

Gender unemployment dynamics in six European countries

Franciscos Koutentakis¹
Department of Economics
University of Crete

Version August 2010

Abstract

The paper investigates unemployment dynamics in six European countries with a particular focus on the gender dimension. Applying a recently established methodology on widely available LFS annual data it calculates the job finding and separation rates and estimates their relative contributions to the fluctuations of male and female unemployment rates. It finds that gender differences in the separation rate explain both the determination and the evolution of the gender unemployment gap. It attributes these differences to female attachment to the labour force.

JEL classification: J16, J6, E23

Keywords: Gender unemployment gap, labour market flows

¹ koutentakis@econ.soc.uoc.gr, University of Crete, Department of Economics, Galos Campus, 74100, Rethymno, Crete, Greece. Tel: ++302831077406. I am grateful to Thomas Moutos for his suggestions. Any remaining errors are my own responsibility.

1. Introduction

The gender unemployment gap is a rather neglected issue in current literature. Among the scarce academic research focusing on the issue the most comprehensive study is the insightful paper of Azmat et. al. (2006). They offer an extensive empirical study of the labour market dynamics behind the gender unemployment gap in OECD countries using data from the ECHP. They find among others that (a) the gender unemployment gap is the outcome of gender differences in labour market flows, both from employment into unemployment and from unemployment into employment and (b) the flows into and out from the labour force are rather irrelevant for the understanding of the gender unemployment gap. They attribute these findings to gender differences in human capital connected with attachment to the labour force interacting with labour market institutions.

In a couple of papers, Queneau and Sen (2007, 2010) test the persistence of the gender unemployment gap in a number of OECD countries. Interestingly their conclusions depend on the measure used to define the gender unemployment gap (difference or ratio of the unemployment rates). However the general conclusion is that the persistence of the gender unemployment gap is rather weak and there is a convergence trend of male and female unemployment rates.

The present study has a twofold contribution. On the one hand, it employs a different methodology that derives labour market flows from LFS data and compares the findings offering additional insights to previous research. On the other hand it offers a long run view at the evolution of the gender unemployment gap; in particular it discusses the dynamics behind the progress in narrowing the gender differences in the unemployment rates. We will identify a general pattern that fits the facts in most of our countries. It will be shown that the separation rate plays the crucial role in both the existence and the evolution of the gender unemployment gap.

Since the issue is not only the existence of the gender unemployment gap² but also its evolution, it is natural to limit ourselves in countries where the problem was already present at some date with data availability. We single out six European countries and take one picture in 1985 and another in 2008 to evaluate the progress. The countries are Belgium, France, Greece, Italy, Portugal and Spain.

Table 1. Unemployment rates by gender in 1985 and 2008

country	year	men	women	total	difference	ratio
BELGIUM	1985	7.4%	17.8%	11.3%	10.5%	2.42
	2008	6.0%	6.7%	6.3%	0.7%	1.11
FRANCE	1985	8.4%	12.6%	10.2%	4.2%	1.50
	2008	6.9%	7.9%	7.4%	1.0%	1.14
GREECE	1985	5.7%	11.8%	7.8%	6.1%	2.07
	2008	4.7%	10.9%	7.2%	6.3%	2.34
ITALY	1985	6.8%	16.7%	10.3%	9.9%	2.45
	2008	5.5%	8.5%	6.7%	3.0%	1.55
PORTUGAL	1987	5.3%	9.9%	7.2%	4.6%	1.87
	2008	6.5%	8.8%	7.6%	2.3%	1.36
SPAIN	1985	19.3%	25.1%	21.0%	5.8%	1.30
	2008	10.1%	13.0%	11.3%	3.0%	1.30

A first general observation is the significant progress in most of our countries. Overall, the gender unemployment gap is far less serious in 2008 than it has been in 1985. Regardless of that general picture there are some differences in the national experiences that we briefly discuss. In particular, we distinguish the successful cases, Italy, Belgium and France, the mixed cases, Spain and Portugal and the stagnant case of Greece.

Starting from the successful cases, Italy and Belgium had the highest gender unemployment gap in 1985, measured either in difference or in ratio terms while in France the initial problem was far less severe. All three countries have made

² We employ the term gap referring to either the difference or the ratio of the female and male unemployment rates. While the difference is usually employed to identify the gender unemployment problem, it depends on the aggregate unemployment rate and may be misleading. For this reason we also report the ratio that is a normalized measure.

considerable progress. By 2008 in Belgium and France the gender unemployment gap was only marginal whereas in Italy it is still present but with a much lower magnitude.

Spain is a mixed case for two reasons. The first is that the gender gap measured in ratio terms was the lowest among our countries and the second that this ratio is kept constant implying the absence of any progress. Although Spain has substantially narrowed the gender unemployment gap in difference terms this was probably the outcome of unemployment falling in equal proportions for both genders.

Portugal is another mixed case since a large part of narrowing the gender unemployment gap was the outcome of increasing male unemployment. In particular, male unemployment has increased by roughly one percentage point while female unemployment has fallen approximately by the same amount. As a consequence, total unemployment marginally increased and the gender unemployment gap has been narrowed. But this can hardly be labeled a progress.

Finally, Greece is the single country that did not achieve any progress in the course of two decades. Indeed, the gender unemployment gap has marginally worsened in terms of both difference and ratio. In that sense it is the stagnant case. Interestingly, the absence of any progress is also evident at the total unemployment rate.

In the rest of the paper we will attempt to interpret these facts in terms of unemployment dynamics, i.e. the job finding and separation rates. The paper is organized as follows: In the next section we present the average job finding and separation rates for the period under consideration. The third section presents the evolution of the gender flow rates and their contribution to unemployment fluctuations. The final section concludes. The methodology for calculating the flow rates and estimating their contributions are presented in the first appendix. The data used are discussed in the second appendix.

2. The average picture

Table 2 reports the calculated average flow rates for the period 1985-2008 (Portugal since 1987) offering a general picture of gender differences in labour market transitions. The letter f represents the job finding rate and the letter s the separation rate.

Table 2. Average flow rates				
country		men	women	total
BELGIUM	f	0.57	0.52	0.54
	s	0.04	0.06	0.05
FRANCE	f	0.95	0.88	0.91
	s	0.09	0.12	0.10
GREECE	f	0.88	0.55	0.67
	s	0.05	0.09	0.07
ITALY	f	0.54	0.51	0.52
	s	0.04	0.08	0.06
PORTUGAL	f	0.89	0.80	0.83
	s	0.04	0.06	0.05
SPAIN	f	0.96	0.68	0.81
	s	0.13	0.18	0.14

A striking finding is that the job finding rate is only marginally higher for men than women in most cases. Substantial differences are observed only in Greece and Spain, with relatively high rates for men and low for women. In Italy and Belgium (the success stories in gender unemployment) the job finding rates for both genders are virtually equal and the lowest among our countries. In Portugal and France the gender difference is also negligible but the rates are relatively high. Overall, gender job findings rates do not differ much, with the exceptions of Greece and Spain.

The separation rate is everywhere substantially higher for women. The highest differences are observed in Greece and Italy (almost double) followed by Portugal, Belgium and Spain (about one and a half) and France (about one and a third). The gender differences in the separation rates are much more evident compared to the job finding rates.

We can compare the average picture emerging from our results with the findings of Azmat et al (2006). According to them the gender gap is the outcome of gender differences in *both* flow rates. According to our results, the gender difference in the job finding rate is only marginal in four out of six countries and *the major gender differences concern the separation rate*. Hence the aforementioned conclusion of Azmat et al (2006) is verified here only for Greece and Spain. (In Italy they also report marginal differences in the gender job finding rates).

Another remark concerns the participation issue. The methodology employed ignores transitions between activity and inactivity assuming a constant labour force. It is evident from our findings that women are clearly disadvantaged in the separation rate and equal at best in the job finding rate. This leads by definition to a higher female unemployment rate. It is interesting to note that the calculated flow rates *inside* the labour market sufficiently explain the gender unemployment gap in terms of transitions between employment and unemployment without any reference to transitions between activity and inactivity. In that sense the participation issue is rather irrelevant.

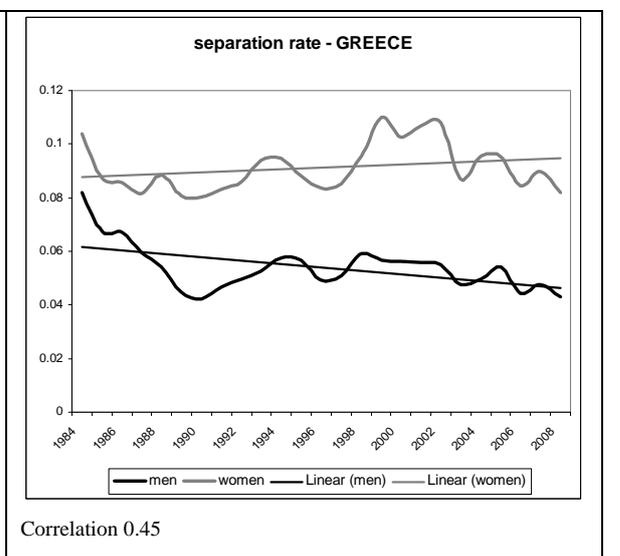
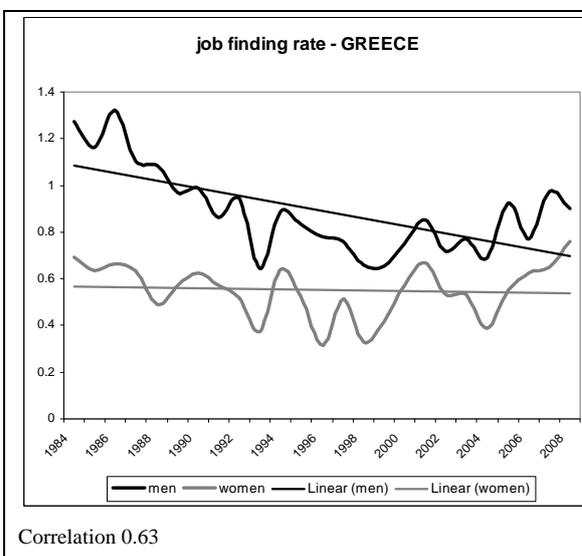
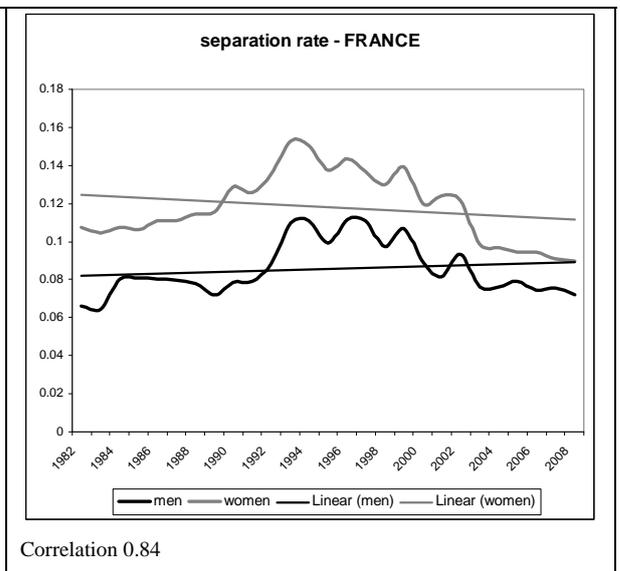
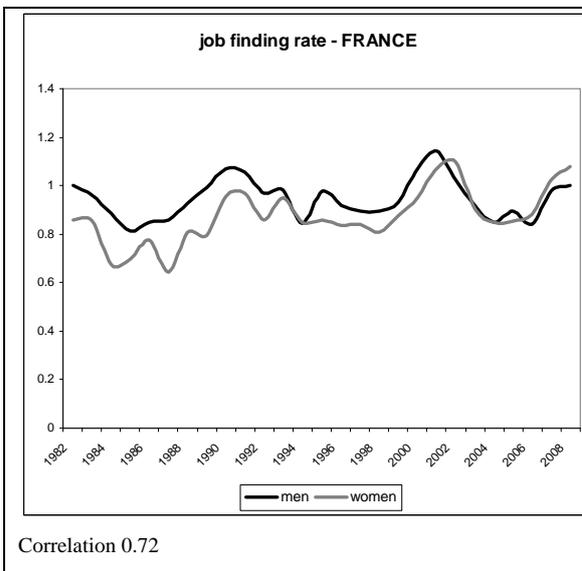
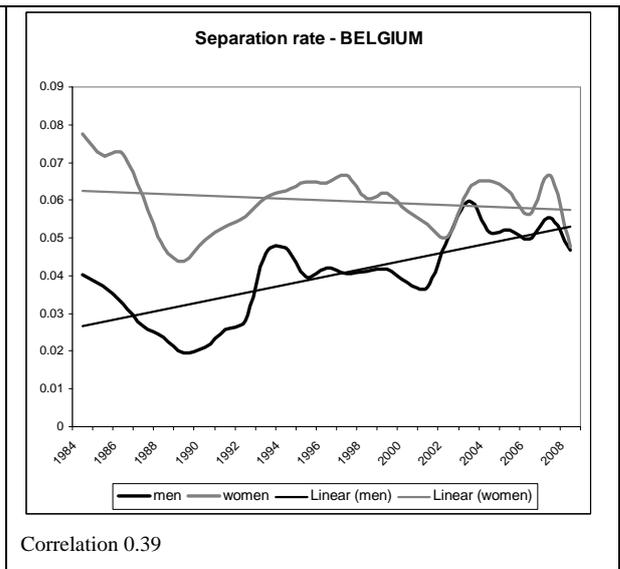
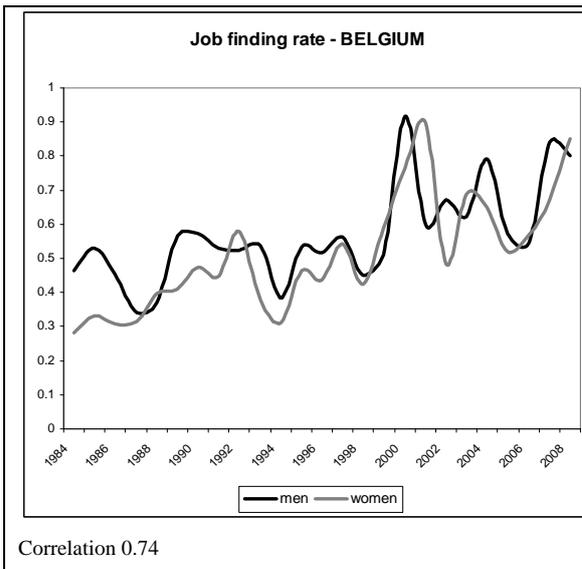
The average flow rates can only explain the average gender unemployment gap. Our next question is the evolution of the gender unemployment gap and that requires the examination of the trends of the flow rates in the period under concern along with their contributions to the fluctuations of the unemployment rate. We discuss both issues in the following section.

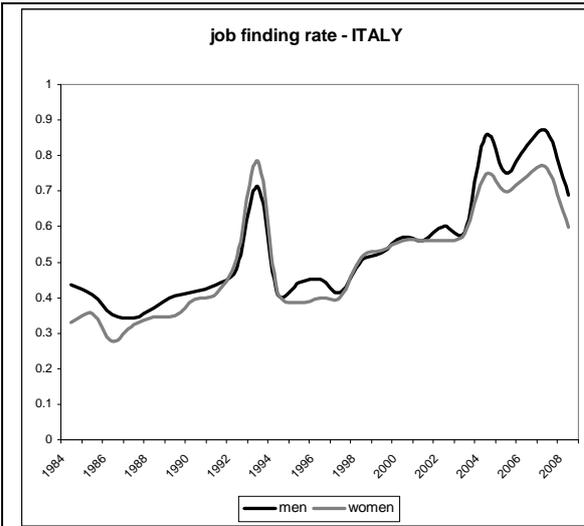
3. The evolution of the flow rates

This section presents the long run evolution of the gender flow rates in each of our countries, i.e. the dynamics behind the determination of the gender unemployment gap. A narrowing gender gap or ratio may be the outcome of increasing female job finding rate and/or decreasing female separation rate, both relative to the respective male flow rates. For this we shall see the annual run movements of the flow rates and evaluate their relative importance in the course of the gender unemployment gap.

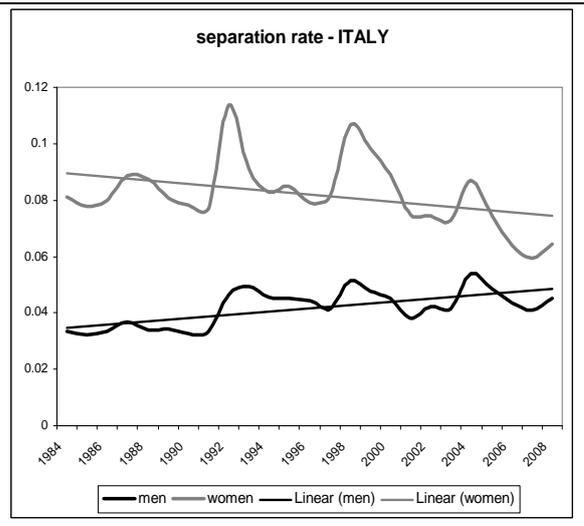
Figures 1-6 show the annual gender flow rates. A linear trend is drawn in the separation rates (as well as the job finding rates in Greece and Portugal since the average trends are not easily visible). The correlation coefficients are also reported.

Figures 1-6

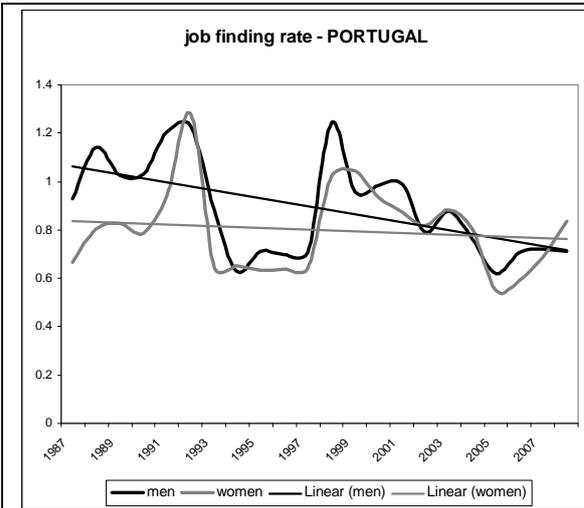




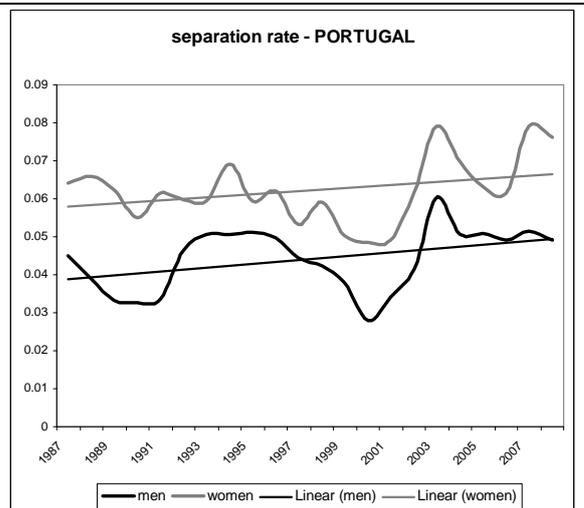
Correlation 0.96



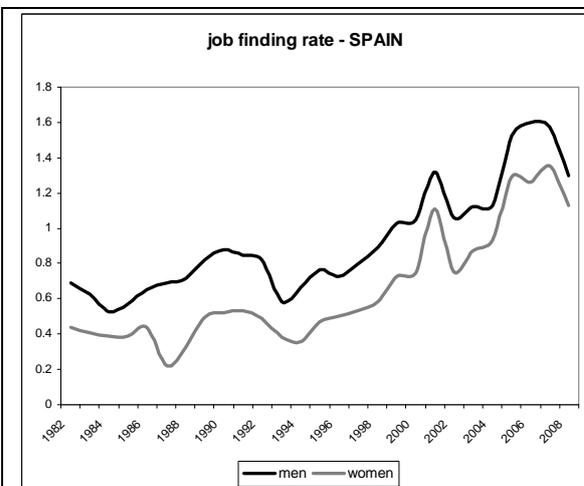
Correlation 0.32



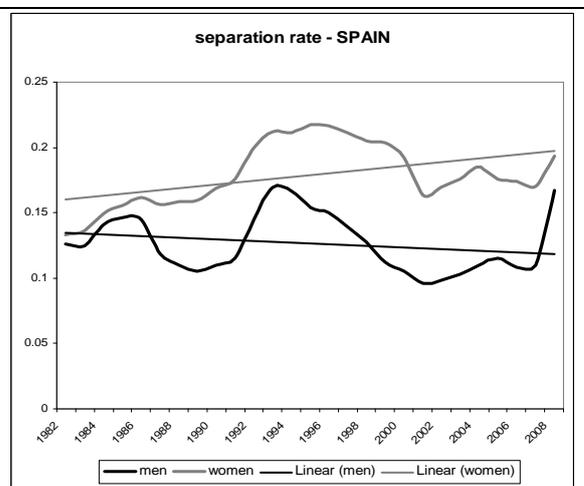
Correlation 0.77



Correlation 0.68



Correlation 0.97



Correlation 0.46

In Belgium, France and Italy (the successful cases) the job finding rates of both genders are very close and move jointly. The trend is increasing in Belgium and Italy but not in France. However the other side of gender unemployment dynamics is far more interesting. The gender separation rates are clearly converging allowing us to state the early conclusion that *narrowing the gender unemployment gap is the outcome of converging separation rates; more specifically a decline of the female separation rate combined with an increase of the respective male rate*. This is also negatively verified for Greece, Spain and Portugal. Their lack of success in narrowing the gender unemployment gap is the outcome of the lack of convergence of the gender separation rates. In Greece and Spain the gender separation rates are diverging while in Portugal the separation rates increase in parallel for both genders.

To obtain some quantitative measure of the importance of the flow rates we estimate their contributions to the fluctuations of the unemployment rate of each gender. The results are shown on Table 3. β^f is the contribution of the job finding rate to the fluctuation of the unemployment rate and β^s is the contribution of the separation rate. The estimation methodology is discussed in appendix 1.

Table 3. Contributions to unemployment fluctuations

country		men	women	total
BELGIUM 1985-2008	β^f	0.62	0.79	0.68
	β^s	0.29	0.17	0.27
FRANCE 1983-2008	β^f	0.40	0.79	0.51
	β^s	0.56	0.19	0.45
GREECE 1985-2008	β^f	0.82	0.86	0.84
	β^s	0.20	0.12	0.15
ITALY 1985-2008	β^f	0.85	0.70	0.77
	β^s	0.18	0.24	0.21
PORTUGAL 1988-2008	β^f	0.62	0.85	0.73

	β^s	0.33	0.20	0.27
SPAIN 1983-2008	β^f	0.59	0.91	0.66
	β^s	0.44	0.06	0.33

Almost everywhere unemployment fluctuations are driven by the job finding rate. However this is clearly more evident for women with the exception of Italy. For men the picture is different. Specifically, in France, Spain, Portugal and Belgium the separation rate contributes a more substantial part to male unemployment. This finding reveals a *disproportional/asymmetric contribution of the flow rates on gender unemployment*. In other words, women become unemployed because they cannot find jobs while men become more so because they lose jobs.

Combining this finding with the importance of the convergence of the separation rates in narrowing the gender unemployment gap discussed above, we can conclude that a substantial part of the gender unemployment gap is determined by the male separation rate and its subsequent effect on male unemployment.

This holds in a straightforward way in Belgium and France: the declining female separation rate had only a weak negative effect on female unemployment while the increasing male separation rate had a much stronger positive effect on male unemployment. *The increasing separation rate did not allow male unemployment to fall as quickly as the female unemployment did*. Note that in Belgium the separation effect on male unemployment is lower compared to France but the increase of the separation rate was steeper.

In Italy the case was somewhat different. The declining female separation rate had a slightly higher negative effect on female unemployment compared with the positive effect of the increasing separation rate on male unemployment. *Hence the declining separation rate pushed female unemployment to fall faster than male unemployment*.

In Portugal the fall of the female unemployment rate and the consequent narrowing of the gender unemployment gap were achieved in the first years of our

sample period. Subsequently and especially after 1999 the unemployment rates of both genders are moving upwards since the job finding rates are falling and the separation rates increasing for both genders. Given the quicker decline of the male job finding rate and the stronger effect of the increasing separation rate on male unemployment we can easily explain the narrowing of the gender unemployment gap through the deterioration of male unemployment.

In Spain the job finding rate was rising for both genders. This was the dominant force behind the decline of female unemployment while the contemporary increase of the female separation rate had only marginal effect. This contrasts the fall of male unemployment that is more equally attributed to both flow rates. The relatively weaker effect of the male job finding rate canceled out the fact that it has been constantly higher than the female rate. To put it simply, while men had always more job opportunities than women, that was not so important for their unemployment rate.

Greece is not only exceptional in terms of persisting gender unemployment gap but also in terms of the flow rates. Similar to Portugal the job finding rates of both genders have been decreasing, evidently faster for men. But in contrast to Portugal the male separation rate has been also declining moderating the effect on male unemployment. These explain the decline of the Greek male unemployment rate as opposed to the increasing Portuguese rate as well as the widening of the Greek gender unemployment gap as opposed to the narrowing Portuguese.

4. Conclusions

The heterogeneity in the national experiences does not allow many general conclusions to be drawn. However, at least from our three successful cases, Belgium, France and Italy, we can describe a general pattern in the evolution of the gender unemployment gap.

The examination of the flow rates showed that job opportunities – as reflected in the job finding rate – are not substantially diversified by gender. That is to say that unemployed men and women can find jobs at approximately equal rates. Additionally,

these rates fluctuate together, meaning that the same factors simultaneously determine job opportunities for both genders. Hence the claim that gender differences in the unemployment rate are the outcome of hiring decisions – attributable either to institutions or to discrimination – does not find support from our findings in these three countries.

On the other hand, we saw that the gender differences in the separation rates are much more evident. That is to say that employed women become unemployed at a higher rate than men. Of course, this does not necessarily imply discrimination in the firing decisions since the separation rate includes voluntary quits. Indeed, since firing costs arrangements do not differ by gender, it makes much more sense to interpret this finding as the outcome of weak female attachment to the labour market. The fact that the female separation rate is declining – in contrast to male – indicates that gender specific factors are in play and attachment to the labour force may be such a factor. To put the claim simply, increasing female attachment to the labour force is not only evident in the increasing female participation rate but also in the falling female separation rate.

Greece and Spain, despite of their differences, commonly share the failure to follow the pattern described above. In terms of the job finding rate they have both sustained substantial gender differences indicating that job opportunities and hiring decisions are stubbornly diversified in respect to gender. In terms of the separation rate we found diverging trends implying that women lose or quit their jobs at an increasingly higher rate than men.

Finally we must note that the gender unemployment gap is not a strictly female issue. It includes by construction the male unemployment rate as well as its underlying dynamics. Portugal is a crude case where the narrowing of the gender unemployment gap was partly the outcome of increasing male unemployment. We have also found that Belgium and France experienced increases of the male separation rate with strong effects on the male unemployment rate and the subsequent narrowing of the gender gap.

Appendix 1: Methodology

The methodology we employ measures the flow rates from LFS data. The core methodology is due to Shimer (2005, 2007) who used US data from the Current Population Survey to construct quarterly time series and examine the cyclical behaviour and contributions of the job finding and separation rates to the variations of the unemployment rate. Building on his influential work, some authors have extended, modified and questioned his findings. Elsby, Michaels and Solon (2007) propose a different decomposition of the variations of the unemployment rate while Fujita and Ramey (2007) suggest a different measure of the contributions of the flow rates to the unemployment rate. Others have applied the same methodology to examine the variations of unemployment in different countries. Elsby, Hobijn and Sahin (2008) use annual and quarterly labour force surveys data from OECD countries and Petrongolo and Pissarides (2008) examine UK, France and Spain using labour force surveys and administrative data from the unemployment registration records.

The method is built on basic stock-flow relationships. Assuming that the labour force is constant, i.e. all unemployment variations derive from transitions between two states, employment and unemployment, the unemployment stock U (i.e., the number of unemployed persons) evolves according to

$$\frac{dU}{dt} = sN - fU \quad (1.a)$$

In equation (1.a), N is the employment stock, s is the flow rate from employment to unemployment, i.e. the separation rate, and f is the flow rate from unemployment to employment, i.e. the job finding rate. We assume that s, f are Poisson arrival rates.

Denoting the constant labour force by L , and substituting $N = L - U$ into equation (1.a) we find that,

$$\frac{dU}{dt} + (s + f)U = sL \quad (1.b)$$

If we take U_t as the initial condition, the solution of differential equation (1.b) is

$$U_{t+1} = \frac{S_t}{s_t + f_t} L_t [1 - e^{-(s_t + f_t)}] + U_t e^{-(s_t + f_t)} \quad (2)$$

This is a relationship between current and previous unemployment levels and the flow rates that we shall use later.

Following Shimer (2005, 2007) we shall obtain the flow rates from labour force surveys data. Let us consider the discrete change in the number of unemployed workers within a year: it must necessarily be equal to the inflows during the year, given by the short-term (less than a year) number of unemployed workers, U_t^S , minus the outflows, given by the previously unemployed who found a job during the year, i.e. the previous unemployment stock times the probability of finding a job, $F_t U_{t-1}$. Thus,

$$U_t - U_{t-1} = U_t^S - F_t U_{t-1} \quad (3)$$

Solving equation (3) for F we find that the job finding probability is,

$$F_t = 1 - \frac{U_t - U_t^S}{U_{t-1}} \quad (4)$$

Having thus determined the job finding probability we can calculate the associated Poisson rate using the formula

$$f_t = -\ln(1 - F_t) \quad (5)$$

The calculation of the separation rate is a little more complicated. Had we used the expression $U_t - U_{t-1} = S_t N_{t-1} - F_t U_{t-1}$ (which can be rewritten as $S_t = \frac{U_t^S}{N_{t-1}}$)

we would be underestimating the job separation probability, since we would fail to take account of all those workers who lost a job and found another one during the year; this is what Shimer (2005, 2007) calls *time aggregation bias*. To avoid this problem we substitute the current and previous number of unemployed workers, the current labour force and the current job finding rate (as calculated above) into equation (2) and solve for s_t .³

Once we have calculated the flow rates, the implied steady state unemployment rate is found by setting $\frac{dU}{dt} = 0$ in equation (1.b) and noting that $u_t \equiv U_t / L_t$. We thus reach the standard expression:

$$u_t^{s.s.} = \frac{s_t}{s_t + f_t} \quad (6)$$

The steady state unemployment rate is the unemployment rate that would remain constant between the previous and the current year had the flow rates been equal to s_t and f_t during the year, and had not been any transitions into or out from the labour force. In that sense we omit the effects of activity/inactivity flows on the unemployment rate, assuming that all variations derive from variations of the flows between two states, employment and unemployment.

Now we decompose unemployment fluctuations to those attributed to changes in the job finding rate and those attributed to changes in the separation rate and quantify their relative contributions. Following Elsby, Michaels and Solon (2009) we log-differentiate the steady state unemployment rate in equation (6) above to obtain

$$du_t^{ss} = u_t^{ss}(1 - u_t^{ss})(d \log s_t - d \log f_t) \quad (7)$$

Equation (7) decomposes the change of the (steady state) unemployment rate into the respective logarithmic changes of the flow rates with an equal weight.

³ Note that equation (2) offers only an implicit solution for s . The calculation is done using the FindRoot command in the Mathematica software.

Let us denote by $du_t^f = -u_t^{ss}(1-u_t^{ss})d \log f_t$ and $du_t^s = u_t^{ss}(1-u_t^{ss})d \log s_t$ the respective contributions of the job finding rate and the separation rate to the variation of the unemployment rate, i.e. $du_t^{ss} = du_t^s + du_t^f$.

To quantify the contributions of each flow rate, we follow Fujita and Ramey (2009) who calculate the proportion of the variance of du_t^{ss} that is explained by its covariance with du_t^f and du_t^s :

$$\beta^f = \frac{\text{Cov}(du_t^{ss}, du_t^f)}{\text{Var}(du_t^{ss})} \quad (8.a)$$

$$\beta^s = \frac{\text{Cov}(du_t^{ss}, du_t^s)}{\text{Var}(du_t^{ss})} \quad (8.b)$$

In the above expressions, β^f is the proportion of unemployment fluctuations deriving from fluctuations in the job finding rate, and β^s is the proportion deriving from fluctuations in the separation rate. The sum $\beta^f + \beta^s$ should equal to unity; this holds approximately in our results.

Appendix 2: Data

We use data from the OECD online database (<http://stats.oecd.org>), specifically LFS by sex and age (15 years and over) and incidence of unemployment by duration. The use of annual data needs some justification. Presumably, there are multiple transitions during a year and annual data underestimate both flow rates, an issue that would be less serious if we used quarterly or monthly data. The problem is the lack of such data for our period. To the best of my knowledge, quarterly time series for unemployment by duration exist only since 1998 for our sample countries. Hence in order to apply the methodology in a useful manner, i.e. to examine the long run gender unemployment dynamics, we have to resort to annual data.

Such a concession does not look unacceptable, at least for the purposes of this study. Our concerns are the long run trends and the *relative* gender flow rates rather than their precise values. In other words the important part is the comparison of the gender flow rates and we can safely assume that any bias due to annual data will be equally present for both genders. Let us use a simple example to illustrate this. We take quarterly data from the EUROSTAT online database (http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database) for the period 1998-2008 and compare the gender ratios of the flow rates with the respective ratios calculated using annual data for the same period. The table summarizes the comparison. The second column reports the gender ratio of the job finding rate derived from quarterly data while the third column reports the same ratio derived from annual data. Respectively, the fourth column reports the gender ratio of the separation rate derived from quarterly data while the fifth column reports the same ratio derived from annual data. With the exception of Portugal the ratios do not differ much, verifying the adequacy of our calculations based on annual data.

Table 4. Comparison of annual and quarterly gender ratios of the flow rates

country	f gender ratio		s gender ratio	
	quarterly	annual	quarterly	annual
Belgium	0.97	0.97	1.25	1.21
France	1.00	1.02	1.21	1.25
Greece	0.65	0.70	1.68	1.86
Italy	0.91	0.94	1.64	1.74
Portugal	0.86	0.97	1.26	1.41
Spain	0.77	0.79	1.54	1.60

Finally, a rough, though substantial indication of the adequacy of annual data is the steady state unemployment rate implied by the calculated flow rates. The average steady state rate is very close to the average actual unemployment rate and the annual steady state rate is highly correlated with the annual actual unemployment rate.

REFERENCES

Azmat G., Güell M. and Manning A. (2006) “Gender Gaps in Unemployment Rates in OECD Countries”, *Journal of Labor Economics*, 24:1; 1-37

Elsby, M., Michaels R., and Solon G., (2009) "The Ins and Outs of Cyclical Unemployment" *American Economic Journal: Macroeconomics*, 1:1; 84–110.

Elsby M., Hobijn B. and Sahin A. (2008) “Unemployment Dynamics in the OECD”, *NBER Working Paper* No 14617

Fujita S. and Ramey G. (2009) “The Cyclicalities of Separation and Job Finding Rates”, *International Economic Review*, 50:2; 415-430

Petrongolo B. and Pissarides C. (2008) "The Ins and Outs of European Unemployment" *American Economic Review*, 98:2; 256–62

Queneau H. and Sen A. (2007) “Evidence Regarding Persistence in the Gender Unemployment Gap Based on the Ratio of Female to Male Unemployment Rate”, *Economics Bulletin*, 5:23; 1-10

Queneau, Hervé and Sen, Amit (2010) “On the persistence of the gender unemployment gap: evidence from eight OECD countries”, *Applied Economics Letters*, 17: 2; 141-145

Shimer R. (2005) “Reassessing the Ins and Outs of Unemployment”, mimeo University of Chicago

Shimer R. (2007) “Reassessing the Ins and Outs of Unemployment”, NBER Working Paper No. 13421