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Maurizio Baussola - Chiara Mussida

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Maurizio Baussola and Chiara Mussida[a*]

[a] *Department of Economics and Social Sciences, Università Cattolica, Piacenza, Italy*

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Abstract

Recent labour market developments include an increase in labour market mismatches, in that high unemployment rates coexist with significant levels of vacancies. This pattern is particularly evident in the US economy, but is also significant within the European Union; it implies that the natural rate of unemployment may rise significantly, thus suggesting that even if policies aimed at reducing it are implemented, the unemployment rate may remain steady if not increase. An important factor possibly influencing such an increase is related to the gender differential in employment opportunities. This is particularly relevant wherever such a differential represents a structural characteristic of the labour market, as in the case of Italy. The present work focuses on this issue and presents a methodology to decompose the natural rate of unemployment by gender, thus defining it in terms of equilibrium labour market flows between the aggregate states of the labour market (Employment, Unemployment, Non Labour Force). In addition, we propose estimates of the determinants of the unemployment gender gap, in order to pinpoint the relative roles of individual characteristics and structural factors in determining this difference.

Keywords: unemployment gender gap, differentials, multinomial models, transition probability matrix.
JEL classification codes: C21, C41, J16, J31, J71

*Corresponding author. Address: Department of Economics and Social Sciences, Università Cattolica del Sacro Cuore,via Emilia Parmense, 84, 29122 Piacenza, Italy. Tel.: +39 0523 599318; fax: +31 0523 599301.
E-mail addresses: maurizio.baussola@unicatt.it (M. Baussola) and chiara.mussida@unicatt.it (C. Mussida).

1 Introduction

It is widely recognised that the shocks produced by the latest economic recession, brought about by the financial crisis, have had a strong negative impact on unemployment at an international level. This impact has not been transitory, as the unemployment rate has not yet returned to its pre-crisis level in the majority of developed economies, so the natural rate is increasing.

This scenario is of great concern, as permanent separations due to plant closures account for a large part of labour turnover; furthermore, mismatches between labour supply and demand occur together with other simultaneous factors affecting the unemployment rate.

Possible explanations of the increase in the natural rate typically refer to the role played by increases in welfare benefits (e.g. unemployment benefits) on the supply side; they also refer to demand side factors, which are, however, significant in the current economic downturn. The mismatch between vacancies and job seekers is also related to both sectoral and regional factors, in particular with reference to the construction and finance sectors and to those areas in which these activities are more concentrated.

There is another explanation, involving the increase in the long-term unemployment and other structural factors such as the unemployment gender gap. The latter is particularly significant in the Italian labour market, which besides sectoral and regional imbalances, also reveals a structural difference between the unemployment rates and more generally the employment opportunities for the male and female components of the labour force.

In this paper, we decompose the difference by gender in the unemployment rate using gross labour market transition data for the Italian economy over the period 2004-10.

We extend the methodology proposed by Marston (1976) and Baussola (1985) and we explicitly consider individual characteristics as well as other structural variables affecting the unemployment gender differential. This analysis is crucial, as on the one hand it highlights the most relevant flows affecting the unemployment gender gap, emphasizing the role of the flows in and out of inactivity which are neglected in many studies on the decomposition of the unemployment rate differentials. On the other hand, the analysis enables us to ascertain the variables which affect this gap, thus underlining relevant policy implications.

Our analysis is based on the new Labour Force Survey set up by the National Institute of Statistics (ISTAT), which enables us to analyse annual gross flows between the three labour market states, namely, employment, unemployment and non-labour force. This fact has to be underlined, as other international investigations on the unemployment gender gap (see for example, Azmat et al. (2006)) use a different source, the European Community Household panel Survey (ECHPS), which allows for the reconstruction of labour market flows only retrospectively. This implies that individuals are asked to reconstruct their position in the labour market one year before. This fact typically causes an increase in the permanence rate, particularly in the unemployment state, thus determining biased results.

The paper proceeds as follows. Section 2 presents the methodologies adopted to analyse the unemployment gender GAP and their relevance. Section 3 describes the data and the

samples. We show the results of the unemployment gender decomposition in Section 4. We offer empirical results on the determinants of the components of our decomposition in Section 5. Section 6 concludes.

2 The Analytical Framework

This section describes the methodology used for the breakdown of the unemployment gender differentials. We adopt a simple three-state labour market representation. Such a representation enables us to describe the labour market by means of a Transition Probability Matrix (TPM) which shows both permanence in each labour market condition and the probability of moving from one state to another in a given period of time.[1]

Figure 1 shows a TPM in which each row represents the initial stock and each column gives the value of the stock at the end of the period. Thus, we have three labour market stocks, namely employment (E), unemployment (U), and inactivity (N). Each element of the matrix represents the probability of moving from the initial state (state at time $(t-1)$) to the state at the end of the period (state at time (t)). Thus values on the main diagonal represent persistence patterns, as they show the probability of remaining in the same condition during the given unit of time.

Here we need to introduce another definition, i.e. the probability of successful labour force entry (*pne*), which is defined as:

$$pne = \frac{ne}{ne + nu}. \tag{1}$$

In general terms, labour market transition probabilities enable us to measure the relative size of each labour market state and therefore to measure both the unemployment level and its rate. By looking at the transition probability matrix by gender we can determine both the absolute difference between the unemployment rates and the relationship between such transition probabilities and differences in the unemployment rate by gender.

This decomposition of the unemployment rate differential may be derived by assuming the steady-state condition, i.e., by assuming that inflows and outflows from all labour market states counterbalance. Under this assumption we can write:

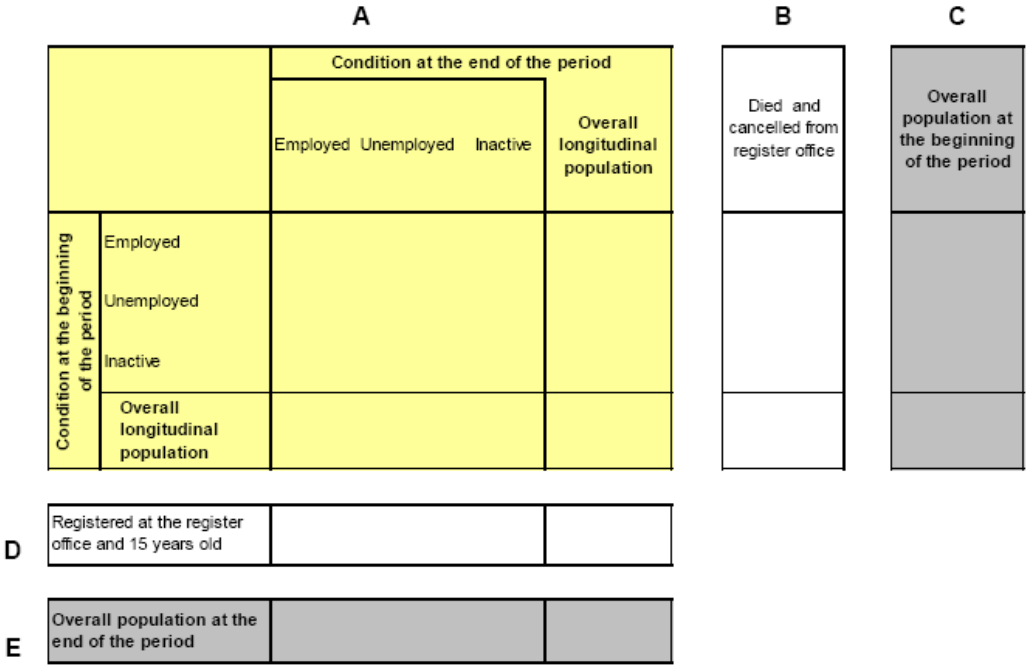
$$ueU + neN = (eu + en)E \tag{2}$$

$$euE + nuN = (ue + un)U \tag{3}$$

Equation (2) guarantees the steady-state assumption with respect to employment, whereas equation (3) guarantees the unemployment steady-state condition. By solving with respect

[1] We compute quarterly transition probabilities, which are then averaged over the year. Transition probabilities are computed as the ratio between each flow and the corresponding stock at initial time.

Figure 1: Labour Market Transition Matrix



to N we get:

$$N = \frac{(eu + en)}{neE} - \frac{ue}{neU} \tag{4}$$

$$N = \frac{-eu}{nuE} + \frac{(ue + un)}{nuU}. \tag{5}$$

We can then obtain the following equation, from which we can derive the steady-state unemployment rate:

$$eE = dU, \tag{6}$$

where $e = [eu + (1 - pne)en]$; $d = (ue + un \times pne)$.). The steady-state unemployment rate is, therefore, expressed by the relation u=U/(U+E), which may be defined in terms of transition probabilities as:

$$u = \frac{e}{e + d}.. \tag{7}$$

Such a definition of the steady-state unemployment rate allows us to express the variation in the unemployment rate in terms of variations in the transition probabilities.

We can then calculate the female and male steady-state unemployment rates (u_f and u_m, respectively) and then decompose their differentials (Δu) as:

$$\Delta u = \sum \frac{1}{2}[\frac{du}{dp\_m(i)} + \frac{du}{dp\_f(i)}]\Delta p(i), \tag{8}$$

where $p(i)$ is the individual $(i-th)$ transition probability and the terms in brackets represent the marginal impact of each probability on the steady state unemployment rate;[2] $\Delta p(i)$ is the difference between female and male $i-th$ transition probability.

In addition, we can also calculate the mean length of an unemployment spell (D):

$$D = \sum \frac{1}{1-uu}T, \tag{9}$$

where uu is the permanence rate in unemployment and T is the survey time length (in months).

3 Data and Sample

The empirical analyses exploit data from 2004-2010 ISTAT longitudinal data. Each year, the Survey collects information on almost 280,000 households in 1,246 Italian municipalities for a total of 700,000 individuals.

We are forced to limit analysis to this period as previous data (data produced before the survey renewal of 2004) on labour market flows are not comparable with those derived from the new survey. Technical details on the survey are provided in Appendix Section A-1.[3]

The empirical results of our analyses are based on multinomial logit model estimates. We specify a separate model for each labour market state by assuming a simple three-state representation (employment, unemployment, and inactivity), and by assuming independence of the outflows from each of the three labour market states. The variables used in the econometric analyses are described in the Appendix in Table A-1. The dependent variables utr, etr and ntr thus refer to the outflows from the states of unemployed, employed and inactive, respectively.

[2]The impact is computed as a partial derivative of the steady-state unemployment rate with respect to each transition probability $\frac{du}{dp(i)}$, evaluated at the intermediate point between the values of male and female. The value obtained from eq. (8) informs on the impact of each gender difference in the transition probabilities on the unemployment rate differential.

[3]The most recent changes in the definitions and design of the survey occurred in 2004. The changes, primarily dictated by the requirement to adapt the survey to new EU standards, were also intended to respond to the need for increased knowledge and improved survey quality. For a more detailed discussion of the characteristics of the Italian LFS, see Gazzelloni (2006) and ISTAT (2009).

4 Empirical Results

Gross labour market flows confirm flaws in the conventional wisdom that the Italian economy is characterised by an inflexible and tight labour market.

The evidence that continental European labour markets are quite active is also confirmed in the analysis by Burda and Wyplosz (1994), who found that gross-labour market flow dynamics in Germany and France are substantial and present cyclical patterns similar to those in the United States. Our investigation confirms this for Italy too and suggests that the persistence pattern in the unemployment stock may derive from the matching function relating worker and job flows, in that imbalances may prevail between the pool of unemployed workers and created vacancies.

However, it should be noted that the persistence of unemployment has fallen significantly in Italy according to the latest wave of the national Labour Force Survey, as the definition of job seekers has been restricted with respect to the previous survey. This fact renders the Italian labour market even more dynamic.

This evidence is coherent with previous findings on the Italian labour market flows over long periods of observation, bearing in mind changes in the Labour Force Survey methodology (e.g. Baussola (1985, 1988), Fabrizi and Mussida (2009), Contini and Trivellato (2005)).

This section discusses the results of the unemployment decomposition we presented in Section 2 and also discusses the impact of labour market flows on the steady-state unemployment rate and the implied gender gap.

The adopted transition probabilities are calculated by dividing the quarterly outflows from each status by the corresponding initial stock. The TPM in Figure 1 thus represents a discrete Markov chain, which however implies that movements from one state to another are independent of time spent in the original status.

It can be easily shown that the unemployment gender gap is still a relevant issue within the Italian labour market as women show an unemployment rate which is on average 3 to 4 percentage points higher than that of men (Figure A-1 in the Appendix). This characteristic is shared with other OECD countries, in particular the Mediterranean economies, as pointed out in Azmat et al. (2006) and by OECD data.[4] Instead the gender gap is not relevant in northern European and English-speaking countries; in particular, the US economy exhibits unemployment rates for men which are higher than those for women, particularly over the recent recession (Şahin et al., 2010).

As regards labour market transition probabilities, we refer to employment outflows towards unemployment (eu) and inactivity (en), permanence in unemployment (uu) and outflows from unemployment (ue and un).Finally we give outflows from inactivity, the probability of successful entry into the labour market (pne, defined above) and the probability of

[4]OECD data confirm such evidence. These are available in Internet at http://www.oecd-ilibrary.org/employment/unemployment-rate_20752342-table1.

not successful entry into the labour market ($1 - pne$).

Table 1: Transition Probabilities by Gender and Year

	eu	en	ue	un	uu	ne	nu	pne	1-pne
				2004-2005					
M	0.019246	0.047571	0.349673	0.293028	0.357298	0.052158	0.033386	0.609724	0.390276
F	0.023676	0.077604	0.259606	0.451734	0.28866	0.030351	0.025489	0.543529	0.45647
T	0.020989	0.059391	0.301259	0.378338	0.320403	0.038395	0.028402	0.57480	0.42520
				2005-2006					
M	0.01736	0.042444	0.380435	0.290217	0.329348	0.060872	0.029156	0.676143	0.323857
F	0.021023	0.074643	0.265349	0.401665	0.332986	0.037904	0.027749	0.57734	0.42266
T	0.0188	0.055099	0.321637	0.347156	0.331207	0.046347	0.028266	0.621162	0.378838
				2006-2007					
M	0.015732	0.045314	0.349701	0.325749	0.324551	0.051322	0.024883	0.673469	0.326531
F	0.014142	0.084385	0.260317	0.474074	0.265608	0.034952	0.019669	0.639906	0.360094
T	0.015109	0.06062	0.302247	0.404494	0.293258	0.040965	0.021584	0.654925	0.345075
				2007-2008					
M	0.014164	0.048486	0.366947	0.282913	0.35014	0.062204	0.030349	0.672093	0.327907
F	0.018992	0.073654	0.303644	0.421053	0.275304	0.042445	0.029642	0.588801	0.411199
T	0.01606	0.058417	0.334708	0.353265	0.312027	0.049746	0.029903	0.624563	0.375437
				2008-2009					
M	0.022292	0.051517	0.305236	0.319285	0.002753	0.053648	0.031223	0.632111	0.367889
F	0.026147	0.077208	0.273782	0.443155	0.283063	0.033903	0.025907	0.566845	0.433155
T	0.023583	0.057972	0.289186	0.379101	0.331713	0.039922	0.027829	0.589243	0.410757
				2009-2010					
M	0.024822	0.046194	0.285097	0.300216	0.414687	0.049509	0.033147	0.598978	0.401022
F	0.023398	0.07381	0.260244	0.425249	0.314507	0.033432	0.02701	0.553125	0.446875
T	0.024254	0.057209	0.272678	0.361749	0.365574	0.03944	0.029304	0.573723	0.426277

Table 1 shows the raw transition probabilities by gender, whilst Table 3 displays the transition probabilities used to compute the steady-state unemployment rate by gender. The last two columns report the total difference between gender in the steady-state unemployment rate explained by such probabilities, and the gender gap in the steady-state unemployment rate (computed by using equation (7)), respectively. By looking at the last rows of each yearly estimate it is easy to see the contribution of each probability to the gender unemployment gap. It is worth underlining the fact that the most relevant flow in determining this gap is en, i.e. flows from employment to inactivity. This confirms previous evidence provided by Baussola (1985) and Marston (1976), and contrasts with other evidence not based on aggregate labour market flows; it also explains unemployment dynamics only in terms of inflows and outflows from unemployment to employment, thus neglecting the significant role of inflows and outflows which involve inactivity (Azmat et al. (2006), Elsby et al. (2009)).

The impact of en on gender differentials is very high in the first half of the period, while it declines in relevance from the beginning of the economic downturn. Outflows from unemployment (ue and un) exert a contrasting impact on the gender gap: successful exits (ue)

Table 2: Unemployment rates and Duration

	U % (steady-state)	U%	D (months)
	2004-2005		
M	6.40	6.68	4.67
F	10.60	10.47	4.22
T	8.10	8.18	4.41
	2005-2006		
M	6.30	5.12	4.47
F	10.10	9.56	4.50
T	7.80	6.88	4.49
	2006-2007		
M	5.50	5.09	4.44
F	8.80	7.32	4.09
T	6.90	5.97	4.24
	2007-2008		
M	5.00	5.12	4.62
F	7.90	8.20	4.14
T	6.20	6.40	4.36
	2008-2009		
M	5.50	7.29	4.86
F	8.50	10.20	4.21
T	6.70	8.70	4.49
	2009-2010		
M	6.80	8.53	5.13
F	9.30	10.22	4.38
T	7.80	9.20	4.73

tend to increase such differentials, but their impact decreases during the period, especially at the height of the economic downturn (2008-2009, and also in 2010); outflows to inactivity (un), on the other hand, reduce such discrepancies. The probability of successful entry into the labour market (pne) decreases in impact on gender differentials over the period. This implies a decreasing impact of the two transitions used for its computation, i.e. outflows from inactivity to employment and unemployment, ne and nu respectively.

The overall trend of gender differentials in the steady-state unemployment rate determined by transition probabilities (sixth column of Table 3)increases from 2004 to 2006, and thereafter decreases, especially as of the start of the economic downturn (i.e. since 2008).

The gender gap trend in the steady state unemployment rate as reported in the last column of Table 3 is very close to that computed by gender differentials, thus emphasizing the fact that during the recent crisis the gender gap has decreased. This is most probably due to the fact that the economic downturn hit male and female employment asymmetrically. This is particularly due to the sectoral characteristics of this crisis, which has hit economic sectors typically characterized by male employment. These changes have resulted in an increase in male unemployment and therefore in a reduction in the gender gap in unemployment rates. Women have not benefited from more favourable labour market conditions during the crisis, but given that male employment has fallen, there has been a reduction in the unemployment gap with respect to men.

The probability of successful entry into the labour market (pne) decreases its impact on gender differentials over the period. This implies also a decreasing impact of the two transitions employed for its computation, i. e. outflows from inactivity to employment and unemployment, ne and nu respectively.

The overall trend of gender differentials in the steady-state unemployment rate determined by the transition probabilities (sixth column of Table 3) increases from 2004 to 2006, and thereafter decreases especially at the start of the economic downturn (since 2008). The trend of the gender gap in the steady state unemployment rate reported in the last column of Table 3 is very close to the one computed by gender differentials, emphasizing that during the recent crisis the gender gap was reduced. This is likely due to the fact that the economic downturn hit asymmetrically male and female employment.

This is particularly due to the sectoral characteristics of this crisis, which hit economic sectors typically characterized by male employment.[5] These changes result in an increase of male unemployment and therefore in a reduction of the gender gap in unemployment rate. Women do not benefit of more favourable labour market conditions during the crisis, but, given the deteriorating conditions of male employment, there has been a reduction of the unemployment gap with respect to men.

The reduction in the gender unemployment rate gap is also confirmed by official statistical data, dropping from 4.2% in 2004 to 2.1% in 2010. This reduction was due to the increase in the male unemployment rate which increased from 6.4% in 2004 to 7.6% in

[5]For a discussion on the impact of the last crisis on employment, see OECD (2010).

Table 3: Gender Unemployment rate Differentials by Year

	eu	en	ue	un	pne	Total Diff(1)	Total Diff(2)
		2004-2005					
Diff between transition prob. (F-M)	0.0044	0.0300	-0.0901	0.1587	-0.0662		
du/dp(i)M	1.6483	0.6433	-0.1180	-0.0719	-0.1130		
du/dp(i)F	1.5867	0.7243	-0.1856	-0.1009	-0.2070		
1/2[du/dpiM +du/dpiF]	1.6175	0.6838	-0.1518	-0.0864	-0.1600		
Unemployment rate difference	0.7166	2.0536	1.3672	-1.3714	1.0590	3.8250	3.7956
	eu	en	ue	un	pne	Total Diff(1)	Total Diff(2)
		2005-2006					
Diff between transition prob. (F-M)	0.0037	0.0322	-0.1151	0.1114	-0.0988		
du/dp(i)M	1.5612	0.5056	-0.0842	-0.0569	-0.0907		
du/dp(i)F	1.6449	0.6952	-0.1739	-0.1004	-0.1926		
1/2[du/dpiM +du/dpiF]	1.6030	0.6004	-0.1291	-0.0787	-0.1417		
Unemployment rate difference	0.5871	1.9332	1.4853	-0.8768	1.3997	4.5286	4.4436
	eu	en	ue	un	pne	Total Diff(1)	Total Diff(2)
		2006-2007					
Diff between transition prob. (F-M)	-0.0016	0.0391	-0.0894	0.1483	-0.0336		
du/dp(i)M	1.5828	0.5168	-0.0849	-0.0572	-0.0994		
du/dp(i)F	1.5238	0.6266	-0.1204	-0.0770	-0.1857		
1/2[du/dpiM +du/dpiF]	1.5533	0.5717	-0.1026	-0.0671	-0.1425		
Unemployment rate difference	-0.2470	2.2337	0.9175	-0.9954	0.4783	2.3872	2.2299
	eu	en	ue	un	pne	Total Diff(1)	Total Diff(2)
		2007-2008					
Diff between transition prob. (F-M)	0.0048	0.0252	-0.0633	0.1381	-0.0833		
du/dp(i)M	1.6159	0.5299	-0.0872	-0.0586	-0.0489		
du/dp(i)F	1.5278	0.6282	-0.1365	-0.0804	-0.0917		
1/2[du/dpiM +du/dpiF]	1.5719	0.5791	-0.1119	-0.0695	-0.0703		
Unemployment rate difference	0.7590	1.4573	0.7081	-0.9599	0.5855	2.5500	3.0816
	eu	en	ue	un	pne	Total Diff(1)	Total Diff(2)
		2008-2009					
Diff between transition prob. (F-M)	0.0039	0.0257	-0.0315	0.1239	-0.0653		
du/dp(i)M	1.6866	0.6205	-0.1372	-0.0867	-0.0650		
du/dp(i)F	1.5363	0.6654	-0.1744	-0.0988	-0.1089		
1/2[du/dpiM +du/dpiF]	1.6114	0.6430	-0.1558	-0.0928	-0.0870		
Unemployment rate difference	0.6213	1.6518	0.4900	-1.1493	0.5676	2.1814	2.6717
	eu	en	ue	un	pne	Total Diff(1)	Total Diff(2)
		2009-2010					
Diff between transition prob. (F-M)	-0.0014	0.0276	-0.0249	0.1250	-0.0459		
du/dp(i)M	1.7997	0.7217	-0.1678	-0.1005	-0.0628		
du/dp(i)F	1.6270	0.7271	-0.1851	-0.1024	-0.1058		
1/2[du/dpiM +du/dpiF]	1.7133	0.7244	-0.1765	-0.1015	-0.0843		
Unemployment rate difference	-0.2440	2.0004	0.4386	-1.2685	0.3866	1.3131	1.6887

(1) Sum of the unemployment rate differences.
(2) Difference between the steady-state unemployment rates.

2010. In contrast, the female unemployment rate has remained relatively steady, moving from 10.6% in 2004 to 9.7% in 2010.[6]

However, it is worth underlining the fact that within the Italian labour market it is crucial to take into consideration the flows from and to inactivity, as the definition of unemployment adopted to measure the official unemployment rate does not take into account the overall potential willingness to work. Estimates of such broader definitions of unemployment show that under such circumstances the unemployment rate would be significantly higher (Olivieri and Paccagnella, 2011).

5 5 Estimates of the determinants of gender GAP

This section investigates the determinants of the labour market transitions relevant for the computation of the steady-state unemployment rate. As shown above, the steady-state unemployment rate started to increase in 2007, and this tendency was exacerbated by the latest economic downturn (2008-2009).

Unemployment is the result of the mismatch between labour demand and supply. The labour market in Italy is typically characterized by sticky unemployment rates, i.e. the unemployment rate does not react promptly (or reacts with a time lag) to economic changes. There may be structural factors which inhibit the elasticity of unemployment to output changes, thus contributing to the increase of the natural (structural) rate of unemployment. In Italy we typically find gender gaps in the labour market indicators, as well as geographical discrepancies and sectoral differences. The aim of this section is to better understand the factors behind the observed trend of the unemployment rate.

First we look at the pattern of the labour market transitions (Table 1) used for the computation of the steady-state unemployment rate. We see that the numerator of the indicator increases mainly due to the increasing transitions between employment and unemployment (eu)and the reduced unsuccessful exits from the labour market ($1pne$). The denominator was reduced mainly by the decreasing trend of both the unemployment outflows. We therefore now analyse the determinants of decreasing ue and un and of increasing eu. We also look at the determinants of inactivity outflows, as these are used to compute the probability of successful entry into the labour market.

The estimation of the determinants of the outflows from each labour market state is carried out by using multinomial logit models. We specify a separate model for each row of the transition matrix, i.e. we divide the sample into three sub-samples, according to state in the labour market at the beginning of the reference period. For notational convenience we number the three states from 0 to 2. The model for the transition probabilities can be written as follows:

[6]These figures are available in Internet at http://www.istat.it/salastampa/comunicati/in_calendario/forzelav/.

$$P_{ij,h} = \frac{\exp z_t^h \beta_j}{\sum_{l=0}^{2} \exp \left(z_t^h \beta_l \right)}, \tag{10}$$

for $h \in (i, t-l)$. According to Theil normalisation, we set $\beta_0 = 0$. Conventionally we will assume permanence in the initial state as the baseline category. Model parameters are estimated using Maximum Likelihood. A detailed technical description of the Maximum Likelihood method in this context can be found in Gourieroux (1989) (ch. 5), Cameron and Trivedi (2005) (ch. 15).

We now briefly describe the variables employed in the econometric analysis and reported in the Appendix Table A-1. The first independent variable, 'sex', attempts to determine the impact of gender on labour market transitions. The relevance of gender is emphasized both in past literature, which analyzes aggregate data (e.g. Baussola (1985, 1988) and Leoni (1984)) and in more recent studies employing individual labour force data from ISTAT for the decade 1993-2003), such as Schindler (2009) and Trivellato et al. (2005).

Table 4: Outflows from Unemployment, 2004–2010

	UE		UN	
	Coef	Mgl.Eff	Coef	Mgl.Eff
sex	.238***	.111***	-.579***	-.161***
age	-.015	.004*	-.068***	-.014***
agesq	.000	-.000***	.001***	.000***
italian	.066	-.014	.266***	.054***
famsize	.031*	.004	.019	.001
experience	.430***	.109***	-.251***	-.105***
loweduc	-.668***	-.122***	.020	.069***
compulsory	-.671***	-.140***	.055	.085***
diploma	-.473***	-.098***	.054	.063***
urate	-.077***	-.017***	.010*	.011***
dursearch	-.000***	-.000***	-.001	.000
gdpgrowth	5.837*	.643	5.014*	.549
year 2005	.121	.018	.064	.001
year 2006	.023	-.026*	.274***	.063***
year 2007	-.017	-.012	.078	.020
year 2008	-.172*	-.043***	.089	.039***
year 2009	-.375***	-.068***	-.037	.029**
Pseudo R^2	.0475			
Observations	13453		13453	

Notes: * Significant at the 10% level; ** significant at the 5% level; *** significant at the 1% level.

The individual age (which in this analysis refers to the working age with the upper limit of 74 years to reflect the new definition of 'unemployed' adopted in the current LFS) and age squared were both included in all estimates. The previously-quoted studies, together with (among others) Bertola and Garibaldi (2003) and Picchio (2006), stress the impact of

age on transitions in the labour market. Particular attention was also devoted to the issue of youth unemployment which, as previously stated, strongly characterises the Italian labour market.[7]

We also control for citizenship and household size, the first to account for the increased weight of foreigners in the labour market, especially among the employed (ISTAT, 2010a), the second so as to include the relevance of the household in assessing probabilities of employment.

The impact of education on labour market transitions is assessed by including specific dichotomous variables. The importance of educational attainment is also described by ISTAT (2010b).

Table 5: Outflows from Employment, 2004–2010

	EU		EN	
	Coef	Mgl.Eff	Coef	Mgl.Eff
sex	-.126***	-.001**	-.571***	-.025***
age	-.114***	-.001***	-.298***	-.011***
agesq	.000***	.000***	.004***	.000***
italian	-.382***	-.006***	.195***	.008***
famsize	.022	.000	.050***	.002***
loweduc	.612***	.009***	.780***	.047***
compulsory	.263***	.003***	.344***	.015***
diploma	.142**	.002**	.187***	.009***
urate	.097***	.001***	.066***	.003***
bluecollar	.800***	.011***	.528***	.023***
fulltime	-691***	-.010***	-.877***	-.049***
year 2005	-.004	-.000	-.053	-.002*
year 2006	-.242***	-.002***	.139***	.006***
year 2007	.106	.001	.122***	.005***
year 2008	.362***	.005***	.105***	.004**
year 2009	.382***	.005***	.033	.001
Pseudo R^2	.1271			
Observations	163639		163639	

Notes: * Significant at the 10% level; ** significant at the 5% level; *** significant at the 1% level.

The structural variables refer to the regional unemployment rates (annual rates, ISTAT). It is important to emphasize that in addition to capturing the structural component of unemployment, the regional unemployment rate also summarizes the overall impact of the geographical component.[8]

[7]The issue of youth unemployment in Italy has been analyzed in the literature by employing data from different sources. Among these we cite Barbieri and Sestito (2008) who use the ISTAT LFS, Picchio (2008), who analyzes data from the SHIW, the Survey of Italian Households' Income and Wealth conducted by the Bank of Italy, and Berton et al. (2008) who use data from INPS (National Institute of Social Security) administrative archives.

[8]Regional differentiation of the unemployment rate makes it possible to determine the impact of the geographical component on labour market transitions. The unemployment rate thus absorbs both the geographical

Table 6: Outflows from Inactivity, 2004–2010

	NE		NU	
	Coef	Mgl.Eff	Coef	Mgl.Eff
sex	.908***	.008***	.632***	.000***
age	.244***	.002***	.309***	.000***
agesq	-.003***	-.000***	-.005***	-.000***
italian	-.020	.000	-.345***	-.000***
famsize	.001	-.000	-.047***	-.000***
loweduc	-1.212***	-.004***	-.685***	-.000
compulsory	-1.096***	-.002***	-.418***	.000***
diploma	-.735***	-.000	-.301***	.001***
urate	-.036***	-.000***	.049***	.000***
year 2005	.217***	.002***	.087**	.000**
year 2006	.048	.000	-.230***	-.000***
year 2007	.171***	.000**	.183***	.000**
year 2008	.016	-.000	.032	-.000
year 2009	-.047	-.001***	.123*	.000
Pseudo R^2	.2267			
Observations	169432		169432	

Notes: * Significant at the 10% level; ** significant at the 5% level; *** significant at the 1% level.

This is another peculiarity of the Italian labour market, which is typically characterized by high geographical differentials and discrepancies, especially as regards probability of permanence in and/or transition from the state of unemployment.

This issue has also been widely discussed in the literature (among others, Paggiaro (1999) and Ricciardi (1991)), and is confirmed by the current analysis. The annual growth rate of regional GDP, here introduced only for the unemployment outflows estimates, attempts to summarize the cyclical component.

In relation exclusively to transitions out of unemployment, information was included regarding both previous work experience, as this often increases the likelihood of finding employment (Fabrizi and Mussida (2009) and ISTAT (2010b)), and duration of unemployment.

Finally, a set of covariates are used to capture job and task heterogeneity only for the outflows from employment. We include dummy indicators for part-time job and blue-collar workers.

The last group of variables consists of six yearly dummy variables which try to capture the behaviour of our estimates within the time period analysed, in order to indicate if there is any evidence for a trend in the transition probabilities.

Table 4 displays the results for the determinants of the unemployment outflows.

The likelihood of exits to employment are lower for females holding low educational attainment titles in a labour market with a high unemployment rate and long unemployment duration. Being a younger male helps reduce the probability of unemployment outflows to

and structural components.

Table 7: Actual vs Fitted transition probabilities, 2004–2010

	eu	en	ue	un	uu	ne	nu
				Male			
Actual[(a)]	0.0188	0.0464	0.3396	0.3005	0.3598	0.0547	0.0303
Fitted[(b)]	0.0190	0.0522	0.3514	0.3009	0.3476	0.0816	0.0462
Gap (Actual-Fitted)	-0.0002	-0.0058	-0.0118	-0.0004	0.0122	-0.0269	-0.0159
				Female			
Actual	0.0213	0.0761	0.2705	0.4355	0.2940	0.0353	0.0259
Fitted	0.0200	0.0826	0.2450	0.4556	0.2993	0.0371	0.0271
Gap	0.0013	-0.0064	0.0255	-0.0202	-0.0053	-0.0018	-0.0012
				Total			
Actual	0.0218	0.0581	0.3036	0.3707	0.3257	0.0425	0.0275
Fitted	0.0189	0.0619	0.2943	0.3825	0.3232	0.0488	0.0312
Gap	0.0029	-0.0038	0.0093	-0.0118	0.0025	-0.0064	-0.0036

[(a)] Average transition probabilities from raw data over the period 2004–2009
[(b)] Average transition probabilities from pooled model estimates for the overall period 2004–2009.

inactivity. Job experience also contributes.

Table 5 shows the estimates of the determinants of employment outflows. An increasing likelihood of movements from employment to unemployment is observed for low-educated blue-collar female workers. Again, the relevance of gender in determining such transition probabilities resulting in an increasing steady-state unemployment rate is confirmed.

The right-hand panel of Table 5 displays the coefficient estimates for the flows from employment to inactivity; the model is well specified as is shown by the fact that all the covariates employed, with the partial exception of the time dummies, exert a relevant impact on this part of the labour market.

Table 6 shows the estimates for inactivity outflows. The relevance of gender is also confirmed for these transitions; indeed there are relevant gender differentials for both outflows. Individual age and education also play a role: becoming older and more educated increases the likelihood of leaving the state of inactivity successfully.

Finally, we look at the behaviour of estimated transitions within the time period analysed; this is summarized by the yearly time dummies included in each estimate. These estimates, after controlling for individual characteristics by assuming their effects as constant over time, and taking into account structural features of our labour market (unemployment rate, absorbing the structural component and GDP growth rate, representing the cyclical component), represent an attempt to capture the presence of any trend in the transition probabilities.

Nonetheless, in the present study the temporal trends are not referred to an excessively prolonged period. Transitions out of the state of unemployment (Table 4) do not seem to follow any trends. Outflows from employment are characterized by a higher number of significant time-dummy parameters than transitions out of unemployment, especially for flows towards unemployment.

However, the analysis of these coefficients, especially those referring to flows between employment and unemployment, reveals an immediate increase from 2004 to 2005, followed by a level that remains constant over time.

For the outflows from inactivity we find a relevant number time-dummies parameters. This suggests the existence of fluctuations in transitions in the six-year period considered.

6 Conclusions

The unemployment gender gap is particularly relevant within the Italian labour market, representing a crucial factor for explaining the rise in the natural rate of unemployment, particularly after the latest economic downturn.

We have proposed a breakdown of this gap which enables us to underline the most relevant labour flows determining the unemployment gap between the female and male components of the labour force.

This analysis suggests that the inclusion of the inactivity state gives a more precise decomposition of the gender gap, as the flows from inactivity to employment represent a non-negligible component of the overall inflows to employment. In this respect women do show both a significantly lower probability of successful entry into the labour force, and an even lower probability of leaving unemployment towards employment with respect to their male counterparts.

It is worth noting that labour market conditions have been worsening over the last two years as a consequence of a deepening economic crisis. This is shown by the significant reduction for both men and women of the likelihood of successful entry into the labour force and the increase of the exit probability from employment towards the unemployment condition.

Also, the gap in the discouragement effect is relevant and reveals an increase in the corresponding probability for both gender components.

The microeconometric estimates confirm this analysis and, in addition, suggest that sectoral and regional factors represent crucial determinants of the inflows and outflows from and to employment. As far as personal characteristics are concerned, a higher level of education may help increase employment inflows, on the one hand, and, on the other hand, reduce employment outflows.

Appendix

A-1 The Italian LFS

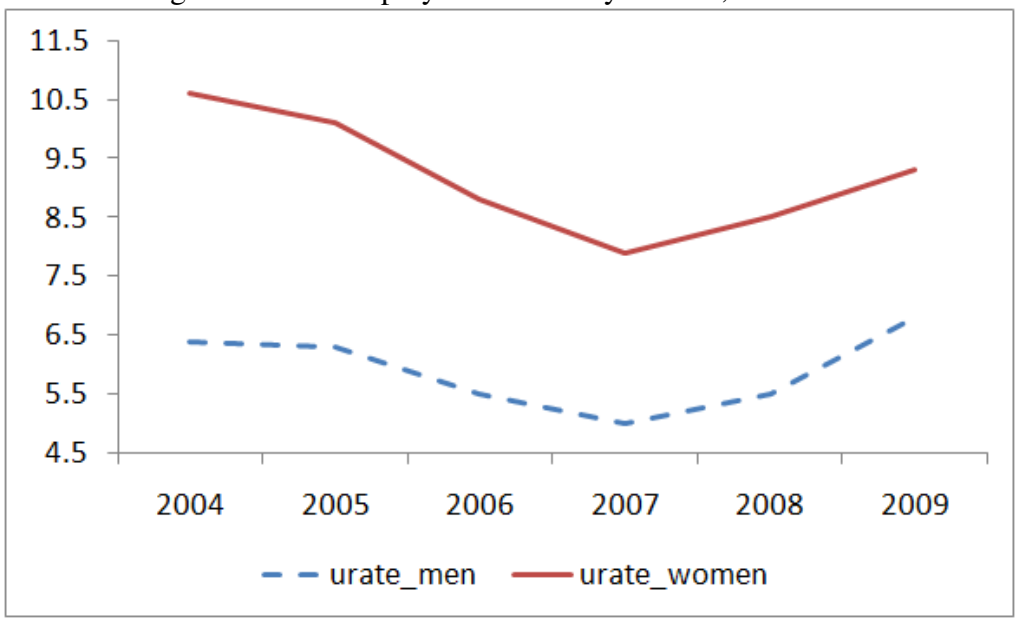
The sampling design of the survey is composed of two stages, with a stratification of the unit at the first stage; the first stage units are municipalities, while the second stage comprises households. Each household member is interviewed. The main difference between the two stages is that while

for families a 2-2-2 rotation scheme is applied, the municipalities surveyed do not change over time. More specifically, a household was interviewed for two consecutive surveys and, after being excluded from the sample for two quarters, was interviewed for another two consecutive quarters. This is defined as a (2-2-2) rotation scheme.[9]

This rotation system makes it possible to maintain half the sample unchanged in two consecutive quarters and in quarters one year apart. In other words, the scheme implies a 50% overlapping of the theoretical sample to a quarter of the distance, a 25% overlapping to three quarters, a 50% to four quarters, and a 25% to five quarters. Our analyses are based on yearly longitudinal data for the period 2004-2010.

These data are employed both to compute the labour market transitions which determine the steady-state unemployment rate and the related gender differentials, and to estimate the determinants of the labour market transitions which mostly affect such indicators and differentials. This latter investigation is carried out by using the variables described in the Appendix Table A-1. The choice of the variables was driven both by specific econometric tests and preliminary checks, and by the relevance of the indicators which are widely emphasized in the literature and in the aforementioned descriptive statistics.

Figure A-1: Unemployment Rates by Gender, 2004–2010



[9]For in-depth details on the sampling design, see Discenza and Lucarelli (2009).

Figure A-2: Transitions from Employment to Unemployment by Gender, 2004–2010

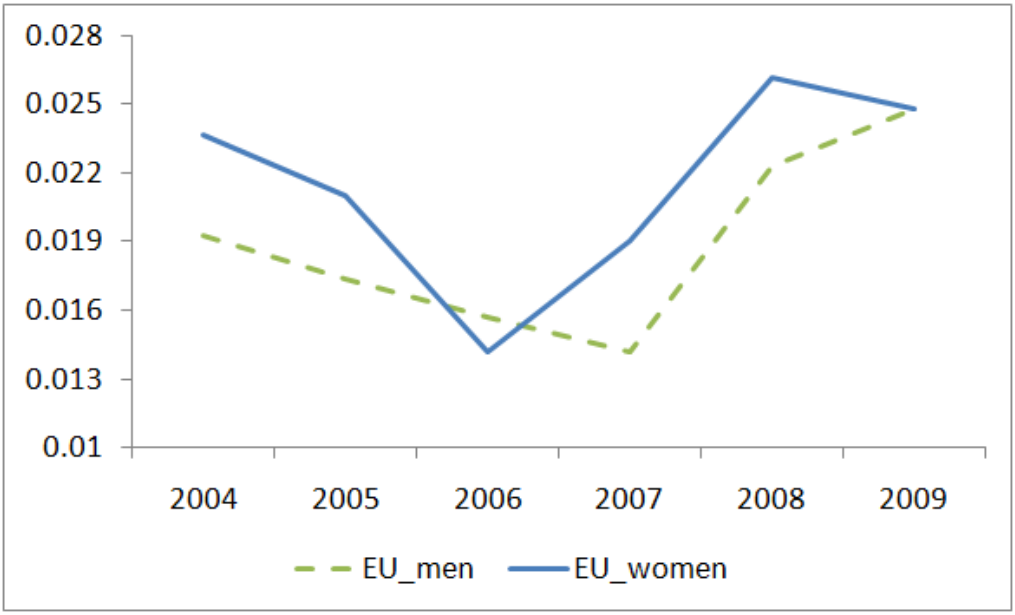


Figure A-3: Transitions from Employment to Inactivity by Gender, 2004–2010

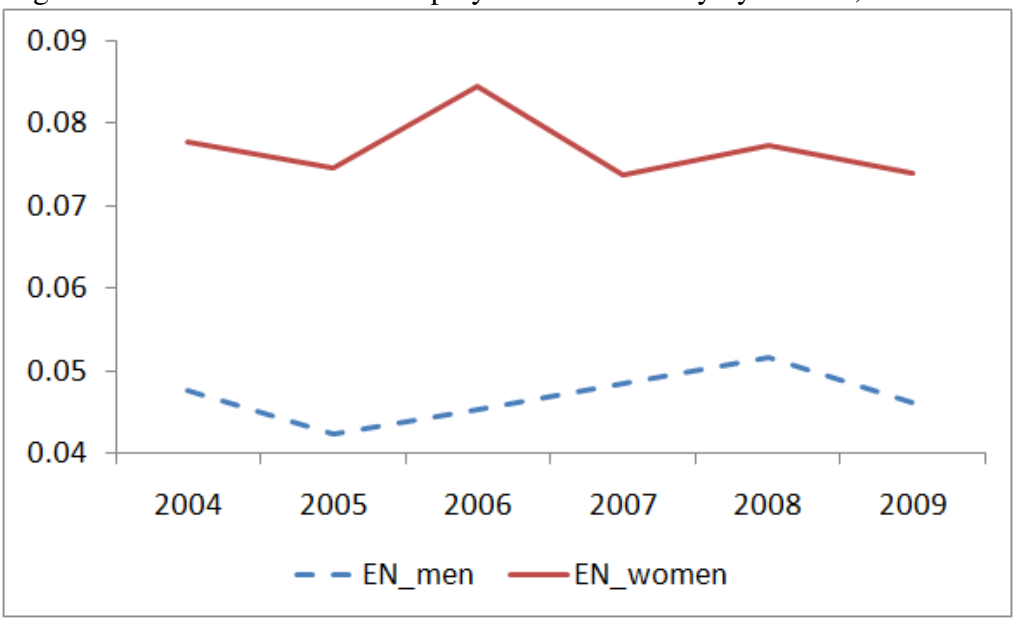


Figure A-4: Transitions from Unemployment to Employment by Gender, 2004–2010

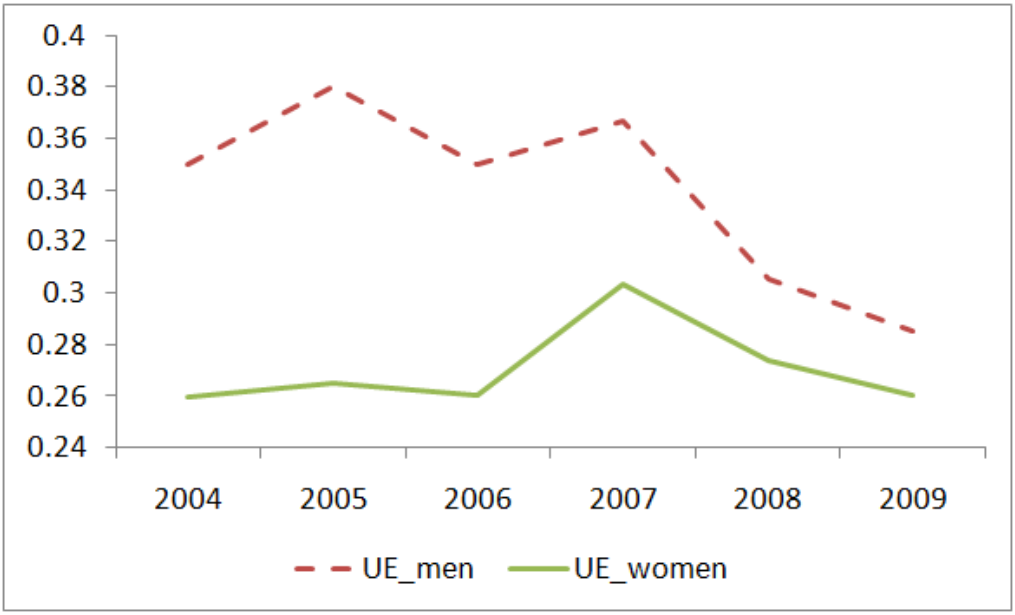


Figure A-5: Transitions from Unemployment to Inactivity by Gender, 2004–2010

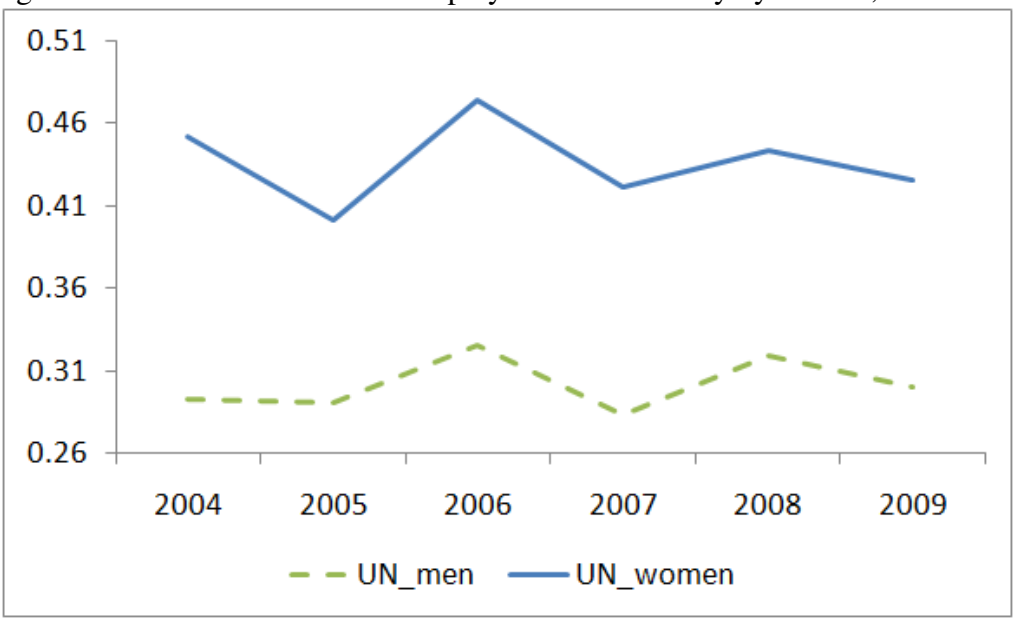


Figure A-6: Transitions from Inactivity to Employment by Gender, 2004–2010

Figure A-7: Transitions from Inactivity to Unemployment by Gender, 2004–2010

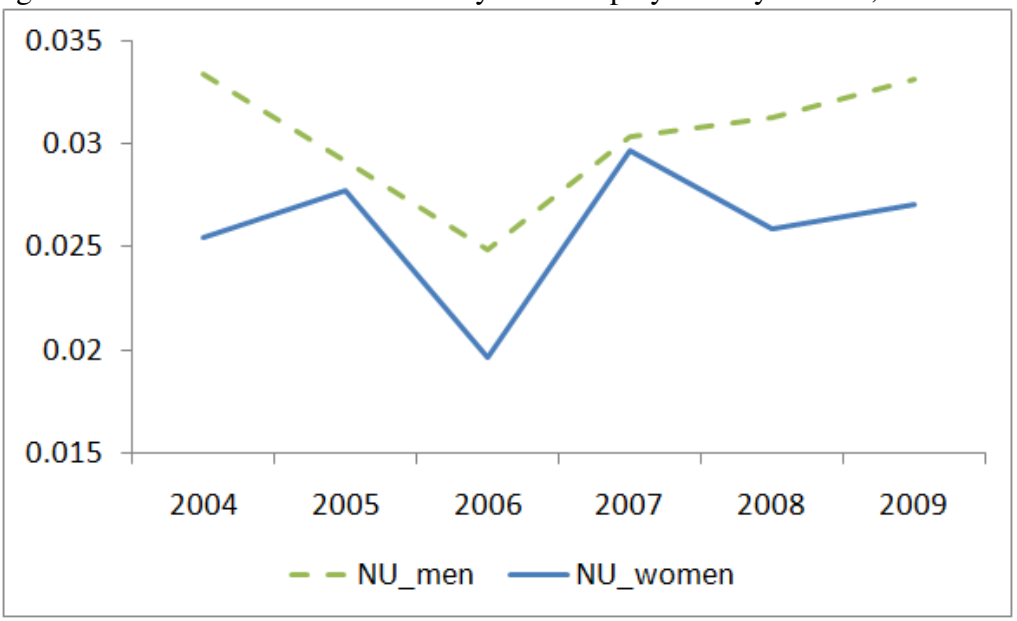


Figure A-8: Probability of successful entry into the labour market by Gender, 2004–2010

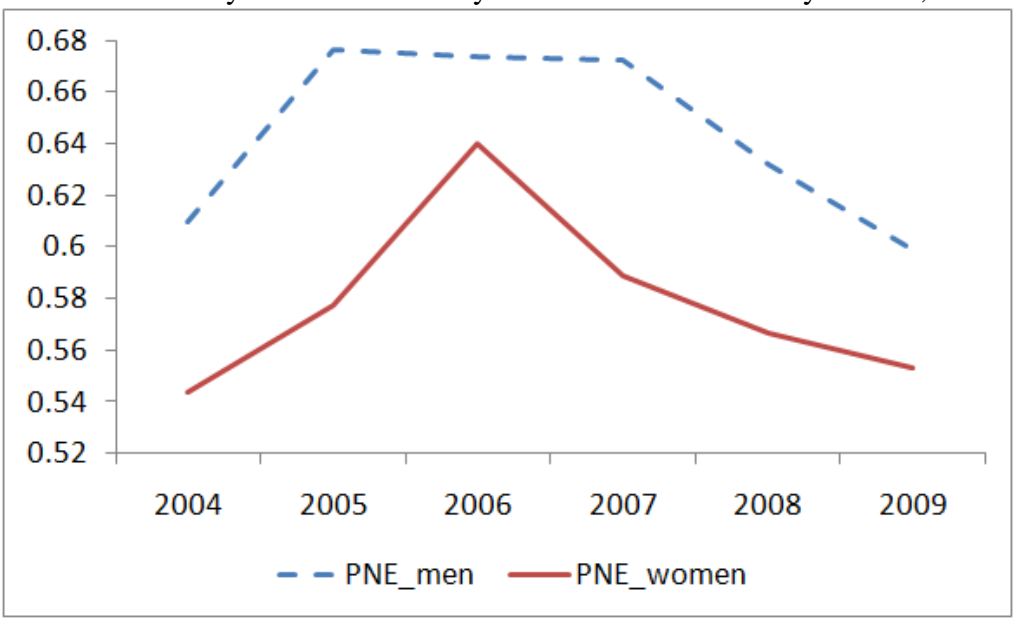


Table A-1: Description of variables employed in the econometric analysis

Variabile	Description
utr	1 for UE, 2 for UN, 3 for UU (base)
etr	1 for EU, 2 for EN, 3 for EE (base)
ntr	1 for NE, 2 for NU, 3 for NN (base)
sex	1 if male
age	age of the individual, [15-74] age bracket
agesq	individual age squared
italian	1 if italian, 0 if foreigner
famsize	household size
experience[(a)]	1 for unemployed with job experience
loweduc	1 if illiterate or having completed 5 years of schooling
compulsory	1 if compulsory education completed
diploma	1 for holding diploma
degree	1 for holding degree or PhD (omitted category)
urate	regional unemployment rate (annual average)
durric[(a)]	search for work duration (months)
gdpgrowth[(a)]	annual gdp growth rate, regional level
bluecollar[(b)]	1 for blue collar occupation, 0 for white collar
fulltime[(b)]	1 for full time jobs
time 2005 - time 2009	time dummies (yearly)

(a) Covariates employed only for unemployment related estimates.
(b) Covariates employed only for employment related estimates.

A-2 More on the impacts of gender

In this section we present the results shown in Tables A-2–A-4, which show the estimates of unemployment, employment and inactivity outflows by including more specific and detailed determinants of labour market transitions. We have therefore included interaction variables for gender and educational attainment and age dummy variables.[10]

We carried out these additional estimates for two main reasons: firstly, to verify the robustness of the findings discussed in Section 5, and secondly, to better understand the role played by gender, education, and age for each labour market transition.

Table A-2 shows the estimates of the determinants of unemployment outflows. The role of gender, education and age is confirmed. The more favourable employment opportunities for males compared to females is confirmed. The gender gap in employment opportunities is higher for low educational attainment compared to high education, especially a lower primary education level and, to a lesser extent, compulsory education. The gender gap is low for people holding a diploma. Finally, women holding a degree show a lesser probability of leaving unemployment compared to men. To sum up, holding a degree plays a role in determining female employment opportunities compared to lower educational attainment of both genders, but the disadvantage with respect to males holding a degree still persists.

The coefficients of age dummies suggest higher dynamics for the young component of the labour force (15-25 years of age), mainly due to the higher number of interruptions in their working careers.[11]

Table A-3 displays the estimates of the determinants of employment outflows. Gender plays a role, particularly in the transitions from employment to inactivity, with an advantage for men, but only those who are highly educated compared to the baseline category (females holding a degree). As for the outflows from unemployment, youngsters exhibit more frequent movements between the labour market states.[12]

Table A-4 shows the estimates of the determinants of inactivity outflows. As described in Section 5, gender, age and education play a relevant role. The dummies for age brackets suggest that getting older enhances the opportunities to enter the labour force (both through employment and unemployment). Nonetheless, as expected older persons (55 and more years of age) show a lesser probability than younger persons of leaving the state of inactivity. This is most likely a retirement-related issue.

To sum up, these additional sets of estimates confirm the robustness of our findings (Section 5), and also allows an in-depth understanding of the relevant (structural) characteristics of the Italian labour market flows.

[10] We considered the interactions between genders, male and female, and educational levels, low-educated (lower primary), compulsory (primary), diploma (secondary) and degree (tertiary). Female holding a degree comprise the base category for the interpretation of results. We also included the following age brackets: 15–25 (base category), 25–35, 35–45, 45–55 and 55 years of age and over.

[11] These dynamics have been exacerbated by the labour market reforms of the late nineties (e.g. Law No. 196/1997, "Treu Package") which introduced and generalized the use of atypical and temporary contractual arrangements.

[12] The estimation exercises here reported capture insights into the behaviour of the young in the labour market. These are only suggestions, since more detailed information is needed to obtain an exhaustive picture of the labour market conditions for the young. Nonetheless this is beyond the aim of this work.

Table A-2: Outflows from Unemployment, 2004–2010

	UE		UN	
	Coef	Mgl.Eff	Coef	Mgl.Eff
Gender_Education interactions – Reference: Fem_degree				
male_loweduc	-.287**	-.011	-.484***	-.082***
male_compulsory	-.399***	-.036**	-.432***	-.060***
male_diploma	-.357***	-.039**	-.317***	-.038**
male_degree	.265**	.072**	-.134	-.060**
fem_loweduc	-1.019***	-.179***	.270**	.154***
fem_compulsory	-.756***	-.159***	.230**	.130***
fem_diploma	-.379***	-.087***	.147	.075***
Age – Reference: $[15, 25)$				
$[25, 35)$	-.131**	-.017	-.083	-.005
$[35, 45)$	-.118**	-.043***	.188***	.058***
$[45, 55)$	-.129	-.075***	.469***	.128***
$[55, over)$	-.270**	-.169***	1.218***	.321***
italian	.069	-.014	.274***	.056***
famsize	.028	.004	.016	.001
experience	.420***	.105***	-.233***	-.099***
urate	-.078***	-.017***	.011**	.011***
dursearch	-.000***	-.000***	-.000	.000
gdpgrowth	5.719**	.613	5.047*	.573
year 2005	.121	.018	.060	.001
year 2006	.019	-.026*	.274***	.064***
year 2007	-.023	-.013	.075	.020
year 2008	-.176**	-.045***	.097	.042***
year 2009	-.378***	-.069***	-.031	.031**
Pseudo R^2	.0478			
Observations	13453		13453	

Notes: * Significant at the 10% level; ** significant at the 5% level; *** significant at the 1% level.

Table A-3: Outflows from Employment, 2004–2010

	EU		EN	
	Coef	Mgl.Eff	Coef	Mgl.Eff
Gender_Education interactions – Reference: Fem_degree				
male_loweduc	.522***	.008***	.443***	.021***
male_compulsory	.076	.001	-.069	-.003
male_diploma	-.077	-.001	-.205***	-.008***
male_degree	-.275**	-.003**	-.365***	-.013***
fem_loweduc	.139	.001	.909***	.055***
fem_compulsory	.187**	.002	.456***	.021***
fem_diploma	.112	.001	.168***	.007***
Age – Reference: $[15, 25)$				
$[25, 35)$	-.674***	-.0*7***	-.735	-.024***
$[35, 45)$	-1.271***	-.013***	-1.329***	-.045***
$[45, 55)$	-1.583***	-.015***	-1.071***	-.036***
$[55, over)$	-1.921***	-.014***	.685***	.036***
italian	-.401***	-.006***	.214***	.008***
famsize	.023	.000	.040***	.002***
urate	.096***	.001***	.058***	.002***
bluecollar	.822***	.011***	.441***	.018***
fulltime	-.711***	-.011***	-.989***	-.056***
year 2005	-.007	-.000	-.078**	-.003**
year 2006	-.248***	-.003***	.110***	.004***
year 2007	.097	.001	.093**	.004**
year 2008	.348***	.004***	.094**	.004**
year 2009	.368***	.005***	.019	.000
Pseudo R^2	.1201			
Observations	163639		163639	

Notes: * Significant at the 10% level; ** significant at the 5% level; *** significant at the 1% level.

Table A-4: Outflows from Inactivity, 2004–2010

	NE		NU	
	Coef	Mgl.Eff	Coef	Mgl.Eff
Gender_Education interactions – Reference: Fem_degree				
male_loweduc	-.466***	-.011***	-.223**	-.002**
male_compulsory	-.372***	-.009***	-.159**	-.001**
male_diploma	-.092	-.002	.087	.001
male_degree	.465***	.015***	.177	.002
fem_loweduc	-1.656***	-.032***	-1.201***	-.009***
fem_compulsory	-1.347***	-.027***	-.704***	-.006***
fem_diploma	-.699***	-.014***	-.357***	-.003***
Age – Reference: $[15, 25)$				
$[25, 35)$	.959***	.037***	.799***	.011***
$[35, 45)$	.733***	.026***	.499***	.006***
$[45, 55)$	.172***	.005***	-.206***	-.002***
$[55, over)$	-1.724***	-.052***	-2.929***	-.046***
italian	.003	.000	-.399***	-.005***
famsize	.036***	.001***	-.028**	-.000**
urate	-.035***	-.001***	.054***	.000***
year 2005	.212***	.006***	.087**	.001**
year 2006	.049	.001	-.217***	-.002***
year 2007	.161***	.004***	.192***	.002***
year 2008	.011	.000	.037	.000
year 2009	-.064	-.002	.123***	.001**
Pseudo R^2	.2104			
Observations	169432		169432	

Notes: * Significant at the 10% level; ** significant at the 5% level; *** significant at the 1% level.

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