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Quantity Adjustments in the Regional Labour Markets of EU Candidate Countries

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Abstract

This paper analyses the adjustment of regional labour markets of former and present EU candidate countries to asymmetric shocks. As in EU member states, a substantial part of the adjustment to changes in employment in candidate countries is carried by participation decisions and migration plays a small role. Candidate countries, however, experienced larger region-specific shocks to labour demand than member states, and these shocks lead to higher long-run changes in employment. Furthermore, adjustment mechanisms partly explain high regional unemployment. High unemployment regions exhibit a lower capability to absorb region specific shocks through mechanisms other than higher unemployment.

Introduction

On 1 May 2004 eight of the formerly planned economies became new member states of the European Union, and the European Commission foresees that a further two will join by 2007. These enlargements pose a number of challenges to the old and new member states of the European Union (EU). In particular, with accession to the EU the new member states become eligible for transfers from the European regional funds, and are expected to pursue the goal of joining the European Monetary Union (EMU). Enlargement, however, also represents a challenge for the former candidate countries, which experienced a rapid transition from planned to market economies in the last fifteen years. On the one hand, this transition was accompanied by a deep recession. On the other hand, regional disparities increased substantially. In the 1990s employment - population ratios in the Central and Eastern European accession candidate countries declined by between 6 and 20 percentage points, participation rates fell by over 5 percentage points and unemployment rates increased from zero to double digit levels in many countries. At the same time regional labour market disparities in candidate countries increased throughout the 1990s (Boeri and Scarpetta, 1996) and reached levels comparable to those of Western Europe by the end of the decade (Huber and Gács, 2003).

Given these dramatic changes in the past and the challenges ahead, assessing the capability of candidate countries to adjust to regional shocks is important, as it provides information on whether candidate countries have converged to adjustment mechanisms often found in mature market economies. Furthermore, the adjustment capability of regional labour markets is an important determinant for a number of crucial policy

decisions to be taken in the phase of integration following accession. It influences the optimal point in time to join the EMU (which can occur in 2006 at the earliest) as well as the particular policy needs of candidate countries with respect to the reforms of structural funds in 2006.

In this paper we are interested in whether the substantial heterogeneity in regional labour market conditions in the candidate countries is associated with differences in the capability of regions to absorb region specific shocks. We extend the literature on regional labour market dynamics to the candidate countries by applying the multi-variate model that has become the workhorse of the regional evolution literature (Blanchard and Katz, 1992 and Decressin and Fatás, 1995) to Central and Eastern European (CEE) regions and focus on potential differences in labour market adjustment between region types. First, we find that in contrast to EU member states, candidate countries have experienced larger region-specific shocks to labour demand, and that these shocks tend to be more persistent than in member states. Second, we find that despite these differences candidate countries are typical European labour markets in the sense that a substantial part of the adjustment to changes in employment is carried by participation decisions while migration plays a minor role in regional adjustment. Furthermore, high regional unemployment can be partly explained by the low capability of high unemployment regions to absorb region specific shocks, through mechanisms other than increasing unemployment.

The paper is structured as follows. The next section describes the theoretical model underlying our analysis and section three discusses data issues. Section four clears some of the econometric problems that have to be dealt with before estimation, while sections five presents results with respect to univariate processes, the multivariate model and the regional differentiation, respectively. Section six is the conclusion.

A model of Labour Market Adjustment

To analyse regional labour market dynamics of the candidate countries we use the workhorse model in the regional evolutions literature inspired by Blanchard and Katz (1992). In this model region-specific labour demand is given by:

$$l_{it} = -\alpha_1 w_{it} + z_{it} \tag{1}$$

with l_{it} the log of employment in region i at time t, w_{it} the log wage rate in the region and z_{it} a shift parameter for labour demand. Note that all variables are in log deviations from national developments.[1] The shift parameter

(z_{it}) is included to allow for capital mobility. As in Blanchard and Katz (1992) we assume that the location decision of a firm is driven by the aim to move to regions with the lowest costs, i.e.

$$\Delta z_{it} = \rho_{0i} + \rho_1 w_{it} + \zeta^{D}{}_{it} \,. \tag{2}$$

with $\rho_1<0$, Δ the difference operator and $\zeta^{D}{}_{it}$ a shock to labour demand. Regional labour supply in region i at time t (n_{it}) is driven by migration and participation decisions of residents and satisfies the identity $n_{it} = pop_{it} + p_{it}$ with pop_{it} the (log of) population and p_{it} the (log of) participation rate relative to the national average in region i at time t . We assume that the relative participation rate is influenced by relative unemployment rates and relative wage levels (see Hojvat-Gallin, 1999):

$$p_{it} = \lambda_{0i} + \lambda_1 u_{it} + \lambda_2 w_{it} + \zeta^{S}_{it} \tag{3}$$

where λ_{0i} is a region specific constant to capture long run differences in participation rates between regions as may arise from differences in demographics (i.e. higher share of female or young population) as well as differences in the internal characteristics (e.g. amenities) of the regions, $\zeta^{S}{}_{it}$ is a participation rate shock and u_{it} is the unemployment rate (measured as the ratio between unemployment and employment).

Changes in the population of a region, relative to national changes, by contrast can be due either to differences in demographic developments or to migration. We assume that demographic trends are time invariant and can thus be described by a regional fixed effect (β_{0i}). Net migration is assumed to be determined by differences in expected lifetime income relative to the rest of the country. Thus changes in relative population can be modelled by:

$$\Delta pop_{it} = \beta_{0i} + \beta_1 u_{it} + \beta_2 w_{it} + \zeta^{M}_{it} \tag{4}$$

with $\zeta^{M}{}_{it}$ a migration shock.

Equation (4) follows from standard migration theory (e.g. Harris and Todaro, 1970) which postulates that economic migrants should move from low wage, high unemployment regions to high wage and low unemployment regions.

Finally, to close the model we use the standard approximation of the unemployment rate $u_{it} \approx n_{it} - l_{it}$ and assume that wages are set according to:

$$w_{it} = \chi_{i0} - \chi_1 u_{it-1} \tag{5}$$

As pointed out by Bean (1994) this wage equation is consistent with various theories of wage formation such as trade union or efficiency wage theory.

According to this model region-specific shocks can be evened out via two main mechanisms. First, capital mobility (equation (2)) and job creation (equation (1)) in the region may work to countervail a negative shock. This mechanism will work only if wages fall sufficiently to make job creation in the region attractive to firms. Second, migration may be an alternative mode of adjustment. If in the face of an adverse shock to a region, workers emigrate to another, relative unemployment and participation rates will be equilibrated. In the absence of either of these adjustment mechanisms a permanent reduction in labour demand in the region will increase unemployment rates and/or reduce participation rates in the long run. The adjustment processes triggered by these two mechanisms differ considerably. If adjustment via migration is predominant, then jobs lost or won in regions will be highly persistent. If, by contrast, adjustment via capital mobility or region endogenous job creation is more important, then in the long run jobs initially lost in a region should re-emerge and employment losses should not be persistent (see Fatás, 2000).

Data

The regional data for this paper were taken from regional statistical yearbooks. They encompass the period from 1992 to 1998 for the regions of five accession countries (Bulgaria, Czech Republic, Hungary, Poland and Romania).[2] We focus on these five countries, because they are the only ones among the former and present candidate countries that provide consistent regional statistics for a long enough time period.[3] Even for these countries there is, however, some variation in the definition of variables. For instance in the Czech Republic, Hungary and Poland unemployment data are end-of-year data while in Bulgaria and Romania they are annual averages (a data description is provided in Appendix 1). Furthermore, there are some differences in the definition of registered unemployment (e.g. in Romania owners of land in excess of one hectare cannot register as unemployed while in other countries they can.).

We deal with the data problems in a number of ways: First of all we measure all variables relative to national indicators through the method proposed in Decressin and Fatas (1995). This will remove from the data any

distortions that have an impact on the national averages of the indicators. Second aside from presenting results for all candidate countries we also divide these countries into two subgroups: those that have already signed the accession treaty and have joined the EU (i.e. the Czech Republic, Hungary and Poland) and those that are still negotiating with the EU (Romania and Bulgaria) and refer to these two groups as first- and second-round countries, respectively. Aside from providing additional information on the heterogeneity among these two groups, which are characterised by substantial differences in the speed of accession to the EU, this also allows us to correct for the differences in the definition of unemployment rates in the two country groups.

As a benchmark we use data on the regions of five EU member states. These are the Netherlands, Germany, Spain, Portugal and Italy for the period from 1989 to 1995. This choice was guided by data availability and a concern to include highly developed EU countries as well as poorer member states that are often compared to the central and eastern European candidate countries and whose labour markets are less flexible. EU data were taken exclusively from the Eurostat Regio database.[4]

The regions of the EU and candidate countries differ in terms of size, wealth and labour market outcomes (see Table 1). In general, regions of candidate countries are substantially smaller than those of member states both in terms of population and area. This may have implications on the findings of this paper with respect to migration, since migration across regional borders is higher in smaller regions. One may thus expect to find higher migration in candidate countries. Furthermore, if region specific shocks reflect sectoral shocks in specialised regions, one should also find larger region specific shocks in smaller regions.

{Table 1 around here}

In comparison to EU member states, candidate countries are characterised by high unemployment, which is in particular driven by high, long-term unemployment rates and higher youth unemployment than in in EU member states (Knogler, 2001). With the exception of Hungary they are, however, also characterised by higher participation rates than the southern European high unemployment countries such as Spain. This is primarily due to a higher female participation rate in these countries, while participation rates of the elderly are comparable to that of many EU countries (see Huber and Gács, 2003). Furthermore, candidate countries also share a number of

common problems with current EU member states. In particular the predicted demographic decline in these countries for the next decades is much more pronounced than in the EU member states. Demographic forecasts of the UN predict that up to 2020 the population may decline by between 1.8% (Poland) and 11.3% (Bulgaria) in these countries as opposed to 1.5% in the European Union. This could have implications on regional labour market adjustment mechanisms as analysed in this paper, since it is often found (see for example Hunt, 2000) that older people are less likely to migrate than younger people.

Transition in Central and Eastern European countries has also been accompanied by the emergence of large regional disparities (see Boeri and Scarpetta, 1996). A number of stylised facts have been established in this respect: Large cities have exhibited the lowest unemployment rates and highest wages throughout transition; border regions to the west have developed better than non-border regions; and mono-industrial regions faced considerable labour market problems (see Gorzelak, 1996, Smith 1998). To assess how different region types react to asymmetric shocks, we employ the commonly used Scarpetta-Huber-taxonomy (Scarpetta and Huber, 1995) on regions of candidate countries (see Burda and Profit, 1996, Boeri and Scarpetta, 1996, Boeri and Terrell, 2002). Scarpetta and Huber (1995) use explorative data analysis techniques to divide CEE regions into urban, industrial, agricultural and diverse regions (a map of these regions is provided in Appendix 3).[5]

{Table 2 around here}

In all our results for region types we exclude EU regions and focus only on the candidate countries. Thus Table 2 reports average participation rates and unemployment rates relative to the national average in 1992 and 1998 in the respective regions of the candidate countries. A value larger than one indicates that the average region of this type has shown a value higher than the national average, while a value smaller than one indicates a lower value than the national average in candidate countries. Urban regions have shown substantially smaller unemployment rates and slightly higher participation rates throughout transition, while the other diverse regions have been characterised by substantially higher unemployment rates and both slightly lower participation rates. Industrial regions by contrast had substantially higher unemployment rates in 1998 - a fact that reflects industrial

restructuring in the course of the 1990s in many of the regions. Agricultural regions have performed according to the national average.

As a further category of regions we use EU border regions. These are (Czech, Polish and Hungarian) regions directly bordering Germany or Austria. In the early phases of transition, border regions were characterised by substantially lower unemployment rates, higher employment growth and lower participation rates, but have since converged to the overall levels of candidate countries (Figure 1) concerning all indicators but participation rates. This markedly better development of border regions in early transition has been attributed to a better economic situation as well as the importance of cross border commuting and a higher activity rate in the hidden economy (Lackó, 2000; Svejnar, 1999) .

{Figure 1 around here}

Econometric Issues

Direct estimation of the model in equations (1) to (5) is made difficult by the fact that the migration equation (4) and the participation rate equation (3) are difficult to identify separately unless one makes strong assumptions about the relative speed with which migration and participation react to changes in wages and unemployment. Since these assumptions would prejudice findings, Blanchard and Katz (1992) suggest running trivariate vector autoregressions of the following form:[6]

$$\Delta l_{it} = \varphi_{0i} + \varphi_1(L)\Delta l_{it-1} + \varphi_2(L)er_{it-1} + \varphi_3(L)pr_{it-1} + \xi_{it}^{D} \tag{6}$$

$$er_{it} = \phi_{0i} + \phi_1(L)\Delta l_{it} + \phi_2(L)er_{it-1} + \phi_3(L)pr_{it-1} + \xi_{it}^{E} \tag{7}$$

$$pr_{it} = \theta_{0i} + \theta_1(L)\Delta l_{it} + \theta_2(L)er_{it-1} + \theta_3(L)pr_{it-1} + \xi_{it}^{P} \tag{8}$$

with l_{it}, $er_{it,}$ pr_{it} the log of employment, the employment rate (i.e. the negative unemployment rate) the participation rate in region i all relative to the national at time t and ξ^{D}_{it}, ξ^{E}_{it}, ξ^{P}_{it} region specific shocks to labour demand, employment and participation rates, respectively. The identifying assumption made in this analysis is that contemporaneous shocks to labour demand affect neither the employment rate nor the participation rate

immediately and that the employment rate does not affect participation contemporaneously.[7] While these assumptions may seem strong, by estimating this model migration can be implicitly calculated from the identity $l_t = er_t + pr_t + pop_t$ (Fatás, 2000).

There are a number of issues that have to be dealt with in the estimation of the system in equations (6) to (8). First, the fact that the system consists of a dynamic panel specification renders the standard least squares dummy variable (LSDV) estimator biased, since the error terms are correlated with the right hand side variables (Baltagi, 1995). For this reason we estimate the system by single equation estimation using the GMM estimator proposed by Arellano and Bond, (1991).[8] Since the model in (6) to (8) is triangular, given that the error terms (shocks) are not autocorrelated and that the variables included in the VAR are not integrated, this will lead to consistent estimates of the system (Greene, 2000)

Second, as mentioned before, the model in (6) to (8) is formulated in terms of region-specific variables. Two methods have been proposed to define this region-specific variable. Decressin and Fatás (1995) run regressions of the form:

$$Y_{it} = \gamma_0 + \gamma_1 Y_{at} + \eta_{it} \tag{9}$$

for each and every region and interpret the residuals of this regression as region-specific development, while Blanchard and Katz (1992) use differences between regional and national indicators. In part the choice between these methods depends on how closely regional developments follow national trends. For this reason we ran regressions of the regional indicator on the national indicator as in Decressin and Fatás (1995). Since reporting the results of these regressions for the 275 regions covered exceeds the space limitations of this paper, we focus on the average γ_1 and R^2 values of these regressions in table 3.[9] While the average coefficient estimates should by definition be close to one, as reported in the table, the average R^2 values are also high for all countries considered (Table 3). This suggests a close relationship between national and regional variables in both the candidate countries and the EU member states analysed in this paper.

{Table 3: around here}

A further influence on the choice is whether the resulting series are stationary. Fatás (2000) shows that implicitly these procedures represent a detrending method. Since stationarity of the variables analysed is an assumption necessary for consistent estimation of (6) to (8) we conducted Im, Persaran and Shin (1997) panel unit root tests on the residuals of equation (9). Starting from a specification as: $\Delta\eta_{it} = \delta_{0i} + \delta_{1i}\eta_{it-1} + \xi_{it}$ with η_{it} the residual of (9), this tests the null that $\delta_{1i} = 0$ for all i against the alternative that a subset of the series in the panel are not integrated i.e. $\delta_{1i} < 0$ for all i=1..N_1 , and $\delta_{1i} = 0$ for all i=N_1+1, ..., N (Banerjee, 1999, Maddala and Wu, 1999). Results reported in Table 3 suggest that for the transformed series the null (of a unit root) can be rejected for all series at the national level and almost all series regionally. Thus for the remainder of the paper we follow the approach of Decressin and Fatás (1995).

Table 4 displays the within group (time) and between group (cross sectional) standard deviation of the residuals of equaton (9). As can be seen our method removes practically the total between group variance from the data, but leaves substantial variation within group deviations to be explained. From the point of view of our analysis this suggests that our regressions focus strongly on the time series variance of the variables, which are also of primary interest to this paper, while cross sectional variance, which may at least in part arise from national differences in statistical systems, are removed.

{Table 4 around here}

Third, the lag length of the lag polynomials of (6) to (8) has to be determined. To decide on this we performed a number of specification tests using lag lengths from one to three for all lag polynomials. In general models using lags of length one performed best in terms of parameter significance of included lags, tests for autocorrelations of the residuals and when conducting tests of instrument exogeneity for the Arellano Bond estimates. Thus below we report results for models using a lag of one.[10]

Results

Univariate Processes

Before estimating the model presented in equations (6) to (8) we also estimated univariate processes of the form:

$$\bar{\eta}_{it} = \kappa_{0i} + \kappa_1 \bar{\eta}_{it-1} + \xi_{it} \quad (10)$$

where $\bar{\eta}_{it}$ is the estimated residual of equation (9) for each of the indicators (relative employment growth, relative employment rates and relative participation rates) entered in our regression, κ_{0i} is a region specific fixed effect, while κ_1 is a measure of the persistence of the indicator.

In accordance with the literature on EU member states (see Fatas, 2000, Decressin and Fatas, 1995) we find low persistence of employment growth rates in the EU, but high levels of persistence for both unemployment and participation rates (Table 5). For first round candidate countries, by contrast, we find comparable persistence in relative employment growth rates but significantly lower persistence of relative employment and relative participation rates. In the second round candidate countries relative employment rates are as persistent as in the EU. Differences among region types seem to be small, however. Relative employment rates are less persistent in urban regions and more persistent in industrial regions. High unemployment regions have a slightly higher persistence in relative employment rates and participation rates than non-border regions, and in non–border regions persistence in relative employment rates is also higher than in border regions.

{Table 5 around here}

Multivariate Results

Figure 2 displays the estimated impulse response functions of the model considered in equations (6) to (8). The top left hand panel of the figure shows the reaction of relative employment, relative unemployment rates and relative participation rates in a ”typical” candidate country’s region to a unit relative labour demand shock. An increase in relative employment in period t=1 has a large and persistent impact on relative employment. While in the first year after the shock (t=2) 89% of the initial increase is present, by the third year (t=4) this amounts to 94%. In member states the change in relative employment rates is slightly less persistent. After three years 69.3% of the original shock persists. This finding on candidate countries is not surprising when considering the substantial employment decline in the years of transition. The increase in relative employment is primarily accommodated by changes in relative participation rates, while relative unemployment rate dynamics play a

smaller role. Adjustment via labour force participation and unemployment rate peak after one year and then steadily decline to their long run level in all country groups. In candidate countries this return takes 4 years and in member states the process ends after 3 years. Differences between first and second round candidate countries are particularly pronounced with respect to the persistence of the relative employment change, which is more persistent in first round countries, and the reaction of relative unemployment rates, which are more persistent in second round candidate countries.

{Figure 2 around here}

These differences, however, should be interpreted in the light of results in the literature. In Table 6 we thus report the share of the first year shock accommodated by changes in the relative unemployment rate, participation rate and migration within one year, found in the literature. This table suggests that the results for EU member states are comparable to those of other studies of the European Union. The only counterintuitive result is that a negative demand shock on the region leads to a slight immigration rather than emigration in member states. This is, however, not uncommon. In particular Fatas (2000) reports similar dynamics for Germany (one of the countries in our study) and the UK.[11] Thus we conclude that even though our observation period is relatively short, we are able to capture the major features of labour market adjustment in the EU.

Results for first round candidate countries indicate that they are well within the realms of the parameters usually found for the European Union. In particular, in first round candidate countries unemployment rate reactions accommodate 10% of the initial shock. This is comparable to Sweden, the Netherlands, Germany and the U.K. Migration accounts for 21% of the shock, which seems relatively large but is plausible in the context of the smaller region size in candidate countries and comparable to Spain, Sweden and Belgium and the smaller EU regions analysed by Tani (2003). With respect to the non-European OECD member states in Table 6, however, candidate countries appear to be typical European countries. As in most of the EU, participation rate changes carry the largest part of the adjustment and in contrast to the US and Australia unemployment rate and migration are of relatively minor importance. These results, in particular concerning the low responsiveness migration, are corroborated by more detailed studies on migration in candidate countries. Both Fidrmuc (2004) and Ederveen

and Bardsley (2004) provide evidence for the low intra-national migration in first round candidate countries, as do recent country studies provided Cseres-Gergely (2003) on Hungary and Kallai (2003) on Romania.

Results for second round candidate countries by contrast are somewhat implausible. As shown in Table 6 we find that a unit shock to labour demand leads to an immigration of half of the original shock. Thus the unemployment rate increases by 76% of the original shock and participation accommodates for another 54%. One explanation for these strange results could be the substantial differences in national definitions of registered unemployed in some of the second round candidate countries.[12]

{Table 6 Around here}

Thus the first round candidate countries appear to be comparable to many member states. The difference between the two regions seems to lie in the size of past shocks and the persistence of relative employment changes. The standard deviation of the residual of equation (6), which can be interpreted as the size of the regions specific labour demand shock, is substantially higher in candidate countries (both first and second round) than in member states. Also changes in relative employment are substantially more persistent in the candidate countries. The adjustment to the shock in employment ends at a level of around 90% of the original in the candidate countries but at 69% in the member states (Table 7).

{Table 7: Around Here}

Regional Differences

We also estimated model (6) to (8) for the region types in the Scarpetta and Huber (1995) taxonomy, border and non-border regions as well as for high and low unemployment rate regions (Table 8 and figures in the Appendix). In the cases of urban and diverse regions and for border regions these results are unreliable due to the low number of regions. In all these cases the number of cross-sectional observations is smaller or equal to fifty. Thus we focus on results of non-border regions only and merge urban and diverse regions into one category.[13]

{Table 8 around here}

In general, results indicate that differences among region types are driven by the persistence of the employment shock and the relative importance of unemployment rates and migration in the adjustment. While in non-border regions adjustment resembles that of candidate countries overall, there is some heterogeneity when considering region types according to the Scarpetta and Huber taxonomy. In particular agricultural regions are characterized by relatively low persistence of employment shocks and a high reaction of employment rates, while in diverse regions the opposite is the case. In these regions employment shocks are highly persistent and migration plays an important role in adjustment.[14] Finally, high unemployment regions have been subject to larger region specific shocks, and have a higher persistence of employment changes (which were mostly employment declines in these regions), and a higher importance of adjustment through unemployment rates than low unemployment regions. This suggests that part of the variation in labour market developments in urban, industrial and peripheral regions as well as the differences between high and low unemployment rate regions may be attributed to differences in the adjustment of regions to shocks in labour demand.

Conclusions

This paper analyses the adjustment of regional labour markets of candidate countries to asymmetric shocks. We find that in contrast to EU member states, candidate countries have experienced larger region specific shocks to labour demand, and that these shocks tend to be more persistent than in member states. This suggests that region specific shocks are somewhat more important in driving labour market developments in the candidate countries and have more important long-run implications. This could be attributed to the inherited industrial structure in these countries, which was characterised by higher specialisation. Furthermore, on the policy side this implies that an approach focusing on regional rather than national policies to combat unemployment may be even more suitable in candidate countries than in current EU member states.

Otherwise the regions of candidate countries (in particular first round candidate countries) are typically European regions in many respects. In particular as in the EU, and in contrast to non-European OECD member states, adjustments in relative participation rates play a large role and adjustments in migration a small role. This

in turn can be taken as evidence that, as in EU member states, a primary focus of regional labour market policies should be in removing barriers to regional mobility. We would argue that in addressing this low mobility policy makers should take a relatively broad view on migration and incorporate potential housing market imperfections, problems of spatial matching, active labour market policy and infrastructure policy in their design.

We also find that part of the substantially more favourable labour market developments in urban regions and the less favourable situation of industrial and peripheral regions as well as the differences between high and low unemployment rate regions may be attributed to differences in the adjustment of regions to shocks in labour demand. In particular high unemployment rate regions were characterised by larger (mostly negative) shocks to labour demand, a higher persistence of these shocks, and larger adjustment through unemployment rates rather than migration. This suggests that high unemployment regions in candidate countries suffer most from low mobility. Policies to remove barriers to migration may thus be particularly rewarding to alleviate problems in high unemployment regions, which are also often peripheral or declining industrial regions in these countries.

Literature

Arellano M, Bond S (1991) Some Tests of Specification for Panel data: Monte Carlo Evidence and an Application to Employment Equations. *Review of Economic Studies* 58(2):277 – 297

Baltagi BH (1995) *The Econometric Analysis of Panel Data*. John Wiley & Sons, Cichester

Banerjee A (1999) Panel unit Roots and Cointergration an Overview. *Oxford Bulletin of Economics and Statistics* 61(0):603 –606

Bean C (1994) European Unemployment: A Survey. *Journal of Economic Literature*; 32(2): 573-619

Blanchard O, Katz LF (1992) Regional Evolutions. *Brookings Papers on Economic Activity* 0(1):1-75.

Boeri T, Scarpetta S (1996) Regional mismatch and the transition to a market economy. *Labour Economics* 3:233 - 254

Boeri T, Terrell K (2002) Institutional Determinants of Labour Reallocation in Transition. *Journal of Economic Perspectives* 16(1):51 – 76

Boersma L, Dijk Jv (2002) Regional Labour Market Dynamics in the Netherlands. *Papers in Regional Science* 81: 343 - 364

Burda MC, Profit S (1996) Matching Across Space: Evidence on Mobility in the Czech Republic. *Labour Economics* 3:233 - 254

Cseres-Gergely Z (2002) Residential Mobility, Migration and Economic Incentives. Manuscript, Hungarian Academy of Science, Budapest

Debelle G, Vickery J (1998) Labour Market Adjustment: Evidence on Interstate Labour Mobility. Research Discussion Paper 9801. Reserve of Australia, Economic Research Department.

Decressin J, Fatas A (1995) Regional Labour Market Dynamics in Europe. *European Economic Review* 39(9):1627–55.

Delaigle S, Lohest O (1999) Regional Labour Market Dynamics: Evaluation and Application to Belgium. Manuscript, Universite Catholique de Louvain.

Ederveen S, Bardsley N (2003) The influence of wage and unemployment differentials on labour mobility in the EU: A meta-analysis. ACCESSLAB Research Report, Workpackage 3, Austrian Institute for Economic Research (WIFO), Vienna

Fatas A (2000) Intranational Labour Migration Business Cycles and Growth. In: Hess GD Wincoop Ev (eds) Intranational Macroeconomics. Cambridge, Cambridge University Press

Fidrmuc J (2004) Migration and Regional Adjustment to Asymmetric Shocks in Transition Economies . *Journal of Comparative Economics*, 32(2): 230-247

Fredriksson P (1999) The Dynamics of Regional Labor Markets and Active Labor Market Policy: Swedish Evidence. *Oxford Economic Papers* 51(4): 623-48

Gács V (2003) Regional Labour Market Dynamics – An Application to Central and Eastern Europe. Manuscript, WIFO, Vienna

Gács V, Huber P (2003) Regional Labour Market Problems in the Candidate Countries: A Descriptive Analysis. AccessLab, Report on Workpackage 2, Austrian Institute for Economic Research (WIFO), Vienna

Gorzelak G (1996) *The Regional Dimension of Transformation in Central Europe. Regional Studies* Association, London

Greene WH (2000) *Econometric Analysis*. Prentice Hall, Upper Saddle River, New Jersey

Harris JR, Todaro MP (1970) Migration, Unemployment and Development: A Two Sector Analysis. *American Economic Review* 60(1): 120-142.

Hojvat GJ (1999) Net Migration and State Labour Market Dynamics. Manuscript, Federal Reserve,

Huber P, Iara A, Traistaru I (2004) The AccessLab Data Base. Manuscript, Austrian Institute of Economic Research, Vienna

Hunt J (2000) Why Do People Still Live in East Germany? CEPR Discussion Paper No. 123, London.

Im KS, Persaran MH, Shin Y (1997) Testing for Unit Roots in Heterogeneous Panels. mimeo, Department of Applied Economics, University of Cambridge

Jimeno JF, Bentolila S (1998): Regional Unemployment Persistence Spain, 1976-94. *Labour Economics* 5 25-51

Judson RA and Owen AL (1996) Estimating Dynamic Panel Data Models: A Practical Guide for Macroeconomists. *Economics Letters* 65(1):9-15

Kallai E (2003) Determinants of Inter Regional Mobility in Romania. AccessLab, Report on Workpackage 3, Austrian Institute for Economic Research (WIFO), Vienna

Kiviet JF (1995) On Bias, Inconsistency and Efficiency of Various Estimators in Dynamic Panel Data Models. *Journal of Econometrics* 69(1):53 – 78.

Knogler M (2001) Die Arbeitsmarkte der Beitrittskandidaten vor dem Hintergrund der EU-Osterweiterung, Working Paper 228, Osteuropa Institut Muenchen.

Lackó M (2000): *Egy rázós szektor: a rejtett gazdaság és hatásai a poszt-szocialista országokban háztartartási áramfelhasználásra épülo becslések* alapján (A shocking sector: the hidden economy and its impacts in the post-socialist countries with help of estimations based on household electricity consumption). TÁRKI-KTI, Budapest

Maddala GS, Wu S (1999) A Comparative Study of Unit Root Tests with Panel Data and a New Simple Test. *Oxford Bulletin of Economics and Statistics* 61(0) 607 -630

Pekkala S, Kangasharju A (2002) Regional Labour Markets in Finland: Adjustment to Total versusRegion Specific Shocks. *Papers in Regional Science* 81:329 – 342

Pekkala S, Kangasharju A (2002a) Regional Labour Market Adjustment: Are Positive and Negative Shocks Different? *Labour: Review of Labour Economics and Industrial Relations* 16(2): 267-286

Petrakos G (1995) Patterns of Regional Inequality in Transition Economies. Manuscript, Department of Planning and Regional Development University of Thesaly, Greece

Scarpetta S Huber P (1995) Regional Economic Structures and Unemployment in Central and Eastern Europe: An Attempt to Identify Common Patterns. In: Scarpetta S, Wörgötter A(eds.) *The Regional Dimension of Unemployment in Transition Economies*. OECD, Paris.

Svejnar J (1999) Labour Market in the Transitional Central and East European Economies. In: Ashenfelter O, Card D (eds) *Handbook of Labour Economics*, Volume 3. Elsevier Science,

Smith A (1998) *Restructuring the Regional Economy – Industrial and Regional Development in Slovakia*. Studies of Communism in Transition, Edward Elgar, Cheltenham, UK

Tani M (2003) Have Europeans Become More Mobile? A Note on Regional Evolutions in the EU: 1988-1997. *Economics Letters* 80(1): 23-30

Traistaru I, Nijkamp P, Resmini L (2002) *The Emerging Economic Geography in EU Accession Countries*. Ashgate Publishing Ltd, Aldershot

Table 1: Summary Statistics of Regional Data in Candidate and EU Countries

	Population		Area	Unemployment Rate		Participation Rate		Employment growth	
	1992	1998		1992	1998	1992	1998	1993	1998
Czech Republic (74 Regions)	135.7 (133.6)	133.7 (135.8)	1,051 (578)	2.9 (1.4)	7.5 (3.0)	32.9 (6.4)	34.8 (5-0)	-18.7 (6.5)	-3.2 (4.0)
Poland (49 Regions)	783.0 (604.0)	789.1 (590.5)	6,381 (3630)	13.6 (4.4)	10.4 (4.1)	45.9 (3.7)	45.5 (4.6)	-5.9 (5.5)	-0.1 (2.6)
Hungary[b] (20 Regions)	516.9 (393.2)	506.8 (367.3)	4,651 (1790)	8.2 (3.2)	9.1 (3.8)	32.6 (4.3)	25.7 (6.65)	-9.8 (2.4)	-2.0 (2.2)
Bulgaria (28 Regions)	303.0 (215.5)	293.9 (217.6)	3961 (1496)	14.7 (4.1)	13.8 (4.5)	43.8 (2.4)	43.0 (2.3)	-1.7 (2.1)	-0.2 (1.0)
Romania (41 Regions)	555.8 (330.8)	548.8 (325.7)	5814 (1495)	3.0 (1.3)	9.0 (2.9)	47.2 (2.8)	42.7 (2.7)	-3.8 (3.0)	-2.7 (2.7)
	1989	1995		1989	1995	1989	1995	1989	1995
Germany[a] (11 Regions)	5978.7 (5251.4)	6192.3 (5129.2)	8,925 (5,661)	6.7 (2.3)	7.6 (1.9)	43.8 (5.8)	41.7 (6.5)	3.1 (0.1)	-1.2 (0.1)
Italy (20 Regions)	2837.9 (2276.8)	2865.0 (2245.1)	15,066 (7,226)	10.0 (6.27)	11.9 (6.8)	30.7 (3.2)	30.0 (3.5)	0.9 (1.9)	-0.7 (1.7)
Netherlands (12 Regions)	1260.6 (964.5)	1288.3 (939.2)	2,824 (1,139)	8.5 (1.5)	7.0 (1.0)	32.8 (4.0)	33.1 (4.2)	3.0 (1.6)	2.0 (0.5)
Portugal[c] (5 Regions)	1408.6 (1444.3)	1883.7 (1339.1)	13.123 (10,249)	4.8 (3.1)	7.3 (2.1)	29.3 (4.2)	31.6 (4.1)	2.4 (9.5)	-8.9 (5.1)
Spain (15 Regions)	2169.8 (2014.8)	2178.3 (1992.2)	28,044 (29,521)	17.4 (6.0)	23.1 (5.4)	27.8 (3.5)	25.1 (3.8)	-4.8 (1.7)	2.9 (2.5)

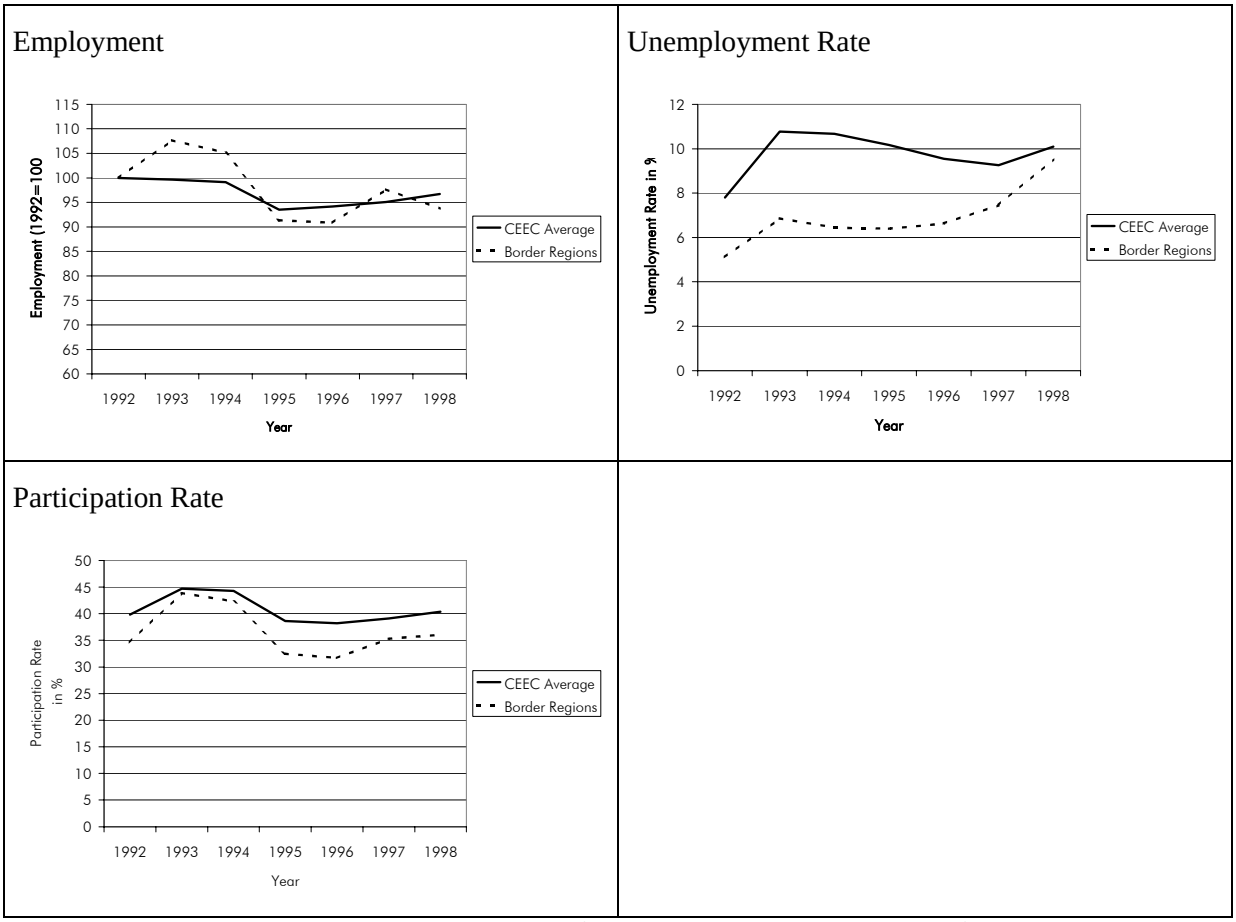
Note: Table reports unweighted averages (standard deviations) of regional variables. Values in brackets are standard deviations Population is measured in thousand inhabitants, area in square kilometres all other variables in percent. a) German data for employment and wage growth, as well as participation rates ends in 1994 this is reported in the column headed 1995. b) Hungarian data for 1998 was excluded from the analysis due to changes in methodology. Thus 1997 values are reported in the table. c) Portugal excluding overseas territories (i.e. Acores and Madeira).(see also the data description in the appendix).

Table 2: Regional Indicators Relative to National Average by Region Types

	Participation Rates		Unemployment Rates		Number of Regions
	1992	1998	1992	1998	
Agricultural	0.90	0.95	0.93	1.03	71
Regions	(0.16)	(0.14)	(0.27)	(0.39)	
Industrial	0.97	0.98	0.99	1.11	61
Regions	(0.14)	(0.12)	(0.39)	(0.38)	
Urban Regions	1.10	1.04	0.67	0.73	26
	(0.30)	(0.19)	(0.31)	(0.33)	
Other Regions	0.96	0.96	1.20	1.18	56
	(0.10)	(0.09)	(0.30)	(0.29)	

Note: Table reports unweighted averages (standard deviations) of variables normalised by national averages for candidate countries' regions only. Values in brackets are standard deviations. Hungarian data for 1998 is excluded in the calculations.

Figure 1: Evolution of Employment, Unemployment Rates and Labour Force Participation in EU Border Regions and the CEE Average, 1992-1998



Note: Figure reports unweighted averages (standard deviations) of variables normalised by national averages for candidate countries' border and non border regions only. Hungarian data for 1998 is excluded in the calculations

Table 3: Results of Specification Tests

	Regression Results*						P-Value of Unit Root test**		
	Employment Rate		Participation Rate		Employment Growth		Employment Rate	Participation Rate	Employment Growth
	γ_1	R^2	γ_1	R^2	γ_1	R^2			
Member States	0.95	0.76	1.16	0.52	1.01	0.97	0.00	0.00	0.00
Candidate Countries	0.99	0.80	0.93	0.62	0.98	0.99	0.00	0.00	0.00
First Round	0.97	0.87	0.91	0.65	0.98	0.98	0.00	0.00	0.00
Second Round	1.01	0.66	0.96	0.57	0.99	1.00	0.00	0.00	0.00
Border regions	0.96	0.70	0.90	0.60	0.88	0.70	0.15	0.00	0.00
Non-border regions	0.93	0.80	0.96	0.65	0.79	0.83	0.00	0.00	0.00
Agricultural Regions	0.89	0.75	0.87	0.59	0.99	1.00	0.00	0.00	0.00
Industrial regions	1.05	0.85	0.99	0.67	0.99	1.00	0.00	0.00	0.00
Urban Regions	0.90	0.81	0.82	0.56	1.01	1.00	0.00	0.00	0.00
Other Diverse	1.10	0.83	0.99	0.66	0.98	0.98	0.00	0.00	0.00
High Unemployment	1.12	0.74	0.89	0.49	0.97	0.99	0.00	0.00	0.00
Low Unemployment	0.77	0.86	1.00	0.80	1.02	1.00	0.00	0.00	0.00

* Columns labelled γ_1 report the average coefficient of a regression of the regional indicator on the national indicator and columns labelled R^2 the average R^2 value of this regressions ** Columns report the P-value of the Im, Persaran and Shin (1997) test for unit roots of the series of residuals in equation (9). High unemployment rate regions = regions with unemployment rates in excess of 10% in 1998; Low unemployment rate regions = regions with unemployment rates lower than 7% in 1998. Regional typology for candidate countries according to Scarpetta and Huber (1995) Hungarian data from 1992 to 1997 employment growth and participation rate for Germany 1989 – 1994 Member States excluding overseas territories (Acores and Madeira), Results for region types refer to regions of candidate countries only.

Table 4: Standard Deviation of Region Specific Components

	Variance Components of Residuals					
	Employment Growth		Participation Rate		Employment Rate	
	B	W	B	W	B	W
Member States	0.02	0.17	0.02	0.19	0.01	0.78
Candidate Countries	0.00	0.15	0.00	0.20	0.00	0.73
First Round	0.02	0.17	0.02	0.19	0.01	0.78
Second Round	0.00	0.13	0.00	0.07	0.00	0.68
Border regions	0.02	0.17	0.02	0.19	0.01	0.68
Non-border regions	0.00	0.11	0.00	0.11	0.00	0.78
Agricultural Regions	0.00	0.15	0.00	0.13	0.01	0.54
Industrial regions	0.00	0.17	0.00	0.14	0.01	0.60
Urban Regions	0.02	0.13	0.02	0.19	0.00	0.78
Other Diverse	0.00	0.16	0.00	0.10	0.01	0.68
High Unemployment	0.00	0.16	0.00	0.20	0.01	0.60
Low Unemployment	0.02	0.17	0.02	0.19	0.00	0.78

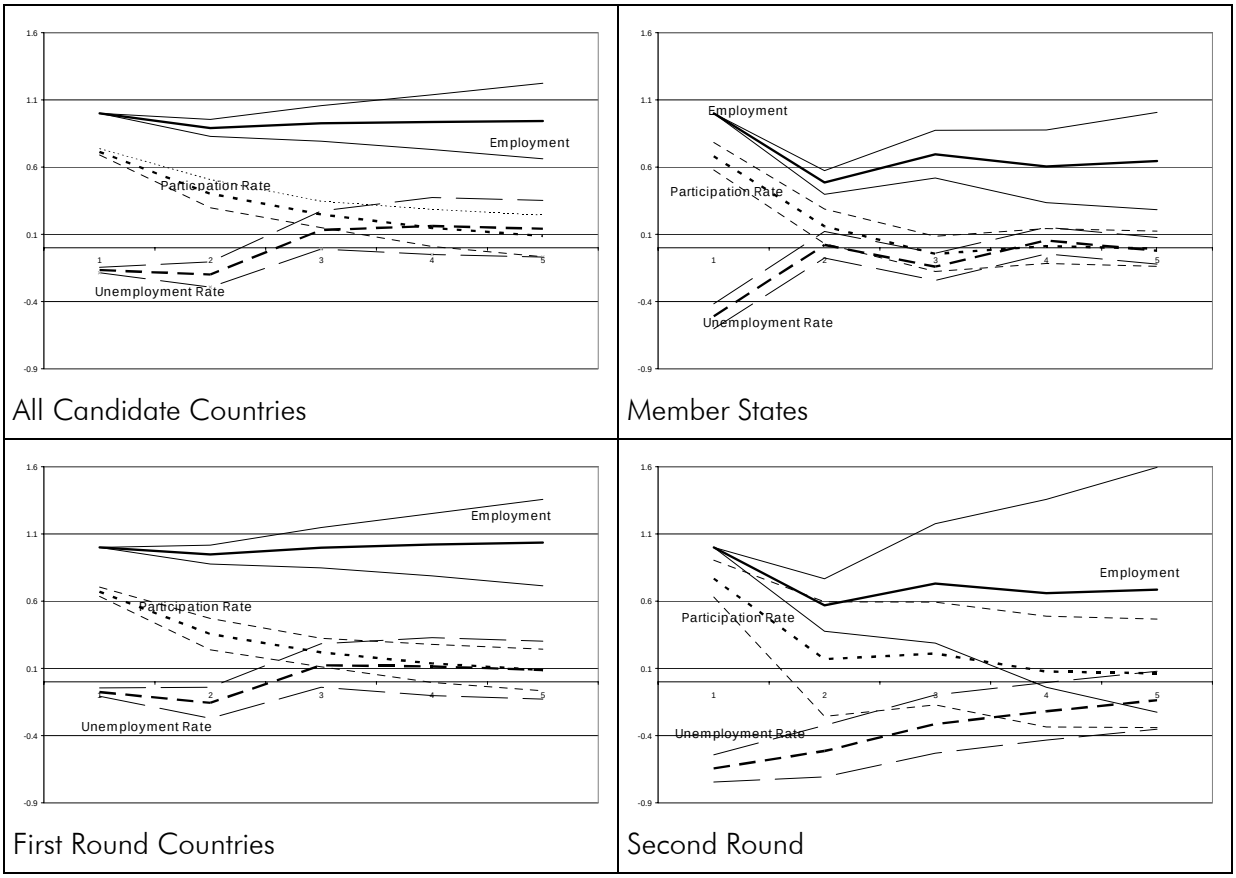
* Columns labelled W report the within standard deviation and columns labelled B report the between standard deviation of the series of residuals in equation (9). High unemployment rate regions = regions with unemployment rates in excess of 10% in 1998; Low unemployment rate regions = regions with unemployment rates lower than 7% in 1998. Regional typology for candidate countries according to Scarpetta and Huber (1995). Hungarian data from 1992 to 1997. Employment growth and participation rate for Germany 1989 – 1994. Member States excluding overseas territories (Acores and Madeira). Results for region types refer to candidate countries regions only.

Table 5: Persistence of Regional Development

	Participation Rate		Unemployment Rate		Employment Growth	
First Round 1992-1998	0.231** (0.023)	T=7 [a] N=143	0.168 (0.070)	T=7 N=143	-0.149** (0.024)	T=6 [a] N=155
Second Round 1992-1998	0.084** (0.039)	T=7 N=69	0.420** (0.071)	T=7 N=69	-0.053 (0.063)	T=6 [a] N=74
EU 1992-1998	0.693*** (0.132)	T=5 N=68	0.390*** (0.107)	T=5 [a] N=68	-0.392** (0.155)	T=4 N=68
Border Regions	0.229*** (0.066)	N=25	0.286** (0.126)	N=25	-0.269*** (0.080)	N=25
Non- Border Regions	0.213*** (0.032)	N=185	0.486*** (0.032)	N=185	-0.159*** (0.032)	N=185
Agricultural Regions	0.172*** (0.022)	N=71	0.407*** (0.075)	N=71	-0.191*** (0.041)	N=71 T=
Industrial Regions	0.210*** (0.024)	N=61	0.650*** (0.155)	N=61	-0.162*** (0.024)	N=61
Urban Regions	0.235** (0.082)	N=26	0.276*** (0.092)	N=26	-0.210*** (0.054)	N=26
Other Diverse Regions	0.119** (0.047)	N=50	0.456*** (0.140)	N=50	-0.170** (0.081)	N=50
high unemployment	0.220** (0.028)	N=96	0.491*** (0.079)	N=96	-0.172*** (0.042)	N=107
low unemployment	0.195** (0.017)	N=55	0.430*** (0.054)	N=55	-0.130*** (0.032)	N=60

Note: Results report the coefficient of regression (11), values in brackets are standard errors of the estimate, a) indicates that the null of second order auto-correlation as suggested by Arellano – Bond cannot be rejected at the 5% level *** (**) (*) coefficients are significantly different from zero at the 1% (***), 5% (**) and 10% (*) level. German employment growth and participation rate 1989 – 1994, Excluding Portuguese overseas territories (Acores and Madeira) Hungarian data from 1992 to 1997 ..High unemployment rate regions = regions with unemployment rates in excess of 10% in 1998; Low unemployment rate regions = regions with unemployment rates lower than 7% in 1998. Regional typology for candidate countries according to Scarpetta and Huber (1995). Results for region types refer to candidate countries regions only. T= maximum number of time periods, N= number of cross sectional units.

Figure 2: Impulse Response of Relative Employment, Relative Unemployment Rate and Relative Participation Rate to a Unit Shock in Relative Employment



The calculations are based on single equation robust Arellano-Bond estimations of log relative employment, log relative participation rate (participation rate defined as labour force to total regional population) and log relative employment rate. Thick lines are Impulse Responses thin lines associated 95% confidence intervals. Hungarian data are from 1992 to 1997 employment growth and participation rate for Germany 1989 – 1994. Member states excluding overseas territories (Acores and Madeira).

Table 6: Comparison of Shares of Shock Accommodated by Alternative Variables in the Literature

	Employment Rate	Participation Rate	Net Migration
Europe (1975 – 1987, 51 Regions)	22	75	4
Europe (1988-1997, 166 Regions)	47	32	21
Spain* (1976 – 1994, 17 regions)	36	23	41
Sweden (1966 – 1993, 24 regions)	8	26	66
Finland (1976 – 2000, 11 regions)	27	65	8
Netherlands* (1993 – 1999, 18 regions)**	14	74	12
Belgium (1970 – 1995, 3 Regions)[a)]	-4 to 22	3 to 33	45 to 99
Germany (8 regions, 27 years)	12	93	-5
Italy (11 regions, 27 years)	37	62	1
UK (11 regions, 27 years)	12	91	-3
US (1978 – 1990, 51 States)	34	26	40
Australia (1978 – 1997, 7 States)	20	40	40
This Paper			
Member States	35	68	-3
Candidate Countries overall (212 regions)	16	71	12
First Round (1992 – 1998, 143 regions)	10	69	21
Second Round (1992 – 1998, 69 regions)	54	76	-41

Sources: Decressin and Fatas (1995) for Europe 1975-1987, Tani (2003) for Europe 1988-1997 Jimeno and Bentolila (1998) for Spain, Fredriksson (1999) for Sweden, Pekkala and Kangashartju (2002) for Finland, Boersma and van Dijk (2002) for the Netherlands, Deglaigle and Lohest (1999) for Belgium, Blachard and Katz (1992) for US and Debelle and Vickery (1998) for Australia Fatas (2000) for Germany, Italy, UK (approximate figures estimated from graphs)* Quarterly Data, ** First quarter a) separate for each of three regions. Own results are based on single equation robust Arellano-Bond estimations of log relative employment, log relative participation rate (participation rate defined as labour force to total regional population) and log relative employment rate. Hungarian data from 1992 to 1997 employment growth and participation rate for Germany 1989 – 1994 Member states excluding overseas territories (Acores and Madeira).

Table 7: Dynamic Behaviour of Employment by Country Groups

	Size of Shock	% of shock remaining after one year t=2	% of shock remaining after three years t=4
Member States	0.021	68.5	69.5
Candidate Countries	0.055	89.5	93.4
First Round	0.056	94.7	102.0
Second Round	0.046	57.0	65.9

The calculations are based on single equation robust Arellano-Bond estimations of log relative employment, log relative participation rate (participation rate defined as labour force to total regional population) and log relative employment rate. Hungarian data from 1992 to 1997 employment growth and participation rate for Germany 1989 – 1994 Member States excluding overseas territories (Acores and Madeira),

Table 8: Dynamic Behaviour of Employment and First Year Adjustment by Region Types

				Share of shock accommodated in the first year by...		
	Size of Shock	% of shock remaining after One year t=2	% of shock remaining after three years t=4	Employment Rate	Participation Rate	Net Migration
Non Border Regions	0.056	90	94	19	72	9
Agricultural Regions	0.057	62	64	46	71	-19
Industrial Regions	0.052	78	79	28	74	-2
Diverse Regions	0.053	100	100	7	68	25
Low unemployment regions	0.049	68	69	24	74	2
High unemployment regions	0.062	81	79	45	75	-20

Note: Hungarian data from 1992 to 1997 High unemployment rate regions = regions with unemployment rates in excess of 10% in 1998; Low unemployment rate regions = regions with unemployment rates lower than 7% in 1998. Regional typology for candidate countries according to Scarpetta and Huber. Results for region types refer to candidate countries regions only.

Appendix 1: Data Description & Sources

Data Definitions

Data for the Czech Republic, Hungary and Poland were taken from national sources (regional and national statistical yearbooks). Data for Bulgaria and Romania were taken from the Regspec database (see Traistaru and Iara, 2002 for a description). Despite their substantial use in regional labour market analysis of candidate countries, data are not always comparable due to differences in national statistical systems. The following indicators were used:

Unemployment rates: Registered unemployment rates are measured at the end of the year (31.12.) for the Czech Republic, Poland, Hungary and Slovakia. In Bulgaria and Romania they are annual averages.

Population: Refers to the average population for all countries

Participation rates: Are measured in % of total population and calculated appropriately from employment figures and unemployment rates in all countries.

Dealing with Data Problems

In some cases changes in reporting system and regional aggregation needed to be overcome: In the Czech Republic in 1996 the district of Jesenik was formed from the territories of Sumperk and Bruntal. Thus for Czech data the districts of Sumperk, Jesenik and Bruntal were excluded to provide a comparable level of regional disaggregation for the complete period from 1992 to 1998.

In Hungary up to 1997, regional employment statistics were collected at the enterprise level, after this establishment level statistics have been provided. Due to these changes 1998 data were omitted.

Data Sources

Czech Republic - Cesky Statisticke Urad (CSU): Okresy Ceske Republiky (Okresy of the Czech Republic), years 1992 - 1998

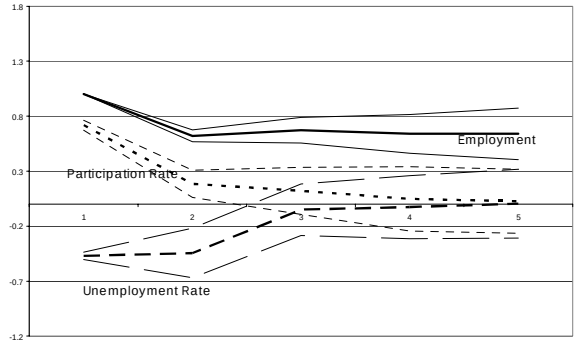
Poland - Glowny Urzad Statystyczny (Polish Statistical Office) Rocznik Statystyczny Wojewodztw, various issues, 1992 - 1999

Hungary - Központi Statisztikai Hivatal, Területi Statisztikai Evkönyv – Regional Statistical Yearbook, various years, 1992-1998

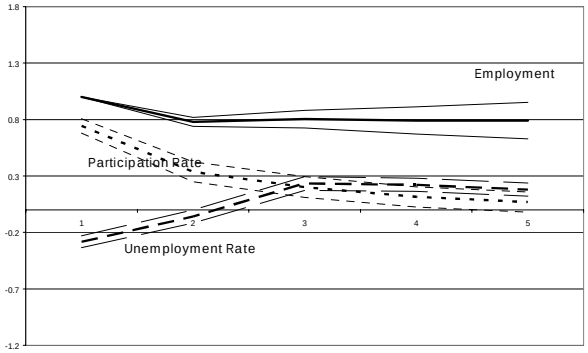
Bulgaria, Romania – Respec database (REGSTAT) see Iara and Traisturu (2002) for descriptions

APPENDIX 2: IMPULSE REPONSE FUNCTIONS BY REGION TYPES

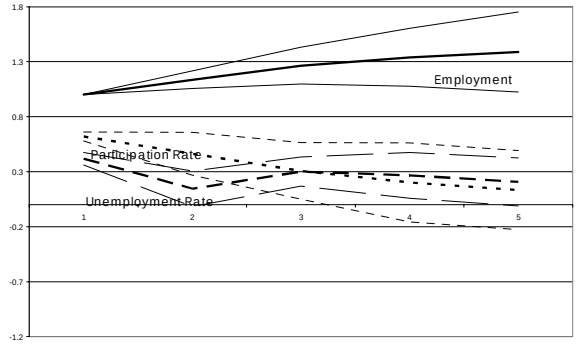
Agricultural Regions



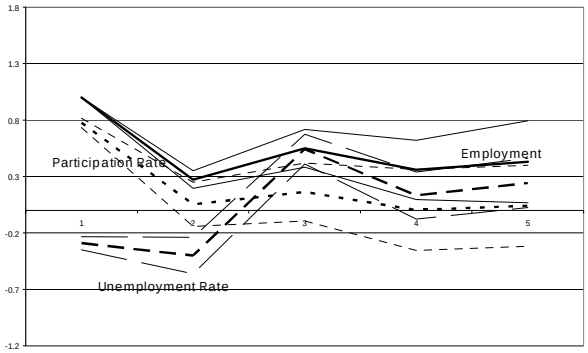
Heavily Industrialised Regions

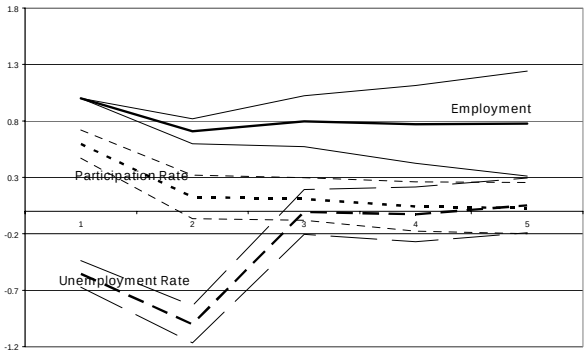


Diversified Regions

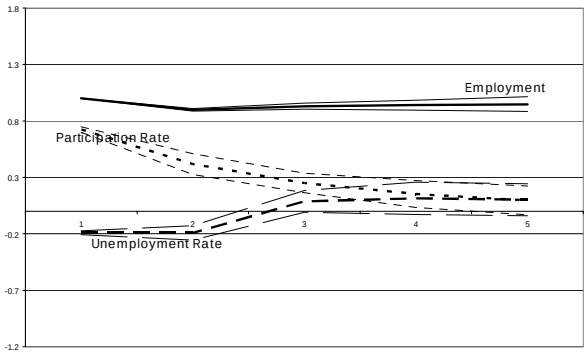


Urban Regions

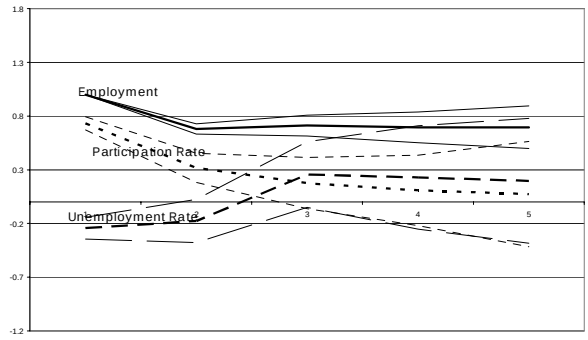




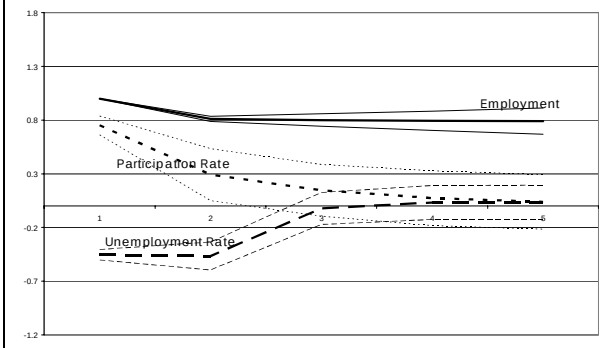
Border Regions



Non Border Regions



Low Unemployment Rate



High Unemployment Rate

APPENDIX 3: Maps of region typologies

Figure A3.1: Maps for Czech Repubic, Hungary, Bulgaria Romania

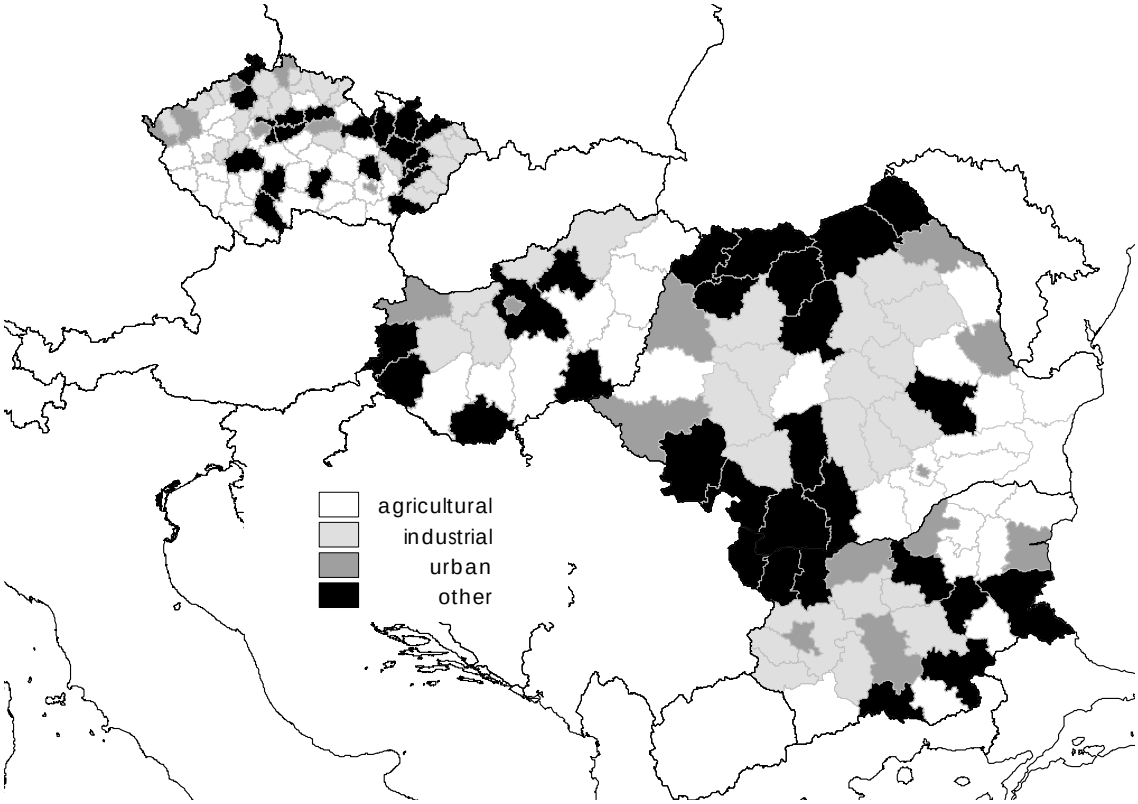
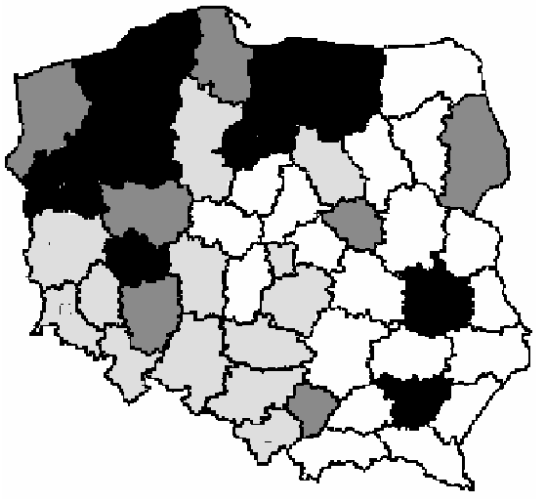


Figure A3.2 Map for Poland



Note: Legend see map A3.1

ADDITIONAL APPENDICES

Appendix 3: Robustness of Results

This Appendix presents results concerning the robustness of estimates. First, Table A3.1 and A3.2 compare our results to LSDV estimates and to estimates where the regions specific innovation is defined as the difference to the candidate countries average (in Gács, 2003). Figure A3.1 reports overall Impulse responses using two lags rather than one and in the last section (Figures A3.2 to A3.4) impulse responses using Gács' (2003) and LSDV estimation results are displayed.

Table A3.1: Comparison of Shares of Shock Accommodated by Methods

	Employment Rate	Participation Rate	Net Migration	Employment Rate	Participation Rate	Net Migration
	LSDV Estimation			Relative to CC average (Gács 2003)		
Overall	54	60	-14	10	68	22
First Round	19	75	6	2	90	1
Second Round	90	62	-53			
MS	34	68	-2			
Aggr	46	64	-10	29	62	7
Ind	72	63	-35	11	55	33
Urban	18	63	55	4*	68	30
Other	7	31	76			
High un	12	58	30			
Low un	73	68	-31			
non border				15	62	23

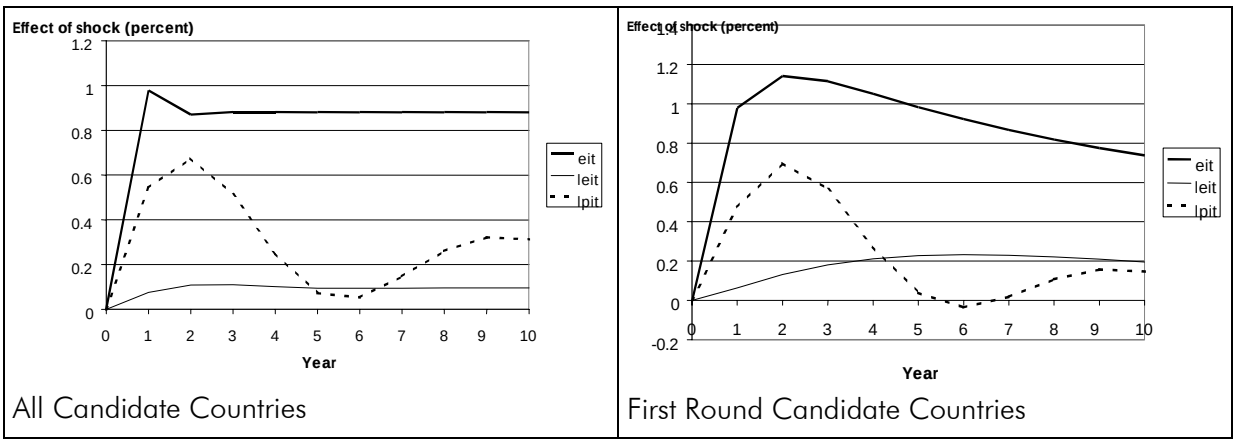
Table A3.1: Comparison of Size and Persistence of Shocks by Methods

	Size of Shock	% of shock remaining after one year t=2	% of shock remaining after three years t=4	Size of Shock	% of shock remaining after one year t=2	% of shock remaining after three years t=4
	LSDV Estimation			Relative to CC average (Gács 2003)		
Overall	0.019	0.6	0.6	0.15	0.5	0.5
First Round	0.018	0.6	0.6	0.18	0.8	0.6
Second Round	0.023	0.5	0.3			
MS	0.013	0,6	0.6			
Aggr	0.014	0.6	0.6	0.11	0.7	0.5
Ind	0.018	0.5	0.6	0.09	0.6	0.4
Urban	0.017	0.6	0.6	0.19	0.5	0.5
Other	0.022	0.7	0.7			
High un	0.016	0.6	0.6			
Low un	0.015	0.0	-0.1			
non border				0.15	0.5	0.5

Figure A3.1 Impulse responses for Candidate Countries with lag length two

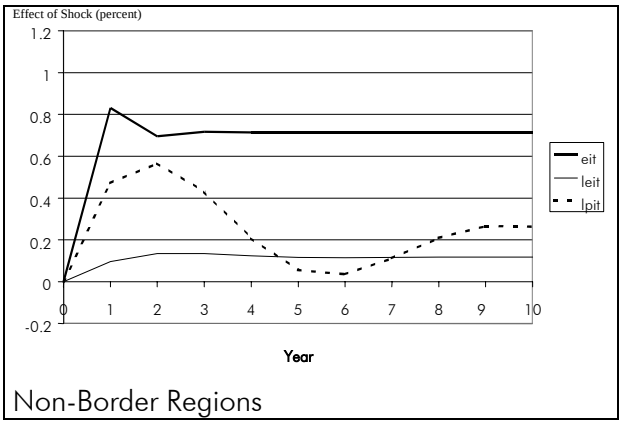
RESULTS USING DIFFERENCES BETWEEN NATIONAL AND REGIONAL INDICATORS (Blanchard & Katz)

Figure A3.2: Impulse Response of relative employment, relative employment rate and relative participation rate to a shock of one standard deviation in relative employment



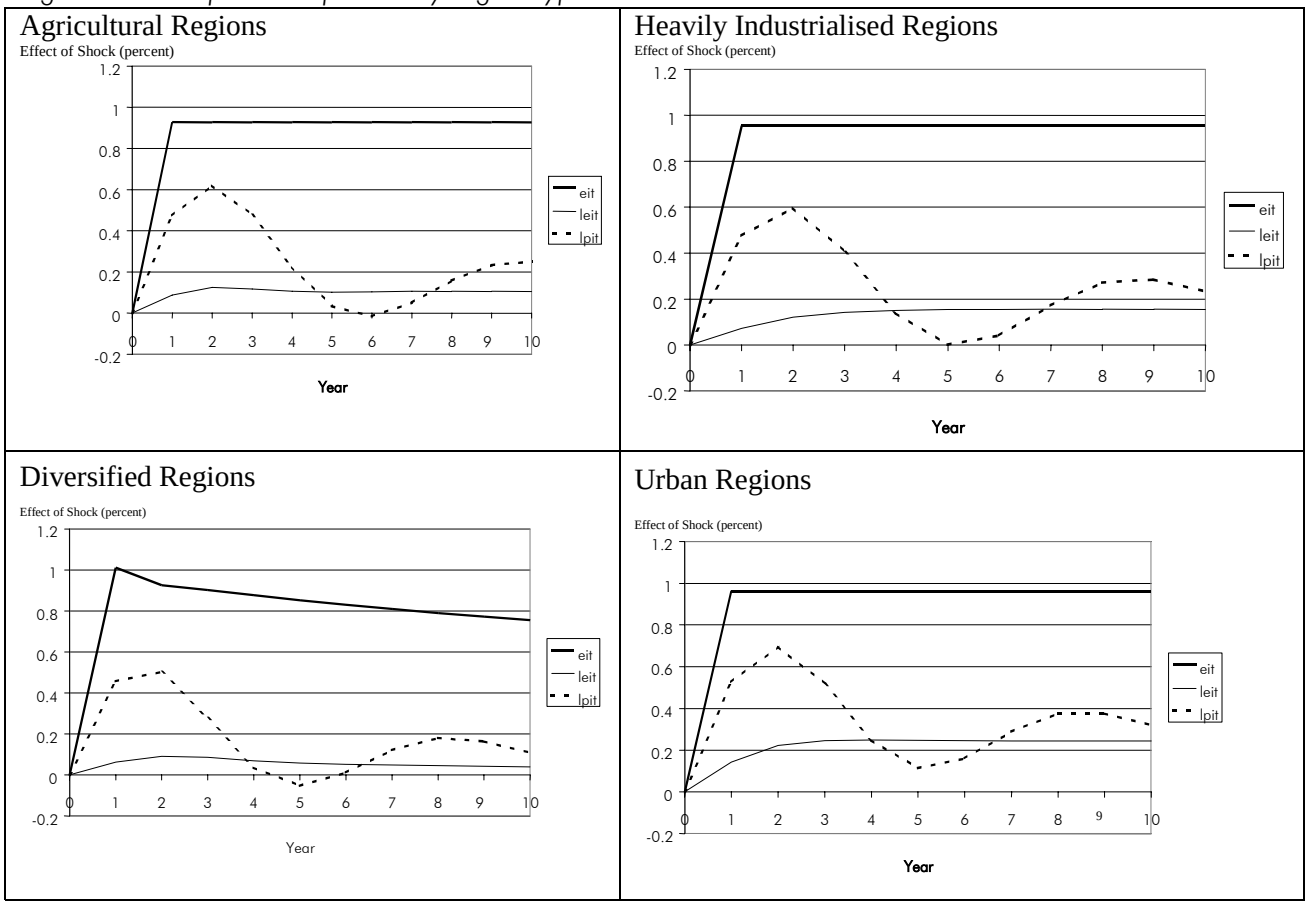
The calculations are based on single equation robust Arellano-Bond estimations of log relative employment, log relative participation rate (participation rate defined as labour force to total regional population) and log relative employment rate where relative refers to relative to the CEEC average

Figure A3.3: Non-border regions: Impulse Response of relative employment (in first differences), relative employment rate and participation rate to a positive unit labour demand shock



The calculations are based on single equation robust Arellano-Bond estimations of log relative employment growth, log relative participation rate (participation rate defined as labour force to total regional population) and log relative employment rate where relative refers to relative to the CEEC average

Figure A3.4: Impulse Responses by region type LSDV Estimator



Appendix 4: Common and Region Specific Developments

The stylised facts reported in the paper suggest that there has been a considerable differentiation of labour market conditions in the candidate countries during the last decade. This raises the issue whether these differences have been mainly due to idiosyncratic shocks to regions or rather to different reactions of individual regions to national shocks. To disentangle these two influences a number of authors (e.g. Vinals and Jimeno, 1996, Delaigle and Lohest, 1999) have suggested running bivariate vector autoregressions of national and regional indicators. We follow this approach using annual data from the regions in our sample. We thus estimate vector auto-regressions of the form:[1]

(6) $$Y_{At} = \beta_0 + \beta_1 Y_{At-1} + \xi_t^A$$

(7) $$Y_{it} = \delta_0 + \delta_1 Y_{it-1} + \delta_2 Y_{At} + \delta_3 Y_{At-1} + \xi_{it}$$

with Y_{it} the indicator in region i at time t and Y_{at} the same indicator for the national level, and calculate the share of the national shock in the three-year ahead prediction error.[2]

The results suggest that the importance of national developments of unemployment is somewhat larger in the first round candidate than in EU member states. Around 70% of the three year ahead forecast error of the system in equations 6 and 7, results from innovations in national unemployment development, only 30% of the forecast for region specific innovations. In the EU member states 40% of the forecast error in unemployment rates are due to national factors 60% are due to regional influences. The importance of national developments in participation rates as well as employment growth in first round candidate countries , by contrast, are comparable to member states. In second round candidate countries, region specific developments are slightly more important concerning participation rates and unemployment rates, while differences to both the EU and first round candidate countries concerning other indicators are small.

[1] These are estimated by single equation estimation using the GMM estimator proposed by Arellano – Bond (1991) see below

[2] Three year ahead forecast errors were used to mimic „medium term" adjustment, results are robust to using two or four year ahead forecast errors.

Similarly, differences among region types are small and arise primarily with respect to unemployment and participation rates. In urban regions the unemployment rate development was characterised by substantial idiosyncratic developments, while in other diverse regions national factors seem to have played a more important role. In agricultural regions participation rate developments have shown above average idiosyncraticity while industrial regions follow national developments more closely. Finally, in agricultural regions employment growth has followed national developments slightly more closely than in other regions. In border regions national developments in participation rates are less important than in non-border regions. This may be attributed to the higher impact of emigration and cross-border commuting in these regions.

Table 3: Share of three year ahead forecast error of national shocks in regional series

	Participation rate	Unemployment rate	employment growth	wage growth
Member States[b)]	0.427	0.395	0.544	0.472
Candidate Countries[a)]	0.456	0.601	0.531	0.490
First Round[a)]	0.494	0.681	0.509	0.487
Second Round	0.314	0.467	0.511	0.498
Border Regions[a)]	0.371	0.583	0.539	0.487
Non-Border Regions[a)]	0.528	0.629	0.482	0.548
Agricultural Regions [a)]	0.436	0.444	0.562	0.517
Industrial Regions [a)]	0.611	0.511	0.444	0.544
Urban Regions [a)]	0.500	0.433	0.477	0.557
Other Diverse regions [a)]	0.486	0.568	0.497	0.563
High Unemployment Regions [a)]	0.377	0.313	0.391	0.539
Low Unemployment Regions [a)]	0.551	0.498	0.545	0.533

Notes: high unemployment rate regions = regions with unemployment rates in excess of 10% in 1998; Low unemployment rate regions = regions with unemployment rates lower than 7% in 1998. Regional typology for candidate countries according to Scarpetta and Huber a) Hungarian data from 1992 to 1997 b) employment growth and participation rate for Germany 1989 – 1994 Excluding overseas territories (Acores and Madeira), Results for region types refer to candidate countries regions only.

The important difference in region specific developments lies in the important role of region specific shocks in high unemployment regions relative to the smaller role in low unemployment regions. Regional idiosyncratic developments in unemployment and participation rates as well as employment growth have been more important in high unemployment regions of the candidate countries. This suggests that high unemployment rates (and low participation rates) in the high unemployment regions are due to region specific problems to a larger degree than in low unemployment rate regions.

Appendix 5: Demand or Supply Shocks

A second issue arising from the model presented in equations (1) to (5) is whether shocks to labour demand or labour supply have been more important in explaining regional labour market development in candidate countries. This too can be addressed at the hands of descriptive statistics. In particular, if average unemployment rates and employment growth rates are positively correlated, this implies that employment growth is primarily driven by labour supply shocks. If by contrast employment growth is driven by labour demand shocks the two variables will be negatively correlated. We thus estimate a regression of the unemployment rate on employment growth for the time period 1992-1998. The results (see table 4) suggest a significant positive and correlation between annual employment change and average unemployment. The R^2 of this regression, however, is small and the relationship seems to be unstable over time. When looking at shorter time periods (1992-1994 and 1995-1998), a negative relationship between average unemployment and employment growth in the first time period and a positive relationship between the two variables in the second time period can be observed. That is while between 1992 and 1994 reductions in employment growth were associated with simultaneous increases in the unemployment rate. The regression results indicate a „labour supply-driven" change in employment for the period 1995-1998.

Table 4: Relationship between average unemployment and average annual employment growth (in logs) in the Candidate Countries

	1992-1998	1992-1994	1995-1998
Constant	0.103***	0.095***	0.126***
	(0.002)	(0.002)	(0.001)
Ln (Employment Growth)	0.189***	-0.601***	0.807***
	(0.06)	(0.034)	(0.032)
Number of Observations			
Adjusted R^2	0.006	0.318	0.4163

Values in brackets indicate standard errors. ***, ** and * correspond to significance at the 1%, 5% and 10%, respectively.

Notes

[1] From an empirical perspective, working with deviations from national averages has the advantage of removing any variation in data resulting from differences in national reporting systems.

[2] Similar data has been used in a number of studies on labour markets in accession candidate countries (see: Boeri and Scarpetta, 1996 and Traistaru, Nijkamp and Resmini, 2002).

[3] In the other candidate countries regional classification and data definitions are characterized by substantial changes, and time series of the length necessary for our estimation are not available. In Slovakia, regions were redefined in 1996 in a way such that comparisons to later periods are impossible; in Slovenia data before 1996 is only available at the communal level for which no unemployment data was provided. Since 1996 data is available at the level of statistical regions. For the Baltic countries (Estonia, Lithuania and Latvia) comparable data are available only since 1995 at the regional level (see Huber, Iara and Traistaru, 2004 for a discussion of data availability in these countries)

[4] Unfortunately these five countries are the only ones for which data on all indicators are available for the complete time period and set of regions on this data base.

[5] In this taxonomy diverse regions represent a residual category which is characterized neither by strong sectoral specialization nor a high population density.

[6] Since the contribution of Blanchard and Katz (1992), a number of authors have proposed extensions of this method. In particular Pekkala and Kangasharju (2002, 2002a) identify aggregate shocks by entering variables in absolute values rather than deviations from the national mean in equations (6) to (8) and analyse potential asymmetries by including separate series for positive and negative labor demand shocks (Δl_{it}). Unfortunately, the first of these extensions is not available to us, because differences in national statistical reporting systems would necessitate estimation on a country-by-country basis, which in turn would decrease the number of observations below the the number necessary to allow convergence of the Arellano-Bond estimator. We have, however, explored the possibility of potential asymmetries of positive and negative labor demand shocks using the same methodology as Pekkala and Kangasharju (2002a), and performing Wald tests of equality of coefficients for

positive and negative shocks (results are available from the authors). As Pekkala and Kangasharju (2002a) for Finland, we find little evidence of asymmetry in the candidate countries. We thus focus on results for the symmetric case only.

[7] Gács (2003) and Huber (2004) provide estimates in which alternative identification assumptions such as restricting the contemporaneous effect of participation rates on employment rates to zero were made. These specifications provide qualitatively similar results. We give preference to our identification strategy because (as also noted in the literature) it imposes the minimal structure on the model necessary to identify labor demand shocks.

[8] In simulation studies (Kiviet, 1995 Judson and Owen, 1996) this estimator outperforms least squares dummy variable (LSDV) estimates for data sets of our size. To check for robustness (6) to (8) were also estimated using the LSDV estimator and including two lags (rather than one). None of this changes the qualitative results, reported below. Results are robust to using two-step rather than one-step estimates. Gács (2003) uses the CEE average rather than residuals for a subset of countries considered in this study. Her results are comparable to ours (see Appendix available from authors).

[9] A full set of results is available from the authors.

[10] Results for a lag length of two are similar to those reported here and are available from the author

[11] This can be attributed to the effects of commuting, since persons who have previously worked in other region will register unemployed at their place of residence, thus increasing measured labour supply in the home region.

[12] A further reason could be that there are only few cross sectional units in the second round candidate countries, which may impinge on the quality of estimates.

[13] Impulse responses for region types are displayed in the Appendix.

[14] This accords with the results of Gács (2003), who finds relatively similar adjustments in using a slightly different typology.

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