



Employment Performance and Convergence in the European Countries and Regions¹

Cristiano Perugini, Marcello Signorelli
Department of Economics - University of Perugia

Abstract

This paper analyzes the national and regional (NUTS-2) employment performance and convergence for various aggregations of 27 European countries (EU-25, plus Romania and Bulgaria), mainly using the three employment rates (total, female, older worker) adopted by the European Employment Strategy (EES). At the national level, this analysis confirmed the existence of considerable differences in employment performance between and within the various country aggregations. Empirical analysis highlighted the remarkable net job creations in the EU-15 (and EMU-12) for the period 1997-2003, accompanied by a (national) convergence for all three employment indicators. As regards total employment rates, significant converging trends also emerge at the regional level for both EU-15 and EMU-12 aggregations. In the eight Central European Countries, new EU members (8 CEC-NM), a σ diverging trend in the total employment rate began in 1999, whereas converging dynamics were limited to the employment rate of older workers in the period 1998-2001. Regional analyses showed significant β diverging dynamics in the total employment rates (1999-2003) for the eight CEC-NM regions. At the national level of analyses, the relationship between “progress in transition” and employment performance was also briefly examined. Results show that a simple, stable correlation does not exist. However, a weak U-shaped relationship existing in 1998 shifted downward and evolved toward a positive link in 2003. The main results of cluster analysis of the 53 regions of the ten CECs confirmed a high level of regional labour market diversification, and the fact that sector structure affects employment performance significantly.

JEL Classification: J21, O52, P27, R23

Keywords: Employment performance, employment convergence, regional labour markets

1. Introduction

The aim of the paper was to study the quantitative labour market performance of 27 European countries and 262 regions, in the period following the 1997 launch of the European Employment Strategy.

After some preliminary considerations and information on methodology and data used, Section 3 analyzes national employment performance with respect to the three European objectives and their convergence dynamics (σ - and Lowess β -types). For the ten Central European Countries, employment performance was analyzed in relationship to their progress in transition.

The regional (NUTS-2) level of analysis focused on σ and (parametric) β employment convergence trends (Section 4), cluster analysis being applied to the 53 regions of the ten Central European Countries (Section 5).

The concluding Section summarizes the main results of the research and comments on the role played by the European Employment Strategy.

¹ An earlier version of this paper has been presented at the AISSEC biennial conference held in Naples (I) in February 2004. We thank for their useful comments Carlo Frateschi, Michael Keren, Susan Senior Nello, Milica Uvalic, Vittorio Valli and two anonymous referees. The usual disclaimers apply. Contacts: perugini@unipg.it; signorel@unipg.it

2. Preliminary Considerations, Methodology and Data

In the last few decades, various labour market performances have been extensively studied from both theoretical and empirical points of view. In particular, the diverging employment performances of the United States and Europe have inspired many analyses based on the “*eurosclerosis*” hypothesis (e.g. Bean, 1994). However, research at national level for the European area has shown the existence (and persistence) of remarkable differences in employment performance (e.g. Moro, 1998; Garibaldi and Mauro, 2002; Valli, 2002). Some empirical results (e.g. Marelli, 2000; Martin and Tyler, 2000, Decressin and Fatàs, 1995) have highlighted the presence and persistence of huge differences in the EU-15 regions. This paper extends empirical analysis, for the period 1997-2003, to the new (and acceding) EU countries and regions.

Traditional economic literature considers unemployment indicators to be the main proxies of labour market performance. Although already in the late 1960s the usefulness of considering also employment dynamics was emphasized (Valli, 1970), only recently have many authors started to prefer the use of employment indicators (e.g. Frey, 1994; Signorelli, 1997; Moro, 1998; Garibaldi and Mauro, 2002; Tronti, 2002; Marelli, 2004a). It is argued here that, for various reasons, employment indicators are preferable to unemployment indicators. This is because, first of all, there are well-known difficulties and (national) differences in defining the unemployed condition. Second, unemployment rate depends on participation rate (labour supply), which in turn depends on employment rate (job opportunities). In particular, compared evidence shows that similar unemployment rates are compatible with significant differences in employment rates². In addition, considering the importance of the fiscal wedge on labour (social contributions and labour income tax), total employment rates are also important indicators of the sustainability of national welfare systems³. The European Employment Strategy, launched during the 1997 Luxembourg Job Summit, also defined three quantitative objectives at the Councils of Lisbon (2000) and Stockholm (2001), based on the following indicators: (1) total employment rate (= total employment x 100 / working age population⁴) of 70% by 2010; (2) female employment rate (= female employment x 100 / female working age population) higher than 60% by 2010; and (3) older worker employment rate (= employed persons from 55 to 64 years old x 100 / population between 55 and 64 years old) exceeding 50% by 2010. In this paper, we mainly use these three indicators to compare national/regional employment performance and to analyse their convergence/divergence patterns. With respect to national employment performance, we also consider the weight of the shadow economy (as a proxy for “irregular employment”). The existence and stability of a relationship between progress in transition and employment performance is then briefly examined using a synthetic transition index for the years 1998 and 2003 for the ten Central

² The weakening of a negative correlation between growth of employment and a rise in unemployment, due to important changes in labour force participation, is, for example, reported by Boeri and Scarpetta (1996) with regard to regional labour markets in some transition economies.

³ As the working-age population and total population trends are partially different, i.e., the former is (slowly) decreasing in many European countries, it would also be useful to consider employment rates calculated on total populations. This would allow us to take into account the fact that reductions in employment may be accompanied by increases in employment rates, due to working-age population decreases.

⁴ The working-age population is considered as the population between the ages of 15 and 64.

European countries (CEC-10 = eight “new” EU members, plus the acceding countries of Romania and Bulgaria).

Following the example of some recent contributions (e.g., Marelli 2000), the convergence analysis of national (and regional) employment performances is based on the traditional instruments of the empirical growth literature (Barro and Sala-I-Martin, 1995), with reference to the three employment indicators. The national level of analysis considers the whole set of 27 European countries (EU-25, plus Romania and Bulgaria), as well as the groups of the “old” EU-15, members of the European Monetary Union (EMU-12), ten Central European Countries (CEC-10) and eight new EU members (8 CEC-NM).

The regional analysis is based on the Eurostat Regio data-set (NUTS-2 level of classification, hereafter simply called “regional level”) and consists of (i) employment rates convergence studies (of σ - and β -types) for 262 European regions (1999-2003)⁵; and (ii) cluster analyses for 53 regions of the CEC-10 (2001). The NUTS-2 level provides the best compromise between level of spatial detail and data availability.

In recent years, two major (general) European institutional changes and one (specific) European policy innovation have taken place: (i) the adoption in January 1999 of a single currency by 11 of the 15 “old” EU members (Greece followed in January 2001), with the elimination of some national policy instruments (exchange rate and monetary policies) and restrictions in national fiscal policies (Maastricht and Stability Pact criteria); (ii) the move by eight Central European Countries (8 CEC-NM) toward European Union membership, which culminated in its enlargement in May 2004 (Romania and Bulgaria will join the EU in 2007); and (iii) the launch in 1997 of the European Employment Strategy as an open-method of coordination of employment policies designed to enable the Union to achieve conditions for full employment. Some of the results of our study may serve as a preliminary, partial evaluation of the employment effects which accompanied these institutional changes and innovations in policy.

3. National Employment Performances, European Goals and Convergence Analysis

We briefly analyse here, at national level, (i) employment performance (2003), net job creation (1997-2003) and distance from the quantitative objectives of the European Employment Strategy; (ii) σ - and β -type convergence dynamics; and (iii) the relationship between progress in transition and employment performance for the CEC-10.

⁵ 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. Another study which used employment data to investigate regional differences in Europe is that of Decressin and Fatàs (1995). 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. With regard to transition economies, Boeri and Scarpetta (1996) found that further deteriorations of labour market conditions are more difficult in regions already experiencing high levels of unemployment, either because they have already undergone restructuring and/or because of the existence of social barriers which hamper further dis-employment processes.

3.1. National Comparisons and European Objectives

With respect to the main “Lisbon objective”, only four of the EU-15 countries have reached total employment rates exceeding 70% (Denmark, Netherlands, Sweden, United Kingdom); ten countries (four of the EU-15, four “new” EU members, plus Romania and Bulgaria) have total employment rates (ER) of under 60% (Spain, Belgium, Greece, Slovak Republic, Romania, Hungary, Italy, Malta, Bulgaria, Poland). The remaining countries (seven of the EU-15 and seven “new” members) have ER of between 60 and 70%. The changes in total employment rates between 1997 and 2003 are all positive for the “old” EU-15 members (especially Spain, Ireland, The Netherlands, Italy and Finland)⁶, whereas five “new” EU members plus Romania show a negative variation. The dynamics in Romania (-7.8) and Poland (-7.7) have been particularly negative.

As regards the second “Lisbon objective”, seven countries of the EU-15 (Sweden, Denmark, The Netherlands, Finland, United Kingdom, Austria, Portugal) plus Cyprus, have female employment rates higher than 60%, while six countries (three of the EU-15, two “new” EU members, plus Bulgaria) have female ER lower than 50% (Bulgaria, Spain, Poland, Greece, Italy, Malta). The remaining countries have female ER between 50 and 60%. As regards the 1997-2003 dynamics, changes in female ER were positive in all the EU-15 countries (especially Spain, The Netherlands, Ireland and Italy) and negative in five “new” members (especially Poland, -5.3). Romania recorded an exceptional fall in employment (-7.6).

Considering the third European goal, defined at the Stockholm Council, only six countries (four of the EU-15 and two “new” EU members) have employment rates for older workers (55-64 years) higher than 50% (Sweden, Denmark, United Kingdom, Estonia, Portugal, Cyprus), and six countries (two of the EU-15 and four “new” EU members) show 55-64 ER lower than 30% (Luxembourg, Hungary, Belgium, Poland, Slovak Republic, Slovenia). Nine countries have 55-64 ER between 30 and 40%, and the remaining ones have older workers ER between 40 and 50%. The 1997-2003 changes were positive for all countries (especially Finland, The Netherlands, Hungary and Bulgaria), the only exceptions being Romania and Poland, which showed remarkable net job destruction (-14.0 and -7.0, respectively).

A fourth European objective, not defined in precise quantitative terms, regards the emergence of irregular employment from the shadow economy. Comparisons show remarkable differences (Table A1, in Appendix). The extent of the shadow economy in the EU-15 (expressed as a percentage of the GNP) is the lowest in Austria (9.8%) and the highest in Greece (28.7%) and Italy (27.1%), with a mean of 18.7% and a coefficient of variation of 28.3. In the CEC-10, the shadow economy is generally higher than in the EU-15, with an average of 24.7% and a lower coefficient of variation (17.4). In particular, whereas the Slovak and Czech Republics have lower values (18.9% and

⁶ It should be noted that the EU-15 employment growth during the period 1997-2002 (more than 12 million new jobs) was largely made up of permanent contracts (79% of total net job creation: 44% females, 35% males). The remaining 21% is represented by temporary contracts (13% females, 8% males). In addition, the same job creation was mainly due to full-time contracts (69% of net job creation: 36% males, 33% females), as opposed to part-time jobs (31% new jobs, 24% females, 7% males) (EU, 2003 and 2004).

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19.1%), the shadow economy is much more important in Latvia (39.9%), Bulgaria (36.9%), Romania (34.4%) and Lithuania (30.3%)⁷.

Table 1 – Employment rates: rankings in Europe 27 (2003) and changes 1997-2003

Total Employment rate			Female Employment rate			55-64 Employment rate		
<i>Lisbon goal (by 2010)</i>	70%		<i>Lisbon goal (by 2010)</i>	> 60%		<i>Stockholm goal (by 2010)</i>	> 50%	
<i>Means</i>			<i>Means</i>			<i>Means</i>		
<i>EU-25</i>	63.5		<i>EU-25</i>	55.3		<i>EU-25</i>	41.0	
<i>EU-15</i>	65.8		<i>EU-15</i>	56.7		<i>EU-15</i>	43.8	
<i>CEC-10</i>	58.8		<i>CEC-10</i>	53.9		<i>CEC-10</i>	35.5	
<i>Ranking 2003</i>	Δ 97-03*		<i>Ranking 2003</i>	Δ 97-03*		<i>Ranking 2003</i>	Δ 97-03*	
Denmark	75.1	+0.2	Sweden	71.5	+4.3	Sweden	68.6	+6.0
Netherlands	73.5	+5.0	Denmark	70.5	+1.4	Denmark	60.2	+8.5
Sweden	72.9	+3.4	Netherlands	65.8	+7.8	U.K.	55.5	+7.2
U.K.	71.8	+1.9	Finland	65.7	+5.4	Estonia	52.3	+2.1
Austria	69.2	+1.4	U.K.	65.3	+2.2	Portugal	51.1	+2.9
Cyprus	69.2	+3.5	Austria	62.8	+4.2	Cyprus	50.4	+1.0
Finland	67.7	+4.4	Portugal	60.6	+4.1	Finland	49.6	+14.0
Portugal	67.2	+1.5	Cyprus	60.4	+6.9	Ireland	49.0	+8.6
Ireland	65.4	+7.9	Estonia	59.0	-1.3	Netherlands	44.8	+12.8
Germany	64.8	+1.1	Germany	58.8	+3.5	Lithuania	44.7	+5.2
Czech Rep.	64.7	-2.6	Lithuania	58.4	-0.2	Latria	44.1	+7.8
Luxembourg	63.1	+3.2	Latvia	57.9	+2.8	Czech Rep.	42.3	+5.2
Estonia	62.9	-1.7	Slovenia	57.6	-0.4	Greece	42.3	+1.3
France	62.8	+3.2	France	56.7	+4.3	Spain	40.8	+6.7
Slovenia	62.6	0.0	Czech Rep.	56.3	-2.4	Germany	39.3	+1.2
Latvia	61.8	+1.9	Ireland	55.8	+9.9	Romania	38.1	-14.0
Lithuania	61.1	-1.2	Slovak Rep.	52.2	-1.3	France	36.8	+7.8
Spain	59.7	+10.3	Belgium	51.8	+5.3	Austria	30.4	+2.1
Belgium	59.6	+2.8	Romania	51.5	-7.6	Italy	30.3	+2.4
Greece	57.9	+2.8	Hungary	50.9	+5.5	Malta	30.3	+1.8
Slovak Rep.	57.7	-2.9	Luxembourg	50.8	+5.5	Bulgaria	30.0	+9.2
Romania	57.6	-7.8	Bulgaria	49.0	+2.7	Luxemburg	29.5	+5.6
Hungary	57.0	+4.6	Spain	46.0	+11.6	Hungary	28.9	+11.2
Italy	56.1	+4.8	Poland	46.0	-5.3	Belgium	28.1	+6.0
Malta	54.5	+0.3	Greece	43.9	+4.6	Poland	26.9	-7.0
Bulgaria	52.5	+2.1	Italy	42.7	+6.3	Slovak Rep.	24.6	+1.8
Poland	51.2	-7.7	Malta	33.6	+0.5	Slovenia	23.5	+1.7
<i>Mean</i>	62.9		<i>Mean</i>	55.0		<i>Mean</i>	40.5	
<i>Coefficient of variation</i>	10.2		<i>Coefficient of variation</i>	16.6		<i>Coefficient of variation</i>	28.8	

Source: elaboration on Eurostat data.

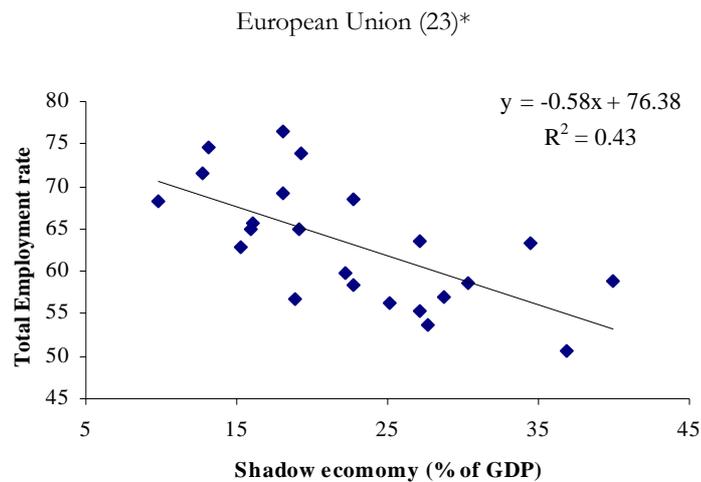
Notes: The coefficient of variation is $100 * \sigma / m$, where σ is the standard deviation and m is the mean; the Δ 97-03 measures the difference between the ER in 2003 and the ER in 1997. Obviously the % changes are much higher. All the employment rates for Malta and Luxembourg refer to 2002. * 1997-2002 for Luxembourg; 1998-2003 for Czech Republic, Estonia, Latvia, Lithuania and Slovak Republic; 2000-2003 for Cyprus and Bulgaria; 2000-2003 for Malta and Romania only for the Total employment rate; 2000-2002 for Malta.

⁷ For a theoretical and empirical investigation of the irregular economy in the framework of labour market analysis, see Dallago (1990).

It should be noted (Figure 1) that, as already emphasized (e.g., Valli, 1988; Marelli, 2000), a significant negative correlation exists between total (regular) employment rate and size of shadow economy (we use the size of shadow economy as a proxy of irregular employment, for which reliable data are not available).

Thus, the countries with the worst employment performances have a higher incidence of “irregular employment”⁸.

Figure 1. Correlation between total employment rate and size of shadow economy (2000)



Source: elaboration on Eurostat data (Total Employment rates) and Schneider data (shadow economy in Table A1).

Note: * Data not available for Luxembourg and Estonia.

3.2. Convergence Analysis

Convergence analysis was used to evaluate the dynamics of the three main employment indicators. Both sigma convergence and Lowess beta convergences were considered for the following groups of countries: Europe-25 (Europe 24), EU-15, EMU-12, CEC-10 and 8 CEC-NM⁹.

Sigma convergence consists of analyzing the evolution of the dispersion of the three national basic employment performance indicators over time. This type of convergence is usually measured by the standard deviation of the variable transformed into natural logarithms. Lowess (locally weighted scatterplot smoothing) is a non-parametric technique for estimating the relationship between employment growth and initial employment level, and can (graphically) reveal the existence of (non-parametric) beta convergences/divergences or more complex relationships. The suitability and

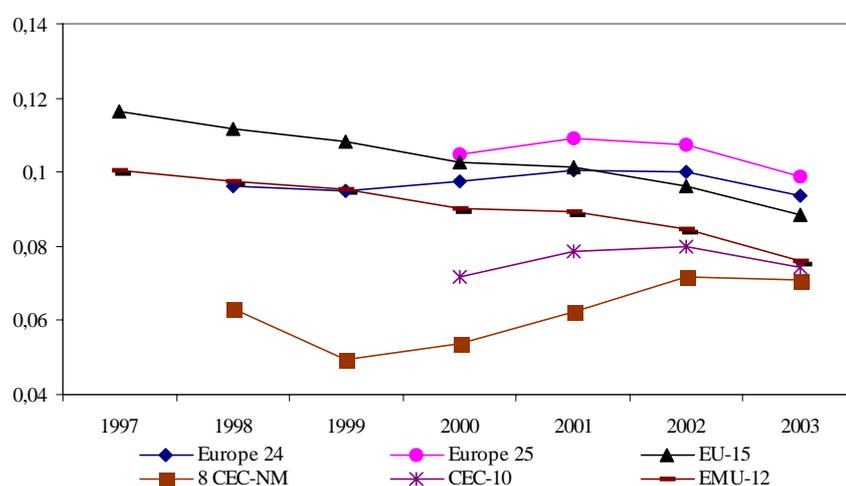
⁸ If official employment rates were corrected to allow for irregular employment, a general convergence and upward shift of “corrected” employment levels would result. Employment in illegal activities is, of course, excluded from the definition of “irregular employment”.

⁹ Europe 25 is made up of EU-15 plus CEC-10; Europe 24 excludes Bulgaria, due to lack of data. 8 CEC-NM includes the new (2004) EU members, but excludes Malta and Cyprus.

usefulness of extending this analytical instrument to variables other than income or productivity, e.g., employment, were already stressed by Marelli (2000).

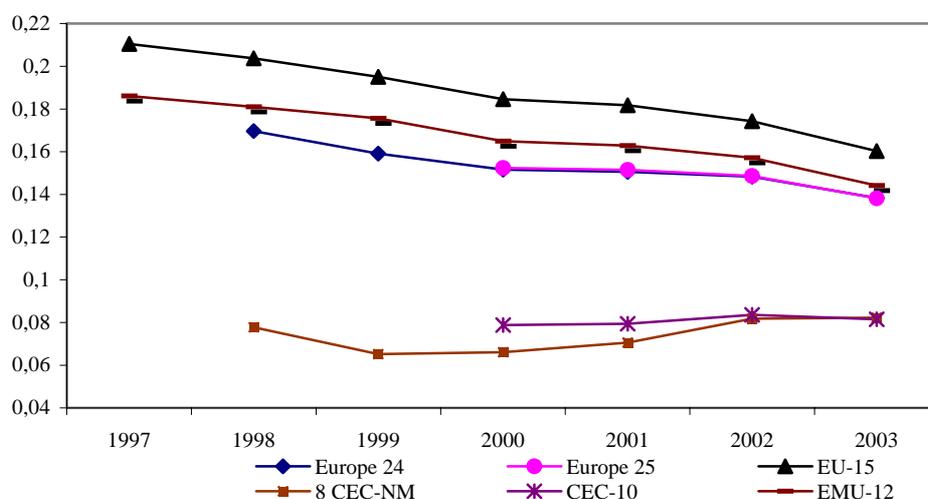
Regarding total employment rate (Figure 2, Table A2), the data show the remarkably stable sigma convergence for the EU-15 in the period 1997-2003. The same pattern is observed for the EMU-12, in which a lower level of dispersion is also evident. Instead, a diverging trend starts in 1999 for the 8 CEC-NM. In the other aggregations, the sigma values are quite stable during the period, although a sort of an inverted U-shape emerges for the period 2000-2003. With respect to female ER (Figure 3, Table A3), while the converging trend is confirmed for the EU-15 and EMU-12, a similar outcome is also recorded for the Europe-25 and Europe-24 groups. The sigma values are stable in the CEC-10 (and 8 CEC-NM). A more general convergence trend exists for the older worker ER (Figure 4, Table A4). In particular, it is remarkable that a reduction of sigma values was observable for the 8 CEC-NM during the period 1998-2001.

Figure 2. Trend of Sigma convergence index of country total employment rates



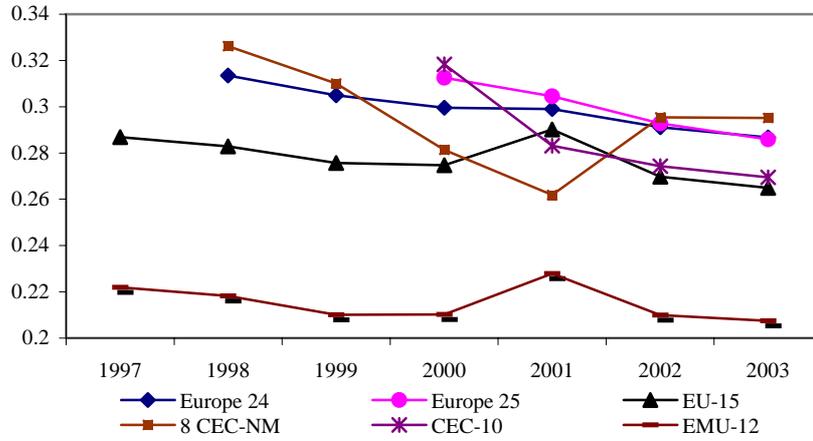
Source: elaboration on Eurostat data

Figure 3. Trend of Sigma convergence index of country female total employment rates



Source: elaboration on Eurostat data

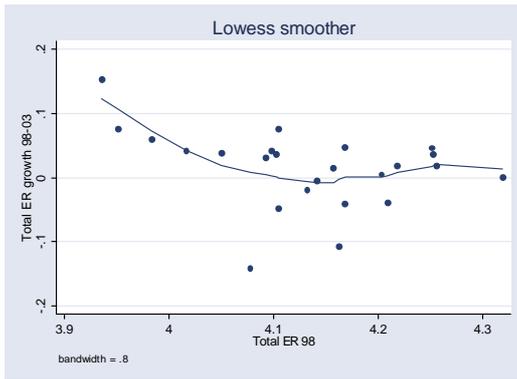
Figure 4. Trend of Sigma convergence index of country 55-64 total employment rates



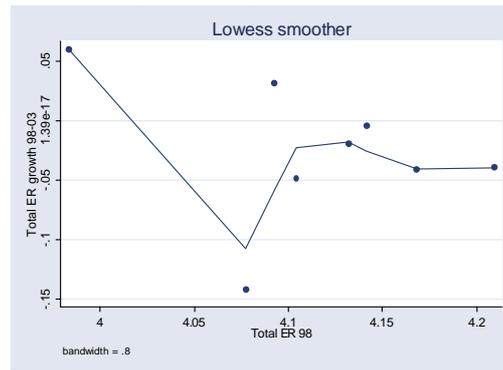
Source: elaboration on Eurostat data

Figure 5. Lowess beta convergence estimates of total ER at Country level

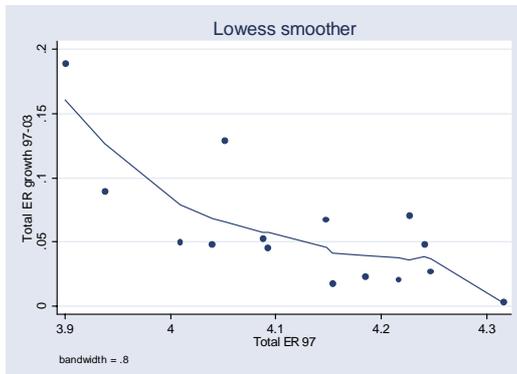
Europe 24 (1998-2003)



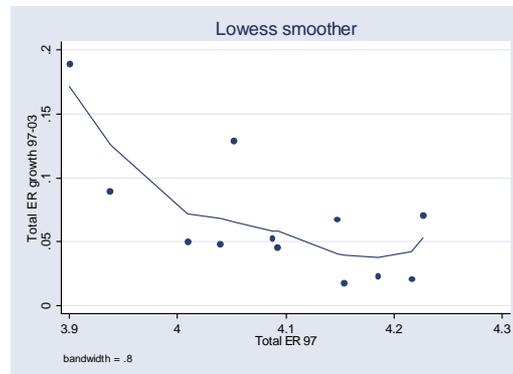
8 CEC-NM (1998-2003)



EU-15 (1997-2003)



EMU-12 (1997-2003)



Source: elaboration on Eurostat data

The Lowess technique, with a 0.8 span, shows clear beta-convergence in EU-15 and EMU-12 total employment rates (Figure 5): the countries with the worst initial performances (1997) showed the highest employment growth (in 1997-2003). In the Europe-24 aggregation (1998-2003), only some of the worst performing countries in 1998 tend to converge, whereas no significant relationship between initial conditions and employment growth emerges, among the 8 CEC-NM. Considering female ER (Figure A1), a remarkable convergence is again recorded for the EU-15 and EMU-12, with a similar but weaker pattern for the Europe-24 countries. Instead, the absence of any clear relationship is confirmed as regards the 8 CEC-NM. In the older worker ER (Figure A2), only a weak beta-convergence emerges for the EU-15, whereas in the EMU-12 aggregate the countries converge within the two clubs of the initially (1997) best- and worst-performing countries. An analogous convergence into two clubs is observed in the 8 CEC-NM aggregate, whereas a more ambiguous outcome is recorded for the Europe-24 group.

3.3. Progress in Transition and Employment Performance in the Central European Countries

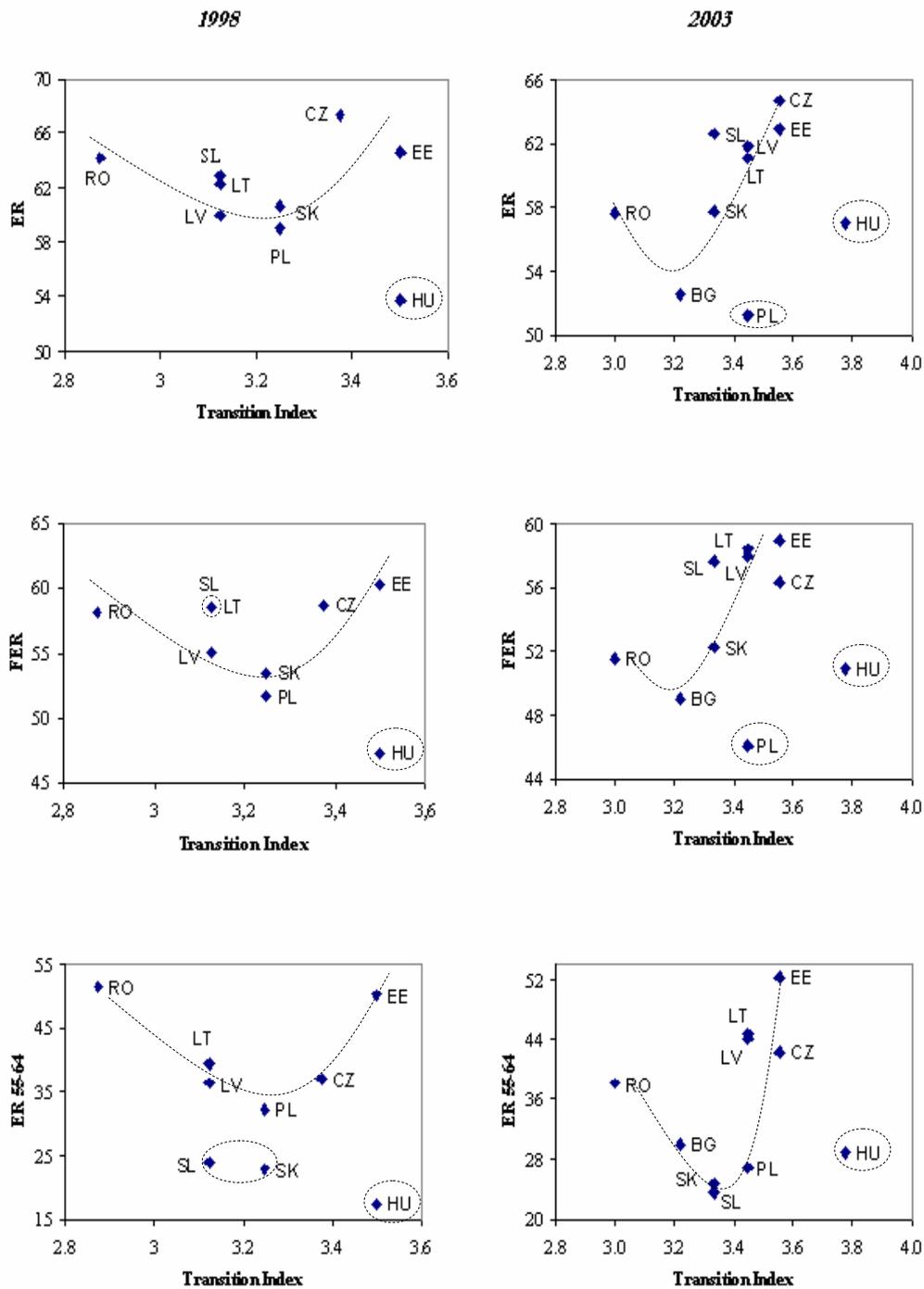
The CEC-10 are characterised by various levels of progress in transition. Although we are aware of the importance of very many factors affecting employment dynamics, in this section we briefly examine the existence and stability of a relationship between synthetic indexes of transition¹⁰ and national employment performance levels and changes. The transition process is well-known to have implied, *per se*, net job destruction, mainly due to the sharp fall in demand for the products of state-owned companies (and consequently in output and, although to a lesser extent, employment¹¹) and to large-scale restructuring processes accompanied by complex inter-industry labour reallocation. Although with significant diversities among countries and also due to relevant institutional differences (Boeri and Terrel, 2002; Burda, 1993, Garibaldi and Brixiova, 1997), the emergence of a private sector has helped (and is still contributing) only slowly to offset these job losses. The patterns of job creation and destruction vary indeed significantly during transition periods, with the latter largely prevailing in the early stages; and the job creation showing instead a higher capacity to compensate for losses in later periods¹².

¹⁰ The main synthetic transition index was calculated as the average of single country transition scores supplied by EBRD (Transition Report, various issues) and referring to Enterprises (3 indicators), Markets and Trade (3), Financial Institutions (2) and Infrastructure (1). The latter was not considered in 1998.

¹¹ For a theoretical and empirical analysis, in the framework of the matching functions, about the speed of privatisation and closure of the state sector, see Burda (1993). Interesting works in the literature focuses on the theory of the Optimal Speed of Transition to model the labour reallocation from the inefficient old state sector to the newly established private sector (Aghion and Blanchard, 1994; Castanheira and Roland, 2000).

¹² See Haltiwanger *et al.*, 2003, for other stylised facts about job destruction and creation in transition economies, and for a useful literature review on the topic.

Figure 6. Progress in transition and employment performance



Source: elaboration on Eurostat and Schneider data

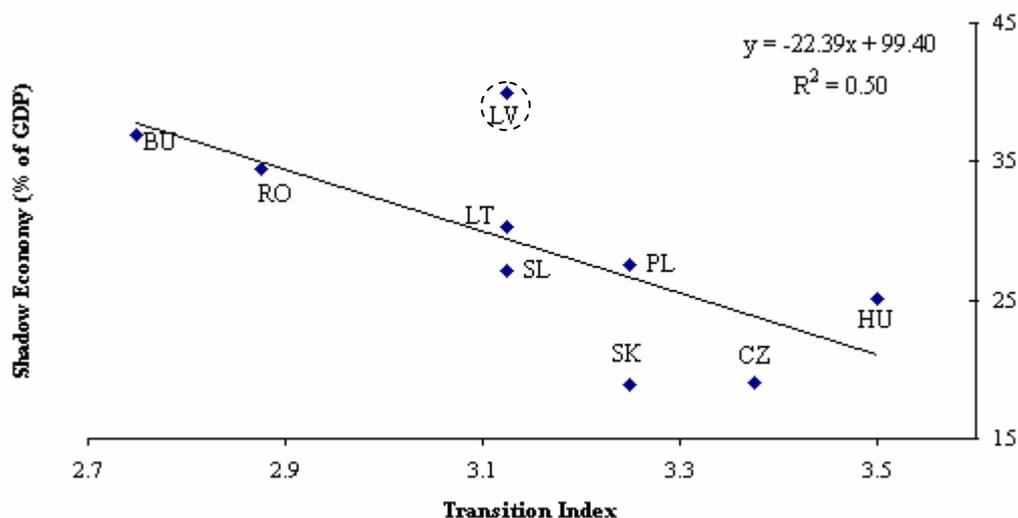
Figure 6 shows that a simple, stable relationship between progress in transition and employment performance does not exist. However, if we exclude the influence of a

few outliers, weak U-shaped relationships arise in 1998. The more recent data (2003) show, besides a downward shift of the diagrams corresponding to an almost general worsening of the employment performances, the further weakening of the U-shaped relationship (partly maintained by the Romanian situation) and the emerging of a positive correlation, which is not in contrast with the previous shape, since all the countries have now progressed to a transition stage beyond the level (roughly 3.2 of the synthetic transition index) at which the inversion of slope takes place.

The relationship between “speed” of transition, measured by variations in the synthetic transition index (2003-1998), and net job creation, calculated by the change in employment rates (2003-1998), is shown in Figure A3 (Appendix). A weak positive relationship arises: countries with faster transitions show better (less negative, or positive) net job creation. A similar positive correlation emerges for the average synthetic index (1998-2003) and the changes (1998-2003) in the three employment indicators (Figure A4).

Finally, we consider the correlation between progress in transition and size of the shadow economy (Figure 7). In this case, the relationship seems clearer: the progress in transition is generally accompanied by a reduction in the weight of the shadow economy. The exception (outlier) is Latvia, which has the highest weight of shadow economy associated with an intermediate level of transition.

Figure 7. Correlation Between Transition Index and the Size of Shadow Economy (CEC-9*, 2000)



* Data not available for Estonia

4. Regional Employment Performance: Converging and Diverging Patterns

Studies at national level may hide different dynamics at regional level. A greater degree of openness in regional systems implies indeed an increasing diversification and specialization of productive structures which, together with specific social and institutional features, are likely to translate into variegated economic and employment performances. This is particularly true for Europe, where ongoing integration process

renders increasingly crucial the regional dimension and the prominence of region-specific shocks (Decressin and Fatàs, 1995), and where profound regional labour market differences have often been emphasized (e.g., Overmans and Puga, 2002). The integration process is accompanied by a physiological relative decrease in traditional influence and the significance of national borders (Marelli, 2004a). As regards the Central European Countries, the importance of regional labour market diversification, also in comparison with Western standards, and the tendency to undergo increasing disparities as transition proceeds, have already been documented (Boeri and Scarpetta, 1996).

Before comparing in a static framework the main employment structures and performance indicators at regional levels focusing on the ten CEC, it is useful to evaluate the evolution of the labour market indicator (total employment rate) which, as noted earlier, the EES has assumed as crucial. This is done for various aggregations (Europe-25, EU-15, CEC-10, 8 CEC-NM)¹³. From a methodological point of view, these analyses are again performed through the β - and σ - type convergence estimates; the only methodological difference with respect to the previous country level analysis is the use of a parametric technique for the β estimate¹⁴. The source of regional data is again the Eurostat Regio Database, the temporal extent (1999-2003) of our estimates being influenced by the availability of new labour force surveys data harmonized at European level¹⁵.

Table 2 shows the basic descriptive statistics of the regional employment rates for the four groups of countries in the first and last years available.

Table 2. Descriptive statistics of the total employment rate (ER) at regional level

	Mean	Min.	Max	1 st Quartile	Median	3 rd Quartile	Standard Deviation	Coefficient of variation
<i>1999</i>								
Europe 25	62.08	38.70	79.90	57.88	62.45	67.68	8.08	13.02
EU-15	63.03	38.70	79.90	58.80	63.50	69.00	8.13	12.89
EMU-12	60.81	38.70	74.80	56.80	61.60	65.80	7.46	12.27
CEC-10	58.33	40.40	73.00	54.80	58.90	62.60	6.76	11.58
8 CEC-NM	59.11	48.10	73.00	55.70	58.80	62.00	5.49	9.28
<i>2003</i>								
Europe 25	63.18	42.00	78.60	58.10	63.55	68.70	7.96	12.60
EU-15	64.97	42.00	78.60	61.00	65.40	70.00	7.31	11.25
EMU-12	62.95	42.00	78.60	59.15	63.50	67.25	6.74	10.71
CEC-10	56.14	46.00	71.10	51.20	55.60	61.70	6.41	11.41
8 CEC-NM	56.63	46.00	71.10	51.40	55.60	62.10	6.97	12.31

Source: elaboration on Eurostat Regio data

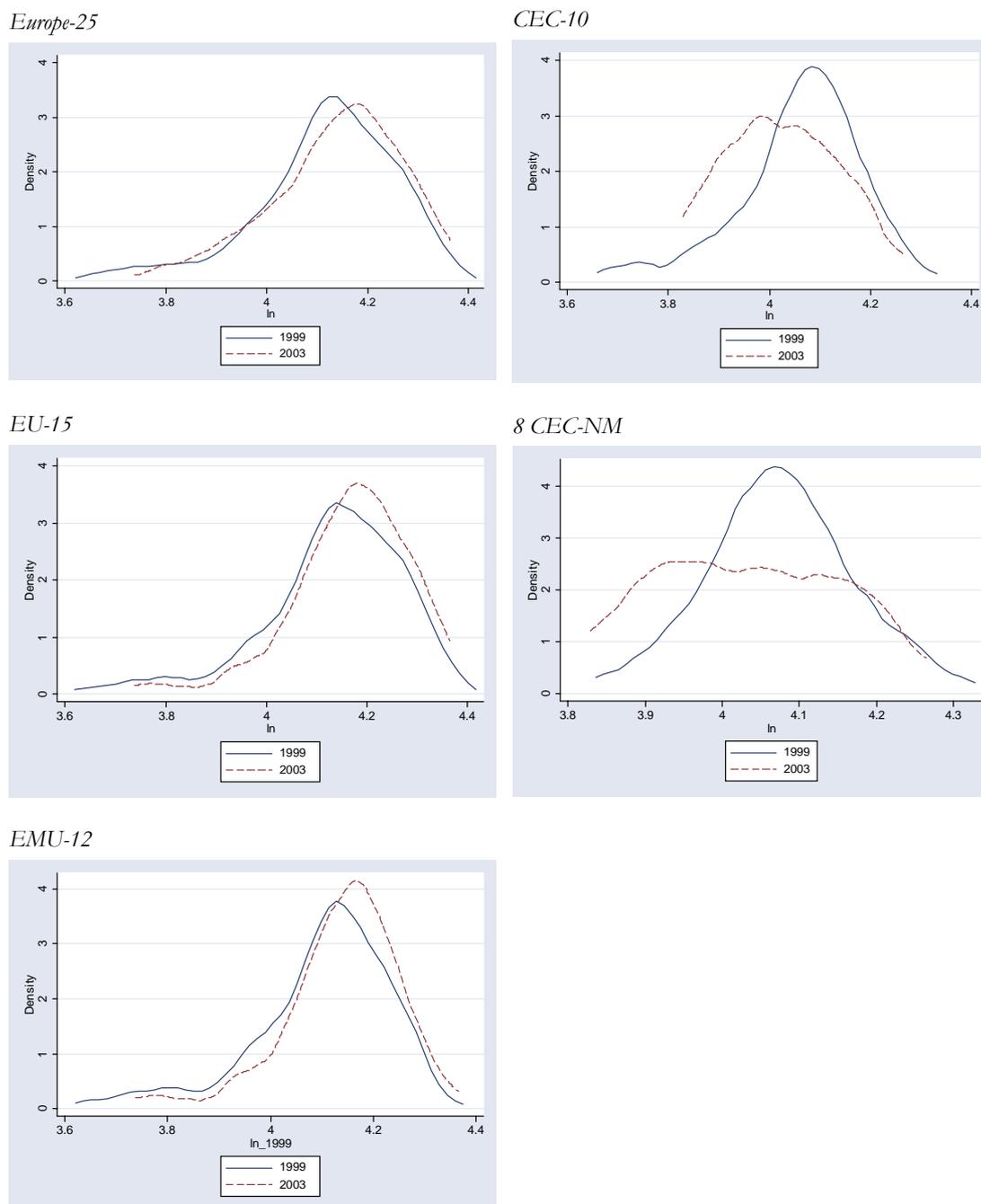
¹³ We preferred to use sub-samples rather than geographical dummy variables, which are more common especially in regional beta-convergence analysis, since our aim was to investigate the existence of patterns of convergence/divergence within various groups of countries.

¹⁴ For a useful discussion of parametric versus non-parametric methodologies in convergence studies, see Brasili and Oppi (2003).

¹⁵ The dataset is composed of 262 NUTS-2 regions. French overseas departments (Guadeloupe, Martinique, Guyana and Reunion) are excluded, since many values were missing. The few remaining missing values were estimated by linear interpolation.

To help identify major changes, kernel density estimations (Silverman, 1986) are used in Figure 8 to represent and compare the shapes of total ER distributions in 1999 and 2003 (data transformed into natural logarithms). The plots are densities that can be considered as the continuous equivalents of histograms, in which the number of intervals tends towards infinity. The point on the curve associated with any ER level can be interpreted as the likelihood that a given region will have that employment rate.

Figure 8. Kernel Density estimations for the regional employment rates in 1999 and 2003

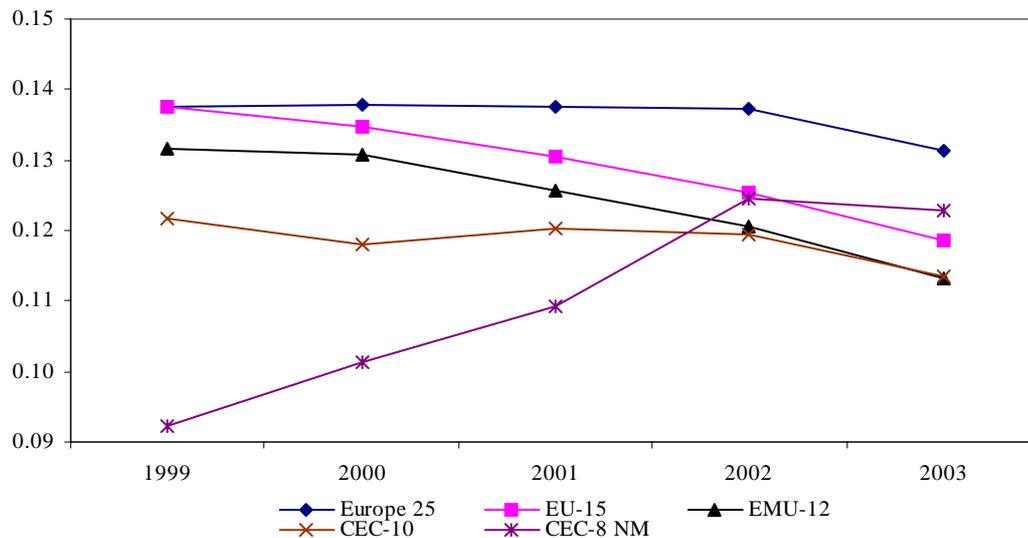


Source: elaboration on Eurostat Regio data

The first feature which emerges from Figure 8 is the forward shift of ER distribution in the case of Europe-25, which is essentially driven by the performance of the EU-15 group (very similar to that of the EMU-12), for which the probability that a region will fall into the higher values classes increases. Thus, comparison of the distribution shapes in 1999 and 2003 indicates that the regional labour markets of the old members (and of EMU countries) have generally improved, but that they have also tended to concentrate further on the modal value, anticipating the possible existence of a σ regional convergence trend. Significantly different considerations emerge as regards the distributions of regional ER limited to Central European Countries: the distributions do not shift horizontally, but their shapes in 2003 evolve significantly in comparison to four years earlier. Namely, the distributions appear significantly less concentrated, and the probability of regions attaining the modal values decreases favoring the likelihood of having a lower ER. This is clearly described by the fact that the area below the curve has enlarged during the time period for the lowest ER levels, and it is more restricted for the average and highest ER values.

These important and differentiated evolutions in regional labour market performances are now assessed through using convergence analysis. The measure of σ convergence is again the standard deviation of the ER variable, transformed into natural logarithms. The trends of the dispersion coefficients are shown in Table A5 and Figure 9.

Figure 9. Convergence trends of regional employment rates: sigma coefficient



Source: elaboration on Eurostat Regio data

The data show a weak sigma convergence pattern between the regions of the Europe-25 countries, with a significant decrease in the dispersion only in the last year. The calculation of the same index for the other four groups of countries confirms the results of kernel density estimations and helps to interpret the aggregate trend. This can indeed be considered as the outcome of the combination of a significant converging trend for the regions of the EU-15 and EMU-12, an ambiguous pattern (until 2002) for the CEC-10, and a strongly diverging trend for the regions of the eight new member states. The outcome for the regions of the old members indicate an inversion of the trend reported by Marelli (2000) who, implementing a partially different type of analysis,

considered various regional levels only for the five most important EU-15 countries and showed a clear σ -diverging trend for the period 1979-1997. The increased regional dispersion for the 8 CEC-NM would suggest that an increase in regional diversification could be a feature (although not confirmed by the σ trend for the CEC-10) not only of the earlier stages of transition (as documented by Boeri and Scarpetta, 1996), but also of more advanced stages.

Different information is supplied by the estimates along the lines of the β convergence approach. In the basic formulation, the regression model shows the link between growth rate and initial level of the variable (total employment rate, in this case)¹⁶:

$$\Delta ER = \alpha + \beta ER_0 + \varepsilon \quad [1]$$

where ER_0 is total employment rate in 1999 and ΔER is its change over the interval 1999-2003. Parameter β describes the converging (if positive) or diverging (if negative) trend of regional ER toward the mean. While in general the beta-type convergence is estimated for the GDP levels in order to test the hypothesis of income convergence (Barro and Sala-I-Martin, 1995), in this case the analysis assumes the exclusively descriptive meaning of specifying if there is a relatively stronger improvement of the regional employment performances in the most disadvantaged regions. The aim of our estimate is limited to providing this information and not to deriving any estimate or quantitative consideration about the levels of the parameters. For example, since a generalised forward shift of the ER has already been shown for the EU-15 regions, β convergence indicates that regional ER converge toward higher levels.

Table 3. Beta Convergence of regional employment rates

	Europe 25	EU-15	EMU-12	CEC-10	8 CEC-NM
<i>Dependent ER growth 1999-2003</i>	<i>Coefficient and P-values</i>				
1999 ER	- 0.122 (0.000)	-0.173 (0.000)	-0.183 (0.000)	-0.209 (0.009)	0.117 (0.329)
Constant	0.521 (0.000)	0.746 (0.000)	0.788 (0.000)	0.808 (0.013)	-0.524 (0.285)
	<i>Observations: 262</i>	<i>Observations: 209</i>	<i>Observations: 164</i>	<i>Observations: 53</i>	<i>Observations: 39</i>
	<i>Adjusted R²: 0.084</i>	<i>Adjusted R²: 0.330</i>	<i>Adjusted R²: 0.316</i>	<i>Adjusted R²: 0.109</i>	<i>Adjusted R²: -0.001</i>
	<i>Prob F: 0.0000</i>	<i>Prob F: 0.0000</i>	<i>Prob F: 0.0000</i>	<i>Prob F: 0.0092</i>	<i>Prob F: 0.3292</i>

Source: elaboration on Eurostat Regio data

¹⁶ Convergence regressions were computed with reference to the period 1999-2003, except for the regions of Bulgaria, for which the first data refer to 2000. In this case, the 1999 data were approximated by linear interpolation. The agricultural employment indicators refer to 2000 rather than 1999 for all the Polish and Bulgarian regions, and for the German regions of Leipzig, Dresden and Chemnitz. The same data for the Portuguese regions of Centro, Lisboa and Alentejo refer to 2003, since previous data are missing.

The estimates derived from the basic models clearly show a beta-convergence between the labour market performances (in terms of ER) of the Europe-25 regions. The results are significantly reinforced when the analysis is restricted to the regions of the old member States and even more so when limited to the twelve members of the monetary union¹⁷. Again, these results indicate discontinuity with regard to evidence referring to an earlier period (1979-1997) and to a limited sub-set of the EU regions (Marelli, 2000). These outcomes suggested a weak diverging trend over the whole period with a weak convergence limited to the second sub-period (1986-1997) and to the first (1979-1986) if the Spanish regions were excluded from the subset. A strong beta convergence also exists for the regions of the CEC-10. The relationship between beta and sigma convergence (the former is a necessary but not sufficient condition for the latter) is thus also evident with regard to employment performance: the significant negative relationship between initial ER levels and growth rate (the lowest regions grow faster, or, as is the case of CEC, decrease more slowly) does not imply a concentration of the distribution. The results for the 8 CEC-NM regions are ambiguous since, although a diverging pattern is suggested by the positive coefficient of the initial ER, both the single coefficients and the whole model are insufficiently significant.

In order to consider the roles of sector structure and the ongoing inter-industry reallocation of employment (already suggested by the downward trend of regional and country ER for the CEC), the beta convergence regressions have been conditioned on the importance of the farming sector (agriculture ER) in the regions¹⁸ (Table 4). Many areas, especially in the Central Europe, still exhibit large primary sectors that are bound to shrink as the development process advances, and this adjustment trend cannot be neglected if the aggregate employment performances of these systems are considered.

Table 4. Conditional convergence of regional employment rates

	Europe 25	EU-15	EMU-12	CEC-10	8 CEC-NM
<i>Dep. ER growth 1999-2003</i>	<i>Coefficient and P-values</i>				
1999 ER	-0.151 (0.000)	-0.169 (0.000)	-0.182 (0.000)	-0.200 (0.007)	0.042 (0.728)
1999 ER agriculture	-0.015 (0.000)	0.002 (0.414)	0.002 (0.439)	-0.030 (0.002)	-0.027 (0.042)
Constant	0.656 (0.000)	0.732 (0.000)	0.779 (0.000)	0.829 (0.006)	-0.171 (0.730)
	<i>Observations: 262</i>	<i>Observations: 209</i>	<i>Observations: 164</i>	<i>Observations: 53</i>	<i>Observations: 39</i>
	<i>Adjusted R²: 0.161</i>	<i>Adjusted R²: 0.332</i>	<i>Adjusted R²: 0.314</i>	<i>Adjusted R²: 0.252</i>	<i>Adjusted R²: 0.085</i>
	<i>Prob F: 0.0000</i>	<i>Prob F: 0.0000</i>	<i>Prob F: 0.0000</i>	<i>Prob F: 0.0003</i>	<i>Prob F: 0.0770</i>

Source: elaboration on Eurostat Regio data

¹⁷ Logarithmic transformations only improved the significance levels of the coefficients of the dependent variables in the estimates for CEC-10 (which, in any case, remained significant at 10%, even in the estimates with non-transformed variables). All the signs of the coefficients of the parameters (and the hierarchy of the coefficients between the various levels of aggregation) remained unchanged. The same results were found for the estimates listed in Table 4. All the outcomes obtained without log-transformation are available upon request.

¹⁸ The importance of the agricultural sector (usually defined as the share of farming in production) as a proxy of the structural features of economic systems, is also widely used in the empirical literature (e.g., Boldrin and Canova, 2001) regarding geographical economic and income disparities.

The sectoral variable is significant in the models of the Europe-25 and CEC-10 regions, where its contribution to the explicative potential of the model is not negligible. The negative sign confirms the expected outcome that the regions where farming played a relatively more important role in 1999 performed worse in terms of employment rates over the subsequent four years. In other words, the outflow from the (probably) oversized primary sector still negatively affects the whole employment performance of the region. The agricultural ER does not supply any explicative contribution in the regression of the regions of the EU-15 and EMU-12, where farming has already reached a more equilibrium size.

The convergence analyses implemented at the regional level partly confirm the outcomes of the country analysis as regards the sigma converging trend of the old members versus the diverging pattern of the new EU members of Central Europe. In terms of beta convergence, while the clear trend of the EU-15 regions towards an upward concentration is confirmed, the ambiguous σ -trend for the CEC-10 is replaced by a strong β converging trajectory, significantly affected by the evolutions of the primary sector. This reinforces the need to gain deeper insights about the employment structure considering a wider set of labour market indicators of the regions of the Central European countries.

5. A Cluster Analysis for CEC-10 Regional Labour Markets

The considerable amount of information available about the sub-national labour markets of the ten CEC can be used to evaluate the possible size and degree of similarity and diversification of their regions. To this aim, the cluster analysis techniques, of the family of multivariate statistics, look significantly promising, since they allow the observed cases, described by a set of variables, to be classified in fewer classes (or clusters), not known a-priori, maximising the similarity within the groups and the diversity among them (Fabbris 1997).

In order to maximise the reliability of the outcomes obtained, the cluster analysis was carried out using different methods and preceded by other steps aimed at optimising its implementation.

5.1. Data and Methodology of Analysis

The basic dataset identified for the analysis is a matrix of 53 rows (the NUTS 2 level regions of the CEC-10) and 25 columns of the variables considered. The whole dataset was obtained from the Eurostat Regio database and refers to the year 2001. The indicators can be divided into two ideal sets: those concerning the basic features of the regional labour markets: employment rates (general, male, females, 55-64 years), self-employment rate and share of total employment, unemployment rates (general, male, female), youth and long-term unemployment rate and share of total unemployment; and those depicting the sector composition of employment (NACE 1 sector classification), again calculated on the working-age population. The emphasis placed on this second set of indicators is justified by the role that the literature on economic growth (e.g. Paci and Pigliaru, 1999; Molle, 1997) has attributed to the industry structure, as being a crucial determinant of development, because of the well-known structural, economic and productive differences among sectors. The translation of this influence into diversified labour market performance has also been recently shown in empirical analyses

concerning Europe (Marelli, 2000; Martin and Tyler, 1995). The centrality of regional structural differences could be even stronger, as partly witnessed by the convergence analysis conditioned to the role of farming used above, in the transition countries, where the ongoing adjustments can imply labour force outflows from certain sectors (typically agriculture or industries where the presence of the State is being significantly reduced) towards the unemployment area that can only slowly be re-absorbed by the economic systems (Boeri and Scarpetta, 1996).

The large number of indicators compared to the observations suggested the need to reduce the variables of the basic matrix. A correlation analysis showed significant relationships between many variables (especially those of the first set), rendering their information potential redundant. Since the cluster analysis results are strongly influenced by high levels of correlations among the active variables (Barjak, 2001), this suggested a restriction of their number. This was done through two different approaches, corresponding to the two ideal sets of indicators. The very strong correlation among some indicators of the basic features of the regional labour markets (Table A6) suggested that, among the correlated variables [as in Barjak (2001) a threshold of the Spearman Index higher than 0.80 was adopted], the one with the highest informative power and the most general meaning should be maintained¹⁹. The following variables were maintained: Total employment rate, Employment rate 55-64, Self employment rate, Total Unemployment rate, and Long-term Unemployment as a share of total employment, since the rate was highly correlated with the general unemployment indicators.

As regards the second set of variables, those concerning the sector composition of employment, a factor analysis was carried out to identify a number of latent factors that could extract the maximum variance of the indicators with the minimum loss of information. Moving from the 9-sectors initial partition, the principal component method (SPSS Software, 9.0) identified three factors that accounted for a cumulated variance of 78.14 %. They were thus considered as satisfactory in describing the sector specialisation of the regional labour market (Table A7)²⁰. The first component is positively correlated with the public and private service employment rates and inversely correlated with the agricultural sector: it can thus be considered a post-agricultural service-oriented labour market indicator; the second and the third can be directly associated with employment in the manufacturing industry and the Mining & quarrying and Energy industry, respectively.

Having significantly reduced the number of variables by eliminating the most evident redundancies, a first cluster analysis was implemented on the reduced matrix of 53 rows and 8 columns. Considering the attributes of the outcomes obtainable from the cluster analysis (Fabbris, 301-302) and some previous empirical literature (Marelli, 2004a; Barjak, 2001), the elaboration was organized into two levels of analysis, taking into account the clustering options available in the SPSS package. Firstly, through the hierarchic *Ward* method, the units were classified into 7 groups that were considered satisfying (dendrogram inspection and consistency with the ex-ante available information). Subsequently, in order to test the stability of the outcome, such clustering was optimised through a new cluster analysis, but using the non-hierarchic *k-means* method, with the instruction to classify the observations into 7 groups whose centres

¹⁹ Employment rates were thus preferred over the shares of the variable total.

²⁰ KMO and Bartlett's sphericity tests were both satisfactory. The first one reaches 0.803, considered as "merit" by Kaiser (1974) (quoted in Fabbris, 1997, p. 194).

coincided with those of the groups of the previous application (Ward). With the exception of three observations out of 53²¹, this procedure gave a classification that was coincident with the previous one. For this reason, it was considered to be sufficiently reliable and was finally adopted.

Afterwards, in order that the influence of the choice of the variables on the characterisation obtained be more explicit (especially those concerning the sector employment), two further cluster analyses were implemented using the two sets of variables separately. The outcomes, obtained using the methodology described above, provide further interesting points for discussion.

5.2 The Outcomes

The classification obtained and the cluster characterisation using the whole set of variables are presented in Table 5, Table A8, and Map 1.

Table 5. Characterisation of the clusters (cluster mean – general mean)

Cluster	Employment rate	Employment rate 55.64	Self empl. rate	Unempl. rate	Long Term Unempl. share	Post agric. Service oriented	Manufact.	Mining and quarrying
1	-1.05	-0.83	-0.62	1.22	0.74	0.01	-0.24	-0.28
2	-0.37	-0.34	-0.52	-0.21	-0.33	0.18	-0.15	-0.28
3	1.92	1.58	0.05	-1.20	-2.09	3.64	-2.08	-0.28
4	0.84	-0.05	-0.34	-1.00	0.09	-0.17	1.70	-0.28
5	-0.29	-0.47	-0.73	0.50	0.19	0.43	-0.15	3.54
6	0.16	0.51	1.08	0.02	-0.31	-0.24	-0.41	-0.15
7	1.52	2.55	2.52	-0.99	0.05	-2.08	-1.04	0.33

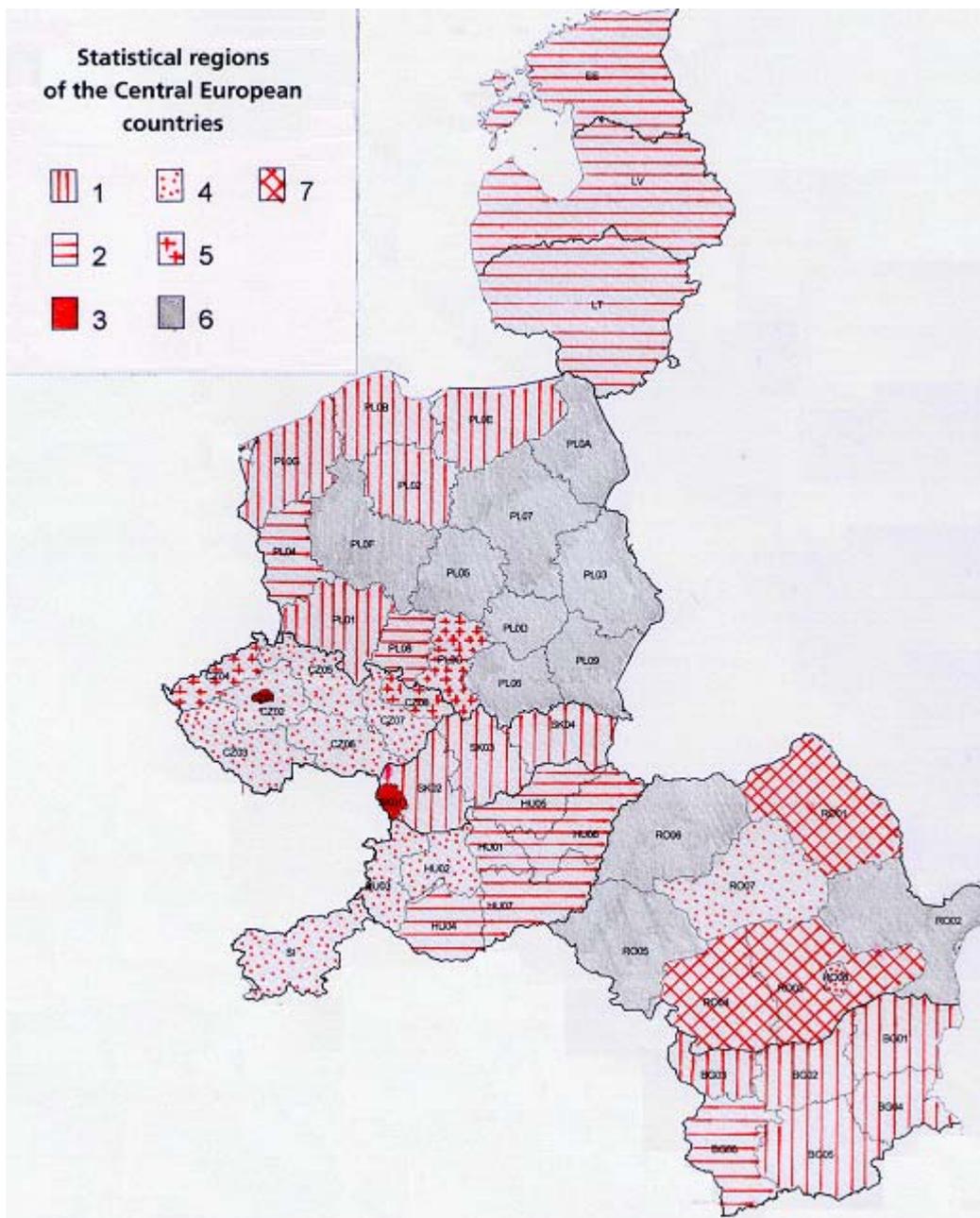
Source: elaboration on Eurostat Regio data

All the variables were standardised ($m=0$, $var=1$)

The map highlights how the clusters, along with a certain level of geographical compactness, also show a common cross-country dispersion. Only Cluster 3 is indeed exclusively made up of regions of one country (Romania), while all the remaining ones go beyond national borders. Similarly, each country is articulated into regions belonging to different countries; Poland and Romania show the highest levels of diversification and Bulgaria and the Slovak Republic the lowest. This first outcome (also confirmed when a larger number of clusters is adopted), consistent with Marelli (2004a), supports the growing importance of the regional differences as well as the economic and policy relevance (Overmans and Puga, 2002) of the regional dimension. The clusters characteristics help to identify this cross-country articulation of the regional labour markets.

²¹ The 3 observations moved to the next (most similar) cluster.

Map 1. Regional labour market clusters of the central European countries



Source: elaboration on Eurostat Regio data

Cluster 1, which groups 13 regions, contains a relevant part of southern Bulgaria, all the regions of Slovakia except the region of the capital city (Bratislava), the northern regions and the Dolnoslaskie region of Poland. The regions show marked below-average levels for all the employment rates and the highest unemployment levels. From the sectoral point-of-view, they show an average agricultural and tertiary specialisation and weak manufacturing and mining and quarrying industries. Cluster 2 (the Baltic Countries, eastern Hungary, two regions of southwest Poland and the South-West region of Bulgaria), shows many features that are similar to the previous group, but differs substantially in terms of unemployment rates (lower than average). In other

words, with the sectoral specialisation and the levels of labour market participation being equal, these regions are more able to absorb labour supply in the economic system. Cluster 3 is made up of two urban regions, Bratislava and Praha, the two capital cities of Slovak Republic and Czech Republic, respectively. This cluster, together with cluster 7, shows the best labour market performances. Cluster 7 is composed of three regions of Romania that still rely heavily on agriculture and this fact probably distorts the employment performance by overestimating labour participation and underestimating unemployment. Cluster 4 is composed of most of the Czech Republic, Slovenia, the western regions of Hungary and the two Romanian regions of Bucuresti and Centru. The group shows a high employment rate, average levels of employment for the class of workers aged 55-64, and low self-employment and unemployment rates. From the sectoral point of view, these regions are the most specialised in the manufacturing industry and show an agricultural sector that is still important in terms of labour absorption. Cluster 5 groups two confining regions of Poland (Slaskie) and the Czech Republic (Ostravsko) and the eastern Czech region of Severozapad, which are still significantly dominated by the mining and quarrying sectors. This sector specialisation (coupled with the strong historical presence of the traditional heavy industries) and their structural difficulties are probably the major determinant of the poor labour market performance of these regions. It should be said that a greater regional detail would probably highlight some diversities in the Polish region due to the existing structural differences. Cluster 6 includes a large portion of central and eastern Poland and one eastern and the two western regions of Romania and shows above-average employment rates (especially self-employment), average unemployment and lower long-term unemployment levels. From the sectoral point of view, the group average shows a relatively high reliance on agriculture and a low level of importance of the manufacturing sector. For these regions, together with those of group 7, further job losses are to be expected from the adjustment process in the primary sector (Overmans and Puga, 2002), similar to that already envisaged by Barjak (2001) for the case of eastern Poland.

In order to help the interpretation of these outcomes and assess the role of the structure of employment in determining the CEC-10 regional labour market performance, two further cluster analyses were implemented separately for the two sets of variables. For the sake of brevity, only the analysis implemented using the employment and unemployment variables is reported (Tables A9 and 6), since the other analysis only classifies the regions according to their employment industry articulation²².

Table 6. Characterisation of the clusters (cluster mean – general mean)

Cluster	Employment rate	Employment rate 55.64	Self employment rate	Unemployment rate	Long Term Unemployment share
1	-1.03	-0.81	-0.59	1.16	0.25
2	0.30	-0.16	-0.48	-0.64	0.17
3	1.68	2.16	1.53	-1.07	-0.81
4	0.16	0.51	1.08	0.02	-0.31

Source: elaboration on Eurostat Regio data. All the variables were standardised ($m=0$, $var=1$)

²² This classification is of core importance if the economic structure is the main focus of the analysis, and if it is used to distinguish regional industry structures as a preliminary step to other elaborations (as in Marelli 2004b). The outcomes of this cluster analysis are available upon request.

The first group corresponds largely to the previous Cluster one, both in terms of labour market features and geographical articulation. The only exceptions are indeed the Polish regions of Slaskie, Opolskie and Lubuskie: in the previous analysis the first one belonged to the cluster of regions specialized in the mining and quarrying sector, while the other two regions belonged to Cluster 2 (the most similar to the previous first group). The second Cluster, with a better-than-average performance in terms of total employment and unemployment rates but with a lower level of the other indicators, largely corresponds to the sum of Clusters two and four in the previous analysis, grouping all of Hungary, the three Baltic Countries and Slovenia, all of Czech Republic (with the exception of Prague), the Romanian regions of Centru and Bucuresti and the Bulgarian region of Yugoiztochen. The best performing Cluster 3 coincides perfectly with the union of the previous clusters three and seven (the best performers in the previous analysis). Their outstanding outcomes, especially in terms of ER correspond to the greatest distance in terms of sector employment structure (two capital cities of Prague and Bratislava and the three most agricultural regions of Romania). Finally, Cluster four perfectly overlaps the previous Cluster six.

The substantial stability of the configurations of Clusters one and six of the previous analysis, also recorded when the sector variables are dropped, is clearly a consequence of the relatively weak characterization of the regions included in the groups in terms of employment industry specialization (see Table 5). These can be considered therefore the regions where the labour market performance is less dependent on the sector structure of the economy, and in a certain sense they can be considered less vulnerable to the ongoing general sector reallocation of resources. The opposite is true for the previous Clusters three and seven, where the employment structure information allows distinguishing between the service-oriented regions and those where a massive outflow from farming (and a marked deterioration of labour market indicators) is to be expected. Similarly, the sector indicators provide useful information for discerning the very different performance of previous Clusters two and four (in the second analysis all their regions belong to Cluster two). In particular they are helpful in separating the regions where the manufacturing sector plays a relevant role and is able to guarantee a good labour market performance, from those where a fuzzier sector structure is accompanied by lower unemployment rates and a weaker labour market participation (indicated by lower-than-average ERs). In summary, it can be underlined how the agricultural sector in particular (as also anticipated in dynamic terms by the regional convergence analysis) strongly influences the regional labour market performances, and this underlines its relevance in terms of policy intervention targeted at preventing further marked deterioration in terms of employment.

6. Concluding Remarks

This paper analyses national and regional (NUTS-2) employment performance and convergence for various aggregations of 27 European countries (EU-25, plus Romania and Bulgaria), mainly using the three employment indicators (total, female, older worker) adopted by the European Employment Strategy (EES) to define quantitative objectives to be reached by 2010. Analysis focuses exclusively on these

quantitative aspects, although we are aware of the importance of other crucial features of employment (i.e. labour productivity and real wage levels and changes)²³.

The national level of investigation confirmed the existence of marked differences in employment performances within the Europe-27 aggregation, but also in those of EU-15, EMU-12, CEC-10 and 8 CEC-NM. For many countries, the 2003 levels of labour market performance were still far from the three European goals and the weight of the shadow economy is still unacceptable. In 2003, only Denmark, Sweden and the U.K. had already reached all three quantitative objectives of the EES.

However, net job creation in the period 1997-2003 was remarkable and positive in all the EU-15 and EMU-12 countries, whereas dynamics in the new and acceding countries were more heterogeneous (and, mostly, negative). In particular, Spain and Ireland experienced extraordinarily high net job creation; on the contrary, Poland and Romania suffered remarkable net job destruction.

The σ and Lowess β convergence analysis highlighted the fact that the remarkable net job creations in the EU-15 (and EMU-12) were accompanied by a significant (national) convergence in all three employment indicators (1997-2003). As regards total employment rate, significant converging trends (both σ and β) also exist and are significant at regional level for both EU-15 and EMU-12 aggregations.

In the ten CEC (eight new EU members, plus Romania and Bulgaria) a significant σ convergence (2000-2003) exists only for the older worker employment rates. Analysis at regional level highlights a weak σ convergence and a significant β convergence for total employment rates in the period 1999-2003. The β convergence conditioned on the (initial) employment weight of the agricultural sector shows that regions where it was higher in 1999 had worse performances in the period 1999-2003.

In the 8 CEC-NM (new members), a σ -diverging trend started in 1999 for the total employment rate indicator, whereas a converging dynamic was limited to the period 1998-2001 for the older worker employment rate. As shown in regional analyses, a significant σ -diverging trend exists for (regional) total employment rates (1999-2003) in the 8 CEC-NM. Results of Lowess analyses for the same group of countries highlight the prevalence of net job destruction (1998-2003), accompanied by the absence of a β convergence dynamic.

In the national-level analyses for the ten CEC, an empirical investigation of the relationship between “progress in transition” and employment performance was also carried out. In general, a simple, stable relationship does not emerge. The data indicate that progress in transition was still accompanied by net job destructions in six out of the ten CEC (especially Poland and Romania) during the period 1998-2003. However, the weak U-shaped relationship in 1998 evolved in 2003, as transition proceeded, toward a positive relationship. This is not in contrast with the result of 1998, since by now the most part of the countries are on the upward section of the curve. The positive correlation of “speed in transition” (and of the 1998-2003 average level of transition) with net job creation cannot easily be explained, due to difficulties in defining the principal direction of causality. The significant net job destructions that still exists in many countries can indeed affect the process (and speed) of transition, making

²³ The new strategic goal established at the Lisbon Council in 2000 for the following decade is: “*to become the most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion*”.

institutional changes (e.g., price liberalization and/or privatization in some sectors) politically difficult beyond certain thresholds (Burda, 1993). Moreover, the fact that countries with lower synthetic transition indexes have a larger shadow economy does not guarantee that further progress in transition will immediately be accompanied by a reduction in “irregular employment” and that the latter will automatically emerge on to the formal labour market.

As regards the regional level of investigation, cluster analyses were also carried out for the 53 regions of the ten CEC (2001). The main results show that: (i) all the countries have a high level of regional labour market diversification; (ii) regions with similar employment performance and/or sectoral structure are scattered throughout various and not necessarily adjacent countries; and (iii) the industry structure (especially the weight of the farming sector) still significantly affects (official) employment performance in many regions.

Referring only to the two main institutional changes in recent years (adoption of a single currency by 12 EU countries, and the move of eight CECs toward EU membership) and to a specific policy innovation (launch of the European Employment Strategy in 1997, as a co-ordination of multilevel “regional” employment policies), we can now highlight some key conclusions and provide some tentative interpretations and possible implications, on the basis of the main empirical results of this paper .

The 12 European countries which adopted a single currency, notwithstanding the restrictive macro-economic policies required to respect the financial convergence goals defined by the Maastricht Treaty criteria (1992) and confirmed in the “Stability and Growth Pact” (1997), have (like the EU-15 aggregation) been characterised by significant and to some extent unexpected improvements in (national) employment performances (1997-2003) and by σ - and β -convergence trends on both national (1997-2003) and regional (1999-2003) levels. We argue that a positive link between the (surprising) employment performance and the role played by the European Employment Strategy cannot be excluded. The effects of the EES on employment are extremely difficult to evaluate, but the overlap, in the period 1997-2003, of some quantitative evidence (which also partly emerged in our research) with important employment policy innovation, support the above statement: (i) in contrast to the previous periods, employment significantly increased in all the EU-15 members (more than 12 million new jobs in the EU-15 from 1997 to 2002, of which about 10 million were permanent jobs), and this is also true for the most recent years, when GDP growth rates were extremely low (employment/GDP elasticity has increased remarkably); (ii) employment increases (1997-2003) were much higher in the EU-15 and EMU-12 countries and regions with the worst initial performance, and a significant reduction in national and regional dispersion also emerges; (iii) a general convergence of employment rates toward the three European objectives arises; (iv) unemployment, especially long-term, decreased (the decline was less than the increase in employment, due to higher participation in the labour market); (v) the process of exchange of information between member States, encouraged by the EES, allowed better assessment of the transferability of good practices; (vi) after 2000 (Lisbon Council), the EES provided a better definition of clearer quantitative objectives, with greater emphasis on net employment creation rather than unemployment reduction; (vii) the EES Employment Guidelines recommended and strongly encouraged some labour market reforms and better implementation of many instruments (public and private employment services, life-long learning, wage moderation, etc.).

The 8 Central European countries (new EU members) which had heterogeneous but mostly negative dynamics, accompanied by σ - and β -divergence trends at both national and regional levels, have in recent years concentrated significant efforts to further improving their levels of transition and on comply with the requirements of EU membership. It can be argued that these institutional changes - which led to considerable job destructions only later partly compensated by job creation patterns in the newly created private sector – may be considered as the main causes of the labour market dynamics evidenced during this period. In this framework, preliminary steps in complying with the EES guidelines²⁴ (and their eventual results) are probably dominated by the above-mentioned commitments. Notwithstanding the considerable variety in the patterns and speeds of national transition, it may be argued that, in the near future, labour market dynamics will finally show visible quantitative improvements, as a result of the combined effects of the fading of the negative employment effects of transition and the spread of the potential contained in the EES employment guidelines. The three general²⁵ guidelines and most of the ten specific²⁶ ones, adopted in the 2003 revision of the EES, seem indeed to be able to address some of the crucial issues of the CEC labour markets, as also evidenced in this paper (e.g., favouring emergence of irregular employment, encouraging job creation and entrepreneurship, implementing active, preventive measures for the unemployed)²⁷. In particular, the results of our regional analyses, which showed marked and growing levels of diversification even within single countries, are pertinent to the last specific guideline (*addressing regional employment disparities*). These remarkable differences (in terms of both employment structure and performance) indicate the appropriateness of the (vertical and horizontal) subsidiarity principle and the need for its effective enforcement, as envisaged by the EES and concretely translated, for example, into the enhanced importance of regional dimensions in defining priorities according to the main financial instrument of the EES (European Social Funds). From this point of view, the greater importance attached to the so-called Active Labour Market Policies (ALMP) in itself implies a de-centralisation process, since

²⁴ EU co-ordination on employment policies (EES) is an important part of the Community *acquis*. The objective of the Commission is to ensure that candidate countries define employment policies that will prepare them for membership in the Union and progressively adjust institutions and policies to the European Employment Strategy, to allow the full implementation of the Employment Title of the Treaty since their accession. It was indeed agreed that, in a first step, the candidate countries and the Commission would analyse the key challenges for employment policies in the “Joint Assessment Papers” signed by the Commissioner for Employment and Social Affairs and by the Ministers of Labour. The eight new EU members started to participate fully in the European Employment Strategy and submitted their first National Action Plan in September/October 2004.

²⁵ (i) full employment, as defined in Lisbon and Stockholm; (ii) quality and productivity at work (employment growth must be accompanied by productivity changes in order to permit real wage increases); and (iii) a cohesive and inclusive labour market (employment is a crucial mean to social inclusion).

²⁶ (i) active and preventive measures for the unemployed and inactive; (ii) job creation and entrepreneurship; (iii) address change and promote adaptability and mobility in the labour market; (iv) promote development of human capital and lifelong learning; (v) increase labour supply and promote active ageing; (vi) gender equality; (vii) promote integration and combat discrimination against disadvantaged people in the labour market; (viii) make work pay through incentives to enhance work attractiveness; and (ix) transform undeclared work into regular employment; (x) address regional employment disparities.

²⁷ In addition each single country receives EES recommendations according to the particular features of its labour markets.

their implementation requires in-depth knowledge of features of labour markets at regional/local level. The role of ALMP will be particularly crucial to accompany in the CECs the easily predictable adjustments in the relative weight of traditional sectors (farming, mining, some portions of manufacturing) in many regions where they still account for a relatively significant share of employment. As suggested by Marelli (2004b), the opportunity of common European policies for similar regions in different countries should also be examined, although, in the case of the labour market, the effects of the profound institutional differences between nations (Burda, 2003) cannot be neglected.

The regional dimension also seems crucial with reference to the set of development policies. The accession to EU of the eight CECs provides new opportunities for regional development and economic convergence, through the use of the financial resources of the structural funds aimed at pursuing the priority objectives. Although this paper only focuses on employment and does not explicitly consider regional levels of development (e.g., in terms of levels and changes in per-capita GDP), it is interesting to note that a significant correlation exists between levels of employment performance and levels of per-capita GDP - which is the benchmark indicator for the framework of European regional policies - and that the highest level of correlation is recorded for the regions of the eight new EU members²⁸. Thus, for them, EU membership means the opportunity to benefit from a regional development policy that will largely interest regions with poorer employment performances. These inflows of public resource may thus help to sustain the efforts of labour market policies, acting on both quantitative (net job creation) and qualitative (labour productivity, real wage growth) aspects. From this point of view, close integration of development and labour policies should be strongly encouraged.

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²⁸ The two variables, referring to 2001, show significant (at 1%) levels of correlation. The Spearman index is 0.54 for the whole set of Europe-25 regions; 0.57 for EU-15 regions; 0.38 for CEC-10, and 0.62 for 8 CEC-NM. The remarkable decrease in the correlation index for the CEC-10 may be attributed to the highly distorting effect of the particularly high levels of agricultural employment, especially in the Romanian regions.

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APPENDIX

Table A1 - The size (% of GDP) of the shadow economy in Europe (1999-2000)

European Union – 15		Central European Countries - 10	
Austria	9.8	Slovak Republic	18.9
United Kingdom	12.7	Czech Republic	19.1
Netherlands	13.1	Hungary	25.1
France	15.2	Slovenia	27.1
Ireland	15.9	Poland	27.6
Germany	16.0	Lithuania	30.3
Denmark	18.0	Romania	34.4
Finland	18.1	Bulgaria	36.9
Sweden	19.2	Latvia	39.9
Belgium	22.2	Estonia	n.a.
Spain	22.7		
Portugal	22.7		
Italy	27.1		
Greece	28.7		
Luxembourg	n.a.		
<i>Mean</i>	18.7		24.7
<i>Coefficient of variation</i>	28.3		17.4

Mean (all countries): 22.6
Coefficient of variation (all Countries): 34.3

Source: Schneider (2003) calculations based on "currency demand approach" (EU-15) and Schneider (2003) calculations based on Worldbank data, Washington D.C., 2002 (CEC-10).

Table A2. Sigma convergence of country total employment rates

	1997	1998	1999	2000	2001	2002	2003
Europe 24		0.0964	0.0947	0.0977	0.1006	0.1003	0.0937
Europe 25				0.1050	0.1090	0.1073	0.0987
EU - 15	0.1163	0.1116	0.1080	0.1026	0.1014	0.0961	0.0884
EMU-12	0.1004	0.0974	0.0952	0.0902	0.0896	0.0846	0.0760
8 CEC-NM		0.0633	0.0494	0.0537	0.0623	0.0717	0.0708
CEC-10				0.0717	0.0788	0.0797	0.0744

Source: elaboration on Eurostat data.

Table A3. Sigma convergence of country female employment rates

	1997	1998	1999	2000	2001	2002	2003
Europe 24		0.1696	0.1591	0.1515	0.1506	0.1483	0.1383
Europe 25				0.1523	0.1514	0.1486	0.1381
EU - 15	0.2105	0.2037	0.1950	0.1846	0.1818	0.1742	0.1603
EMU-12	0.1861	0.1810	0.1757	0.1649	0.1628	0.1572	0.1442
8 CEC-NM		0.0779	0.0653	0.0661	0.0706	0.0818	0.0822
CEC-10				0.0788	0.0795	0.0836	0.0815

Source: elaboration on Eurostat data.

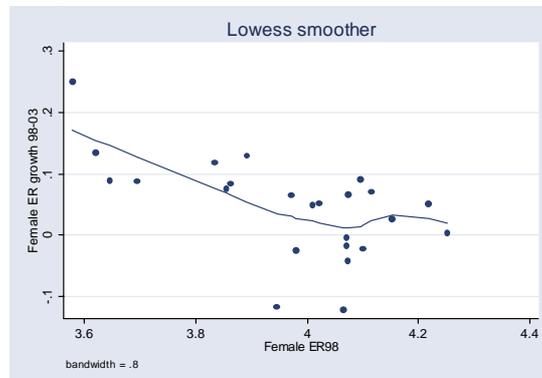
Table A4. Sigma convergence of country 55-64 employment rates

	1997	1998	1999	2000	2001	2002	2003
Europe 24		0.3135	0.3050	0.2996	0.2990	0.2911	0.2867
Europe 25				0.3126	0.3046	0.2928	0.2858
EU - 15	0.2869	0.2829	0.2756	0.2746	0.2902	0.2697	0.2649
EMU-12	0.2220	0.2182	0.2100	0.2102	0.2279	0.2099	0.2074
8 CEC-NM		0.3262	0.3100	0.2813	0.2619	0.2954	0.2952
CEC-10				0.3183	0.2832	0.2743	0.2695

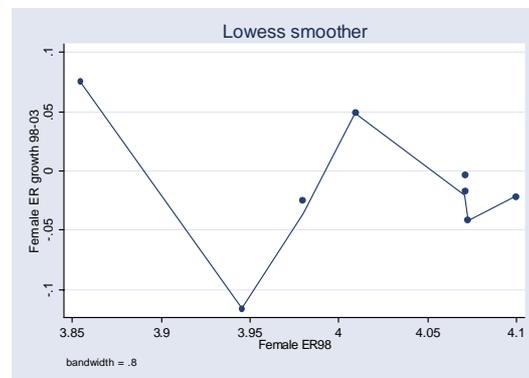
Source: elaboration on Eurostat data.

Figure A1. Lowess beta convergence estimates of Female ER at Country level

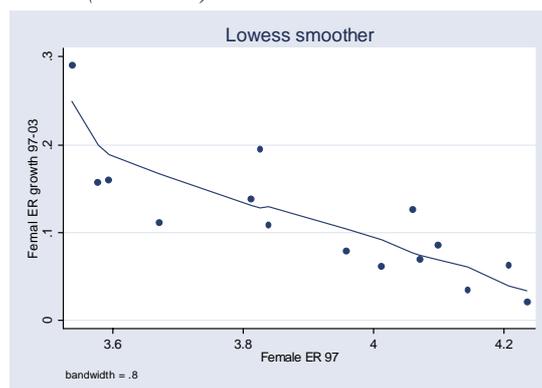
Europe 24 (1998-2003)



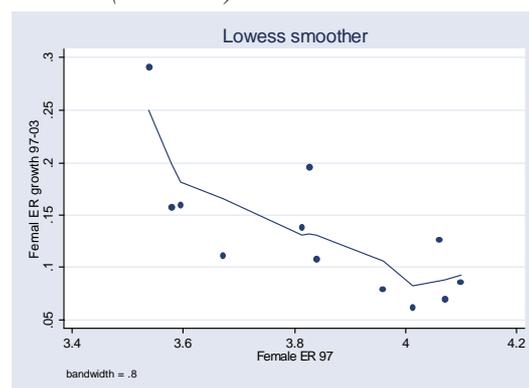
8 CEC-NM (1998-2003)



EU-15 (1997-2003)



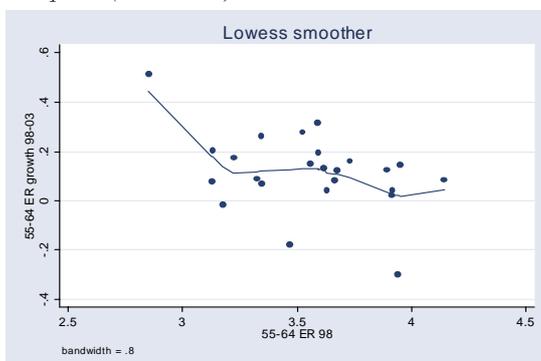
EMU-12 (1997-2003)



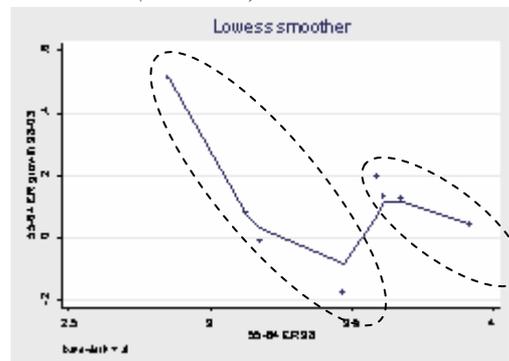
Source: elaboration on Eurostat data.

Figure A2. Lowess beta convergence estimates of 55-64 ER at Country level

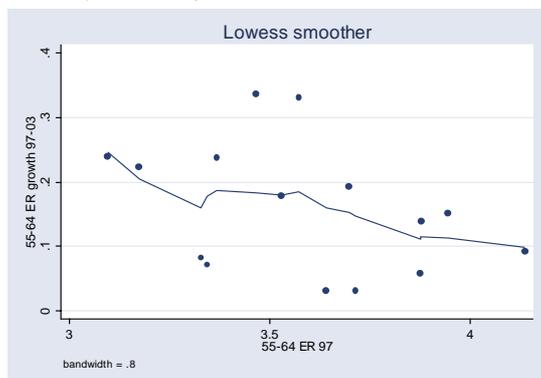
Europe 24 (1998-2003)



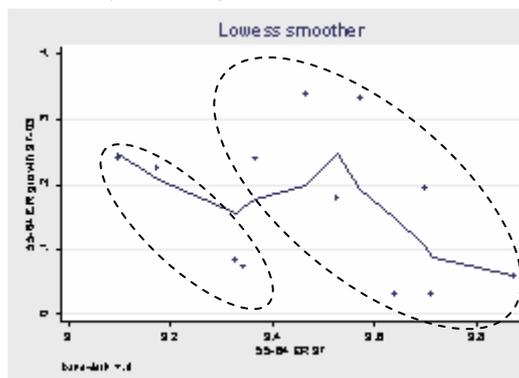
8 CEC-NM (1998-2003)



EU-15 (1997-2003)

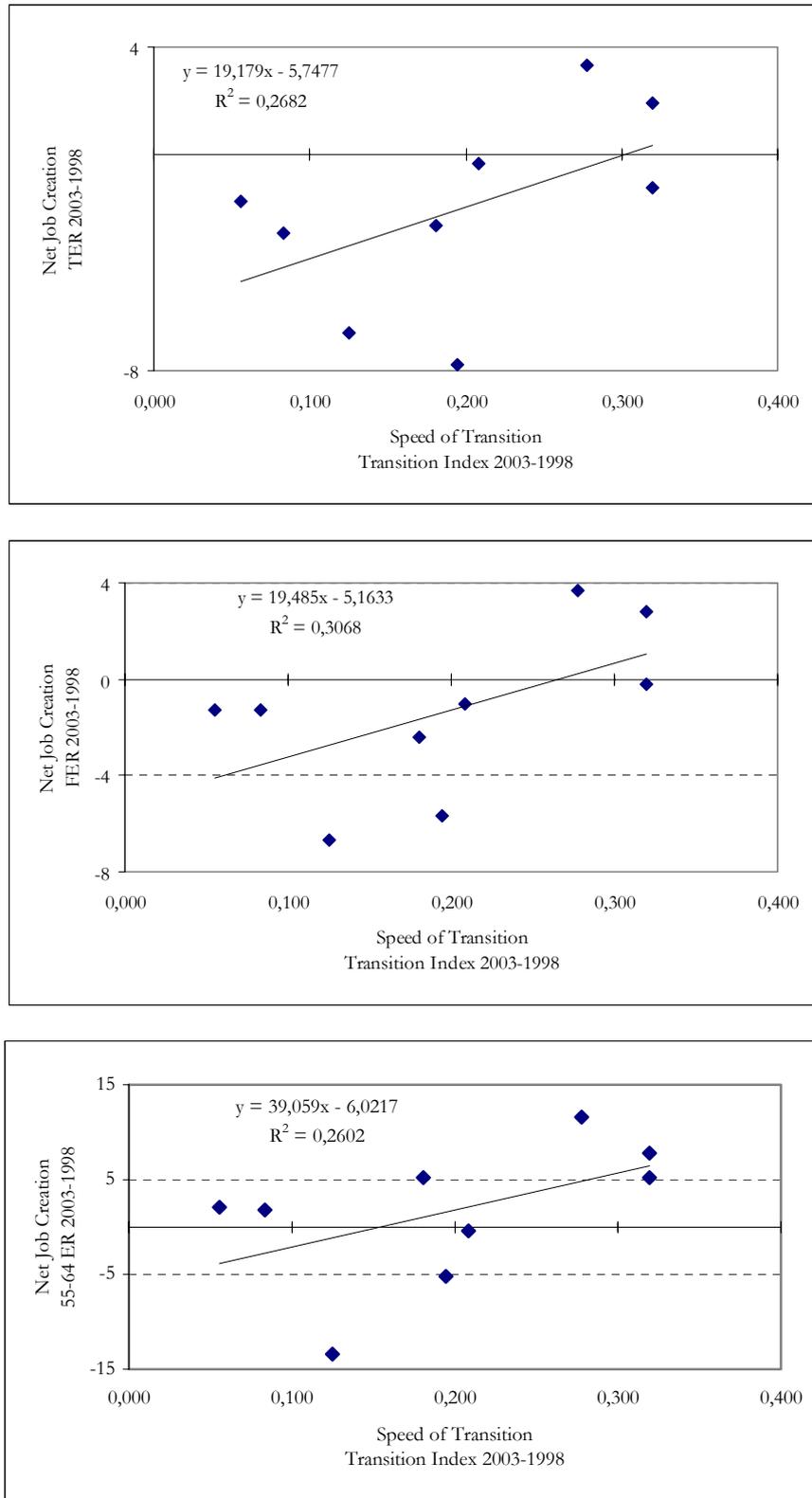


EMU-12 (1997-2003)



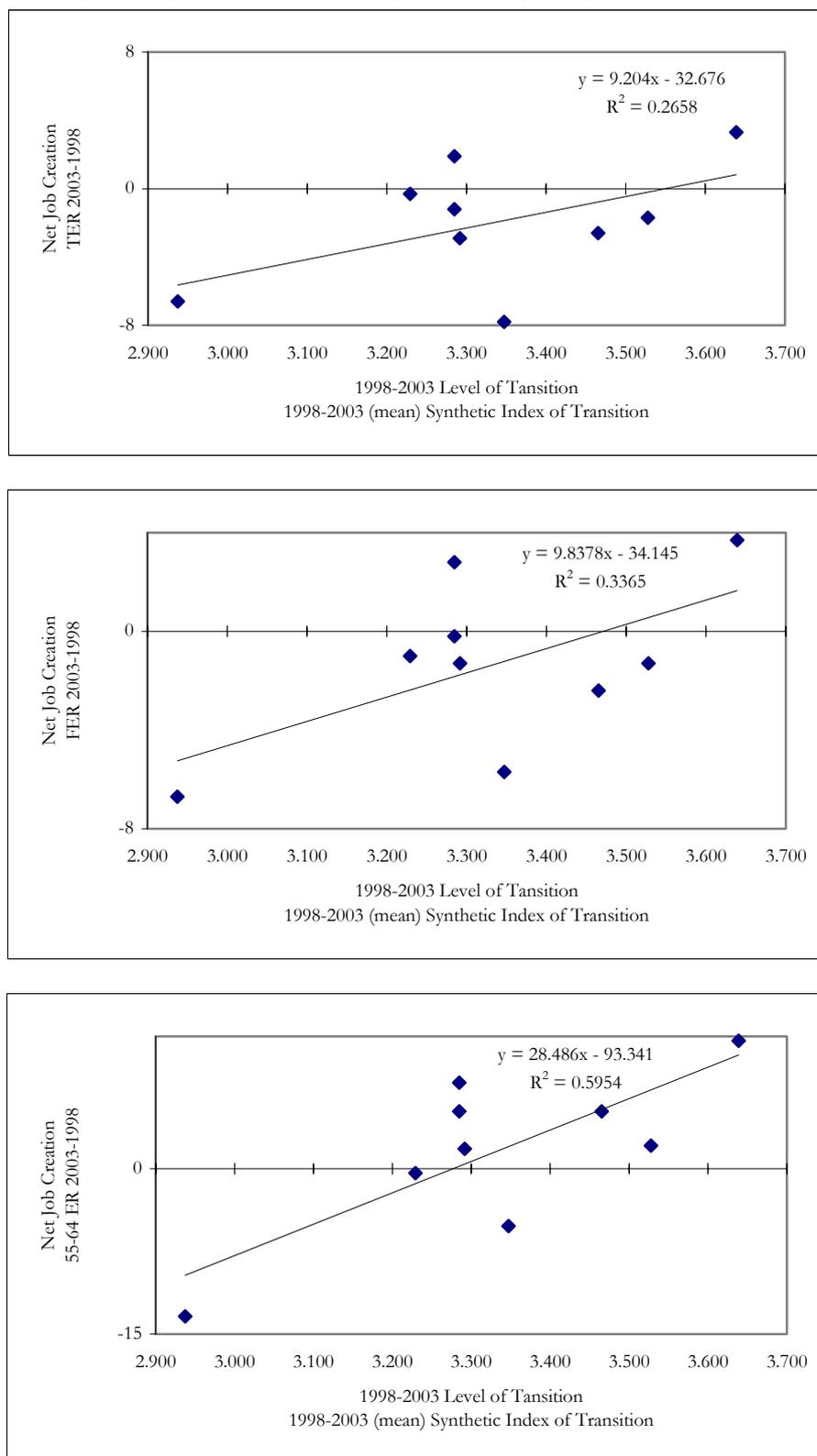
Source: elaboration on Eurostat data.

Figure A3. Speed of Transition and Net Job Creation (CEC-9)



Source: elaboration on EBRD and Schneider data.

Figure A4. Level (1998-2003) of Transition and Net Job Creation (CEC-9)



Source: elaboration on EBRD and Schneider data.

Table A5. Convergence trends of regional employment rates: sigma

	1999	2000	2001	2002	2003
Europe 25	0.1377	0.1377	0.1376	0.1373	0.1312
EU-15	0.1376	0.1347	0.1306	0.1255	0.1187
EMU-12	0.1316	0.1309	0.1256	0.1206	0.1131
CEC-10	0.1216	0.1179	0.1202	0.1195	0.1135
CEC-8 NM	0.0924	0.1012	0.1091	0.1244	0.1229

Source: elaboration on Eurostat Regio data

Table A6. Levels of correlation* between basic indicators of regional labour markets

		Employment rate				Self-employment		Unemployment				Long term unemployment	
		Total	Male	Female	55-64	Share of tot empl.	Rate	Total	Male	Female	Youth	Share of total unempl.	Rate
Employment rate	Total	1.00	0.97	0.96	0.79	<i>0.23</i>	0.46	-0.77	-0.77	-0.70	-0.70	-0.37	-0.75
	Male	0.97	1.00	0.87	0.69	<i>0.18</i>	0.39	-0.78	-0.83	-0.67	-0.72	-0.44	-0.78
	Female	0.96	0.87	1.00	0.84	<i>0.27</i>	0.50	-0.70	-0.66	-0.69	-0.62	-0.28	-0.65
	55-64	0.79	0.69	0.84	1.00	0.58	0.76	-0.50	-0.48	-0.48	-0.41	-0.28	-0.51
Self employment	Share of total empl.	<i>0.23</i>	<i>0.18</i>	<i>0.27</i>	0.58	1.00	<i>0.95</i>	-0.12	-0.16	-0.08	0.02	-0.20	-0.22
	Rate	0.46	0.39	0.50	0.76	<i>0.95</i>	1.00	-0.30	-0.32	-0.26	-0.16	-0.23	-0.36
Unempl.	Total	-0.77	-0.78	-0.70	-0.50	<i>-0.12</i>	-0.30	1.00	0.97	0.96	0.94	0.34	0.92
	Male	-0.77	-0.83	-0.66	-0.48	<i>-0.16</i>	-0.32	0.97	1.00	0.86	0.91	0.46	0.95
	Female	-0.70	-0.67	-0.69	-0.48	<i>-0.08</i>	-0.26	0.96	0.86	1.00	0.91	<i>0.19</i>	0.83
	Youth	-0.70	-0.72	-0.62	-0.41	<i>0.02</i>	-0.16	0.94	0.91	0.91	1.00	0.31	0.86
Long term unempl.	Share of total unempl.	-0.37	-0.44	-0.28	-0.28	<i>-0.20</i>	-0.23	0.34	0.46	<i>0.19</i>	0.31	1.00	0.63
	Rate	-0.75	-0.78	-0.65	-0.51	<i>-0.22</i>	-0.36	0.92	0.95	0.83	0.86	0.63	1.00

Source: elaboration on Eurostat Regio data

* Spearman coefficient; for the values in Italics the correlations are not significant at the 0.01 or 0.05 levels

Table A7. Outcomes of the factor analysis

NACE 1 sectors	Communalities		Rotated* components		
	Initial	Extracted	1	2	3
AB	1.000	0.626	-0.714	-0.341	-0.017
CE	1.000	0.971	-0.139	-0.027	0.975
D	1.000	0.925	0.004	0.960	-0.049
F	1.000	0.684	0.672	0.473	0.091
GH	1.000	0.781	0.859	0.119	-0.167
I	1.000	0.788	0.874	0.134	0.076
JK	1.000	0.855	0.907	-0.132	-0.121
L	1.000	0.680	0.775	0.088	-0.267
MQ	1.000	0.724	0.814	-0.123	-0.217
Explained variance %			53.286	13.989	10.869
Cumulated explained variance			53.286	67.274	78.144

Source: elaboration on Eurostat Regio data

* Varimax rotation with Kaiser normalization

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Table A8. Outcomes of the cluster analysis considering all the variables

<i>Cluster 1 (13 regions)</i>	<i>Cluster 2 (11 regions)</i>	<i>Cluster 3 (2 regions)</i>	
BG-North-East	BG-South-West	CZ-Praha	
BG-North-Central	EE-Estonia	SK-Bratislavsky kray	
BG-North-West	HU-Kozep-Magyarorszag		
BG-South-East	HU-Del-Dunantul		
BG-South-Central	HU-Eszak-Magyarorszag		
PL-Dolnoslaskie	HU-Eszak-Alfold		
PL-Kujawsko Pomorskie	HU-Del-Alfold		
PL-Pomorskie	LT-LITHUANIA		
PL-Warminsko-Mazurskie	LV-LATVIA		
PL-Zachodniopomorskie	PL-Lubuskie		
SK-Zapadne Slovensko	PL-Opolskie		
SK-Stredne Slovensko			
SK-Vychodne Slovensko			
<i>Cluster 4 (10 regions)</i>	<i>Cluster 5 (3 regions)</i>	<i>Cluster 6 (11 regions)</i>	<i>Cluster 7 (3 regions)</i>
CZ-Stredni Cechy	CZ-Severozapad	PL-Lubelskie	RO-Nord-Est
CZ-Jihozapad	CZ-ostravsko	PL-Lodzkie	RO-Sud
CZ-Severovychod	PL-Slaskie	PL-Malopolskie	RO-Sud-Vest
CZ-Jihovychod		PL-Mazowieckie	
CZ-Stredni Morava		PL-Podkarpackie	
HU-Kozep-Dunantul		PL-Podlaskie	
HU-Nyugat-Dunantul		PL-Swietokrzyskie	
RO-Centru		PL-Wielkopolskie	
RO-Bucaresti		RO-Sud-Est	
SL-SLOVENIA		RO-Vest	
		RO-Nord-Vest	

Source: elaboration on Eurostat Regio data

Table A9. Outcomes of the cluster analysis only for the employment/unemployment variables

<i>Cluster 1</i> <i>(16 regions)</i>	<i>Cluster 2</i> <i>(21 regions)</i>	<i>Cluster 3</i> <i>(5 regions)</i>	<i>Cluster 4</i> <i>(11 regions)</i>
BG-North-East	BG-Yugoiztochen	CZ-Praha	PL-Lubelskie
BG-North-Central	CZ-Strední Cechy	RO-Nord-Est	PL-Lódzkie
BG-North-West	CZ-Jihozápad	RO-Sud	PL-Malopolskie
BG-South-East	CZ-Severozápad	RO-Sud-Vest	PL-Mazowieckie
BG-South-Central	CZ-Severovýchod	SK-Bratislavský	PL-Podkarpackie
PL-Dolnoslaskie	CZ-Jihovýchod		PL-Podlaskie
PL-Kujawsko-Pomorskie	CZ-Strední Morava		PL-Swietokrzyskie
PL-Lubuskie	CZ-Moravskoslezsko		PL-Wielkopolskie
PL-Opolskie	EE-ESTONIA		RO-Sud-Est
PL-Pomorskie	HU-Közép-Magyarország		RO-Vest
PL-Slaskie	HU-Közép-Dunántúl		RO-Nord-Vest
PL-Warminsko-Mazurskie	HU-Nyugat-Dunántúl		
PL-Zachodniopomorskie	HU-Dél-Dunántúl		
SK-Západné Slovensko	HU-Észak-Magyarország		
SK-Stredné Slovensko	HU-Észak-Alföld		
SK-Východné Slovensko	HU-Dél-Alföld		
	LT-LITHUANIA		
	LV-LATVIA		
	RO-Centru		
	RO-Bucuresti		
	SL-SLOVENIA		

Source: elaboration on Eurostat Regio data