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

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The paper is preliminary.

Abstract

Using administrative record data from Spanish Social Security over the time 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. We find that both the flows from unemployment to employment and vice versa play a role in explaining the gender gap in the unemployment rate. Gender differentials in labour market outcomes are procyclical, probably due to the procyclical nature of typically male occupations. Decompositions show that the gender gaps are not explained by differences in sample composition but in their returns. 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.

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1 Introduction

Differences in unemployment rates between males and females in the Spanish labour market have been persistent for a long time but strongly declined during the recent economic crisis. According to the Labour Force Survey[2], in the first quarter of 2002 the female unemployment rate was twice that of males (8%), in contrast, during the crisis this divergence virtually disappeared: the unemployment rate in the first quarter of 2013 was around 27% for both men and women. In this paper, we analyse whether this decline stems from the convergence of unemployment and/or re-employment probabilities for men and women during the crisis and explore if this is accompanied by a reduction in the gender gap in the initial wages of the unemployed who have found a job. We decompose all these differences into variation in the sample composition and residual changes induced by different returns to the characteristics. Few studies have analysed the relationship between gender and labour market outcomes other than wages or earnings. 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) identifying the labour market flows accounting for the gender gap in unemployment rates, ii) exploring the changes of gender gaps in labour market outcomes over the business cycle and iii) finding the factors driving to more inequality.

We particularly focus on differences in the unemployment and employment dynamics and on initial wages over the business cycle. Examining the aggregate unemployment rate by gender may mask important gender inequalities (Queen and Sen, 2010), so it is relevant to decompose it in flows into and out of unemployment. Azmat et al. (2006) find that high-gap countries[4] tend to have larger gender gaps in both flows from employment to unemployment and vice versa. Variation of the gender divergence of the unemployment rate over the business cycle shows the relevance to explore this issue in boom and bust periods.

[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 http://www.eesc.europa.eu.

[4] High gap countries are countries in which the female unemployment rate is much higher than the male. This is the case in Mediterranean countries (Spain, Greece, Italy and France).

Economic theories provide several explanations for differences in labour market outcomes by gender[5] 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. Queneau and Sen (2008) also argue that differences in reservation wages are ambiguous: "On the one hand, if women incur greater search costs than men, their reservation wages should, all else equal, be lower than those of men (Lippman and McCall,1976). On the other hand, women may have higher reservation wages than men due to a greater propensity to engage in housework and childcare." Discrimination via employer prejudice or statistical discrimination[6] may also be behind gender differences in labour market outcomes. If employers expect women to leave the job sooner than men, they will be less willing to invest in their training (Donohue, 1988) or may allocate them 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 activities predicts labour market outcomes of the group allocated to more procyclical occupations to be more dependent on the business cycle.

Empirical evidence on gender divergences in labour market outcomes other than wages 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 the probability to fall back into unemployment? And finally, how do all of those 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 between males and females during the period 2002-2013. Moreover, we compare the initial wages after an unemployment spell and their determinants for the 2004-2013 period.

[5] For a review of this literature, see Altonji and Blank (1999).

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

An important contribution 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 of a large sample. We construct a sample that includes all the unemployment benefit spells and the consecutive job spells that started between 2002 and 2013, and we observe individuals until the end date of the spell or December 2013. We avoid left-censoring, but do have a limited number of long right censored spells. To examine the probabilities of leaving and re-entering unemployment, we estimate bivariate mixed proportional hazard rate models. The analysis of initial wages after re-employment is carried out using standard linear regressions, separately for men and women and controlling for individual and job characteristics and economic conditions.

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 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 policies[8] 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 and Queen and Sen (2010) point out the status of women relative to men as a measure of progress.

However, the literature on the gender gap has focused mainly on pay and participation divergences and studies on the gender gap in unemployment are scarce. International evidence on the different impact of the business cycle on unemployment by gender concludes that gender segregation and the concentration of males in specific

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

industries and occupations are crucial explanatory factors. For the US, Nielsen (1984) argues that the sector distribution and the specific sectors affected by the recession lead to higher unemployment rates for men during recessions. Rives and Sosin (2002), developing occupation-weighted unemployment rates, found that the gender distribution across occupations favours lower unemployment rates for women.

Decomposing the unemployment rate into flows into and out of unemployment, Azmat et al. (2006) in a cross-country study using data from the European Community Household Panel (ECHP) for 1994-1999, found that high-gap countries tend to have larger gender gaps in both the flows from employment to unemployment and vice versa. Sahin et al. (2009) affirm that in the US, the higher unemployment rate of males during the 2007 recession stems from their higher unemployment inflow, which is a consequence of the deterioration of male dominated industries and of the increase the number of men that enter the labour force but fail to find a job.

Studies on unemployment and employment exits using separate equations for men and women have shown that determinants of labour market outcomes vary with 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 relatively high 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 rates. However, few of these studies take into account the influence of the business cycle. Theodossiou (2002) investigates gender differences in labour turnover in the UK and finds that the changing conditions in the labour market have more affected males than females.

Studies for Argentina (Ortega, 2008) and Poland (Malgorzata, 2013) applying non-linear Oaxaca-Blinder decompositions find that the gender inequalities in unemployment rates are due to differences in the returns to characteristics rather than differences in the characteristics, suggesting the possibility of labour market discrimination against women.

Studies that focus on gender differences in labour market outcomes other than wages are also scarce in Spain. Eusamio (2004) using data from ECHP for the period 1994-1998, found that women have more difficulties to leave unemployment and higher probabilities to leave their job. She considered both individuals starting an unemployment spell or an employment spell. From a non-linear Oaxaca decomposition, she found that men and women have the same characteristics but these are rewarded differently. Ahn and Ugidos-Olazabal (1995), using the *Encuesta de Calidad de Vida en el Trabajo (ECVT)*[9] of 1985, explored the determinants of unemployment durations separately for men and women, distinguishing exits to employment and out of the labour force. Alonso-Villar and del Río (2008) found that agglomeration especially favours women in terms of unemployment rates. Hospido (2009) using ECHP (1994-2001) for young workers showed that turnover rates are similar by gender but the factors that affect them differ. Moreover she points out the existence of a gender wage penalty for interruptions and mobility. Peña-Boquete (2014) 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 during the 1977-2013 period. Using the *Encuesta de Población activa* (EPA) data, 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. Finally, Murillo and Simón (2014) examined the evolution of the gender gap in Spain between 2002 and 2010 using the Wage Structure Survey. They found that the decreasing trend of the 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.

[9] The Survey on Quality of Life at Work.

3 Data and descriptive statistics

The data we use come from the Longitudinal Working Lives Sample[10] (LWLS) based upon administrative records from the Spanish Social Security Administration (SSA). The LWLS is collected annually since 2004 and contains historical information on a four percent random sample of the population who ever had any relationship with the SSA in the sample period, paying contributions or receiving benefits. It has approximately one million people. 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 contains information on individual characteristics such as gender, age, and nationality, firm and job attributes such as firm size, sector of activity, annual wages[11] and type of contract, as well as information related to contributory and non-contributory benefits. It therefore allows us to analyse how the labour market transitions correlate with individual and job characteristics.

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 the consecutive job spells. 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 old, avoiding exits through early retirement and workers in the Social Security Regime[12]. We remove individuals with incomplete information or any degree of disability and observations from Ceuta and Melilla. We drop overlapping spells. We only include spells that last at least 31 days (after recoding) since the very short spells normally are an administrative artefact and cannot be considered as serious labour market states.

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,

[10] We use the LWLS version with fiscal data.

[11] We use the tax module to obtain information on wages. See Arranz and García Serrano (2011)

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

the immediate exits (within 31 days after the end of the job spell) we separate are finding another job and non-employment (with or without benefits). They are explained in detail in Table 1. Our definition of unemployment is restricted to spells with receipt of benefits[13]. 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 benefit spell is measured as the difference (in days) between the date of entry into unemployment and the date of ending the unemployment benefit spell, either because unemployment benefits expire or because the worker finds a job. If at the end of the observation period the worker still receives unemployment benefits, the spell is right-censored. Exits for other reasons are also considered 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.

To construct job spells, 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. The limit of 31 days and the requirement that the duration of the new spell is at least 31 days avoid considering the strategic use of unemployment benefits as a job-to-unemployment transition. Job duration is defined as the difference (in days) between the termination date and the starting date of the job. If at the end of the observation period the employee is still working for the same employer, data are

[13] For details about the Spanish Unemployment Insurance System see, e.g., Nagore and van Soest (2014)

considered right censored. Job exits for other reasons are also considered right censored.

The sample of unemployed workers consists of 164,177 women and 167,655 men starting an unemployment spell with benefits during the observation period. Among these, 90,649 women and 99,681 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 unemployment benefits.

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 for males and females.

4.1 Characteristics of unemployment by gender over the business cycle

Personal characteristics such as gender, age, level of education, nationality, children and economic conditions may affect the chances of leaving unemployment. In turn, men and women may differ in these characteristics and that may lead to differences in unemployment exit rates. To explore the gender sample composition over the business cycle, Table 2 shows descriptive statistics of unemployed men and women in the periods before (2000-2007) and during the recession (2008-2013). 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).

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.

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

	Expansion period				Recession period			
	Females		Males		Females		Males	
Variable	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
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
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	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
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	89,751		82,864		126,356		133,234	

Source: Own elaboration using LWLS and the Spanish Labour Force Survey (quarterly regional unemployment 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.
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. Variable definitions are given in Table A1 (Appendix).

The distribution of education level varies by gender and slightly by economic period. Most unemployed individuals have lower-secondary level of education, in the expansion period 40% (43.8%) of women (men). Nevertheless, a higher share of women is high qualified. For instance, 15.4% (17.7%) of women while only 8% (9.1%) of men have post-secondary level in the expansion (recession) period. This is consistent with an OECD report (OECD, 2004) confirming that in Spain, the proportion of female tertiary graduates has surpassed that of men already in the early 1990s.

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

Personal, job characteristics and economic conditions may affect the likelihood of losing the job, and they may differ by gender. 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.

Personal characteristics were already analysed in section 4.1; the differences compared to the unemployment samples are due to differences in job finding rates, which will be analysed in 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.

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

	Expansion period				Recession period			
	Females		Males		Females		Males	
Variable	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
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
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
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
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 contract is open_ended	8.3%	0.28	2.8%	0.16	8.3%	0.28	2.9%	0.17
Current contract is on-call temporary	13.7%	0.34	4.5%	0.21	14.6%	0.35	5.1%	0.22
Current contract is temporary	60.3%	0.49	74.3%	0.44	55.2%	0.50	69.0%	0.46
Current contract is 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	149.60	150.05	127.45	201.01	189.10	202.11	182.21
Number of individuals	48,583		51,950		69,923		76,462	

Note: See 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.

The job characteristics we consider relate to type of occupation, 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 individuals in both samples belongs to services 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 to 4.3% (2.6%) in the recession for men (women).

Information on the size of the firm (number of employees) where the worker is hired is not always available, and we include a dummy for a missing value.[14] Most workers are employed in microenterprises (size_1_9), for instance 38.6% (28%) of men (women) in the pre-recession. 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 that are more common in 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 public sector (16%) is more than twice that of men (7%) in both economic periods.

[14] The main reason is that the information on firm size in the LWLS of a given year is based upon administrative records collected in March of the next year. For many workers, the firm at which they had their last job no longer exists at that time. However, in order to reduce these missing values, we have assigned the more recent firm size available from previous LWLS, however, it is not possible for firms that dissapear before 2004 .

Table 4 presents the evolution of the average initial wages of new full-time jobs (consecutive to unemployment) for men and women during the period 2004-2013. Average initial wages vary by gender and change over time. They are higher for men than for women, but these differences decrease, especially since 2009. Initial wages increased more moderately for men during the expansion period and decreased during the recession (specially for men) with the exception of the increase in 2009 that is more pronounced for women. This might respond to a positive selection of women into employment, so that more qualified women find a job. In contrast, men are more concentrated than women in low-paying occupations[15] and during the recession they more often have to be re-employed into jobs paying lower wages in other sectors.

Table 4. Average real initial daily wages (full time jobs) for males and females. 2004-2013

	Males		Females		Difference
	mean	**Std. Dev**	**mean**	**Std. Dev**	**Male-female**
2004	50.01	16.7	45.05	16.64	4.96
2005	50.74	17.31	46.13	17.49	4.61
2006	50.98	17.28	46.87	17.37	4.11
2007	51.72	17.53	47.42	17.21	4.3
2008	51.36	17.79	46.95	18.09	4.41
2009	52.99	16.77	50.09	18.55	2.9
2010	52.43	16.99	49.71	18.43	2.72
2011	52.36	17.26	49.67	18.59	2.69
2012	51.05	17.44	49.05	19.01	2
2013	50.86	17.51	49.68	19.7	1.18

Source: see table 2.
Note: Real daily wages in euros of 2011.

To sum up, we have found clear gender differences[16] in sample composition. The most important ones relate to level of education and job characteristics. Women have higher level of education than men and are more concentrated in non-manual occupations, services and the public sector. They work more often in large firms and more often work part-time. 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

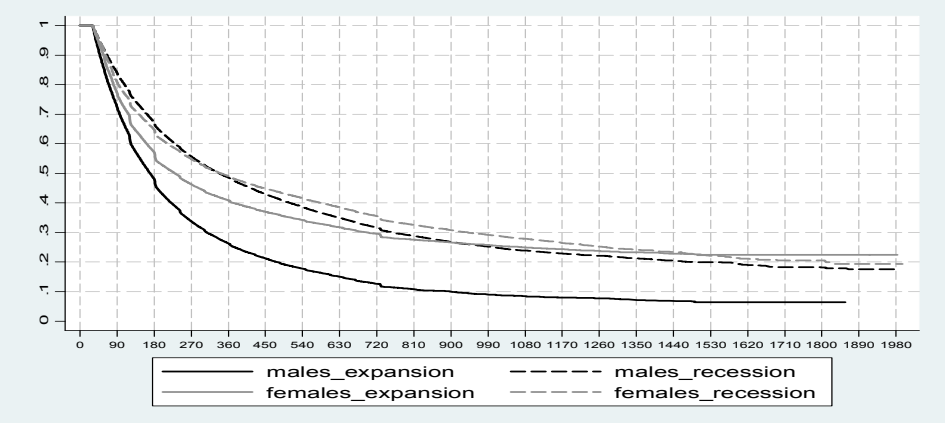
[15] Brindusa et al. (2013) document the recent process of job polarization in Spain, characterized by an increase of occupations at the low end of the wage distribution where males have a higher concentration.
[16] Most of them are in line with Cebrián and Moreno (2007).

women. Third, and probably as a consequence of the previous facts, the reduction of the gender gap in wages. Finally, an important growth of part-time jobs to adjust to fluctuations in demand.

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

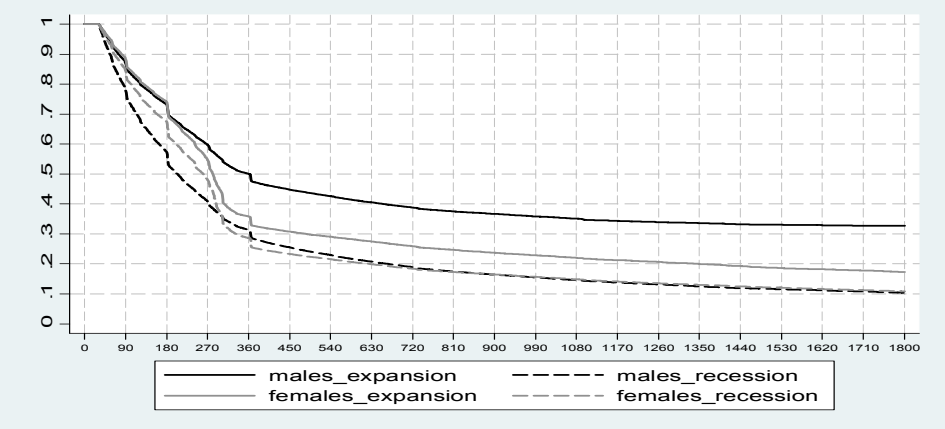
Figures 1 and 2 show Kaplan Meier survival functions for unemployment exits to any job and re-entries to non-employment (treating other types of exits as right-censoring) for males and females in both economic periods. For example, the probability that an unemployed male found a job within a year fell from 75% in the expansion period to 50% in the recession period; these probabilities are 59% and 50% for the female group. On the other hand, the probability of a transition from job to non-employment increased from 50% in the boom period to 68% in the recession for men, and from 65% to 71% for women. Thus, in the expansion period gender differences in unemployment exits and re-entries are substantial, but they are reduced significantly during the crisis.

Figure 1: Kaplan-Meier Survival estimates; exits from unemployment to any job. Expansion (2002-2007) and recession (2008-2013) period. Males & Females. Duration in days



Source: Own elaboration from LWLS.

Figure 2: Kaplan-Meier Survival estimates; exits from job to non-employment. Expansion (2002-2007) and recession (2008-2013) period. Males & Females. Duration in days



Source: Own elaboration from LWLS.

The hazard rates corresponding to these survival functions are sketched in Figures 3 and 4[17]. The empirical hazard rate at time t is the proportion of individuals unemployed (employed) for at least *t* days that find (loss) the job on day *t+1*. The figures confirm that the highest impact of the crisis on unemployment exits and job losses are found for males, particularly in the first year of the spells. In Figure 3 there is a negative association between each hazard rate and the duration of the spell, and it is stronger for males in the expansion period. An exception is the peak in the hazard after two years of unemployment, which corresponds to the maximum duration of contributory unemployment benefits. Figure 4 shows that males and females exhibit similar job loss patterns in both periods, with declining hazards until about 400 days of tenure. Some local peaks are found at 90, 180, 270 and 360 days. These peaks are also found in previous studies and correspond to the usual durations of temporary contracts. More specifically, the pronounced females' peak around 270 days may correspond to seasonal activities that are more common in females. The negative association between hazard and duration in Figures 3 and 4 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.

[17] The estimates use Kernel smoothing.

Figure 3. Kaplan-Meier Kernel smoothed hazard functions; Exits from unemployment to any job. Expansion (2002-2007) and recession (2008-2013) period. Males & Females. Duration in days

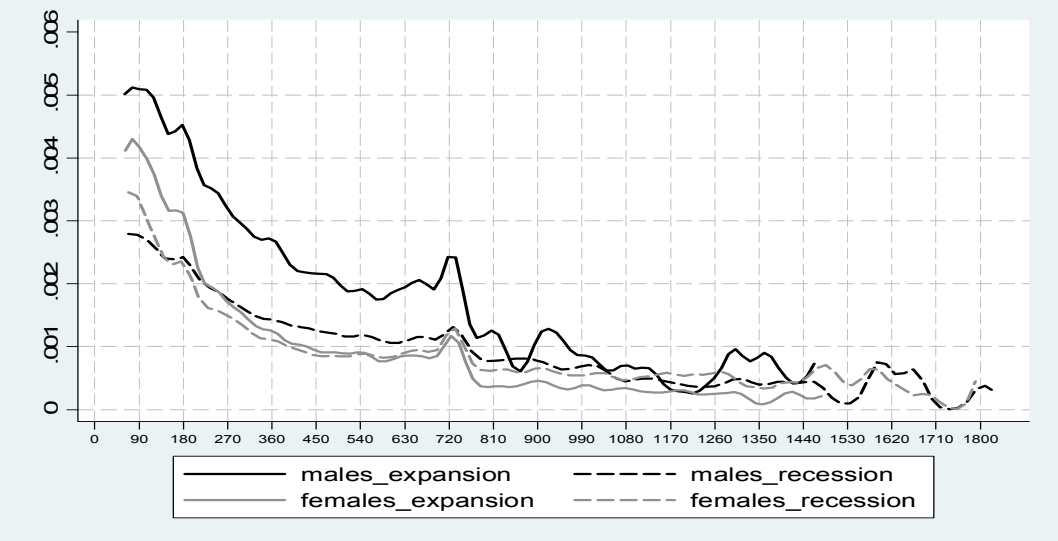
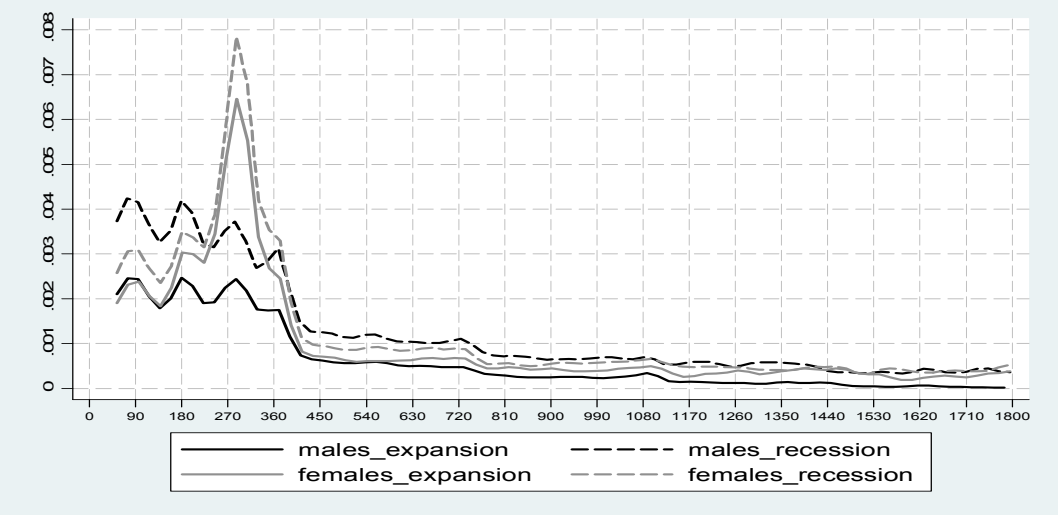


Figure 4. Kaplan-Meier Kernel smoothed hazard functions; Exits from Job to non-employment. Expansion (2002-2007) and recession (2008-2013) period. Males & Females. Duration in days



In short, 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 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.

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 non-employment *(j=2).* This gives the total hazard

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

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) 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:

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

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.*

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**.** This discrete distribution is computationally easier than continuous distributions. Moreover, it is

common in the literature on labour market transitions; see, for instance, Bover et al. (2002), Rebollo (2012), or Bijwaard and Wahba (2014).

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[18]. 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).

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 k^{th} 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)*:

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

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

Here *s=1,…,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 5 presents the estimation results of the correlated competing risks model distinguishing two exits: any job and non-employment. The best likelihood is obtained using a discrete unobserved heterogeneity distribution with three mass points. In our specification, as is well established in the literature, the probability of leaving unemployment depends on individual characteristics such as age, nationality, children and level of education, as well as labour market conditions, such as the regional unemployment rates.

Coefficients on the covariates

We are mainly interested in transitions to work; the other exit is controlled for but not of our primary interest since it merges unemployment without benefits with exit to non-participation; we cannot disentangle the two. We focus on the differences in the determinants of transitions from unemployment to work between males and females. As expected, individuals living in regions with higher unemployment rates have a lower probability of finding a job. The estimated coefficient is larger for women than for men, suggesting that women are more sensitive to regional labour market conditions. 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.

Table 5. 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**
Unemployment rate	-0.0166***	0.00410***	-0.00629***	0.00121**
	(0.000622)	(0.000503)	(0.000541)	(0.000523)
Age	0.0441***	-0.0587***	0.0730***	-0.0644***
	(0.00289)	(0.00247)	(0.00243)	(0.00239)
Age2	-0.000700***	0.000523***	-0.00110***	0.000487***
	(3.90e-05)	(3.31e-05)	(3.27e-05)	(3.21e-05)
Spanish_speaking	-0.110***	0.331***	-0.00475	0.372***
	(0.0210)	(0.0154)	(0.0132)	(0.0124)
Non_Spanish_speaking	-0.141***	0.194***	-0.132***	0.264***
	(0.0156)	(0.0116)	(0.0102)	(0.00933)
Children<4	-0.562***	-0.143***	-0.00104	-0.187***
	(0.00814)	(0.00640)	(0.00738)	(0.00820)
Children>3 &<16	-0.0942***	-0.0857***	0.0598***	-0.132***
	(0.00666)	(0.00578)	(0.00617)	(0.00671)
Primary	-0.111***	0.0544***	-0.0657***	0.0405***
	(0.00921)	(0.00719)	(0.00662)	(0.00662)
Upper_secondary	0.0237***	-0.00187	-0.0696***	0.0596***
	(0.00744)	(0.00622)	(0.00693)	(0.00708)
Post_secondary	0.207***	0.0830***	-0.00943	0.0814***
	(0.00889)	(0.00782)	(0.0102)	(0.0106)
Inhabitants >40,000	0.0585***	0.0591***	0.111***	0.0206***
	(0.00588)	(0.00497)	(0.00522)	(0.00536)
V1	-1.170***	0.300***	-0.576***	0.327***
	(0.0615)	(0.00858)	(0.0224)	(0.00852)
V2	0.318***	-0.00456	0.438***	-0.242***
	(0.0168)	(0.00797)	(0.00873)	(0.00763)
a1	1.034***		4.337***	
	(0.104)		(0.0999)	
a2	1.866***		4.710***	
	(0.0527)		(0.108)	
Observations	1,271,359		1,242,403	
Log Likelihood	-2,503,000		-2,483,000.00	
Number of ids	164,177	164,177	167,655	167,655
Number of exits	179,990	176,172	188,776	165,090

Terms of mass points	**Female sample**			**Male sample**		
	1	**2**	**3**	**1**	**2**	**3**
Probability	27%	63%	10%	40.5%	58.89%	0.5%
V any job	-1.170	0.318	1.234	-0.576	0.438	-4.556
V non-employment	0.300	-0.00456	0.813	0.327	-0.242	1.976
Rho	-85%			-99.12%		

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

Female immigrants (Spanish speaking and non-Spanish speaking) and non-Spanish-speaking male immigrants are less likely to find a job than natives. Women in the group of Spanish speaking immigrants seem particularly disadvantaged. 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 23% more likely to find a job than a woman with lower secondary education level, while for men these probabilities are not significantly different. Women with lower level of education are in a disadvantaged position compared to similar men, perhaps due to the different type of jobs they access. Accordingly, Dolado et al. (2001,2004) find that occupational segregation in Spain is much higher for the less educated women.

Unobserved heterogeneity

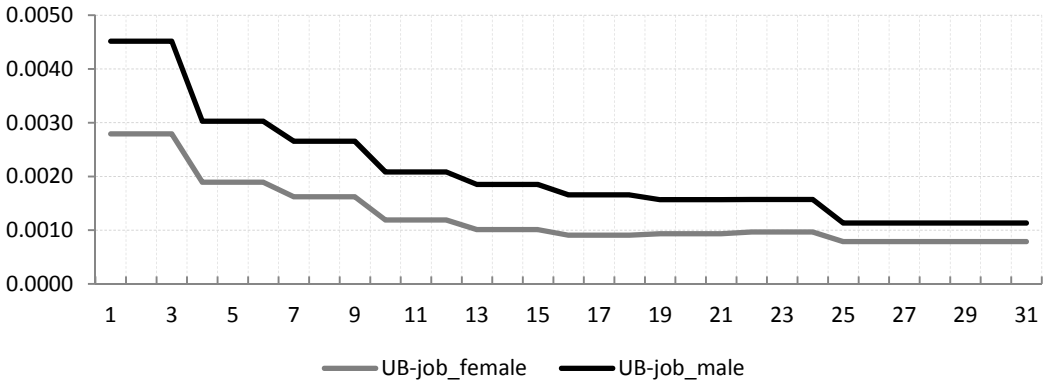
According to the estimated discrete distribution, the correlation between the unobserved heterogeneity terms is negative and sizeable. This implies that someone who is likely to find a job has lower chances to exit out of the labour force. This correlation is higher for males, possibly due to the prominent role of women in taking care of the family which reduces the link between productivity and exit probabilities. For instance, women in the third group 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. Most individuals (63% of women and 59% of men) belong to a group in which exit hazard rates to any job are higher than the average, and hazard rates to non-employment are average for women but lower for men. A second group (27% of women and 40.5% of men) has below average chances of an exit to a job but higher chances to non-employment. The very small third group of men (0.53%) has virtually no chance of finding a job but a high chance to withdraw from the labour market. Finally, the smallest group of women (10%) has larger exit probabilities to both destinations.

Baseline Hazard Estimates

Figure 6 shows the hazard functions of the competing risks model for a benchmark man and woman for the unemployment to job transitions in a year of expansion. Unlike in figures 1 to 4, 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 hazards 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 (employers are reluctant to hire individuals who have been unemployed for a longer time) or discouraged worker effect. The duration dependence is larger for males.

Figure 6. Hazard rates benchmark person for unemployment to any job transition. Males and females; competing risks model. Duration in months

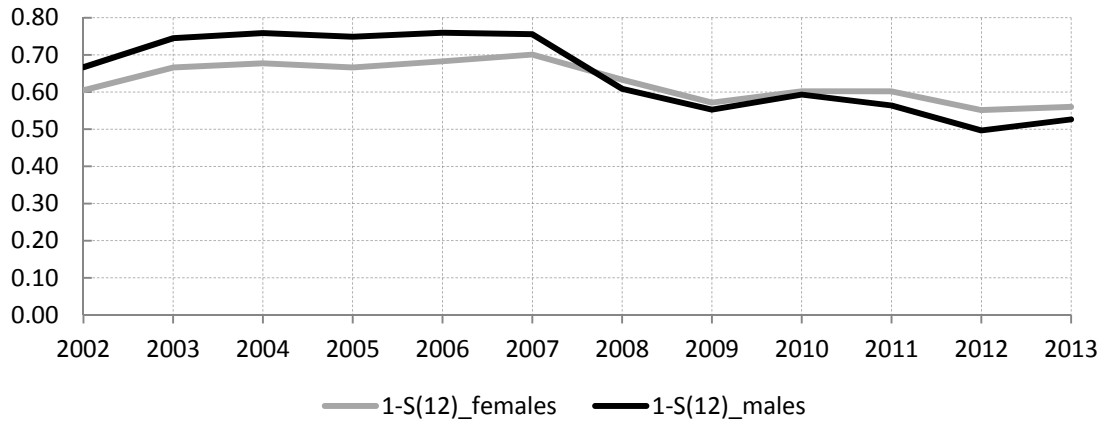


Note: Benchmark individual: Native, no children, lower secondary level of education, living in a municipality with less than 40,000 inhabitants, year 2002. Unemployment rate=10.28 and age=33.

Figure 7 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, controlling for observed and unobserved heterogeneity. As expected, better economic conditions rise 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 regional unemployment rate coefficient. The effect of the regional unemployment rate is higher for females while the procyclical pattern of the yearly dummies is stronger for males, probably due to the higher procyclicality of men's occupations. 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 67% for females), while in the recession period those two effects tend to offset each other (i.e, in 2010 59% for males and 60% for females), implying a reduction of the gender gap in unemployment duration during the

downturn. The most pronounced drops in job finding probabilities are found in 2008, 2009 and 2012.

Figure 7. Probability of finding a job after 12 months of unemployment. Males and females. 2002-2013



Note: Benchmark individual: the same as in the Figure 6 except for year dummy and the unemployment rate, which is the total unemployment rate for the second quarter of each year.

The role of composition variation and business cycle in unemployment duration

Table 6 displays the results of decompositions of the difference between the survival probabilities in unemployment[19] after 360 days for the male and female samples 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 34 percent for males and 45 percent for females in the expansion period, a gender difference of minus 11.1 percentage points. However, during the recession the survival probabilities increase to 48.8 percent for males and 50.7 percent for females, implying a substantial decrease in the differential between males and females to -1.85% percent.

The remaining rows show the decomposition of these observed inequalities between men and women into composition effect and behavioural effect. First, we take the female estimates, but compute the average probabilities for the male sample. Comparing with the female probabilities in row 3 gives the composition effect: the difference explained by the fact that individual characteristics in the male and female samples are different. Following the methodology proposed by Yun(2004), we also

[19] According to our goals, we focus on analysing unemployment exits to any job.

obtain the contribution of each variable to the composition effect[20]. The remaining part of the male-female changes is the behavioral effect (last row).

Table 6 Decomposition analysis for exits from unemployment to any job

	Expansion		Recession	
Total Differences	**-11.10%**	**100%**	**-1.85%**	**100%**
Males	33.9%		48.8%	
Females	45.0%		50.7%	
Composition effects	**1.168%**	**-10.5%**	**1.9%**	**-102%**
Regional Unemp rate	0.400	-4.21%	-0.008	0.8%
Age	0.387	-4.07%	0.183	-18.8%
Immigrants	0.412	-4.34%	0.404	-41.4%
Children	-1.919	20.18%	-1.107	113.5%
Education level	1.670	-17.57%	1.380	-141.4%
Inhabitants	0.052	-0.54%	-0.0004	0.04%
Yearly dummy exp.	-0.003	0.03%	0.000	0.0%
Yearly dummy rec.	0.000	0.00%	0.148	-15.2%
Behavioural effect	**-12.3%**	**110.5%**	**-3.7%**	**202%**

Note: Evaluated at female coefficients.

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 do not allow to distinguish them. On the other hand, the opposite sign of the composition effects (1.2%), compared to the sign of the total difference, reveals a dampening effect of women's characteristics. If women and men had the same characteristics, the gender gap would be greater. Specifically, differences in the distribution of education level contribute to increasing female's job finding rates compared to males'. The higher level of education, therefore, can be viewed as protecting women from unemployment.

The reduction of the gender gap in the downturn, is due to the substantial drop of the behavioural effect (from -12.3% to -3.7%), largely explained by changes in time

[20] The weight of each variable is computed as a linear combination of mean characteristics and estimated parameters as follow: $\omega_{\Delta X_i} = \frac{\beta_i^w(\overline{X_i^m} - \overline{X_i^w})}{\beta^w(\overline{X^m} - \overline{X^w})}$ and $\sum_{i=1}^{k} \omega_{\Delta X_i} = 1$; where k is the number of the explanatory variables in the model and $\overline{X^m}$ and $\overline{X^w}$ the mean level of characteristics for men and women respectively.

trend (already analyzed in Figure 7) and a small increase in the dampening effect of sample composition.

6.2. Gender gap in initial Wages over the business cycle

Table 7 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. Different specifications are shown. Model I includes personal characteristics and labour market conditions. By sequentially adding job characteristics (in Model II) and previous unemployment duration (in Model III), we eliminate differences in estimated initial wages between samples that may be due to differences in these observable characteristics (described in Section 3). We mainly focus on Model III and point out some differences between models.

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 47. 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. However, immigrants, specially women, tend to take the lower paid jobs. Having children certainly influences the gender wage gap, reducing wages for women but increasing them for men. The positive effect of education level is stronger for women than for men. Thus, lower educated women are in a clear disadvantaged position, which is aggravated by their concentration in lower-paid jobs. In contrast, higher educated women and (to a lesser extent) men, are concentrated in higher-paid jobs. Living in a more densely populated area leads to lower initial wages. Jobs in non-manual occupations are better paid than in manual occupations. 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. 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. The opposite is true for men.

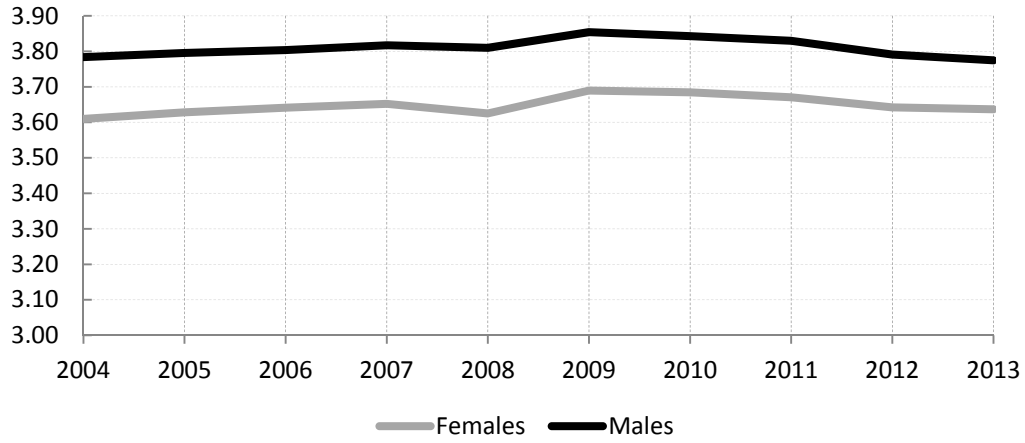
Table 7 OLS Estimation of initial ln wages for males and females

	Females			Males		
	Model I	**Model II**	**Model III**	**Model I**	**Model II**	**Model III**
Unemployment rate	-0.00242***	-0.00264***	-0.00274***	-0.00472***	-0.00386***	-0.00391***
	(0.000243)	(0.000222)	(0.000221)	(0.000172)	(0.000163)	(0.000163)
Age	0.0229***	0.0199***	0.0220***	0.0193***	0.0178***	0.0190***
	(0.00113)	(0.00101)	(0.00101)	(0.000779)	(0.000729)	(0.000727)
Age2	-0.000243***	-0.000229***	-0.000253***	-0.000214***	-0.000194***	-0.000206***
	(1.51e-05)	(1.36e-05)	(1.36e-05)	(1.04e-05)	(9.76e-06)	(9.72e-06)
Spanish_speaking	-0.0736***	0.00693	0.000401	-0.0906***	-0.0712***	-0.0762***
	(0.00752)	(0.00679)	(0.00677)	(0.00406)	(0.00382)	(0.00381)
Non_Spanish_speak	-0.0249***	0.0495***	0.0459***	-0.0390***	-0.0252***	-0.0291***
	(0.00544)	(0.00492)	(0.00491)	(0.00313)	(0.00295)	(0.00294)
Children<4	-0.0256***	-0.0333***	-0.0250***	0.0110***	0.00790***	0.00880***
	(0.00329)	(0.00296)	(0.00296)	(0.00232)	(0.00217)	(0.00216)
Children>3 & <15	-0.0195***	-0.0206***	-0.0176***	0.00687***	0.00616***	0.00659***
	(0.00256)	(0.00231)	(0.00230)	(0.00188)	(0.00177)	(0.00176)
Primary	-0.0419***	-0.0196***	-0.0193***	-0.0193***	-0.0223***	-0.0220***
	(0.00324)	(0.00293)	(0.00292)	(0.00194)	(0.00183)	(0.00182)
Upper_secondary	0.111***	0.0576***	0.0573***	0.0615***	0.0453***	0.0451***
	(0.00262)	(0.00247)	(0.00246)	(0.00214)	(0.00208)	(0.00207)
Post_secondary	0.338***	0.220***	0.216***	0.240***	0.181***	0.179***
	(0.00312)	(0.00308)	(0.00307)	(0.00334)	(0.00343)	(0.00342)
Inhabitants	-0.0296***	-0.0114***	-0.0115***	-0.0162***	-0.0102***	-0.0109***
	(0.00212)	(0.00195)	(0.00194)	(0.00158)	(0.00150)	(0.00150)
Non_manual		0.0930***	0.0930***		0.0918***	0.0920***
		(0.00233)	(0.00232)		(0.00221)	(0.00220)
Construction		0.133***	0.134***		0.183***	0.179***
		(0.00674)	(0.00671)		(0.00193)	(0.00193)
Manufacturing		0.00966***	0.00683**		0.122***	0.120***
		(0.00332)	(0.00331)		(0.00242)	(0.00241)
High_technology		0.167***	0.167***		0.0847***	0.0854***
		(0.00590)	(0.00588)		(0.00414)	(0.00412)
Public		0.112***	0.113***		-0.0271***	-0.0236***
		(0.00323)	(0.00322)		(0.00346)	(0.00344)
Size_0		0.0159**	0.0177***		-0.00400	-0.00213
		(0.00661)	(0.00659)		(0.00380)	(0.00379)
Size_10_19		0.0301***	0.0286***		0.0271***	0.0260***
		(0.00364)	(0.00363)		(0.00235)	(0.00234)
Size_20_49		0.0687***	0.0667***		0.0633***	0.0617***
		(0.00318)	(0.00317)		(0.00227)	(0.00226)
Size_50_249		0.116***	0.112***		0.136***	0.134***
		(0.00284)	(0.00283)		(0.00228)	(0.00227)
Size_250		0.189***	0.183***		0.213***	0.210***
		(0.00307)	(0.00306)		(0.00284)	(0.00283)
Open_ended		0.0935***	0.0790***		0.116***	0.102***
		(0.00294)	(0.00298)		(0.00334)	(0.00335)
On_call_temporary		0.128***	0.122***		0.113***	0.108***
		(0.00314)	(0.00313)		(0.00375)	(0.00374)
Permanent		0.00417	0.00783***		0.00863***	0.0115***
		(0.00294)	(0.00293)		(0.00221)	(0.00221)
THA		0.0487***	0.0504***		0.0514***	0.0532***
		(0.00433)	(0.00431)		(0.00386)	(0.00384)
Previous unemp. duration			-0.000226***			-0.000241***
			(1.56e-05)			(1.16e-05)
Previous unemp. duration_2			6.82e-08***			1.07e-07***
			(2.01e-08)			(1.52e-08)
Constant	3.243***	3.156***	3.151***	3.511***	3.355***	3.363***
	(0.0201)	(0.0182)	(0.0181)	(0.0141)	(0.0133)	(0.0132)
Observations	90,454	90,115	90,115	136,456	136,139	136,139
R-squared	0.171	0.33	0.334	0.076	0.19	0.197
Log Likelihood	-23,837	-13,996	-13,633	-23,982	-14,710	-14,119

*Note: Model I: personal characteristics; Model II: adding job characteristics to Model I; and Model III: adding previous unemployment duration to Model II. References categories: Native Spanish, lower secondary education level, 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. For both sexes, an on-call contract is the type of contract with a higher wage, followed by open-ended, permanent and temporary 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 females from 210 days of unemployment, probably because women have more difficulties in finding reemployment and have shorter entitlement periods, which induces them to accept lower wages.

Figure 8. Evolution of initial wages 2004-2013 for a benchmark individual. Male and Female. Model III



Note: Benchmark individual: native, No children, lower secondary, and living in a municipality with less than 40,000 inhabitants, 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.

Figure 8 shows the evolution of log 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, 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 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.

The role of compositional variation by gender in initial wages

Table 8 shows the results of the decomposition of mean differences in log wages between males and females in two economic periods based on Model III. Using the methodology described in Table 6, the first rows give the average log wages for males and females in each economic period according to the estimated models[21], 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 10.33 percent 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 (7.12 percent). The gender wage gap after controlling for observed and unobserved heterogeneity is significantly higher than the observed wage gap (Table 4) suggesting that the sample characteristics of the women help to reduce the gross wage gap. This is in line with Guner et al. (2014), although, while our sample consists of full time workers just after leaving the unemployment spell, they consider the complete workforce.

Table 8. Decomposition analysis of gender gap in initial wages.

	Expansion		Recession	
Total Differences	**10.33%**	**100%**	**7.12%**	**100%**
males	3.88		3.90	
females	3.78		3.83	
Composition effects	**-7.2%**	**-70%**	**-9.4%**	**-132%**
Regional Unemp rate	0.024	-1.7%	0.017	-2.3%
Age	0.004	-0.3%	-0.013	1.7%
Immigrants	-0.014	1.0%	-0.017	2.2%
Children	0.003	-0.2%	0.009	-1.2%
Education level	0.360	-25.2%	0.355	-46.8%
Inhabitants	-0.004	0.3%	0.001	-0.1%
Yearly dummy exp.	0.005	-0.3%	0.000	0.0%
Yearly dummy rec.	0.000	0.0%	-0.024	3.2%
Public	0.177	-12.4%	0.161	-21.2%
Firm size	0.425	-29.8%	0.361	-47.5%
Industry	-0.633	44.4%	-0.490	64.5%
Non_manual	0.375	-26.4%	0.324	-42.7%
High_technology	-0.022	1.5%	-0.013	1.7%
Type of contract	0.315	-22.1%	0.297	-39.1%
THA	0.010	-0.7%	0.006	-0.8%
Previous unemp_dur	-0.025	1.7%	0.027	-3.5%
Behavioural effect	**17.6%**	**170%**	**16.5%**	**232%**

Note: Evaluated at female coefficients

The remaining rows show the two components that contribute to explaining the gender gap: the composition effect (explained part), which is also detailed by groups of

[21] The decomposition analysis is done for Model III for males and females that includes personal, job characteristics and previous unemployment duration as explanatory variables.

characteristics, and the behavioural effect (residual part). For the two periods, the gender gap is completely explained by the differences in the returns to the characteristics. This may capture potential effects of gender differences in unobservable variables such as differences in the type of jobs [22], motivation, productivity, discrimination, etc. Again, women's characteristics dampen the behavioural effect. For instance, gender differences in the distribution by level of education, firm size and non-manual occupation contribute reducing the income inequality, and dominate the effect of industry in the opposite direction[23].

During the recession period the gender gap in initial wages narrows due to a moderate reduction of the residual part[24], mainly associated with changes in time trend (already described in Figure 8), and women's gain in composition characteristics, largely explained by the reduction in the opposite effect of industry.

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

Table 9 presents the estimation results of the hazards for job transitions to other job and to non-employment[25], for male and female samples using three different models. Model I includes personal characteristics and labour market conditions; by sequentially adding job characteristics (in Model II) and initial wages (in Model III), we eliminate differences in estimated job durations between groups that may be due to differences in these observable characteristics. The best likelihood is obtained using a discrete unobserved heterogeneity distribution with three mass points for females and two mass points for males[26]. Our benchmark model is Model III, 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

[22] Evidence from Croson and Gneezy (2009) and Bonin et al. (2007) reveals that women are more risk-averse than men so they apply to more stable jobs with lower average wages.
[23] Women are more concentrated than men in the services sector which is the lower-paying industry.
[24] Guner et al. (2014), also find that the unexplained part of the observed gender wage gap has decreased from 2004 to 2010 for the complete workforce.
[25] In this context, exits to non-employment include transitions to unemployment (with and without benefits) and out of the labour force.
[26] Estimation for males using discrete distribution of unobserved heterogeneity with three mass points does not converge.

middle-aged workers and differences by gender in favour of men's job tenure increase gradually with age. 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., 9% 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 to each level of education. For primary level of education, the effects of job characteristics reducing stability are similar for both sexes, but for upper and post-secondary level 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 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 (-15%), 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 (4.5%) less likely to become non-employed than those in the private sector, the opposite is true for men (18.8%). 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. Previous unemployment duration correlates differently by gender. It is hardly associated with subsequent job stability for men. Maybe two opposite effects cancel out: longer time

Table 9. Estimation results of the correlated competing risks model (job to other job and non-employment)

	Job-to-Job						Job-to-Non-employment					
	Females			Males			Females			Males		
	Model I	Model II	Model III	Model I	Model II	Model III	Model I	Model II	Model III	Model I	Model II	Model III
Unemployment rate	-0.0140***	-0.0148***	-0.0148***	-0.00700***	-0.0109***	-0.0125***	0.0152***	0.00903***	0.00884***	0.0224***	0.0138***	0.0155***
	(0.00131)	(0.00128)	(0.00150)	(0.00113)	(0.00113)	(0.00132)	(0.000623)	(0.000614)	(0.000698)	(0.000592)	(0.000588)	(0.000656)
Age	-0.0149**	-0.00598	-0.0235***	0.0188***	0.0307***	0.0257***	-0.0172***	-0.0118***	-0.0196***	-0.0218***	-0.0183***	-0.0234***
	(0.00639)	(0.00625)	(0.00711)	(0.00507)	(0.00502)	(0.00577)	(0.00327)	(0.00325)	(0.00361)	(0.00295)	(0.00292)	(0.00322)
Age2	-0.000170*	-0.000163*	6.58e-05	-0.000458***	-0.000559***	-0.000524***	0.000286***	0.000167***	0.000266***	0.000315***	0.000254***	0.000309***
	(8.73e-05)	(8.55e-05)	(9.70e-05)	(6.88e-05)	(6.82e-05)	(7.82e-05)	(4.34e-05)	(4.32e-05)	(4.79e-05)	(3.93e-05)	(3.89e-05)	(4.27e-05)
Spanish_speaking	0.189***	0.110***	0.124***	0.113***	0.0192	0.0367	0.261***	0.248***	0.224***	0.306***	0.222***	0.240***
	(0.0421)	(0.0410)	(0.0457)	(0.0262)	(0.0260)	(0.0298)	(0.0215)	(0.0213)	(0.0233)	(0.0145)	(0.0144)	(0.0157)
Non_Spanish_speaking	0.00816	-0.0193	-0.0494	0.0225	-0.0432**	-0.0477**	0.137***	0.128***	0.0847***	0.213***	0.146***	0.153***
	(0.0338)	(0.0328)	(0.0373)	(0.0214)	(0.0212)	(0.0242)	(0.0159)	(0.0157)	(0.0173)	(0.0113)	(0.0112)	(0.0122)
Children<4	-0.241***	-0.209***	-0.200***	-0.0130	0.00279	-0.00650	0.0759***	0.0909***	0.0898***	-0.0295***	-0.0261***	-0.0313***
	(0.0177)	(0.0175)	(0.0199)	(0.0144)	(0.0143)	(0.0162)	(0.00898)	(0.00898)	(0.00993)	(0.00870)	(0.00865)	(0.00942)
Children>3 &<16	-0.0940***	-0.0884***	-0.0806***	0.0214*	0.0253**	0.0288**	0.0496***	0.0376***	0.0401***	-0.0121*	-0.0232***	-0.0206***
	(0.0144)	(0.0141)	(0.0160)	(0.0123)	(0.0121)	(0.0138)	(0.00697)	(0.00695)	(0.00765)	(0.00702)	(0.00697)	(0.00757)
Primary	-0.122***	-0.100***	-0.122***	-0.00689	-0.0460***	-0.0285*	0.0898***	0.0462***	0.0493***	0.110***	0.0477***	0.0519***
	(0.0207)	(0.0200)	(0.0225)	(0.0132)	(0.0130)	(0.0147)	(0.00901)	(0.00883)	(0.00968)	(0.00726)	(0.00717)	(0.00777)
Upper_secondary	0.0823***	0.0761***	0.0472***	-0.000714	0.0634***	0.0497***	-0.161***	-0.0666***	-0.0806***	-0.222***	-0.0889***	-0.0984***
	(0.0144)	(0.0142)	(0.0162)	(0.0130)	(0.0133)	(0.0153)	(0.00751)	(0.00770)	(0.00854)	(0.00812)	(0.00831)	(0.00917)
Post_secondary	0.186***	0.200***	0.118***	0.0372**	0.185***	0.133***	-0.274***	-0.150***	-0.218***	-0.430***	-0.174***	-0.231***
	(0.0163)	(0.0168)	(0.0198)	(0.0183)	(0.0200)	(0.0236)	(0.00930)	(0.0101)	(0.0115)	(0.0128)	(0.0140)	(0.0158)
Inhabitants>40,000	-0.118***	-0.102***	-0.0859***	-0.0449***	-0.0400***	-0.0341***	0.119***	0.0426***	0.0507***	0.0332***	-0.0431***	-0.0327***
	(0.0118)	(0.0115)	(0.0130)	(0.0101)	(0.0100)	(0.0114)	(0.00603)	(0.00607)	(0.00671)	(0.00594)	(0.00596)	(0.00650)
Non_manual		0.0371***	0.0102		0.0383***	0.0151		-0.164***	-0.200***		-0.131***	-0.162***
		(0.0133)	(0.0152)		(0.0140)	(0.0161)		(0.00712)	(0.00793)		(0.00875)	(0.00973)
Construction		-0.0804**	-0.176***		-0.0963***	-0.145***		-0.114***	-0.162***		0.0744***	0.0497***
		(0.0377)	(0.0428)		(0.0132)	(0.0151)		(0.0239)	(0.0260)		(0.00775)	(0.00856)
Manufacturing		-0.303***	-0.355***		-0.266***	-0.308***		0.0614***	0.0514***		-0.0250**	-0.0519***
		(0.0246)	(0.0286)		(0.0172)	(0.0200)		(0.0113)	(0.0126)		(0.00980)	(0.0109)
High_technology		0.120***	0.0696*		0.0673***	0.0548*		-0.0360*	-0.0723***		-0.0189	-0.0600***
		(0.0333)	(0.0395)		(0.0255)	(0.0302)		(0.0206)	(0.0236)		(0.0172)	(0.0199)
Public		-0.254***	-0.379***		-0.419***	-0.463***		0.0177*	-0.0464***		0.163***	0.172***
		(0.0199)	(0.0234)		(0.0254)	(0.0293)		(0.0100)	(0.0113)		(0.0127)	(0.0139)
Size_0		0.853***	0.920***		0.750***	0.790***		0.304***	0.402***		0.364***	0.431***
		(0.0259)	(0.0330)		(0.0189)	(0.0241)		(0.0172)	(0.0217)		(0.0133)	(0.0159)
Size_10_19		-0.0438**	-0.0524**		-0.0220	-0.0254		-0.102***	-0.108***		-0.107***	-0.110***
		(0.0214)	(0.0242)		(0.0163)	(0.0183)		(0.0115)	(0.0126)		(0.00950)	(0.0102)
Size_20_49		-0.0509***	-0.0660***		-0.0548***	-0.0631***		-0.133***	-0.157***		-0.154***	-0.171***
		(0.0190)	(0.0214)		(0.0157)	(0.0177)		(0.0102)	(0.0112)		(0.00917)	(0.00999)
Size_50_249		-0.135***	-0.176***		-0.158***	-0.197***		-0.154***	-0.180***		-0.188***	-0.229***
		(0.0167)	(0.0190)		(0.0155)	(0.0178)		(0.00882)	(0.00973)		(0.00913)	(0.0101)

Table 9, continued

	Females			Males			Females			Males		
	Model I	**Model II**	**Model III**	**Model I**	**Model II**	**Model III**	**Model I**	**Model II**	**Model III**	**Model I**	**Model II**	**Model III**
Size_250		-0.292***	-0.335***		-0.298***	-0.364***		-0.208***	-0.255***		-0.241***	-0.301***
		(0.0175)	(0.0200)		(0.0184)	(0.0212)		(0.00921)	(0.0103)		(0.0112)	(0.0125)
Construction		-0.0804**	-0.176***		-0.0963***	-0.145***		-0.114***	-0.162***		0.0744***	0.0497***
		(0.0377)	(0.0428)		(0.0132)	(0.0151)		(0.0239)	(0.0260)		(0.00775)	(0.00856)
Manufacturing		-0.303***	-0.355***		-0.266***	-0.308***		0.0614***	0.0514***		-0.0250**	-0.0519***
		(0.0246)	(0.0286)		(0.0172)	(0.0200)		(0.0113)	(0.0126)		(0.00980)	(0.0109)
Non_manual		0.0371***	0.0102		0.0383***	0.0151		-0.164***	-0.200***		-0.131***	-0.162***
		(0.0133)	(0.0152)		(0.0140)	(0.0161)		(0.00712)	(0.00793)		(0.00875)	(0.00973)
High_technology		0.120***	0.0696*		0.0673***	0.0548*		-0.0360*	-0.0723***		-0.0189	-0.0600***
		(0.0333)	(0.0395)		(0.0255)	(0.0302)		(0.0206)	(0.0236)		(0.0172)	(0.0199)
Open_ended		-1.056***	-1.062***		-1.152***	-1.198***		0.0539***	0.0414***		0.190***	0.172***
		(0.0258)	(0.0293)		(0.0377)	(0.0428)		(0.00875)	(0.00970)		(0.0122)	(0.0133)
On_call_temporary		-0.00300	-0.0784***		-0.110***	-0.127***		-0.0416***	-0.0813***		-0.137***	-0.169***
		(0.0194)	(0.0225)		(0.0254)	(0.0290)		(0.0107)	(0.0120)		(0.0152)	(0.0169)
Permanent		-0.879***	-0.948***		-0.986***	-1.047***		-1.406***	-1.427***		-1.291***	-1.299***
		(0.0170)	(0.0193)		(0.0153)	(0.0175)		(0.0116)	(0.0127)		(0.0106)	(0.0116)
THA		1.189***	1.164***		1.013***	1.014***		0.220***	0.178***		0.218***	0.204***
		(0.0205)	(0.0229)		(0.0203)	(0.0232)		(0.0162)	(0.0177)		(0.0162)	(0.0180)
Part_time_coef		-0.235***	-0.436***		-0.321***	-0.460***		0.105***	-0.188***		-0.0148	-0.219***
		(0.0254)	(0.0343)		(0.0344)	(0.0438)		(0.0130)	(0.0175)		(0.0207)	(0.0249)
Unemp_dur_1		-0.000195**	-9.49e-05		-0.000503***	-0.000459***		0.000791***	0.000842***		0.000282***	0.000270***
		(9.28e-05)	(0.000105)		(8.78e-05)	(1.00e-04)		(5.28e-05)	(5.80e-05)		(4.76e-05)	(5.16e-05)
Unemp_dur_1_2		-1.35e-07	-1.48e-07		2.97e-08	3.35e-08		-1.10e-06***	-1.09e-06***		-4.06e-07***	-3.33e-07***
		(1.23e-07)	(1.39e-07)		(1.28e-07)	(1.46e-07)		(7.05e-08)	(7.73e-08)		(6.33e-08)	(6.82e-08)
Real_daily_salary			0.00767***			0.00504***			0.00685***			0.00464***
			(0.000390)			(0.000324)			(0.000219)			(0.000197)
V1	1.038***	0.208	-17.01	-0.729***	0.282***	0.280***	-0.635***	0.0242***	0.874***	0.250***	-0.106***	-0.0858***
	(0.0765)	(10.06)	(1,347)	(0.104)	(0.0577)	(0.0536)	(0.172)	(0.00884)	(0.0722)	(0.0192)	(0.0316)	(0.0253)
V2	0.277***	1.126	1.215				0.0106	-0.409***	-0.448***			
	(0.0949)	(10.06)	(22.74)				(0.0493)	(0.0761)	(0.0932)			
a1	-0.616	3.808***	-3.999***	-0.789***	0.241	0.525						
	(0.904)	(0.185)	(0.270)	(0.194)	(0.51)	(0.502)						
a2	1.252**	1.562***	-2.420***									
	(0.507)	(0.419)	(0.362)									
Observations	886,175	879,474	728,255	894,129	888,018	745,065	886,175	879,474	728,255	894,129	888,018	745,065
Joint Log Likelihood	-1,154,000	-1,133,000	-911,790	-1,230,000	-1,207,000	-988,439						
Number of ids	90,649	90,257	78,953	99,681	99,310	87,968	90,649	90,257	78,953	99,681	99,310	87,968
Number of spells	180,993	180,359	150403	190270	189680	160573	180,993	180,359	150,403	190,270	189,680	160,573
Number of exits	35,557	35,358	27,367	45,142	44,968	34,740	122,575	122,425	99,754	123,069	122,897	102,917

Notes[27]: See table 7 for benchmark characteristics. Piecewise baseline and discrete distribution of unobserved heterogeneity with 3 (2) mass points for females (males).

[27] 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.

with unemployment benefits allows workers to wait until a good job match arrives[28] 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 until two years of unemployment. This may reflect the lower job opportunities and shorter unemployment benefit periods of women that lead them to accept less stable jobs.

Unobserved heterogeneity

The unobserved heterogeneity parameters in Table 10 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 workers (90% of women and 63% of men) belong to a group in which hazard rates to other job are above average and hazard rates to non-employment are below average (for males) or virtually equal to the average (for females). Another group of women (8%) has the highest probabilities to transit to other job and the lowest to become non-employed.

Table 10. Terms of mass points[29] correlated from the correlated competing risk model using Model III

Terms of mass points	Female sample			Male sample	
	1	2	3	1	2
Probability	2%	8%	90%	63%	37%
V Other job	-17.01	1.21	0.20	0.28	-0.47
V Non-employment	0.87	-0.45	0.02	-0.09	0.15
Rho	-0.75			-1	

Baseline Hazard Estimates

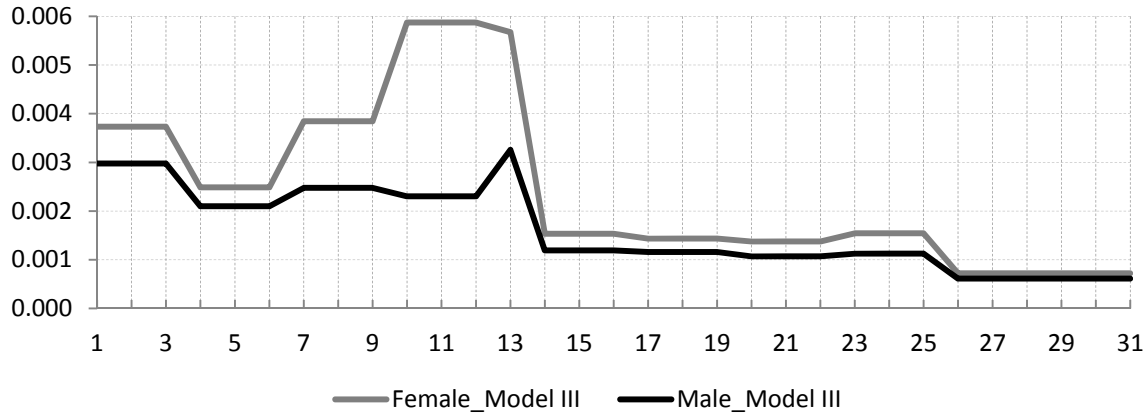
Analogous to Figure 6, Figure 9 shows the hazard function of the competing risks model for exits to non-employment for a male and a female worker in a year representative of the expansion period. Patterns for males and females are quite similar with the exception

[28] From Job matching theory, jobs are experienced goods and good job matches are those that survive longer.

[29] Unobserved heterogeneity terms using Model I and II: for females, using the Model I: Prob(type I)= 10.7%; Prob(type II)=69%; Prob(type III)=20%; V3 (other job)=-1.529 V3(non-emp)=0.306 Rho=-47%; using the Model II: Prob(type I)= 88.7%; Prob(type II)=9%; Prob(type III)=2%; V3 (other job)=-14.7; V3(non-emp)=0.861; Rho=-78%;
For males: Using model I: p1=31%; p2=69%; V2(other job)= 0.33; V2(Non-emp)=-0.11; Rho=-1; Using Model II: p1=56%; p2=44%; V2(other job)=-0.335; V2(Non-emp)=0.12; Rho=-1

of a higher exit rate from job to non-employment in months 7-13 for women, probably associated to the seasonal nature of female activities. Afterwards there is a shape decline in exit rates[30]. So, 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.

Figure 9 Hazard rates benchmark person for Job to non-employment transition. Females and Males; competing risks Model III. Duration in months



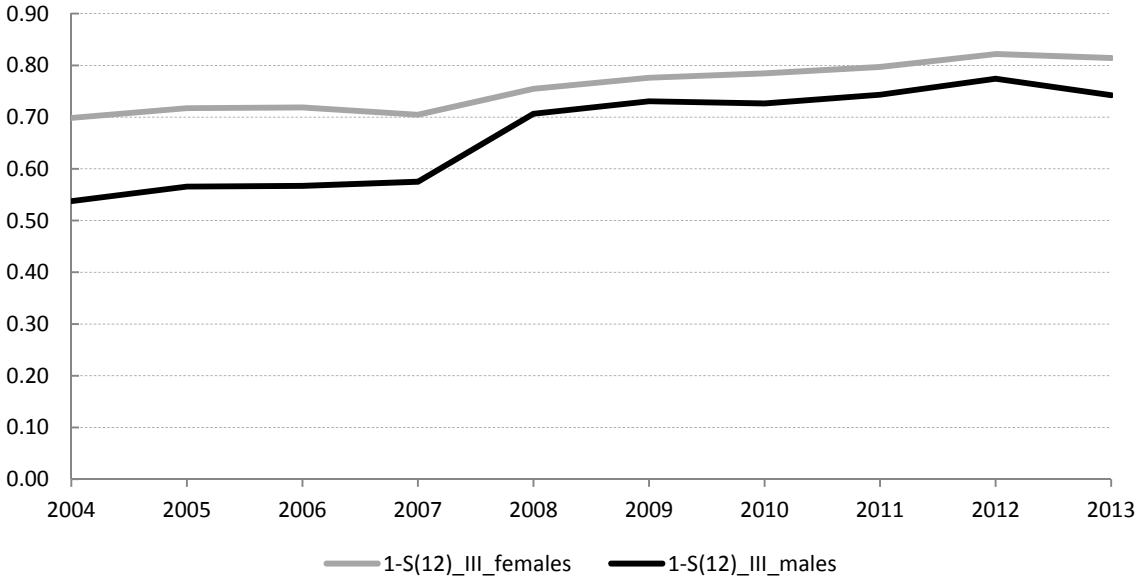
Note: Benchmark person: Unemployment rate= 10.28; age=33; native, no children, lower secondary level of education; year 2004; private sector; size_1_9; services sector; Non-manual occupation; non-High Technology; temporary contract; no THA; part time coefficient=0.9; previous unemployment duration= 167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

Analogous to Figure 7, Figure 10 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 (personal, and job characteristics) and unobserved heterogeneity. This probability remains quite stable for 2005-2007 period 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 at 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.

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. However, the comparison of Models I and II reveals that job characteristics change over time, showing a growing job stability pattern, similar for both sexes during the expansion period but only for men during the recession. In addition, differences between Models II and III suggest that women work in jobs where the dynamic positive effect of wages on job exits is more pronounced, especially during the crisis. The economic slump therefore influences more negatively men's job stability, which is consistent with males tending to be employed in more procyclical occupations. But the characteristics of their jobs act in the opposite direction, which would lead to more job stability for men.

Figure 10. Probability of exiting to non-employment after 12 months in the job. Females & Males. 2004-2013. Model III



Note: See note of figure 9 for benchmark characteristics. Here the unemployment rate corresponds to the unemployment rate of the second quarter of each year.

The role of composition variation in job duration (exits to non-employment)

Table 10 shows the results of decompositions[31] of the gender gap in job duration, using the methodology presented in Table 6. Gender inequality is measured as the

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

difference between 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 percent for males and 41.9 percent for females in the expansion period, a difference of 7.9 percentage points. During the recession this probability decreases to 36.9 percent for males and 37.6 percent for females, so that the gender gap disappears.

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 coefficients. Differences in coefficients may be due to different reasons, such as differences in job match quality, productivity, motivation, or discrimination behavior, 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 increasing females' job stability.

Table 10 Decomposition analysis for exits from job to non-employment

	Expansion		Recession	
Total Differences	**7.90%**	**100%**	**-0.70%**	**100%**
males	49.8%		36.9%	
females	41.9%		37.6%	
Composition effects	**-4.7%**	**-59.6%**	**-4.8%**	**686%**
Regional Unemp rate	0.036	-2.14%	0.032	22.1%
Age	0.015	-0.87%	0.007	5.0%
Immigrants	0.044	-2.64%	0.065	44.7%
Children	-0.012	0.70%	-0.007	-4.5%
Education level	0.220	-13.10%	0.249	170.6%
Inhabitants	-0.001	0.06%	0.004	2.5%
Yearly dummy exp.	-0.004	0.23%	-0.004	-2.8%
Yearly dummy rec.	0.000	0.00%	-0.004	-3.0%
Public	0.032	-1.89%	0.032	22.0%
Firm size	0.356	-21.23%	0.274	187.9%
Industry	-0.334	19.91%	-0.295	-202.3%
non_manual	0.427	-25.47%	0.445	304.9%
high_technology	-0.007	0.44%	-0.009	-5.9%
Type of contract	-0.042	2.52%	-0.080	-54.9%
THA	-0.003	0.18%	0.001	0.6%
Part time coef.	-0.120	7.16%	-0.136	-93.0%
Unemp_dur_1	-0.012	0.73%	0.023	15.8%
Real_daily_wage	0.406	-24.23%	0.403	276.2%
Behavioural effect	**12.6%**	**160%**	**4.1%**	**-586%**

Note: evaluated at female coefficients.

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 analyzed in Figure 7) that is canceled 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 unemployment duration, consecutive job stability and initial wages over the business cycle (2002-2013) in the Spanish labour market. 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.

The data reveal substantial gender differences in the characteristics of unemployed workers and consecutive jobs, and their changes by economic period, due to both supply and demand factors. For instance, women are more qualified and more concentrated in non-manual occupations, services and part-time jobs. The crisis leads to a fall of construction and manufacturing jobs (male concentrated sectors), a reduction of the hires among low qualified workers, mainly women, and a narrowing of the gender gap in initial wages.

Comparing unemployment exits for men and women, we find that the chances to find a job decrease with the duration of unemployment for both sexes, but they are higher for males, mainly during the first three months. Negative duration dependence of the hazard is stronger for males, probably due to their stronger discouraged worker effects.

In the expansion period, average unemployment duration is significantly higher for women than 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) are behind this, which we unfortunately cannot distinguish. Female education level increases females' job finding rates and therefore contributes to reducing the gender disparity.

During the recession period, job finding rates decrease more for men than for women, resulting in a substantial decrease in the gender inequalities in unemployment duration. This is mainly due to the larger procyclicality (time trend) of job finding rates for men, probably associated to men's occupations.

Women harmed against similar men in job finding chances are those with children, low level of education, the age group 24-44 and Spanish speaking immigrants.

Focusing on the new jobs taken by the unemployed workers, we find that during the expansion period, both the initial wages and job stability are higher for men. These gender gaps again are driven by differences in the returns to individual characteristics (unexplained part). Some women's personal (level of education) and job (firm size, non-manual occupation) characteristics contribute narrowing both gender inequalities.

In the downturn, male wages increase less than female wages, narrowing slightly the gender gap in initial wages. Male wages are more negatively influenced by the labour market conditions and by the negative time trend, perhaps because men had to move more often than women to other industries to leave the unemployment, suffering a penalty of wages. In turn, changes in the industry composition lead to higher wages for women.

Furthermore, job tenure declines more for men and as a result the gender gap in job stability disappeared. The former reduction responds to the larger impact of the crisis on men's job tenure, which is consistent with males tending to be employed in occupations more affected by cyclical fluctuations. However, the characteristics of their jobs would increase job stability, and effect that is not found for females during the recession.

Hazards to non-employment show similar patterns for men and women with the exception of a higher job exit rate for females (7-13 months), probably associated with the seasonal nature of their activities. The pattern consists of a first stage (13 months) of positive duration dependence that turns negative, in line with matching theory predictions.

Women who are more negatively affected compared to similar men in terms of job quality[32] are those with children, low level of education, immigrants, those working in the manufacturing industry, the private sector and large firms. Moreover, the negative associations of unemployment duration and subsequent initial wages and job tenure are larger for females.

The possibly transitory equality of male and female unemployment rates should not be confused with absence of gender inequalities, so policy measures should be addressed at reducing them. The priority should be to reduce the time the unemployed need to find a job,

[32] Considering job duration (better matches typically last longer) and the level of wages as indicators of the job quality.

because it seems to be the main source of inequality, by itself and affecting inequality in consecutive job stability and wage. To reach this aim, we propose measures addressed to increasing the likelihood of receiving a job offer, such as enhancing the level of skills and assistance in the process of job search. In addition, to increase the ability of women to accept the job, conciliating work and family measures is necessary, such as fostering flexible and continuous schedules, work from home, and improving conditions of part time jobs. Finally, a direct measure to promote job stability and higher wages is to involve women in firm continuous training.

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

Appendix

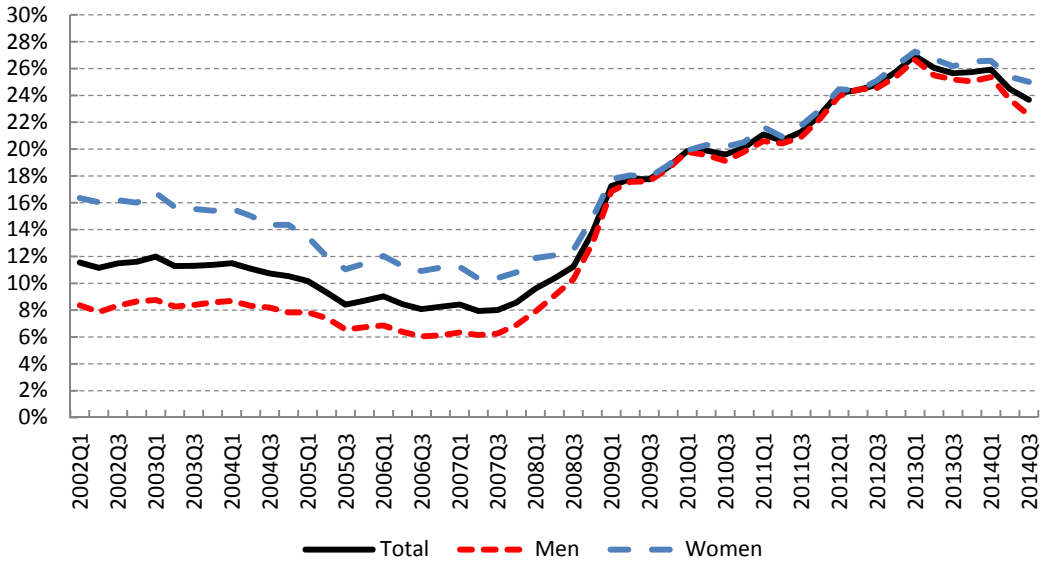
Table A1. Definition of explanatory variables.

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 .
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.
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 in high technology according with the classification of industries by technologic 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.

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



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