The rise of NEET and Youth Unemployment in EU regions after the crisis

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Abstract

This paper assesses the impact of the crisis on the NEET rate and on the youth unemployment rate (YUR) of the EU regions. It begins with a review of the literature and presents some descriptive statistics on NEET and YURs. We use Eurostat's data for the period 2000-2011 concerning the NUTS-1 regions. We focus on the changes in both indices from 2000-08 to 2009-11. Our econometric analysis, implemented both by pooling all regions and by different groups of countries, uses GMM and bias-corrected LSDV dynamic panel data estimators with GDP growth as the key explanatory variable.

We find that NEET rates are persistent. Persistence increases over the crisis period and is close to YUR's. The sensitivity of NEET rates to GDP decreases during the crisis. This result is mainly influenced by the dynamics in Continental regions, whereas Anglo-Saxon regions are particularly sensitive to GDP during the crisis and NMS regions are always sensitive to GDP. The highest persistence and the lowest response to GDP is found in Southern regions. These patterns are similar to those obtained for YUR and UR, excepted for NMS regions (where we find an insignificant impact of GDP on YUR and UR in 2010).

Keywords: youth unemployment, NEET rates, crisis impact, EU regions

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1. Introduction

The 2008-09 financial crisis, the consequent Great Recession, the Eurozone sovereign debt crisis and the ensuing austerity measures have caused a deep impact – not always immediate, in some cases delayed but enduring – on the European labour markets. The most exposed segments of the labour market to the impact of the crisis are young people, old workers, vulnerable employment in general and (at least in many world regions) women. In any case, the economic crisis abruptly ended the gradual decline in global youth unemployment rates that was recorded during the period 2002–07 (ILO, 2012).

Nonetheless, there are significant differences between countries and even between regions within countries. In this paper, we focus on developments within the European Union (EU) and we consider the Nuts-1 regional breakdown. Also in the case of investigations on labour markets, the regional level is particularly important not only from an empirical analysis perspective, but also from a policy standpoint; just recall the EU's cohesion objectives. However, regional (sub-national) investigations on the labour market impact of the recent crisis have been rare so far.[1] This contribution tries to fill this gap.

A second original contribution of this paper is that the analysis is based not only on the traditional indicators – youth unemployment rates (YUR) to be compared with the adult or total unemployment rates (UR) – but also on the more innovative NEET indicator (as we will explain in the next section). The use of a Nuts-1 regional breakdown makes possible using such data as well.

The econometric set-up is designed in order to take full advantage from the panel structure of our data: 1) all models incorporate dynamic feedbacks to identify the degree of persistence in the dependent variables; 2) we accommodate latent heterogeneity at different levels of regional aggregation; 3) we allow the crisis years to exert a separate impact on the dependent variable of interest, both through the inclusion of time indicators and in interactions with the GDP growth rates. To this end, estimation is based on GMM and bias-corrected fixed effect dynamic panel data estimators.

The structure of the paper is the following. In Section 2, we shall briefly review the literature on NEET and youth unemployment, by focusing on the most recent studies after the global crisis. Section 3 presents a short description of the dynamics of both labour market indicators, by distinguishing the period before the crisis (2000-08) from the subsequent period (2009-11). The econometric analysis is presented in Section 4. Section 5 concludes and discusses the main policy implications. Estimation results for male and female NEET rates, YUR and UR are relegated into an appendix at the end of the paper.

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[1] For a recent exception see Marelli et al. (2012b).

2. NEET and Youth unemployment: a review of the literature

The youth unemployment rate (YUR) is, in most countries, twice or three times as high as the total unemployment rate. The NEET group – i.e. young people "neither in employment or education or training" – is even a greater problem for society since it leads to the risk of a "lost generation". Many authors argue that the size of the group of "youth left behind" can be better proxied by the NEET indicator rather than YUR (e.g., O'Higgins, 2011 and Scarpetta et al., 2010).

Also international institutions have recognized the importance of NEET indicator, initially adopted to study the problems of young workers in the United Kingdom. The initiative "Youth on the Move" within the Europe 2020 programme of the EU (European Commission, 2010) emphasises the importance of focusing on the NEET problem. Then, it has become a key statistical indicator, now collected also by Eurostat. For a recent investigation on the key characteristics of NEET in Europe, their institutional and structural determinants, the distribution across EU countries, the consequences (economic and social costs), and suggested policies, see the study by the European Foundation for the Improvement of Living and Working Conditions (Eurofound, 2012).

Both total unemployment rate (UR) and youth unemployment rate (YUR) have increased in many countries after the Global financial crisis (2008), the Great Recession (2008-09) and – more recently in the EU – the sovereign debt crisis and new recession (2012-13). Concerning the timing of the labour market responses, it was previously estimated that in normal recessions it takes three quarters, after output has started to recover, for employment to begin increasing and an additional two quarters for the unemployment rate to peak (moreover unemployment can still rise for a period even after employment growth has become positive); but these lags are longer if the recession comes together with a financial crisis.

The employment and unemployment impact of the crisis has been differentiated across countries. Germany's case is outstanding, since in this country unemployment has decreased even in crisis years. In general, there have been two main types of adjustments: (i) in the most 'flexible' countries (such as the United States, Ireland, the Baltic states and also Spain), employment was cut rapidly and deeply, helping to maintain labour productivity, but at the cost of high increases in unemployment;[2] (ii) in some other countries (not only Germany but also Japan, the Netherlands, Denmark and Italy), labour hoarding practices, working hour adjustments and specific policy measures caused a small immediate reaction; however, especially in case of prolonged or double-

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[2] In the US, after two year of net job destruction, since 2011 net job creation resumed with a gradual decline in the unemployment rate. A similar trend - but with a higher magnitude - occurred in the Baltic States. On the contrary, the bad labour market performance is persisting in Ireland and Spain due to the sovereign and banking crises and to the consequent austerity policies.

dip recessions (as in the case of Italy) these strategies and policies are much less effective and the persistence of the impact is much higher.

Thus labour market institutions are a first major determinant of the different behaviour across countries. This, of course, in addition to the specific macroeconomic evolutions and structural determinants.[3] Already some years ago, OECD (2006) showed that almost two-thirds of non-cyclical unemployment changes are explained by changes in policies and institutions. More recently, the IMF (2010) examined the role of institutions and policies in explaining changes in Okun coefficients – i.e. the parameters linking unemployment change to GDP growth – across countries and over time.

Institutional determinants analysed in theoretical or empirical studies include several variables such as: taxes on labour, unemployment benefits (as to their amount, duration, and replacement ratio), degree of unionisation (union density and union coverage), collective bargaining (degree of coordination and/or centralisation), minimum wages, employment protection legislation (EPL), incidence of temporary or part-time contracts, active labour market policies (but additional variables include economic freedom, liberalisation of product markets, housing policies, and many others).

As far as the impact of the crisis on the young people is concerned, most of evidence confirms the deeper impact compared to adult (or total) unemployment rates; moreover, YUR are more sensitive to the business cycle than adult unemployment rates. The main reasons can be found in the lower qualifications, less experience (than older workers) and weaker work contracts.[4] As a matter of fact, following severe recessions, hardships for young people in both acquiring a job as a new entrant and remaining employed are enhanced. Notice that, being discouraged by high YUR, many young people give up job search altogether[5]; in some cases, they decide to postpone job search and continue their stay in the education system, but in other cases the outcome is even worse, since they join the NEET group.

In addition to the greater immediate impact of the crisis[6] on YUR than on adult unemployment rates, further evidence concerns the persistence of unemployment over time and the increasing share of long-term unemployment. In fact, long periods of unemployment erode the skills of young workers, reduce their employability, cause a permanent loss of human capital and make

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[3] For a recent review of the main determinants (macroeconomic, demographic, structural, institutional, etc.) see Marelli et al. (2012a).

[4] See Arpaia and Curci (2010), who produced a broad analysis of labour market adjustments in the EU-27 after the 2008-09 recession in terms of employment, unemployment, hours worked and wages.

[5] According to ILO (2012), if the unemployment rate is adjusted for the drop-out induced by the economic crisis, the global YUR in 2011 would rise from 12.6% to 13.6%.

[6] The greater impact on YUR has been found in the specific case of financial crises, in an empirical analysis including a long period (starting 1980) and a large sample of countries in the world: see Choudhry et al. (2012).

unemployment persistent. Young people with low human capital and few skills are particularly exposed to long-term unemployment, unstable and low quality jobs, and perhaps social exclusion (OECD, 2005). However, more human capital and higher levels of education do not automatically translate into improved labour market outcomes and more jobs (ILO, 2012).

The literature on this issue is increasing. O'Higgins (2011 and 2012) warns that the key problem is not only that young people are more vulnerable to a crisis' effects than older adults but also that these effects are likely to be more long-lasting for the young. But even before the crisis, persistence in the NEET rates was a common result in empirical studies, at least for countries in Southern Europe (Quintini et al., 2007). Since the existence of a "youth experience gap" harms the employability of young people, appropriate institutions concerning the education system and the school-to-work transition processes are of utmost importance (Caroleo and Pastore, 2007). It seems, for example, that youth labour performance is better in countries operating a "dual apprenticeship system".

In conclusion, we can say that studies on NEET and YUR, following a comparative approach for all (or most of) EU countries, are rare; even more scarce are the investigations at the regional level. On the contrary, there are more specific investigations devoted to "case studies"[7] or comparisons between few regions or countries. For example, the Moving Project (2010) compares the situation in three EU regions: Merseyside (UK), Calabria (Italy), Andalusia (Spain). It is also interesting to note that investigations on NEET have become common even outside Europe: while Rosso et al. (2012) focus on the Mediterranean region, Liang (2009) provides an interesting evidence for Japan.

Before ending this section it is appropriate to mention the most recent policies to tackle youth unemployment in the European context. Within the comprehensive package of EU policy initiatives called "Youth on the move" (European Commission, 2010), the new "Youth opportunity initiative" is designed to prevent early school leaving, help youngsters in developing skills relevant to the labour market, assisting young people in finding a first good job and ensuring on-the-job training. The specific actions financed directly by the EU include: youth guarantee schemes, apprenticeships and traineeships programmes, support schemes for young business starters and social entrepreneurs, volunteering opportunities, continuous support for Erasmus and Leonardo da Vinci programs (see Eurofund, 2012).

In particular, the "Youth Guarantee Recommendation" agreed by the EU Council of Employment and Social Affairs Ministers in February 2013, requires that Member States should put in place measures to ensure that young people up to age 25 receive a good quality offer of

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[7] Many studies or reports of public agencies still refer to the UK regions, where the NEET analyses initiated.

employment, continued education, an apprenticeship or a traineeship within four months of leaving school or becoming unemployed.[8]

3. Recent evolution of NEET and Youth unemployment in EU regions

In the last decade, higher than average YUR were found in different groups of countries: (i) many Mediterranean countries (Spain, Italy, Greece, with the addition of France and Belgium); (ii) some Scandinavian countries; and (iii) many new member states (NMS) of the EU.

As to the NEET rates, the recent contribution by Eurofound (2012) reports that in 2011 12.9% of young people (in the age class 15-24 years) were not in employment, education or training on average in the EU. Bulgaria, Ireland, Italy and Spain have very high NEET rates (greater than 17%); high rates are also found in the United Kingdom; average rates in France, Portugal and some Eastern countries; low rates in Germany, Sweden and Finland; the lowest ones (less than 7%) are found in the Netherlands and Luxembourg.

Now we present some elaborations that made use of Eurostat data on EU regions. We have considered the Nuts-1 level regions; their total number for the EU-27 countries is 97 (there are 7 countries where the Nuts-1 region corresponds to the country itself). The NEET rate is defined as "Young people aged 18-24 not in employment and not in any education and training" (as percentage over corresponding population). The unemployment rate (UR) refers to population 15 years old or over; the youth unemployment rate (YUR) to the 15-24 age class.

The data concerning the above mentioned labour market indices are generally available from 2000 to 2011. However, since there are some missing values, the precise number of regions for each variable is specified in Table 1 below.

The key control variable we shall use in section 4 is Gross domestic product; since it is measured in current market prices, we have used the GDP deflator at the national level to obtain real GDP for the regions.[9]

In order to present some statistics concerning the key labour market indices, we have chosen to cluster the regions in supra-national groups (also because studies on similar indicators presented at the national level are more frequent). Thus we have chosen five groups; they are characterised by some specific features concerning labour market institutions and the economic setting as a whole (including educational and welfare systems):

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[8] The corresponding Youth Employment Initiative has a budget of 6 billion euro for the period 2014-20. It will be complementary to other projects undertaken at national level, including those with European Social Fund (ESF) support.

[9] In this way, we can have GDP (computed) data till the year 2010, while the regional data of Gross value added in real terms are available just up to 2009.

1. Continental regions: high productive industries and dual educational system

2. Northern (Scandinavian) regions: extensive Active Labour Market Policies and flexicurity

3. Anglo-Saxon regions: high quality of education and labour market flexibility

4. Southern regions: role of the family and diffusion of temporary works

5. regions in New Member States: catching-up and trying to build a modern welfare system

Table 1 - Mean values for regional groups (m) and number of regions (n)

| rgroup		year	NEET rate T	NEET rate M	NEET rate F	YUR T	YUR M	YUR F	TUR T	TUR M	TUR F
1	m	2000	11,83	11,04	13,66	12,81	12,67	13,00	8,68	7,95	9,53
	n		29	25	28	35	35	35	35	35	35
	m	2008	11,73	10,74	12,53	14,68	14,75	14,63	7,97	7,84	7,77
	n		32	25	25	36	36	36	36	36	35
	m	2011	11,90	11,49	12,85	14,97	14,88	15,11	7,69	7,79	7,17
	n		31	23	24	37	37	37	37	37	36
2	m	2000	9,35	9,10	9,65	13,14	14,04	12,28	6,64	6,78	6,46
	n		2	2	2	5	5	5	5	5	5
	m	2008	9,78	9,34	10,24	16,98	16,76	17,24	5,72	5,44	6,06
	n		5	5	5	5	5	5	5	5	5
	m	2011	10,26	10,42	10,08	20,86	22,10	19,56	7,68	7,90	7,42
	n		5	5	5	5	5	5	5	5	5
3	m	2000	14,28	10,71	17,86	12,14	13,60	10,47	5,77	6,42	5,01
	n		12	11	12	13	13	13	13	13	13
	m	2008	15,67	13,12	18,33	14,75	16,83	12,35	5,70	6,31	4,95
	n		13	13	13	13	13	13	13	13	13
	m	2011	19,06	17,70	20,47	21,87	24,64	18,67	8,63	9,58	7,52
	n		13	13	13	13	13	13	13	13	13
4	m	2000	18,59	14,81	22,28	24,20	19,05	30,87	11,02	7,75	16,26
	n		19	19	19	19	19	19	19	19	19
	m	2008	16,55	14,84	18,78	21,34	18,75	25,07	8,85	7,26	11,18
	n		19	18	19	19	19	19	19	19	19
	m	2011	22,63	22,22	23,04	38,26	36,54	40,58	15,98	15,08	17,31
	n		19	19	19	19	19	19	19	19	19
5	m	2000**	20,93	19,47	22,41	25,48	26,99	25,00	12,31	11,97	12,55
	n		12	12	12	21	21	21	21	21	21
	m	2008	13,51	11,32	15,77	16,09	15,87	16,89	6,62	6,59	6,81
	n		21	21	21	21	21	21	21	21	21
	m	2011	17,78	17,15	18,45	25,23	25,84	25,66	10,24	10,41	10,09
	n		21	21	21	21	21	21	21	21	21

**2001 for NEET

This classification is taken by Caroleo and Pastore (2007), although their analysis is at the country – not regional – level.[10] The authors themselves recognize that it largely overlaps with that

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[10] A different grouping of EU countries, into four clusters of countries (not necessarily contiguous from a geographical point of view) can be found in Eurofound (2012).

elaborated by Esping-Andersen (1990) for old member states. We add that in the NMS we have included all countries that have joined the EU in 2004 and 2007, but Cyprus and Malta (that have been added to the Southern regional group).[11]

Table 1 presents, for the five regional groups, the mean values of NEET rates, YUR and UR; for all variables, in addition to total figures, we provide the distinctive figures for each gender.

Now we present the previous labour market indices in graphical form, in order to focus on the key changes after the crisis. We have chosen 2008 as the last year before the crisis, because this was the dominant situation in the EU (although in some regional groups the situation began to deteriorate in 2008 even in labour markets).

Fig. 1 - UR (males and females)

Groups of regions

Legend: 2000, 2008, 2011
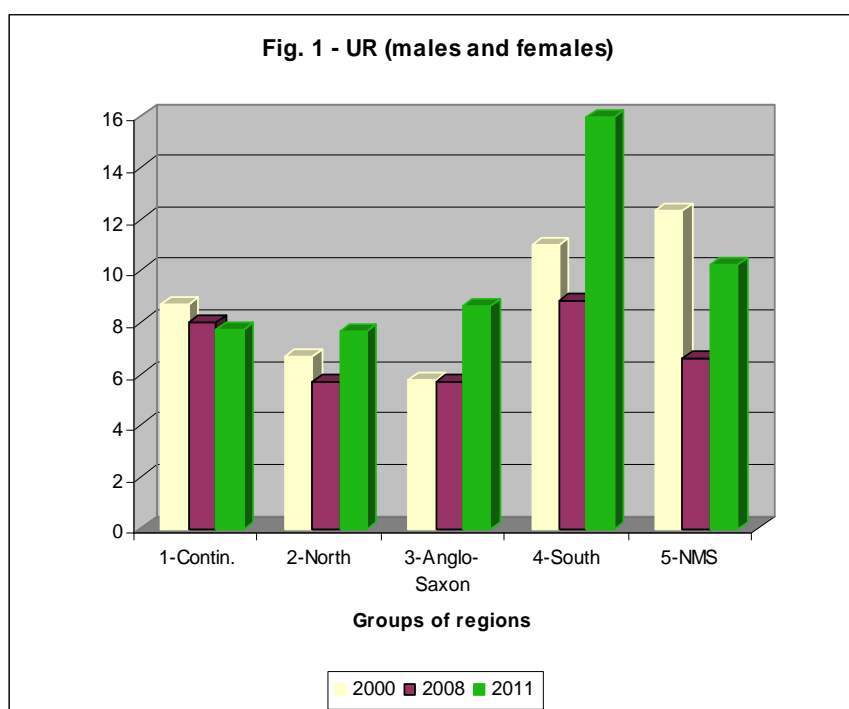
Total UR (Figure 1) is lower in Continental, Northern and Anglo-Saxon regions, compared to the two remaining groups. However, it has slightly decreased after the crisis in Continental regions. The increase in Northern regions has been small; it has been more significant in Anglo-saxon regions and NMS. Finally in Southern regions it has doubled.

Thus labour market institutions seem to play a crucial role (of course in addition to further variables here not considered, e.g. structural conditions). Either cooperative/corporatist or flexicurity models seem superior – from the point of view of unemployment performance – to the complete flexibility of Anglo-saxon countries or to the traditional systems of Southern countries.

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[11] Furthermore, differently from Caroleo and Pastore we have included France in the Continental group (instead of the Southern one) and Denmark in the Northern group (instead of the Continental one).

Fig. 2 - Youth UR (males and females)
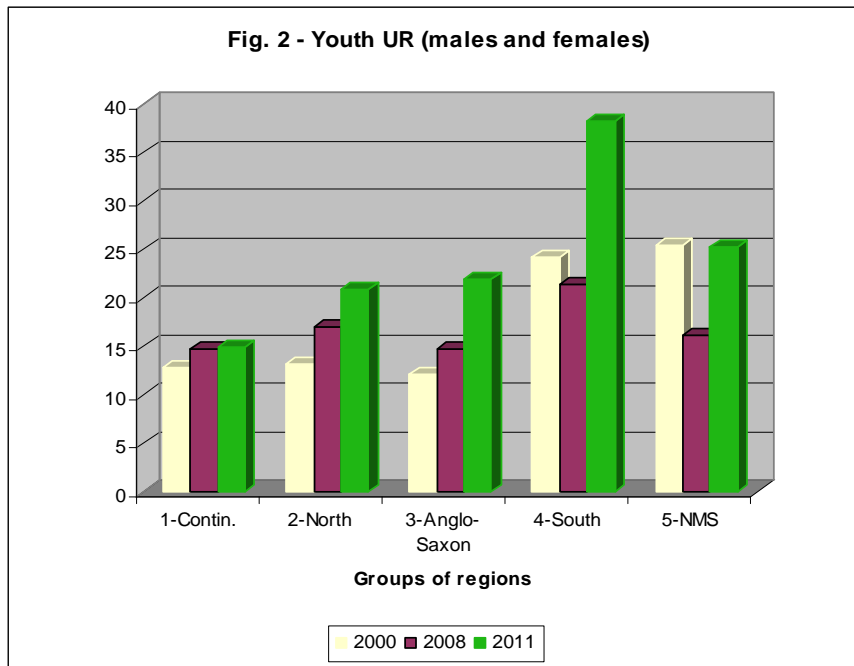
The gap between the first two groups of regions and the remaining three is even wider in the case of YUR (Figure 2). Here the ranking of the worst performing regions places the Southern regions at the first place, the NMS at the second and the Anglo-Saxon at the third. In all three groups there has been a significant increase of YUR after the crisis; but also in Northern regions there has been a rise.

Thus, besides labour market institutions, it seems that also the educational systems and school-to-work processes play a relevant role. In particular, the "dual" educational system of Germany and Continental Europe appears the best way to minimize unemployment among young people.

Fig. 3 - NEET rates (males and females)
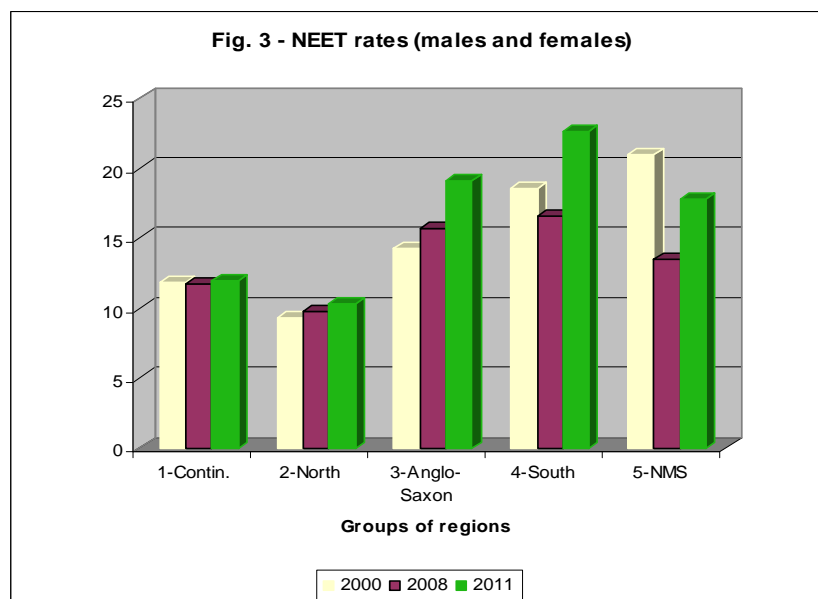
In the case of NEET rates (Figure 3) the picture is quite similar to the previous one (concerning YUR). It is however interesting to note that the performance of Anglo-Saxon countries is relatively worse compared to NMS; on the opposite side, the best performance is recorded by Northern countries, while for YUR Continental regions performed better. Of course, the worst NEET rate is still found in Southern regions.

4. The Econometric analysis

We consider the following baseline model for NEET rates

$$y_{i,t} = \gamma y_{i,t-1} + \beta_0 x_{i,t} + \beta_1 x_{i,t-1} + c_t \left(\gamma_c y_{i,t-1} + \beta_{0c} x_{i,t} + \beta_{1c} x_{i,t-1} \right) + u_{it}, \tag{1}$$

$i = 1,...,N$, $t = 1,...,T$, where

- $y_{i,t}$ is the NEET rate (or, alternatively, YUR and UR) of region i in year t and $x_{i,t}$ is a variable of economic activity at the regional level (e.g. regional GDP growth).
- c_t is a binary indicator that equals unity if t falls in the crisis period and zero otherwise.
- $u_{i,t} = \alpha_i + \eta_t + \lambda_{r(i),t} + \varepsilon_{i,t}$ is a composite error comprising the following components: α_i indicates correlated latent regional effects; η_t are latent aggregate transitory shocks; $\lambda_{r(i),t}$ captures possibly time-varying effects at a macro-region level, with $r(i)$ indicating the macro-region of region i; $\varepsilon_{i,t}$ is a conventional idiosyncratic shock.

Equation (1) is suitably designed to identify the following effects of interest:

- The pre- and post-crisis persistence coefficients, γ and $\gamma + c_t \gamma_c$, respectively.
- The pre- and post-crisis two-year effects of $x_{i,t}$, $\beta_0 + \beta_1$ and $\beta_0 + \beta_1 + c_t \left(\beta_{0c} + \beta_{1c} \right)$, respectively.

4.1 Results for the pooled regressions

Our estimation sample covers the period from 2000 to 2010 (GDP is not observed in 2011). We focus on the crisis period 2009-2010, over which all European countries had already entered recession (starting from 2008 produces less significant results, although signs and sizes of coefficient estimates remain largely the same).

We use two popular dynamic panel data estimators: the two-step Difference GMM (DIFF GMM, see Arellano and Bond 1991) and the two-step System GMM (SYS GMM, see Blundell and

Bond 1998). Results are shown in Table 2 (corresponding Tables for male and female rates are in appendix). Standard errors estimates are corrected through the Windmeijer (2005) procedure. Almost always, GMM-type instruments start from the third lag of the dependent variable. The conventional tests (Hansen test, difference-in-Hansen test and Arellano-Bond AR tests) never reject the specification for all models considered.

Table 2 - GMM estimates - Total NEET rates

VARIABLES	(1) DIFF GMM	(2) DIFF GMM	(3) DIFF GMM	(4) SYS GMM	(5) SYS GMM
neetratet(-1)	0.786***	0.764***	0.768***	0.776***	0.714***
	(0.0475)	(0.0504)	(0.0444)	(0.0449)	(0.0680)
neetratet(-1)*crisis			0.125**	0.111**	0.107*
			(0.0554)	(0.0454)	(0.0581)
GDP growth	-0.169***	-0.173***	-0.170***	-0.189***	-0.227***
	(0.0320)	(0.0490)	(0.0440)	(0.0489)	(0.0595)
GDP growth (-1)	-0.426***	-0.383***	-0.436***	-0.346***	-0.492***
	(0.112)	(0.110)	(0.115)	(0.110)	(0.149)
GDP growth*crisis		-0.0266	-0.00577	0.0148	0.0349
		(0.0768)	(0.0723)	(0.0752)	(0.0890)
GDP growth(-1)*crisis	0.358***	0.258*	0.351**	0.245*	0.449**
	(0.116)	(0.138)	(0.140)	(0.140)	(0.221)
Northern				1.208	3.101
				(1.103)	(2.616)
Anglo-Saxon				1.079**	2.251***
				(0.512)	(0.475)
Southern				1.434	2.761**
				(0.890)	(1.184)
NMS				2.913***	4.105***
				(0.675)	(1.168)
Continental*crisis					-2.723***
					(0.911)
Northern*crisis					-2.902
					(2.315)
Anglo-saxon*crisis					-1.778
					(1.137)
Southern*crisis					-2.566
					(1.591)
NMS*crisis					-3.638**
					(1.652)
Constant				3.500***	3.984***
				(0.647)	(0.850)
Observations	645	645	645	735	735
Number of regions	89	89	89	90	90
GDP growth pre-crisis effect	-0.595***	-0.557***	-0.606***	-0.536***	-0.720***
GDP growth crisis effect	-0.237***	-0.325***	-0.260***	-0.276***	-0.236*
t-dummies F-test pvalue	0.000	0.004	0.004	0.002	0.002
Number of instruments	46	46	46	55	64
Hansen test pvalue	0.267	0.235	0.343	0.400	0.314
AR2 test pvalue	0.211	0.153	0.198	0.151	0.0845
AR3 test pvalue	0.388	0.372	0.369	0.369	0.436
Crisis effect t-test		1.421	2.250**	2.160**	1.915*
Persistence during crisis			0.894***	0.887***	0.821***

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

To capture the η_t effects, all models include time dummies, which always turn out jointly significant. The regional effects α_i are accommodated through first differencing in the case of DIFF GMM and through both first differencing and a mean-stationarity assumption in the case of SYS GMM. Model 1 applies the constraints $\beta_{0c} = 0$, $\gamma_c = 0$ and does not consider the macro-region component. Model 2 is Model 1 without the first constraint. Model 3 is Model 2 without the $\gamma_c = 0$ constraint. Model 4 also incorporates the macro-region effects, but only time-constant, whilst Model 5 permits time-varying macro-region effects.

At this aggregate level, our estimates, consistently, tell the following story.

1. NEET rates are persistent and negatively respond to growth over the whole estimation period.

2. The crisis exerts a significant twofold impact. First, persistence of NEET rates over the crisis period seems higher than before. Second, the crisis effect of GDP growth is significantly lower for all NEET rates. Interestingly, before 2009 this effect is distributed over a two-year span, with a peak in the second year (the negative coefficient on *GDP growth(-1)*). From 2009, this pattern modifies and the lagged effect of growth is almost completely offset (the positive coefficient on *GDP growth(-1)*crisis*), making NEET rates considerably less sensitive to GDP. This finding may be explained by internal flexibility strategies adopted by the firms (including STWT) and by successful labor market policies implemented by a number of regions in our sample in response to lower growth. We will come back to this point in more detail in Section 5.

3. Overall, male NEET rates seem more responsive to GDP changes than female NEET rates. Such difference tends to be attenuated during the years of the crisis (see Tables A1 and A2 in appendix).

4.2 Results by groups of regions

It is likely that the results of Table 2 are mostly driven by the largest group of regions in our estimation sample, Continental, dominated by Germans regions. To shed more light on the different patterns across the groups of regions we carry out dynamic panel data regressions by macro-regions (this exercise excludes the Northern group that has only six regions). Moreover, to get further insight into the crisis effects, we consider two increasingly general extensions of our previous specification: the first allows the threshold year, 2008, to exert a separate impact on NEET rates, the second goes a step further and also allows different effects for the crisis years, 2009 and 2010. Due

to the reduced number of cross-sectional units in each macro-region, we carry out estimation through the LSDV estimator corrected for finite sample bias (LSDVC, see Kiviet 1995, Bruno 2005a and Bruno 2005b). Results are reported in Tables 3 for the first specification and Table 4 for the second.

Table 3 - LSDVC estimates by macro-regions - Total NEET rates

VARIABLES	Continental	Anglo-Saxon	Southern	NMS
neetratet(-1)	0.635***	0.481***	0.890***	0.584***
	(0.0671)	(0.114)	(0.0732)	(0.0628)
GDP growth	-0.102	-0.205	0.136	-0.214***
	(0.0731)	(0.262)	(0.103)	(0.0775)
GDP growth(-1)	-0.127	0.0137	-0.0440	-0.200**
	(0.0875)	(0.258)	(0.106)	(0.0866)
GDP growth*crisis	0.0376	-0.0200	-0.460**	-0.0673
	(0.126)	(0.514)	(0.179)	(0.0925)
GDP growth(-1)*crisis	0.164	-0.801*	0.188	0.0507
	(0.117)	(0.418)	(0.243)	(0.106)
GDP growth*2008	0.128	-0.613	-0.896**	0.0144
	(0.112)	(0.627)	(0.380)	(0.122)
GDP growth(-1)*2008	0.299**	0.235	0.608	-0.0771
	(0.148)	(0.589)	(0.538)	(0.121)
Dummy 2003	0.413	-3.621***	0.759	-0.644
	(0.338)	(0.634)	(0.628)	(0.508)
Dummy 2004	0.572	-2.756***	-0.183	0.0243
	(0.368)	(0.666)	(0.585)	(0.537)
Dummy 2005	0.535	-2.538***	0.134	-0.617
	(0.360)	(0.686)	(0.587)	(0.567)
Dummy 2006	-0.446	-2.613***	-1.712***	-1.245**
	(0.419)	(0.704)	(0.605)	(0.594)
Dummy 2007	-0.557	2.034***	-0.223	-2.422***
	(0.415)	(0.744)	(0.631)	(0.671)
Dummy 2008	-1.662***	-2.196	0.0511	-2.524***
	(0.503)	(2.653)	(1.554)	(0.866)
Dummy 2009	0.0560	-0.533	2.349***	-2.285***
	(0.523)	(1.485)	(0.895)	(0.810)
Dummy 2010	-0.521	-1.189	2.155*	-2.103**
	(0.454)	(2.593)	(1.233)	(0.831)
Observations	286	114	153	155
Number of regions	35	13	17	20
GDP growth pre-crisis effect	-0.229**	-0.192	0.0916	-0.414***
GDP growth effect in 2008	0.198	-0.569	-0.197	-0.477***
2008 effect t-test	2.261**	-0.748	-0.771	-0.425
GDP growth crisis effect	-0.0271	-1.013***	-0.181	-0.430***
Crisis effect t-test	1.106	-1.669*	-0.958	-0.136
t-dummies F-test pvalue	0.000	0.000	0.000	0.000

Bootstrapped standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 4 - LSDVC estimates by macro-regions, with separate impacts of the crisis years - Total NEET rates

VARIABLES	Continental	Anglo-Saxon	Southern	NMS
neetratet(-1)	0.621***	0.499***	0.893***	0.606***
	(0.0675)	(0.116)	(0.0739)	(0.0621)
GDP growth	-0.107	-0.195	0.137	-0.223***
	(0.0736)	(0.274)	(0.105)	(0.0779)
GDP growth(-1)	-0.125	0.0379	-0.0436	-0.207**
	(0.0881)	(0.275)	(0.108)	(0.0872)
GDP growth*2008	0.128	-0.683	-0.909**	-0.00178
	(0.113)	(0.646)	(0.386)	(0.124)
GDP growth(-1)*2008	0.281*	0.292	0.624	-0.0678
	(0.149)	(0.608)	(0.545)	(0.122)
GDP growth*2009	0.210	-0.980	-0.351	0.0123
	(0.153)	(1.144)	(0.412)	(0.100)
GDP growth(-1)*2009	0.151	-0.0306	0.317	-0.0916
	(0.123)	(0.966)	(0.341)	(0.136)
GDP growth*2010	-0.244	0.269	-0.556***	-0.190
	(0.192)	(0.688)	(0.203)	(0.172)
GDP growth(-1)*2010	0.107	-0.754	-0.200	0.129
	(0.180)	(0.505)	(0.360)	(0.114)
dummy 2003	0.419	-3.625***	0.760	-0.624
	(0.341)	(0.630)	(0.632)	(0.511)
dummy 2004	0.599	-2.719***	-0.184	0.0777
	(0.370)	(0.672)	(0.590)	(0.538)
dummy 2005	0.566	-2.465***	0.135	-0.538
	(0.363)	(0.686)	(0.591)	(0.570)
dummy 2006	-0.404	-2.528***	-1.712***	-1.130*
	(0.421)	(0.710)	(0.609)	(0.595)
dummy 2007	-0.534	2.109***	-0.218	-2.267***
	(0.418)	(0.748)	(0.636)	(0.672)
dummy 2008	-1.614***	-2.485	0.0188	-2.360***
	(0.506)	(2.687)	(1.567)	(0.868)
dummy 2009	0.711	-2.875	2.721	-1.230
	(0.632)	(2.397)	(1.890)	(0.953)
dummy 2010	-0.0438	-1.355	0.597	-1.420
	(0.649)	(2.628)	(1.637)	(0.920)
Observations	286	114	153	155
Number of regions	35	13	17	20
GDP growth pre-crisis effect	-0.232**	-0.157	0.0931	-0.430***
GDP growth effect in 2008	0.177	-0.549	-0.192	-0.499***
2008 effect t-test	2.143**	-0.776	-0.757	-0.474
GDP growth effect in 2009	0.129	-1.168***	0.0589	-0.509***
2009 effect t-test	1.794*	-1.930*	-0.0959	-0.596
GDP growth effect in 2010	-0.369	-0.642	-0.664	-0.490***
2010 effect t-test	-0.456	-0.556	-1.800*	-0.342
t-dummies F-test pvalue	0.000	0.000	0.005	0.000

Bootstrapped standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

In either case substantial heterogeneity across macro-regions emerge, with the following specific aspects.

1. NEET rates in Continental regions show unresponsiveness to GDP growth during the years of the crisis, especially in 2008 and 2009. This confirms that the stickiness over the crisis

years found in the aggregate model is primarily due to the predominance of these regions in the estimation sample.

2. Quite an opposite behavior is found in the Anglo-Saxon group, where NEET rates are extremely sensitive to GDP growth during the crisis period, but not before.

3. NEET rates in the Southern group stand as the most persistent and sticky to GDP growth over the whole period considered. Focusing on the time dummies coefficients, there is evidence of significantly positive aggregate shocks in 2009 and 2010 in the first specification. These, though, become less significant in the second specification, where in particular the size of the shock in 2010 is explained out by a larger and significant response to the GDP reduction in that year. Overall, such evidence suggests the existence of stronger structural weaknesses and hints lack of effective anti-cyclical interventions at regional and national levels in this group of regions.

4. NEET rates in the NMS regions are significantly sensitive to GDP growth over all estimation period, with no evidence of a crisis effect.

4.3 Results for YUR and UR

The peculiarities of the regional NEET rates can be better highlighted in comparison with the regional unemployment rates. To this end, we applied the most general specification to YUR and UR. Results, reported in Tables 5 and 6, tend to suggest a picture that is broadly consistent with what found for the NEET rates over most of the aspects considered.

Remarkably, the successful implementation of anti-cyclical labor market policies in the Continental group emerges even more clearly for both YUR and UR, with significantly lower responses to GDP changes over the crisis years. The opposite pattern peculiar to the Anglo-Saxon regions is also confirmed here, and in a more pronounced way. As a notable difference with the NEET estimates, we find that in the NMS regions, similarly to what happens in the Continental group on a broader level, the response of unemployment rates to GDP variation is significantly reduced in 2010.[12]

As found for the NEET rates, youth and total unemployment rates show the highest levels of persistence in the Southern regions, with even more force. Overall, total unemployment seems more persistent not only than youth unemployment, confirming what already found by Bruno et al. (2013) for a panel of OECD countries, but also than NEET rates. From an econometric point of view, we notice that the presence of unit roots both in the YUR and UR estimates does not affect

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[12] Notice that some Eastern countries with many regions, such as Poland, were mildly hit by the Great Recession.

the validity of our inference methods since: 1) asymptotics is for large N and fixed T; 2) the bias correction method is even more accurate in the presence of unit roots (Kiviet 1995).

Table 5 - LSDVC estimates by macro-regions, with separate impacts of the crisis years - YUR

VARIABLES	Continental	Anglo-Saxon	Southern	NMS
yurt(-1)	0.297***	0.495***	1.024***	0.792***
	(0.0641)	(0.108)	(0.0539)	(0.0552)
GDP growth	-0.167	-0.206	-0.117	-0.404***
	(0.120)	(0.312)	(0.171)	(0.148)
GDP growth(-1)	-0.157	-0.653**	-0.182	-0.557***
	(0.135)	(0.296)	(0.172)	(0.150)
GDP growth*2008	0.222	-0.470	-0.494	0.0659
	(0.179)	(0.657)	(0.559)	(0.241)
GDP growth(-1)*2008	0.404	0.286	0.0685	0.125
	(0.246)	(0.644)	(0.728)	(0.265)
GDP growth*2009	0.440**	-2.322*	-0.582	-0.0788
	(0.207)	(1.254)	(0.615)	(0.210)
GDP growth(-1)*2009	0.0720	1.638	0.417	0.0177
	(0.194)	(1.098)	(0.547)	(0.243)
GDP growth*2010	-0.171	-0.572	-0.718**	0.597
	(0.318)	(0.735)	(0.321)	(0.372)
GDP growth(-1)*2010	0.536**	-0.528	-0.0895	0.379*
	(0.239)	(0.556)	(0.509)	(0.223)
dummy 2003	0.338	0.0785	0.395	-0.807
	(0.557)	(0.702)	(1.002)	(1.018)
dummy 2004	2.139***	-0.624	-0.610	1.042
	(0.627)	(0.640)	(0.962)	(1.020)
dummy 2005	3.250***	1.031*	-0.749	-0.507
	(0.610)	(0.579)	(0.956)	(1.081)
dummy 2006	2.282***	0.671	-1.393	-2.224**
	(0.731)	(0.632)	(1.003)	(1.061)
dummy 2007	0.617	0.761	-0.596	-3.622***
	(0.690)	(0.710)	(0.983)	(1.098)
dummy 2008	-1.142	-0.650	2.202	-3.383*
	(0.820)	(2.845)	(2.159)	(1.738)
dummy 2009	2.706***	-4.976*	3.853	-0.544
	(0.904)	(2.603)	(2.712)	(1.799)
dummy 2010	2.997***	-1.444	1.135	-3.153*
	(0.912)	(2.805)	(2.348)	(1.618)
Observations	324	115	162	180
Number of regions	36	13	18	20
GDP growth pre-crisis effect	-0.324*	-0.858**	-0.299	-0.961***
GDP growth effect in 2008	0.302	-1.042*	-0.724	-0.770***
2008 effect t-test	2.063**	-0.363	-0.711	0.617
GDP growth effect in 2009	0.188	-1.542***	-0.464	-1.022***
2009 effect t-test	1.750*	-1.244	-0.285	-0.215
GDP growth effect in 2010	0.0414	-1.959***	-1.107*	0.0142
2010 effect t-test	0.766	-1.165	-1.307	2.533**
t-dummies F-test pvalue	0.000	0.041	0.419	0.000

Bootstrapped standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 6 - LSDVC estimates by macro-regions, with separate impacts of the crisis years - Total UR

VARIABLES	Continental	Anglo-Saxon	Southern	NMS
turt(-1)	1.020***	0.662***	1.110***	0.853***
	(0.0398)	(0.106)	(0.0411)	(0.0490)
GDP growth	-0.0879*	-0.177	-0.125	-0.226***
	(0.0481)	(0.117)	(0.0791)	(0.0608)
GDP growth(-1)	-0.158***	-0.149	-0.0359	-0.222***
	(0.0538)	(0.113)	(0.0800)	(0.0618)
GDP growth*2008	0.0838	-0.0266	-0.149	0.0622
	(0.0707)	(0.246)	(0.259)	(0.0993)
GDP growth(-1)*2008	0.136	-0.0694	-0.227	0.00902
	(0.0978)	(0.242)	(0.338)	(0.109)
GDP growth*2009	0.123	-1.160**	-0.129	-0.0190
	(0.0823)	(0.476)	(0.283)	(0.0864)
GDP growth(-1)*2009	0.0723	0.939**	0.0137	-0.0439
	(0.0771)	(0.416)	(0.252)	(0.0997)
GDP growth*2010	0.0494	-0.331	-0.243	0.400***
	(0.128)	(0.283)	(0.149)	(0.152)
GDP growth(-1)*2010	0.305***	-0.311	-0.201	0.104
	(0.0936)	(0.214)	(0.233)	(0.0912)
dummy 2003	-0.0726	-0.241	-0.251	-0.828**
	(0.221)	(0.265)	(0.465)	(0.419)
dummy 2004	0.291	-0.325	-0.370	0.305
	(0.250)	(0.236)	(0.447)	(0.420)
dummy 2005	-0.269	-0.261	-0.968**	-0.461
	(0.235)	(0.225)	(0.441)	(0.446)
dummy 2006	-0.943***	0.114	-0.810*	-1.374***
	(0.265)	(0.230)	(0.463)	(0.442)
dummy 2007	-1.380***	-0.127	-0.494	-1.749***
	(0.248)	(0.246)	(0.449)	(0.464)
dummy 2008	-1.599***	-0.189	1.776*	-1.675**
	(0.319)	(1.050)	(1.002)	(0.722)
dummy 2009	0.0981	-2.669***	1.840	-0.554
	(0.357)	(1.004)	(1.247)	(0.760)
dummy 2010	-0.327	-0.767	-0.296	-1.749**
	(0.348)	(1.059)	(1.070)	(0.696)
Observations	324	115	162	180
Number of regions	36	13	18	20
GDP growth pre-crisis effect	-0.246***	-0.326**	-0.161	-0.448***
GDP growth effect in 2008	-0.0254	-0.422**	-0.536*	-0.377***
2008 effect t-test	1.833*	-0.502	-1.353	0.560
GDP growth effect in 2009	-0.0498	-0.547***	-0.276	-0.511***
2009 effect t-test	1.684*	-1.057	-0.435	-0.539
GDP growth effect in 2010	0.109	-0.968***	-0.605**	0.0567
2010 effect t-test	1.864*	-1.740*	-1.555	3.198***
t-dummies F-test pvalue	0.000	0.104	0.047	0.000

Bootstrapped standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

5. Conclusions

The main task of this paper was to investigate the recent dynamics of youth unemployment rates (YUR) in comparison with both total unemployment rates and the (more innovative) NEET indicator. The focus was on the changes happened after the 2008 financial crisis and consequent Great Recession. Our sample units are almost 100 Nuts-1 regions of the EU.

The descriptive part of the paper (Section 3) suggested to distinguish between five groups of countries (and regions). We have seen that the best performance, also after the crisis (2009-2011) was recorded in Continental and Northern regions, while the worst evolutions can be found in Southern and NMS regions; the Anglo-saxon regions are to a certain extent in the middle. Of course, the different institutions of labour markets, educational systems and school-to-work processes are relevant in explaining such different behaviour.

The econometric section intended to detect differences in persistence of NEET and YUR rates, and also possible changes (after the crisis) in the sensitivity of such labour market indicators on GDP dynamics. We have used dynamic panel data GMM and bias-corrected LSDV estimators. The main results can be summarised as follows:

1. NEET rates are persistent over time at a degree comparable to YUR's; furthermore, persistence increased over the crisis years (2009-10).

2. The highest persistence of NEET rates, as well as YUR and UR, and the lowest response to GDP is found in Southern regions.

3. The sensitivity of NEET rates to GDP has decreased during the crisis. This result is especially influenced by the dynamics in Continental regions, whereas Anglo-Saxon regions are particularly sensitive to GDP during the crisis and NMS regions are also highly sensitive to GDP, but rather homogenously over the whole estimation period.

4. The foregoing patterns are largely replicated by the YUR estimates with the exception that for NMS regions YUR is not found sensitive to GDP in 2010.

As for the policy implications, we first of all summarize the main policies that according to ILO (2012) can be address to the youth (un)employment problem. They can be grouped in the following areas: (i) macroeconomic and growth policies; (ii) active labour market policies and programmes; (iii) social protection for young people (decent employment is not only about generating any jobs, but also about improving the quality of jobs); (iv) enhancing social dialogue and monitoring of labour markets in order to design effective policies.

Suggestion (i) is particularly relevant in consideration of the current debate on austerity measures undertaken by Eurozone countries to face the sovereign debt crisis. In fact, the contemporaneous fiscal consolidations in several countries is causing a new recession after the Great Recession. This double-dip recession bears a continuous negative impact on labour markets: the EU unemployment rate is now over 12%. Thus macroeconomic policies should become less restrictive and should be accompanied by growth-oriented policies on the supply side. However, at this point it is too late to solve the labour market problems just acting on aggregate demand. Active

labour market policies and programmes (point ii) are fundamental at this stage, to contrast persistence effects and structural unemployment.

This is even more important for young people, since the expansion of a "lost generation" in many European countries highlights the need to adopt effective active and passive labour policies and adequate school-to-work processes. Passive policies and social protection (point iii above) are also needed because the dramatic situation in labour markets is bringing about profound social and even political consequences.

Two results of our empirical analyses bear particularly relevant policy implications. The first result is that, in the case of big crises, it seems that institutions and policies similar to those adopted in Continental Europe, especially in Germany, are especially apt to minimize the impact on labour markets (thanks to working hour adjustments, crisis management agreed with trade unions, targeted policies for young people, etc.). The second relevant outcome concerns the Southern regions: the high persistence of NEET and YUR and the low responsiveness to GDP means that, even if the economy will eventually recover at the end of this year, many years will elapse before the situation of young people might improve; thus a combination of active and passive labour policies is of the utmost importance.

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Appendix – Male and Female estimates

Table A1 - GMM Estimates - Male NEET rates

VARIABLES	(1) DIFF GMM	(2) DIFF GMM	(3) DIFF GMM	(4) SYS GMM	(5) SYS GMM
neetratem(-1)	0.730***	0.727***	0.736***	0.700***	0.615***
	(0.0575)	(0.0671)	(0.0651)	(0.0663)	(0.103)
neetratem(-1)*crisis			0.131*	0.127**	0.0611
			(0.0776)	(0.0595)	(0.140)
GDP growth	-0.233***	-0.189***	-0.193**	-0.264***	-0.289***
	(0.0395)	(0.0696)	(0.0757)	(0.0766)	(0.0965)
GDP growth (-1)	-0.502***	-0.503***	-0.608***	-0.531***	-0.726***
	(0.179)	(0.164)	(0.174)	(0.145)	(0.206)
GDP growth*crisis		-0.0718	-0.0580	0.0392	0.0488
		(0.0841)	(0.103)	(0.0982)	(0.113)
GDP growth(-1)*crisis	0.337*	0.365	0.491**	0.349*	0.598**
	(0.184)	(0.232)	(0.225)	(0.197)	(0.261)
Northern				1.260	4.067
				(2.049)	(3.550)
Anglo-Saxon				1.760**	1.063
				(0.743)	(0.848)
Southern				3.078**	4.400**
				(1.439)	(1.991)
NMS				4.463***	6.269***
				(0.774)	(1.583)
Continental*crisis					-2.417
					(1.543)
Northern*crisis					-6.494*
					(3.767)
Anglo-saxon*crisis					-0.963
					(2.741)
Southern*crisis					-1.784
					(4.117)
NMS*crisis					-4.292*
					(2.317)
Constant				4.235***	5.132***
				(0.799)	(1.187)
Observations	591	591	591	681	681
Number of regions	86	86	86	87	87
GDP growth pre-crisis effect	-0.735***	-0.692***	-0.801***	-0.795***	-1.015***
GDP growth crisis effect	-0.398***	-0.398**	-0.368**	-0.407***	-0.368**
t-dummies F-test pvalue	0.010	0.004	0.004	0.002	0.002
Number of instruments	46	46	46	55	55
Hansen test pvalue	0.270	0.287	0.121	0.168	0.237
AR2 test pvalue	0.047	0.056	0.051	0.048	0.013
AR3 test pvalue	0.337	0.355	0.324	0.327	0.399
Crisis effect t-test		1.239	1.840*	2.537**	2.625***
Persistence during crisis			0.867***	0.827***	0.676***

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table A2 - GMM Estimates - Female NEET rates

VARIABLES	(1) DIFF GMM	(2) DIFF GMM	(3) DIFF GMM	(4) SYS GMM	(5) SYS GMM
neetratef(-1)	0.733***	0.681***	0.703***	0.832***	0.813***
	(0.0563)	(0.0601)	(0.0558)	(0.0474)	(0.0651)
neetratef(-1)*crisis			0.0628	0.0631	0.0764
			(0.0574)	(0.0489)	(0.0487)
GDP growth	-0.146***	-0.112**	-0.106**	-0.131***	-0.172***
	(0.0400)	(0.0471)	(0.0474)	(0.0493)	(0.0657)
GDP growth (-1)	-0.346***	-0.309***	-0.357***	-0.346***	-0.434***
	(0.0910)	(0.0979)	(0.0888)	(0.0940)	(0.117)
GDP growth*crisis		-0.0884	-0.0878	-0.0504	0.00361
		(0.0696)	(0.0692)	(0.0791)	(0.0915)
GDP growth(-1)*crisis	0.252***	0.141	0.218**	0.289***	0.413**
	(0.0848)	(0.108)	(0.103)	(0.108)	(0.166)
Northern				1.469	-0.677
				(2.159)	(3.208)
Anglo-saxon				1.469**	2.788***
				(0.719)	(0.783)
Southern				1.228	1.855
				(0.882)	(1.177)
NMS				2.497***	3.623***
				(0.820)	(1.200)
Continental*crisis					-1.439
					(1.092)
Northern*crisis					-1.177
					(2.215)
Anglo-Saxon*crisis					-2.622**
					(1.197)
Southern*crisis					-2.517
					(1.585)
NMS*crisis					-2.685*
					(1.429)
Constant				2.608***	2.805***
				(0.751)	(1.015)
Observations	601	601	601	690	690
Number of regions	86	86	86	87	87
GDP growth pre-crisis effect	-0.492***	-0.421***	-0.463***	-0.477***	-0.606***
GDP growth crisis effect	-0.239***	-0.368***	-0.333***	-0.238**	-0.190*
t-dummies F-test pvalue	0.004	0.004	0.004	0.00239	0.00187
Number of instruments	46	46	46	55	64
Hansen test pvalue	0.397	0.382	0.391	0.347	0.642
AR2 test pvalue	0.439	0.356	0.388	0.554	0.691
AR3 test pvalue	0.506	0.527	0.548	0.575	0.564
Crisis effect t-test		0.412	1.158	2.565***	2.134**
Persistence during crisis			0.765***	0.896***	0.889***

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table A3 - LSDVC Estimates by macro-regions - Male NEET rates

VARIABLES	Continental	Anglo-Saxon	Southern	NMS
neetratem(-1)	0.570***	0.609***	0.890***	0.577***
	(0.0745)	(0.114)	(0.0794)	(0.0640)
GDP growth	-0.0533	0.120	0.139	-0.329***
	(0.103)	(0.336)	(0.129)	(0.0945)
GDP growth(-1)	-0.0963	-0.240	-0.113	-0.297***
	(0.123)	(0.329)	(0.131)	(0.102)
GDP growth*crisis	-0.118	-0.972*	-0.475**	-0.0289
	(0.169)	(0.579)	(0.236)	(0.116)
GDP growth(-1)*crisis	-0.0590	-0.392	0.259	0.123
	(0.192)	(0.570)	(0.318)	(0.129)
GDP growth*2008	0.0331	-2.186***	-1.064**	0.0616
	(0.186)	(0.722)	(0.539)	(0.166)
GDP growth(-1)*2008	0.334*	1.630**	1.200*	-0.00416
	(0.192)	(0.687)	(0.655)	(0.154)
Dummy 2003	0.421	-3.332***	0.661	-0.412
	(0.428)	(0.769)	(0.736)	(0.628)
Dummy 2004	0.537	-1.737**	-0.437	0.0961
	(0.487)	(0.743)	(0.779)	(0.659)
Dummy 2005	0.0945	-1.334*	0.349	-0.516
	(0.514)	(0.713)	(0.725)	(0.678)
Dummy 2006	-0.665	-1.541*	-1.394*	-1.158
	(0.524)	(0.798)	(0.787)	(0.718)
Dummy 2007	-0.927*	1.541*	-0.299	-2.456***
	(0.533)	(0.826)	(0.760)	(0.774)
Dummy 2008	-1.692***	-8.067**	-1.074	-3.333***
	(0.635)	(3.177)	(1.927)	(1.005)
Dummy 2009	0.646	-1.528	3.234***	-2.347**
	(0.723)	(1.809)	(1.187)	(0.970)
Dummy 2010	-0.818	0.140	2.325	-2.241**
	(0.696)	(3.042)	(1.852)	(0.941)
Observations	242	108	151	153
Number of regions	32	13	17	20
GDP growth pre-crisis effect	-0.150	-0.121	0.0258	-0.626***
GDP growth effect in 2008	0.217	-0.677	0.162	-0.569***
2008 effect t-test	1.451	-0.986	0.285	0.308
GDP growth crisis effect	-0.326	-1.485***	-0.190	-0.532***
Crisis effect t-test	-0.654	-2.366**	-0.561	0.610
t-dummies F-test pvalue	0.002	0.000	0.011	0.001

Bootstrapped standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table A4 - LSDVC Estimates by macro-regions - Female NEET rates

VARIABLES	Continental	Anglo-Saxon	Southern	NMS
neetratef(-1)	0.471***	0.400***	0.811***	0.482***
	(0.0696)	(0.125)	(0.0811)	(0.0758)
GDP growth	-0.0556	-0.455	0.155	-0.0870
	(0.0960)	(0.373)	(0.116)	(0.0879)
GDP growth(-1)	-0.153	0.279	0.0432	-0.122
	(0.111)	(0.355)	(0.119)	(0.0981)
GDP growth*crisis	-0.141	0.843	-0.444**	-0.124
	(0.156)	(0.702)	(0.202)	(0.105)
GDP growth(-1)*crisis	0.130	-0.988*	0.0978	-0.0466
	(0.164)	(0.581)	(0.275)	(0.120)
GDP growth*2008	0.0582	1.000	-0.380	-0.0770
	(0.171)	(0.819)	(0.427)	(0.138)
GDP growth(-1)*2008	0.369**	-1.162	-0.176	-0.154
	(0.177)	(0.813)	(0.606)	(0.136)
Dummy 2003	0.0997	-4.207***	0.783	-0.926
	(0.401)	(0.895)	(0.703)	(0.578)
Dummy 2004	0.572	-4.335***	0.00704	-0.287
	(0.434)	(0.948)	(0.656)	(0.623)
Dummy 2005	0.904**	-3.607***	-0.169	-0.983
	(0.392)	(0.969)	(0.661)	(0.663)
Dummy 2006	-0.0273	-3.728***	-2.081***	-1.750**
	(0.485)	(1.003)	(0.684)	(0.688)
Dummy 2007	-0.470	2.098*	-0.465	-3.195***
	(0.488)	(1.071)	(0.739)	(0.784)
Dummy 2008	-1.715***	3.888	1.516	-2.328**
	(0.622)	(3.724)	(1.767)	(1.030)
Dummy 2009	-0.822	0.669	1.388	-3.095***
	(0.658)	(2.075)	(1.017)	(0.951)
Dummy 2010	-0.430	-1.968	1.978	-2.977***
	(0.624)	(3.602)	(1.389)	(0.983)
Observations	246	109	153	155
Number of regions	32	13	17	20
GDP growth pre-crisis effect	-0.209	-0.177	0.198	-0.209**
GDP growth effect in 2008	0.218	-0.339	-0.358	-0.440***
2008 effect t-test	1.814*	-0.276	-1.318	-1.389
GDP growth crisis effect	-0.219	-0.322	-0.148	-0.380***
Crisis effect t-test	-0.0458	-0.222	-1.069	-1.242
t-dummies F-test pvalue	0.000	0.000	0.000	0.000

Bootstrapped standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table A5 - LSDVC Estimates by macro-regions, with separate impacts of the crisis years - Male NEET rates

VARIABLES	Continental	Anglo-Saxon	Southern	NMS
neetratem(-1)	0.566***	0.593***	0.885***	0.593***
	(0.0752)	(0.119)	(0.0803)	(0.0626)
GDP growth	-0.0581	0.0770	0.143	-0.336***
	(0.105)	(0.345)	(0.131)	(0.0946)
GDP growth(-1)	-0.0756	-0.261	-0.104	-0.303***
	(0.125)	(0.343)	(0.132)	(0.102)
GDP growth*2008	0.0205	-2.176***	-1.037*	0.0192
	(0.190)	(0.735)	(0.549)	(0.172)
GDP growth(-1)*2008	0.293	1.604**	1.185*	0.00904
	(0.196)	(0.702)	(0.666)	(0.154)
GDP growth*2009	0.152	-1.780	-0.481	0.0635
	(0.239)	(1.343)	(0.513)	(0.123)
GDP growth(-1)*2009	-0.215	0.153	0.710	-0.0885
	(0.214)	(1.199)	(0.463)	(0.170)
GDP growth*2010	-0.330	-0.411	-0.619**	-0.0854
	(0.268)	(0.782)	(0.288)	(0.215)
GDP growth(-1)*2010	0.0254	-0.227	-0.342	0.209
	(0.284)	(0.689)	(0.480)	(0.138)
dummy 2003	0.442	-3.285***	0.664	-0.405
	(0.434)	(0.762)	(0.742)	(0.628)
dummy 2004	0.577	-1.764**	-0.435	0.115
	(0.493)	(0.757)	(0.785)	(0.658)
dummy 2005	0.0860	-1.408**	0.349	-0.474
	(0.520)	(0.716)	(0.730)	(0.679)
dummy 2006	-0.641	-1.618**	-1.394*	-1.095
	(0.531)	(0.796)	(0.792)	(0.715)
dummy 2007	-0.939*	1.501*	-0.316	-2.361***
	(0.540)	(0.827)	(0.767)	(0.772)
dummy 2008	-1.584**	-8.153**	-1.025	-3.191***
	(0.642)	(3.171)	(1.949)	(1.003)
dummy 2009	1.749*	-4.197	3.161	-1.048
	(0.958)	(2.967)	(2.331)	(1.112)
dummy 2010	0.117	-0.249	0.0180	-1.713
	(0.938)	(3.080)	(2.401)	(1.063)
Observations	242	108	151	153
Number of regions	32	13	17	20
GDP growth pre-crisis effect	-0.134	-0.184	0.0398	-0.639***
GDP growth effect in 2008	0.180	-0.755	0.188	-0.611***
2008 effect t-test	1.217	-1.023	0.309	0.150
GDP growth effect in 2009	-0.197	-1.811***	0.268	-0.664***
2009 effect t-test	-0.208	-2.674***	0.480	-0.141
GDP growth effect in 2010	-0.438	-0.823	-0.921	-0.515***
2010 effect t-test	-0.662	-0.599	-1.569	0.573
t-dummies F-test pvalue	0.002	0.000	0.179	0.001

Bootstrapped standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table A6 - LSDVC Estimates by macro-regions, with separate impacts of the crisis years - Female NEET rates

VARIABLES	Continental	Anglo-Saxon	Southern	NMS
neetratef(-1)	0.456***	0.411***	0.814***	0.496***
	(0.0706)	(0.128)	(0.0825)	(0.0764)
GDP growth	-0.0552	-0.423	0.157	-0.0954
	(0.0964)	(0.394)	(0.119)	(0.0887)
GDP growth(-1)	-0.144	0.327	0.0447	-0.128
	(0.112)	(0.386)	(0.121)	(0.0993)
GDP growth*2008	0.0502	0.902	-0.395	-0.0794
	(0.172)	(0.853)	(0.435)	(0.141)
GDP growth(-1)*2008	0.343*	-1.073	-0.161	-0.149
	(0.179)	(0.836)	(0.614)	(0.138)
GDP growth*2009	0.0506	-0.147	-0.348	-0.0680
	(0.207)	(1.664)	(0.466)	(0.114)
GDP growth(-1)*2009	0.0926	-0.150	0.127	-0.128
	(0.178)	(1.454)	(0.387)	(0.154)
GDP growth*2010	-0.437*	0.880	-0.492**	-0.259
	(0.234)	(0.984)	(0.231)	(0.197)
GDP growth(-1)*2010	0.00208	-1.070*	-0.0865	0.00688
	(0.255)	(0.648)	(0.410)	(0.129)
dummy 2003	0.111	-4.216***	0.785	-0.905
	(0.401)	(0.908)	(0.710)	(0.585)
dummy 2004	0.589	-4.309***	0.00638	-0.235
	(0.436)	(0.961)	(0.664)	(0.627)
dummy 2005	0.909**	-3.509***	-0.168	-0.919
	(0.394)	(0.984)	(0.668)	(0.671)
dummy 2006	-0.00922	-3.614***	-2.080***	-1.664**
	(0.487)	(1.029)	(0.691)	(0.694)
dummy 2007	-0.478	2.183**	-0.459	-3.087***
	(0.491)	(1.083)	(0.746)	(0.790)
dummy 2008	-1.653***	3.552	1.493	-2.231**
	(0.626)	(3.792)	(1.784)	(1.040)
dummy 2009	-0.0998	-1.381	1.771	-2.447**
	(0.851)	(3.565)	(2.162)	(1.117)
dummy 2010	-0.153	-1.995	1.256	-2.428**
	(0.793)	(3.783)	(1.853)	(1.067)
Observations	246	109	153	155
Number of regions	32	13	17	20
GDP growth pre-crisis effect	-0.199	-0.0960	0.202	-0.224**
GDP growth effect in 2008	0.195	-0.267	-0.354	-0.452***
2008 effect t-test	1.661*	-0.285	-1.306	-1.375
GDP growth effect in 2009	-0.0555	-0.393	-0.0185	-0.420***
2009 effect t-test	0.568	-0.421	-0.544	-1.306
GDP growth effect in 2010	-0.634	-0.286	-0.377	-0.476***
2010 effect t-test	-1.044	-0.167	-1.209	-1.238
t-dummies F-test pvalue	0.000	0.000	0.003	0.000

Bootstrapped standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table A7 - LSDVC Estimates by macro-regions, with separate impacts of the crisis years - Male YUR

VARIABLES	Continental	Anglo-Saxon	Southern	NMS
yurm(-1)	0.264***	0.427***	1.000***	0.743***
	(0.0668)	(0.110)	(0.0577)	(0.0588)
GDP growth	-0.261*	-0.0942	-0.197	-0.400**
	(0.149)	(0.471)	(0.202)	(0.175)
GDP growth(-1)	-0.136	-0.748*	-0.168	-0.632***
	(0.168)	(0.444)	(0.204)	(0.177)
GDP growth*2008	0.296	-1.336	-0.932	0.0403
	(0.221)	(0.988)	(0.660)	(0.285)
GDP growth(-1)*2008	0.304	0.909	0.705	0.191
	(0.305)	(0.970)	(0.856)	(0.313)
GDP growth*2009	0.779***	-3.937**	-0.620	-0.217
	(0.256)	(1.890)	(0.728)	(0.249)
GDP growth(-1)*2009	0.0618	1.790	0.879	-0.0940
	(0.240)	(1.654)	(0.646)	(0.288)
GDP growth*2010	-0.0648	-1.276	-0.521	0.663
	(0.393)	(1.094)	(0.380)	(0.437)
GDP growth(-1)*2010	0.540*	-0.910	-0.375	0.353
	(0.299)	(0.882)	(0.602)	(0.264)
dummy 2003	0.651	-0.258	0.513	-1.569
	(0.690)	(1.060)	(1.182)	(1.205)
dummy 2004	2.190***	-1.375	0.0102	1.956
	(0.783)	(0.959)	(1.136)	(1.213)
dummy 2005	3.038***	1.237	-0.952	-0.922
	(0.752)	(0.877)	(1.128)	(1.281)
dummy 2006	2.157**	0.645	-0.991	-3.085**
	(0.886)	(0.940)	(1.184)	(1.258)
dummy 2007	0.207	0.381	-0.721	-3.719***
	(0.836)	(1.036)	(1.153)	(1.319)
dummy 2008	-1.352	-3.151	1.314	-4.566**
	(1.007)	(4.242)	(2.524)	(2.067)
dummy 2009	3.881***	-9.420**	3.813	0.401
	(1.118)	(3.950)	(3.212)	(2.136)
dummy 2010	2.740**	-1.755	0.543	-4.645**
	(1.146)	(4.241)	(2.779)	(1.924)
Observations	324	115	162	180
Number of regions	36	13	18	20
GDP growth pre-crisis effect	-0.397*	-0.842	-0.365	-1.032***
GDP growth effect in 2008	0.204	-1.270	-0.592	-0.801**
2008 effect t-test	1.601	-0.561	-0.323	0.632
GDP growth effect in 2009	0.444	-2.989***	-0.107	-1.343***
2009 effect t-test	2.317**	-2.568***	0.377	-0.922
GDP growth effect in 2010	0.0780	-3.029***	-1.261*	-0.0162
2010 effect t-test	0.803	-1.525	-1.226	2.251**
t-dummies F-test pvalue	0.000	0.029	0.758	0.000

Bootstrapped standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table A8 - LSDVC Estimates by macro-regions, with separate impacts of the crisis years - Female YUR

VARIABLES	Continental	Anglo-Saxon	Southern	NMS
yurf(-1)	0.350***	0.365***	0.902***	0.742***
	(0.0638)	(0.105)	(0.0740)	(0.0607)
GDP growth	-0.0490	-0.280	-0.135	-0.441***
	(0.134)	(0.338)	(0.210)	(0.164)
GDP growth(-1)	-0.198	-0.589*	-0.299	-0.492***
	(0.150)	(0.317)	(0.209)	(0.166)
GDP growth*2008	0.125	0.373	0.367	0.119
	(0.199)	(0.710)	(0.678)	(0.267)
GDP growth(-1)*2008	0.546**	-0.339	-0.803	-0.0842
	(0.275)	(0.695)	(0.884)	(0.293)
GDP growth*2009	0.0698	-1.050	-0.546	0.0121
	(0.231)	(1.352)	(0.758)	(0.233)
GDP growth(-1)*2009	0.112	1.894	-0.0196	0.188
	(0.215)	(1.183)	(0.669)	(0.270)
GDP growth*2010	-0.334	-0.376	-0.627	0.442
	(0.355)	(0.792)	(0.389)	(0.413)
GDP growth(-1)*2010	0.537**	-0.258	0.353	0.272
	(0.265)	(0.580)	(0.630)	(0.245)
dummy 2003	-0.169	0.467	0.0580	0.0929
	(0.618)	(0.761)	(1.205)	(1.127)
dummy 2004	2.029***	0.370	-1.571	-0.180
	(0.687)	(0.679)	(1.163)	(1.130)
dummy 2005	3.448***	0.814	-0.849	-0.518
	(0.649)	(0.625)	(1.174)	(1.196)
dummy 2006	2.273***	1.040	-2.164*	-1.544
	(0.787)	(0.662)	(1.233)	(1.168)
dummy 2007	0.959	1.664**	-0.813	-4.516***
	(0.745)	(0.742)	(1.241)	(1.190)
dummy 2008	-1.089	2.520	2.412	-2.726
	(0.912)	(3.052)	(2.659)	(1.915)
dummy 2009	1.349	-0.492	2.135	-4.012**
	(1.008)	(2.792)	(3.336)	(1.975)
dummy 2010	3.243***	0.678	1.698	-2.684
	(0.988)	(3.113)	(2.852)	(1.790)
Observations	324	115	162	180
Number of regions	36	13	18	20
GDP growth pre-crisis effect	-0.247	-0.870**	-0.434	-0.933***
GDP growth effect in 2008	0.424	-0.836	-0.870	-0.898***
2008 effect t-test	1.981**	0.0609	-0.598	0.102
GDP growth effect in 2009	-0.0644	-0.0255	-0.999	-0.733***
2009 effect t-test	0.559	1.426	-0.792	0.634
GDP growth effect in 2010	-0.0435	-1.504**	-0.708	-0.218
2010 effect t-test	0.382	-0.648	-0.362	1.677*
t-dummies F-test pvalue	0.000	0.521	0.434	0.001

Bootstrapped standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table A9 - LSDVC Estimates by macro-regions, with separate impacts of the crisis years - Male Total UR

VARIABLES	Continental	Anglo-Saxon	Southern	NMS
turm(-1)	0.990***	0.719***	1.179***	0.803***
	(0.0468)	(0.109)	(0.0315)	(0.0527)
GDP growth	-0.0941*	-0.148	-0.128	-0.231***
	(0.0520)	(0.154)	(0.0781)	(0.0657)
GDP growth(-1)	-0.182***	-0.209	-0.0779	-0.300***
	(0.0581)	(0.148)	(0.0789)	(0.0670)
GDP growth*2008	0.113	-0.355	-0.242	0.0677
	(0.0763)	(0.323)	(0.256)	(0.108)
GDP growth(-1)*2008	0.224**	0.190	-0.0490	0.0132
	(0.105)	(0.317)	(0.333)	(0.118)
GDP growth*2009	0.124	-1.694***	-0.136	-0.133
	(0.0893)	(0.628)	(0.279)	(0.0933)
GDP growth(-1)*2009	0.104	1.258**	0.134	-0.0299
	(0.0830)	(0.547)	(0.247)	(0.108)
GDP growth*2010	-0.0144	-0.501	-0.221	0.394**
	(0.139)	(0.373)	(0.147)	(0.164)
GDP growth(-1)*2010	0.262***	-0.298	-0.166	0.172*
	(0.101)	(0.295)	(0.228)	(0.102)
dummy 2003	-0.244	-0.300	-0.0916	-1.637***
	(0.239)	(0.347)	(0.460)	(0.456)
dummy 2004	-0.0877	-0.479	-0.118	-0.0391
	(0.275)	(0.310)	(0.440)	(0.455)
dummy 2005	-0.499*	-0.290	-0.642	-1.019**
	(0.262)	(0.295)	(0.433)	(0.483)
dummy 2006	-1.311***	-0.0343	-0.572	-1.821***
	(0.293)	(0.302)	(0.454)	(0.478)
dummy 2007	-1.591***	-0.403	-0.235	-2.104***
	(0.272)	(0.323)	(0.435)	(0.504)
dummy 2008	-2.084***	-1.330	1.699*	-2.269***
	(0.344)	(1.380)	(0.976)	(0.782)
dummy 2009	0.0508	-3.735***	2.067*	-1.468*
	(0.387)	(1.353)	(1.223)	(0.816)
dummy 2010	-0.819**	-0.991	-0.740	-2.723***
	(0.380)	(1.409)	(1.047)	(0.767)
Observations	324	115	162	180
Number of regions	36	13	18	20
GDP growth pre-crisis effect	-0.276***	-0.357*	-0.206*	-0.531***
GDP growth effect in 2008	0.0609	-0.522*	-0.497*	-0.450***
2008 effect t-test	2.605***	-0.655	-1.069	0.586
GDP growth effect in 2009	-0.0476	-0.793***	-0.208	-0.694***
2009 effect t-test	1.815*	-1.565	-0.00710	-1.288
GDP growth effect in 2010	-0.0284	-1.157***	-0.593**	0.0348
2010 effect t-test	1.199	-1.598	-1.382	3.302***
t-dummies F-test pvalue	0.000	0.158	0.117	0.000

Bootstrapped standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table A10 - LSDVC Estimates by macro-regions, with separate impacts of the crisis years - Female Total UR

VARIABLES	Continental	Anglo-Saxon	Southern	NMS
turf(-1)	0.971***	0.295***	0.970***	0.911***
	(0.0387)	(0.109)	(0.0621)	(0.0498)
GDP growth	-0.115**	-0.175	-0.133	-0.241***
	(0.0569)	(0.126)	(0.0984)	(0.0639)
GDP growth(-1)	-0.105*	-0.124	0.0205	-0.120*
	(0.0614)	(0.119)	(0.0989)	(0.0652)
GDP growth*2008	0.0933	0.204	-0.000736	0.0938
	(0.0834)	(0.263)	(0.320)	(0.104)
GDP growth(-1)*2008	0.00826	-0.321	-0.490	-0.0123
	(0.120)	(0.258)	(0.420)	(0.114)
GDP growth*2009	0.145	-0.377	-0.0632	0.100
	(0.0919)	(0.503)	(0.354)	(0.0910)
GDP growth(-1)*2009	0.0311	0.480	-0.124	-0.0628
	(0.0884)	(0.440)	(0.316)	(0.105)
GDP growth*2010	0.0566	-0.279	-0.229	0.393**
	(0.139)	(0.290)	(0.184)	(0.161)
GDP growth(-1)*2010	0.285**	-0.263	-0.240	0.0469
	(0.113)	(0.214)	(0.295)	(0.0946)
dummy 2003	0.0750	-0.228	-0.328	-0.416
	(0.243)	(0.283)	(0.572)	(0.439)
dummy 2004	0.931***	-0.195	-0.827	0.418
	(0.285)	(0.249)	(0.551)	(0.440)
dummy 2005	0.253	-0.285	-1.395**	-0.00114
	(0.259)	(0.236)	(0.553)	(0.467)
dummy 2006	-0.352	0.235	-1.251**	-1.159**
	(0.296)	(0.242)	(0.588)	(0.458)
dummy 2007	-0.891***	0.280	-1.042*	-1.653***
	(0.299)	(0.264)	(0.593)	(0.476)
dummy 2008	-1.028***	1.026	1.607	-1.400*
	(0.386)	(1.120)	(1.282)	(0.756)
dummy 2009	0.0216	-0.708	1.358	0.0296
	(0.435)	(1.040)	(1.567)	(0.808)
dummy 2010	0.255	0.226	-0.00447	-0.810
	(0.425)	(1.115)	(1.333)	(0.729)
Observations	315	115	162	180
Number of regions	35	13	18	20
GDP growth pre-crisis effect	-0.220***	-0.299*	-0.112	-0.360***
GDP growth effect in 2008	-0.119	-0.416*	-0.603*	-0.279**
2008 effect t-test	0.710	-0.577	-1.418	0.612
GDP growth effect in 2009	-0.0436	-0.195	-0.299	-0.323***
2009 effect t-test	1.364	0.469	-0.557	0.306
GDP growth effect in 2010	0.122	-0.841***	-0.581*	0.0791
2010 effect t-test	1.614	-1.491	-1.316	2.659***
t-dummies F-test pvalue	0.000	0.174	0.047	0.000

Bootstrapped standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1