Youth Labour Market Performance in European Regions

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Abstract

The aim of this paper is to analyse key evidence on EU regional (NUTS-2 level) differences and changes in youth labour market performance. In the first part of the paper we provide some key theoretical background. Then, after some basic descriptive and sigma and beta convergence analysis, we investigate regional youth unemployment rates determinants econometrically by means of dynamic spatial panel techniques (1999-2006). The analysis is carried out for 248 EU regions, but we also distinguish the two samples of western and eastern regions.

Outcomes provide some new evidence and highlight interesting differences in the determinants of male and female youth unemployment, especially if the east/west sub-samples of regions are considered. This may favour a better understanding of the complex regional youth labour market performance and dynamics in enlarged EU with important policy implications at different levels.

Keywords: Youth labour market, Regions, Eastern and Western EU countries

JEL Classification: J21, J13, R23, P50

(English not revised)

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1. Introduction

The integration of young people in the labour market is a key policy issue of the European Employment Strategy. In particular, the European Employment Guidelines, included in the "Jobs and Growth" package adopted by the European Council in 2005, call for intensified efforts to build employment pathways for young people and to reduce youth unemployment. Beyond promoting more and better investment in human capital, the guidelines also include targets for the reduction of early school leaving and for a "new start" within six months of unemployment for unemployed youth. Youth employment issues have also been given a higher profile in the Commission's Strategic Guideline for Cohesion for the period 2007-2013 as well as in the new European Social Fund regulation. Finally, in the 2007 Communication on Promoting young people's full participation in education, employment and society, the Commission underlined the need to promote the labour market integration of youth in the larger context of general employment policies (flexicurity). In addition, the reduction of regional (and gender) disparities is one of the traditional objective of the European Union in order to favour "economic and social cohesion" and equal job opportunities.

The objective of this paper is to provide some empirical evidence on youth labour market performance and dynamics for an extensive set of EU regions. To this aim, in the next section we provide an outlook of the various fields of the literature involved in the study. We then present (section 3) descriptive empirical evidence on regional youth unemployment rates differences and changes throughout European NUTS2 regions. Section 4 is the empirical part of the paper, aimed at investigating the determinants of youth unemployment rates: there we introduce the explanatory variables used and discuss their expected impacts on the basis of some specific literature; then we illustrate the econometric approach and the results obtained. In the section 5 we provide some final remarks. Throughout the whole empirical analysis we assign prominent importance to gender and geographical (east/west) specificities.

2. A Bird's Eye View of the Fields of the Literature Significant for the Study

A huge theoretical and empirical literature exists on the determinants of different labour market performances and dynamics in Europe. Here we just present a small part of the (empirical) literature by focusing on (i) youth labour markets and (ii) regional (sub-national) labour markets. More specific aspects and contributions are dealt with in section 4.1, where we illustrate the explanatory variables used in the empirical models and their expected effects on youth labour market. In the existing literature, the two subjects have been generally considered as separate topics, mainly due to limitation in the data availability, and considering single countries or separate geographic areas.

As regards youth labour market analysis, a preliminary methodological point concerns the definition of "youth": although the official statistics tend to focus on the group aged 15-24 (as we do in this paper), a large debate exists on the pros and cons of various definitions of youth and on their consequences in the study of labour market performance and dynamics (e.g., Lefresne, 2003; O'Higgins, 1997). We now briefly review few innovative researches carried out for the European context.

As for the empirical literature that takes into account of theoretical aspects, Caroleo and Pastore (2007) focus on the role of "youth experience gap" as the key factor for explaining youth unemployment and they classify EU countries into five groups according to the mix of policy instruments (including different degrees and types of labour market flexibility), of educational and training systems, of passive income support schemes and fiscal incentives. Quintini et al. (2007) investigate the changes in the school-to-work transition process in OECD countries by highlighting also the persisting differences between youth and adult unemployment rates (the first rate is generally more than two times higher than the second one). Clark and Summers (1982) analyse the determinants of the higher flows in and out of unemployment for young compared to adult people. O'Higgins (2003) investigates the trends in youth labour market in developing and transition countries and highlights the main difficulties of integration of young people into "decent work". He also highlights that falls in the youth share in the labour force can be due to falling rates of labour force participation on the part of young people determined by increasing level of education participation[1]. For this reason the employment rate indicator (increasingly used as a key indicator for the population aged 15-64) presents obvious limitations if referred to young people (especially 15-24). However, it has been also

[1] As for the influence of education and training systems on participation of young people in labour market of Central and Eastern European countries, see Domadenik and Pastore (2006).

acknowledged that the youth unemployment rate[2] can be affected by important limitations (e.g. Ryan, 2003), especially when other key variables are not used as controls. In recent years (e.g. OECD, 1999; O'Higgins, 2001) new formulations of youth (non-)employment rates have been introduced[3]. In addition, O'Higgins (2003) highlights the importance of considering (i) the youth employment "quality" in terms of wage, weight of the informal sector and underemployment and (ii) the existence of "state dependence" concerning the complex role of "child labour" (e.g. ILO, 2002) and the persistence of youth unemployment (e.g. Heckman and Borjas, 1980; Ryan, 2001). Some authors investigate the role of short-term contract regulations (e.g. Nunziata and Staffolani, 2007), the impact of institutional settings (e.g., Kolev and Saget, 2005; Newmark and Wascer, 2004; Bassanini and Duval, 2006), in particular minimum wage regulations (e.g., Neumark and Wascher, 1999; Abowd at al., 1997) and temporary jobs (e.g. Booth et al, 2002; Quintini and Martin, 2006) in affecting youth labour market performances.

Many authors consider explicitly the effects of demographic composition and changes: for example, Flaim (1990) shows the negative effect of "baby boom" on unemployment rates; differently, Shimer (1999) finds that a larger youth population share reduces total unemployment rate and raises labour force participation by young people; Korenman and Neumarl (1997) analyse the impact of the youth share of population on youth unemployment, finding that its role its overwhelmed by the effects of aggregate economic conditions;

As for the determinants of differences and dynamics in European regional labour markets, the existing literature generally distinguished the two blocks of transition countries (e.g. Huber, 2007; Marelli and Signorelli, 2008) and old EU-15 countries (e.g. Perugini and Signorelli, 2007), with few exceptions (e.g. Caroleo and Destefanis, 2006; Marelli, 2007; Perugini and Signorelli, 2004).

Considering the empirical literature on transition countries[4], a part of the literature focuses on sigma and beta regional convergence. Boeri and Scarpetta (1996) show the large increase in regional labour market disparities and others (e.g. Smith, 1998; Gorzelak, 1996; Petrakos, 1996; Römisch, 2003) present evidences on sigma divergence of unemployment, wages and GDP per capita for the Central and Eastern European countries. Perugini and Signorelli (2004) and Marelli (2004a and 2007) consider both sigma and beta convergence in old EU and new-EU (transition) countries. As for the literature considering also a theoretical perspective, Ferragina and Pastore (2006 and 2008) present interesting surveys and results explaining the high and persistent disparities in regional unemployment rates in relation with the optimal speed of transition theory (Aghion and Blanchard, 1994 and Boeri, 2000). Huber (2007) surveys the empirical literature on regional labour market development in transition, especially focusing on the evidence of increasing regional disparities and polarisation on capital cities and regions closer to EU-borders. An additional survey on the "mystery" of regional labour market performance differentials can be found in Elhorst (2003). Some authors highlight the importance of the regional differences in initial conditions. Scarpetta (1995) showed that transition particularly affected the regions in which the planned economy had concentrated the largest part of economic activities (especially in the manufacturing sector), while Gorzelak (1996) stressed the importance of the regional distance from the core of Europe. Other authors focused on the role of the degree of restructuring affected by the depth and speed of the reform process: Newell and Pastore (2000) showed that when unemployment is positively related to workers' reallocation across regions, spatial unemployment differentials increase and the main reason is to be found in a different degree of industrial change. In order to explain regional unemployment, Boeri (2000) especially focused on the geographical immobility of workers (caused by lack of housing in potential destination area) and the existence of wage rigidities. Similarly, Fidrmuc (2004) highlighted the scarce role of migration in reducing regional disparities in the CEECs. Many

[2] It should be reminded that the negative consequences of unemployment are largely associated with lengthy spells of unemployment and, for that reason, the long-term unemployment rate is a useful index to be considered (e.g. O'Higgins, 1991; Perugini and Signorelli, 2007).

[3] The youth non-employment rate can be defined as the ratio between young people not in employment (minus young people in education) and youth population (minus young people in education). A similar youth employment rate can be defined as the ratio between employed young people and youth population (minus young people in education).

[4] As showed by Kornai (1980 and 1992), the situation before transition was characterised by chronic labour shortage (over-employment with low productivity), especially in the more developed and industrialised (CEECs). The same author (Kornai, 2006) also highlights that the new unemployment phenomenon emerged in early stage of transition was largely unexpected in its main characters (two digits levels and wide regional differences); moreover, it was wrongly considered of short duration by the initial (optimistic) theoretical models of transition (e.g. Aghion and Blanchard 1994).

other authors attempt to identify the mechanisms of regional labour market adjustment in transition (e.g. Bornhorst and Commander, 2006; Huber, 2004; Gacs and Huber, 2005).

As for the old EU member countries, the literature on regional labour markets is very extensive and a review of it is normally the core of a paper (e.g., Elhorst, 2003). We recall here only few recent studies.

Marelli (2004b) used national and regional data to compare the speed and synchrony of employment changes at different territorial levels across Europe. A previous study (Marelli, 2000), in a long-term perspective, focused on σ and β convergence in the employment levels of regions in some EU-12 countries during various sub-periods. A similar study was carried out for eastern and western European regions bt Perugini and Signorelli (2004). A very famous study which used employment data to investigate regional differences in Europe is that of Decressin and Fatàs (1995). Similarly, using unemployment rates, Overmans and Puga (2002) showed a polarization of the EU NUTS-2 regions toward the highest and lowest levels during the period 1986-1996. An interesting example of research able to connects sectoral and institutional aspects to regional unemployment in Europe is Longhi et al. (2005). Perugini and Signorelli (2007) present evidences on regional differences and dynamics according to both employment and unemployment indicators; Montuenga et al. (2006) adopt a regional perspective for investigating the wage curve and measurement of wage flexibility, and Sudekum (2006) uses some stylised facts of EU-15 regions to present a theoretical model combining a wage curve with increasing returns technology. In addition, Bollino and Signorelli (2003) consider the institutions as a particular and complex factor of production affecting regional production structures and employment performances, while Monastiriotis (2006) present a set of labour market flexibility indicators at sub-national level. Caroleo and Coppola (2005) confirm the importance of institutional variables to explain EU regional unemployment disparities.

As already noted, in the existing literature the two subjects of youth and regional labour markets have been generally considered as separate topics and, usually, for separate countries or blocks of European countries, while a key innovation of this paper is to investigate the regional dimension (at NUTS-2 level) of youth labour market performance in the enlarged European Union.

3. Descriptive Empirical Evidence

Data on youth unemployment rates are drawn from Eurostat on line database and refer to 248 regions of 26 EU member countries (Bulgaria was excluded due to many missing data on various variables). 241 regions are from the old EU-15 countries plus Cyprus and Malta (this set is named WEST-17); 47 regions are from the 9 new EU members of Central and Eastern Europe (CEE-9). All data are available from 1999 to 2006; few missing data were reconstructed by linear interpolation. The list of variable and their definitions are reported in Table A1 in the Appendix. We focus here on regional total, male and female youth unemployment rates (YUR, MYUR and FYUR, respectively), for which we first of all provide the traditional descriptive statistics, also distinguishing the two geographical sub-sets. We employ the UN definition of young people as those belonging to the 15-24 age group which, although fairly rigid, may be considered reasonable and useful for comparisons across time and regions (O'Higgins, 2003). This age definition implies that the persons included may hold at maximum a first stage tertiary education level (corresponding to ISCED 5b level); therefore, the highest levels of formal education (5a and 6) are excluded. In interpreting empirical evidence it should be born in mind that the YUR is affected by all the problems related to general unemployment rates (in particular the definition of unemployment and the role of discouragement effects); however, in the case of youth unemployment some specific problems, as underemployment and informal sector employment, may even be more serious (O'Higghins, 2003).

Average values of YUR for the EU-26 regions are particularly high and plot a U-shaped pattern during the period considered, with a decreasing trend until 2001 and a subsequent growth which led the mean and median values in 2005 very close to (or above) the initial levels; in 2006 a new decreasing trend seems to begin (table 1). This was accompanied by a remarkable decrease in variability of regional labour market performance, as testified by the sharp drop in the coefficients of variation. If we consider the two sets of western and eastern regions separately, we observe a similar pattern for the WEST-17 regions for the mean levels of YUR only; its median levels showed instead an almost monotonic increase, reaching in 2006 a level 2% higher than in 1999. Mean YUR in eastern regions followed a U-inverted path, rising above 28% in 2002; the median value was instead very unstable until 2003; afterwards, it seems to have stabilised at about 24.7% (+2% compared to 1999). For both sub-samples also regional YUR dispersion decreased, but more weakly in eastern Europe. The east-west gap is in 2006 at about 6% and 9% in terms of mean and median value, respectively; however, this difference widened up to 13% during the period considered.

Table 1.
Descriptive statistics for Youth Unemployment Rate (YUR)

	1999	2000	2001	2002	2003	2004	2005	2006
				EU-26				
Mean	19.17	17.95	17.06	17.95	18.49	18.87	19.18	17.97
Median	16.38	15.12	13.56	14.53	15.48	16.74	17.06	16.26
Minimum	2.42	3.28	2.00	3.39	2.03	5.54	6.17	3.80
Maximum	66.20	63.42	59.79	59.46	58.42	49.12	46.09	38.98
Coeff. Var.	0.639	0.671	0.705	0.670	0.617	0.521	0.472	0.441
				WEST-17				
Mean	18.09	16.17	14.72	15.51	16.40	16.80	17.61	16.84
Median	13.85	12.69	11.78	13.04	14.13	14.81	16.14	15.48
Minimum	2.42	3.28	2.00	3.39	2.03	5.54	6.17	3.80
Maximum	66.20	63.42	59.79	59.46	58.42	49.12	46.09	38.98
Coeff. Var.	0.692	0.720	0.712	0.651	0.603	0.487	0.450	0.439
				CEE-9				
Mean	23.76	25.55	27.07	28.43	27.42	27.69	25.93	22.80
Median	22.64	24.42	22.97	26.14	23.17	24.71	24.72	24.77
Minimum	7.50	8.26	7.16	8.57	7.72	9.42	9.11	7.96
Maximum	53.18	46.60	48.81	54.57	51.53	47.91	45.00	36.60
Coeff. Var.	0.414	0.424	0.486	0.491	0.478	0.413	0.407	0.367

Source: elaboration on Eurostat online database

In order to help explaining these complex evolutions, we provide K-density estimations of the distributions of YUR in the initial and final year for the three sample (Figure B1 in the appendix, top panels). While in the case of WEST-17 regions, the shape of the distribution clearly represent the stability of the median values accompanied by marked sigma convergence, the K-density for the CEE-9 sample highlights that the weak sigma convergence revealed by the coefficient of variation hided a more complex pattern of club sigma convergence around two different levels of YUR. The distribution is indeed now more compact, but a minority of regions clustered around a median value of about 15%, whereas most of the remaining ones fall between 30 and 40%. This polarisation can also be deduced by Lowess beta convergence diagrams (see Figure B2, top panels). While for the three samples the non-linearity of the negative relationship is clear, in the case of the eastern regions a different slope seems to emerge for the low and high YUR regions in 1999. For the first one, the convergence rate is faster (and probably produces the first cluster of regions with YUR in 2006 lower to average YUR in 1999); for the second ones the rate is slower and probably shapes the second cluster of regions around a higher YUR level.

As regards the gender differences (Tables B1 and B2), the gap between average female and male UR remained quite stable (at about 3%) over the period considered for the whole sample (EU-26); this was not the case of the median values, which were quite close during the period and with FYUR below MYUR in 2002 and 2003. Again the sharp decrease of the coefficient of variation highlights marked sigma convergence. Similar patterns are observed for the sub-sample of the western regions, whereas in the CEE-9 regions average and female unemployment rates were steadily below those for male, the only exceptions being the year 2006; again, the sigma convergence pattern is relatively weak.

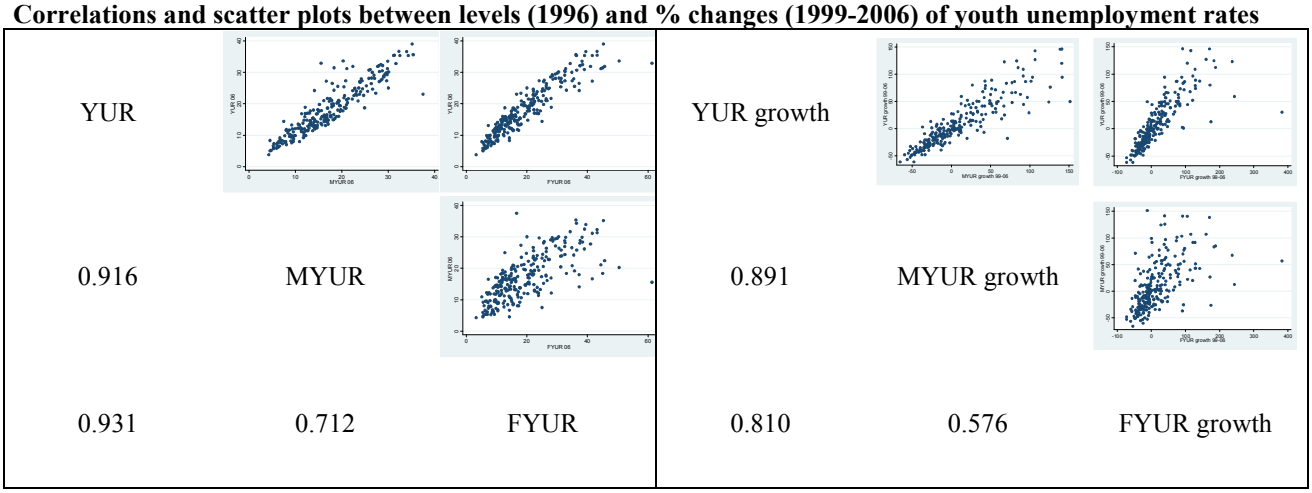
A feature common to both WEST-17 and CEE-9 regions is that male and female average unemployment rates decreased slightly (about 1 p.p.), whereas the median level increased (of about 2 p.p.). However, the processes behind these evidences seem quite different. For the WEST-17 regions this was probably the outcome of the joint existence of a sigma convergence trend (in particular the disappearance in 2006 of the right long tail of the distributions in 1999, see Figure B1, central and bottom panels) and of a generalised shift forward of the distribution. This means that the regions with a very bad labour market performance in 1999 were reabsorbed (towards the average levels) during the 8 years considered, but this was accompanied by a general worsening of the youth unemployment rates. The K-densities for the CEE-9 regions also highlight a narrowing of the distribution, which may account for the drop of average MYUR and FYUR; however, a bimodality of the distributions emerges again, with higher density in the groups of bad performing regions (especially in the case of males), which may account for the worsening of the median FYUR and MYUR). The outcomes of parametric and non parametric estimates of beta convergence (Figure B2, central and bottom panels) show again a significant and negative beta convergence trend of gender

unemployment rates, with features specific to the two sub-samples which are analogous to those commented for total youth employment rates.

Some final descriptive features are provided by means of correlation measures and scatter plot diagrams.

Both diagrams and the correlation indexes in Figure 1 highlight a strong and significant correlation between total and gender youth unemployment rates, at both static and dynamic level. Similarly, FYUR and MYUR are also positively (although relatively more weakly) related. This means that in the regions considered a relatively good/bad performance of male youth labour market is closely associated by a relatively good/bad performance of female youth labour market.

Figure 1.
Correlations and scatter plots between levels (1996) and % changes (1999-2006) of youth unemployment rates



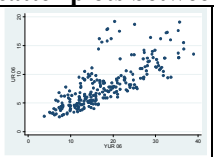
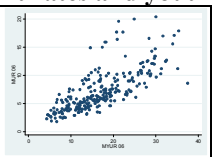
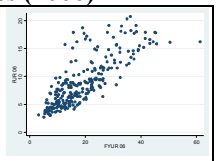
Note: all correlations are significant at 1%

We also highlight (Figure B3 and B4 in Appendix) the not surprisingly negative and significant correlations existing between youth unemployment rates and youth employment rates in both static and dynamic terms. This means that the regions with higher youth unemployment rates tend to have lower youth employment rates, and *vice versa*. Similarly, the regional labour market performance improvement or worsening (period 1999-2006) tend to occur in both youth unemployment and youth employment rates, although the correlations are weaker compared to those in levels. Therefore, for example, reductions in youth unemployment rates are only partly translated in increases in youth employment rates[5].

In figure 2 the levels of correlation (year 2006) of the youth and total unemployment rates (UR, MUR, FUR) show relatively good/bad general labour market performances are associated to relatively good/bad youth labour market performance, and *vice versa*. In other words, where the labour market is in general more efficient, it is also able to include relatively more young persons. The positive and significant correlation between youth and total unemployment rates is confirmed also in dynamic terms (1999-2006) (Figure B5 in Appendix). The above correlations are consistent with a large and stable empirical evidence (e.g., O'Higgins, 1997; Gaude, 1997; Kolev and Saget, 2005), and suggest that the reduction of youth unemployment rates will largely depend on economic and institutional factors and policies able to improve the general labour market performance dynamics.

[5] The difference between the two dynamics is explained by changes in youth participation rates (e.g., an increase in full-time schooling participation produces remarkable and complex effects on youth participation, unemployment and employment rates). For a general discussion on the different labour market performance indicators and on the relationship between employment, unemployment and participation rates, see Perugini and Signorelli (2007).

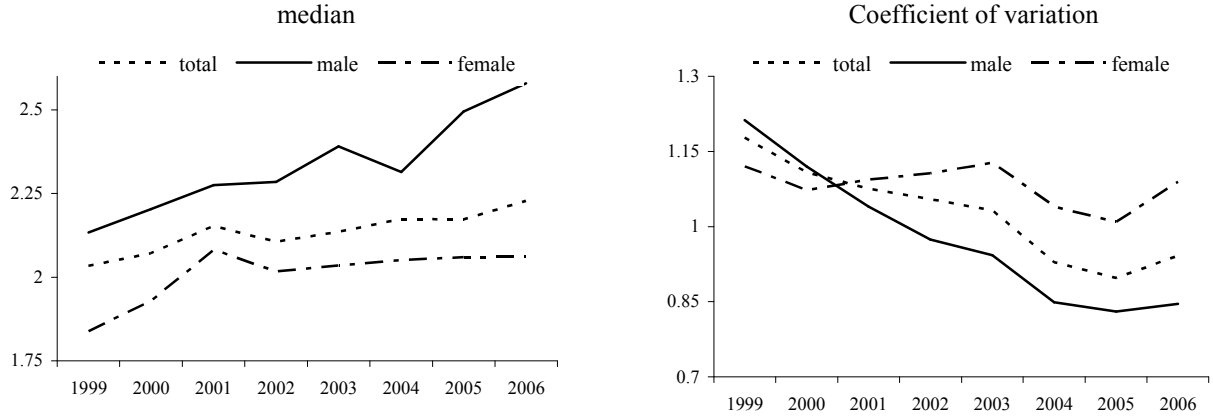
Figure 2.
Correlations and scatter plots between total unemployment rates and youth unemployment rates (2006)

UR		MUR		FUR	
0.761	YUR	0.744	MYUR	0.796	FYUR

Note: all correlations are significant at 1%

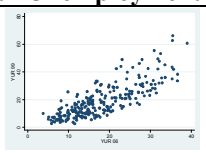
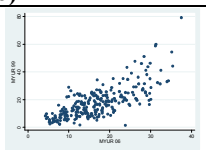
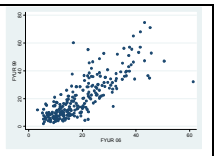
If we compare median YUR and UR, we see that their remarkable distance (YUR is on average twice UR, also for males and females) has tended to increase over the period considered, especially for males (Figure 3). So, in the period 1999-2006, the well-known "unemployment problem" in (some) EU countries and regions further became (especially) a question of high youth unemployment rates. As regards regional variability, the decreasing trend of the ratio between the coefficient of variation clearly indicate that regional dispersion of youth unemployment rates dropped steeply compared to unemployment rates, especially in the case of males. Only for females regional differences of youth unemployment are still above total unemployment differences and this may indicate that the usually lower geographical mobility of women plays a relatively weaker role in closing spatial gaps. Similar patterns emerge for the subsamples of western and eastern regions (not reported here for the sake of brevity), with one notable exception: in the CEE-9 regions the ratio of the coefficients of variation is steadily below one, again suggesting a possible stronger role of youth mobility in mitigating regional differences in eastern Europe. However, this indirect evidence cannot be tested due to unavailability of data on regional youth migration.

Figure 3.
Ratio of youth to total unemployment rate medians and coefficients of variations (EU-26 regions)



In figure 4 we illustrate the strong temporal persistence of regional youth labour market performance, correlating and plotting youth unemployment rates at the beginning and at the end of the period considered.

Figure 4.
Persistence of Youth Unemployment rates (1999 and 2006)

YUR 1999		MYUR 1999		FYUR 1999	
0.807	YUR 2006	0.745	MYUR 2006	0.809	FYUR 2006

Note: all correlations are significant at 1%

The large existing evidence of spatial dependence of regional labour market performances in Europe (e.g., Overmans and Puga, 2002; Niebuhr, 2003; Burridge and Gordon, 1981; Mohlo, 1995; Badinger and Url, 2002; Aragon et al., 2003; Blanchard and Katz, 1992; Decressin and Fatàs, 1995; Elhorst, 2003; Perugini and Signorelli, 2007) suggested the explicit consideration of spatial autocorrelation patterns. In general terms, spatial autocorrelation occurs when the value assumed by a variable in a given place is correlated (positively or negatively) with the value assumed by the same variable in a different place or in a set of different places (typically in its neighbourhood). This may be due essentially to: (a) measurement errors for observations referring to contiguous geographic units; (b) actual spatial interaction patterns. Spatial interaction may be highlighted descriptively, e.g., with the classical Moran I spatial correlation index. Its detection is also crucial for obtaining reliable econometric results, and should be treated by means of specific techniques (see next section). The technical precondition to the calculation of spatial autocorrelation is the availability of a weights (or spatial lags) matrix able to express the connections between the geographic units in question. We considered here the matrix of the inverse geographical distance between the capital city (or the most highly populated city) of each region. Table 2, consistent with the existing literature on labour market performances, shows the existence of positive and significant spatial autocorrelation also for youth unemployment rates.

Table 2. Dynamics of Moran's spatial correlation index in EU-26 regions

	1999	2000	2001	2002	2003	2004	2005	2006
YUR	0.239	0.282	0.335	0.385	0.367	0.383	0.314	0.271
MYUR	0.193	0.248	0.325	0.406	0.382	0.383	0.308	0.238
FYUR	0.265	0.290	0.319	0.347	0.321	0.349	0.287	0.274

Note: all correlations are significant at 1%

4. The Determinants of Regional Unemployment Rates in Europe

In this section we provide econometric estimates of the determinants of youth unemployment rates across European regions. We first describe the data and variables considered and their expected relationship with youth unemployment rates (section 4.1). The objective here is to give only a general idea of the possible effects played by different factors, which may be quite complex, controversial, and strongly dependent on the regional contexts (e.g., eastern *versus* western members) and on the unemployment segment (male versus female) considered. We will go more into details when discussing the empirical outcomes obtained. In section 4.2 we present the econometric approach and the empirical model and then the results obtained (4.3).

4.1. Data, Variables and Expected Relationships

As already mentioned, due to the constraints to data availability, we are able to consider here only a few of the potential factors affecting youth labour market performance. We use as dependent variables youth unemployment rates (total, male and female), which are available for the 248 regions considered for the period 1999-2006. Mainly drawing from the Eurostat Regio dataset (all statistics except Lab_comp, supplied by Cambridge Econometrics), we built a panel dataset and we were able to consider the explanatory variables listed in table A1 of the appendix. Among the most important missing information we mention youth labour mobility, youth wages and education levels, and the various important specific institutional settings (in particular minimum wage norms, employment protection legislation, systems of unemployment compensation and work incentives), which are also very difficult to consider in a regional panel analysis due

to low or inexistent time and cross-section variability. However, as regards institutional variables, their not explicit consideration is connected to our econometric approach (see section 4.2), which is able to account for spatial patterns emerging from the data itself: This strategy is alternative, and preferable if institutional aspects are not the focus of the paper, to imposing arbitrarily ex ante geographical constraints, for example in the form of group of country dummy variables or country level scores.

The first set of them refers to the regional industry structure and is first of all composed of the employment shares of six NACE subsectors[6]. Unfortunately, deeper sectoral detail was only available for a restricted set of regions (of some western EU countries), and we decided to privilege the geographical scope of the analysis. We also included among the explanatory variables a classical measure of relative specialisation (a dissimilarity – or Krugman - index, which compares the sectoral distribution of employment relative to the average distribution of the sample considered, and grows as the regional industry mix is more specialised compared to the benchmark situation), and a turbulence index (TURB) which grows as the regional sectoral structure changes over time (year by year in our case). The formal expressions of the two measures is reported in table A1. Finally, we also considered a statistic information recently released by Eurostat, HRST, which is the share of persons occupied in science and technology sectors (HRST) [7] out of total population. This may be considered as a proxy of regional labour demand for highly skilled workers (independent of their formal level and education), and so of the skills/knowledge intensity of labour demand.

Considering our definition of "youth" (persons aged 15-24), it may be expected that regional structural sectors biased towards low-skilled/low compensation sectors are more inclusive of young un-experienced (Pastore and Caroleo, 2008) and not highly skilled workers (Quintini and Martin, 2006). Therefore, a labour demand biased towards scientific and technological skills (HRST) should harm our cohorts of young workforce. Unfortunately, our industry breakdown does not allow to distinguish properly these sectoral features; moreover, we should also consider the great variety of socio-economic context included in our study, i.e, the same industry aggregate might demand very different tacit and codified knowledge in a developed "high tech" region with respect to a region that attracted low skills segments of productive processes. This in particular applies to manufacturing industries (and so CDE), for which we may expect different outcomes for the CEE and WEST samples. Lower unemployment rates should be found for the regions more specialised in the primary sector, constructions, and in the prevalently low-skilled market services (GHI); *vice versa* we expect a positive relationship of UR with specialisation in JK. Similar relationship may be hypothesised between LQ and youth unemployment, since the access to services mostly supplied by public administrations is usually very difficult at early working ages.

As regards the impact of industry concentration/diversification (Krugman index), we rely on the approach followed for example by Frenken at al. (2007), who basically emphasise how sectoral variety may in general reduce unemployment risks due, since, as in the basic portfolio theory (Markowitz, 1952), diversification allows absorbing adverse shocks less painfully (e.g., Duranton and Puga, 1999; Malizia and Ke, 1993; Munro and Schachter, 1999). Since young workers may be usually thought as relatively more sectorally mobile workforce segment, a variety of employment opportunities may contribute to enhancing their employment opportunities. On the other hand, regions with more strongly characterised by one or few

[6] AB (Agriculture, hunting, forestry and fishing); CDE (Total industry, excluding construction); F (Construction); GHI (Wholesale and retail trade, repair of motor vehicles, motorcycles and personal and household goods; hotels and restaurants; transport, storage and communication); JK (Financial intermediation; real estate, renting and business activities); and L to Q (Public administration and defence, compulsory social security; education; health and social work; other community, social and personal service activities; private households with employed persons; extra-territorial organizations and bodies).

[7] HRST, used here, includes the following categories of workers:

- *professionals*, i.e., workers whose main tasks require a high level of professional knowledge and experience in the fields of physical and life sciences, or social sciences and humanities;
- *technicians and associated professionals*, i.e., workers whose main tasks require technical knowledge and experience in one or more fields of physical and life sciences, or social sciences and humanities.

These types of occupations typically require successfully completed education at the third level, corresponding to the International Standard Classification Education (ISCED) levels 6, 5a and 5b. However, whether the people involved have or do not have this formal education (e.g., they have formal education below ISCED class 5b) is irrelevant, as those in these occupations are automatically considered as belonging to HRST. Therefore, the advantage of using this Eurostat classification consists of capturing the tacit knowledge of highly qualified and experienced blue-collar workers occupied in complex tasks, and of considering them as provided with informal education as skilled labour. The field of study of the persons considered in HRST are the following: natural sciences; engineering and technology; medical sciences; agricultural sciences; social sciences; humanities; other fields.

industries are more exposed to asymmetric shocks; at the same time, these context may be characterised by higher concentration of knowledge and abilities specific to the important industries. The impact of this factor on youth likelihood to get job positions may be ambiguous; on the one hand, the higher demand for specific skills increases the opportunity cost of hiring inexperienced workers; on the other hand, if the mechanisms of transmission of knowledge and skills happens largely through informal and extra-work channels (as in the case of the industrial districts), a growing specialisation may be associated to easier access of (formally) low and medium skilled workers. Moreover, the diversity of labour market institutions may favour a positive relationship between diversification and unemployment, as explained by Longhi et al. (2005). If, as underlined by a very extensive literature, a productivity gap exists between firms located in specialised areas with respect to those in diversified settings (see Perugini et al., 2008 for an attempt to summarize this literature), collective bargaining carried out at sovra-regional or sectoral level may set minimum wage levels (or working conditions) not affordable for low-productivity firms, so curbing employment in diversified regions.

As for the index of industrial turbulence (Turb), sectoral reallocation processes are usually accompanied by an increase of structural unemployment of certain labour segments, and this may be hypothesised to affect negatively youth employment both directly and indirectly. A share of displaced jobs may indeed be of young workers; moreover, structural unemployment and a general worsening of labour market conditions may hit indirectly young workers, rendering their hiring relatively less profitable in the presence of available cheap adult unemployed, more endowed with non-specific skills. Of course the effect of labour reallocation on youth employment depends on its causes and on the changes induced on labour demand. For example the consequences of the hypothesised process of skill-biased technical change (SBTC) typically favour highly skilled labour, which, however, cannot be considered properly included in our defined cohort of youth[8]. Similarly, the restructuring process that accompanied transition in eastern Europe undertook many different trajectories, related to the position assumed by the regional economic system in the international division of labour (see, among many others, Newell and Pastore (2000), Huber (2007), and Ferragina and Pastore (2008). In the CEE countries, also the effects of different speeds of firms restructuring on youth unemployment has been analysed (Kolev and Saget, 2005), although with no clear empirical evidence; a slow process may have preserved existing jobs and the welfare of senior workers at the expenses of young people; at the same time rapid restructuring may generate the discussed structural unemployment effects, with an even worse net outcome. Similarly, no clear evidence exists of the presumed beneficial effect on young workers of private sector development, for which their profile was thought more suitable.

The second important set of explanatory variables is composed of two indicators (Part_y and Temp_y) aimed at representing the importance for the regional system of the two options of part time and temporary employment. These data are directly available at regional level without any age disaggregation, which is instead available at national level; therefore, regional youth and part-time employment rates have been calculated assuming that the share of young temporary workers (male and female) on total sector employment at regional level is the same as the national one.

Temporary and part-time jobs are very and increasingly common when youth enter the labour market for the first time (see, for example, Quintini et al., 2007, for empirical evidence about OECD countries). This clearly happens because these contracts assure higher flexibility on the labour demand side with regards to output fluctuations, reduce the risk related to the information asymmetry on the non observable quality standards of the worker (OECD, 2004), and usually pay lower wages (Booth et al., 2000). Moreover, according to a mainstream approach to youth unemployment, temporary and part-time jobs offer the opportunity to bridge the so-called experience gap. This empirical and theoretical evidence would suggest a negative relationship between the diffusion of these contractual options and unemployment rates; however, much depends on the fact that these jobs are or not strict substitutes for permanent/full time jobs, which is ultimately related to the general conditions of the labour market. For example, Quintini and Martin (2006) show that part-time work is accompanied by low unemployment when it is mostly voluntary (as in Denmark and the Netherlands in the last decade), and *vice versa* (Belgium and France). Moreover, some empirical evidence and sound theoretical arguments (see Caroleo and Pastore, 2008) challenge this conjecture, arguing that: (i) increased flexibility has a positively impacts selectively on unemployment, favouring only the most skilled and motivated job seekers; (ii) short term contracts only contribute to filling the generic knowledge gap, since firms have no incentive in investing in specific human capital; and (iii) often short-term contracts

[8] Only a minor share of the young population considered (15-24) can have indeed already attained tertiary education.

are not a stepping stone to permanent positions, but rather a low-quality employment trap (Booth et al., 2002).

We also included in the regressions a measure of self employment (self) which is unfortunately not available for the youth segment and by gender. If in general high self employment can be associated with high employment (unless it is a residual choice, i.e., the inverse causality direction holds), we do not expect a clear negative relationship with youth unemployment, since it usually includes entrepreneurs and professionals which are older than our youth age definition (15-24).

Unemployment rates clearly depend on participation rates into the workforce, since an exogenous increase in labour supply may exceed available jobs and result in higher unemployment. However it is well-known that this relationship is quite ambiguous, since high unemployment may discourage participation into the labour force and, in the case of youth, suggest for example to stay in education and improve job's prospects. Consistent with other empirical works (Korenman and Neumark, 1997), we use here a measure of youth/adult population ratio (share of population aged 15-24 out of total working age population) to control for this crucial supply side determinant of youth unemployment (O'Higgins, 1997; 2001).

The level of per capita GDP (in PPP) was also included to represent the regional level of development in the cross-section sense and an indicator of general cyclical economic conditions on the time dimension. The empirical and theoretical literature has highlighted a strong responsiveness of youth unemployment rates (higher that that for adult UR) to changing economic conditions; this is due to supply side factors, i.e., young people are usually more likely to quit voluntarily their jobs then older people, also during recessions (O'Higgins, 1997). Undoubtedly, demand side consideration are prevalent, since firing a young worker in adverse cyclical conditions is relatively easier due weaker protection of youth employment and lower costs (in terms of forgiven training and knowledge investments) suffered by firms.

We were also able to consider, as a control variable, a regional measure of labour compensation per employee, which is not available unfortunately for the segment of youth. This prevents considering the important effects of the adult/youth wage gap, which would also supply important information on the complementarity / substitutability of the two labour inputs (O'Higgins, 1997). If we assume that this proxy of average labour cost is proportional to those of young and adult groups, than it might be expected to be positively correlated to youth (and also adult) unemployment. Other control variables included in the analysis are the average number of the hours weekly worked and population density. The first one, if assumed proportional for the youth and adult segment, should be positively related to youth (and adult) unemployment; as regards the second variable, this should capture the urban/rural scale and account for the possible urban effects not already controlled for (we indeed already considered explicitly some features associated with urban areas, i.e., the attraction of young people, the industry diversification, high skilled labour demand).

4.2. Econometric Approach

The econometric approach used to test the determinants of youth employment rates has to be able to face various important questions. As already mentioned, we were able to consider a panel dataset, composed of 248 groups (regions) and 8 years. Within the family of data panel econometric techniques, our approach needs to simultaneously consider: (i) the time persistence of our dependent variables (see table 3 for descriptive evidence); (ii) the spatial structure of the dependent variables (table 4); and (iii) the possible endogeneity of various explanatory variables. The approach able to address simultaneously the three points is the system GMM estimator (Arellano and Bover, 1995; Blundell and Bond, 1998; Roodman, 2006). Indeed, it allows introducing dynamics into the panel model obtaining unbiased and consistent outcomes also with relatively short-time panels; it allows considering potential endogeneity of explanatory variables; and, most importantly, as shown by Hong, Sun and Li (2008), the system GMM method can be employed in order to include in a dynamic model, the spatially lagged dependent variable, therefore eliminating this otherwise potential and powerful source of omitted variable bias (e.g. Anselin, 1988, 1999; Atzeni *et al.*, 2004)[9].

Our basic empirical model is:

[9] Unfortunately, software routines to run dynamic panel data models with spatial autocorrelation are not yet fully available, although an increasing literature is developing on this econometric branch (see, for example, Yu 2007).

$$
\begin{aligned}
&YUR_{r,t} = \\
&\gamma(YUR)_{r,t-1} + \rho W(YUR)_{r,t} + \\
&+ \alpha_1(IND_j)_{rt} + \alpha_2(Krugman)_{r,t} + \alpha_3(Turb)_{r,t} + \alpha_4(Hrst)_{r,t} + \beta_1(Pc\_GDP)_{rt} + \beta_2(Dens)_{rt} + \\
&+ \chi_1(Temp\_y)_{r,t} + \chi_2(Part\_y)_{r,t} + \chi_3(Self)_{rt} + \chi_4(Hours)_{rt} + \chi_5(Lab\_com)_{rt} + \chi_6(Young) + \delta + \varepsilon_{r,t}
\end{aligned} \tag{1}
$$

where subscripts r and t are regions and time, respectively, and j the dependent and explanatory variables are those defined in table A1, for region *r* (from 1 to 248, 201 and 47, depending on the sample considered) and time *t* (from 1999 to 2006). The time-lagged and the spatially-lagged dependent variables are included in the set of regressors; Pc_GDP, Temp_y, Part_y, Self, Lab_com and the spatially lagged dependent variable are assumed to be endogenous. $\gamma, \rho, \alpha, \beta$ and χ are the vectors of estimated coefficients, and δ and $\varepsilon_{r,t}$ are the constant and the error terms, respectively.

Outcomes of the estimation of equation 1 are presented in table 4. In order to more clearly highlight the role of each of the j=6 industries, we estimated six different models, so that the coefficient of the industry variable can be directly interpreted with respect to all the remaining ones. In column 7 we include the j-1 industry shares, but their coefficients should be interpreted relative to the missing industry (JK). The same approach was used for the empirical models of MYUR and FYUR, using the gender specific explanatory variables if available (Temp_y, Part_y, Young) (Tables 5 and 6). In order to test the possible differences occurring for between the two geographical subsamples, we also estimated separate models for the WEST-17 and the CEE-9 regions (Table B3 to B8 in the appendix). The punctual values of the coefficients are clearly not directly comparable, therefore we can only discuss the differences in signs and significance of the estimated coefficients. The alternative of considering the explanatory variables interacted with a east/west dummy was discouraged by the resulting huge number of regressors and the consequent problems of system GMM implementation (especially related to handling endogenous variables and their instruments).

In system GMM estimator the original equations in levels are added to the system of first-differenced equations with the technical gains of additional moment conditions and increased efficiency. Considering that the consistency of the system GMM estimator depends on whether a selected set of lagged level and first-differenced values of the explanatory variables are valid instruments in the regression, two specification tests are employed[10]. The overall validity of the instruments is tested by the standard Sargan test of over-identifying restrictions (of whether the instruments, as a group, appear exogenous). Because significant second-order serial correlation of the first-differenced residuals indicates serial correlation in the original error terms and therefore misspecification of the instruments, we also test for first-order and second-order serial correlation in the first-differenced residuals. If the original error terms are not serially correlated, there should be evidence of a significant negative first-order serial correlation in differenced residuals and no evidence of second-order serial correlation in the first-differenced residuals.

4.3. Outcomes

In Table 3 we illustrate the outcomes obtained by estimating equation 1 for the whole sample. A first interesting piece of information is the strong significant and positive coefficients of the lagged (both time and spatially) dependent variables, which confirm the descriptive evidence and the necessity of their consideration in econometric exercises. These outcomes are confirmed throughout all the estimates proposed in this paper, therefore extend to youth unemployment the existing evidence of strong temporal persistence and geographic structure of labour market performance. Outcomes also show a significant negative relationship between development levels and unemployment, as expected, and also supply evidence that higher youth unemployment is associated to highly urban areas.

As regards the impact of the regional industry structure, higher shares of the primary sector (AB) and industry (CDE) favour less youth unemployment, and the same effect is unexpectedly played by increasing importance of financial and business services (JK); again contrary to expectations a growing construction sector (F) favours higher youth unemployment, whereas public services (LQ) play the hypothesised positive role. The proxy for labour demand of highly skilled workers is, as expected, positively associated to youth

[10] Since the system GMM method creates one instrument for each time period, variable and lag distance, the number of lags was reduced when necessary (in the CEE-9 sample) in order to fulfil the suggested rule of thumb to keep the number of instruments smaller than the number of groups.

unemployment, whereas the indicators of industry concentration and turbulence are not statistically significant.

Among the variables depicting the features of regional labour markets, Young and Lab_comp play the expected positive impact on unemployment, and the length of the working week is not statistically significant. The diffusion of part-time employment seems to reduce youth unemployment, whereas, temporary employment resulted rarely significant and with an unexpected sign. It should be noted that an increase in the so-called "flexibility at the margin" can both favour youth participation rate and youth employment rate, with uncertain effect on youth unemployment rate.

Finally, regional systems characterised by stronger presence of self employment are those with increasing youth unemployment; this would confirm the relatively more difficulties encountered by youth in entering the labour area when the regional system is increasingly characterised by positions which entail high skills, experience and risk undertaking.

Table 3 -Determinants of YUR in EU-26 regions (dynamic panel estimates, system GMM, 1999-2006)

	1	2	3	4	5	6	7
$YUR_{(t-1)}$	0.715***	0.686***	0.730***	0.726***	0.718***	0.525***	0.553***
YUR (spatial lag)°	0.410***	0.389***	0.384***	0.346***	0.353***	0.599***	0.566***
Pc_gdp°	-0.000***	-0.000***	-0.000***	-0.000**	-0.000**	-0.000***	-0.000***
Dens	0.000*	0.000**	0.000*	0.000*	0.000**	0.001***	0.001***
AB	-0.119***	-	-	-	-	-	-0.115*
CDE	-	-0.077***	-	-	-	-	0.035
F	-	-	0.121*	-	-	-	-0.036
GHI	-	-	-	0.023	-	-	-0.010
JK	-	-	-	-	-0.111**	-	-
LQ	-	-	-	-	-	0.331***	0.331***
Krugman	6.850**	0.866	3.042	1.276	0.137	-1.476	4.784
Turb	0.155	-3.396	-1.142	2.273	1.425	-13.778	-11.605
Hrst	0.089***	0.087***	0.117***	0.094***	0.116***	0.025	-0.004
Temp_y°	0.046**	0.014	0.010	0.025	0.012	0.055**	0.080***
Part_y°	-0.078***	-0.095***	-0.063***	-0.078***	-0.062***	-0.124***	-0.125***
Self°	0.412***	0.212***	0.293***	0.308***	0.310***	0.463***	0.535***
Hours°	0.043	-0.023	0.041	0.027	0.069	0.058	0.068
Lab_comp°	0.255***	0.188***	0.257***	0.235***	0.245***	0.118**	0.108**
Young	0.461***	0.276***	0.336***	0.388***	0.368***	0.335***	0.469***
Time effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
const	-21.414***	-9.389*	-19.853***	18.451***	-18.924***	-24.538***	-28.483***
n. obs.	1736	1736	1736	1736	1736	1736	1736
n. groups	248	248	248	248	248	248	248
Wald test	13352.28***	13406.52***	12850.09***	13073.47***	12931.79***	6513.24***	9045.70***
AB test AR1	-5.170***	-5.670***	-5.480***	-5.310***	-5.170***	-4.660***	-4.640***
AB test AR2	0.470	0.330	0.500	0.670	0.620	0.320	0.210
Sargan Test	24.540	24.150	23.120	31.700	27.160	23.730	25.870

, **, * = significant at 1, 5 and 10%, respectively;*

° = assumed endogenous.

The empirical models estimated for male and female youth unemployment rates (Tables 4 and 5), supply evidence of only a limited set of gender specificities. We focus her only on the most important differences between the MYUR and FYUR models and the general one. As regards regional sectoral features a first important point is that increasing specialisation in the industrial sector (in the strict sense) only reduces male unemployment, whereas no significant effects can be observed for females. On the other hand, a growing share of advanced market services (JK) benefits youth female unemployment; which is also favoured by increasing industry concentration (Krugman index). The size of the youth population cohort seems to play a relatively clearer and stronger role on female unemployment rate; this is consistent with other empirical evidence (Korenman and Neumark, 1997), that motivates this relatively more important role of this variable with the exogenous tendency towards increased labour force participation on the part of

young women, which may tend to compensate the impact of other determinants (general economic conditions, sectoral structure, etc.).

Table 4 -Determinants of MYUR in EU-26 regions (dynamic panel estimates, system GMM, 1999-2006)

	1	2	3	4	5	6	7
MYUR $_{(t-1)}$	0.537***	0.504***	0.540***	0.523***	0.528***	0.376***	0.396***
MYUR (spatial lag)°	0.592***	0.638***	0.572***	0.584***	0.590***	0.774***	0.709***
Pc_gdp°	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***
Dens	0.001***	0.001***	0.001***	0.001***	0.001***	0.001***	0.001***
AB	-0.132***	-	-	-	-	-	-0.245***
CDE	-	-0.118***	-	-	-	-	-0.140*
F	-	-	0.082	-	-	-	-0.259*
GHI	-	-	-	0.023	-	-	-0.072
JK	-	-	-	-	-0.041	-	-
LQ		-	-	-	-	0.392***	0.251***
Krugman	5.875*	-1.298	-1.618	-2.293	-2.193	0.035	8.639**
Turb	5.315	-4.127	3.779	3.595	2.545	-10.699	-7.920
Hrst	0.045	0.075**	0.084**	0.074**	0.080**	0.027	-0.038
Temp_y_m°	-0.015	-0.044*	-0.030	-0.028	-0.034	0.009	0.051
Part_y _m°	-0.110***	-0.136***	-0.099***	-0.108***	-0.101***	-0.181***	-0.204***
Self °	0.256***	0.073	0.211***	0.217***	0.212***	0.319***	0.305***
Hours°	-0.150	-0.197	-0.114	-0.122	-0.104	-0.182	-0.207
Lab_comp°	0.128***	0.106***	0.153***	0.151***	0.162***	-0.010	-0.073
Young_m	0.288***	0.060	0.232**	0.245**	0.224**	0.190*	0.271**
Time effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
const	-5.012	6.548	-6.437	-5.756	-5.767	-10.703	3.659
n. obs.	1736	1736	1736	1736	1736	1736	1736
n.groups	248	248	248	248	248	248	248
Wald test	4327.70***	4335.75***	4454.79***	4385.58***	4369.11***	3480.81***	4126.71***
AB test AR1	-3.300***	-3.570***	-3.260***	-3.190***	-3.300***	-3.610***	-3.690***
AB test AR2	1.010	1.070	1.290	1.330	1.210	1.190	1.100
Sargan Test	35.660	32.080	42.590	50.720	38.950	21.160	22.920

, **, * = significant at 1, 5 and 10%, respectively;*

° = assumed endogenous.

Much more interesting results are provided by the estimated youth unemployment models for the two subsamples of western and eastern regions.

As regards the first one (WEST-17, tables B3-B5), the most striking points for YUR are the confirmation of the positive role of specialisation in industry (CDE) and the negative role of LQ, while important news are the negative significant coefficient of traditional market services (GHI), and the not significance of agriculture. In addition, industry concentration assumes an unexpected positive coefficient, while the explanatory power of the labour market features seems fairly trimmed down. However, these outcomes are clearly dependent on crucial gender differences, as testified by the comparisons of table B4 (MYUR) and B5 (FYUR). A strong importance of GHI is only beneficial for female unemployment, suggesting that this "low-skilled" sector is an important gate to employment for young females (probably also intrinsically more willing to accept jobs in trade activities, hotels and restaurants, and so forth). The neutral role of primary activities is instead confirmed for both male and female labour force. This is not totally surprising considering that we are considering the subsample of western regions, where average income levels are relatively high and probably pose to conditions to prefer the unemployment status (for example by means of household support) to economically and socially undesirable job positions in agriculture. Tables B4 and B5 also reveal that the negative effect of sector concentration is limited to male unemployment, for which also a growing industry turbulence seems detrimental. This suggests that only for male segment is supported the ideas of diversification being favourable to youth employment and of sectoral restructuring being harmful.

Female labour market performance in western regions seems instead totally neutral to these two factors, and this should probably be connected to the fact that, being in a relatively worse general condition,

other factors (exogenous labour supply and labour cost levels) play a relatively more direct and substantive role. In interpreting these outcomes we should indeed not forget that in western regions female young workers face steadily worse conditions (see descriptive tables 1, B1 and B2 and figure B1) with respect to the male counterparts.

Table 5 -Determinants of FYUR in EU-26 regions (dynamic panel estimates, system GMM, 1999-2006)

	1	2	3	4	5	6	7
FYUR $_{(t-1)}$	0.743***	0.726***	0.735***	0.732***	0.733***	0.628***	0.665***
FYUR (spatial lag)°	0.380***	0.342***	0.386***	0.338***	0.337***	0.469***	0.464***
Pc_gdp°	-0.000***	-0.000**	-0.000***	-0.000*	-0.000*	-0.000**	-0.000
Dens	0.000	0.001***	0.001***	0.001**	0.001***	0.001***	0.001**
AB	-0.140***	-	-	-	-	-	0.002
CDE	-	0.002	-	-	-	-	0.219**
F	-	-	0.170**	-	-	-	0.282**
GHI	-	-	-	-0.069	-	-	0.031
JK	-	-	-	-	-0.164**	-	-
LQ	-	-	-	-	-	0.312***	0.449***
Krugman	-3.843	-13.071***	-10.700***	-16.133***	-13.752***	-12.900***	-2.922
Turb	6.908	10.688	6.671	12.166	11.594	-7.970	-6.636
Hrst	0.096***	0.111***	0.150***	0.100***	0.149***	0.059	0.062
Temp_y_f°	0.035	0.033	0.009	0.032	0.006	0.066**	0.032
Part_y _f°	-0.099***	-0.108***	-0.080***	-0.097***	-0.078**	-0.142***	-0.065
Self °	0.734***	0.701***	0.690***	0.753***	0.693***	0.842***	0.838***
Hours°	-0.033	-0.037	-0.005	-0.005	0.020	0.031	0.187
Lab_comp°	0.286***	0.281***	0.318***	0.280***	0.298***	0.161**	0.170**
Young_f	0.693***	0.680***	0.625***	0.708***	0.665***	0.642***	0.648***
Time effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Const	-24.592***	-23.286***	-26.853***	-24.061***	-25.472***	-32.818***	-54.730***
n. obs.	1736	1736	1736	1736	1736	1736	1736
n.groups	248	248	248	248	248	248	248
Wald test	9547.74***	11438.62***	8772.80***	9424.88***	9616.75***	7800.89***	10373.68***
AB test AR1	-4.000***	-4.040***	-4.000***	-3.880***	-3.770***	-3.740***	-3.720***
AB test AR2	-0.590	-0.510	-0.520	-0.440	-0.410	-0.610	-0.640
Sargan Test	37.110	39.760	38.220	45.070	45.690	42.530	39.760

, **, * = significant at 1, 5 and 10%, respectively;*

° = assumed endogenous.

Moreover, the gender models highlight very different impacts of specific labour market features, namely part-time, temporary and self employment all benefit youth males labour market performance. These outcomes basically corroborate the theories supporting the view that more flexible labour markets favour the access to labour positions by youth. Interestingly, in the case of women, only part-time employment seems able to reduce unemployment, whereas regional contexts more characterised by self employment are associated to higher female unemployment, probably as a result higher barriers to engage in autonomous activities faced by women. Temporary positions seem instead to be for females closer substitutes for permanent ones with respects to males, probably again as a result of the pressures to accept fixed-terms jobs exerted by worse labour market conditions.

Tables B6 to B8 highlight the outcomes obtained for the subsample of the CEE-9 regions. As a premise, we should underline that, due to the low number of regions (47), some caution is needed in the interpretation and comment of the empirical evidence. First of all, for both sexes, a growing specialisation in agriculture still plays a crucial role in providing job opportunities, and this must probably be connected to the apparently surprising unemployment increasing role of manufacturing. Probably, the still important excess of labour supply in eastern regions is able to fulfil labour demanded by industry firms, which therefore prefer hiring adult and relatively experienced workers, crowding out youth employment which turns towards residual occupations in agriculture. As in western regions, maybe for intrinsic features of youth female labour supply, a strong presence of traditional market services reduces women's unemployment. Contrary to

what happens on the western side, a growing sectoral concentration reduces the possibility of being unemployed for young men, whereas industry reallocations processes seem quite neutral for both sexes.

As regards the features specific to labour market, is generally confirmed for both models the association between temporary contracts and lower unemployment, similarly, self employment assumes the usual positive coefficient. It is instead surprising that the diffusion of part-time does not play any beneficial role especially for female unemployment. Finally, it should be noted the prevailing non significance of the other labour market variables (Hours, Lab_comp and Young), probably to be interpreted in the light of the generally bad youth labour market conditions in CEE-9 regions which do not allow these factors to play any significant and stable role.

5. Final Remarks

Investigations on youth labour market performance are extremely difficult due to interactions with schooling participation and many other reasons well evidenced in the literature reviewed in Section 2. Most of existing empirical studies adopt a cross sectional approach to compare national data or regional data of a single country; in this paper we produce new descriptive evidence and econometric results on youth unemployment rates on 248 EU regions (NUTS-2 level) for the period 1999-2006. Another distinctive feature of the paper is that we distinguish by gender and between the two sub-groups of western (EU-17 countries) and eastern (CEEC-9 countries) regions.

Notwithstanding the lack of regional data for some crucial variables imposes extreme caution, we try to derive some policy implications.

First of all, it seems extremely important that the various levels of policy interventions (European, national, regional and local) maintain a particular focus on "youth unemployment" and "regional disparities" as clearly suggested by the following evidences: (i) youth unemployment rates persist at a high level (near 18% on average), (ii) notwithstanding (sigma and beta) convergence dynamics in the considered period, the unemployment rates range in 2006 is still remarkable (from 3.8% to 38.9%) and, finally, (iii) the "unemployment problem" in EU is especially and increasingly due to youth unemployment (YUR is on average more than twice total UR and the ratio increased over time). Considering the huge territorial differences, we argue that the exchange of complete information on "best practices" of regional youth labour policies, as already suggested by the European Employment Strategy, should be further reinforced.

However, the strict correlations between good/better youth and total labour market performance suggest considering the possible economic and labour policies targeted to young people in a much more general framework of economic and labour market dynamics. In other terms, also considering the negative static and dynamic correlation between youth unemployment and employment rates, it seem crucial that policies for young people regarding schooling and integration into the labour market are implemented within a coherent framework of sustainable economic, institutional and social development (institutional and growth policies).

Further important points emerging from the descriptive analysis (and confirmed by the econometric tests) are (i) the strong persistence over time of youth labour market performance and (ii) its clear spatial dependence. The first point should increase the awareness that if potential labour market weaknesses are left free to unfold, the price to be paid will be high for a long time; on the other hand, it also means that policy efforts aimed at increasing labour market performance, if successful, are probably able to produce durable outcomes, and this time pattern of benefits should be carefully considered when assessing the present costs of policy interventions. The second point (spatial autocorrelation), suggests that sovra-regional aspects (for example institutions in a broad sense) do matter in shaping labour market performances and that policy design should carefully consider the true spatial extent and interactions which take place at regional level. Moreover, spatial autocorrelation is usually synonymous of spillover effects, and sovra-regional policy makers should be careful in avoiding possible free riding temptations by regional levels, which are largely responsible for the design and implementation of active labour policies.

The results of the econometric analysis showed that the effects on youth unemployment rates can be rarely generalised and often diverge when we distinguish by gender and in the two geographical sub-groups of WEST-17 and CEE-9 regions.

First of all, it should be noted that the previous implications in favour of an integration between labour, institutional and development policies is confirmed by the econometric results showing highly significant and positive effects (especially in Western regions) of better development levels and dynamics in reducing unemployment rates.

As for the role of structural factors (sectoral composition, concentration and turbulence, and employment in HRST), the empirical evidence provides interesting east/west differences. In western regions the youth employment segment considered is benefited from specialisation in manufacturing and traditional services (for women), and this may be justified in terms of the skill requirements (no skills or technical knowledge acquired in upper secondary professional schools) needed to perform most of tasks in these sectors. These outcomes suggest that policy measures targeted at speeding up restructuring processes towards advanced (or high-skilled) sectors in western Europe may be at the expenses of this workforce group. This consideration is reinforced by the steadily positive impact on unemployment of labour demand of high-skilled profiles (variable HRST). Conversely, a strong presence of public services represents a barrier to youth employment. In eastern regions, distinctive features are represented (i) by the unemployment reducing role of primary activities, which probably still play an important role in absorbing low skilled workers; and (ii) by the surprising negative role of manufacturing. This may be due to the fact that labour market conditions in eastern regions are generally bad and many adult unemployed are probably former manufacturing workers displaced by technical and structural restructuring. Their relative ability and skill endowment probably increase the relative cost of hiring unskilled and inexperienced young workers, thus crowding them out.

As for the policies in favour of self-employment, the econometric results show that this variable is only able to reduce male unemployment in western regions, but is positively associated to higher female (east and west sample) and to male (east) youth unemployment.

A policy of "wage moderation" seems to have a quite general positive effect in reducing youth unemployment. However, the significance and the stability of the effects of lower labour cost decrease when we distinguish the two separate blocks of Eastern and Western regions.

If we consider the possible role of policies for increasing the "flexibility at the margin", it should be noted that the diffusion of temporary employment have significant effects in reducing youth unemployment in the group of CEEC regions and for male segment in western regions. Differently, a growing recourse to part-time jobs favours lower youth unemployment only in western regions[11].

Further empirical investigations are necessary for a better definition of effective labour and economic policies favouring a highly desirable reduction of youth unemployment rates, regional differences and gender gaps in the enlarged European Union.

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[11] Obviously, the complex effect of "flexibility" on youth labour market performance should be careful considered in shaping the institutional framework, also considering the possible risks of falling into traps of low quality job. This important aspect, not considered in this paper, is the specific objects of a large literature.

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APPENDIX

A

VARIABLES AND DEFINITIONS

Table A1.
List of variables, definitions and availability by gender

	Acronym	*Definition*		*Availability of data by gender*
	YUR (MYUR, FYUR)	Unemployment 15-24 / Labour force 15-24		t, m, f
α	AB*	Employment AB / employment	IND_j	t
	CDE*	Employment CDE / employment		t
	F*	Employment F / employment		t
	GHI*	Employment GHI / employment		t
	JK*	Employment JK / employment		t
	LQ*	Employment LQ / employment		t
	Turb**	Turbulence index		t
	Krugman***	Krugman concentration index		t
	Hrst	Employment in hrst / active population		t
β	Pc_gdp	GDP in PPP per inhabitant		t
	Dens	Population / Squared km		t
χ	Temp_y ****	Temporary employment 15-24 / population 15-24		t, m, f
	Part_y ****	Part-time employment 15-24 / population 15-25		t, m, f
	Self	Self employment / population 15-64		t
	Hours	Hours worked per week		t
	Lab_comp	Labour compensation per employee (000 euro 1995)		t
	Young	Population 15-24 / population 15-64		t, m, f

* *Nace classification*

** $$TURB_{r,t} = \frac{1}{2} \cdot \sum_h \left| q_{r,h,t} - q_{r,h,t-1} \right|$$

where $q_{r,h,t}$ is the share of employment in subsector h on total employment in region r and time t, and $q_{r,t,h}$ is the share of employment in subsector h on total employment in region r and time t-1.

*** $$KRUGMAN_r = \frac{1}{2} \cdot \sum_h \left| q_{r,h} - q_{eu,h} \right|$$

where $q_{r,h}$ is the share of employment in subsector h on total employment in region r, and $q_{eu,h}$ is the corresponding average at European Level.

**** *calculated assuming that the share of young temporary and part-time workers (male and female) on total sector employment at regional level is the same as the national one.*

B

TABLES AND FIGURES

Table B1.
Descriptive statistics for Male Youth Unemployment Rate (MYUR)

	1999	2000	2001	2002	2003	2004	2005	2006
				EU-26				
Mean	17.87	16.74	16.19	17.23	17.79	18.20	18.36	17.01
Median	16.22	14.32	13.42	14.62	15.54	16.54	16.59	16.25
Minimum	1.26	2.89	1.52	3.18	1.69	4.17	5.96	4.27
Maximum	79.15	76.86	54.75	57.31	52.41	53.16	47.60	37.50
Coeff. Var.	0.641	0.676	0.696	0.635	0.580	0.498	0.467	0.433
				WEST-17				
Mean	16.48	14.66	13.62	14.61	15.62	15.95	16.59	15.85
Median	13.95	12.06	12.15	13.77	14.35	15.35	15.15	15.20
Minimum	1.26	2.89	1.52	3.18	1.69	4.17	5.96	4.27
Maximum	79.15	76.86	54.75	53.60	51.93	39.47	41.22	37.50
Coeff. Var.	0.694	0.716	0.670	0.560	0.530	0.428	0.424	0.425
				CEE-9				
Mean	23.84	25.64	27.17	28.40	27.08	27.82	25.89	21.95
Median	22.06	25.44	23.98	26.14	23.17	26.28	24.46	23.94
Minimum	8.38	7.79	7.84	6.42	7.74	11.35	10.05	8.41
Maximum	51.08	51.34	49.85	57.31	52.41	53.16	47.60	35.39
Coeff. Var.	0.400	0.406	0.475	0.491	0.474	0.397	0.401	0.361

Table B2.
Descriptive statistics for Female Youth Unemployment Rate (FYUR)

	1999	2000	2001	2002	2003	2004	2005	2006
				EU-26				
Mean	20.81	19.68	18.20	19.10	19.66	19.78	20.42	19.45
Median	15.99	14.36	13.64	14.12	15.27	16.62	17.71	16.90
Minimum	1.94	2.48	0.00	2.59	2.54	3.30	4.87	3.29
Maximum	74.74	70.40	68.30	70.05	75.00	62.26	66.67	61.29
Coeff. Var.	0.725	0.737	0.779	0.760	0.735	0.620	0.555	0.531
				WEST-17				
Mean	20.13	18.34	16.16	16.88	17.74	17.97	19.12	18.39
Median	13.94	12.04	11.69	11.63	12.66	15.20	16.03	15.54
Minimum	1.94	2.48	0.00	2.59	2.54	3.30	4.87	3.29
Maximum	74.74	70.40	68.30	70.05	75.00	62.26	66.67	61.29
Coeff. Var.	0.787	0.803	0.834	0.808	0.784	0.636	0.574	0.557
				CEE-9				
Mean	23.71	25.39	26.95	28.59	27.87	27.52	25.96	23.94
Median	21.78	24.06	22.93	24.25	24.13	22.89	23.32	24.07
Minimum	6.67	6.97	6.67	7.84	7.69	7.03	7.69	5.15
Maximum	55.53	45.84	51.33	55.44	51.98	49.15	44.83	39.49
Coeff. Var.	0.461	0.476	0.515	0.506	0.500	0.466	0.438	0.398

Table B3.
Determinants of YUR in WEST-17 regions (dynamic panel estimates, system GMM, 1999-2006)

	1	2	3	4	5	6	7
$YUR_{(t-1)}$	0.725***	0.713***	0.728***	0.716***	0.733***	0.625***	0.628***
YUR (spatial lag)°	0.394***	0.420***	0.395***	0.408***	0.415***	0.444***	0.481***
Pc_gdp°	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***
Dens	0.001***	0.001***	0.001***	0.001***	0.001***	0.001***	0.001***
AB	0.040	-	-	-	-	-	-0.133**
CDE	-	-0.093***	-	-	-	-	-0.169***
F	-	-	-0.043	-	-	-	-0.243***
GHI	-	-	-	-0.048*	-	-	-0.147**
JK	-	-	-	-	0.057	-	-
LQ	-	-	-	-	-	0.251***	0.083
Krugman	10.304***	6.547**	11.264***	11.624***	10.555***	5.884*	4.735
Turb	-4.594	-8.599	-4.847	-4.212	-4.670	-12.763*	-13.465*
Hrst	0.116***	0.110***	0.105***	0.102***	0.099***	0.079***	0.045
Temp_y_er°	-0.028	-0.004	-0.022	-0.029*	-0.016	0.031	0.041
Part_y_er°	-0.024	-0.052**	-0.023	-0.016	-0.025	-0.072***	-0.081***
Self_er°	-0.009	0.075	-0.018	-0.031	0.018	0.241***	0.200**
Hours°	0.117	0.063	0.139*	0.155*	0.120	0.167*	0.150
Lab_comp°	0.090**	0.134***	0.067	0.045	0.096**	0.037	0.016
Young	0.009	0.002	0.025	0.006	0.020	0.146**	0.111
Time effects	yes	yes	yes	yes	yes	yes	yes
const	-8.503**	-5.728	-8.467	-7.155*	-9.733**	-20.574	-2.720
n. obs.	1407	1407	1407	1407	1407	1407	1407
n.groups	201	201	201	201	201	201	201
Wald test	10286.47***	8690.84***	10039.48***	9712.19***	9206.34***	8026.68***	8336.18***
AB test AR1	-3.690***	-4.040***	-3.840***	-3.390***	-3.910***	-3.570***	-4.260***
AB test AR2	1.420	1.180	1.440	1.510	1.400	1.000	1.220
Sargan Test	79.890	51.600	91.670*	118.470***	62.230	60.970	54.780

, **, * = significant at 1, 5 and 10%, respectively;*
° = *assumed endogenous.*

Table B4.
Determinants of MYUR in WEST-17 regions (dynamic panel estimates, system GMM, 1999-2006)

	1	2	3	4	5	6	7
$MYUR_{(t-1)}$	0.616***	0.625***	0.608***	0.613***	0.613***	0.543***	0.527***
MYUR (spatial lag)°	0.374***	0.340***	0.348***	0.365***	0.383***	0.279***	0.313***
Pc_gdp°	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
Dens	0.001***	0.001***	0.001***	0.001***	0.000**	0.001***	0.001***
AB	0.118	-	-	-	-	-	-0.073
CDE	-	-0.117***	-	-	-	-	-0.183**
F	-	-	-0.076	-	-	-	-0.331**
GHI	-	-	-	-0.027	-	-	-0.067
JK	-	-	-	-	-0.020	-	-
LQ	-	-	-	-	-	0.253***	0.120
Krugman	14.093***	9.217**	17.386***	16.118***	17.765***	10.641**	7.866*
Turb	63.194***	46.694**	51.811***	49.214**	49.680***	37.638*	30.249
Hrst	0.132***	0.109**	0.145***	0.135***	0.171***	0.124***	0.088*
Temp_y_er_m°	-0.102***	-0.051*	-0.091***	-0.091***	-0.083***	-0.012	-0.002
Part_y_er_m°	-0.102***	-0.122***	-0.094***	-0.086**	-0.101***	-0.128***	-0.143***
Self_er°	-0.317**	-0.220*	-0.372***	-0.333***	-0.238*	-0.090	-0.244*
Hours°	-0.135	-0.095	0.023	0.006	-0.037	0.115	0.174
Lab_comp°	-0.047	-0.074	-0.187**	-0.165**	-0.069	-0.157**	-0.242***
Young_m	-0.037	0.009	0.034	0.011	0.083	0.212*	0.135
Time effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
const	6.336	7.564	3.639	4.117	-0.871	-13.086*	3.598
n. obs.	1407	1407	1407	1407	1407	1407	1407
n.groups	201	201	201	201	201	201	201
Wald test	3947.16***	4624.23***	3567.16***	3629.83***	3821.38***	2828.07***	3320.86***
AB test AR1	-3.000***	-2.640***	-3.160***	-2.620***	-3.270***	-2.720***	-2.950***
AB test AR2	1.900*	2.030**	1.870*	1.980**	1.760*	1.460	1.760*
Sargan Test	36.860	39.530	45.360	86.090	17.260	20.680	18.650

, **, * = significant at 1, 5 and 10%, respectively;*
° = assumed endogenous.

Table B5.
Determinants of FYUR in WEST-17 regions (dynamic panel estimates, system GMM, 1999-2006)

	1	2	3	4	5	6	7
$FYUR_{(t-1)}$	0.666***	0.661***	0.671***	0.646***	0.673***	0.594***	0.595***
FYUR (spatial lag)°	0.475***	0.513***	0.455***	0.498***	0.492***	0.575***	0.574***
Pc_gdp°	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***
Dens	0.001***	0.001***	0.001***	0.001***	0.001***	0.001***	0.001***
AB	0.074	-	-	-	-	-	-0.020
CDE	-	-0.111***	-	-	-	-	-0.120
F	-	-	-0.057	-	-	-	-0.098
GHI	-	-	-	-0.140***	-	-	-0.188**
JK	-	-	-	-	-0.005	-	-
LQ	-	-	-	-	-	0.324***	0.129
Krugman	3.901	-5.048	1.149	1.810	0.583	-6.703	-1.574
Turb	11.563	8.617	19.684*	15.182	11.225	1.310	-0.188
Hrst	0.142***	0.133***	0.137***	0.115***	0.133***	0.085*	0.085
Temp_y_er_f°	-0.028	0.019	-0.004	-0.008	0.004	0.060*	0.023
Part_y_er_f°	-0.034*	-0.076**	-0.036*	-0.020	-0.040*	-0.073**	-0.034*
Self_er°	0.302**	0.572***	0.363***	0.470***	0.530***	0.733***	0.441***
Hours°	0.128	0.013	0.136	0.160	0.102	0.180	0.308**
Lab_comp°	0.196**	0.292***	0.126	0.172**	0.280***	0.134*	0.114
Young_f	0.231**	0.325***	0.351***	0.358***	0.364***	0.458***	0.227**
Time effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Const	-16.710***	-15.782**	-17.043***	-17.522***	-22.374***	-35.845***	-17.829
n. obs.	1407	1407	1407	1407	1407	1407	1407
n.groups	201	201	201	201	201	201	201
Wald test	6681.74***	6101.00***	6644.95***	6161.69***	6169.69***	5930.90***	7082.18***
AB test AR1	-2.900***	-2.930***	-2.970***	-2.830***	-3.020***	-2.610***	-3.040***
AB test AR2	-0.400	-0.510	-0.300	-0.380	-0.440	-0.550	-0.480
Sargan Test	68.330	54.710	99.620**	83.330	53.210	82.880	49.040

, **, * = significant at 1, 5 and 10%, respectively;*
° = *assumed endogenous.*

Table B6.
Determinants of YUR in CEEC-9 regions (dynamic panel estimates, system GMM, 1999-2006)

	1	2	3	4	5	6	7
$YUR_{(t-1)}$	0.370***	0.327**	0.670***	0.678***	0.699***	0.799***	0.693***
YUR (spatial lag)°	1.240***	1.223***	0.730**	0.695**	0.780***	0.510**	0.480**
Pc_gdp°	-0.002***	-0.001**	-0.000	-0.001	-0.000	-0.001***	-0.001***
Dens	-0.010	-0.002	-0.004	-0.004	-0.003	-0.005**	-0.003
AB	-1.331***	-	-	-	-	-	-0.703*
CDE	-	0.792**	-	-	-	-	0.204
F	-	-	1.960	-	-	-	0.022
GHI	-	-	-	-0.226	-	-	-0.431
JK	-	-	-	-	-0.722	-	-
LQ	-	-	-	-	-	1.327**	1.665***
Krugman	-65.039	-190.789***	-101.303**	-86.333**	-77.060**	17.218	15.742
Turb	118.456	88.592	48.195	20.651	0.415	-59.015	17.443
Hrst	-0.238	0.151	-0.570	-0.009	0.343	0.498	0.040
Temp_y_er°	-1.762***	-1.860***	-1.190**	-0.923**	-0.737**	-0.710**	-1.222***
Part_y_er°	3.197***	3.282***	2.888*	1.289	1.024	1.140	2.600***
Self_er°	3.449	3.096**	1.590	1.119	1.059*	0.198	1.349***
Hours°	8.707**	7.562**	4.566	4.206	3.751**	2.465**	3.662***
Lab_comp°	0.779	-0.505	0.823	0.056	-0.546	0.260	0.860
Young	-1.124	-1.425	-1.415*	-1.531*	-1.744***	-1.786***	-0.281
Time effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
const	-327.81**	-297.147*	-170.061	-133.385	-119.891*	-103.387**	-177.965**
n. obs.	329	329	329	329	329	329	329
n.groups	47	47	47	47	47	47	47
F test	25.960***	35.470***	36.660***	41.020***	75.300***	74.810***	175.640***
AB test AR1	-1.850*	-2.000**	-0.480	-1.010	-1.240	-2.570**	-1.820*
AB test AR2	-1.060	-1.210	-1.240	-1.790*	-2.880***	-3.230***	-3.210***
Sargan Test	0.160	0.160	0.360	0.390	0.930	3.170	4.460

, **, * = significant at 1, 5 and 10%, respectively;*
° = *assumed endogenous.*

Table B7.
Determinants of MYUR in CEEC-9 regions (dynamic panel estimates, system GMM, 1999-2006)

	1	2	3	4	5	6	7
MYUR $_{(t-1)}$	0.430**	0.434**	0.262*	0.240*	0.139	0.330*	0.023
MYUR (spatial lag)°	0.738**	0.718**	0.986***	1.009***	1.440***	0.970***	0.961*
Pc_gdp°	-0.002**	-0.001	0.001	0.000	0.001	0.001	-0.003***
Dens	0.000	0.019**	0.000	0.002	0.001	0.001	0.008
AB	-1.711***	-	-	-	-	-	-2.769*
CDE	-	1.949***	-	-	-	-	-0.623
F	-	-	0.403	-	-	-	-1.965
GHI	-	-	-	-0.472	-	-	-3.071
JK	-	-	-	-	-3.541**	-	-
LQ	-	-	-	-	-	-0.411	1.248
Krugman	-75.438***	-287.601***	-77.009**	-86.268**	-158.372***	-89.544	-112.055
Turb	89.239	72.770	7.967	-21.325	-2.301	-14.636	39.617
Hrst	0.477	0.389	-0.533	-0.467	-0.314	-0.579	1.156*
Temp_y_er_m°	-2.088***	-2.372***	-0.590	-0.508	-0.671	-0.480	-2.948***
Part_y_er_m°	4.008***	5.364***	1.460	1.069	2.217	0.832	6.082***
Self_er°	3.377***	3.983***	1.066	0.880	2.066**	1.121*	3.298***
Hours°	2.244	2.525	2.465	2.336	6.517*	1.402	4.673
Lab_comp°	-3.715	-5.655**	-3.674**	-3.127**	-2.105	-3.185*	-5.631**
Young_m	0.479	-1.117	-1.900**	-1.657*	-1.456*	-1.932*	0.381
Time effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
const	-74.188	-100.823	-45.491	-29.365	-218.715	10.566	-56.903
n. obs.	329	329	329	329	329	329	329
n.groups	47	47	47	47	47	47	47
F test	53.93***	38.02***	16.14***	33.81***	34.66***	30.76***	18.78***
AB test AR1	-0.590	-1.030	-0.870	-0.600	-0.200	-0.380	-0.780
AB test AR2	-0.530	0.860	0.090	0.100	-0.420	-0.210	-1.230
Sargan Test	0.180	0.060	0.340	0.490	1.040	0.580	0.190

, **, * = significant at 1, 5 and 10%, respectively;*
° = assumed endogenous.

Table B8.
Determinants of FYUR in CEEC-9 regions (dynamic panel estimates, system GMM, 1999-2006)

	1	2	3	4	5	6	7
FYUR $_{(t-1)}$	0.764***	0.832***	0.908***	1.095***	0.927***	0.931***	0.798***
FYUR (spatial lag)°	0.576***	0.529***	0.580**	0.065	0.550**	0.403	0.438**
Pc_gdp°	-0.000	-0.000	-0.001	0.000	-0.001	-0.000	-0.001**
Dens	-0.003	0.003	-0.003	0.003	-0.002	-0.004**	0.000
AB	-1.019***	-	-	-	-	-	-1.051**
CDE	-	0.830***	-	-	-	-	-0.389
F	-	-	1.022*	-	-	-	-0.853
GHI	-	-	-	-0.814***	-	-	-1.227**
JK	-	-	-	-	0.645	-	-
LQ	-	-	-	-	-	0.502*	-0.315
Krugman	-7.861	-81.775**	-22.135	-7.367	11.069	9.881	-15.491
Turb	27.972	-9.080	-34.765	-87.246**	-39.405	-28.959	-27.824
Hrst	-0.640	0.084	0.225	0.052	0.186	0.098	0.002
Temp_y_er_f°	-0.810***	-0.908***	-0.527***	-0.341*	-0.282	-0.378**	-0.597*
Part_y_er_f°	0.906	0.774	-0.039	-0.764	-1.511*	-0.667	0.172
Self_er°	2.194***	1.817***	0.936	-0.190	0.596	0.639	1.237**
Hours°	-0.251	-0.601	-1.139	-2.146**	-2.156**	-0.939	-0.800
Lab_comp°	1.189	-0.133	1.299	0.414	1.116*	1.698**	1.233
Young_f	0.215	-0.548	-1.199*	-0.471	-1.453*	-1.126*	-0.439
Time effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Const	3.735	2.365	44.234	113.487***	100.192**	33.581	100.430
n. obs.	329	329	329	329	329	329	329
n.groups	47	47	47	47	47	47	47
F test	318.94***	563.74***	362.63	683.86	393.53***	426.14***	833.17***
AB test AR1	-1.170	-1.770*	-2.890***	-2.830***	-2.280**	-2.830***	-2.360**
AB test AR2	-0.750	0.340	0.850	0.960	0.770	1.770*	1.290
Sargan Test	11.180	6.140	5.330	3.130	4.480	5.530	4.880

, **, * = significant at 1, 5 and 10%, respectively;*
° = assumed endogenous.

Figure B1.
Kernel density estimation of unemployment rates in EU-26, WEST-17 and CEE_9 regions (1999 and 2006)

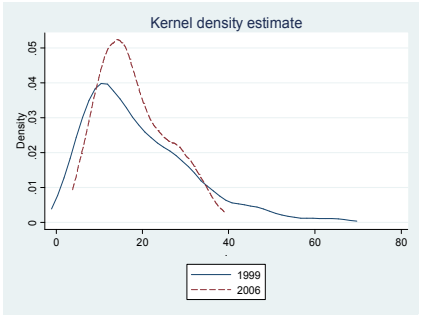
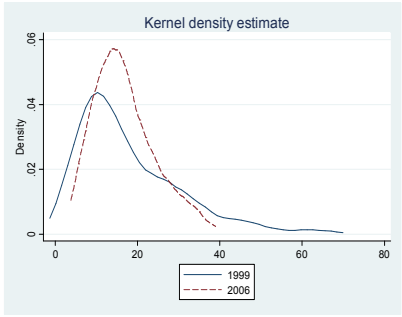
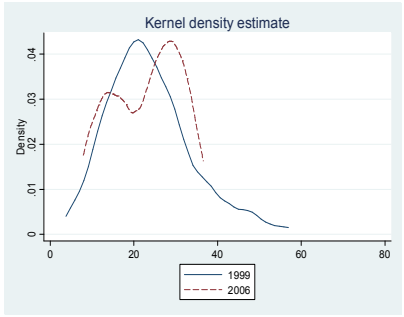
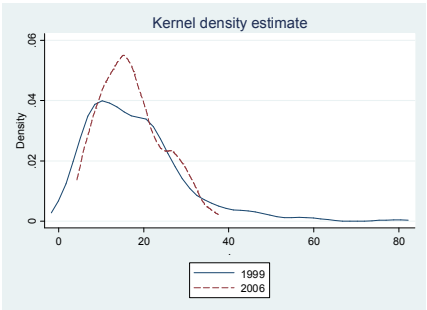
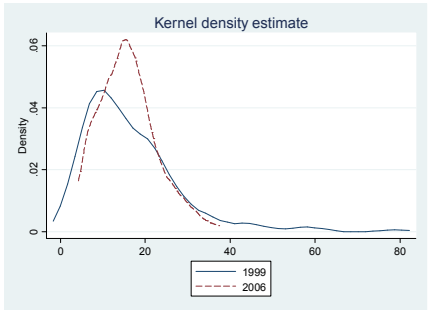
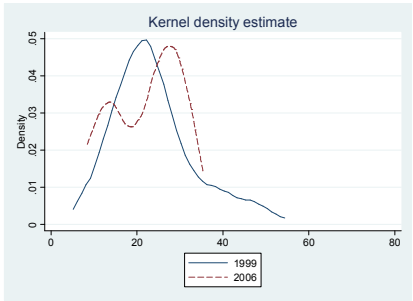
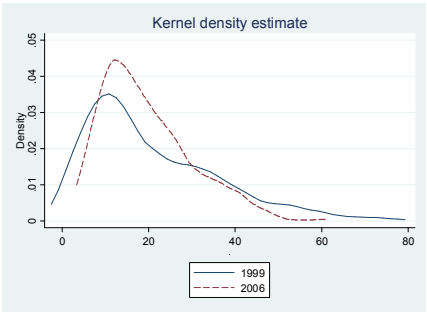
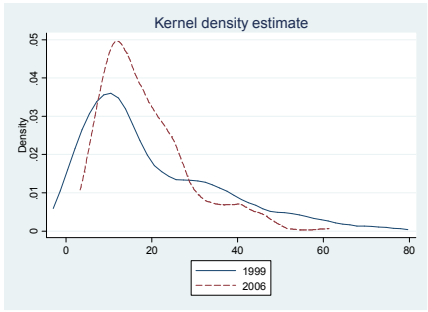
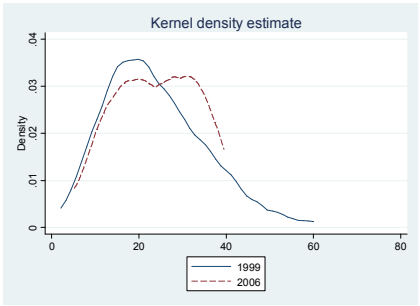
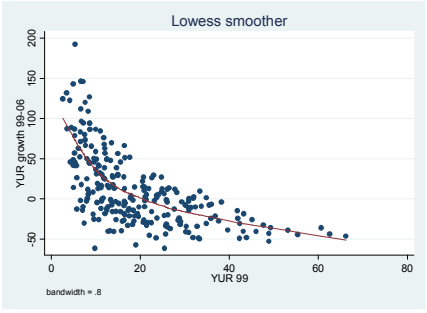
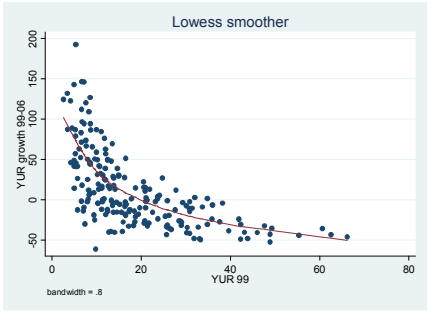
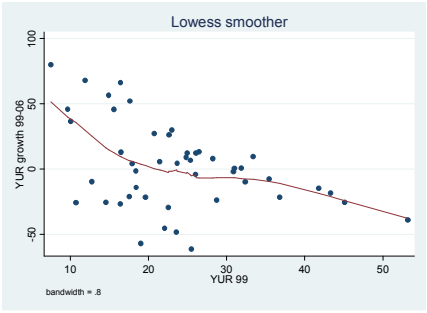
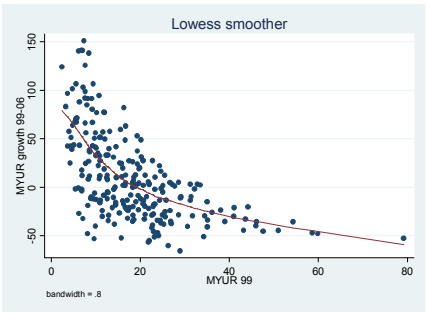
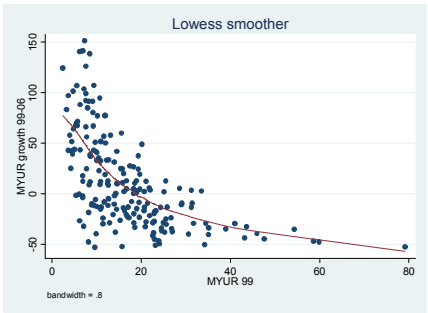
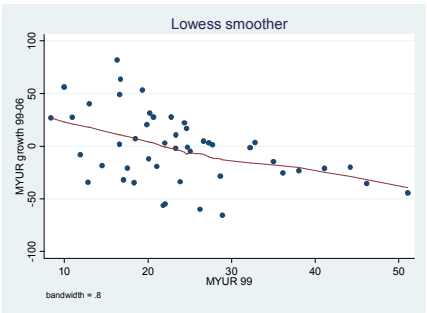
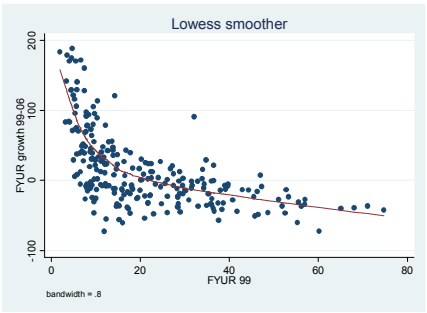
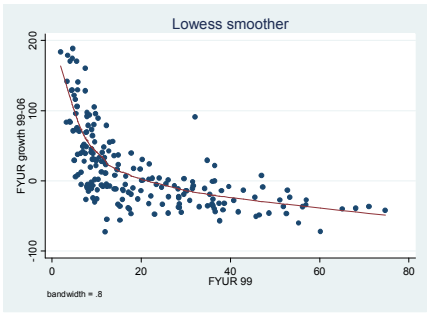
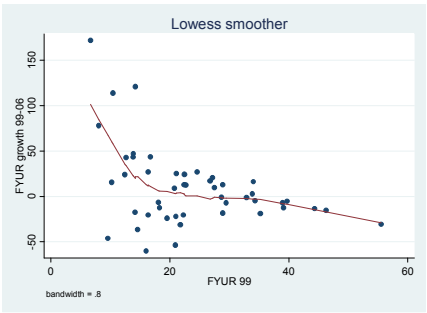
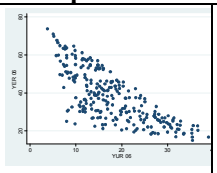
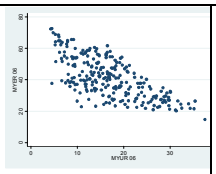
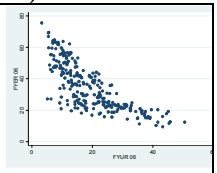
EU-26	WEST-17	CEE-9
YUR		
		
MYUR		
		
FYUR		
		

Figure B2.
Lowess and parametric estimates of unemployment rates beta convergence in EU-26, WEST-17 and CEE-9 regions (1999-2006)*

EU-26	WEST-17	CEE-9
YUR		
		
β = - 2.26 Adj R^2= 0.37 N. obs.= 246	β = -2.39 Adj R^2= 0.39 N. obs.= 199	β = - 1.44 Adj R^2= 0.17 N. obs.= 47
MYUR		
		
β = - 2.28 Adj R^2= 0.33 N. obs.= 242	β = - 2.41 Adj R^2= 0.34 N. obs.= 195	β = - 1.58 Adj R^2= 0.18 N. obs.= 47
FYUR		
		
β = - 2.09 Adj R^2= 0.34 N. obs.= 244	β = - 2.14 Adj R^2= 0.36 N. obs.= 197	β = - 1.63 Adj R^2= 0.15 N. obs.= 47

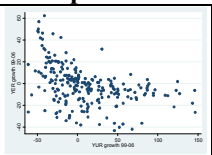
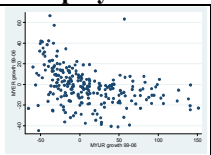
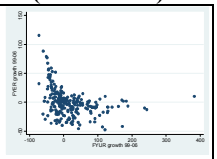
All the beta coefficients are significant at 1%
** growth rates were truncated at 200 in order to avoid outlier*

Figure B3.
Correlations and scatter plots between Youth Unemployment and Youth Employment rates (2006)

YUR		MYUR		FYUR	
-0.751	YER	-0.692	MYER	-0.768	FYER

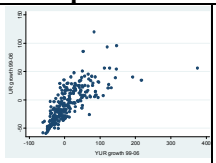
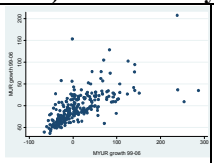
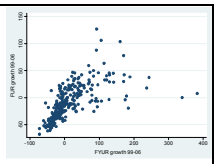
Note: all correlations are significant at 1%

Figure B4.
Correlations and scatter plots between % changes of youth employment and unemployment rates (1999-2006)

YUR growth		MYUR growth		FYUR growth	
-0.431	YER growth	-0.382	MYER growth	-0.346	FYER growth

Note: all correlations are significant at 1%

Figure B5.
Correlations and scatter plots between % changes (1999-2006) of total and youth unemployment rates

UR growth		MUR growth		FUR growth	
0.7340	YUR growth	0.6534	MYUR growth	0.6262	FYUR growth

Note: all correlations are significant at 1%