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Maurizio Baussola, Dipartimento di Scienze Economiche e Sociali, Università Cattolica del Sacro Cuore, Piacenza

Chiara Mussida, Dipartimento di Scienze Economiche e Sociali, Università Cattolica del Sacro Cuore, Piacenza

✉ maurizio.baussola@unicatt.it

✉ chiara.mussida@unicatt.it

I quaderni possono essere richiesti a:
Dipartimento di Scienze Economiche e Sociali,
Università Cattolica del Sacro Cuore
Via Emilia Parmense 84 - 29122 Piacenza - Tel. 0523 599.342
http://dipartimenti.unicatt.it/dises

✉ dises-pc@unicatt.it

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Regional and Gender Differentials in the Persistence of Unemployment

Maurizio Baussola[1] and Chiara Mussida

Department of Economic and Social Sciences, Università Cattolica del Sacro Cuore, Piacenza, Italy

Abstract

The persistence of unemployment increased over the recent great recession in many European countries, however, with diversified impacts. We therefore analyse such impacts in four European countries – Italy, Spain, France, and the UK – representing different institutional frameworks which may reflect the so-called continental European and Anglo-Saxon framework, respectively. We analyse the determinants of unemployment persistence by using individual level data from the EU-SILC panel for the period 2007-2013. This data enables us to take into account initial conditions and state dependence in addition to individual and household characteristics.
We primarily focus on gender and regional effects which indeed have a strong impact on the persistence in the state of unemployment.

Keywords: unemployment persistence, state dependence, initial conditions, comparison across countries
JEL classification codes: C23, C25, E24, J60, J64

[1] Corresponding author. Address: Department of Economic and Social Sciences, Università Cattolica del Sacro Cuore, via Emilia Parmense, 84, 29122 Piacenza, Italy. Tel.: +39 0523 599310; fax: +31 0523 599301. E-mail addresses: maurizio.baussola@unicatt.it (M. Baussola) and chiara.mussida@unicatt.it (C. Mussida).

1. *Introduction*

Unemployment has been growing over the last few years as the great recession has deepened, thus determining a sharp increase in the unemployment rate (Pissarides, 2013). At the end of 2011 the unemployment rate was still close to the historical peak reached during the crisis. Unemployment remains well above the pre-crisis level in most countries. In particular, this phenomenon has affected the young component of the labour force and low-skilled workers.

These impacts have been diversified within Europe, thus suggesting that the economic downturn caused heterogeneous impacts on employment and unemployment in European countries (OECD, 2008).

In addition, unemployment duration and persistence increase significantly thus suggesting the need for policy aiming at increasing employment opportunities on the whole and – in particular – for young people.

Some countries (e.g Italy, Spain and France) are more exposed to the risk of unemployment persistence and labour force withdrawal (e.g., discouragement effect) because of structural characteristics of their labour markets. However, concerns about unemployment persistence are increasing even in countries in which long-term unemployment was relatively low at the beginning of the recession but then it has sharply increased (UK).

Policy intervention may be targeted to a mix of both supply and demand side policy aiming at reforming the institutional setting and increasing aggregate demand.

We therefore analyse such effects by considering four European countries, Italy, Spain, France and the UK during the period 2007-2013 which reflect different labour market institutions and regulations.

The analysis considers unemployment in the context of the so-called flow approach to labour market (Davis et al, 2006), in which the overall flows from and to the different labour market states are considered (i.e., unemployment, inactivity, employment). This perspective enables one to empirically test the determinants of such flows and, in particular, those affecting unemployment. More specifically, we set up an empirical model in which unemployment persistence (i.e., the probability of remaining unemployed) is determined by a set of explanatory variables reflecting individual and household characteristics, regional factors and institutional frameworks.

In this paper, we use individual level data from the EU-SILC panel for the period 2007-2013 (periods 2007-2010 and 2010-2013). Thus we can explicitly consider the unemployment state dependence and the so called initial condition issue, i.e. the effect on the probability of leaving unemployment of individual initial characteristics, which arises when the start of the observation period

does not coincide with the start of the stochastic process, by following the method proposed by Heckman (1981).

Section 2 provides a description of the methodological frameworks for analyzing labour market dynamics and unemployment persistence; Sections 3 describes the data and the sample; Section 4 sketches the adopted empirical model; Section 5 discusses the results and offers a comparison across countries; Section 6 concludes.

2. *Labour market dynamics and unemployment persistence*

The flow approach to labour market has regained attention over the last years as there is a growing interest in understanding unemployment dynamics which is indeed the results of different forces driving both labour demand and supply.

Such an approach, which finds the theoretical background in the seminal studies by Mortensen (1970) has later been widely used to analyse the impact of cyclical fluctuations on labour market dynamics.

The studies by Blanchard and Diamond (1990), Davis and Haltiwanger (1992), Blanchard and Portugal (2001), Mortensen and Pissarides (1994), among others, emphasise the relevance of this approach in explaining the relationship between economic fluctuations and unemployment.

We use such a dynamic vision of the labour market to consider unemployment persistence as the result of inflows and outflows from and to inactivity and employment. In this framework it is therefore crucial to pinpoint the factors which may affect such movements and – as a result – unemployment persistence.

In previous studies (Baussola and Mussida, 2014 and Baussola et. Al, 2015) we have emphasized the role of the determinants of unemployment inflows and outflows. In this study, we take the complementary view, in that we estimate the determinants of the probability of remaining unemployed. In addition, we concentrate on the possible state dependence effect, i.e. the effect of past unemployment condition on the current unemployment status. This issue is relevant as we want to use this dynamic labour market framework to verify to what extent the economic recession has increased unemployment persistence. In other words, this analysis may help understand to what extent unemployment is characterized by structural factors which may play a crucial role in determining unemployment in the medium to long-term.

A close relationship between unemployment persistence, duration dependence and long-term unemployment has established itself in the literature (e.g., Alogoskoufis and Manning 1988, OECD, 1994). Unemployment persistence refers to the tendency of the stock of unemployed in a number of European countries to remain well

above pre-recession levels long after a recovery from adverse shocks has set in.

In addition, during the actual recession unemployment persistence remains stable if not increases. This is partly explained by the unemployment duration dependence, i.e., the relation between time spent in unemployment and the probability of leaving the state, which is found negative (Heckman and Borjas, 1980) in many European countries, i.e., a jobless person's probability of re-employment declines with the elapsed duration of unemployment. Negative duration dependence implies that the long-term unemployed have a harder time finding work than the short-term jobless.

Studies on the duration dependence explore both its nature and its determinants, which include individual characteristics (e.g., gender, age, educational levels, skills and area of residence) and institutional factors (e.g., the presence and generosity of unemployment insurance schemes/unemployment benefits). Tatsiramos (2009), for instance, explores both the direct effects of unemployment benefits on the hazard of leaving unemployment, i.e., the nature of duration dependence, and the indirect effects of those benefits on subsequent employment stability. The analysis is based on the European Community Household Panel (ECHP) data for eight European countries through the period 1994-2001. This study suggests, as expected, that receiving unemployment benefits reduces

the unemployment hazards in all countries and therefore induces negative duration dependence and subsequent higher unemployment persistence.

Nevertheless, there are differences across countries, as the unemployment benefit-to wage -ratio varies significantly across countries together with the expected benefit duration, and thus the impact on unemployment duration may be heterogeneous. The case of Italy is a typical example, in which the impact of unemployment benefits is mild given that they pay a relative small amount of salary and they are in fact replaced by other forms of benefits (e.g. the so-called wage supplementation fund, "Cassa Integrazioni Guadagni"). It is worth underlining, however, that a structural reform is under discussion and approval and thus it may have a significant impact on unemployment duration in an early future.

In this paper we analyse the probability of remaining in the state of unemployment in four different countries that are characterized by heterogeneous unemployment insurance settings which therefore may determine a differentiated impact on unemployment persistence.

This latter is also tested for by considering the effect of past unemployment on the unemployment hazard rate, and thus the estimate of the lagged unemployment condition is therefore a proxy of the duration dependence.

3. *Data*

Our data are from the EU-SILC panel. It is a rotating panel survey based on harmonized methodology and definitions across most members of the European Union (Eurostat, 2010). The topics covered by the survey are living conditions, income, social exclusion, housing, work, demography, and education.

The survey is conducted in each country by its National Institute of Statistics and the sampling designs and operational details adopted are similar. We select data for Italy, Spain, France and the UK for the time windows 2007-2010 and 2010-2013.

As far as we are concerned, the rotating scheme of the survey implies that each sampled household remains in the sample for four years; the overlap between year t and t+1 is 75 per cent if there is no attrition, between year t and t+2 is 50 per cent, and between year t and t+3 is 25 per cent.[2]

Sampling units (households) to be added each year, and the whole sample in the first wave of the survey, are selected according

[2] The rotation scheme of the EU SILC panel reduces/eliminate the phenomenon of attrition, i.e., unit non-response of eligible persons or households that occurs after the first wave of panel (Rendtel, 2002). As suggested by Eurostat (2010) we checked for the presence of attrition by examining the variable RB110 which gives information on the membership status. People are asked whether they were in the same household in previous waves (current household members) or not (not current household members) and whether and why they moved into/out the household since previous/last wave. By combining those information with those obtained from variable RB120 or "to where did the person move" we can reasonably exclude that there is attrition on our data.

to two-stage stratified sampling designs. The primary sample units, municipalities, are stratified by region and demographic size, whereas the secondary sample units, households, are drawn from the population register of sampled municipalities.

We focus on the population interviewed in the periods 2007-2010 and 2010-2013, aged between 15 and 64 (in order to avoid to get mixed up with early retirement issues). The models are estimated separately by country and period. The effective (balanced) sample sizes are 17,930 (16,839) in Italy, 13,421 (14,832) in Spain, 20,709 (21,647) in France, and 5,804 (6,921) in the UK in 2007-2010 (2010-2013).

We are interested in the estimation of the impacts of different factors on the persistence in the state of unemployment across countries. Table 1 reports the unemployment rates by gender and country for the period 2004-2014. The gender gap, measured as the difference between femle and male unemployment rates, is significant in Italy and Spain and it has been reducing over the recession because of the worsening conditions of male employment, i.e., the crisis primarily affected economic sectors typically characterized by male employment (the gender gap reduced from 3.9 p.p. in 2004 to 1.9 p.p. in 2014 in Italy, and from 6.7 p.p. in 2004 to 1.8 p.p. in 2014 in Spain). The gender gap is instead not relevant in France and changes the sign with the crisis, it goes from 2.2 p.p. in 2004 to -0.5 p.p. in 2014, whereas in the UK remains inverted, i.e.,

males do show a higher unemployment rate compare with females (from -0.8 p.p. in 2004 to -0.6 p.p. in 2014).

Table 2 in the Appendix reports summary statistics by country and period for the variables used in the econometric analysis. The dependent variable is the permanence in unemployment and it is measured by the persistence in the state of unemployment in two consecutive periods (years). We carry out three sets of estimates for all the countries examined for the periods 2007-2010 and 2010-2013. The first exercise include a dummy variables for gender and specific dummy variables for education and age. The second exercise includes interactions between gender and education, whereas the third set includes interactions between gender and age. The aim of the first exercise is to disentangle the impact of gender, education and age, which are relevant individual characteristics typically affecting the persistence in the state of unemployment. The second and last exercise, instead, aim at obtaining the joint impact of gender and education and gender and age, respectively, on the permanence in the state of unemployment.

We include dummy variables for the geographical area of residence classified according to the NUTS system. NUTS is the acronym of "Nomenclatura delle unità territoriali statistiche". Specifically, we refer to the first level of disaggregation, NUTS2, corresponding to the macro-region. The advantage of employing this kind of classifications is mainly represented by the homogeneity of

the criteria, which facilitates cross-country comparisons of results. In addition we also consider the labour market performance of the regions, i.e., the unemployment rates. We therefore aggregate the NUTS2 accordingly to the average regional unemployment rates and we obtained three regional dummies for Italy and two regional dummies for Spain, France and the UK.[3] The base category is the group of regions with higher unemployment rates.

We distinguish between five age groups (15-24; 25-34; 35-44; 45-54, and 55-64) and three educational variables defined according to UNESCO's International Standard Classification of Education (ISCED). The EU-SILC distinguishes between education completed in the lower secondary stage (ISCED 0-2), upper secondary education (ISCED 3), and post-secondary or tertiary education (ISCED 5-7). We include dummy indicators for marital status and the presence and number of children by age in the household, i.e. 0-3 years old, and for the equivalised household income deflated at 2007 (and 2010) prices.[4] Finally, as we deal with panel data, we include time dummies for the years analysed.

[3] The regions pertaining to each category (region1, region2, and region3) are listed in Table 6 in the Appendix.

[4] The equivalised household income is computed starting from the total disposable household income, variable HY020, and using the within-household non-response inflation factor, HY025, and the equivalised household size, hhsize. The income is computed in thousands as follows: eqhhincome = (HY020*HY025)/(hhsize*1000). It is also deflated by using the Consumer Price Index (CPI), gathered by ISTAT.

4. *The empirical model*

The probability of an individual i being unemployed at time t is estimated by applying a random effects dynamic probit model on a balanced sample. The inclusion, among covariates, of the previous employment status allows us to disentangle the contribution to unemployment probabilities of unobserved heterogeneity and past unemployment (state dependence), and allows us to interpret our model as a first-order Markov process.

The latent variable of the estimated model is specified as follows:

$$y_{it}^{*} = \gamma y_{it-1} + x_{it}^{'}\beta + \lambda x'_{it-1} + \alpha_i + u_{it}$$
$$y_{it} = 1\left[y_{it}^{*} > 0\right] \qquad (1)$$

with $i = 1,\ldots, N$ indicating the individual and $t = 2\ldots T$ the time periods. The dependent variable, y, takes value one if an individual i is employed at time t. x_{it} is a vector of control variables, β is a vector of unknown parameters to be estimated, α_i is the individual specific and time invariant random component and u_{it} is the idiosyncratic error term. We assume that both α_i and u_{it} are normally distributed and independent of x_{it} and that there is no serial correlation in u_{it}.

Equation (1) assumes exogenous initial conditions and therefore independence between α_i and y_{it-1}. However, since it is most

likely that the initial employment status is not randomly assigned to the individual, estimates obtained from equation (1) would be inconsistent. With the aim of providing consistent estimates, we follow the method proposed by Heckman (1981)[5] which explicitly account for the initial conditions problem by approximating the unknown initial conditions with a static equation using information from the first wave available in the data.

The Heckman estimator requires a simultaneous two-stage procedure. In the first stage a reduced form equation, approximating the conditional distribution of the initial conditions, takes the following form:

$$y_{i1} = 1\left[z_{i1}^{'}\pi + \xi_{i1} > 0\right] \tag{2}$$

where z_{i1} is a vector of exogenous variables that can include x_{i1} control variables and an additional instrument as follows:

$$\xi_{i1} = \theta\alpha_1 + \omega_i \tag{3}$$

with ξ_{i1} correlated with α_i but uncorrelated with ω_i for t > 1.

[5] Wooldridge (2005) also proposed an estimator to account for initial conditions problem in non-linear dynamic random effects models. However, the literature (e.g., Akay, 2012) showed that the Heckman's estimator performs better for short panel and, then, we rely on it in our paper.

The joint probability of the observed binary sequence for individual *i*, given the unobserved heterogeneity term, is:

$$\Phi\left[\left(z_{i1}^{'}\pi+\theta\alpha_i\right)\left(2y_{i1}-1\right)\right]\prod_{t=2}^{T}\Phi\left[\left(\gamma y_{it-1}+x_{it}^{'}\beta+\lambda x'_{it-1}+\alpha_i\right)\left(2y_{it}-1\right)\right] \quad (4)$$

If α is normally distributed, then the integral over α/σ_α can be evaluated using Gaussian-Hermite quadrature.

To obtain an estimate of the extent of both state dependence and the impact of individual and household control variables, and more in general to present the results as percentage effects, we need to calculate the average partial effect (APE) of the lagged dependent variable y_{it-1} on $P\left(y_{it}=1\right)$ by following the method suggested by Stewart (2007). The method used here is based on estimates of counterfactual outcome probabilities taking y_{it-1} as fixed at 0 and fixed at 1, and evaluated at $x_{it}=\bar{x}$ (the mean):

$$\hat{p}_j=\frac{1}{N}\sum_{i=1}^{N}\Phi\left\{\left(\bar{x}'\hat{\beta}+\hat{\gamma}_j+\hat{\lambda}\bar{x}'_{it-1}\right)\left(1-\rho\right)^{\frac{1}{2}}\right\}, \quad (5)$$

$$\hat{p}_0=\frac{1}{N}\sum_{i=1}^{N}\Phi\left\{\left(\bar{x}'\hat{\beta}+\hat{\lambda}\bar{x}'_{it-1}\right)\left(1-\rho\right)^{\frac{1}{2}}\right\} \quad (6)$$

The APE are given by: $APE=\hat{p}_j-\hat{p}_0$

5. *Results*

We have previously underlined the relevance of the analysis of unemployment persistence, as more specific policy may be addressed when such a phenomenon is significant and, therefore, the so-called hard core unemployment is a relevant characteristic of unemployment.

In addition, it is worth recalling that unemployment should be analysed within a dynamic framework if one aims at understanding its nature and determinants. In other words, unemployment should be analysed by considering the whole labour market flows which determine labour mobility on the whole.

Previous analyses (e.g. Baussola and Mussida, 2014 and Baussola et al., 2015) have shown how labour market flows are determined by individual characteristics and other structural factors such as regional discrepancies. Thus the unemployment rate is the result of inflows and outflows from the unemployment state in a given time interval. We therefore analyse the probability of leaving unemployment by explicitly taking into account the state dependence impact.

This is done by using the specification firstly proposed by Heckman (1981), i.e., random effect dynamic probit model, and then empirically augmented by Stewart (2005). This specification enables us to specify the probability of leaving unemployment as a function

of the previous unemployment condition and a set of covariates reflecting individual and household characteristics, and regional economic conditions.

We analyse four European countries (Italy, Spain, France and the UK) strongly affected by the great European recession and that are still struggling to improve the labour market conditions.

The model has been estimated for both women and men and thus gender differentials are accounted for by means of a gender dummy variable. The dependent variable is the permanence in the state of unemployment. As explained above, we carry out three sets of estimates for all the countries examined for the periods 2007-2010 and 2010-2013. The first exercise include a dummy variables for gender and specific dummy variables for education (Table 3), the second exercise includes interactions between gender and education (Table 4), whilst the third includes interactions between gender and age. The aim of the first exercise is to disentangle the impact of gender and education, whereas the second and third exercise aim to obtain the joint impact of gender and education and gender and age, respectively, on the permanence in the state of unemployment.

As concerns the equation for Italy, (Table 3) state dependence is significant although its effect is relatively mild but increasing over the recession. Being unemployed in the previous period (year) increases the probability of remaining in such a condition by around 11p.p. in the 2007-2010 and by more than 14

p.p. in the 2010-2013 period. Thus, worsening economic conditions bring about an increase in the persistence of unemployment.

Such a probability is also positively affected by individual age, thus implying that young people have a higher probability of remaining unemployed. This probability decreases significantly with age, as the older labour force age bracket (55-64) shows an almost 10 p.p. decrease in the probability of remaining unemployed in both periods.

Marital status exerts a negative and significant impact on the latter probability, thus suggesting that being married reduces the probability of remaining unemployed by 8.5 p.p. in 2007-2010. This effect increases over the recession implying a negative impact of almost 20 p.p.

The marital status effect is the results of the interaction of two different explanations. On the one hand, being married may reduce unemployment duration by increasing the probability of leaving unemployment towards inactivity, if a household income is adequately supported by one spouse. On the other hand, being married may increase the job search intensity of a spouse if the other has lost his/her job or is experiencing job reallocation .

In addition the number of children in a household – in the bracket 0-3 years of age – does not have any significant effect in both periods.

Household's income (equivalised disposable household income) has a negative impact, although it appears mild. As concerns the model which analyses the joint effect of gender and educational attainment, we have indeed interacted the gender and education dummies (Table 4), in order to better analyse the impact of the human capital proxy (education dummy). We find that the recession changed the relative gender disadvantage. Before the crisis, i.e., in the period 2007-2010, female at all the educational levels analysed show lower probabilities of leaving the state of unemployment compared to males (especially higher educated, i.e., secondary and tertiary educational attainment levels). The gender gap changes since the recession, i.e., in the period 2010-2013, as male do show higher probabilities of remaining unemployed compared to females. This is likely due to the fact that female, especially if less educated, more frequently leave unemployment for inactivity when the economic conditions worsen. The regional effect is significant and relevant in Italy, as being in the North and Centre reduces the probability of remaining unemployed by more than 7 p.p. and 4.7 p.p. respectively. The recession increases the regional discrepancies, especially between the North and the South (the probability of remaining unemployed is around 13.5 p.p. lower in the North compared to the South in the period 2010-201, Table 3), whereas the differential between the North and the Centre does not change remarkably.

The interactions between gender and age (Table 5) do show a worsening of the labour market conditions of young males (aged 15-24 and 25-34) and young females (aged 15-24) since the recession.

In the case of Spain we observe a significant and relatively higher state dependence. Such an effect is twice as large compared with Italy (Tables 35), implying that the probability of remaining unemployed is increased by 23.3 p.p. if one has been in the same condition in the previous period, during the 2007-2010 period. Indeed, this effect reduces over the recession as in the latest period analysed, i.e, 2010-2013, the corresponding impact is 17.6 p.p., with the partial exception of the estimates with the interactions between gender and age (Table 5).

The gender gap is not significant, while age and education do affect the probability of being unemployed. Such a probability decreases with age and education levels. It is worth noting that low skilled men are relatively disadvantaged with respect to low skilled women, as shown by the interaction of the education and gender dummies. In addition, we do not find significant changes by gender and age since the recession (Table 5). These evidence contrasts with that of the Italian labour market in which we note a different pattern showing a change of the relative disadvantage by gender before and during the crisis, i.e., before the crisis women do show higher probabilities of remaining unemployed, whereas the opposite is true during the recession. Marital status does affect (negatively) the

unemployment probability, whereas the number of household's children aged from 0 to 3 has the opposite effect, although it is significant only at a higher significance level than the conventional used (5% or 1%). Its impact is non negligible implying a decrease in the probability of being unemployed of about 5 p.p.. This impact is, however, milder than that observed in Italy.

The effect of household's real disposable income is significant although, on average, mild. Regional effects are significant implying that the labour force of Castilla y León, Castilla-La Mancha, Extremadura, Andalucía, Región de Murcia, Ciudad Autónoma de Ceuta, Ciudad Autónoma de Melilla, and Canarias does show a higher propensity to remain unemployed compared with the rest of the country. In terms of average partial effects, this implies an impact corresponding to a higher unemployment probability in these regions (6.8 p.p.). This regional effect however decreases over the recession, may be because of a widespread deterioration of the economic cycle which may have significantly affected the Spanish economy on the whole.

France does show a strong state dependence effect which is higher than those observed both in Spain and Italy. It implies that the previous unemployment condition determines a 52.3 p.p. increase in the probability of remaining unemployed. The impact of this variable decreases to 41.3 p.p. in 2013 (Table 3) and the reduction is confirmed also in the estimated with the interactions between gender

and education and gender and age (Tables 4 and 5, respectively). This fact is not related to an improvement of the whole economic conditions but – more likely – depends on a more significant impact of the discouragement effect that may cause a larger outflow from unemployment to inactivity, thus also reducing state dependence.

The gender gap is not significant (as in Spain), whereas age and education show a pattern similar to the other continental labour markets. The interaction of gender and education (Table 4) shows results similar to those prevailing in Italy, thus suggesting that the discouragement of the unskilled female labour force is a specific pattern of the continental European labour market and therefore those unskilled women likely left unemployment for inactivity during the crisis/in the latest period analysed (2010-2013). The interaction of gender and age, instead, shows a worsening of the probability of leaving unemployment for both older males and females (Table 5).

The marital status variable implies a negative effect (as expected), whereas – and more relevant – the number of household's children aged from 0 to 3 exerts a significant and negative effect which is, in addition, not negligible in terms of average impact (5 p.p. reduction in both periods).

This is an important result because fiscal policy in France is particularly focused to household's income and it has typically considered a household equivalent income as the base to determine

taxation at the household level. This policy has in fact stimulated both the female participation rate and the fertility rate, thus causing the average family size to be increased.

Regional effects are significant together with the negative and significant effect of a household's disposable income. The magnitude of the first effect is lower with respect to that observed for the disadvantaged regions in Spain (about 4.3. p.p. gap with the rest of the country); such a gap involves areas in the Nord Pas-de-Calais, Languedoc-Roussillon, Provence-Alpes-Côte d'Azur and Corse regions.

The effect of the income variable is coherent with what we have observed in the other European countries.

The Anglo- Saxon framework is considered by analysing the unemployment hazards for the UK. In this context the male component of the labour force appears to be disadvantaged with respect to the female component. Indeed, the probability of remaining unemployed is 3.4 p.p. higher for men as compared with the corresponding probability for women. This result may crucially depend on the effect of the economic recession which has primarily hit sectors (e.g. construction) where male employment is more relevant. This is also confirmed by the fact that such an impact is increased in 2010-2013.

Age has a negative effect on such a probability with an impact which is increasing from the lower to the higher age bracket.

The effect of education is controversial as it has not a clear-cut impact (Tables 3-5). Looking at the interaction with the gender dummy (Table 4) and age (Table 5), the disadvantage of the male labour both before and during the crisis force is clearly stated.

Marital status is significant in the estimates relative to 2010-2013 and its impact is similar to that observed in Italy. However, the dummy variable reflecting the presence of children aged from 0 to 3 in a household is significant and its impact is relevant, suggesting that the probability of remaining unemployed is reduced by more than 3.9 p. p. This effect is however not significant in the second period under investigation.

The impact of the real disposable income variable is negative and significant and in line with the impact registered in the other contexts, while the regional effects are also relevant but with a lower magnitude with respect to the other countries examined, especially to Italy. The regional disparities are indeed structural features of the Italian labour market and their impact on unemployment is not negligible. Nonetheless it is relevant also in the UK. In detail, individuals leaving in the regions of Northumberland, Tyne and Wear, South Yorkshire, West Midlands, Inner London, and Outer London do show a lower probability of around 3% or remaining unemployed compared to the rest of the country. This impact, however, is not significant in the second period of investigation.

6. *Conclusions*

The persistence of unemployment is a crucial issue within the European Union and is one of the consequences of the European recession. It is therefore worth analysing to what extent unemployment persistence is significant and affects different European economies just before and during the crisis. In addition, it is relevant to pinpoint the main determinants, i.e., those individual or household characteristics which are crucial in affecting such a pattern.

For these reasons we have undertaken an econometric investigation focusing on four European countries – Italy, Spain, France, the UK – reflecting the so-called continental labour market framework, which however has been affected by further changes in labour legislation.

We have focused on the probability of remaining unemployed in a given time span also considering the state dependence effect which has enabled us to verify in more details the persistence effect. The analysis has been developed in a labour market dynamic settings, i.e. taking into account labour market flows, by using the EU-SILC survey over the periods 2007-2013. This has enabled us to analyse different institutional frameworks (countries) in different period of the economic cycle, thus

pinpointing the effect of the economic recession on unemployment persistence.

Taking into consideration these observations, the evidence derived from the estimates suggests that:

- State dependence is significant but its impact on the probability of remaining unemployed varies widely within the sample of countries. France shows the strongest impact, suggesting that being unemployed in the previous period (year) increases the probability of staying unemployed by more than 50 p.p. in the aftermath of the crisis. Italy and Spain present a milder impact. However, one should take into consideration that outflows from unemployment towards inactivity are relevant and thus the permanence rate into unemployment may reduce through this mechanism. The state dependence effect increases only in Italy as business cycle conditions worsen in the second period of investigation (2010-2013).
- Gender differentials are still significant in Italy and France in that it implies a disadvantage for the female component of the labour force, although this difference has been reducing due to the worsening condition of male employment (with the recession).

- Marital status is significant in reducing the probability of remaining unemployed. In addition, parenthood shows a not negligible and negative impact only in France, thus suggesting that fiscal policies aimed at improving households' real disposable income and female fertility rate, may exert a significant effect on unemployment.
- The effect of age is negative, thus poising the issue of the need for policy targeted towards the young labour force, while education, also interacted with gender, emphasises how the female component of the labour force in Italy and France is the core of the disadvantaged component.
- Disposable income has a negative effect on unemployment persistence, thus suggesting the relevance of policy towards households which are at the bottom of income distribution.

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Table 1: Unemployment Rates by Country and Gender, 2004- 2014

	ITALY			SPAIN			FRANCE			UK		
	Men	Women	Total	Men	Women	Total	Men	Women	Total	Men	Women	Total
2004	6.3	10.2	7.9	8.3	15.0	11.1	8.6	10.8	9.7	5.0	4.2	4.6
2005	6.2	10	7.7	7.1	12.0	9.1	8.4	10.3	9.3	5.2	4.3	4.8
2006	5.4	8.8	6.8	6.3	11.3	8.5	8.5	10.1	9.3	5.7	4.9	5.3
2007	4.9	7.8	6.1	6.4	10.7	8.2	7.8	9.0	8.4	5.6	4.9	5.3
2008	5.5	8.5	6.7	10.1	12.8	11.3	7.2	8.4	7.8	6.1	5.1	5.6
2009	6.7	9.2	7.7	17.6	18.1	17.9	9.2	9.8	9.5	8.5	6.4	7.5
2010	7.5	9.6	8.4	19.6	20.2	19.9	9.3	10.1	9.7	8.6	6.9	7.8
2011	7.5	9.5	8.4	21.0	21.8	21.4	9.1	10.1	9.6	8.6	7.3	8.0
2012	9.8	11.8	10.7	24.6	25.0	24.8	10.0	10.4	10.2	8.3	7.4	7.9
2013	11.5	13.1	12.1	25.6	26.7	26.1	10.4	10.2	10.3	8.0	7.0	7.5
2014	11.9	13.8	12.7	23.6	25.4	24.4	10.1	9.6	9.9	6.4	5.8	6.1

Source: Eurostat LFS data.

Table 2: Descriptive Statistics by Country and Time Period

	ITALY		SPAIN		FRANCE		UK	
	2007-2010	2010-2013	2007-2010	2010-2013	2007-2010	2010-2013	2007-2010	2010-2013
Unemployment	0.075	0.063	0.105	0.125	0.066	0.052	0.025	0.025
Lagged unemployment	0.074	0.059	0.094	0.119	0.065	0.051	0.023	0.026
Male	0.489	0.474	0.481	0.477	0.477	0.472	0.460	0.465
Region								
Region 1[(a)]	0.416	0.482	0.393	0.415	0.239	0.232	0.118	0.306
Region 2[(b)]	0.366	0.307	0.607	0.585	0.761	0.768	0.882	0.694
Region 3[(c)]	0.218	0.211						
Age								
Age [15,24]	0.116	0.076	0.120	0.080	0.116	0.074	0.074	0.060
Age [25,34]	0.183	0.106	0.190	0.116	0.164	0.120	0.151	0.096
Age [35,44]	0.253	0.169	0.246	0.195	0.248	0.175	0.263	0.145
Age [45,54]	0.256	0.196	0.259	0.208	0.251	0.188	0.261	0.173
Age [55,64]	0.192	0.179	0.185	0.166	0.221	0.193	0.250	0.192
Education								
None, primary, lower secondary	0.431	0.514	0.260	0.550	0.277	0.296	0.121	0.200
Upper secondary	0.392	0.346	0.460	0.197	0.461	0.439	0.447	0.392

Post secondary or tertiary	0.177	0.140	0.280	0.238	0.262	0.262	0.370	0.362
Married	0.597	0.612	0.544	0.614	0.544	0.565	0.597	0.631
Number of kids 0-3	0.074	0.043	0.080	0.050	0.080	0.053	0.093	0.064
	(0.275)	*(0.218)*	*(0.283)*	*(0.230)*	*(0.286)*	*(0.233)*	*(0.307)*	*(0.266)*
Equivalised Household Income	18.323	18.771	14.485	16.074	22.224	24.500	24.168	21.323
	(12.422)	*(13.123)*	*(9.039)*	*(10.263)*	*(15.572)*	*(17.562)*	*(20.269)*	*(15.082)*
Delta employment rate 2006-2007	0.329	-0.568	0.981	-1.177	0.372	-0.047	-0.031	-0.597
(2009-2010)	*(0.387)*	*(0.141)*	*(1.252)*	*(0.872)*	*(1.939)*	*(1.456)*	*(1.750)*	*(0.756)*
Observations	17,930	16,839	13,421	14,832	20,709	21,647	5,804	6,912

Notes: Standard deviations in parentheses for continuous variables.
The full specification includes yearly time dummies.
(a), (b), (c): for a description of the regions see Table 7.
Source: our calculations on EU-SILC data

Table 3: APE for the Persistence of Unemployment by Country and Time Period, balanced samples

	ITALY		SPAIN		FRANCE		UK	
	2007-2010	2010-2013	2007-2010	2010-2013	2007-2010	2010-2013	2007-2010	2010-2013
Lagged unemployment	0.112***	0.144***	0.231***	0.176***	0.523***	0.413***	0.153***	0.125*
	(0.075)	(0.036)	(0.030)	(0.095)	(0.023)	(0.075)	(0.092)	(0.026)
Male	-0.008	0.079***	0.019	0.021	0.011	0.018	0.034***	0.073*
	(0.007)	(0.024)	(0.004)	(0.005)	(0.002)	(0.003)	(0.028)	(0.016)
Region								
Region 1[(a)]	-0.070***	-0.135***	-0.068***	-0.048*	-0.043*	0.027	-0.029*	0.041
	(0.058)	(0.039)	(0.013)	(0.010)	(0.007)	(0.004)	(0.023)	(0.009)
Region 3	-0.047***	-0.052**						
	(0.042)	(0.017)						
Age: Reference – [15, 24]								
Age [25,34]	-0.005	0.356***	0.051*	0.227***	0.009	0.225***	-0.039*	0.174*
	(0.004)	(0.072)	(0.010)	(0.077)	(0.002)	(0.038)	(0.037)	(0.037)
Age [35,44]	-0.049***	0.259***	-0.039	0.219***	-0.038*	0.193***	-0.061***	0.228***
	(0.043)	(0.064)	(0.009)	(0.073)	(0.007)	(0.033)	(0.057)	(0.050)
Age [45,54]	-0.073***	0.291***	-0.111***	0.211***	-0.075***	0.188***	-0.057***	0.298***
	(0.063)	(0.094)	(0.027)	(0.071)	(0.014)	(0.032)	(0.053)	(0.063)

Age [55,64]	-0.097***	0.170***	-0.150***	0.194***	-0.076***	0.143***	-0.060***	0.279***
	(0.090)	(0.050)	(0.031)	(0.077)	(0.013)	(0.025)	(0.058)	(0.060)
Education: Reference - Primary								
Upper secondary	0.001	0.038*	-0.111***	-0.030***	-0.072***	0.019	0.007	0.101*
	(0.001)	(0.012)	(0.027)	(0.008)	(0.013)	(0.003)	(0.006)	(0.021)
Post secondary or tertiary	0.035***	0.013	-0.150***	-0.049***	-0.131***	-0.060*	0.015	0.069
	(0.028)	(0.004)	(0.031)	(0.014)	(0.022)	(0.010)	(0.013)	(0.016)
Married	-0.085***	-0.197***	-0.049*	-0.085***	-0.066***	-0.208***	-0.018	-0.217***
	(0.061)	(0.050)	(0.010)	(0.024)	(0.010)	(0.027)	(0.014)	(0.036)
Number of kids 0-3	0.000	-0.024	0.036	0.058*	-0.051*	-0.048	-0.036*	0.014
	(0.000)	(0.008)	(0.007)	(0.017)	(0.009)	(0.008)	(0.034)	(0.003)
Equivalised Household Income	-0.008***	-0.011***	-0.007***	-0.004***	-0.002***	-0.003***	-0.019***	-0.010***
	(0.004)	(0.002)	(0.001)	(0.001)	(0.000)	(0.001)	(0.003)	(0.002)
Year 2009 (2012)	0.014*	0.000	0158***	0.079***	0.049***	0.040*	0.019	0.061
	(0.012)	(0.000)	(0.030)	(0.023)	(0.008)	(0.007)	(0.015)	(0.013)
Year 2010 (2013)	0.009	0.027*	0.143***	0.059***	0.040***	0.044***	0.016	0.021
	(0.008)	(0.008)	(0.027)	(0.017)	(0.007)	(0.007)	(0.013)	(0.005)
Observations	17,930	16,839	13,421	14,832	20,709	21,647	5,084	6,912

* Significant at the 10% level; ** significant at the 5% level; *** significant at the 1% level.
Notes: Standard errors in parentheses.

[a]Regions with the lower regional average unemployment rates. The base category is the group of regions (Region2) with higher unemployment rates in all the countries analysed (see Table 6).
Source: our calculations on EU-SILC data

Table 4: APE for the Persistence of Unemployment by Country and Time Period, interactions between Gender and Education, balanced samples

	ITALY		SPAIN		FRANCE		UK	
	2007-2010	2010-2013	2007-2010	2010-2013	2007-2010	2010-2013	2007-2010	2010-2013
Lagged unemployment	0.112***	0.145***	0.233***	0.176***	0.524***	0.396***	0.141***	0.122
	(0.075)	(0.035)	(0.029)	(0.058)	(0.024)	(0.083	(0.087)	(0.025)
Gender and Education interactions: Reference – low educated females								
Low educated males	-0.041*	0.136***	0.035*	0.037*	0.019	0.092***	0.080*	0.059
	(0.007)	(0.037)	(0.007)	(0.011)	(0.003)	(0.016)	(0.056)	(0.013)
Middle educated males	-0.049*	0.136***	-0.101***	-0.040	-0.053*	0.068***	0.065*	0.157*
	(0.008)	(0.036)	(0.024)	(0.011)	(0.010)	(0.012)	(0.049)	(0.032)
Highly educated males	-0.117***	0.056	-0.126***	-0.062*	-0.125***	-0.053	0.059*	0.155*
	(0.123)	(0.016)	(0.030)	(0.016)	(0.024)	(0.009)	(0.046)	(0.035)
Middle educated females	-0.056***	0.081***	-0.090***	-0.036	-0.071***	0.055*	0.007	0.096
	(0.015)	(0.023)	(0.021)	(0.010)	(0.013)	(0.010)	(0.006)	(0.021)

Highly educated females	-0.051***	0.099*	-0.138***	-0.073***	-0.115***	0.006	0.034	0.034
	(0.039)	(0.027)	(0.032)	(0.018)	(0.022)	(0.001)	(0.028)	(0.008)
Region								
Region 1[(a)]	-0.070***	-0.137***	-0.068***	-0.047*	-0.042*	0.028	-0.031*	0.040
	(0.058)	(0.037)	(0.013)	(0.012)	(0.007)	(0.005)	(0.025)	(0.009)
Region 2[(b)]	-0.047***	-0.054*						
	(0.042)	(0.017)						
Age: Reference – [15, 24]								
Age [25,34]	-0.004	0.352***	0.053*	0.296***	0.009	0.219***	-0.041*	0.175*
	(0.003)	(0.073)	(0.010)	(0.129)	(0.001)	(0.041)	(0.039)	(0.037)
Age [35,44]	-0.049***	0.260***	-0.037	0.309***	-0.039*	0.190***	-0.065**	0.229***
	(0.043)	(0.064)	(0.008)	(0.129)	(0.007)	(0.035)	(0.060)	(0.050)
Age [45,54]	-0.072***	0.291***	-0.098***	0.300***	-0.076***	0.185***	-0.060***	0.301***
	(0.063)	(0.070)	(0.021)	(0.126)	(0.013)	(0.035)	(0.056)	(0.063)
Age [55,64]	-0.097***	0.171***	-0.129***	0.262***	-0.080***	0.144***	-0.065***	0.281***
	(0.090)	(0.049)	(0.030)	(0.116)	(0.014)	(0.027)	0.063	(0.060)
Married	-0.085***	-0.203***	-0.050***	-0,128***	-0.066***	-0.207***	-0.019	-0.219***
	(0.061)	(0.049)	(0.010)	(0.036)	(0.010)	(0.028)	(0.016)	(0.037)
Number of kids 0-3	0.000	-0.026	0.036	0.046*	-0.051*	-0.049	-0.039*	0.017
	(0.000)	(0.008)	(0.007)	(0.014)	(0.009)	(0.008)	(0.037)	(0.004)

Equivalised Household Income	-0.008***	-0.011***	-0.007***	-0.004***	-0.002***	-0.003***	-0.019***	-0.010***
	(0.004)	(0.002)	(0.001)	(0.001)	(0.000)	(0.001)	(0.003)	(0.002)
Year 2009 (2012)	0.014*	0.000	0160***	0.086***	0.049***	0.040*	.0.020	0.060
	(0.012)	(0.000)	(0.029)	(0.026)	(0.009)	(0.007)	(0.017)	(0.013)
Year 2010 (2013)	0.009	0.028*	0.144***	0.084***	0.040***	0.044***	0.016	0.020
	(0.008)	(0.008)	(0.026)	(0.025)	(0.006)	(0.008)	(0.014)	(0.004)
Observations	17,930	16,839	13,421	14,832	20,709	21,647	5,084	6,912

* Significant at the 10% level; ** significant at the 5% level; *** significant at the 1% level.
Standard errors in parentheses.
Source: our calculations on EU SILC data

Table 5: APE for the Persistence of Unemployment by Country and Time Period, interactions between Gender and Age, balanced samples

	ITALY		SPAIN		FRANCE		UK	
	2007-2010	2010-2013	2007-2010	2010-2013	2007-2010	2010-2013	2007-2010	2010-2013
Lagged unemployment	0.122***	0.111***	0.233***	0.224***	0.515***	0.450***	0.140***	0.080*
	(0.076)	(0.039)	(0.027)	(0.020)	(0.029)	(0.035)	(0.089)	(0.043)
Gender and Age interactions: Reference – youngest females								
Males aged [15,24]	0.032	0.249***	0.072	-0.054	0.071*	0.050	0.021	0.037
	(0.024)	(0.071)	(0.012)	(0.009)	(0.010)	(0.011)	(0.018)	(0.022)
Males aged [25,34]	-0.017	0.197***	0.104*	0.090*	0.048	0.010	-0.015	-0.065
	(0.014)	(0.062)	(0.016)	(0.012)	(0.007)	(0.002)	(0.014)	(0.046)
Males aged [35,44]	-0.048***	0.052	0.002	-0.032	-0.006	-0.055*	-0.036*	-0.035
	(0.041)	(0.021)	(0.000)	(0.005)	(0.001)	(0.014)	(0.036)	(0.023)
Males aged [45,54]	-0.069***	0.061	-0.084*	-0.016	-0.047	-0.079*	-0.029	-0.008
	(0.059)	(0.024)	(0.018)	(0.003)	(0.007)	(0.020)	(0.029)	(0.005)
Males aged [55,64]	-0.074***	0.019	-0.073	-0.001	-0.035	-0.096***	-0.031	-0.053
	(0.065)	(0.008)	(0.016)	(0.000)	(0.006)	(0.025)	(0.031)	(0.036)
Females aged [25,34]	0.039***	0.190***	0.078*	0.058	0.048	0.016	-0,038*	-0.055
	(0.028)	(0.061)	(0.013)	(0.008)	(0.007)	(0.004)	(0.039)	(0.039)

Females aged [35,44]	-0.027	0.052	-0.009	0.055	0.000	-0.045	-0.050***	-0.080*
	(0.023)	(0.021)	(0.002)	0.008	(0.000)	(0.011)	(0.051)	(0.056)
Females aged [45,54]	-0.058***	0.072*	-0.053	-0.023	-0.040	-0.050	-0.053***	-0.064
	(0.050)	(0.028)	(0.011)	(0.004)	(0.006)	(0.012)	(0.055)	(0.044)
Females aged [55,64]	-0.113***	-0.092*	-0.122***	-0.149***	-0.058*	-0.122***	-0.001	-0.052
	(0.109)	(0.043)	(0.028)	(0.028)	(0.009)	(0.033)	(0.035)	(0.035)
Education: Reference - Primary								
Upper secondary	-0.008	-0.045***	-0.117***	-0.138***	-0.075***	-0.044*	-0.001	-0.018
	(0.024)	(0.033)	(0.036)	(0.030)	(0.024)	(0.028)	(0.035)	(0.044)
Post secondary or tertiary	0.029***	-0.038**	-0.157***	-0.142***	-0.139***	-0.110***	0.006	-0.005
	(0.034)	(0.031)	(0.040)	(0.028)	(0.029)	(0.038)	(0.036)	(0.042)
Region								
Region 1[(a)]	-0.085***	-0.090***	-0.072***	-0.043	-0.046*	0.039	-0.036*	0.011
	(0.066)	(0.044)	(0.029)	(0.013)	(0.021)	(0.024)	(0.050)	(0.041)
Region 2[(b)]	-0.058***	-0.025						
	(0.050)	(0.030)						
Married	-0.110***	-0.111***	-0.053*	-0,092***	-0.071***	-0.116***	-0.025	-0.059*
	(0.078)	(0.048)	(0.027)	(0.018)	(0.022)	(0.037)	(0.043)	(0.056)
Number of kids 0-3	-0.007	-0.033	0.036	0.026	-0.054*	-0.060***	-0.039*	-0.028
	(0.024)	(0.031)	(0.025)	(0.010)	(0.021)	(0.030)	(0.048)	(0.044)

Equivalised Household Income	-0.019***	-0.008***	-0.010***	-0.006***	-0.003***	-0.004***	-0.033***	-0.017***
	(0.039)	(0.042)	(0.027)	(0.011)	(0.020)	(0.027)	(0.097)	(0.081)
Year 2009 (2012)	0.010*	0.014	0160***	0.110***	0.050***	0.042***	0.011	0.038*
	(0.026)	(0.031)	(0.035)	(0.017)	(0.020)	(0.024)	(0.037)	(0.047)
Year 2010 (2013)	0.004	0.046***	0.144***	0.119***	0.040***	0.055***	0.008	0.018
	(0.025)	(0.037)	(0.033)	(0.018)	(0.019)	(0.025)	(0.036)	(0.043)
Observations	17,930	16,839	13,421	14,832	20,709	21,647	5,084	6,912

* Significant at the 10% level; ** significant at the 5% level; *** significant at the 1% level.
Standard errors in parentheses.
Source: our calculations on EU SILC data

Table 6: Regions used in the estimates

	Variable name	Regions
Italy	North/Region1	Piedmont, Aosta Valley, Lombardy, Veneto, Trentino Alto Adige, Liguria, Friuli Venezia Giulia, Emilia Romagna
	Centre/Region2	Toscana, Umbria, Marche, Lazio
	South/Region3	Abruzzo, Molise, Campania, Puglia, Basilicata, Calabria, Sicilia, Sardegna
Spain	Region1	Comunidad Valenciana; Andalucía; Región de Murcia; Ciudad Autónoma de Ceuta; Ciudad Autónoma de Melilla; Canarias
	Region2	Castilla y León, Castilla-La Mancha, Extremadura, Andalucía, Región de Murcia, Ciudad Autónoma de Ceuta, Ciudad Autónoma de Melilla, Canarias
France	Region1	Nord - Pas-de-Calais, Languedoc-Roussillon
	Region2	Île de France, Champagne-Ardenne, Picardie, Haute-Normandie, Centre, Basse-Normandie, Bourgogne, Lorraine, Alsace, Franche-Comté, Pays de la Loire, Bretagne, Poitou-Charentes, Aquitaine, Midi-Pyrénées, Limousin, Rhône-Alpes, Auvergne, Rhône-Alpes, Auvergne, Provence-Alpes-Côte d'Azur, Corse
UK	Region1	Northumberland and Tyne and Wear; South Yorkshire; West Midlands; South Western Scotland
	Region2	Tees Valley and Durham, Inner London, Outer London

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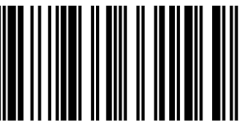
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