsible for a substantial degree of variation in all the estimated hazard rates. The relation between the unobserved characteristics affecting each type of unemployment spell with the employment hazard depends on the type of the worker. Nevertheless, the general results show that dynamic selection effects point that workers who tend to have long employment spells will also tend to have short unemployment experiences. At the end of the section we briefly discuss the importance of considering this dynamic selection effect in order to correctly measure the effect of the variables we are interested in.

[28] Although we make little comment about the voluntary unemployment hazard rate, it is included in the estimation to avoid dynamic sample selection biases.

[29] We also have tried to estimate de model with four points of support but convergence was not achieved in any of the estimations. This lack of convergence was due to the fact that some parameters of the unobserved heterogeneity distribution became too large (i.e, the unobserved heterogeneity term for the exit rate from employment due to layoff). We estimated the model again fixing the constants and though convergence was achieved, the parameters of interest remained practically invariant. Hence we have opted to show the results for the three mass points estimation.

Duration dependence is modelled with a step function. For every hazard rate, we include separate dummy variables for each month from the first to the twelfth. For the rest, we build aggregate intervals[30]. These intervals are 13-15, 15-18, 19-23, 24, 25-30, 31-35, 36, > 37 for the employment hazard rate and 13-15, 15-18 and > 19 for the involuntary unemployment hazard rate. The only interval for the voluntary unemployment hazard rate is >13. This flexible specification of the duration dependence term enables us to track duration dependence stemming from selection effects or unobserved individual effects. More importantly, this flexible specification should avoid any influence of the duration dependence behaviour on estimation of UIS parameters.

Before presenting the results for the impact of the UIS on employment and unemployment duration, it is worth highlighting some results regarding the different patterns of duration dependence observed in the estimated hazard rates. Firstly, estimated hazard rates indicate that the pattern of duration dependence differs strongly across the different types of transitions considered in the analysis. The estimated layoff hazard rate displays positive duration dependence during the first year of the contract and subsequently turns negative. It also shows spikes at specific durations, the largest at months 6 and 12. The estimated quit hazard rate is low and remains fairly constant throughout the spell. The estimated recall hazard rate exhibits negative duration dependence, as documented by previous researchers. In contrast to previous research, we find that the new job hazard rate also displays negative duration dependence, albeit of a lesser magnitude.

6.1 The Incidence of the UIS on Employment duration

The empirical analysis presented in this section is based on the idea that the UIS might affect the timing of involuntary exit from employment. Using on-the-job search models (Juradja, 2003) one can argue that, in the presence of demand fluctuations and firm-specific human capital, it will be optimal for the firm to layoff those workers who are entitled to UI benefits and recall them as the benefits approach exhaustion. One could also argue that people with loose attachment to the labour market will be the most affected by the entry requirements of the UIS (Baker and Rea, 1998). This last idea supports the need to estimate the incidence of the UIS taking into account the type of the contract held by the worker. Our basic distinction is between temporary and permanent contracts.

We capture the effects of qualification for these benefits with a set of time-varying explanatory variables for different levels of entitlement. The first dummy variable, *entitlement,* takes value one at the month the qualifying period is fulfilled and zero otherwise. This last variable picks up any

[30] Initially, we specified one dummy variable for each month. However, due to scarcity of observations for long-term employment and unemployment durations, we recorded them at certain specific duration intervals.

peak in the employment hazard rate in the first month of UI benefit entitlement. We then allow for the effects of the length of the available entitlement, conditional on the worker being eligible, by adding a step function to the length of entitlement, grouped as follows: *between 1-4 months*, *between 5-8 months*, and *between 9-12 months*, after the qualifying period is fulfilled. This last set of dummy variables is relevant because potential benefit duration when unemployed increases as the worker accumulates months of employment. Notice that our focus is on the effect of UIS on job separations, and not on the issue of seniority. The point at which the worker fulfils the entry requirement is based on the length of total employment spells in the base period and does not depend on the duration of a specific worker-firm employment relationship.

As can be seen from Table 3 (Part 1), the set of variables that describes the entitlement effect tend to be statistically significant for both contract types. One useful way of illustrating the impact of the entry requirement on layoff and quit hazard rates is to plot them against the benefit qualifying period. This information is depicted in Figure 5. The figures show that, the impact of the UIS on employment duration varies with the degree of attachment to the labour market as it is stronger for females and workers holding temporary contracts than for male workers holding permanent contracts (see also Table 4). With the exception of male workers on permanent contracts, the layoff rate displays a spike at the point where the worker qualifies for benefits, whereas the quit hazard rate hardly varies with this parameter at any point. The sharpest spikes are found for female workers with temporary contracts for whom the layoff hazard increases by 0.65 percentage points when qualifying for benefits –compared to the layoff hazard rate one month before benefit expiration- and fall by 2.29 percentage points afterwards –compared to the layoff hazard rate at the month of benefit expiration- (see Table 4).

To correctly assess the importance of the effects of the entry requirement on the layoff and quit hazard rates, it is necessary to point out the important difference in the magnitude of the hazard rates between the two types of transitions and two types of employments. Figure 6 combines the estimated effects of the UIS and spell duration, in order to illustrate how the monthly transition probability pattern varies depending on the timing of the worker's qualification for UI benefits. We depict the layoff hazard rates associated with eligibility taking place at two different months of the current contract: 6^{th} (i.e the worker has already accumulated six months of employment previous to the current spell) and 12^{th}. For instance, at the 6^{th} month the female permanent worker, who qualifies for UI benefits faces a layoff hazard rate of 1.69% at the moment of qualifying for UI benefits and then this drop to 0.31% one month afterwards. On the contrary, at the 6^{th} month, if the worker does not qualify for UI benefits the sequence of layoff hazard rates are 0.62% (at the 6^{th}

month) and 0.24% (one month after). The estimated layoff hazard rate for a female temporary worker increases from 12.29% to 13.48% due to the above mentioned qualifying effect.

The results presented so far reveal a significant effect of UI benefits on layoffs that is not found for quits, suggesting that employers could be involved in the timing of layoffs. Recall that firms face no experience rating of any kind. In these circumstances, firms and workers may jointly time layoffs to "play" the UIS as some theoretical models have already pointed out (Juradja, 2002) Alternatively, one could argue that from the firm's perspective it may become less costly to fire a worker entitled to UI benefits since such a worker may have less incentive to contest dismissal than one who faces having no income while unemployed. The worker can, for instance, agree to refrain from going to court to fight the dismissal in exchange of not being laid off before the entitlement period. One could also argue that firms may class worker departures as "layoffs" to avoid the label of uncooperative employer or to reduce other job separation costs. In all cases, the estimated effect of the qualifying period on the timing of the layoff appears to reflect moral hazard problems on both sides of the market.

The incidence of the UIS on employment duration seems to be stronger for the case of temporary workers than for the case of permanent ones. From the perspective of the firm, different ideas can support this result. Firstly, the lower dismissal costs associated to temporary contracts may explain this large difference. Also, the differences in individual productivity associated, for instance, to different levels of specific human capital can also explain the observed difference.

6.2 The Incidence of PBD on Unemployment Duration

The specification of the involuntary unemployment hazard[31] rate includes a step function to control for the number of months of UI benefit remaining grouped as follows: *more than 4 months, 2 to 3 months, 1 month, 0 months (named the exhaustion effect).* We use the first set of time dummies to control for the effect of receiving UI benefits and allow this effect to be heterogeneous depending on the months remaining before exhaustion. One could argue that the worker´s search effort will increase the closer is the month of benefit exhaustion. From the firm´s perspective, assuming as given this behaviour of the worker, the probability of re-hiring will also increase as the month of exhaustion of benefits gets closer being this effect stronger for workers with strong attachment to the labour market. We use another step function to control for the months following benefit

[31] In this section we will focus on the results for the involuntary unemployment hazard rate. The inclusion of the voluntary hazard rate in this estimation is justified to control for selection effects but none of the benefit variables are included in this hazard.

exhaustion grouped as: *1 month, 2 to 3 months, more than 4 months*[32]. We use this second set of time dummies to measure the effect of having received the UI benefits. In this way we can capture the behaviour of UI benefit receivers over the entire unemployment spell. As in the estimation of the employment hazard rate, all these variables are interacted with the type of contract though in this case it refers to the contract held in the previous job. In general terms, all these variables are statistically significant (see Table 3 Part II), which suggests that unemployment benefits affect the timing of the outflow from unemployment. They show that, on average, current receipt of benefits causes a reduction of more than 60% in the transition rate out of unemployment.

The common finding that the hazard rate rises as benefit exhaustion approaches (Meyer, 1990; Meyer and Anderson, 1990; Roed and Zhang, 2003) is also obtained in this estimation. The results show that the exhaustion effect is important irrespective of gender, type of contract or type of transition. This result immediately suggests that the net effect of the UIS on unemployment and employment duration depends crucially on the length of the treatment period, that is, the PBD.

Notice, however, that the estimated model allows us to move further as it shows that the impact of the UIS on the probability of exit from unemployment differs according to whether or not the worker returns to the previous firm as well as depending on the type of contract. To illustrate the different patters obtained, Figure 7 display the recall and new job hazard rates in relation to the time remaining before the exhaustion of benefits and the time following their exhaustion. To complement the above-mentioned figures, we display in Table 5 the variation in percentage points of the estimated hazard rate of exit around the time of exhaustion relative to the previous month. Basically, our results call into evidence that the behavioural impacts of UI benefits are not the same for recall and new job entry and that they depend on the degree of attachment to the labour market.

As for the employment spells, the incidence of the UIS seem to be stronger for worker with loose attachment to the labour market. That is, these effects are larger for female and temporary workers than for male workers holding a permanent contract.

One interesting difference worth to notice arises looking at the timing of the effect of the UIS on the unemployment exit probability by type of contract and type of transition. The recall hazard rate for workers who previously held a permanent contract, displays the largest spike just one month prior to benefit exhaustion. For instance, the recall hazard rate increases by 2.74 and 2.21 percentage points for females and males permanent workers respectively just one month before exhaustion –

[32] We compute these sets of dummies by first calculating the PBD for each individual and then, for each unemployment spell duration, the number of months remaining before UI benefit exhaustion and the number of months following benefit exhaustion.

compared to the hazard rate two months prior to expiration-, while at the month the benefits run out the recall hazard rates hardly varies –compared to the hazard rate one month prior to expiration-. Notice the importance of this effect since the recall hazard rate increases by more than two times (from 1.02% one month before benefit expiration to 3.23% at benefit expiration) in the case of males and more than five times in the case of females (from 0.54% one month before benefit to 3.28% at benefit expiration). The new job hazard rate for permanent workers also starts increasing one month prior UI benefit exhaustion but it reaches its maximum when benefits are exhausted. For instance, one month prior to exhaustion the new job hazard rate increases by 5.6 and 4.4 percentage points –compared to the hazard rate two months prior to expiration-, for females and males permanent workers, respectively, meanwhile, at the time of the UI benefits exhaustion, this variation increases to be 6.2 and 8.8 percentage points for the same workers groups.

Nevertheless, as stated above, the largest spikes are obtained for temporary workers and they take place at the time UI benefits run out. For these workers, the recall hazard rate increases by 6.65 (from 5.4% to 12.0%) and 3.91percentage points (from 4.8% to 8.7%) for males and females workers respectively while the new job hazard rate increases by 10.96 (from 12.5% to 23.5%) and 8.48 percentage points (from 9.7% to 18.2%) for the same workers group. Notice that since the hazard rates for temporary workers are the largest ones, these last effects are also the most relevant from the economic point of view.

To better illustrate the different behaviour of the monthly transition probability pattern between recall and new job entry, Figure 8 combines the estimated effects of benefit exhaustion and unemployment spell duration. We display each hazard rate in relation to unemployment duration for a worker with a PBD of six months. These figures confirm the ideas put forward previously. The spike in the recall hazard rate is concentrated at exhaustion of benefits for temporary workers, and just before that for those on permanent contracts. For the new job hazard rate, the spike is concentrated at exhaustion of benefits.

In conclusion, we present evidence that the economic incentives explaining unemployment duration may differ according to whether the shift to unemployment is due to a layoff or a quit and whether the nature of the layoff is temporary (ending in recall) or permanent (ending in new job entry). From our results one could argue that cutting the entitlement period reduce unemployment duration and consequently induce more employment. Nevertheless, we have also shown that these effects can not be solely attributed to worker's behaviour. In particular, recall unemployment spells should not be explained only by job search behaviour but also by firm incentives (i.e., implicit contracts between workers and firms), especially for permanent workers.

6.3 Some Sensitivity Analysis

After commenting the main results it is worth noting that we have carried out a sensitiveness analysis using different distributional assumptions for the unobserved heterogeneity terms. We have proceed as follows. First, we estimate both employment and unemployment competing risks models separately and without controlling for unobserved heterogeneity. Secondly, we estimate separately each of these models but adding a 2-tuple distribution for the unobserved heterogeneity for employment and unemployment competing risk models and allowing the unobserved factors in the employment equation -layoff and quit hazards- to be correlated as well as those in the unemployment equation -recall and new job entry hazards. Thirdly, we control for potential selection bias into multiple spells and states by estimating the employment and unemployment hazards jointly, as described in the econometric section, allowing for a full correlation structure of the unobservables. Introducing unobserved heterogeneity as well as estimating jointly employment and unemployment transitions was strongly supported by the estimated sample likelihood. Besides parameters estimates, basically the pattern of duration dependence and UI benefits parameters, were also notably affected. This indicates that dynamic selection effects are relevant in measuring true duration dependence and, more importantly for the aim of this paper, in estimating the effects of the UIS on job turnover. In Tables 6 and 7 we compare the estimated incidence of the UIS on the corresponding hazard rates for the three model specifications considered. The largest differences are found for the recall and new jobs hazard rates. Basically, we obtain that without controlling for unobserved heterogeneity and dependence between labour states, the researcher does not control properly for dynamic selection effects biasing the estimated effects of PBD on the exit probability from unemployment (see Table 7).

7 Conclusions

The current design of the UIS might provide incentives for workers and employers to increase labour market turnover. Firstly, if one assumes firms to know that unemployed workers with generous unemployment benefits will make a less intensive job search, in the presence of demand fluctuations and firm-specific human capital, it will be optimal for the firm to layoff those workers with high levels of unemployment entitlements and recall workers as they approach expiry of their benefits. An UIS without any form of experience rating might foster this type of incentives. Secondly, unemployment benefit receivers' exhibit higher reservation wages and lower search effort than non-receivers, resulting in a lower exit rate from unemployment and longer unemployment spells. Close to the time of benefit exhaustion, the unemployment exit rate increases

as the value of being unemployed decreases, such that the marginal benefit of the job search increases and the reservation wage declines, leading to a higher exit rate.

The study reported in this paper reveals that at the point where the employee qualifies for unemployment benefits there is a spike in the layoff hazard rate, but none in the quit hazard rate. Hence, the UIS appears to have a negative effect on employment duration while increasing unemployment incidence. We also find a strong impact of the UIS on unemployment duration. The recall and new job hazard rates increase notably around the time of benefit exhaustion. Interestingly, the incidence of the UIS on employment and unemployment transitions is the largest for women and temporary workers, that is, for workers with loose attachment to the labour market and who suffer the largest turnover rates in Spain. Another interesting difference that emerged in the analysis is that the spike in the recall hazard rate for permanent workers takes place just one month before the exhaustion of unemployment benefits.

Hence, the results found show that workers and firms seem to have some influence on the timing of the outflow from both employment and unemployment and use it to their advantage whenever the current characteristics of the UIS allow. However, these incentives might generate excessive labour market turnover, with shorter employment spells and longer unemployment spells. Notice that the importance of these results rests on the fact that the UIS seems to reduce the time spent in employment throughout an individual's working life both directly increasing the probability of exit from employment and indirectly increasing unemployment duration. These findings need to be considered in the Spanish economy, in which over 80% of newly-signed contracts are temporary and more than 30% of unemployed workers return to their previous firm.

Given these results, a potential reform of the UIS addressed to reduce the average unemployment duration and the unemployment rate should consider both sides of the labour market. In one side, the current design of the UIS distorts firm's hiring and firing decisions. On the other side, it also has behavioural consequences on the worker's decisions.

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Tables and Figures

Table 1: Overview of recorded events/outcomes

	Females	Males
Sample of Employment Spells		
Completed Spells	76.2% (13.5)*	75.5% (15.6)
Percentage ending in:		
Layoffs	80.4% (13.3)	75.4% (15.7)
Quits	19.6% (14.5)	24.6% (15.1)
Sample of Involuntary Unemployment Spells		
Completed Involuntary Unemployment Spells	90.0% (7.4)	86.8% (6.3)
Percentage ending in:		
Recall	45.2% (3.7)	34.8% (3.4)
Different firm	52.8% (7.4)	65.2% (5.3)
Sample of Voluntary Unemployment Spells		
Completed Voluntary Unemployment Spells [33]	94.8% (4.5)	90.4% (3.5)

* (Mean duration in months)

[33] No more than 5% of these observations end up back in the same firm.

Figure 1: Employment Hazard Rate with two competing risks: layoff versus quit

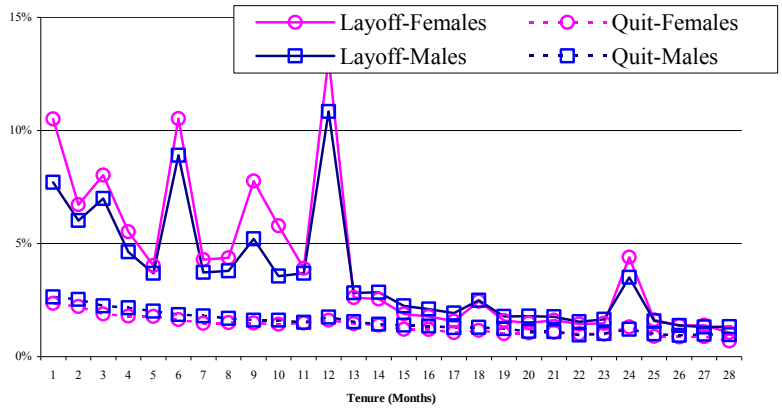
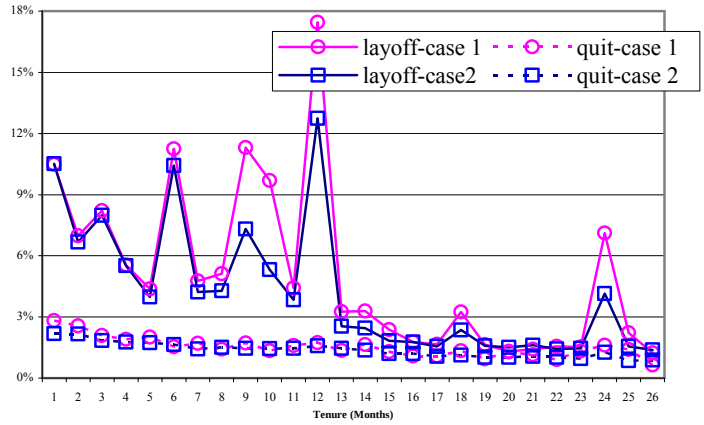
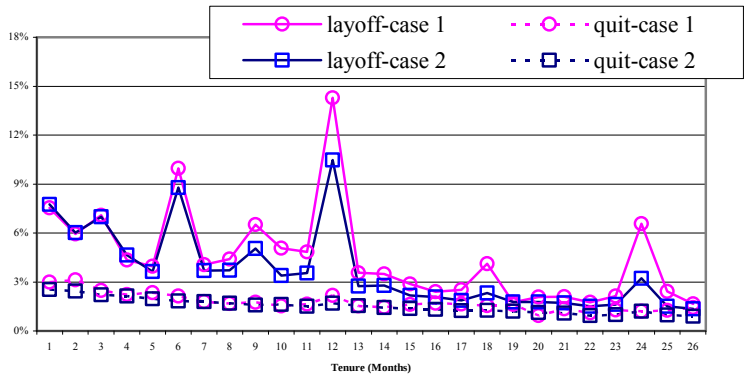


Figure 2: Testing for the empirical relation between the qualifying period and the employment hazard rate

Females



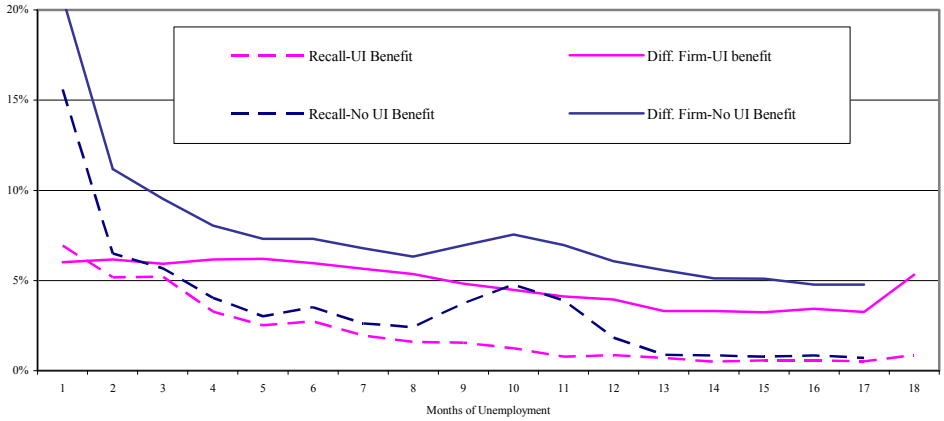
Males



* Case 1= The qualifying period at the beginning of the current employment spell was zero; Case 2= The qualifying period at the beginning of the current employment spell was positive

Figure 3: Unemployment Hazard Rate for UI Benefit receivers and non receivers: recall versus new job entry.

Females



Males

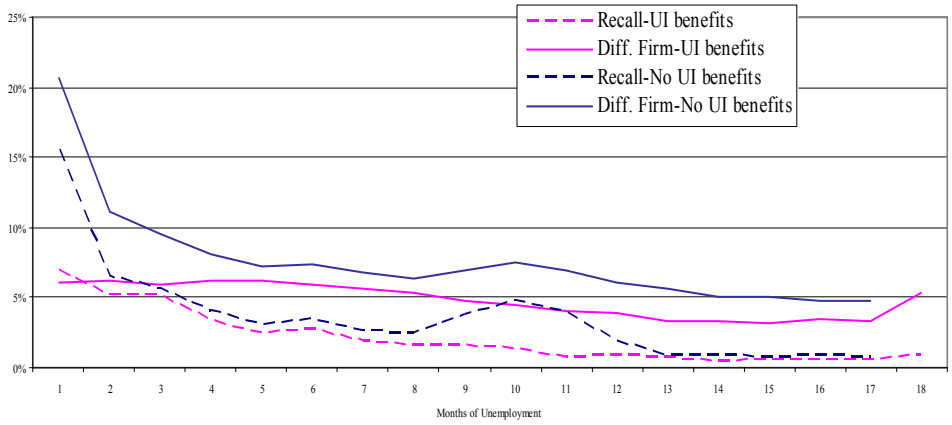


Figure 4: Unemployment Hazard Rate for UI benefits receivers with two competing risks: recall versus new job entry Case 1: worker´s PBD=4 months; Case 2: worker´s PBD=6 months.

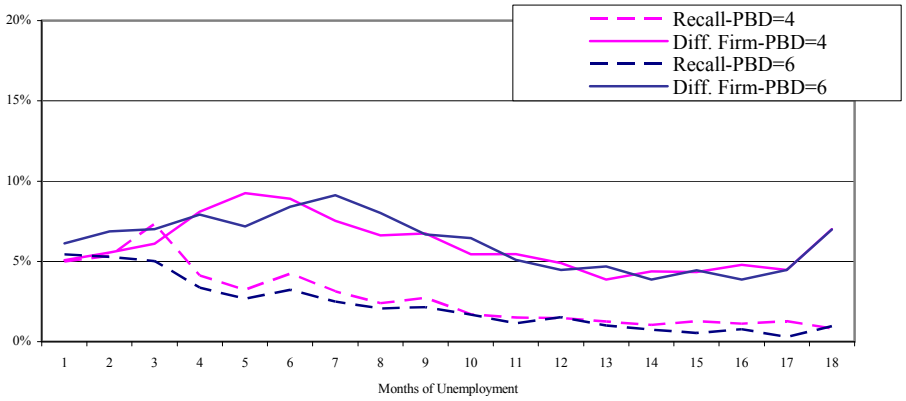


Table 2: Main Sample Statistics

		Men			Women		
		Employment	Unemp. (layoff)	Unemp. (quit)	Employment	Unemp. (layoff)	Unemp. (quit)
Individual Characteristics	Age	32.2	31.2	27.8	31.1	31.0	27.4
	Experience (years)	12.8	8.3	4.3	10.9	7.4	4.4
	Inmigrant	9.3%	10.7%	21.1%	4.2%	4.4%	9.9%
	Receive Assistant Benefits		6.8%	0.6%		9.4%	0.5%
Job Characteristics							
	Part-time	7.8%	16.1%	27.8%	24.9%	32.4%	48.7%
Job Qualification	High	37.9%	20.9%	18.5%	43.3%	25.0%	21.9%
	Medium	33.7%	32.9%	32.3%	32.1%	35.6%	35.6%
	Low	28.4%	46.2%	49.2%	24.6%	39.3%	42.5%
Sector of Activity	Construction	19.2%	23.6%	22.1%	2.8%	2.4%	2.3%
	Industry	21.9%	16.7%	11.2%	11.3%	11.8%	7.1%
	Service	59.0%	59.7%	66.7%	85.9%	85.8%	90.7%
Firm Size	> 50 Employees	33.8%	11.0%	22.8%	37.1%	31.0%	27.0%
	50-20 Employees	12.9%	16.4%	11.4%	10.9%	10.3%	9.5%
	20-5 Employees	17.6%	46.0%	16.9%	15.4%	15.0%	14.6%
	<5 Employees	35.7%	11.0%	48.9%	36.7%	43.7%	48.9%
Public Firm		6.4%	-10.2	1.6%	13.1%	14.2%	2.9%
Permanent Contract		62.3%	15.6%	27.1%	59.7%	16.2%	-0.921
Permanent Contract (discontinuous)		0.5%	1.8%	0.5%	1.9%	4.0%	1.4%
Temporary Help Agency		9.1%	7.6%	5.9%	16.1%	18.0%	5.4%
Aggregate Variables							
Regional Unemp. Rate (quarterly)		11.4%	10.8%	10.0%	10.9%	10.6%	9.9%
GDP growth rate (quarterly)		1.8%	1.8%	1.8%	1.8%	1.8%	1.8%

Table 3: Results of the MMPH Model: Part 1: Employment Hazard Rate

		Men				Women			
		Layoff		Quit		Layoff		Quit	
		Coef.	t-s	Coef.	t-s	Coef.	t-s	Coef.	t-s
Individual Characteristics	Age (years/10)	0.462	26.3	0.372	11.6	0.310	19.3	0.076	0.1
	Experience (years/10)	-0.734	-40.6	-1.493	-32.2	-0.621	-26.4	-1.336	-25.0
	Inmigrant	-0.713	-14.4	-0.218	-1.2	-0.459	-13.3	0.031	2.5
Job Characteristics									
	Part-time	0.339	9.2	0.566	15.7	0.151	10.8	0.473	15.7
Job Qualification	High	-0.175	-9.2	-0.158	-4.3	-0.150	-8.7	-0.280	-8.1
	Medium	-0.681	-25.9	-0.703	-15.7	-0.489	-23.2	-0.715	-17.4
Sector of Activity	Construction	-0.244	-6.5	-0.220	-6.3	-0.309	-6.7	-0.363	-4.1
	Industry	-0.165	0.7	-0.487	-12.2	0.032	0.4	-0.462	-8.9
Firm Size	50-20 Employees	-0.013	1.9	0.048	1.4	0.061	2.4	0.035	0.7
	20-5 Employees	0.067	4.4	0.167	4.0	0.126	5.6	0.099	2.5
	<5 Employees	0.206	8.1	0.295	8.6	0.150	8.2	0.184	5.7
Public Firm		-0.315	-10.2	-1.326	-10.4	-0.354	-7.4	-1.029	-8.3
Permanent Contract		-2.950	-65.8	-1.304	-20.1	-3.082	-76.0	-1.054	-14.9
Permanent Contract (discontinuous)		0.003	1.0	-0.897	-5.4	-0.214	-5.5	-0.443	-4.6
Temporary Help Agency		0.235	4.9	-0.083	-4.1	0.148	8.9	-0.348	-4.9
Aggregate Variables									
Regional Unemp. Rate (quarterly)		-0.298	-13.5	-0.678	-19.4	-0.281	-13.5	-0.724	-17.8
GDP growth rate (quarterly)		-0.724	-3.1	-0.394	-0.9	-0.483	-3.1	-0.213	-0.1
Quarter 1		-0.181	-9.2	-0.069	-1.7	-0.150	-9.6	0.069	6.3
Quarter 2		-0.128	-6.0	-0.076	-1.8	0.205	24.2	0.159	5.2
Quarter 3		-0.028	-0.7	0.054	2.2	0.103	14.2	0.257	2.2
Baseline hazard (months)									
	2	0.753	25.8	0.743	14.0	0.718	21.7	0.749	14.6
	3	0.976	38.5	0.636	9.4	1.053	31.3	0.693	12.4
	4	0.516	16.0	0.527	6.5	0.490	8.8	0.521	8.4
	5	0.329	9.7	0.432	4.0	0.300	2.1	0.400	5.9
	6	1.356	48.8	0.529	3.4	1.417	38.0	0.444	6.2
	7	0.509	13.8	0.476	3.0	0.479	5.5	0.429	5.7
	8	0.592	20.4	0.526	3.3	0.722	11.3	0.556	7.5
	9	1.023	48.8	0.565	3.2	1.560	33.0	0.644	8.3
	10	0.641	31.5	0.553	3.0	1.153	18.0	0.664	8.1
	11	0.858	19.5	0.614	3.7	0.798	8.9	0.585	6.7
	12	1.722	59.4	0.606	2.3	2.054	46.7	0.632	6.5
	13-14	0.742	17.1	0.513	2.2	0.719	6.3	0.651	7.7
	15-18	0.573	15.4	0.506	2.3	0.549	3.3	0.644	8.7
	19-23	0.571	14.0	0.333	-0.6	0.508	2.1	0.490	6.2
	24	1.006	22.3	0.435	0.3	1.380	13.9	0.584	3.8
	25-30	0.380	14.1	0.415	0.6	0.571	2.9	0.450	5.0
	31-35	0.845	14.9	0.348	-0.3	0.709	5.1	0.345	3.1
	36	0.315	7.9	0.102	-1.2	0.791	3.0	0.805	4.1
	>37	0.532	7.9	0.469	0.7	0.611	1.8	0.610	3.7
UIS covariates									
Entitlement Effect (months)									
Entitlement Effect*Permanent Contract	0	0.177	1.3	0.149	0.9	1.021	14.0	0.031	0.2
	1-4	0.319	4.6	0.305	3.1	0.259	3.3	-0.033	-0.5
	5-8	0.480	6.9	0.466	5.9	0.408	5.1	0.058	0.4
	9-12	0.344	5.3	0.481	4.3	0.353	4.1	0.017	0.0
	13-16	0.336	5.9	0.499	5.2	0.391	4.8	0.032	0.1
	>16	0.335	7.0	0.449	6.3	0.374	7.4	0.004	-0.3
Entitlement Effect*Temporary	0	0.068	5.9	-0.070	-0.7	0.102	2.3	-0.160	-1.6
	1-4	-0.228	-7.4	-0.073	-1.3	-0.305	-10.7	-0.248	-4.0

Contract	5-8	-0.222	-7.0	-0.167	-2.6	-0.314	-9.8	-0.316	-4.3
	9-12	-0.254	-8.4	-0.265	-3.1	-0.371	-10.7	-0.452	-5.3
	13-16	-0.323	-10.5	-0.277	-3.2	-0.440	-12.3	-0.363	-4.4
	>16	-0.441	-24.7	-0.054	-1.0	-0.574	-23.6	-0.458	-8.4
Potencial UI benefits	Low	0.194	8.6	0.004	3.1	0.239	10.9	0.011	0.2
	Medium	0.104	5.9	-0.143	-5.0	0.177	8.6	0.014	0.3
	High	-0.041	-1.6	-0.307	-2.0	-0.055	-0.5	-0.101	-1.9
Unobserved Heterogeneity[34]									
	Constant (Type I)	-3.730	-58.6	-3.897	-15.3	-2.592	-92.5	-2.405	-51.5
	Type II	-0.315	-6.1	-0.605	-7.1	-1.122	-24.2	-1.239	-18.9
	Type III	1.023	19.2	0.991	12.9	-1.309	-31.2	-1.510	-20.7

Note 1: For female workers Pr(Type I)=37.2%; Pr(Type II)=31.8%; Pr(Type III)=21.6%; For male workers Pr(Type I)=27.1%; Pr(Type II)=47.4%; Pr(Type III)=25.4%

Note 2: The reference person for the unemployed: Full time native worker with a temporary contract of one month, low wage and low job qualification with a previous unemployment duration lengthier than 18 months, hired in a big private firm at the service sector; The reference person for the Unemployed: Full time native worker with un unemployment spell of one month and whose previous job characteristics were a temporary contract with low wage and low job qualification and hired in a big private firm at the service sector.

[34]Notice that given the approach used to estimate the unobserved heterogeneity terms, the constant parameter of the employment hazard rate for workes type II and type III will be the sum of the estimated constant term corresponding to type I worker´s plus the estimated constant term for workers type II and type III, respectively.

Table 3: Results of the MMPH Model: Part 2: Involuntary Unemployment Hazard Rate

		Men				Women			
		Recall		Diff. Firm		Recall		Diff. Firm	
		Coef.	t-s	Coef.	t-s	Coef.	t-s	Coef.	t-s
Individual Characteristics	Age (years/10)	-0.093	-3.5	-0.239	-8.6	0.072	9.0	-0.318	-15.2
	Experience (years/10)	0.386	4.6	0.289	5.3	0.225	2.5	0.174	1.6
	Inmigrant	0.419	4.2	-0.354	-13.0	0.079	4.1	-0.119	-4.6
Job Characteristics									
	Part-Time Job	-0.076	-2.5	0.414	-17.0	-0.065	-1.9	0.246	11.1
Job Qualification	Medium	0.130	2.0	0.141	5.9	0.063	0.0	0.170	7.7
	High	0.187	3.6	0.074	2.1	0.355	11.2	0.227	7.8
Sector of Activity	Construction	0.508	12.4	0.276	10.1	-0.282	-3.3	-0.046	-0.6
	Industry	0.397	9.8	0.086	1.8	0.431	12.3	-0.126	-5.5
Firm Size		-0.112	-3.2	0.079	2.7	-0.239	-6.6	-0.029	-0.7
		-0.298	-6.6	-0.027	1.1	-0.307	-10.2	-0.086	-2.9
		-0.366	-12.4	0.041	3.6	-0.505	-20.4	-0.042	-0.3
Public Firm		-0.413	-4.0	-0.763	-13.4	-0.208	-2.0	-0.709	-15.3
Temporary Help Agency		0.629	11.4	0.243	2.3	0.370	7.3	0.200	3.3
Permanent Contract		-1.802	-14.9	0.090	5.6	-2.462	-28.3	0.192	3.9
Permanent Contract (discontinuous)		0.859	14.6	-0.578	-7.8	0.496	10.0	-0.638	-10.2
Aggregate Variables									
Regional Unem. Rate (quarterly)		0.265	8.5	-0.110	-8.3	0.112	4.0	-0.288	-14.2
Growth Rate of the GDP (quarterly)		0.439	0.2	0.360	1.0	0.741	1.6	0.795	1.8
First Quarter		-0.062	-1.4	-0.067	-1.2	-0.019	-1.5	-0.019	-1.4
Second Quarter		0.142	2.6	0.252	2.5	0.027	2.5	0.180	2.1
Third Quarter		0.367	4.5	0.147	4.1	0.588	6.3	0.169	5.4
Baseline hazard (months)									
2		-0.578	-22.7	-0.480	-7.7	-0.235	-8.4	-0.090	-4.3
3		-0.647	-22.8	-0.466	-14.0	-0.182	-6.3	-0.152	-6.2
4		-0.838	-24.2	-0.432	-16.7	-0.520	-14.8	-0.245	-8.4
5		-0.810	-21.4	-0.330	-16.4	-0.683	-16.7	-0.270	-8.4
6		-0.671	-19.0	-0.426	-17.6	-0.476	-12.3	-0.344	-9.6
7		-0.996	-21.4	-0.556	-16.2	-1.034	-18.3	-0.445	-11.0
8		-1.050	-20.4	-0.604	-14.7	-0.970	-16.3	-0.393	-9.3
9		-0.248	-13.0	-0.643	-12.9	-0.502	-9.6	-0.286	-6.6
10		-0.426	-13.1	-0.768	-13.6	-0.883	-13.1	-0.376	-7.9
11		-1.295	-16.5	-0.162	-14.4	-1.603	-16.1	-0.542	-10.1
12		-1.742	-15.2	-0.295	-14.1	-1.938	-15.8	-0.536	-9.6
13-15		-1.957	-19.5	-0.396	-18.2	-2.084	-20.3	-0.572	-12.4
> 15		-2.161	-22.7	-0.407	-23.1	-2.140	-24.1	-0.649	-15.4
UI benefits covariates									
Permanent Contract*									
Remaining months before exhaustion of UI benefits	>4	-1.301	-10.8	-1.208	-17.8	-0.260	-3.2	-1.239	-18.8
	2-3	-0.738	-5.9	-1.012	-8.9	-0.330	-3.5	-0.815	-8.2
	1	0.429	2.5	-0.542	-3.7	1.493	15.8	-0.248	-2.0
Exhaustion Effect	0	0.433	1.8	0.056	0.4	1.409	8.5	0.175	1.5
Months beyond the exhaustion of the UI	1	-0.577	-1.9	-0.855	-5.3	-0.061	0.4	-0.734	-5.2
	2-3	-0.688	-2.3	-0.795	-5.5	0.526	2.4	-0.820	-6.1
	4-5	-1.410	-2.9	-1.144	-7.6	0.245	1.1	-1.060	-8.0
Temporary Contract*									
Remaining months before exhaustion of UI benefits	>=4	-1.148	-16.3	-0.710	-15.6	-0.742	-15.1	-0.632	-13.7
	2-3	-1.205	-13.4	-0.677	-11.8	-0.772	-11.7	-0.557	-9.7
	1	-0.842	-7.3	-0.465	-6.6	-0.578	-6.6	-0.446	-5.8
Exhaustion	0	0.016	0.9	0.250	3.5	0.050	0.6	0.247	3.6
Months beyond the exhaustion of the UI	1	-1.182	-8.9	-0.710	-9.2	-1.198	-10.5	-0.668	-8.9
	2-3	-1.372	-10.2	-0.705	-9.8	-1.061	-10.4	-0.882	-12.2
	4-5	-1.545	-10.0	-0.738	-10.9	-1.083	-10.1	-0.716	-12.6

Potencial UI benefits	Low	-0.075	-0.6	0.068	1.2	-0.107	-2.0	0.072	1.1
	Medium	0.190	2.4	0.118	2.1	-0.152	-2.7	0.126	2.0
	High	0.244	4.1	0.196	4.7	0.197	3.4	0.226	4.1
Unemployment Assistance Benefits		1.265	11.7	1.047	17.5	1.268	29.8	0.200	3.3
Unobserved Heterogeneity									
	Constant (Type I)	-3.614	-18.9	-1.666	-11.9	-2.963	-80.9	-1.291	-41.0
	Type II	2.412	21.3	1.412	21.2	1.233	25.9	1.098	27.7
	Type III	1.262	13.3	0.520	8.9	-0.579	-2.7	-0.200	0.9

Same as Note 1 and Note 2

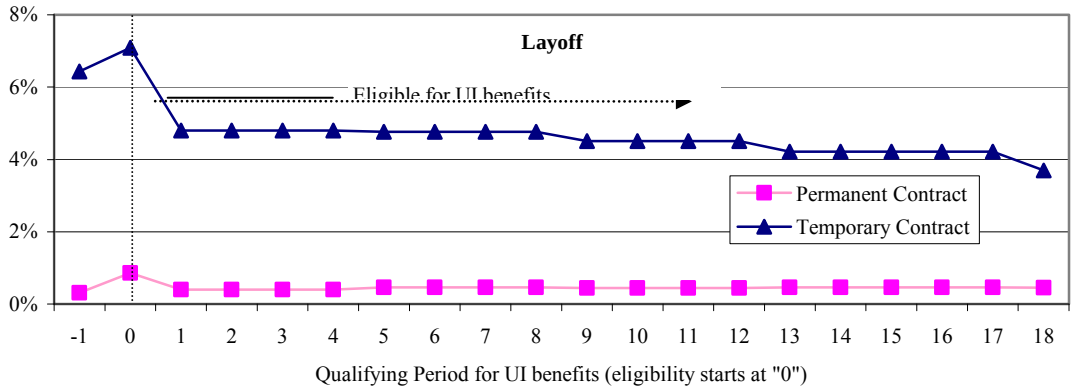
Table 3: Results of the MMPH Model: Part 3: Voluntary Unemployment Hazard Rate

		Men		**Women**	
		Coef.	t-s	Coef.	t-s
Individual Characteristics	Age (years/10)	-0.107	-4.1	-0.191	-6.7
	Experience (years/10)	0.330	10.5	0.285	7.6
	Inmigrant	0.364	10.7	0.293	6.5
Job Characteristics					
	Part-Time Job	-0.301	-10.0	-0.239	-8.6
Job Qualification	Medium	0.020	0.6	0.089	3.0
	High	-0.091	-2.6	0.014	0.5
Sector of Activity	Construction	0.124	4.3	-0.223	-2.4
	Industry	0.043	1.0	-0.020	-0.5
Firm Size		-0.067	-1.5	-0.038	-0.6
		0.064	1.8	0.038	1.0
		0.032	1.2	-0.063	-1.7
Public Firm		-0.488	-3.8	-0.422	-3.9
Temporary Help Agency		-0.043	-0.6	0.267	3.8
Permanent Contract		-0.036	-1.4	0.015	0.5
Permanent Contract (discontinuous)		-0.162	-0.9	0.178	1.7
Baseline hazard (months)	2	-0.406	-13.7	-0.406	-10.7
	3	-0.580	-15.9	-0.581	-12.9
	4	-0.829	-18.2	-0.854	-15.8
	5	-1.011	-18.5	-0.964	-15.7
	6	-1.091	-17.7	-0.947	-14.3
	7	-1.150	-16.8	-1.052	-14.2
	8	-1.113	-15.4	-1.234	-14.5
	9	-0.855	-12.3	-0.928	-11.6
	10	-0.911	-11.7	-0.996	-11.4
	11	-1.080	-11.9	-1.088	-11.2
	12	-1.185	-11.5	-1.297	-11.6
	> 13	-1.463	-22.7	-1.449	-22.0
Aggregate Variables					
Regional Unem. Rate (quarterly)		-0.003	-0.1	-0.095	-2.2
Growth Rate of the GDP (quarterly)		0.736	1.2	0.838	1.4
	Constant (Type I)	-1.252	-9.6	-1.188	-7.4
	Type II	0.803	13.4	0.746	25.6
	Type III	0.020	2.7	0.562	5.1
	Type IV	-0.069	-0.5	-0.660	-0.2

Same as Note 1 and Note 2

Figure 5: Exit Probability from Employment in relation to the UI qualifying period

Females



Males

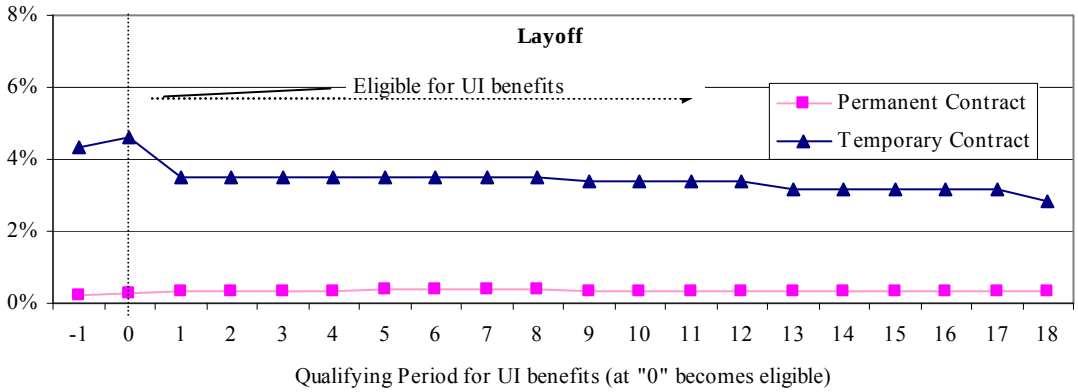


Table 4: Variation in the employment hazard rate relative to the entitlement for UI benefits (percentage points)

			Type of Transition	
	Type of Contract	**Entitlement Effect**	Layoff	Quit
Women	Permanent	When qualifying for benefits	0.55*	0.01
		After qualifying for benefits		
		Between 1-4 months	-0.45**	-0.01
		Between 5-8 months	0.06**	0.02
		Between 9-12 months	-0.02**	-0.01
	Temporary	When qualifying for benefits	0.65**	-0.10*
		After qualifying for benefits		
		Between 1-4 months	-2.29**	-0.05**
		Between 5-8 months	-0.04**	-0.03**
		Between 9-12 months	-0.26**	-0.06**
Men	Permanent	When qualifying for benefits	0.05*	0.02
		After qualifying for benefits		
		Between 1-4 months	0.04**	0.03**
		Between 5-8 months	0.06**	0.03**
		Between 9-12 months	-0.05**	0.00**
	Temporary	When qualifying for benefits	0.29*	-0.03
		After qualifying for benefits		
		Between 1-4 months	-1.16*	-0.04*
		Between 5-8 months	0.02**	-0.04**
		Between 9-12 months	-0.11**	0.00**

Note 3: ** The parameters associated to this effect are statistical significance at the 95% level; * The parameters associated to this effect are statistical significance at the 90% level

Figure 6: Exit Probability from Employment due to a layoff

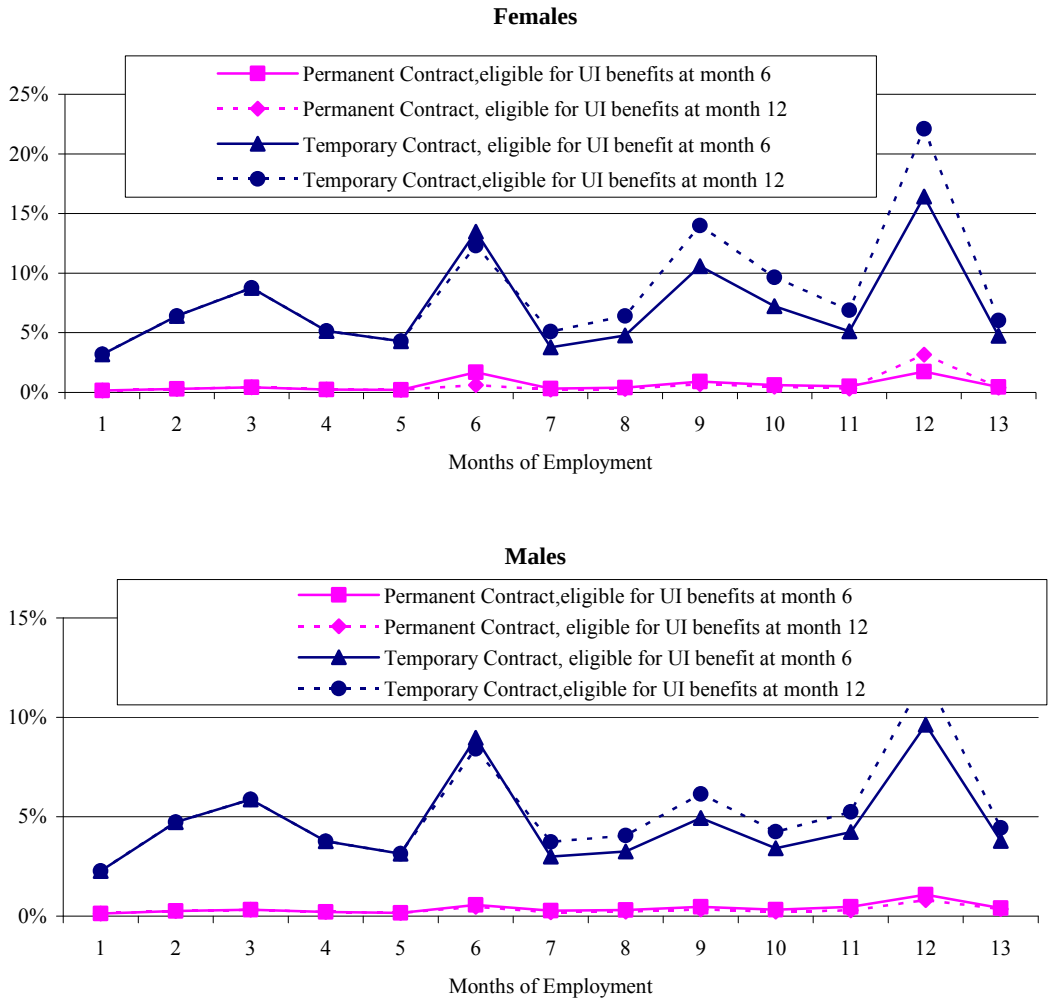
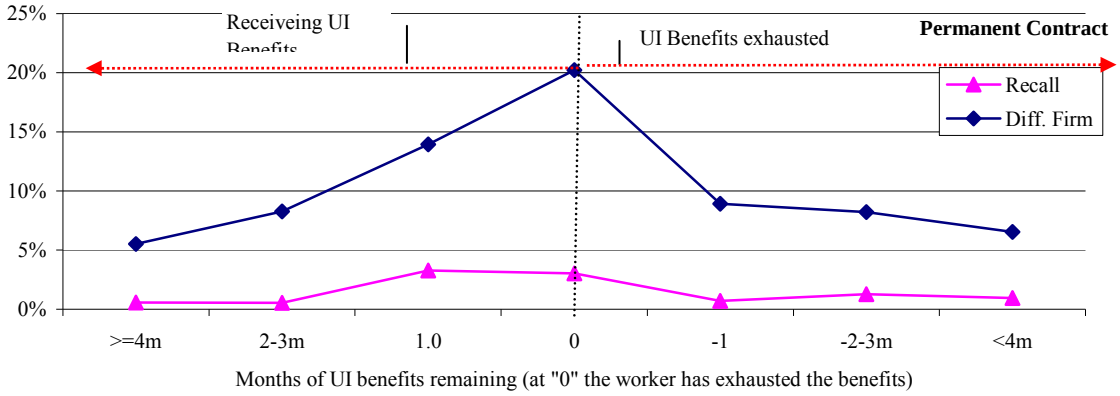
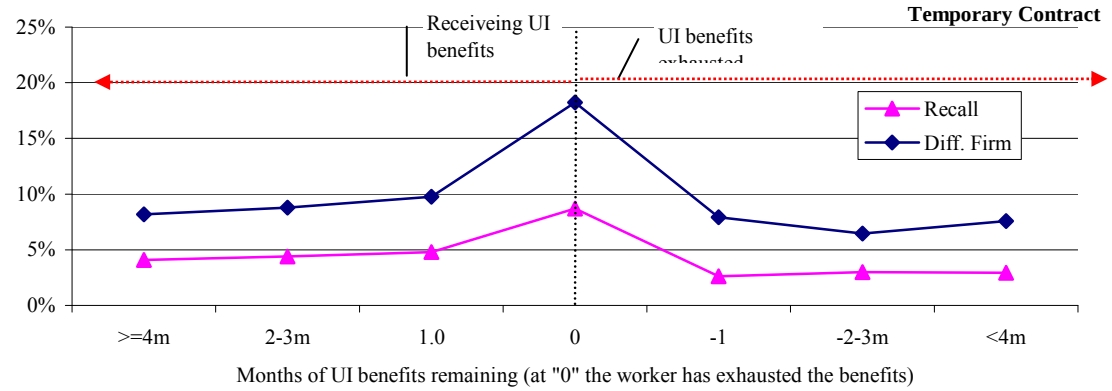


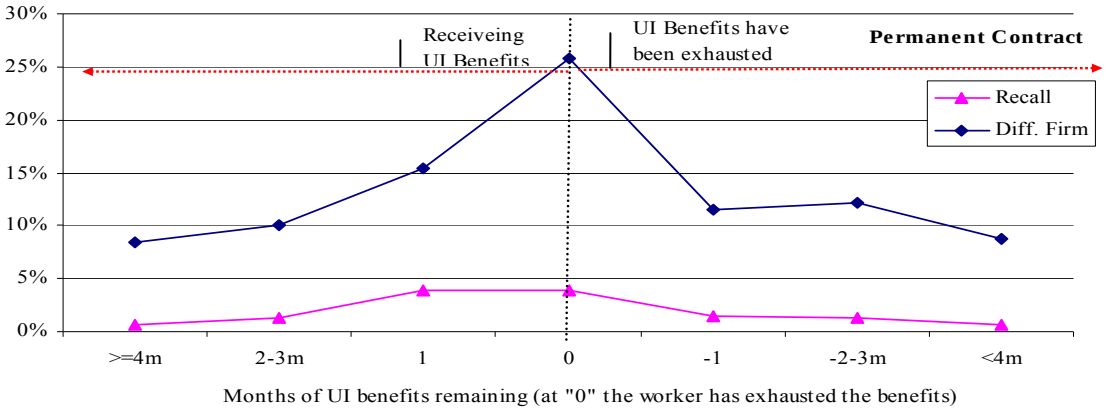
Figure 7: Exit Probability from Involuntary Unemployment in relation to the months left to exhaust UI benefits

Females





Males


30%
25%
20%
15%
10%
5%
0%
Receiveing
UI Benefits
UI Benefits have
been exhausted
Permanent Contract
Recall
Diff. Firm
>=4m
2-3m
1
0
-1
-2-3m
<4m
Months of UI benefits remaining (at "0" the worker has exhausted the benefits)

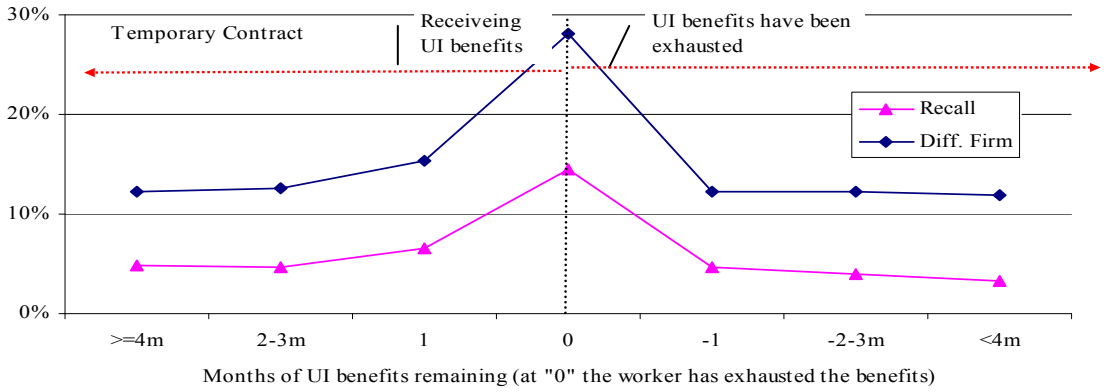

30%
20%
10%
0%
Temporary Contract
Receiveing
UI benefits
UI benefits have been
exhausted
Recall
Diff. Firm
>=4m
2-3m
1
0
-1
-2-3m
<4m
Months of UI benefits remaining (at "0" the worker has exhausted the benefits)

Table 5: Estimated variation –percentage points- in the involuntary unemployment hazard rate relative to UI benefits exhaustion

			Type of Transition	
			Recall	New Job
	Type of Contract	**Exhaustion Effect**		
Women	Permanent	One month prior to exhaustion	2.74**	5.68**
		UI are exhausted	-0.26**	6.27**
		One month following exhaustion	-2.31**	-11.30**
	Temporary	One month prior to exhaustion	0.41**	0.96**
		UI are exhausted	3.90**	8.48**
		One month following exhaustion	-6.07**	-10.30**
Men	Permanent	One month prior to exhaustion	2.21**	4.49**
		UI are exhausted	0.01**	8.84**
		One month following exhaustion	-2.05**	-12.07**
	Temporary	One month prior to exhaustion	1.59**	2.23**
		UI are exhausted	6.65**	10.96**
		One month following exhaustion	-8.17**	-13.54**

Same as note 3

Figure 8: Involuntary Unemployment Hazard Rate in relation to duration of Unemployment for PBD=6 months (Females)

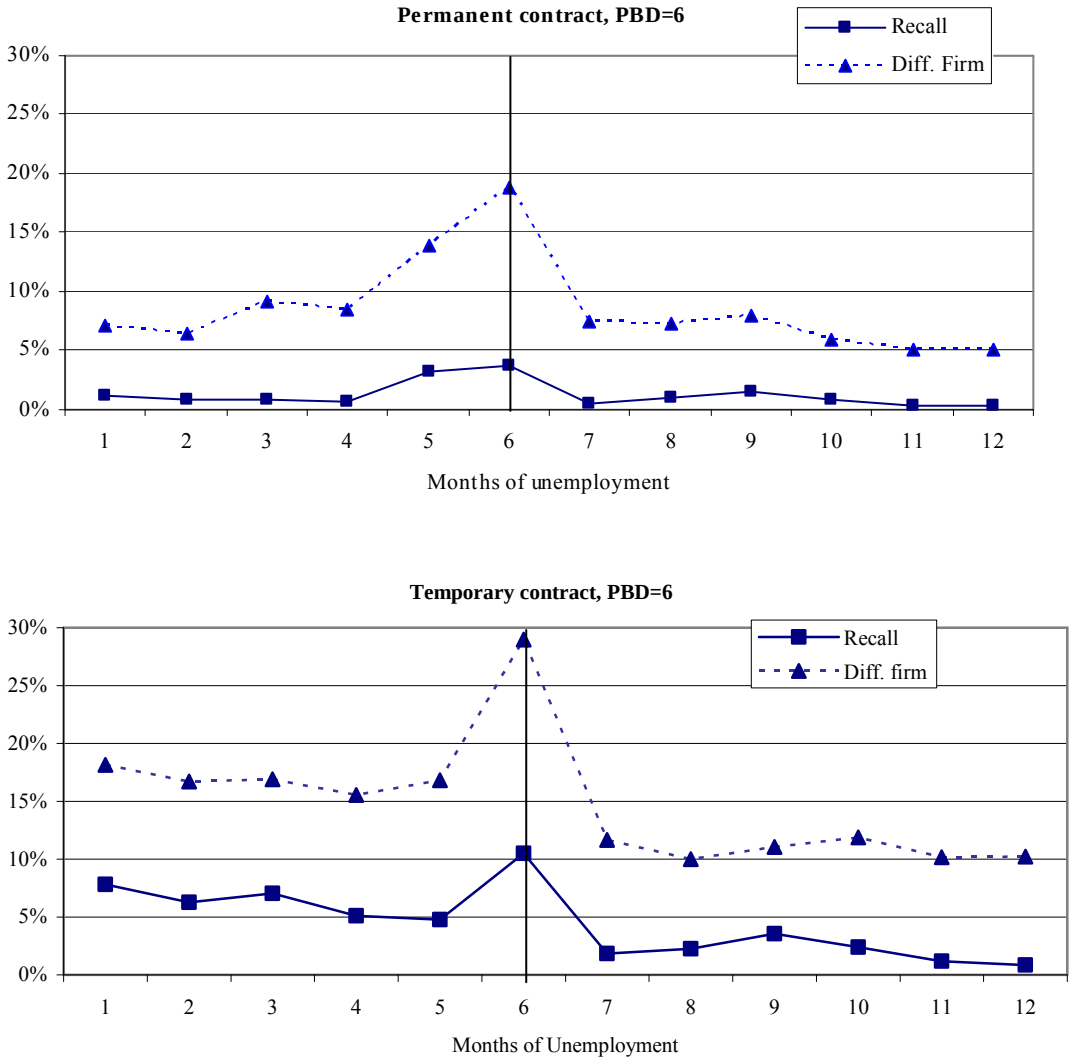


Figure 9: Involuntary Unemployment Hazard Rate in relation to duration of Unemployment for PBD=6 months (Males)

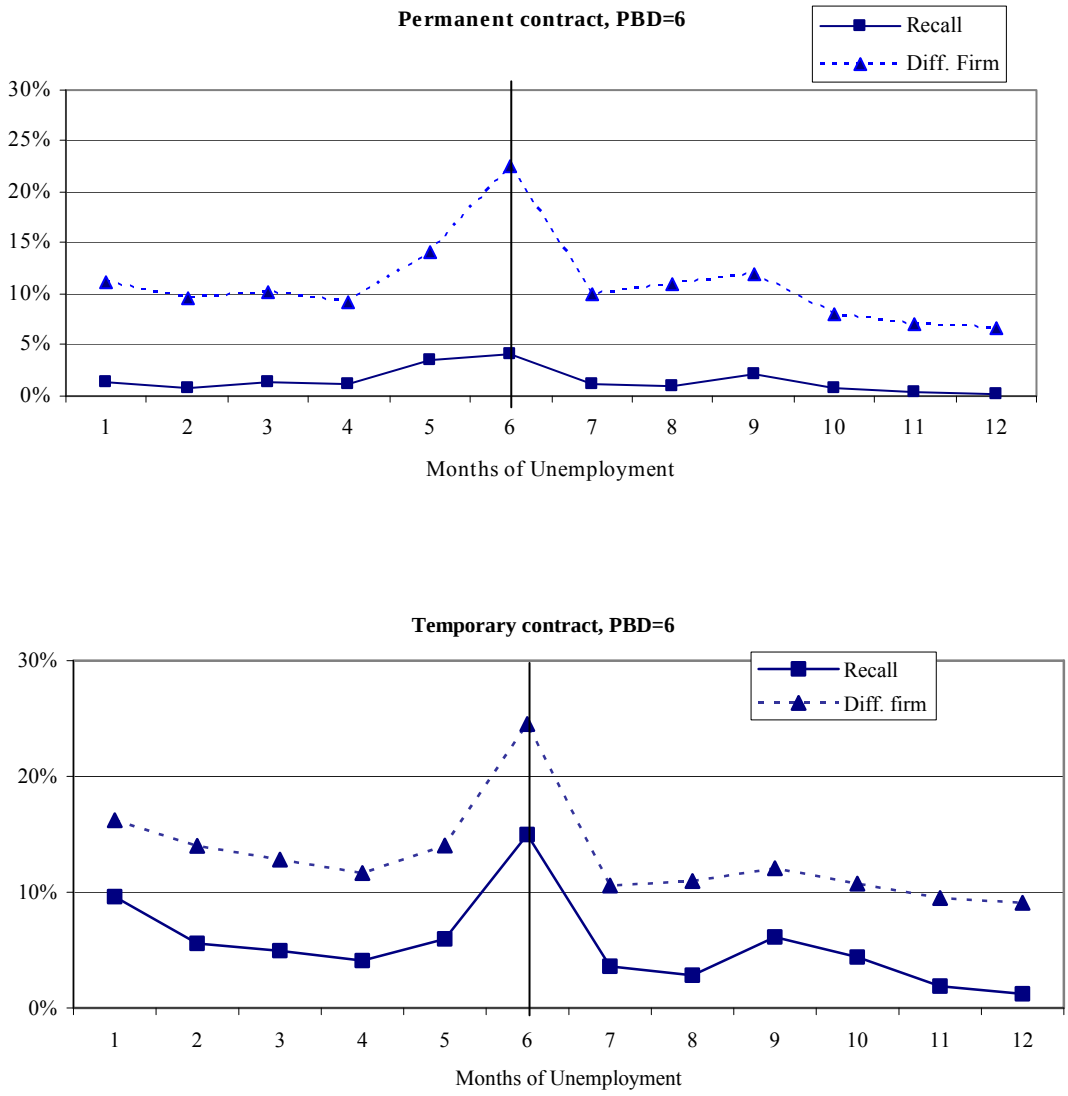


Table 6: Comparing Results between different model specifications: Variation in employment exit probability relative to UI benefits (percentage points)

	Permanent Contract			Temporary Contract		
	Model I	**Model II**	**Model III**	**Model I**	**Model II**	**Model III**
Women						
Layoff						
When qualifying for benefits	0.57	0.64	0.55	0.62	0.98	0.65
After qualifying for benefits	-0.48	-0.51	-0.45	-1.87	-2.85	-2.29
Quit						
When qualifying for benefits	0.03	0.01	0.01	-0.09	-0.11	-0.10
After qualifying for benefits	0.02	-0.02	-0.01	-0.02	-0.06	-0.05
Men						
Layoff						
When qualifying for benefits	0.05	0.04	0.05	0.27	0.32	0.29
After qualifying for benefits	0.03	0.04	0.04	-0.96	-1.24	-1.16
Quit						
When qualifying for benefits	0.03	0.02	0.02	-0.04	-0.04	-0.03
After qualifying for benefits	0.02	0.03	0.03	0.00	-0.00	-0.00

Note 4: Model I: Duration Model without controlling for unobserved heterogeneity; Model II: Duration Model controlling for unobserved heterogeneity (three support points) but assuming independence between labour market states; Model III: Duration Model controlling for unobserved heterogeneity (three support points) and allowing for a full correlation structure between transitions and labour states.

Table 7: Comparing Results between different model specifications: estimated variation (percentage points) of the unemployment exit probability relative to UI benefits exhaustion

	Permanent Contract			Temporary Contract		
	Model I	**Model II**	**Model III**	**Model I**	**Model II**	**Model III**
Women						
Recall						
One month prior to exhaustion	1.17	2.59	2.74	0.62	0.74	0.41
UI are exhausted	-0.28	-0.32	-0.26	1.82	4.14	3.90
One month following exhaustion	-1.09	-2.28	-2.31	-2.84	-6.43	-6.07
New Job						
One month prior to exhaustion	2.86	5.34	5.68	0.57	0.88	0.96
UI are exhausted	3.86	5.79	6.27	4.62	8.27	8.48
One month following exhaustion	-5.89	-11.08	-11.30	-5.16	-10.59	-10.30
Men						
Recall						
One month prior to exhaustion	1.48	2.76	2.21	1.21	2.17	1.59
UI are exhausted	-0.40	0.11	0.01	2.99	7.61	6.65
One month following exhaustion	-1.22	-2.42	-2.05	-3.34	-9.14	-8.17
New Job						
One month prior to exhaustion	3.10	4.17	4.49	1.58	2.00	2.23
UI are exhausted	6.62	7.50	8.84	6.80	9.27	10.96
One month following exhaustion	-8.07	-10.23	-12.07	-8.45	-11.60	-13.54

Same as note 4