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# Unemployment by gender and gender catching-up: Empirical evidence from the Italian regions*

**Marianna Belloc**[1], **Riccardo Tilli**[1]

[1] Department of Economics and Law, Sapienza University of Rome, Via del Castro Laurenziano 9, 00161 Rome, Italy (e-mail: marianna.belloc@uniroma1.it, riccardo.tilli@uniroma1.it)

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**Abstract.** We examine the dynamic behaviour of unemployment rates by gender and of the gender unemployment gap over the 1992–2009 period by Italian regions. The results from unit root tests with unknown structural breaks indicate that the gender unemployment gap has narrowed in most cases. However, the pace of catching-up and the dynamic behaviour characterizing the individual unemployment series differ substantially from one region to another. We comment on our results in the light of the reforms applied in the Italian labour market over the last two decades.

**JEL classification:** C22, J16, J60

**Key words:** Unemployment dynamics, gender unemployment gap, regional disparities, labour market reforms, unit root tests with structural break

## 1 Introduction

In Italy, as in the rest of Europe, unemployment has proved historically higher for women than for men. The Italian National Institute of Statistics (ISTAT, various years) reports that in 1993 the Italian male unemployment rate stood at around 7.3 per cent, whereas the female rate was just below 14 per cent (almost double). The Italian gender unemployment gap has narrowed in the last few years, notably as from 2008, but remains considerable: in 2009 the male and female rates were 6.8 per cent and 9.3 per cent respectively. Reduction of the gender unemployment gap is among the guidelines of the European Employment Strategy which gave rise to the process of thorough labour market liberalization implemented by the European member states over the last two decades.[1]

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[1] The European Employment Strategy was initiated at the Luxembourg European Council (November 1997) and reiterated at the Lisbon European Council (March 2000). Commitments to specific targets, such as reducing gender

In Italy the legislative process towards labour flexibility began in 1997 (for a comprehensive assessment see Schindler 2009). The Treu Law (L. 1997, n. 196) extended the applicability of fixed-term contracts, introduced a number of atypical job arrangements, such as apprenticeships, work training contracts, part-time and temporary jobs, and instituted temporary work agencies (TWAs). Further steps were taken with Legislative Decree 2001 n. 368 and the Biagi Law (L. 2003, n. 30), which introduced some changes in the regulation of fixed-term contracts and apprenticeships, removed some legal constraints on job outsourcing, and legalized new forms of contracts, such as jobs on call and job sharing. These measures were largely aimed at the marginal and weaker market segments, such as young people and women, for whom access to the job market was to be eased by exchanging protection for flexibility. In the light of the European Employment Strategy (e.g., European Commission 2006), this process of liberalization has been coupled with a progressive shift of resources from Passive labour market policies, such as unemployment insurance and income support, to active labour market policies, such as public employment services and training schemes.

Although the aforementioned reforms have been implemented at the national level, their impact should not necessarily be expected to spread evenly across regions for at least two reasons: first, because Italy has traditionally been characterized by considerable, and even widening, regional differentials in various respects, such as unemployment levels, production structure, composition (gender, age, education) of the labour force (e.g., Prasad 1999; Costantini and Monni 2009); and, second, because regulation of some aspects of the reforms, such as TWAs, training programmes and apprenticeships, has been delegated to the regional governments with their own statutes and/or trilateral collective agreements (e.g., Altavilla et al. 2009). Strong complementarities are, thus, likely to work between national and regional policies.

In this paper we look into the dynamics of unemployment by gender and of the gender unemployment gap in Italy over the 1992–2009 period which, as we have seen, was characterized by profound changes in the labour market. Given the above observations, we believe that by considering national paths only, there is the possibility of overlooking important regional differentials, which tend to be very persistent in Italy. This is why we adopt a regional perspective. To the best of our knowledge, the present contribution is the first to analyse the persistence of unemployment rates by gender and by region in Italy.

Our findings suggest that the gap between male and female unemployment rates has been narrowing in 14 out of 19 regions over the last few years. However, they also show a great degree of cross-region heterogeneity in the pace of catching-up and in the characteristics of the underlying dynamics: in some regions the male unemployment rate has increased more than the female rate, in others it has decreased less, while in yet other regions the former has increased and the latter decreased. These preliminary conclusions suggest the importance of identifying the region-specific aspects responsible for such heterogeneous dynamics.

The remainder of this paper is organized as follows. The next section briefly reviews the relevant literature. Section 3 describes the data, whereas Section 4 sketches the methodology. Sections 5 and 6 present our empirical findings and some related discussion. Section 7 concludes.

## 2 Related literature

There are three major approaches to the dynamics of unemployment over the business cycle. The natural rate hypothesis holds that transitory macroeconomic shocks generate cyclical

unemployment and pay gaps, improving parental leave, childcare and part-time work, have been progressively taken on by the member states. Renewed emphasis was placed on the goal to reduce gender differentials in the labour markets in the Communications of the European Commission and in the strategy plan for the period 2010–2015 (European Commission 2010a, 2010b).

movements in the rate of unemployment, which tends otherwise to fluctuate around its equilibrium level (Friedman 1968; Phelps 1968; Layard et al. 1991). The structuralist view has it that most macroeconomic shocks have transitory effects on the unemployment rate, but variations in structural factors occasionally cause structural shifts in its natural rate (Phelps 1994). The hysteresis hypothesis maintains that temporary shocks have permanent (or very persistent) effects on the rate of unemployment, and thus unemployment can be described as a hysteretic phenomenon[2] (Blanchard and Summers 1986). Several studies have applied unit root tests to discriminate among these three competing theories,[3] on both cross-country and cross-regional bases. To our knowledge only three studies have focused on the Italian context: Brunello et al. (2000, 2001), who conclude in favour of strong persistence in Italian regional unemployment, and Lanzafame (2009), who finds evidence supporting the view that regional unemployment is a non-linear stationary process.

A related strand of the literature investigates the issue of gender unemployment differentials. A first group of studies looks into the dynamics of unemployment rates for men and women considered separately:[4] Azmat et al. (2006) and Queneau and Sen (2008, 2009b) for the OECD countries, Koutentakis (2010) for a sample of European economies (Belgium, France, Greece, Italy, Portugal, Spain), and Bičàkovà (2010) for the new EU member states. A second group of contributions considers the unemployment gender gap: Queneau and Sen (2009a) for the US; and Queneau and Sen (2007, 2010) for a sample of OECD countries.

Finally, our paper relates to the literature on the possible differential effects of country level policies on the regional labour market (Caroleo and Destefanis 2006; Mauro et al. 2009). With regard to the Italian context, Destefanis and Fonseca (2007) evaluate the cross-region diversified effects of the Treu Law on the relationship between unemployment and vacancies; Altavilla and Caroleo (2006, 2009) provide an empirical assessment of the impact of active labour market policies on a regional basis; and Ichino et al. (2005) explore the role of TWAs.

## 3 Data description

We use quarterly data on the unemployment rates by gender and by region, obtained from ISTAT (various years) over the sample period 1992/Q4–2009/Q3[5] and including 19 regions (all but Valle d'Aosta[6]): the Centre-North, and namely Piedmont, Lombardy, Trentino Alto Adige, Veneto, Friuli Venezia Giulia, Liguria, Emilia Romagna, Tuscany, Umbria, Marche, Lazio, Abruzzo, Molise; and the South-and-Islands, and namely Campania, Puglia, Basilicata, Calabria, Sicily and Sardinia.

There are two aspects of unemployment by gender to be taken into account: the level of male ($u_M$) and female ($u_F$) unemployment rates and the gap between the two. The levels tell us the percentage of unemployed persons in the labour force. The gender gap tells us about how the

[2] Since the variance of a unit root process can indefinitely increase over time, from the theoretical point of view, description of the rate of unemployment, as well as of any bounded variable, as a unit root process is problematic. We follow León-Ledesma and McAdam (2004: p. 384) in interpreting the unit root, in this case, not "as a 'true' description of the data generating process but as a local approximation over the sample period".

[3] Extensive review of this literature is beyond the scope of this paper, but we may cite a few useful references: Alogoskoufis and Manning (1988), Mitchell (1993), Roed (1996), Blanchard and Katz (1997), Arestis and Biefang-Frisancho Mariscal (2000), Camarero et al. (2006).

[4] Of the empirical contributions on unemployment by gender, which however apply different approaches and methodologies from those adopted in the present paper, mention should be made of Niemi (1974), Johnson (1983), DeBoer and Seeborg (1989) and Fosu (2000).

[5] Longer time series, starting from 1977/Q1, are available but, given the appreciable revision in ISTAT survey methodology and definitions implemented in 1992, we have chosen to consider the most recent period only.

[6] Data on unemployment by gender are also available for Valle d'Aosta. However, since they are of doubtful reliability, this region, the smallest in Italy (0.2% of the national population), has been excluded from the sample.

**Table 1.** Summary statistics: Unemployment rates by gender

| Region | obs | Male | | | | Female | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | mean | s.d. | min | max | mean | s.d. | min | max |
| Piedmont | 68 | 5.1324 | 1.3911 | 2.8 | 8.2 | 10.0765 | 3.6396 | 4.2 | 15.5 |
| Lombardy | 68 | 3.5191 | 0.9028 | 2.0 | 5.6 | 6.1485 | 1.4973 | 3.9 | 9.6 |
| Trentino Alto Adige | 68 | 2.4768 | 0.8286 | 1.1 | 4.6 | 5.4956 | 1.5281 | 2.6 | 9.1 |
| Veneto | 68 | 3.3647 | 0.9491 | 1.6 | 5.4 | 7.8853 | 2.0936 | 4.5 | 12.0 |
| Friuli Venezia Giulia | 68 | 3.1971 | 0.9386 | 1.8 | 5.4 | 9.1868 | 3.6351 | 3.9 | 16.1 |
| Liguria | 68 | 8.1235 | 3.6725 | 1.9 | 14.1 | 9.6162 | 2.9101 | 4.3 | 14.9 |
| Emilia Romagna | 68 | 2.7221 | 0.8513 | 1.3 | 4.5 | 5.7574 | 1.8605 | 2.3 | 10.6 |
| Tuscany | 68 | 3.1926 | 0.8575 | 1.1 | 4.8 | 9.6941 | 2.7758 | 5.3 | 14.9 |
| Umbria | 68 | 5.8441 | 2.1384 | 1.7 | 10.1 | 9.2662 | 2.2022 | 4.3 | 15.6 |
| Marche | 68 | 4.6324 | 1.2696 | 1.6 | 7.3 | 6.7853 | 1.6234 | 3.3 | 10.5 |
| Lazio | 68 | 6.8956 | 1.2818 | 4.4 | 9.5 | 14.0735 | 3.8261 | 6.7 | 20.4 |
| Abruzzo | 68 | 8.8162 | 3.4485 | 2.7 | 14.1 | 11.3103 | 1.9699 | 6.9 | 15.0 |
| Molise | 68 | 7.9632 | 1.8873 | 3.0 | 11.6 | 14.5471 | 2.7997 | 4.7 | 20.2 |
| Campania | 68 | 12.5471 | 2.2110 | 8.4 | 16.2 | 24.4750 | 5.4151 | 13.3 | 31.5 |
| Puglia | 68 | 11.8618 | 1.9214 | 8.4 | 16.1 | 20.5941 | 3.6870 | 13.5 | 28.2 |
| Basilicata | 68 | 11.5559 | 2.9450 | 5.4 | 16.8 | 17.3603 | 2.6014 | 12.0 | 23.2 |
| Calabria | 68 | 12.9176 | 2.4011 | 9.0 | 17.7 | 20.1735 | 5.1953 | 12.9 | 31.9 |
| Sicily | 68 | 15.9956 | 3.2784 | 9.4 | 22.0 | 27.1000 | 6.2849 | 15.2 | 36.7 |
| Sardinia | 68 | 10.4824 | 1.6690 | 5.9 | 13.5 | 18.9574 | 3.1873 | 12.6 | 24.3 |

female unemployment rate performs relatively to the male unemployment rate. There are two ways to measure the gender gap: the ratio ($u_R = u_F/u_M$) between the female and male unemployment rates and the difference ($u_D = u_F - u_M$) between the two. The difference depends on the aggregate unemployment rate, while the ratio is a normalized measure. While one measure can be seen as a transformation of the other ($u_D/u_M = u_R - 1$), the two indexes convey very different information. In particular, Queneau and Sen (2007, 2009a) maintain that $u_D$ is better suited to describe a phenomenon at a given point in time, while $u_R$ is more appropriate for assessing gender unemployment gap dynamics over time. Accordingly, in this paper we measure the gender unemployment gap as the ratio between unemployment rates.[7]

Table 1 provides summary statistics of the male and female unemployment rates. These figures suggest a clear division of the Italian labour market according to the well-known dichotomy between Centre-North and South-and-Islands. Trentino Alto Adige stands out with the lowest average unemployment rates respectively for men (2.4768) and for women (5.4956), while Sicily shows the highest rates for both men (15.9956) and women (27.1000).

Table 2 presents summary statistics of the gender unemployment ratios. As might be expected, the mean ratio is above 1 ($u_F > u_M$) in all the regions considered. Interestingly, the highest mean gender unemployment ratio over the sample period is registered in Tuscany (3.3148), while the lowest is recorded in Calabria (1.5536). Regions showing very high unemployment rates are therefore not necessarily characterized by the widest gender gaps in unemployment rates. This suggests that the two issues, unemployment by gender and gender unemployment gaps, although closely related, should be analysed on an individual basis. These figures tell us nothing of the dynamics of the series that we intend to explore in the following sections.

[7] Results obtained adopting the gender unemployment differences are available from the authors upon request.

**Table 2.** Summary statistics: Gender unemployment gaps – ratios

| Region | obs | mean | s.d. | min | max |
|---|---|---|---|---|---|
| Piedmont | 68 | 1.9397 | 0.3879 | 1.0896 | 2.8039 |
| Lombardy | 68 | 1.7667 | 0.2298 | 1.3333 | 2.3846 |
| Trentino Alto Adige | 68 | 2.4969 | 1.0608 | 1.4400 | 7.6736 |
| Veneto | 68 | 2.3912 | 0.4053 | 1.5641 | 4.0625 |
| Friuli Venezia Giulia | 68 | 2.9198 | 0.9064 | 1.0000 | 4.7143 |
| Liguria | 68 | 1.4315 | 0.7055 | 0.6444 | 3.5882 |
| Emilia Romagna | 68 | 2.2033 | 0.6860 | 1.0500 | 4.1667 |
| Tuscany | 68 | 3.3148 | 1.3816 | 1.3958 | 9.8750 |
| Umbria | 68 | 1.7860 | 0.7040 | 0.7273 | 3.8947 |
| Marche | 68 | 1.5745 | 0.5678 | 0.6727 | 3.6000 |
| Lazio | 68 | 2.0399 | 0.4319 | 1.3016 | 3.1087 |
| Abruzzo | 68 | 1.5318 | 0.7475 | 0.7016 | 3.7027 |
| Molise | 68 | 1.8879 | 0.4321 | 1.1733 | 3.1087 |
| Campania | 68 | 1.9523 | 0.3140 | 1.2353 | 2.7340 |
| Puglia | 68 | 1.7387 | 0.1685 | 1.4113 | 2.1964 |
| Basilicata | 68 | 1.5786 | 0.4354 | 0.8182 | 2.9444 |
| Calabria | 68 | 1.5536 | 0.2099 | 1.1410 | 2.0930 |
| Sicily | 68 | 1.6883 | 0.1640 | 1.2358 | 2.1765 |
| Sardinia | 68 | 1.8266 | 0.2673 | 1.1157 | 2.6429 |

## 4 Methodology

Traditionally, the empirical literature has employed augmented Dickey-Fuller (ADF) unit root tests to study the persistence of the unemployment rates and gender gap series. As shown by Perron (1989), disregarding an existing structural break in the time series leads the conventional ADF tests to be biased towards non-rejection of the unit root null hypothesis. Perron (1989) himself has thus suggested a test that allows for a known (identified *ex ante* by using economic information) and exogenous structural break in the unit root tests. In many cases, however, breakpoints in the time series are unknown and cannot be considered exogenous events (Christiano 1992). Zivot and Andrews (1992) have proposed data dependent algorithms to test for unit roots in the presence of endogenously determined structural break dates. The Zivot and Andrews test is adopted in the recent literature instead of the conventional ADF procedure. The Zivot and Andrews procedure allows for the presence of a simultaneous structural break in the intercept if a sudden breakpoint is detected in the data ('crash model'), in the slope of the trend in the presence of a gradual change in the rate of growth of the series ('changing growth model') or both ('mixed model'). The choice of the model, that is the form of the break (in the intercept, in the slope or both), is far from insignificant. Perron (1989) motivates the adoption of a particular model for different economic time series by graph inspection. However, if the breakpoint date is assumed unknown and data dependent, the form of the break is likely to be unknown and data dependent as well. Using Monte Carlo simulations, Sen (2003) shows that misspecification
of the form of the break can lead to a substantial loss in power, but that the loss in power is minimized if the 'mixed model' is adopted.

Grounding on the above observations, to study the persistence of unemployment rates by gender and of the gender unemployment gap, we implement the Zivot and Andrews unit root test adopting the 'mixed model' that is based on the following equation

$$\Delta y_t = \hat{\mu}_0 + \hat{\mu}_1 DU(\lambda) + \hat{\mu}_2 t + \hat{\mu}_3 DT_t(\lambda) + \hat{\alpha} y_{t\text{-}1} + \sum_{j=1}^{k^*} \hat{c}_j \Delta y_{t-j} + \hat{\varepsilon}_t, \quad (1)$$

where $t = 1,2 \ldots T$ and $\Delta y_t$ is the first difference of $y_t$ (either the unemployment rate or the gender unemployment gap). $\lambda = T_b/T$ is the break fraction and $T_b$ is the break date, while the intercept break and slope break dummy variables are defined, respectively, as $DU(\lambda) = 1$ if $t > T\lambda$ ($DU(\lambda) = 0$ otherwise) and $DU(\lambda) = t - T\lambda$ if $t - T\lambda$ ($DU(\lambda) = 0$ otherwise).

The null hypothesis that the series contains a unit root is $\alpha = 0$, which is tested against the alternative $\alpha < 0$. Failure to reject the unit root hypothesis implies that random shocks cause permanent effects on the dynamics of the series; by contrast, rejection of the null hypothesis suggests that shocks only wield transitory effects on the series, which tends otherwise to return to its deterministic trend path.

The algorithm consists in running regressions for every possible break date sequentially and selecting $T_b$ (and $\lambda$ accordingly) corresponding to the breakpoint most likely to reject the unit root hypothesis and, hence, for which the one-sided *t*-statistic is minimized. Following Zivot and Andrews (1992), we set the trimming region as $(0.15T - 0.85T)$.

A number $k$ of lags is included in the equation regressions to correct for serial correlation. Following Perron (1989), Perron and Vogelsang (1992) and Zivot and Andrews (1992), the optimal number of lags $k^*$ is chosen by using a general-to-specific *t*-test routine, which consists in working backward starting from $k = k_{max}$ and selecting $k^*$ such that the coefficient associated with the last lag ($c_{k^*}$) included in the equation regression is statistically significant at least at the 10 per cent significance level, and the coefficient associated with the subsequent lag ($c_{k^*}$ with $k > k^*$) is not statistically significant. The maximum number of lags, $k_{max}$, is chosen by setting $k_{max} = \sqrt[4]{T}$. This type of selection routine was also proposed by Ng and Perron (1995) as preferable to information criteria methods, which can cause models to be too parsimonious and suffer from size distortions.

## 5 Results

### *5.1 Unemployment rates by gender*

Our first step consists in investigating the appropriate dynamics of the unemployment rates by gender in each Italian region. In particular, we check whether the $u_F$ and $u_M$ series present a unit root, in which case we conclude that the series are highly persistent (hysteresis hypothesis), or not, in which case we find evidence in favour of the view that the series hit by transitory shocks tends to return to its (possibly changing) natural rate (natural rate or structuralist views). For non-unit root regions we further inspect the trend of the series evaluating the slope before and after the break date. Tables 3 and 4 show our results respectively for men and women.

Let us consider the structural break dates first: connecting the endogenously selected breakpoints to historical events may in fact yield insightful information on the role played by policy reforms, if any. When the male unemployment rate is considered, the breakpoint is found in eight (Lombardy, Liguria, Emilia Romagna, Tuscany, Umbria, Abruzzo, Basilicata and Sicily) out of 19 cases in 2003 and in six cases (Trentino Alto Adige, Friuli Venezia Giulia, Lazio, Molise, Puglia and Calabria) between 1998 and 2000. In the remaining regions the break is detected in 2006–2007 (Piedmont, Veneto, Marche and Sardinia) and in 1996 (Campania). Thus, in most of the regions, the break is found to be either in the years immediately following the beginning of the labour market reforms or in the year when the Biagi Law came into force.

When the female rate is taken into account, instead, most of the breakpoints (12 out of 19 cases and, namely, Lombardy, Trentino Alto Adige, Veneto, Liguria, Emilia Romagna, Tuscany, Umbria, Marche, Abruzzo, Puglia, Calabria and Sicily) are concentrated between 1997 and 2000; only two series (Friuli Venezia Giulia and Lazio) manifest a break in 2003, whereas the remaining

**Table 3.** Zivot and Andrews test (male unemployment rate)

| Region | $k^*$ | $T_b$ | $\alpha$ | $\tau_\alpha$ | $\mu_0$ ($\tau_{\mu_0}$) | $\mu_0+\mu_1$ ($\tau_{\mu_1}$) | $\mu_2$ ($\tau_{\mu_2}$) | $\mu_2+\mu_3$ ($\tau_{\mu_3}$) | $HL_\alpha$ |
|---|---|---|---|---|---|---|---|---|---|
| Piedmont | 0 | 2006/02 | –0.5308 | –4.8525* | 3.9042 (4.6913) | 3.3159 (–1.4025) | –0.0384 (–3.9901) | 0.1299 (3.2357) | 0.9159 |
| Lombardy | 1 | 2003/02 | –0.6224 | –4.5231 | 3.4946 (4.6212) | 3.7571 (1.1977) | –0.0505 (–4.6081) | 0.0222 (4.1038) | 0.7116 |
| Trentino | 0 | 1998/03 | –1.0612 | –8.7892*** | 3.6156 (7.1052) | 2.4379 (–3.7201) | –0.0092 (–0.4598) | –0.0021 (0.3370) | 0.2481 |
| Veneto | 0 | 2007/01 | –0.6138 | –5.3234** | 3.0150 (5.1886) | 2.5370 (1.4804) | –0.0295 (–4.4834) | 0.1259 (3.3400) | 0.7285 |
| Friuli | 0 | 2000/01 | –0.8957 | –7.5507*** | 3.8398 (6.6045) | 2.7244 (–2.8687) | –0.0266 (–1.4978) | 0.0256 (2.4634) | 0.3066 |
| Liguria | 2 | 2003/02 | –0.5166 | –4.1306 | 6.8190 (4.3060) | 3.5378 (–3.8547) | –0.0550 (–3.1300) | 0.0478 (2.9890) | 0.9537 |
| Emilia | 2 | 2003/04 | –1.1090 | –4.5642 | 4.4208 (4.4250) | 5.2667 (2.3394) | –0.0591 (–3.9532) | 0.0230 (3.2515) | 0.3128 |
| Tuscany | 2 | 2003/03 | –0.6712 | –4.1941 | 3.1614 (4.1975) | 4.3691 (3.2920) | –0.0469 (3.7652) | –0.0002 (2.2645) | 0.6231 |
| Umbria | 0 | 2003/02 | –0.6726 | –5.7461*** | 5.5128 (5.4269) | 3.4340 (–3.5975) | –0.0289 (–2.0412) | 0.0106 (1.3356) | 0.6208 |
| Marche | 2 | 2007/02 | –0.9370 | –5.1004** | 6.0278 (5.0562) | 4.4205 (–2.7220) | –0.0525 (–4.6372) | 0.4451 (4.8022) | 0.2508 |
| Lazio | 2 | 2000/03 | –0.5916 | –3.6087 | 4.3224 (3.9975) | 3.0237 (–2.6271) | 0.0262 (1.0993) | –0.0108 (–1.1674) | 0.7741 |
| Abruzzo | 2 | 2003/02 | –0.9586 | –6.2839*** | 12.6243 (6.0444) | 7.5543 (–6.4569) | –0.0817 (–3.6724) | 0.0404 (3.3141) | 0.2176 |
| Molise | 2 | 2000/01 | –0.7007 | –4.6651 | 6.1090 (4.7872) | 4.2801 (–2.4488) | 0.0280 (0.7201) | 0.0023 (–0.5709) | 0.5746 |
| Campania | 2 | 1996/02 | –0.6600 | –3.6115 | 5.8126 (3.7796) | 6.1377 (0.4470) | 0.3105 (2.0157) | –0.0774 (–2.2804) | 0.6425 |
| Puglia | 2 | 1999/01 | –0.4006 | –3.1671 | 4.2755 (3.1715) | 2.4858 (–3.5456) | 0.0929 (2.3303) | –0.0223 (–2.2544) | 1.3544 |
| Basilicata | 2 | 2003/03 | –0.8037 | –4.6933 | 11.9112 (4.8302) | 8.3809 (–3.9536) | –0.0407 (–2.0783) | –0.0072 (0.7198) | 0.4257 |
| Calabria | 2 | 1998/02 | –1.0013 | –5.5488** | 10.4873 (5.4957) | 12.9881 (3.4489) | 0.1994 (3.2623) | –0.1860 (–4.5160) | 0.1047 |
| Sicily | 2 | 2003/04 | –0.3827 | –3.5655 | 8.0082 (4.0582) | 6.1518 (–2.6724) | –0.0378 (–2.4404) | –0.0006 (0.8473) | 1.4368 |
| Sardinia | 0 | 2006/01 | –0.6710 | –6.1172*** | 7.6476 (6.1448) | 4.9368 (–3.2587) | –0.0093 (–0.8150) | 0.2026 (2.7788) | 0.6235 |

*Notes*: *** 1%, ** 5% and * 10%. Critical values are obtained from Zivot and Andrews (1992, Table 4): –5.57 (1%), –5.08 (5%), –4.82 (10%).

**Table 4.** Zivot and Andrews test (female unemployment rate)

| Region | $k^*$ | $T_b$ | $\alpha$ | $\tau_\alpha$ | $\mu_0$ ($\tau_{\mu_0}$) | $\mu_0+\mu_1$ ($\tau_{\mu_1}$) | $\mu_2$ ($\tau_{\mu_2}$) | $\mu_2+\mu_3$ ($\tau_{\mu_3}$) | $HL_\alpha$ |
|---|---|---|---|---|---|---|---|---|---|
| Piedmont | 1 | 2006/01 | −0.1954 | −2.5505 | 3.3062 (2.5887) | 2.8223 (−0.7843) | −0.0448 (−2.7632) | 0.0962 (2.2269) | 3.1879 |
| Lombardy | 1 | 2000/02 | −0.6741 | −4.8036 | 6.0421 (4.9470) | 4.8232 (−2.8390) | −0.0559 (−3.2031) | 0.0124 (3.3924) | 0.6183 |
| Trentino | 0 | 1997/03 | −0.9552 | −7.7446*** | 7.0129 (7.0241) | 5.7924 (−3.0888) | 0.0026 (0.0829) | −0.0522 (−1.6624) | 0.2232 |
| Veneto | 0 | 1999/03 | −0.8463 | −7.0751*** | 9.3256 (6.8773) | 7.5851 (−3.8170) | −0.0501 (2.2663) | −0.0402 (0.4174) | 0.3701 |
| Friuli | 0 | 2003/02 | −0.8141 | −7.1346*** | 12.2307 (6.7075) | 9.7654 (−3.0528) | −0.1327 (−4.5642) | 0.0180 (3.1557) | 0.4120 |
| Liguria | 2 | 1999/03 | −0.5035 | −3.7124 | 6.8389 (3.8439) | 4.5938 (−2.8143) | −0.0188 (−0.4934) | −0.0160 (0.0626) | 0.9901 |
| Emilia | 2 | 1999/03 | −0.5877 | −3.5999 | 5.0707 (3.5768) | 3.4907 (−2.5786) | −0.0371 (−1.3952) | 0.0054 (1.4721) | 0.7824 |
| Tuscany | 2 | 2000/03 | −1.0660 | −5.6811*** | 15.1850 (5.7778) | 11.6582 (−4.7963) | −0.1047 (−4.4508) | −0.0298 (3.1028) | 0.2550 |
| Umbria | 2 | 1999/01 | −0.5416 | −3.5251 | 6.2357 (3.9454) | 4.1388 (−2.3762) | 0.0131 (0.2520) | −0.0053 (−0.3111) | 0.8885 |
| Marche | 0 | 1999/03 | −0.7084 | −6.0757*** | 5.5335 (5.3249) | 3.3080 (−3.3084) | 0.0132 (0.4149) | 0.0264 (0.3720) | 0.5624 |
| Lazio | 2 | 2003/03 | −0.4771 | −3.8456 | 9.6274 (3.9728) | 7.1584 (−3.2536) | −0.0718 (−3.3339) | 0.0269 (2.4800) | 1.0691 |
| Abruzzo | 0 | 2000/02 | −0.8311 | −6.7491*** | 9.9021 (6.2783) | 7.6211 (−2.6257) | 0.0353 (0.9471) | −0.0044 (−0.8843) | 0.3897 |
| Molise | 2 | 2007/01 | −0.7903 | −4.6357 | 13.8244 (4.7643) | 11.6540 (−1.5758) | −0.0523 (−2.8577) | 0.0226 (0.4107) | 0.4437 |
| Campania | 2 | 1996/03 | −0.3605 | −2.8912 | 8.5040 (2.8125) | 9.2304 (0.6269) | 0.1804 (1.0939) | −0.1339 (−1.6766) | 1.5505 |
| Puglia | 1 | 1999/04 | −0.5093 | −4.0370 | 8.2074 (3.9061) | 5.1462 (−3.4070) | 0.2327 (3.4183) | −0.0999 (−3.5073) | 0.9737 |
| Basilicata | 1 | 1995/04 | −0.8707 | −5.5330** | 11.6092 (4.0230) | 14.0122 (1.7480) | 0.3304 (1.4410) | −0.0951 (−1.8244) | 0.3388 |
| Calabria | 2 | 1998/02 | −0.6425 | −5.0224* | 9.0376 (4.0270) | 14.8135 (3.4438) | 0.2202 (2.1080) | −0.2599 (−3.6676) | 0.6738 |
| Sicily | 2 | 1998/04 | −0.6603 | −4.2598 | 20.0597 (4.3102) | 22.2348 (2.1347) | 0.0641 (1.0901) | −0.3338 (−3.5291) | 0.6421 |
| Sardinia | 2 | 2001/01 | −1.0818 | −4.9655* | 21.4839 (5.0312) | 19.1939 (−2.1481) | 0.0797 (1.6542) | −0.1802 (−3.1433) | 0.2769 |

*Notes*: *** 1%, ** 5% and * 10%. Critical values are obtained from Zivot and Andrews (1992, Table 4): −5.57 (1%), −5.08 (5%), −4.82 (10%).

cases are either in 2001 (Sardinia) or later in 2006–2007 (Piedmont and Molise). These observations suggest that, while we may speculate that the years following immediately upon adoption of the Treu Law marked a structural change in the dynamics of the female unemployment series in the Italian regions, the Biagi Law does not appear to have played such a role.

Turning to Table 3, we see that, with regard to male unemployment, we are led not to reject the null hypothesis in 10 regions (Lombardy, Liguria, Emilia Romagna, Tuscany, Lazio, Molise, Campania, Puglia, Basilicata and Sicily) and to reject it in the remaining nine (Piedmont, Trentino Alto Adige, Veneto, Friuli Venezia Giulia, Umbria, Marche, Abruzzo, Calabria and Sardinia). In the cases where the unit root is rejected, analysis of the slope coefficient before ($\mu_2$) and after ($\mu_2 + \mu_3$) the break proves revealing, a negative coefficient indicating a downward sloping trend. As will be seen in the penultimate column of Table 3, when the breakpoint is placed in 1998 (immediately after implementation of the Treu Law), in one case (Trentino Alto Adige) the slope coefficient turns out to be negative both before and after the break and in one case (Calabria) positive before and negative after the break. On the contrary, when the break date is placed in the most recent years the opposite occurs: the coefficient is negative before and positive after the break point in Veneto (2007), Friuli Venezia Giulia (2000), Umbria (2003), Marche (2007), Abruzzo (2003) and Sardinia (2006). Note that, in all the non-unit root regions, with the one exception of Calabria, the intercept is larger before the break date ($\mu_0$) than after ($\mu_0 + \mu_1$), a sudden breakpoint thus being detected in the data. However, this breakpoint is not concomitant with a decrease in the series growth rate but, rather, coincides with an increase in most of the regions.

Following Queneau and Sen (2008, 2009a, 2009b) among others, we estimated the half-life that, for the unit root series, indicates the number of periods required for the impact of a unit shock on a time series to dissipate by half and is defined as $HL_\alpha = |\log(1/2)/\log(\alpha + 1)|$[8] (see Andrews 1993). Our results, set out in Table 3 (last column), reveal different degrees of persistence of the male unemployment rate across regions: it is higher in regions like Sicily (1.4368, i.e. over four months), Puglia (1.3544), Liguria (0.9537) and Piedmont (0.9159), and lower in other regions such as Emilia Romagna (0.3128), Basilicata (0.4257), Molise (0.5746) and Tuscany (0.6231).

Turning to the female unemployment rate (Table 4), again the unit root is not rejected in 10 regions (Piedmont, Lombardy, Liguria, Emilia Romagna, Umbria, Lazio, Molise, Campania, Puglia and Sicily) and rejected in nine (Piedmont, Trentino Alto Adige, Veneto, Friuli Venezia Giulia, Umbria, Marche, Abruzzo, Calabria and Sardinia). Among the non-unit root regions, the slope coefficient is negative both before and after the break date in Veneto and Tuscany, where the break is placed respectively in 1999 and 2000. The coefficient is positive before and negative after the break in Trentino Alto Adige (break year 1997), Abruzzo (2000), Basilicata (1995), Calabria (1998) and Sardinia (2001), whereas the opposite holds in Friuli Venezia Giulia (break in 2003). Finally, in one region (Marche) the slope is positive both before and after the break (1999). In all these cases, with the only exceptions of (again) Calabria and (in addition) Basilicata, the structural break in the series is associated with a decrease in the intercept.

Finally, in the last column of Table 4 we provide the estimated half-lives. The most persistent series are found in Piedmont (3.1879), Campania (1.5505), Lazio (1.0691) and Liguria (0.9901), whereas the least persistent are in Molise (0.4437), Lombardy (0.6183), Sicily (0.6421) and Emilia Romagna (0.7824). Note that, comparing the half-lives for those regions where a unit root was detected for both the men's and women's series, the female unemployment rate proves more persistent than the male rate in only three (Liguria, Lazio and Campania) out of seven cases.

[8] More precisely, the half-life is $HL_\phi = |\log(1/2)/\log(\phi)|$, where $\phi$ is obtained from the following equation $y_t = \mu_0 + \mu_1 DU(\lambda) + \mu_2 t + \mu_3 DT_t(\lambda) + \phi y_{t-1} + \sum_{j=1}^{k} c_j \Delta y_{t-j} + \varepsilon_t$, which is equivalent to Equation (1) after adding $y_{t-1}$ to both sides. Hence $\phi = \alpha + 1$.

### *5.2 Gender unemployment gaps*

Table 5 sets out our findings as regards the gender gap. As will be seen, the break date always occurs after 1997. In four cases (Trentino Alto Adige, Emilia Romagna, Puglia and Calabria) the breakpoint is detected in the three years following the Treu Law (1997–1999), in three cases (Piedmont, Molise and Campania) between 2000 and 2001, in 10 cases (Lombardy, Friuli Venezia Giulia, Liguria, Toscana, Umbria, Marche, Lazio, Abruzzo, Basilicata and Sicily) in the three years following the Biagi Law (2003–2005) and, finally, in two cases (Veneto and Sardinia) between 2006 and 2007.

The null hypothesis of unit root is rejected in 13 out of 19 cases at the 1 per cent significance level and in one case at the 10 per cent level, whereas it is not rejected in the five remaining cases. The group of regions for which the unit root hypothesis is rejected is characterized by a considerable degree of heterogeneity. The sign of the after-break ($\mu_2+\mu_3$) slope parameter is negative in all the regions, indicating that the gender unemployment gap is decreasing in the most recent period. The degree to which this happens, however, varies from case to case. The largest (in absolute value) slope coefficients, indicating a faster convergence between the men's and women's unemployment rates, are found to be in Veneto (–0.1268), Sardinia (–0.0814) and Abruzzo (–0.0402). At the other extreme we find Tuscany (–0.0038), Calabria (–0.0061) and Puglia (–0.0072), which present the smallest (in absolute value) slope coefficients. Thus, two of the three 'fastest' regions in terms of gender catching-up are located in the Centre-North and one in the South-and-Islands, whereas the 'slowest' regions are two in the South and one in the Centre-North.

Furthermore, the group of non-unit root regions is heterogeneous as regards the sign of the before-break ($\mu_2$) trend slope. Six regions, Trentino Alto Adige, Liguria, Umbria, Marche, Molise and Sardinia, present a negative trend slope both before and after the break date. The estimated value of the trend slope is in all cases larger in absolute value after the break than before it. This indicates that the catching-up process started from the beginning of the sample period considered (1992), but proceeded at a faster pace after the break. The remaining eight regions, Piedmont, Veneto, Friuli Venezia Giulia, Emilia Romagna, Tuscany, Abruzzo, Puglia and Calabria, by contrast, manifest a switch in the slope sign, from positive (the gap widening) to negative (the gap narrowing). And yet, with the exceptions of Tuscany (0.0285), Emilia Romagna (0.0766) and Piedmont (0.0129), the before-break coefficient is close to zero and not statistically significant, attesting to an almost stable deterministic trend.

The unit root regions are Lombardy, Lazio, Campania, Basilicata and Sicily: two Central-Northern and three Southern-and-Islands regions. Failing to reject the null hypothesis, it then emerges that the gender unemployment gap tends to be persistent in these cases, although the degree of persistence varies from case to case. Table 5 shows (last column) the estimated half-lives of gender unemployment ratios by region. The series that proves most persistent is that of Lazio (0.9007, i.e., just under three months), followed by (in decreasing order) Campania (0.6648), Sicily (0.5725), Basilicata (0.4121) and Lombardy (0.2007).

## 6 Discussion

Our findings in terms of gender catching-up, prompt further comment when we take the results from the unit root tests on the unemployment rates in levels together with those on the gender gap. The catching-up process can come about for three different reasons: the male unemployment rate increases more than the female one, it decreases less, or it increases while the female rate decreases. Examining all 19 regions in detail one by one would be excessively lengthy and would, moreover, is well beyond the scope of this paper, but it can be useful to consider a few

**Table 5.** Zivot and Andrews test (gender unemployment gap – ratios)

| Region | $k^*$ | $T_b$ | $\alpha$ | $\tau_\alpha$ | $\mu_0$ ($\tau_{\mu_0}$) | $\mu_0+\mu_1$ ($\tau_{\mu_1}$) | $\mu_2$ ($\tau_{\mu_2}$) | $\mu_2+\mu_3$ ($\tau_{\mu_3}$) | $HL_\alpha$ |
|---|---|---|---|---|---|---|---|---|---|
| Piedmont | 0 | 2001/02 | −0.8232 | −6.6247*** | 1.5909 (6.3348) | 1.1645 (−3.2355) | 0.0129 (2.6152) | −0.0128 (−3.4417) | 0.4001 |
| Lombardy | 2 | 2005/02 | −1.0316 | −4.4820 | 1.7040 (4.3465) | 1.4725 (−3.2355) | 0.0060 (2.4092) | −0.0091 (−3.4417) | 0.2007 |
| Trentino | 0 | 1998/04 | −1.1959 | −9.6380*** | 2.7527 (6.9474) | 3.7542 (3.1499) | −0.0045 (−0.2423) | −0.0354 (−1.5376) | 0.4253 |
| Veneto | 2 | 2006/02 | −1.5516 | −8.1003*** | 3.6702 (7.9163) | 4.7744 (4.7157) | 0.0005 (0.1507) | −0.1268 (−5.1314) | 1.1651 |
| Friuli | 2 | 2003/01 | −1.0482 | −4.8712* | 3.5508 (4.7081) | 2.3569 (−3.3777) | 0.0041 (0.4662) | −0.0245 (−1.5099) | 0.2286 |
| Liguria | 2 | 2003/02 | −0.8327 | −5.7735*** | 1.0689 (4.6780) | 2.6009 (5.6410) | −0.0100 (−1.7853) | −0.0333 (−2.0277) | 0.3877 |
| Emilia | 0 | 1997/04 | −0.9055 | −7.5295*** | 1.5112 (4.1567) | 0.7693 (−2.5255) | 0.0766 (3.2041) | −0.0191 (−3.7481) | 0.2938 |
| Tuscany | 0 | 2003/02 | −0.8378 | −7.6884*** | 2.5761 (6.1014) | 0.6604 (−4.8748) | 0.0285 (3.1394) | −0.0038 (−1.6446) | 0.3811 |
| Umbria | 0 | 2003/02 | −0.7632 | −6.2734*** | 1.1472 (4.7781) | 2.1265 (3.6031) | −0.0039 (−0.6044) | −0.0078 (−0.2719) | 0.4811 |
| Marche | 0 | 2003/03 | −0.7171 | −6.0872*** | 1.1413 (4.9000) | 2.2358 (4.0809) | −0.0077 (−1.4114) | −0.0383 (−2.3430) | 0.5489 |
| Lazio | 2 | 2003/04 | −0.5368 | −3.7769 | 1.2380 (3.4308) | 0.8836 (−3.0178) | −0.0027 (−0.8520) | 0.0054 (1.1894) | 0.9007 |
| Abruzzo | 0 | 2003/02 | −0.9140 | −8.3936*** | 0.9369 (5.5852) | 2.6120 (6.5496) | 0.0011 (0.2120) | −0.0402 (−3.5518) | 0.2825 |
| Molise | 0 | 2001/02 | −0.9381 | −7.6420*** | 1.9748 (6.7830) | 2.6289 (3.1789) | −0.0119 (−1.6273) | −0.0249 (−1.2899) | 0.2491 |
| Campania | 2 | 2000/04 | −0.6475 | −4.3998 | 1.4237 (3.8799) | 1.7094 (2.7830) | −0.0071 (−1.5157) | −0.0165 (−2.1440) | 0.6648 |
| Puglia | 0 | 1999/02 | −0.8006 | −6.5307*** | 1.2540 (6.1116) | 1.4469 (2.6463) | 0.0053 (1.4303) | −0.0072 (−2.9448) | 0.4299 |
| Basilicata | 2 | 2003/03 | −0.8140 | −4.7882 | 1.0113 (4.3616) | 1.7969 (4.6706) | 0.0030 (0.8975) | −0.0209 (−3.1102) | 0.4121 |
| Calabria | 0 | 1998/03 | −0.7898 | −6.4036*** | 1.1070 (5.7508) | 1.3932 (2.8949) | 0.0012 (0.2113) | −0.0061 (−1.1885) | 0.4445 |
| Sicily | 2 | 2004/03 | −0.7020 | −4.5651 | 1.1948 (4.3044) | 1.2538 (1.0236) | 0.0001 (0.0829) | −0.0147 (−3.4370) | 0.5725 |
| Sardinia | 0 | 2007/01 | −0.9113 | −8.0264*** | 1.7448 (7.5501) | 2.1918 (2.8573) | −0.0025 (−1.3577) | −0.0814 (−3.6613) | 0.2861 |

*Notes*: *** 1%, ** 5% and * 10%. Critical values are obtained from Zivot and Andrews (1992, Table 4): −5.57 (1%), −5.08 (5%), −4.82 (10%).

examples of the possible reasons underlying our findings. Let us take, in particular, some of the regions for which the Zivot and Andrews test led us to reject the unit root hypothesis for both male and female unemployment rates (see Tables 3 and 4), so as to clearly identify the slope of the deterministic trend around which the two series fluctuate.

Not surprisingly, according to our findings, the region that displays the fastest convergence between men's and women's unemployment rates, Veneto, is located in the Centre-North of Italy. Veneto is one of the best-performing Italian regions from several points of view (ISFOL 2004, 2011), and in particular in terms of efficient active labour market policies (this region was one of the first to establish an efficient information disseminating system for job searching and is also marked out by well-functioning TWAs) and a dynamic productive system characterized by an increasing role for the tertiary sector with a large share of women employed. The male and female unemployment rates both follow downward deterministic trends up to 2006; at the very beginning of 2007 the former series starts increasing, while the latter continues to decline, and indeed the gender gap remains almost stable at a very low level until 2006, to decrease yet further thereafter.

The Southern regions, with the exception of Sardinia, which we discuss below, perform relatively worse in terms of gender catching-up. In particular, Puglia and Calabria show decreasing gender gaps as from, respectively, 1998 and 1999, but with very small trend coefficients. These regions (ISFOL 2004, 2011), like the rest of the South-and-Islands, have been historically characterized by histories of very high unemployment rates, structural problems and backwardness in the labour market, substantial delays in the implementation of active labour market policies especially regarding the training system,[9] and a very small share of women employed on part-time or fixed-term contracts (well below the national average).

Sardinia represents an interesting case in the scenario of the South-and-Islands.[10] Our output suggests that the gender gap in this region has slightly narrowed since 1993, notably between 2007 and 2009. This result looks surprising at first sight since the Sardinian labour market has historically been problematic (ISFOL 2004, 2011): high long-term unemployment rates for both male and female population, low participation rates (below the national average) and high rates of unreported employment. The reasons for the recent performance in terms of gender catching-up should probably be sought in the peculiarities of the Sardinian economy, which is driven by the tourist sector. Since tourist services are mostly seasonal, it proves particularly profitable for employers to exploit fixed-term or various other flexible atypical job contracts, which have spawned since the reforms. ISFOL (2011) reports that, in the last few years, Sardinia has seen an increasing use of short-term job arrangements, especially for women: this trend could be related to the gender catching-up in unemployment rates registered for this region.

## 7 Concluding remarks

In this paper we analysed the persistence of unemployment rates by gender and of the gender unemployment gaps in nineteen Italian regions over the 1992–2009 period. We proceeded in two steps: first, we investigated the appropriate characterization of the dynamic behaviour of the unemployment rates for men and women respectively; second, we considered the gender gap and studied its persistence over time. Our results reveal a substantial heterogeneity in the labour market outcomes across the Italian regions. This conclusion is important not only *per se* (the persistence of considerable heterogeneity across the Italian regions is a well-known fact) but

[9] As for 2006, Calabria was the only region not to have issued its own legislative regulations for training apprenticeships, as provided for by the Biagi Law (see Altavilla et al. 2009).

[10] Sardinia is the only Southern region that has produced systematic regulation of active labour market policies (Regional Law n. 20, 2005).

also because it stimulates discussion on the reasons why the impact of national level policy reforms may vary from region to region. As we have seen, notwithstanding the national nature of the Italian labour reforms, a not insignificant body of labour market regulation (e.g., regarding the active labour market policies) is delegated to the regional governments. In the light of these considerations, when labour market strategies are designed and implemented, particular importance must be attributed to careful evaluation of the persistent differential in the region-specific economic structures, the characteristics of the labour markers and the complementarities between different policies.

## References


Alogoskoufis GS, Manning A (1988) On the persistence of unemployment. *Economic Policy* 7: 427–469

Altavilla C, Caroleo FE (2009) *Unintended effects of national-based active labour market policies*. IZA Discussion Paper 4045, Bonn

Altavilla C, Caroleo FE (2006) Evaluating the dynamic effects of active labour policies in Italy. *Labour* 20: 349–382

Altavilla C, Caroleo FE, Di Monte P, Veneziano S (2009) Le peculiarità della normativa nazionale sulle politiche del lavoro nelle regioni del Mezzogiorno. In: CNEL, *Il lavoro che cambia: Regolazione, welfare e politiche attive del lavoro*. Italy

Arestis P, Biefang-Frisancho Mariscal I (2000) OECD unemployment: Structural breaks and stationarity. *Applied Economics* 32: 399–403

Andrews DWK (1993) Exactly median-unbiased estimation of first order autoregressive/unit root models. *Econometrica* 61: 139–165

Azmat G, Guell M, Manning A (2006) Gender gaps in unemployment rates in OECD countries. *Journal of Labor Economics* 24: 1–37

Bičàkovà A (2010) Gender unemployment gaps: Evidence from the new EU member states. *CERGE-EI Working Paper Series* 20: 41–97

Blanchard OJ, Katz LF (1997) What we know and do not know about the natural rate of unemployment. *Journal of Economic Perspectives* 11: 51-72

Blanchard OJ, Summers LH (1986) Hysteresis and the European unemployment problem. *NBER Macroeconomic Annual* 1: 15–90

Brunello G, Lupi C, Ordine P (2000) Regional disparities and the Italian NAIRU. *Oxford Economic Papers* 52: 146–177

Brunello G, Lupi C, Ordine P (2001) Widening differences in Italian regional unemployment. *Labour Economics* 8: 103–129

Camarero M, Carrión-i-Silvestre JL, Tamarit C (2006) Testing for hysteresis in unemployment in OECD countries: New evidence using stationarity panel tests with breaks. *Oxford Bulletin of Economics and Statistics* 68: 167–182

Caroleo FE, Destefanis S (2006) *The European Labour Market: Regional Dimensions*. Physica-Verlag, Heidelberg

Christiano L (1992) Searching for a break in GNP. *Journal of Business and Economic Statistics* 10: 237–250

Costantini V, Monni S (2009) Gender disparities in the Italian regions from a human development perspective. *Journal of Socio-Economics* 38: 256–269

DeBoer L, Seeborg M (1989) The unemployment rates of men and women: A transition probability analysis. *Industrial and Labor Relations Review* 42: 404–414

Destefanis S, Fonseca R (2007) Matching efficiency and labour market reform in Italy: A macroeconometric assessment. *Labour* 21: 57–84

European Commission (2006) *Employment in Europe*. Directorate-General for Employment, Social Affairs and Equal Opportunities, Brussels

European Commission (2010a) A strengthened commitment to equality between women and men: A women's charter declaration by the European Commission. URL: http://eur-lex.europa.eu/en/index.htm, COM/2010/0078

European Commission (2010b) Strategy for equality between women and men 2010–2015. URL: http://eur-lex.europa.eu/en/index.htm, COM/2010/491

Fosu AK (2000) Racial and gender differences in unemployment patterns in an urban labor market: The case of Detroit. *Review of Black Political Economy* 27: 35–47

Friedman M (1968) The role of monetary policy. *The American Economic Review* 58: 1–17

Ichino A, Mealli F, Nannicini T (2005) Temporary work agencies in Italy: A springboard toward permanent employment? *Giornale degli Economisti e Annali di Economia* 64: 1–27

ISFOL (2004) Dossier regionali sul mercato del lavoro: Il lavoro femminile. Monografie sul mercato del lavoro e le politiche per l'impiego 10/2004. ISFOL, Roma

ISFOL (2011) Mercato del lavoro e politiche di genere 2009–2010. Scenari di un biennio di crisi. ISFOL, Roma
ISTAT (various years) Rilevazione trimestrale sulle forze di lavoro. ISTAT, Roma
Johnson JL (1983) Sex differentials in unemployment rates: A case for no concern. *Journal of Political Economy* 91: 293–303
Koutentakis F (2010) Gender unemployment dynamics in six European countries. University of Crete, Department of Economics, Working Paper 1010, Heraklion
Lanzafame M (2009) The nature of regional unemployment in Italy. *Empirical Economics* 39: 877–895
Layard R, Nickell S, Jackman R (1991) *Unemployment: Macroeconomic performance and the labour market*. Oxford University Press, Oxford
León-Ledesma MA, McAdam P (2004) Unemployment, hysteresis and transition. *Scottish Journal of Political Economy* 51: 377–401
Mauro P, Prasad E, Spilimbergo A (1999) Regional unemployment in Europe. In: Mauro P, Prasad E, Spilimbergo A (eds) *Perspectives on regional unemployment in Europe*. International Monetary Fund, Washington DC
Mitchell WF (1993) Testing for unit roots and persistence in OECD unemployment rates. *Applied Economics* 25: 1489–1501
Ng S, Perron P (1995) Unit root tests in ARMA models with data dependent methods for the selection of the truncation lag. *Journal of American Statistical Association* 90: 268–281
Niemi B (1974) The female-male differential in unemployment rates. *Industrial and Labor Relations Review* 27: 331–350
Perron P (1989) The great crash, the oil price shock and the unit root hypothesis. *Econometrica* 57: 1361–1401
Perron P, Vogelsang TJ (1992) Nonstationarity and level shifts with an application to purchasing power parity. *Journal of Business & Economic Statistics* 10: 301–320
Phelps E (1968) Money-wage dynamics and labor market equilibrium. *Journal of Political Economy* 76: 678–711
Phelps E (1994) *Structural slumps: The modern equilibrium theory of unemployment, interest and assets*. Harvard University Press, Cambridge, MA
Prasad E (1999) Regional labor markets in Italy. In: Mauro P, Prasad E, Spilimbergo A (eds) *Perspectives on regional unemployment in Europe*. International Monetary Fund, Washington DC
Queneau H, Sen A (2007) Evidence regarding persistence in the gender unemployment gap based on the ratio of female to male unemployment rate. *Economics Bulletin* 5: 1–10
Queneau H, Sen A (2008) Evidence on the dynamics of unemployment by gender. *Applied Economics* 40: 2099–2108
Queneau H, Sen A (2009a) Regarding the unemployment by race and gender in the United States. *Economics Bulletin* 29: 2749–2757
Queneau H, Sen A (2009b) Further evidence on the dynamics of unemployment by gender. *Economics Bulletin* 29: 3162–3176
Queneau H, Sen A (2010) On the persistence of the gender unemployment gap: Evidence from eight OECD countries. *Applied Economics Letters* 17: 141–145
Roed K (1996) Unemployment hysteresis: Macro evidence from 16 OECD countries. *Empirical Economics* 21: 589–600
Schindler M (2009) The Italian labor market: Recent trends, institutions, and reform options. IMF Working Papers 09/47, International Monetary Fund, Washington DC
Sen A (2003) On the unit-root tests when the alternative is a trend-break stationary process. *Journal of Business & Economic Statistics* 21: 174–184
Zivot E, Andrews DWK (1992) Further evidence on the Great Crash, the oil-price shock, and the unit root hypothesis. *Journal of Business and Economic Statistics* 10: 251–270

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**Resumen.** Examinamos el comportamiento dinámico de las tasas de desempleo por género y de la disparidad en el desempleo entre géneros en el período 1992-2009 en las regiones italianas. Los resultados de las pruebas de raíces unitarias con cambio estructural desconocido indican que la disparidad en el desempleo entre géneros se ha reducido en la mayoría de los casos. Sin embargo, el ritmo de convergencia y el comportamiento dinámico que caracteriza las series de desempleo individuales difieren sustancialmente entre regiones. Se comentan los resultados a la luz de las reformas aplicadas en el mercado laboral italiano de las últimas dos décadas.

要約：本論文では、1992年から2009年の、イタリアの地域別にみられる性別による失業率と性別による失業率の格差の変動について分析する。未知の構造変化がある単位根検定によれば、多くのケースで性別による失業率の格差は縮小してきている。しかし、失業の個別系列を特徴づけるキャッチアップのペースとダイナミックな変動は、地域ごとに大きく異なっている。過去20年間におけるイタリアの労働市場の改革の視点から、分析結果についてコメントする。