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Gender Differences in Unemployment Dynamics and Initial Wages over the Business Cycle.

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Abstract

Using administrative data from Spanish Social Security for the period 2002-2013, we explore differences between unemployed men and women in their probabilities to find a job, their initial wages if they find a new job, and the likelihood to fall back into unemployment. We estimate bivariate proportional hazard models for unemployment duration and for the consecutive job duration for men and women separately, and decompose the gender gap using a non-linear Oaxaca decomposition. Gender differentials in labour market outcomes are procyclical, probably due to the procyclical nature of typically male occupations. While a higher level of education protects women in particular from unemployment, having children hampers women's employment and initial wages after unemployment. There are lower gender gaps in the public sector and in high technology- firms. Decompositions show that the gender gaps are not explained by differences in sample composition. Indeed, if women had similar characteristics to men, the gender gap would be even wider.

Key words: unemployment duration, job duration, decomposition, labour market outcomes.

JEL classification: J64, J62, C41, E32

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1. Introduction

There exists evidence that gender differences in unemployment dynamics differ across countries and with economic conditions. The Spanish labour market suffered dramatically from the Great Recession. According to the Labour Force Survey, the unemployment rate rose from 8% (16%) for men (women) in the first quarter of 2002 to 27% in the first quarter of 2013 for both men and women. In this paper, we analyse how in Spain gender differentials in unemployment exits and re-entries vary with the cyclical variation in local labour market conditions.² Given that the gender gap in unemployment dynamics is expected to have important implications for gender wage differentials, we also explore the gender gap in initial wages of those unemployed who have found a job, providing a more complete picture of the gender gap in labour market outcomes of this specific group of unemployed over the business cycle. We decompose all these gender differences into variation in the sample composition and residual changes induced by different returns to the characteristics. Relatively few studies have analysed the relationship between gender, labour market transitions and the business cycle. The gender dimension in the Europe 2020 strategy,³ recognising the detrimental effect of gender inequality on economic growth, emphasizes the necessity of assessing gender differences in labour market outcomes over time. We contribute to this by: i) exploring the changes of gender gaps in the labour market outcomes of unemployed workers over the business cycle and ii) identifying the factors that lead to more gender inequality in each labour market outcome.

Economic theories provide several explanations for differences in labour market outcomes by gender⁴ and over the business cycle. Job search theory gives ambiguous predictions of differences in unemployment duration by gender. The traditional role of women as second earners (mainly responsible for domestic commitments) may lead to lower job search intensity and fewer job options for females, but cannot explain lower reservation wages. Indeed Brown et al. (2011) find that the higher reservation wage for men compared to women is substantially narrowed in the presence of pre-school children. Discrimination via employer prejudice or statistical discrimination⁵ may also be behind gender differences in labour market outcomes. If employers expect women to leave their job sooner than men, they will be less

² See Figure A1 in the Appendix.

³ The principle of Europe 2020: reinforce mutually a Strategy for smart, sustainable and inclusive growth and the Strategy for Equality between women and men. See www.eesc.europa.eu

⁴ For a review of this literature, see Altonji and Blank (1999).

⁵ Economic models identify two main sources of discrimination. The first one is associated to the prejudice that employers might have against women. Statistical discrimination refers to the underestimation of women's skills, productivity, and labour market attachment in the presence of imperfect information.

willing to invest in training (Donohue, 1988) or may self-select into occupations with lower capital intensity (Barron et al., 1993), resulting in lower wages and more vulnerability to unemployment incidence, especially during downturns. On the other hand, gender segregation across occupations and activities⁶ predicts that labour market outcomes of the group with more procyclical occupations will be more dependent on the business cycle.

Empirical evidence on gender divergences in labour market transitions and their cyclical patterns is scarce and not conclusive. We contribute to this literature by addressing the following research questions: how different are the probabilities to find a job for unemployed men and women with similar individual characteristics? Once they leave unemployment, how different are their (initial) wages and their probabilities to fall back into unemployment? And how do all these inequalities vary over the business cycle? To answer these questions we compare the sample characteristics, patterns and determinants of transitions from unemployment to any job and subsequently from the job to non-employment for males and females during the period 2002-2013.

An important ingredient of this analysis is the use of an administrative dataset (Longitudinal Working Lives Sample)⁷ from the Spanish Social Security Administration. It contains detailed information on employment and unemployment transitions and individual and job characteristics. We construct a sample that includes all the unemployment benefit spells and the consecutive job spells that started from 2002 until 2013, and we observe individuals until the end date of the spell or December 2013. As a consequence, this sample is representative of a specific group of workers with unemployment experience, distinguishing this study from others. To examine the probabilities of leaving and re-entering unemployment, we estimate bivariate mixed proportional hazard rate models. The analysis of the gender gap in initial wages is carried out estimating standard linear regressions, separately for men and women.

The remainder of the paper is organized as follows. Section 2 presents a brief review of the literature. Section 3 describes the data. Section 4 presents the characteristics and exit patterns of unemployment and consecutive job spells. In section 5 we present the econometric

⁶ Petrongolo (2004) analyses gender segregation in employment contracts in 15 EU countries using microdata from the European Community Household Panel.

⁷ Rebollo (2012) points out that the use of an administrative dataset in this type of analysis avoids the seam bias associated with misreported transitions.

framework of unemployment and job durations. Section 6 discusses the main results. Conclusions are drawn in section 7.

2. Literature review

In spite of gender equality policies⁸ in Spain during the last decades, inequalities still exist, revealing differences in employment opportunities. The importance of this issue is well established in the literature and amongst policymakers. The Europe 2020 strategy recognises the detrimental effect of gender inequality on economic growth and considers gender equality a priority policy issue. Cebrián and Moreno (2007) indicate that equality will lead to productivity enhancements.

However, the literature on the gender gap has focused mainly on pay and participation divergences and studies on gender differences in unemployment exits and re-entries are relatively scarce and inconclusive. Most previous studies on the different impact of the business cycle on unemployment by gender use aggregate time series of labour market transitions rather than micro data. They conclude that gender segregation and the concentration of males in specific industries and occupations are crucial explanatory factors. For example, Sahin et al. (2010) affirm that in the US, during the 2007 recession, men exhibited higher unemployment inflow, which is a consequence of the deterioration of male dominated industries and of the increase in the number of men that enter the labour force but fail to find a job. The unemployment outflow is similar for men and women.

Microeconomic international evidence on gender differences in unemployment exits is mixed. Some studies (Koeber and Wright, 2006; Farber, 2015) conclude that after job loss, women experience lower re-employment probabilities and greater wage penalties than men while others find little evidence on gender differences (Perucci et al. 1997).

Many studies find higher rates of males' job loss that can be explained by differences in the type of jobs men and women have, in particular occupation and industry, characteristics not included in most of the previous studies (Wilkins and Wooden, 2013).

Relatively few studies on unemployment and employment exits use separate equations for men and women. They have shown that determinants of labour market outcomes vary with

⁸ See Guner *et al.* (2014) for a review.

gender (Wilkins and Wooden, 2013). Royalty (1998) finds that gender differences in job turnover for young workers in the US arise from the behaviour of less educated women. Frederiksen (2008) shows that the factors behind the lower stability of jobs for women in Denmark might reflect labour market segregation by gender and differences in individual characteristics that are associated with higher job separation rates. Azmat et al. (2006) point out differences in human capital accumulation, institutions, and social attitudes as determinants of the gender gap in unemployment dynamics. However, few of these studies take into account the influence of the business cycle. An exception is Theodossiou (2002) who investigates gender differences in labour turnover in the UK and finds that the changing conditions in the labour market have affected males more than females.

Studies that focus on gender differences in unemployment dynamics are also scarce in Spain. Considering individuals starting an unemployment spell or an employment spell, Eusamio (2004) found that women had more difficulties to leave unemployment and higher probabilities to leave their jobs in the period 1994-1998. She found that men and women with similar characteristics are rewarded differently. Hospido (2009) showed that turnover rates for young workers are similar by gender but the factors that affect them differ. Moreover she points out the existence of a gender wage penalty for career interruptions and mobility.

From a macroeconomic approach, De la Rica and Rebollo (2015) and Peña-Boquete (2014) found that during the downturn the drop in unemployment exits and the increase in layoffs are larger for men than for women. They found that the concentration of women in less-cyclical sectors reduces job loss and the unemployment gap during the current recession. Guner et al. (2014) analysed the trends in gender equality in employment and wages for the 1977-2013 period. They pointed out a decline in the gender gap in employment arising from compositional changes (married women entering the labour force) and potential effects of other factors such as public policies and institutional changes. Still, differences in occupational segregation and wages remained quite stable. The latter is driven mainly by differences in returns to individual characteristics.

De la Roca (2014) analysed real wage cyclicity in Spain for the period 1988-2011. He found evidence of weak real wage cyclicity that is mainly driven by newly hired workers with temporary contracts. The degree of wage cyclicity is much lower for women, but the skill composition of women varies more along the cycle. Finally, Murillo and Simón (2014) found that the decreasing trend of the wage gender gap seen in the expansion period reversed

during the first stage of the crisis. This is mainly explained by the relative improvement of the return to males' characteristics due to the employment destruction during the crisis.

3. Data and descriptive statistics

The data we use come from the Longitudinal Working Lives Sample⁹ (LWLS) based upon administrative records from the Spanish Social Security Administration (SSA). It is collected annually since 2004 on a 4% random sample of the population (approximately one million people) who ever had any relationship with the SSA¹⁰ in the sample period, as contributor or benefit recipient. LWLS contains historical information on employment and unemployment spells.¹¹ Moreover, individuals in the 2004 LWLS remain in the sample as long as they have a relationship with SSA, allowing us to analyse individuals' labour market transitions over time. LWLS provides rich information on individual, firm and job characteristics such as firm size, sector of activity, annual wages and type of contract.

To analyse unemployment exits and subsequent job stability over the business cycle, we construct one sample including unemployment spells with benefits starting between 2002 and 2013 and a corresponding sample including consecutive job spells.¹² Therefore, individuals with job spells only enter if we observe a transition from unemployment to a job.

We apply several filters. For instance, our sample is restricted to individuals younger than 56 years old¹³ and working in the Social Security Regime.¹⁴ We remove individuals with incomplete information or any degree of disability and observations from Ceuta and Melilla (two small Spanish enclaves in Africa). We drop overlapping spells. Following De la Roca (2014) we only include spells that last at least 31 days (after recoding) to exclude all irregular jobs.

For unemployment exits, we distinguish two immediate destination states (within 31 days after the end of the unemployment spell): finding a job and exiting to non-employment (without benefits). For the analysis of the stability of the consecutive job, the immediate exits (within 31 days after the end of the job spell) are: finding another job and non-employment

⁹ We use the LWLS version with fiscal data that contains information on wages.

¹⁰ Civil servants are not included in the LWLS.

¹¹ Historical information containing the type of contract is available since 1991 approximately.

¹² To ensure the representativeness of our sample we merge the LWLS data from 2004 to 2013.

¹³ We avoid exits through early retirement.

¹⁴ Workers that have contributed to other regimes at any time during the period 1997-2013, such as the Self-employment Special Regime or the Agrarian Special Regime, etc., are excluded from our sample since they follow specific rules in the use of unemployment benefits.

(with or without benefits). They are explained in detail in Table 1. Our definition of unemployment is restricted to spells with receipt of benefits.¹⁵ Given that LWLS does not include information on spells of individuals without relationship with SSA, we cannot identify activity or inactivity when benefits are exhausted and the individual has not found a job. The length of the Unemployment Benefits (UB) spell is measured as the difference (in days) between the dates of entry into unemployment and ending the UB spell, either because UB expire or because the worker finds a job. If at the end of the observation period the worker still receives UB, the spell is right-censored.

Table 1: Definition of labour market transitions and their destination states

Original state	Destination state	Definition
Unemployment with benefits	Any job	Immediate job spell of at least 31 days within 31 days after the end of the unemployment benefit spell under study.
	Non-employment state (without benefits)	Includes unemployment without benefits, emigration, black economy and inactivity (e.g. to care for family or to become a student). This state is identified if there is no subsequent job spell (of at least 31 days) within 31 days after the end of the unemployment benefit spell under study.
Job (after an unemployment spell)	Other job	Immediate job spell of at least 31 days within 31 days after the end of the job spell under study. It includes transitions to a new employer.
	Non-employment (with or without benefits)	Includes unemployment with and without benefits, emigration, black economy and inactivity (for instance to care for family or to become a student). This state is identified if there is no subsequent job spell (of at least 31 days) within 31 days after the end of the job spell under study. This includes transitions (within 31 days after the end of the job spell) to unemployment with benefits.

Consecutive job spells with the same employer and a difference shorter than 32 days are considered as one job spell, with the characteristics of the first contract. Job duration is defined as the difference (in days) between the termination and starting dates of the job. If at the end of the observation period the employee is still working for the same employer, the spell is right censored.

The sample of unemployed workers consists of 155,483 women and 158,970 men starting an UB spell during the observation period. Among these, 90,347 women and 99,233 men comprise the sample of unemployed workers that found a new job. Multiple-spells per individual are considered. The sample used for analysing initial wages includes the first observation of individuals that found a full-time job after a spell of UB.

¹⁵ For details on the Spanish Unemployment Insurance System see, e.g., Nagore and van Soest (2014).

4. Characteristics of unemployed and re-employed workers over the business cycle

In this section we explore the variation between the male and female sample composition of unemployed workers and new job starters (among the unemployed workers who found a job) in two economic periods. We also show the influence of the recent crisis on the patterns of re-employment probabilities and consecutive job-to-non-employment hazard rates by gender.

4.1 Characteristics of unemployment by gender over the business cycle

Personal characteristics and economic conditions may affect the chances of leaving unemployment. We therefore include individual and macroeconomic characteristics as explanatory variables (see Table A1 in the Appendix for variable definitions). In turn, men and women may differ in these characteristics and that may lead to differences in unemployment exit rates. Table 2 compares descriptive statistics of unemployed men and women in the periods before (2002-2007) and during the recession (2008-2013).

To account for local economic conditions we use the (quarterly) regional unemployment rate and to better capture the demand for labour we include the job vacancy rate (JVR) by industry. The JVR measures the proportion of total posts that are vacant for each industry (services, manufacturing and construction). These two variables together might also be an indication of the matching efficiency between labour supply and demand.

The importance of the crisis is reflected in the substantial growth of the average regional unemployment rate and the increase in the numbers of unemployed individuals (which is clearly stronger for males). During the recession, surprisingly, the JVR increases, especially for women, due to the increase in the JVR of services (a female dominated sector) while the JVR of construction and manufacturing fall.

Table 2: Descriptive statistics for unemployment spells starting in a period of expansion versus recession, for males and females

Variable	Expansion period				Recession period			
	Females		Males		Females		Males	
	Mean	Std.Dev	Mean	Std.Dev	Mean	Std.Dev	Mean	Std.Dev
MACROECONOMIC VARIABLES								
Regional Unemployment rate	10.28	3.59	10.65	3.89	17.67	7.43	17.66	7.03
Job vacancy rate by industry (%)	0.7	0.13	0.7	0.17	0.9	0.38	0.8	0.38
Inhabitants>40,000 (*)	46.2%	49.9%	44.8%	0.50	45%	50%	45.1%	0.50
INDIVIDUAL CHARACTERISTICS								
Age	33.40	8.83	33.22	9.35	35.33	9.24	35.35	9.52
Nationality								
Spanish native (*)	95.3%	0.21	90.3%	0.30	91.3%	0.28	84.9%	0.36
Spanish speaking immigrant (*)	2.0%	0.14	3.8%	0.19	2.9%	0.17	5.2%	0.22
Non-Spanish speaking immigrant (*)	2.7%	0.16	5.9%	0.24	5.8%	0.23	9.9%	0.30
Children<4 (*)	15.8%	0.36	11.2%	0.32	15.9%	0.37	12.6%	0.33
Children>3 &<16 (*)	24.7%	0.43	20.1%	0.40	26.1%	0.44	22.0%	0.41
Level of education								
Primary education (*)	15.6%	0.36	25.0%	0.43	16.0%	0.37	24.5%	0.43
Lower secondary (*)	40.1%	0.49	43.8%	0.50	38.5%	0.49	44.1%	0.50
Upper secondary (*)	28.8%	0.45	22.6%	0.42	27.8%	0.45	22.2%	0.42
Post-secondary (*)	15.4%	0.36	8.6%	0.28	17.7%	0.38	9.1%	0.29
Number of individuals (**)	86,803		80,790		119,216		125,907	

Source: Own elaboration using LWLS, the Spanish Labour Force Survey (quarterly regional unemployment rate) and Eurostat (quarterly sectorial job vacancy rate). Note: Descriptive characteristics corresponding to the first observation of each individual in each period. Expansion period: 2002-2007 & recession period: 2008-2013. (*) Dummy variables.

(**) Given that one individual might be in the two sample periods (for instance, the unemployment spell starting in the expansion period ends in the recession period), the sum of the number of individuals in both periods is not equal to the number of unemployed individuals mentioned in Section 3.

Applying mean test all differences between males and females are significant except age for E-to-U and inhabitants in the recession period for both events.

The average age of the unemployed individuals is similar for both genders, around 33 years old in the expansion period and two years older during the recession. Most unemployed workers during the expansion have Spanish nationality, 95% of women and 90% of men. During the recession these proportions fall, especially for men (to 84%) due to the increase of unemployed immigrants, mainly non-Spanish speaking. Only 15% (11%) of unemployed women (men) have dependent children younger than four years old and around 24% (20%) of women (men) have children between 4 and 16 years old. These proportions remain stable over time. Around 45% of workers live in a municipality with more than 40,000 inhabitants in two periods.

The distribution of education level varies by gender and slightly by economic period. The largest proportion of unemployed individuals has lower-secondary level of education. Nevertheless, a higher share of women is highly qualified. This is in line with an OECD report (OECD, 2004) confirming that in Spain, the proportion of female tertiary graduates surpassed that of men already in the early 1990s.

4.2 Characteristics of the first job after unemployment by gender over the business cycle

Table 3 provides some descriptive statistics of the explanatory variables of job duration of the unemployed workers who found a job for both samples in the two economic periods (see table A1 for variable definitions).

Personal characteristics were already analysed in section 4.1; the differences compared to the unemployment samples are due to differences in job finding rates (see section 6.1). For example, the proportion of men and women with primary education is smaller in the sample of those who are employed than in the unemployment sample, mainly in the recession period. This is because the lower educated more often fail to find a new job.

The job characteristics we consider relate to type of occupation, required level of qualification, sector of activity, type of contract, firm size and (real) daily wage. The proportion of women working in non-manual occupations (54.8%) is more than twice that of men (24.4%) in the expansion period. These proportions increase slightly in the recession period, since manual occupations are hit hardest by the crisis. The largest proportion of men (women) is working in jobs requiring high (low) qualifications in the two periods. During the recession, the proportion of workers in jobs requiring high qualifications increases.

The largest proportion of individuals in both samples belongs to the service sector, particularly for females (87.7% in the expansion period, compared to 51.5% for males). These proportions increase in the recession, especially for men. In contrast, the proportions of workers in manufacturing and mainly construction sectors are larger for men and decrease with the burst of the property bubble. 33.3% (29.8%) of men against 2.4% (2.2%) of women are in construction during the expansion (recession) period. In the expansion period a higher proportion of men 4.7% (versus 3.3% of women) are employed in sectors with a high level of technology; this fell slightly in the recession.

Table 3: Descriptive statistics for consecutive job spells for males and females.
Expansion and Recession period

Variable	Expansion period				Recession period			
	Females		Males		Females		Males	
	Mean	Std.Dev	Mean	Std.Dev	Mean	Std.Dev	Mean	Std.Dev
MACROECONOMIC VARIABLES								
Regional Unemployment rate	9.95	3.45	10.53	3.79	16.84	7.60	17.36	7.34
Inhabitants>40,000 (*)	46.5%	0.50	46.2%	0.50	45.8%	0.50	47%	0.50
INDIVIDUAL CHARACTERISTICS								
Age	33.51	8.38	33.83	8.95	35.08	8.53	35.73	8.86
Nationality								
Spanish native (*)	95.9%	0.20	91.4%	0.28	93.1%	0.25	86.5%	0.34
Spanish speaking immigrant (*)	1.7%	0.13	3.5%	0.18	2.4%	0.15	5.0%	0.22
Non-Spanish speaking immigrant (*)	2.4%	0.15	5.1%	0.22	4.5%	0.21	8.5%	0.28
Children<4 (*)	13.0%	0.34	12.4%	0.33	14.2%	0.35	13.9%	0.35
Children>3 &<16 (*)	25.1%	0.43	22.5%	0.42	26.3%	0.44	24.6%	0.43
Level of education								
Primary education (*)	13.6%	0.34	24.6%	0.43	12.5%	0.33	22.7%	0.42
Lower secondary (*)	39.6%	0.49	45.5%	0.50	38.0%	0.49	46.0%	0.50
Upper secondary (*)	29.8%	0.46	21.8%	0.41	29.1%	0.45	21.9%	0.41
Post-secondary (*)	17.0%	0.38	8.1%	0.27	20.4%	0.40	9.4%	0.29
JOB CHARACTERISTICS								
Non manual (*)	54.8%	0.50	24.4%	0.43	58.8%	0.49	27.6%	0.45
Required Level of qualification								
Low (*)	47.2%	0.50	30.9%	0.46	43.9%	0.50	28.8%	0.45
Medium (*)	30.9%	0.46	24.8%	0.43	30.9%	0.46	25.4%	0.44
High (*)	21.8%	0.41	44.3%	0.50	25.2%	0.43	45.7%	0.50
Industry								
Construction (*)	2.4%	0.15	33.3%	0.47	2.2%	0.15	29.8%	0.46
Manufacturing (*)	9.6%	0.30	14.7%	0.35	7.0%	0.25	13.5%	0.34
Services (*)	87.7%	0.33	51.5%	0.50	90.8%	0.29	56.7%	0.50
High technology (*)	3.3%	0.18	4.7%	0.21	2.6%	0.16	4.3%	0.20
Firm size								
Size_0 (*)	7.2%	0.26	10.8%	0.31	2.0%	0.14	3.1%	0.17
Size_1_9 (*)	28.0%	0.45	38.6%	0.49	29.2%	0.45	40.2%	0.49
Size_10_19 (*)	8.8%	0.28	11.2%	0.32	9.3%	0.29	12.6%	0.33
Size_20_49 (*)	12.4%	0.33	12.8%	0.33	12.8%	0.33	14.5%	0.35
Size_50_249 (*)	20.0%	0.40	14.8%	0.35	21.2%	0.41	16.6%	0.37
Size_250 (*)	23.7%	0.43	11.9%	0.32	25.5%	0.44	13.0%	0.34
Current Type of contract								
Open_ended (*)	8.3%	0.28	2.8%	0.16	8.3%	0.28	2.9%	0.17
On-call temporary (*)	13.7%	0.34	4.5%	0.21	14.6%	0.35	5.1%	0.22
Temporary (*)	60.3%	0.49	74.3%	0.44	55.2%	0.50	69.0%	0.46
Permanent (*)	17.7%	0.38	18.4%	0.39	21.9%	0.41	23.0%	0.42
Current contract is part-time	27.1%	0.44	6.2%	0.24	34.2%	0.47	11.3%	0.32
Temporary Help Agency (*)	6.0%	0.24	5.7%	0.23	4.2%	0.20	4.3%	0.20
Public Sector (*)	16.3%	0.37	6.6%	0.25	16.7%	0.37	7.0%	0.26
Real daily wage (in euros of 2011) (**)	46.01	17.88	50.42	17.44	49.42	20.34	52.93	19.01
PREVIOUS UNEMPLOYMENT BENEFIT SPELL								
Previous unemployment duration	167.03	149.6	150.05	127.45	201.01	189.1	202.11	182.21
Number of individuals	48,511		51,844		69,668		76,082	

*Note: See note in Table 2. (**) Real daily wage for full time jobs. Applying mean test all differences between males and females are significant except age for E-to-U and inhabitants in the recession period for both events.*

Many workers got a job in a microenterprise (1-9 workers), for instance 38.6% (28%) of men (women) in the pre-recession period. Women are more often employed in large firms than men. Most contracts are temporary in both periods, but there are gender differences in the specific type of contract. Women more often than men have on-call temporary contracts, which

are more common in the public sector. The proportion of part time contracts is around 20% higher for women than for men in both periods. Accordingly, Dolado et al. (2001, 2004) found that occupational segregation by gender is positively correlated with the share of part time jobs in the economy. The use of part time jobs increases during the recession period for both samples. The proportion of new contracts signed through Temporary Help Agencies (THA) acting as intermediary is quite similar for both sexes and decreases in downturn, from 6% to 4%. The proportion of women in the public sector (16%) is more than twice that of men (7%) in both economic periods.

The average real initial wages of new full-time jobs (consecutive to unemployment) vary by gender and change over time.¹⁶ They are higher for men than for women, but these differences decrease, especially since 2009.

To sum up, we have found clear gender differences¹⁷ in sample composition: women have a higher level of education than men and are more concentrated in jobs requiring low qualifications, non-manual occupations, services and the public sector. They work more often in large firms and part-time jobs. Finally, women have lower initial wages than men.

The changes during the recession reveal some interesting facts: first, the marked sectorial character of the crisis, affecting men more seriously than women. Second, the surge in the demand for more experienced and qualified workers, more pronounced for women. Third, and probably as a consequence of the previous facts, there is a reduction of the gender gap in post-displacement wages. Finally, an important growth in part time jobs to adjust to fluctuations in demand.

4.3. Unemployment to any job and job to joblessness exits over the business cycle

Kaplan Meier survival functions for unemployment exits to any job and re-entries to non-employment (treating other types of exits as right-censoring) for males and females in both economic periods are available upon request. They show that during the expansion period, unemployed females have less chances to find a job than males and once they get it, their job tenure is shorter than for males (after 6 months in the job). In the downturn, job finding rates decrease more for men than for women and job losses rise more for men than for women. As

¹⁶ Table available upon request.

¹⁷ Most of them are in line with Cebrián and Moreno (2007).

a consequence, both groups exhibit a similar likelihood of finding a job (during the first year of unemployment) and the consecutive job stability is usually higher for females than for males.

Kaplan Meier estimates of the hazard rates corresponding to these survival functions¹⁸ show that hazard rates are negatively associated with (un)employment duration. This may reflect genuine negative state dependence or spurious state dependence due to heterogeneity and the changing nature of the pool of unemployed over time. These explanations will be disentangled in the econometric model.

5. Econometric framework for unemployment duration and job stability analysis

To analyse the pattern and determinants of leaving unemployment and re-entering non-employment we estimate a correlated competing risks model with two types of exits for each event. For the first event, the destination states that we differentiate are: any job and non-employment and for the second one: other job and non-employment. The models are estimated separately for men and women in order to reflect the gender differences in labour market dynamics.

Multi-state: Competing risks model

To analyse the duration patterns and the determinants of transitions, we use a competing risks framework (see, e.g., Kalbfleisch and Prentice, 2002, Chapter 8). An unemployment spell can end with a transition to any job ($j=1$) or to non-employment ($j=2$). Analogously, a job spell can end with a transition to another job ($j=1$) or to non-employment ($j=2$). This gives the total hazard

$$h(t) = h_1(t) + h_2(t) \quad (1)$$

Here $h(t)$ is the hazard to exit from the unemployment (job) spell to any destination state at duration t , and $h_1(t)$ and $h_2(t)$ are the hazards for exits to the two competing exits. Conditional on observed and unobserved heterogeneity, the competing risks are assumed to be independent. We specify the following Multivariate Mixed Proportional Hazard (MMPH)

¹⁸ Available upon request.

model with gap-time representation with hazards $h_j(t|X_i(t), V_i^j)$ for the two types of transitions $j=1-2$, of individual i conditional on observed and unobserved characteristics:

$$h_j(t|X_i(t), V_i^j) = h_0^j(t) \cdot \exp(X_i(t)' \beta^j) \cdot \exp(V_i^j) \quad (2)$$

The baseline hazard for the transitions $j=1-2$, $h_0^j(t)$, is specified as piecewise constant. The parameters of main interest are the vectors $\beta^j, j = 1, 2$, which determine how the two hazards vary with individual and job characteristics. A positive coefficient in β^j of a covariate implies that, conditional on other covariates and unobserved heterogeneity, an increase of the covariates increases the probability of exit j . A way to interpret the size of the coefficients is through the percentage change in the hazard produced by a one unit change in the covariate obtained as $(e^{\beta_j} - 1) \cdot 100$.

The proportional hazard assumption implies that the shape of the duration dependence (“baseline hazard”) for each exit is the same for all individuals; the covariates change the hazard rates with the same proportion at each t , so the level of the hazard may change across individuals.

The unobserved heterogeneity terms are V_i^j . Following Heckman and Singer (1984), we use discrete frailty and allow V_i^1 and V_i^2 to be correlated. It is computationally easier than a bivariate continuous distribution and allows for a more flexible distribution if the number of mass points grows large. Moreover, it is a common way to model unobserved heterogeneity in the literature on labour market transitions; see, for instance, Bover et al. (2002).

Under a discrete frailty distribution, the population consists of several subpopulations with different risks. For instance, for job hazard, one group of more motivated individuals and with a larger social network could have higher probabilities of finding another job but a lower probability to become non-employed. The group to which an individual belongs, however, is not observed. The population fractions of the groups are unknown parameters p_k .¹⁹ The

number of groups is finite and denoted by K , with $\sum_{k=1}^K p_k = 1$; K is also the number of mass points of the distribution of (V_i^1, V_i^2) .

¹⁹ To ensure the probability is between zero and one we assume $p_k = \frac{\exp(a_k)}{(1 + \sum_{l=1}^{K-1} \exp(a_l))}$.

We assume that unobserved heterogeneity is constant over time (within and across spells of the same individual). For identification, we also assume it is independent of observed characteristics, the standard assumption in this kind of duration models (van den Berg, 2001). Moreover, since we do not impose a normalization on the baseline hazard on $X_i(t)' \beta^j$, we

need to impose $E(V_j)=0$: $\sum_{k=1}^K p_k V^j = 0$ for $j=1,2$ as a normalization.

All parameters are estimated jointly by Maximum Likelihood. The likelihood function is, under the independence assumption, the product of the likelihood function of all the individuals (i), $L = \prod_i L_i$. The likelihood contribution L_i of individual i for two competing risks ($j=1,2$) can be written as the expected value of the conditional likelihood given (V_i^1, V_i^2) : $L_i = \sum_{k=1}^K P_k \cdot L_i(V^k)$, where $L_i(V^k)$ is the conditional likelihood contribution given (V_i^1, V_i^2) is equal to the kth mass point $V^k = (V_k^1, V_k^2)$. This conditional likelihood contribution is a standard likelihood contribution in a model without unobserved heterogeneity; it includes the conditional density function for the observed exits of the completed spells and the conditional survival function for right-censored spells at each competing risks (j):

$$L_i(V^k) = \prod_{j=1}^2 \prod_{s=1}^S h_s^j(t_i | X_i(s), V_j^k)^{d_{i,j,s}} S_s^j(t_i | X_i(s), V_j^k) \quad (3)$$

Here $s=1, \dots, S$ are the spells of individual i, and $d_{i,j,s}$ is a dummy that is 1 if spell s ends in a transition of type j and 0 otherwise. Our estimation code is based upon the Stata code of Bijwaard (2014).

6. Estimation results

This section includes the estimation results of the hazards out of unemployment (to a job or to non-employment without benefits) and of the exits from the first job after unemployment (to another job or to non-employment), as well as the OLS estimates of the equations for initial wages in the new job following the unemployment benefit spells. The period covered is 2002 (or 2004, when wages are considered) to 2013. The estimations are conducted separately for males and females.

6.1 Transitions from unemployment to work

Table 4 presents the estimates of competing risk models distinguishing two exits: any job and non-employment. We are mainly interested in transitions to work since the other exit merges unemployment without benefits and exit to non-participation. The best likelihood is obtained using a discrete unobserved heterogeneity distribution with three (two) mass points for female (male) sample.²⁰ In line with the literature, explanatory variables include individual characteristics and the state of the labour market.

Coefficients on the covariates

As expected, individuals living in regions with higher unemployment rates have a lower probability of finding a job and those who worked in sectors with higher job vacancy rates are more likely to find a job. The estimated coefficients are larger for women than for men, suggesting that women are more sensitive to regional and sectorial labour market conditions.

²⁰ The model with three mass points does not converge for the male sample.

Table 4: Estimation results of correlated competing risks (exit to any job and non-employment) models for male and female samples

	Female sample				Male sample			
	Any job		Non-employment		Any job		Non-employment	
	Coefficient s	SE	Coefficients	SE	Coefficients	SE	Coefficients	SE
Unemployment rate	-0.0152***	(0.000616)	0.00328***	(0.000522)	-0.00799***	(0.000537)	0.00461***	(0.000532)
Job vacancy rate	0.384***	(0.0121)	-0.0150	(0.00996)	0.0616***	(0.00757)	0.0521***	(0.00771)
Age	0.0250***	(0.00287)	-0.0685***	(0.00257)	0.0631***	(0.00241)	-0.0703***	(0.00245)
-								
Age2	0.000364**	(3.87e-05)	0.000655***	(3.47e-05)	-0.000916***	(3.25e-05)	0.000535***	(3.32e-05)
Spanish_speaking imm.	-0.140***	(0.0207)	0.341***	(0.0156)	-0.0442***	(0.0130)	0.418***	(0.0123)
Non_Spanish_speaking	-0.144***	(0.0154)	0.199***	(0.0120)	-0.164***	(0.0101)	0.303***	(0.00929)
Children<4	-0.551***	(0.00808)	-0.136***	(0.00651)	8.68e-05	(0.00733)	-0.198***	(0.00834)
Children>3 & <16	-0.0960***	(0.00660)	-0.0895***	(0.00597)	0.0631***	(0.00612)	-0.152***	(0.00690)
Primary	-0.0805***	(0.00913)	0.0452***	(0.00752)	-0.0727***	(0.00655)	0.0535***	(0.00669)
Upper_secondary	0.0215***	(0.00733)	0.000224	(0.00638)	-0.0590***	(0.00687)	0.0480***	(0.00724)
Post_secondary	0.191***	(0.00875)	0.0857***	(0.00797)	-0.0178*	(0.0101)	0.0915***	(0.0107)
Inhabitants>40,000	0.0601***	(0.00582)	0.0537***	(0.00513)	0.112***	(0.00517)	0.0134**	(0.00545)
V1	-0.372***	(0.00954)	0.179***	(0.00381)	-0.544***	(0.0205)	0.324***	(0.00845)
V2	1.109***	(0.0162)	-0.777***	(0.0368)				
a1	0.705***	(0.0338)						
a2	-1.738***	(0.0595)						
Observations	1,205,918				1,186,593			
Log Likelihood	-2,425,000				-2,398,000			
Number of individuals	155,483				158,970			
Number of exits	179,971		166,397		188,745		154,015	
Terms of mass points	Female sample				Male sample			
	1	2	3		1	2		
Probability	26.9%	10.9%	62.2%		40.4%	59.6%		
V any job	-1.06	1.11	0.26		-0.54	0.37		
V non-employment	0.30	-0.78	0.01		0.32	-0.22		
Rho	-0.86				-1			

Notes: Correlated Competing risks estimation: piecewise baseline and discrete distribution of unobserved heterogeneity with three (two) mass points for female (male) sample. References categories: Native Spanish, lower secondary education level. Age, quarterly unemployment rate and JVR by industry are time-varying variables. Yearly dummies are included in the estimation. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Younger groups and particularly the group older than 45 years exhibit more difficulties in finding a new job. Particularly for men, the group between 24 and 44 years old has much better chances to find a new job than other age groups.

Immigrants, in a lesser extent the group of male Spanish speaking, are less likely to find a job than natives. As expected, having dependent children has opposite effects on job finding rates for males (positive, but only for children older than four years) and females (negative, especially for children younger than four years). The positive effect of living in larger cities on the hazard is stronger for males than for females. A higher level of education implies better chances to find a job for females but not for males. For instance, a woman with post-secondary education level is 21% more likely to find a job than a woman with lower secondary education level, while this coefficient is small and with low significance for men, perhaps due to the different type of jobs they access.

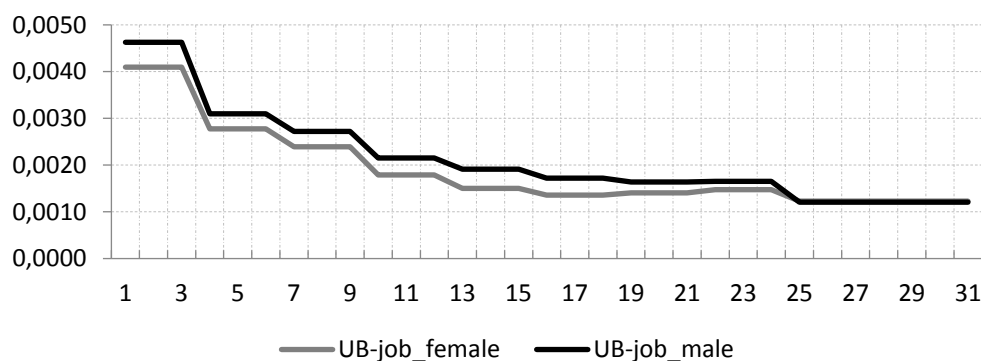
Unobserved heterogeneity

In the competing risks estimations, unobserved heterogeneity is significant in both samples, demonstrating the importance of unobserved characteristics such as effort, social pressure, gender role, etc. for the chances to find a job. According to the estimated discrete distribution, the correlation between the unobserved heterogeneity terms is negative and sizeable. This implies that someone who is likely to find a job has lower chances to exit out of the labour force. An exception is the third group of women that are more likely to find a job but also to become non-employed; they apparently have unobservable characteristics that make them more prone to find a job, but also more prone to withdraw from the labour market because of family responsibilities, possibly due to the prominent role of women in taking care of the family which reduces the link between productivity and exit probabilities.

Baseline Hazard Estimates

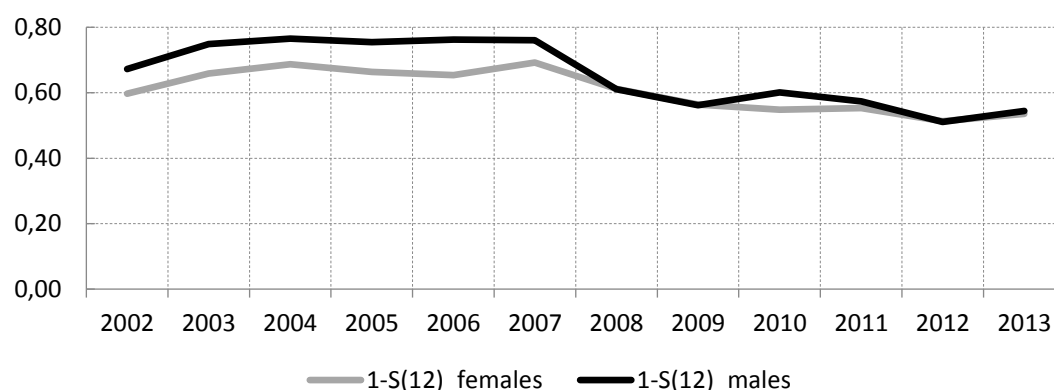
Figure 1 shows the estimated hazard functions for a benchmark man and woman in a year of expansion. Observed and unobserved heterogeneity are controlled for through the covariates and frailty terms, so that slopes can be interpreted as true state dependence. The pattern is quite similar for men and women, but the benchmark man is more likely to find a job than a similar woman, mostly during the first three months of unemployment. From then both hazard functions and their differences decrease with unemployment tenure. Thus, the baseline hazard for both groups shows negative duration dependence, in line with a negative stigma effect or discouraged worker effect. The duration dependence is larger for males.

Figure 1: Hazard rates benchmark person for unemployment to any job transition. Males and females; competing risks model. Duration in months



Note: Benchmark individual: Native, no children, lower secondary level of education, living in a municipality with fewer than 40,000 inhabitants, year 2002. Unemployment rate=10.28, Job vacancy rate=0.69 and age=33.

Figure 2: Probability of finding a job after 12 months of unemployment. Males and females. 2002-2013



Note: Benchmark individual: the same as in the Figure 1 except for yearly dummy, the unemployment rate and the job vacancy rate, the latter two correspond to the second quarter of each year.

Figure 2 shows the impact of the economic conditions on the probability of finding a job after 12 months of unemployment for an unemployed male and female. As expected, better economic conditions increase the probability to find a job and worse economic conditions reduce it. The pattern of these functions is captured by the yearly dummies and the coefficients of regional unemployment rate and job vacancy rate. The joint effect of the regional unemployment rate and the job vacancy rate results in a procyclical pattern, which is more marked for females. In contrast, the procyclical pattern of the yearly dummies is stronger for males. As a consequence, in the expansion period the probability of finding a job is higher for men than for women (for instance, in 2005 75% for males and 66% for females), while in the recession period those two effects tend to offset each other (i.e, in 2009 56% for males and females), virtually eliminating the gender gap in unemployment duration during the downturn. This might reflect the higher procyclicality of men's occupations.

The role of compositional variation and business cycle in unemployment duration

Table 5 displays the results of decomposing the difference between the survival probabilities in unemployment²¹ after 360 days for the male and female samples, in the spirit of, e.g., Verho (2014), in the pre-recession (2002-2007) and recession (2008-2013) periods. The first rows give the average survival probabilities for the two samples in each economic period according to the models estimated, and the difference between them, which is a measure of the gender gap. For instance, the average probability of not finding a job was 35% for males

²¹ According to our goals, we focus on analyzing unemployment exits to any job.

and 43% for females in the expansion period, a gender difference of minus 7.8%. However, during the recession the survival probabilities increase to 50% for males and 48% for females, reversing the gender gap in favour of women.

Table 5: Decomposition analysis for exits from unemployment to any job

	Expansion		Recession	
Total Differences	-7.8%	100%	1.8%	100%
$\overline{S(12)}_{male}^{male}$	0.35		0.50	
$\overline{S(12)}_{female}^{female}$	0.43		0.48	
Composition effects	0.7%	-9.3%	2.7%	151%
Behavioural effect	-8.5%	109.3%	-0.9%	-51%

Note: Evaluated at female coefficients. For notation $\overline{S(12)}_{sample}^{model}$ is the average survival probability at month 12, using the model of females (males) and for the sample of women (men) for the expansion and recession periods.

The remaining rows decompose these differences. First, we use the female estimates and compute the probabilities for the female and male samples. Comparing the average probabilities of the two samples in row 3 gives the composition effect: the part of the difference explained by the differences in individual characteristics in the male and female samples. The remaining part of the female-male changes is the behavioural effect.

Focusing firstly on the expansion period, the results suggest that the longer average unemployment duration for females against males is not due to differences in characteristics between men and women but to differences in the labour market returns (estimated parameters) to their characteristics. There may be many reasons for this, such as differences in motivation, (statistical) discrimination, job search intensity, etc.; unfortunately our data does not allow to distinguish them. The dampening effect of women's characteristics is small (9%) because positive and negative contributions to the composition effect largely cancel. For example, the females' higher education level contributes to increase the female's job finding rates compared to males' while the females larger share of children works in the opposite direction. In the downturn, the gender gap reverses due to the substantial drop of the behavioural effect (to 0.9%), largely explained by changes in time trend (already analysed in Figure 2) and an increase in the composition effect mainly driven by the growth of job vacancy rates in services (female dominated sector).

6.2. Gender gap in initial wages over the business cycle

Table 6 presents the estimation results of log initial wages of full time jobs following an unemployment spell using ordinary least squares (OLS) for males and females. In line with the literature, explanatory variables include personal and job characteristics and previous unemployment duration.

Coefficients on the covariates

Male wages are more negatively affected by the labour market conditions than female wages. Initial wages increase with age until around age 50. They increase more with age for women than for men, particularly at younger ages.

Nationality influences wages differently by gender. Male immigrants earn less than their native counterparts. For the female sample, non-Spanish speaking immigrants earn more than Spanish speaking immigrants and native women. Having children reduces wages for women but increases them for men. The positive effect of education level is slightly stronger for men than for women.

Living in a more densely populated area leads to lower initial wages. Jobs in non-manual occupations are better paid than in manual occupations. Workers in jobs with higher required level of qualification earn more, especially women. Construction is the industry that pays the highest wages, followed by manufacturing and services. Differences in wages (with respect to services) are bigger for men, especially in manufacturing, where women tend to be more concentrated in jobs with low required level of qualification. Jobs with more intensive technology pay better wages than other jobs, especially for women. Female wages in the public sector are higher than in the private sector but they are not significantly different for men.

Table 6: OLS Estimates explaining log initial wages for males and females

	Females		Males	
	Coefficients	SE	Coefficients	SE
Unemployment rate	-0.00286***	(0.000208)	-0.00392***	(0.000158)
age	0.0175***	(0.000952)	0.0131***	(0.000711)
age2	-0.000192***	(1.28e-05)	-0.000142***	(9.50e-06)
Spanish_speaking imm.	-0.00118	(0.00635)	-0.0607***	(0.00370)
Non_Spanish_speaking imm.	0.0470***	(0.00461)	-0.0186***	(0.00285)
Children<4	-0.0260***	(0.00279)	0.00663***	(0.00210)
Children>3 & <16	-0.0101***	(0.00217)	0.00547***	(0.00171)
Primary	-0.0176***	(0.00275)	-0.0164***	(0.00177)
Upper_secondary	0.0385***	(0.00232)	0.0353***	(0.00202)
Post_secondary	0.122***	(0.00302)	0.133***	(0.00336)
Inhabitants>40,000	-0.00794***	(0.00183)	-0.0114***	(0.00146)
Non_manual	0.148***	(0.00224)	0.134***	(0.00225)
High level of qualif.	0.270***	(0.00244)	0.169***	(0.00181)
Medium level of qualif.	0.132***	(0.00212)	0.0999***	(0.00198)
Construction	0.147***	(0.00631)	0.163***	(0.00188)
Manufacturing	0.0187***	(0.00312)	0.123***	(0.00236)
High_technology	0.165***	(0.00554)	0.0816***	(0.00403)
Public	0.100***	(0.00305)	-0.00604*	(0.00339)
Size_0	0.0191***	(0.00620)	0.00363	(0.00368)
Size_10_19	0.0333***	(0.00341)	0.0243***	(0.00228)
Size_20_49	0.0738***	(0.00298)	0.0634***	(0.00220)
Size_50_249	0.127***	(0.00267)	0.141***	(0.00222)
Size_250	0.193***	(0.00288)	0.222***	(0.00276)
Open_ended	0.0546***	(0.00280)	0.0850***	(0.00327)
On_call_temp	0.102***	(0.00296)	0.0959***	(0.00366)
Permanent	-0.00814***	(0.00277)	-0.00192	(0.00216)
THA	0.119***	(0.00410)	0.0982***	(0.00377)
Previous unemp. duration	-0.000145***	(1.49e-05)	-0.000195***	(1.13e-05)
Previous unemp.duration_2	2.40e-08	(1.93e-08)	8.53e-08***	(1.48e-08)
Constant	3.106***	(0.0170)	3.381***	(0.0129)
Observations	89,034		133,711	
R-squared	0.418		0.247	
Log Likelihood	-7,459		-9,139	

*Note: References categories: Native Spanish, lower secondary education level, low level of qualification required in the job, services sector, size_1_9, temporary. Quarterly unemployment rate and age are time-varying variables. Yearly dummies are included in the estimation. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.*

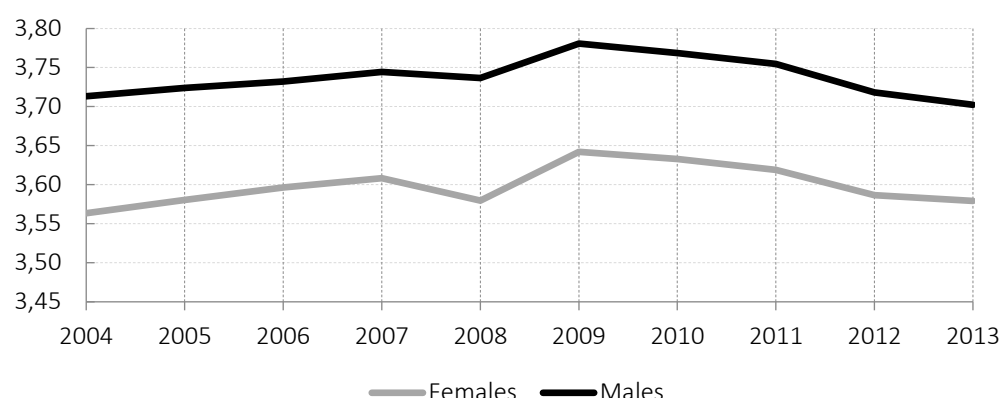
The larger the firm size, the higher the wages,²² especially for men. For both sexes, on-call contract is the type of contract with a higher wage, followed by open-ended, temporary and permanent contracts. The positive effect of working for a temporary help agency is similar for men and women. Longer previous unemployment spells are costly to all workers and more for males.

Figure 3 shows the evolution of log initial wages for a benchmark man and woman over the period 2004-2013. We find similar patterns for both sexes, a moderate growth in the wages during the expansion period followed by a decline in 2008 and an immediate increase in 2009. All these changes are slightly stronger for women. From 2009 a declining trend is observed,

²² The fact that larger firms pay higher wages is also predicted by the Burdett and Mortensen (1998) model.

particularly for men. As a consequence, there is a smooth reduction in the gender differential during the crisis. Male wages are somewhat more negatively influenced by the conditions of the labour market and the time trend is more unfavourable for men, perhaps because men had to move more often than women to other industries in order to leave unemployment, given the sectorial character of the crisis.

Figure 3. Evolution of log initial wages 2004-2013 for a benchmark individual. Male and Female.



Note: Benchmark individual: native, no children, lower secondary, and living in a municipality with fewer than 40,000 inhabitants, low level of qualification required in the job, working in private sector, in a small company (1-10), in services sector, non-manual occupation, non-high technology, with temporary contract, non THA. Unemployment rate of the second quarter of each year; Average age=33. Previous unemployment duration=167 days.

The role of compositional variation by gender in initial wages

Table 7 shows the results of the decomposition of mean differences in log wages between males and females in two economic periods. Using the methodology described in Table 5, the first rows give the average log wages for males and females in each economic period according to the estimated models, and the difference between them. For example, in the expansion period, the average log wage was 3.88 for males and 3.78 for females, so the gender gap was 10% in favour of males. In the downturn, the increase in the average real wages was higher for women than for men, leading to a smaller gender gap (7.2%). The gender wage gap after controlling for observed and unobserved heterogeneity is significantly higher than the observed wage gap²³ suggesting that the sample characteristics of the women help to reduce the gross wage gap. This is in line with Guner et al. (2014).

²³ Available upon request.

Table 7. Decomposition analysis of gender gap in initial wages.

	Expansion		Recession	
Total Differences	0.10	100%	0.072	100%
males	3.88		3.90	
females	3.78		3.83	
Composition effects	-0.02	-17%	-0.04	-55%
Behavioural effect	0.12	117%	0.11	155%

Note: Evaluated at female coefficients.

The remaining rows show the two components that contribute to explaining the gender gap: the composition effect (explained part) and the behavioural effect (residual part). For the two periods, the gender gap is explained by the differences in the returns to the characteristics and women's characteristics dampen the behavioural effect. In the downturn the gender gap in initial wages narrows²⁴ due to a moderate reduction of the residual part, mainly associated with changes in time trend (already described in Figure 3), and women's gain in composition characteristics.

6.3. Differentials in job duration (to non-employment) over the business cycle

Table 8 presents the estimation results of the hazards for job transitions to another job and to non-employment,²⁵ for male and female samples including personal and job characteristics and labour market conditions. The best likelihood is obtained using a discrete unobserved heterogeneity distribution with two mass points.²⁶ Estimate for models that add sequentially explanatory variables are available upon request. In the discussion, we focus on our benchmark model (in job to non-employment exit) and we point out substantial differences with the other specifications.

Coefficients on the covariates

Local unemployment is positively correlated with transitions to non-employment, particularly for men. Young and older workers have less stable jobs than middle-aged workers and differences by gender in favour of men's job tenure increase gradually with age.

²⁴ This is in line with Guner *et al.* (2014) but not with Murillo and Simón (2014).

²⁵ In this context, exits to non-employment include transitions to unemployment (with and without benefits) and out of the labour force.

²⁶ Estimations with three mass points do not converge.

Immigrants have less stable jobs than natives (and the effect is intensified by the characteristics of the jobs of immigrants), especially Spanish speaking immigrants. The effect for non-Spanish speaking immigrants is smaller for women than for men. Unlike men, women with dependent children have more chances to fall into non-employment (i.e., 10% for children younger than four).

A higher level of education increases job stability for both samples. Furthermore, this effect is intensified by the characteristics of the jobs associated with each level of education. For primary level of education, the effects of job characteristics reducing stability are similar for both sexes, but for the upper and post-secondary levels of education, the effect of job characteristics adding stability is stronger for men. Possibly this is because men are more likely to receive job specific training which protects them against layoffs. Living in larger cities increases the job hazard rates for women but decreases them for men.

In order to interpret the coefficients of current job characteristics it is important to note that they may capture causal effects but also (time-persistent) heterogeneity. Workers in non-manual occupations have more stable jobs than manual workers. The influence of the industry on job duration varies by gender. Female employees in construction exhibit the lowest job hazard (-14.5%), followed by services and manufacturing industries. In contrast, male workers in manufacturing show the lowest exit rates, followed by services and construction. Moreover, jobs in sectors with more intensive technology seem to be more stable than other jobs. While women working in the public sector are (4.6%) less likely to become non-employed than those in the private sector, the opposite is true for men (18.5%). Job stability and gender differences in favour of males' job stability increase with firm size.

The influence of the type of contract on job stability is as expected, with differences by gender in the magnitudes of the coefficients. Workers from temporary help agencies have less stable jobs. Higher part time coefficients are associated with more stable jobs. Workers with higher wages exhibit more chances to become non-employed, particularly women.

Table 8. Estimation results of the correlated competing risks model (job to other job and non-employment)

	Females sample				Male sample			
	Job-to-Job		Job-to-non-emp		Job-to-Job		Job-to-non-emp	
	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE
Unemployment rate	-0.0149***	(0.00151)	0.00857***	(0.000692)	-0.0124***	(0.00132)	0.0154***	(0.000656)
Age	-0.0233***	(0.00715)	-0.0176***	(0.00358)	0.0257***	(0.00578)	-0.0230***	(0.00322)
Age2	6.24e-05	(9.75e-05)	0.000239***	(4.75e-05)	-0.000524***	(7.83e-05)	0.000304***	(4.27e-05)
Spanish speaking imm.	0.121***	(0.0462)	0.223***	(0.0232)	0.0369	(0.0299)	0.238***	(0.0157)
Non_Spanish speaking	-0.0468	(0.0376)	0.0869***	(0.0172)	-0.0439*	(0.0243)	0.154***	(0.0122)
Children<4	-0.199***	(0.0199)	0.0928***	(0.00987)	-0.00629	(0.0162)	-0.0314***	(0.00942)
Children>3 & <16	-0.0824***	(0.0161)	0.0389***	(0.00760)	0.0287**	(0.0138)	-0.0211***	(0.00757)
Primary	-0.124***	(0.0226)	0.0494***	(0.00960)	-0.0271*	(0.0147)	0.0524***	(0.00778)
Upper_secondary	0.0452***	(0.0164)	-0.0803***	(0.00845)	0.0490***	(0.0153)	-0.0981***	(0.00918)
Post_secondary	0.117***	(0.0200)	-0.221***	(0.0114)	0.133***	(0.0236)	-0.231***	(0.0158)
Inhabitants>40,000	-0.0848***	(0.0131)	0.0515***	(0.00664)	-0.0345***	(0.0115)	-0.0325***	(0.00651)
Public Sector	-0.382***	(0.0236)	-0.0477***	(0.0112)	-0.463***	(0.0293)	0.170***	(0.0139)
Dummy missing firm size	0.923***	(0.0332)	0.398***	(0.0216)	0.789***	(0.0241)	0.433***	(0.0159)
size_10_19	-0.0540**	(0.0243)	-0.110***	(0.0125)	-0.0244	(0.0183)	-0.111***	(0.0102)
size_20_49	-0.0657***	(0.0215)	-0.160***	(0.0111)	-0.0634***	(0.0177)	-0.171***	(0.01000)
size_50_249	-0.177***	(0.0192)	-0.184***	(0.00966)	-0.198***	(0.0178)	-0.230***	(0.0101)
size_250	-0.336***	(0.0202)	-0.261***	(0.0102)	-0.364***	(0.0213)	-0.301***	(0.0125)
Construction	-0.174***	(0.0430)	-0.157***	(0.0259)	-0.146***	(0.0151)	0.0493***	(0.00857)
Manufacturing	-0.360***	(0.0287)	0.0550***	(0.0124)	-0.307***	(0.0200)	-0.0524***	(0.0109)
Non_manual	0.0115	(0.0153)	-0.198***	(0.00786)	0.0155	(0.0161)	-0.162***	(0.00973)
High technology	0.0702*	(0.0396)	-0.0723***	(0.0234)	0.0538*	(0.0302)	-0.0603***	(0.0200)
Open ended	-1.056***	(0.0294)	0.0182*	(0.00946)	-1.200***	(0.0428)	0.169***	(0.0133)
On_call_temp	-0.0817***	(0.0227)	-0.0839***	(0.0119)	-0.126***	(0.0290)	-0.170***	(0.0169)
Permanent	-0.954***	(0.0194)	-1.418***	(0.0126)	-1.047***	(0.0175)	-1.300***	(0.0116)
THA	1.167***	(0.0231)	0.179***	(0.0175)	1.015***	(0.0232)	0.205***	(0.0180)
Part time coef.	-0.442***	(0.0345)	-0.173***	(0.0173)	-0.457***	(0.0439)	-0.216***	(0.0249)
Unemp_dur_1	-0.0002***	(4.29e-05)	5.47e-05**	(2.16e-05)	-0.000436***	(4.13e-05)	3.61e-05*	(2.09e-05)
Real_daily_salary	0.00771***	(0.000393)	0.00674***	(0.000218)	0.00505***	(0.000325)	0.00460***	(0.000198)
V1	-0.164***	(0.0394)	0.0663***	(0.0116)	-0.466***	(0.151)	0.143***	(0.0328)
a1	1.493***	(0.355)			-0.503	(0.503)		
Observations	726,409				742,206			
Joint Log Likelihood	-910,970				-986,939			
Number of individuals ²⁷	78,712		78,712		87,583		87,583	
Number of exits	27,320		99,691		34,673		102,811	

Notes²⁸: See table 6 for benchmark characteristics. Piecewise baseline and discrete distribution of unobserved heterogeneity with 2 mass points. For female estimation, $Pr(\text{Type I})=81.7\%$; $Pr(\text{Type II})=18\%$; $V2(\text{other job})=0.73$; $V2(\text{non-employment})=-0.3$; $Rho=-1$; For male estimation, $Pr(\text{Type I})=38\%$; $Pr(\text{Type II})=62\%$; $V2(\text{other job})=0.28$; $V2(\text{non-employment})=-0.09$; $Rho=-1$; Significance levels: *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Previous unemployment duration correlates differently by gender. It is hardly associated with subsequent job stability for men (small coefficient and low significance level). Maybe two opposite effects cancel out: longer time with unemployment benefits allows workers to wait until a good job match arrives²⁹ but the scarring effect reduces their job options and makes them accept worse jobs (with shorter tenure). On the other hand, previous unemployment duration is positively associated with the women's hazard rate. This may reflect the lower job opportunities and shorter unemployment benefit periods of women that lead them to accept less stable jobs.

Unobserved heterogeneity

²⁷ The number of individuals starting a job spell is lower than the one mentioned in Section 3 due to some missing values in real initial wages.

²⁸ Yearly dummies are also included in the estimation. Interactions of industry and yearly dummies were tried out but excluded because they did not contribute much.

²⁹ From job matching theory, jobs are experienced goods and good job matches are those that survive longer.

The unobserved heterogeneity parameters show that the groups with lower job to non-employment turnover tend to have higher job-to-job transitions and vice versa for both genders. Most male workers (62%) belong to a group in which hazard rates to other job are above average and hazard rates to non-employment are below average. However, most female workers (82%) have lower probabilities to transit to another job than the average and virtually similar probabilities to become non-employed as the average.

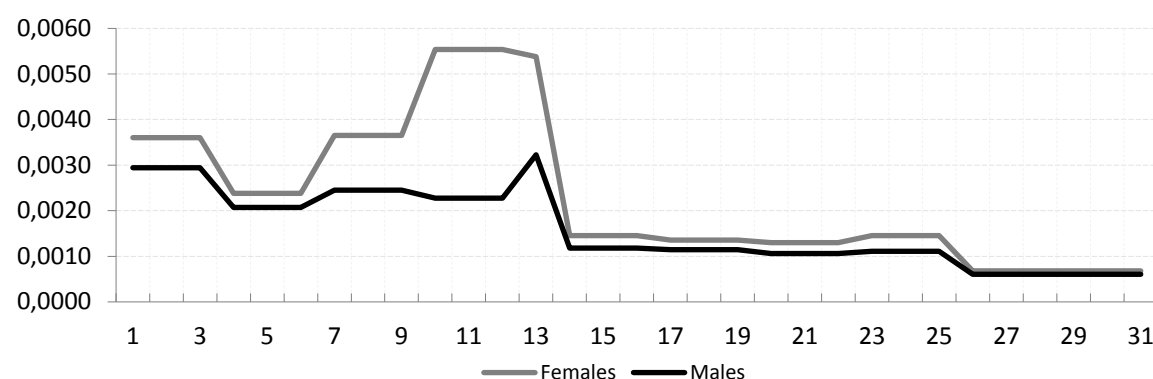
Baseline Hazard Estimates

Analogous to Figure 1, Figure 4 shows the hazard function of the competing risks model for exits to non-employment for a male and a female worker in a year representative of the expansion period. Patterns for males and females are quite similar with the exception of a higher exit rate from job to non-employment in months 7-13 for women, probably associated with the seasonal nature of female activities. Afterwards there is a sharp decline in exit rates.³⁰ Thus, initially there is a positive duration dependence, markedly stronger for females, that subsequently turns negative. This confirms the pattern predicted by the job matching theory, after a stage of learning (employees and employers) from the matching quality, good matches survive.

Analogous to Figure 2, Figure 5 shows the influence of the business cycle on the probability of job exits to non-employment after 12 months in the job for a benchmark male and female, controlling for observed and unobserved heterogeneity. This probability remains quite stable for the period 2005-2007 for both sexes and increases from 2007 to 2012, with a large growth in 2008, particularly for males. As a consequence, the gender gap in exits to non-employment decreases in the downturn. Nevertheless, it is worth to note the stronger decline in the job exit probability for males in 2013, which may point to an increase in the gender gap in the near future.

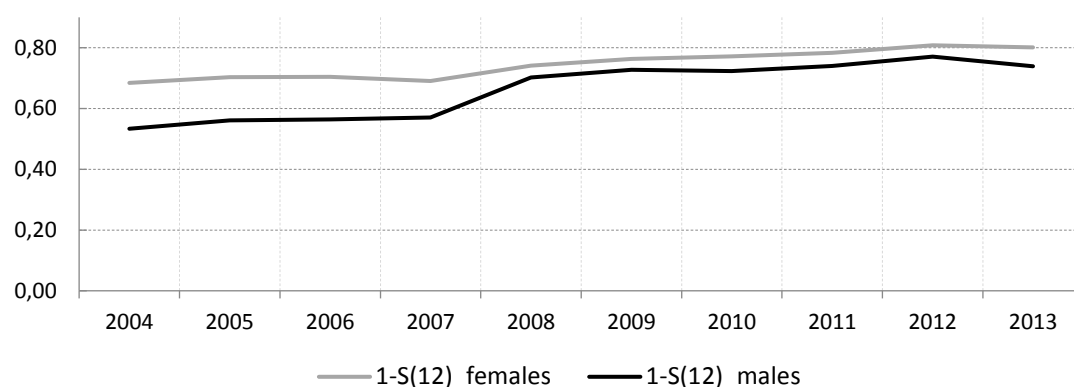
³⁰ In line with this, Rebollo (2012) finds a spike in the probability of leaving employment corresponding to the moment in which the employee qualifies for unemployment benefits.

Figure 4: Hazard rates benchmark person for job to non-employment transition. Females and Males; competing risks Model. Duration in months



Note: Benchmark person: Unemployment rate= 10.28; age=33; native, no children, lower secondary level of education; year 2004; private sector; size_1_9; services sector; non-manual occupation; non-high Technology; temporary contract; no THA; part time coefficient=0.9; previous unemployment duration= 167 days; real daily wage= 46.01.

Figure 5: Probability of exiting to non-employment after 12 months in the job. Females and Males. 2004-2013.



Note: See note of figure 4 for benchmark characteristics. Here the unemployment rate corresponds to the unemployment rate of the second quarter of each year.

The shape of these functions captures the changes in the regional unemployment rate and the time trends. The positive effect of unemployment rate and the increasing time trend in job exits are higher for males, mostly during the recession period. The economic slump therefore influences men's job stability more negatively, which is consistent with males tending to be employed in more procyclical occupations. But the characteristics of their jobs (showing a growing job stability pattern during the recession, unlike women) act in the opposite direction, which would lead to more job stability for men.

Table 9 shows the results of decompositions³¹ of the gender gap in job duration, using the methodology presented in Table 5. Gender inequality is measured as the difference between

³¹ According to our goals, the decomposition analysis is studied for the job to non-employment transition.

the survival probabilities after 360 days for the male and female sample, in two different economic periods. For instance, the first rows show that the average probability of not exiting to non-employment was 49.8% for males and 41.9% for females in the expansion period, a difference of 7.9%. During the recession this probability decreases to 36.9% for males and 37.6% for females, so that the gender gap disappears.

Table 9: Decomposition analysis for exits from job to non-employment

	Expansion		Recession	
Total Differences	7.9%	100%	-0.7%	100%
$\overline{S(12)}_{males}$	49.8%		36.9%	
$\overline{S(12)}_{females}$	41.9%		37.6%	
Composition effects	-4.7%	-59.6%	-4.8%	686%
Behavioural effect	12.6%	160%	4.1%	-586%

Note: evaluated at female coefficients. For notation, $\overline{S(12)}_{Males(Females)}$ is the average survival probability at month 12 under the model males (females) and for the sample of men (women).

The remaining rows show the decomposition of these observed inequalities between men and women into a composition effect and a behavioural effect. The results suggest that the gender gap in the expansion period is not explained by differences in characteristics but by differences in coefficients. Differences in coefficients may be due to different reasons, such as differences in job match quality, productivity, motivation, or discrimination behaviour, but as said before we cannot distinguish them. The women's characteristics as a whole contribute to decreasing (-4.7%) the gender gap. Specifically, gender differences in the distribution of education level, firm size, and proportion of non-manual occupations, as well as the lower wages of females contribute to the increase in the job stability of females.

In the recession period, the gender gap has disappeared and this is driven by a substantial reduction in the behavioural effect, largely associated with the changes in time trend and economic conditions (already analysed in Figure 5) that is cancelled out by the composition effect that remains stable in comparison with the expansion period.

7. Conclusions

In this paper we have examined gender differences in labour market outcomes of the unemployed over the business cycle (2002-2013) in the Spanish labour market. More specifically, we have analysed unemployment duration, consecutive job stability and initial wages after unemployment. Unemployment transitions were explored estimating correlated competing risks models. We focus on transitions from unemployment to any job and consecutive job exits to non-employment. Estimations were done separately for men and women.

We find that men have more cyclical sensitive labour market outcomes than women. This is probably because males tend to be employed in occupations more affected by cyclical fluctuations. This may also reflect the existence of gender occupational segregation.

During the expansion period average unemployment duration is significantly higher for women than for men while consecutive job duration and initial wages are higher for men. A decomposition analysis reveals that these gender inequalities are not explained by observed characteristics; unobserved differences in employees (productivity, job search effort) or employers (discrimination, statistical discrimination) may be behind this, but unfortunately we cannot distinguish between these. Some women's personal (level of education) and job (firm size, non-manual occupation) characteristics contribute to narrowing these gender inequalities.

In the downturn job finding rates and job stability decrease more for men than for women, probably associated with men's occupation types, eliminating the aggregated gender inequalities. Male wages increase less than female wages slightly narrowing the gender gap in initial wages. Perhaps, this is because men had to move more often than women to other industries to leave unemployment, suffering a penalty of wages.³²

While a higher level of education protects especially women from unemployment, having children hampers women's employment and initial wages after unemployment. There are lower gender gaps in the public sector, where women tend to be more concentrated in jobs requiring high qualifications, in small firms and in firms that are more technology-intensive.

³² The crisis in Spain led to a fall of construction and manufacturing jobs (male concentrated sectors).

The possibly transitory equality of male and female unemployment exits and re-entries in the downturn should not be confused with the absence of gender inequalities,³³ so policy measures should be addressed at reducing them in line with Europe 2020 goals.

From a policy point of view this study has the limitation that demand and supply factors were not disentangled. As a consequence, we cannot distinguish the reasons behind the behavioural effects, such as discrimination, differences in productivity, motivation, as well as stigma effects and discouraged effect in job finding process.

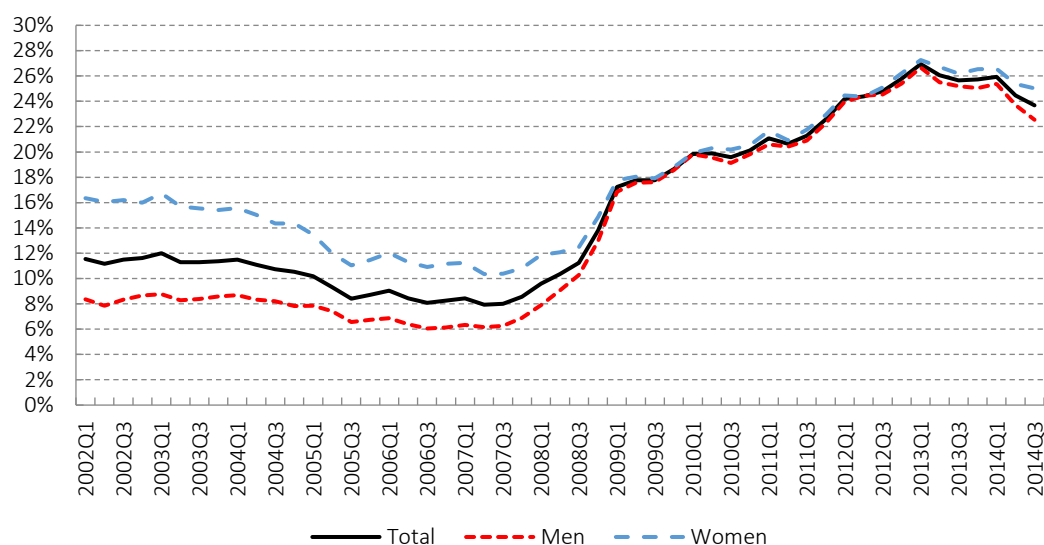
In spite of this limitation, some policy measures formulated to reduce gender inequalities might stem directly or indirectly from this analysis. Low-educated women, who are at a disadvantage relative to similar men, require special attention from policymakers, through, for example, labour market policies enhancing their level of skills. In addition, the opposite response of having children on labour market outcomes in favour of men, may suggest the necessity of policy measures addressed at changing the “traditional” gender roles, through, for instance, education and media, accompanied by reconciling work and family measures, such as fostering flexible and continuous schedules and improving conditions of part time jobs. Finally, one direct measure to promote employment and higher wages for women could be to foster gender equality policies in the workplace, such as involving women in firm continuous training and increasing women’s participation in decision making positions and new emerging sectors such as high technology ones.³⁴

³³ Based on other estimations (not shown), differences in the return to individual characteristics exist in the two different economic periods.

³⁴ Given the lower gender gap found in high technology industry and the gender dimension of Europe 2020 seeking for involving more women in IT jobs.

Appendix

Figure A1. Evolution of unemployment rate by gender in Spain. 2002Q1-2014Q3



Source: Labour Force Survey.

Table A1. Definition of explanatory variables.

Individual characteristics	
Age	It is a continuous time-varying covariate. Values between 16 and 55 years old.
Native	1 if Spanish nationality.
Spanish-speaking immigrants	1 if immigrant comes from a Spanish-speaking country.
Non-Spanish speaking immigrants	1 if immigrant comes from a non-Spanish-speaking country.
Children in the household younger than 4 years old	1 if there are children younger than 4 years old in the household and difference in age between the individual and the children is more than 16 years.
Children in the household between 4 and 15 years old	1 if there are children between 4 and 16 years old in the household and difference in age between the individual and the children is more than 16 years.
Primary education	1 if none and elementary education level.
Lower secondary education	1 if lower secondary education level (middle school).
Upper secondary	1 if upper secondary level (high school).
Post-secondary	1 if post-secondary (or tertiary) education level.
Macroeconomic variables	
Regional Unemployment rate	Quarterly unemployment rate by region (time-varying); source: Economically Active Population Survey (EPA). The region of the individuals constructed as a time-varying covariate.
Job vacancy rate by industry	Quarterly job vacancy rate by industry (time-varying); source: Eurostat. This is assigned to the industry (construction, manufacturing and services) of the former job (or subsequent job if the latter one was missing).
Inhabitants>40,000	1 if the number of inhabitants of the municipality where the individual is living is greater than 40.000. The municipality where the individual is living constructed as time-varying covariate.
Year dummies	Annual year dummies.

Table A1, continued

	Job characteristics
Non-manual occupation	1 if non-manual occupation
Industry	Dummies for manufacturing, construction and services industries.
High Technology	1 if sector of activity is high technology according with the classification of industries by technological level.
Type of contract	Permanent, on-call temporary, temporary, open-ended.
Part-time coefficient	Hours worked as a fraction of full time work (1 is a full time job)
Temporary Agency	1 if the employment is signed through a temporary help agency.
Size of the firm	Dummies for 0 (missing), 1-19, 10-19, 20-49, 50-249, >250
Daily wages	Real annual wage (gross salary) divided by the number of days worked in the year by employer. For reliability we have applied a filter in 1 st and 99 th percentile to this variable. It is a time varying variable
Public Sector	1 if the employer is Public Sector.

Source: Own elaboration

Note: Education level is constructed as a constant variable from the more recent LWLS given that from 2009 LWLS information for education level is more reliable.

References

- Altonji J, Blank R (1999) Race and gender in the labour market, in Ashenfelter O and Card D (eds) *Handbook of Labor Economics* 3C:3143-3259. Elsevier. Amsterdam
- Azmat G, Güell M, Manning A (2006) Gender Gaps in Unemployment Rates in OECD Countries. *Journal of Labour Economics* 24(1):1-37.
- Barron JM, Black DA, Loewenstein MA (1993) Gender differences in training, capital and wages. *Journal of Human Resources* 28(2):343-364.
- Bijwaard GE (2014) Unobserved heterogeneity in Multiple-Spell Multiple-States Duration Models, *Demographic Research* 30(58):1591-1620.
- Bover O, Arellano M, Bentolila S (2002) Unemployment duration, benefit duration and the business cycle. *Economic Journal* 112(479):223-265.
- Brown S, Roberts J, Taylor K (2011) The Gender Reservation Wage Gap: Evidence from British Panel Data, *IZA Working Paper Series*.
- Burdett K, Mortensen D (1998) Wage Differentials, Employers Size, and Unemployment. *International Economic Review* 39(2):257-273.
- Cebrián I, Moreno G (2007) El empleo femenino en el Mercado de trabajo en España. *Temas laborales* 9:35-56.
- De la Rica S, Rebollo-Sanz Y (2015) Gender Differentials in Unemployment Ins and Outs during the Great Recession in Spain. *IZA DP N° 9135* June 2015.
- De la Roca J (2014) Wage cyclicity: Evidence from Spain using social security data. *SERIEs* 5(2-3):173-195.
- Dolado JJ, Felgueroso F, Jimeno JF (2001) Female employment and occupational changes in the 1990s: how is the EU performing relative to the US? *European Economic Review* 45(4-6):875-889.
- Dolado JJ, Felguersosa F, Jimeno JF (2004) Where do women work: analyzing patterns in occupational segregation by gender? *Annales d'Economie et de Statistique* 71-72.
- Donohue J (1988) Determinants of job turnover of young men and women in the United States. A hazard rate analysis. *Research in population Economics* 6:257-301.

- Eusamio, E (2004) El Diferencial de las Tasas de Paro para Hombres y Mujeres en España (1994-1998). CEMFI, Thesis nº 0404.
- Farber H (2015) Job Loss in the Great Recession and its Aftermath: U.S. Evidence from the Displaced Worker Survey. IZA DP No 9069.
- Frederiksen A (2008) Gender differences in job separation rates and employment stability: New evidence from employer-employee data. *Labour Economics* 15(5):915-937
- Guner N, Kaya E Sánchez-Marcos V (2014) Gender gaps in Spain: policies and outcomes over the last three decades. *SERIEs* 5(1):61-103.
- Heckman J, Singer B (1984) The identifiability of the proportional hazard model. *Review of Economic Studies* 51(2):231-241.
- Hospido L (2009) Gender Differences in Wage Growth and Job Mobility of Young Workers in Spain. *Investigaciones Económicas* 33(1):5-37.
- Kalbfleisch JD, Prentice RL (2002) The statistical analysis of failure time data. Second Edition. New York: Wiley.
- Koeber C, Wright D (2006) Gender differences in the reemployment status of displaced workers human capital as signals that mitigate effects of bias. *Journal of Socio-Economics* 35(5):780-796.
- Murillo I, Simón H (2014) La Gran Recesión y el diferencial salarial por género en España. *Hacienda Pública Española* 208(1):39-76.
- Nagore and van Soest (2014) Unemployment Transitions to Stable and Unstable Jobs Before and During the Crisis. IZA Discussion Paper No 8121.
- OECD (2004) Education at a glance: OECD Indicators 2004, Paris: OECD.
- Perucci C, Perucci R, Dena B (1997) Gender Differences in the Economic, Psychological and Social Effects of Plant Closing in an Expanding Economy. *The Social Science Journal* 34(2):217-233.
- Peña-Boquete Y (2014) Have the economic crises reduced the gender gap on the Spanish labour market? *Revue de l'OFCE* 2/2014 (Nº 133):277-302.
- Petrongolo B (2004) Gender Segregation in Employment Contracts. *Journal of the European*

Economic Association 2(2-3):331-345.

Rebollo-Sanz Y (2012) Unemployment insurance and job turnover in Spain. *Labour Economics* 19(3):403-426.

Royalty A (1998) Job-to-Job and Job-to-Non-employment Turnover by Gender and Education Level. *Journal of Labour Economics* 16(2):392-443.

Şahin A, Song J, Hobijn B (2010) The Unemployment Gender Gap During the Current Recession. *Current Issues in Economics and Finance* 16(2):1-7.

Theodossiou I (2002) Factors Affecting the Job-to-joblessness Turnover and Gender. *Labour* 16(4):729-746.

Van den Berg, GJ (2001) Duration models: Specification, identification, and multiple duration. In J. Heckman and E Leamer (Eds.), *Handbook of Econometrics*, Vol. V. Amsterdam:North-Holland, pp. 3381-3460.

Verho J (2014) Unemployment duration and the role of compositional variation: evidence from a period of economic crisis in Finland. *Empirical Economics* 47:35-56.

Wilkins R, Wooden M (2013) Gender differences in Involuntary Job Loss: Why are men more likely to lose their jobs? *Industrial Relations* 52(2):582-608.

