



## **Structural Change and Economic Growth in the New EU Member States**

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**Abstract:** This paper analyses the extent and impact of structural changes that occurred in European economies during past two decades on aggregate economic growth, focusing on the new EU member states from Central and Eastern Europe. After presenting some stylised facts related to employment and output restructuring, we use a conventional shift and share analysis in order to evaluate the impact of broader sectoral shifts on GDP growth, focusing on the period 1995-2011. Decomposition of aggregate GDP/GVA growth using the shift and share analysis shows a distinct North-South pattern of growth and restructuring while the previous NMS-OMS divisions are becoming less relevant. In the North, manufacturing and trade have fuelled growth while in the South there has been much less structural change. Apart from these differences, our results partly differ from earlier findings of similar analyses for the NMS. Finally, we analyze differentiated impacts of the recent (2008-2011) crisis on structural changes in Europe and find interesting similarities between (groups) of NMS and OMS in terms of both growth patterns and responses to the crisis.

### 1 Introduction

The aim of this paper is to examine the extent and patterns of structural changes that have recently occurred in European economies, in particular in the new EU member states from Central and Eastern Europe (NMS). Before examining the effects of structural change on aggregate economic growth we provide first some stylized facts on changing output and employment structures. Next, we proceed with the analysis of growth decomposition using the 'shift and share' analysis, focussing on the period after 1995 and, last but not least, on the crisis period 2008-2011. The standard hypothesis of the growth-accounting literature is that structural change is an important source of economic growth and overall productivity improvements (Maddison, 1987). This hypothesis assumes a surplus of labour in some (less productive) parts of the economy (such as agriculture), thus shifts towards higher productivity sectors (industry) are beneficial for aggregate economic growth. Even within industry shifts towards more productive branches should boost aggregate productivity. On the other hand, structural change may have a negative impact on aggregate productivity growth if labour shifts to industries with slower productivity growth (parts of services sector, especially non-market services). The "structural bonus and burden" hypothesis (Baumol, 1967) were examined on example of Asian economies by Timmer and Szirmai (2000), on a large sample of OECD and developing countries (Fagerberg, 2000), and more recently by Peneder for USA, Japan and EU member states (Peneder, 2003), as well as for the CEE countries (Havlik, 2005a), Havlik, Leitner and Stehrer, 2012). A lot of attention has been devoted also to the analysis of patterns and causes of varying productivity performance between the EU and the USA, exploring in particular at detailed sectoral level the reasons for EU's lagging behind (Timmer, Inklaar, O'Mahony and van Ark, 2010; van Ark, O'Mahony and Timmer, 2012).

All these latter studies have failed to confirm the general validity of the structural bonus hypothesis but did found some evidence for negative productivity effects of structural change. In particular, van Ark et al. (2012) show that slow productivity growth in market services has been characteristic for the EU but not for the USA. In the pre-crisis period 1995-2007, they find that especially trade, finance and business services have boosted US productivity growth in market services relative to the West European EU countries. Similarly, Timmer et al (2010) find that "EU-US productivity gap since the mid 1990s has mainly been

located in market services. Contrary to Baumol's cost-disease hypothesis, labour productivity growth in some services industries has been strong, particularly in the USA". Transatlantic growth differences were especially large in distributive trade and in business services (ibid, p. 34). In contrast, Havlik et al (2012) found that in selected CEE countries (Czech Republic, Hungary, Poland, Slovakia and Slovenia) high productivity growth rates were achieved in manufacturing industries rather than in services during the same period.

Central and East European new EU member states (NMS) have experienced far reaching changes in the course of their transition to a market economy. One aspect of these changes in the course of transition is reflected in the far reaching restructuring of both production and employment patterns.<sup>1</sup> This paper illustrates first these changes with stylized facts related to NMS' output and employment structures during the period 1995-2011 at broader sectoral levels (Section 2), focussing particularly on restructuring patterns during the recent crisis (2008-2011). Section 3 attempts to find out whether there has been a structural convergence towards the more advanced EU countries during the two decades of economic transition and integration with the EU. Section 4 evaluates the impact of structural changes on aggregate growth with the help of a conventional shift and share analysis. Section 5 provides a summary of findings and some policy recommendations related to NMS future role in the economy of an integrated Europe, especially in view of post-crisis growth challenges.

## **2 Basic patterns of changing output and employment structures**

The majority of NMS have inherited a huge, oversized and inefficient industrial sector from the period of central planning. At the same time, the services sector – especially the market services - was grossly underdeveloped (Landesmann and Stehrer, 2002, Vidovic, 2002). In 1990, manufacturing industry value added accounted for around 40% of GDP in Bulgaria and Poland, for about 35% of GDP in the Czech Republic, Romania Slovakia and in the Baltic States, but for less than 30% of GDP in Slovenia and only for 20% in Hungary (Figure 1).<sup>2</sup> Due to considerable structural distortions and production inefficiencies, a high degree of industrialization initially turned out to be a drawback rather than an advantage: it implied, among other problems, also the underdevelopment of other sectors, especially of services. In all NMS countries, industry suffered over-proportionally from the 'transformational recession' at the beginning of transition. The time pattern of this recession varied, largely depending on the date when transformation measures were initiated. In Central and Eastern Europe, the transformational recession started already in 1989/1990 with huge output declines (by about 15% per year) and continued well into 1992/1993. In the Baltic States, the full impact of the crisis came with a delay of approximately two years, and was aggravated by the dissolution of the USSR in 1992.

Despite some recovery after 1993 (largely thanks to Poland), the cumulative *decline of industrial output* between 1990 and 1995 amounted still to nearly 10% in Central and Eastern Europe (CEEC-7) and to more than 50% in the three Baltic states (Havlik, 2005a). Industry, and especially its manufacturing part, shrunk also in relative terms during this period (with the sole exception of Hungary). Poland and Romania also managed to keep the share of manufacturing value added in GDP nearly constant during the past decade – see Figure 1).<sup>3</sup> In Bulgaria and Poland, the share of manufacturing in GDP initially dropped by some 20

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<sup>1</sup> Another structural feature of transition has been the regional and commodity trade restructuring – see Dobrinsky and Landesmann (1995), Havlik (2008).

<sup>2</sup> Unless otherwise stated, wiiw Annual Database which relies on national statistics and Eurostat are used as the main source of data. Data for early 1990s are not fully comparable with later periods due to changes in classifications.

<sup>3</sup> Due to frequent changes in statistical reporting and varying enterprise coverage, data for the first half of 1990s are both less reliable and not fully comparable with later periods.

pp between 1990 and 1995; in the remaining countries this share dropped by “only” 10-15 pp. A number of factors such as the loss of traditional export markets, sudden trade liberalization, restrictive macroeconomic policies and insufficient restructuring played a role. The relative decline of industry went naturally hand in hand with an expansion of services that were grossly underdeveloped under the old system.

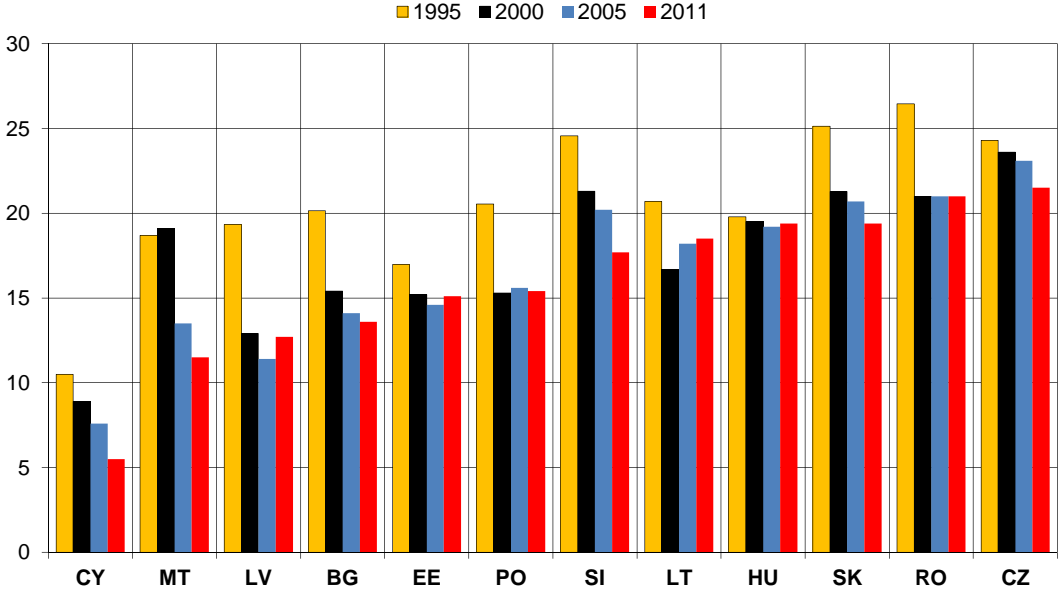
By the year 2011, only the Czech Republic and Romania had a manufacturing industry with the share of more than 20% of GDP – about the same like in the two most industrialized “old EU member states” (OMS) Germany and Ireland. Among the OMS, only Germany and Portugal succeeded to maintain the share of manufacturing in GDP more or less constant over the last two decades (at 20% resp. 15% of GDP); in all other OMS manufacturing shrank considerably over this period (Figure 1).

In several NMS (Hungary, Poland Romania and in the Baltic States, manufacturing industry managed to recover at least part of its previous position since the second half of the 1990s and afterwards, largely thanks to *active restructuring* and privatization efforts, fostered especially by inflows of FDI. Nevertheless, in the year 2001 only Hungary and Poland produced more industrial output, by 60% and 70% respectively, than in 1990. In contrast, in Bulgaria and Romania industry shrank by more than 30% during that period, in the Baltic States by half, while in the remaining NMS countries the cumulative output decline amounted to around 10% (Havlik, 2008; we shall turn to the related structural changes below). During 2000s, both industry and GDP continued to recover – though the recovery was uneven and was abruptly interrupted by the crisis in 2009 (wiiw, 2012). At the beginning of 2010s, manufacturing industry still contributes a significant part to the GDP: the shares of manufacturing in GDP in the majority of NMS were higher than in West and South European EU member states (European Commission, 2011 and Figure 1).<sup>4</sup> On EU-27 average, real estate, renting and business activities replaced manufacturing as the largest sector (in 2009, measured by sector shares in GDP – see European Commission, 2011, p. 55). On the global scale, manufacturing accounted for 17% of GDP in 2010 (33% in China, 28% in South Korea, 20% in Japan, 17% in Mexico and 12% in USA – see Mc Kinsey, 2012).

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<sup>4</sup> On EU-27 average, manufacturing value added accounted for less than 15% of GDP in 1999 whereas market services accounted for 50% of GDP – see European Commission, 2011, p. 37. Only Bulgaria, Poland, Estonia and Latvia have similarly low manufacturing shares.

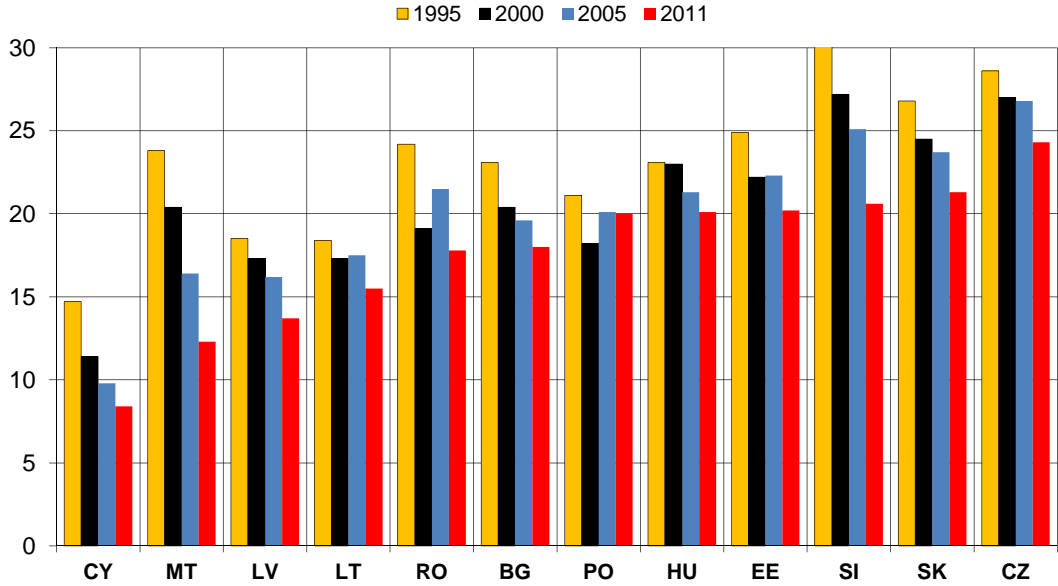
**Figure 1. Manufacturing value added in % of GDP**



Note: countries ranked according to the share of manufacturing in 2011.

Source: own calculations based on WIIW Database and Eurostat.

**Figure 2. Manufacturing employment in % of total**



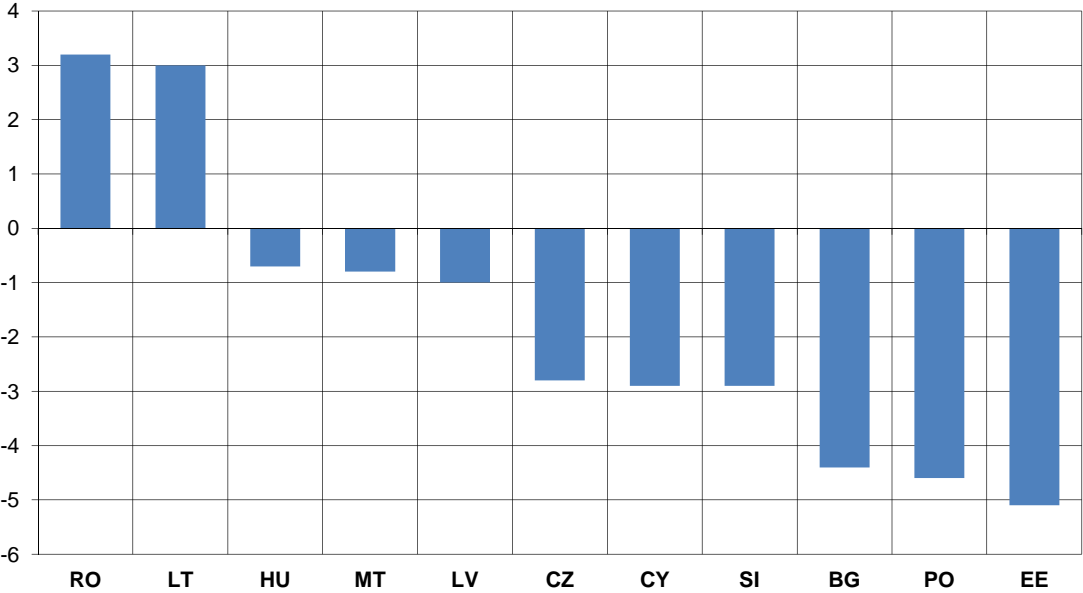
Note: countries ranked according to the share of manufacturing in 2011.

Source: own calculations based on WIIW Database and Eurostat.

*NMS' employment* underwent even more dramatic changes during the last two decades. As a rule, employment declined more than output and millions of jobs were lost in the region during the first transition decade. This reflected the general labour market developments during the 1990s such as declining overall employment, shifts from industry to the service sector and, last but not least, the

emergence of open unemployment.<sup>5</sup> In the second half of the 1990s, only Hungary (and partly also Poland) could modestly increase manufacturing industry employment; in the remaining candidate countries manufacturing employment has continued to fall. Employment adjustments occurred with a certain time lag after output, first due to delayed lay-offs and hardly any expansion of manufacturing jobs thereafter (again in both absolute and relative terms). Another labour market shock occurred as a consequence of the crisis in 2009 and afterwards. Still manufacturing industry remains an important job provider in many NMS countries; the highest employment shares in manufacturing industry were observed in the Czech Republic (nearly 25% of total employment – see Figure 2). In all NMS bar Latvia, and despite a relative decline in importance as a job provider, manufacturing jobs account for more than 15% of the total.

**Figure 3.** Differences in manufacturing industry shares: GVA vs employment, year 2011, in pp



Source: own calculations based on WIIW Database and Eurostat.

An associated feature of diverging output and employment share developments has been an impressive productivity catching-up. During the period 1995-2007, the difference in the growth of labour productivity between NMS (Czech Republic, Hungary, Poland, Slovakia and Slovenia) and EU-15 was about 3-5 pp per year (Havlik et al., 2012, p.243). In relative terms, Bulgaria, Estonia and Poland have the most “labour intensive” manufacturing industry among the NMS (approximated by differences in shares of gross value added and employment in total) while Romania and Lithuania are least labour intensive (Figure 3).<sup>6</sup>

### 3 Structural change in GDP and employment

#### 3.1 GDP and gross value added

The above shown changes in the importance of manufacturing obviously mirror the shifts in the importance of other economic sectors. In order to evaluate the overall pace and patterns of structural

<sup>5</sup> For more details on labour market developments during the 1990s see Vidovic (2002); European Commission – Eurostat (1999).

<sup>6</sup> Needless to say, these differences are affected by the sectoral structure of manufacturing branches and their varying capital intensity.

change we use the structural change indicator S which measures aggregate shifts in sectoral shares.<sup>7</sup> Table 1 provides the results for changes in the structure of EU countries' GDP (gross value added), separately for the whole period 1995-2011 for which comparable data are available, as well as for the three five-year sub-periods and the most recent period of the crisis (2008-2011). Unfortunately, the results are not very conclusive as no clear pattern in the speed of structural change can be discerned. This may result partly from different data availability details, varying phases of structural adjustments in individual countries but, in general, it reflects also different speeds of restructuring in individual countries and sub-periods.

**Table 1.** GDP/GVA structural change (S- indicator, calculated from NACE Rev 2 data)

NMS	Period				
	2011-1995	2011-2005	2005-2000	2000-1995	2011-2008
BU-N2	4.608	1.447	1.847	4.414	1.538
CZ-N2	0.847	0.844	0.457	1.372	0.322
EE-N2	1.444	1.375	1.291	1.303	1.252
HU-N2	1.309	0.547	0.598	1.037	0.607
LV-N2	2.969	1.775	1.180	3.216	2.013
LT-N2	2.811	0.870	1.188	1.530	1.913
PL-N2	1.512	0.471	0.609	1.490	0.335
RO-N1	5.686	1.247	1.141	3.853	2.41 (N2)
SI-N2	1.939	1.171	0.695	0.686	0.830
SK-N2	2.219	1.150	0.940	1.259	0.809
CY-N2	2.369	1.355	1.273	1.004	1.746
MT-N1	4.084	1.821	2.765	1.043	1.175

Source: own calculations based on Eurostat.

Generally, it seems that structural change has been more pronounced in Bulgaria, Romania and in the Baltic States than either in the Czech Republic, Hungary, Estonia or Poland. Furthermore, the "earlier" period 1995-2000 experienced more restructuring than the period immediately before EU accession (2000-2005) and the most recent period 2005-2011 is in several countries characterised by more

<sup>7</sup> Structural change indicator S is calculated from 1-digit NACE rev. 1 resp. NACE rev. 2 data for sectoral gross value added (at current prices) and employment using the formula:

$$S^* = \sqrt{\sum_k (sh_k^{t_2} - sh_k^{t_1})^2 \cdot (sh_k^{t_1} / 100)}$$

$k$  = individual NACE rev. 1 resp. NACE rev 2 sector

$sh_k$  = share of sector k in total output or employment (in %)

$t_i$  = time index, where i denoting different years.

restructuring than before accession (e.g. Czech Republic, Slovakia and Slovenia). The latter period was also affected by the recent crisis which, as a rule, hit manufacturing, construction and tradable services much harder than other sectors (Hanzl-Weiss and Landesmann in Astrov et al, 2013).

In the crisis period (2008-2011), Romania, Latvia, Lithuania and Bulgaria experienced most structural change whereas the output structures of the Czech Republic and Poland remained most stable (for detailed sectoral patterns see below).

A more detailed picture of structural change patterns over the whole period 1995-2011 is provided by Figure 4 which shows sectoral changes of gross value added in percentage points for individual countries. Despite country-specific restructuring patterns (and different classifications due to data availability constraints), several stylized facts common to most countries emerge: the output shares of agriculture and manufacturing have usually declined during that period whereas those of real estate, renting and business activities, information and communication, financial and insurance services as well as of public administration have increased. Generally, however, the restructuring patterns have been highly diverse across individual countries (Figure 4).

A number of distinct interesting features of restructuring emerged during the crisis period 2008-2011. Apart from a certain revival of manufacturing (e.g. in the Baltic states and in Hungary) it was mostly construction and trade which suffered from declining value added shares during the crisis in a number of NMS (Figure 5). Structural change was least pronounced in the Czech Republic during this period. In Poland – the only EU country which did not experience a decline in GDP during the crisis period – a certain return to a “traditional” pattern of restructuring occurred as a number of “productive” sectors (energy, construction and trade) managed to increase their shares in GDP while the shares of information, communication services and especially financial services had declined (Figure 5).

### **3.2 Structural changes in employment**

Structural change indicators for employment (number of employed persons) are presented in Table 2, again separately for the whole period 1995-2011 and individual sub-periods. Unfortunately, detailed data availability again differs across countries; comparable employment data (employed persons) for the whole period are not available for Latvia, Bulgaria and Romania as well as for a number of OMS. The Czech Republic has experienced the least employment structural change among the EU member states; especially the contrast with Slovakia, Slovenia and Hungary is interesting. There is no clear pattern across individual sub-periods: in the majority of countries, the employment restructuring process has been more or less evenly distributed across the whole 1995-2011 period and the structural change indicators do not differ in individual sub-periods.

In the most recent crisis period (2008-2011),<sup>8</sup> employment structures in Hungary (and Malta) changed very little. In remaining countries, especially in the Baltic states and in Romania, employment structures changed much more during the crisis (Table 2).

A closer look at sectoral employment adjustment patterns over the whole period 1995-2011 reveals significant declines in employment shares of agriculture (by up to 10pp in Lithuania and Romania) and of manufacturing (here especially in Slovenia and Malta) while trade and real estate, renting and business activities gained employment shares in most EU countries. In a number of NMS countries (Hungary, Latvia and Slovakia) employment in administrative and support services activities gained most on importance (Figure 6). During the crisis period 2008-2011, the most striking development has been declining

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<sup>8</sup> For this period there are comparable data for all countries in NACE 2 classification and 21 sectors (except France, Portugal and Spain).



employment shares of manufacturing and construction in nearly all NMS (particularly in the Baltic states and except Czech Republic and Poland – see Figure 7).

**Table 2.** Employment structural change (S- indicators)

NMS	Period				
	2011-1995	2011-2005	2005-2000	2000-1995	2011-2008
BG-N2	4.588	1.614	2.072	2.061	1.110
CZ-N2	1.111	1.068	0.299	0.726	0.815
EE-N2	3.089	1.076	0.712	1.744	1.318
HU-N2	3.277	0.539	1.808	1.221	0.555
PL-N2		2.040			0.929
LV-N2	2.538	1.614	1.545	1.016	1.911
LT-N2	4.690	2.463	2.312	1.016	1.582
RO-N1	7.384	4.932	9.124	7.886	1.369 (N2)
SK-N2	3.866	1.140	1.391	1.740	1.114
SI-N2	5.679	2.350	1.368	1.801	1.297
CY-N2	2.698	0.843	0.853	1.455	0.781
MT-N2	5.735	1.781	1.908	1.835	0.482

Source: own calculations based on Eurostat.

#### 4 Structural change and effects on growth

After the presentation of the above stylized facts regarding output and employment restructuring, the next step in our analysis is to evaluate the impact of structural changes on aggregate economic growth. For this purpose we shall use a frequently applied shift-share analysis in analogy with Timmer and Szirmai (2000), Fagerberg (2000), Peneder (2002), de Vries et al (2012) and others.<sup>9</sup> Shift-share analysis provides a convenient tool for investigating how aggregate (productivity) growth is linked to differential (productivity) growth performance at the sectoral level and what are the effects of the reallocation of labour between industries. It is particularly useful for the analysis of structural development patterns in cross-country framework where data limitations prevent us to use more sophisticated econometric approaches. Using a similar notation as presented in Peneder (2002) and Havlik (2008), we decompose the aggregate growth of gross value added into three separate effects:

$$\text{growth}(Y_T) = \frac{Y_{T,fy} - Y_{T,by}}{Y_{T,by}} = \frac{\overbrace{\sum_{i=1}^n Y_{i,by} (S_{i,fy} - S_{i,by})}^{I:\text{staticshftheffect}} + \overbrace{\sum_{i=1}^n (Y_{i,fy} - Y_{i,by}) (S_{i,fy} - S_{i,by})}^{II:\text{dynamicshftheffect}} + \overbrace{\sum_{i=1}^n (Y_{i,fy} - Y_{i,by}) S_{i,by}}^{III:\text{withingrowtheffect}}}{Y_{T,by}}$$

<sup>9</sup> A decomposition of aggregate productivity growth in the total economy and manufacturing industry in the NMS was done by the present author earlier (Havlik, 2008).

*Notes:* Y=gross value added (GDP); by=base year, fy=final year;  $T=\sum$  over industries  $i$ ;  $S_i$ =share of industry  $i$  in total employment.

The first structural component is calculated as the sum of relative changes in the allocation of labour across industries between the final year and the base year, weighted by the volume of sector's output in the base year. This component is called the employment structural effect. It is positive/negative if industries with initially high levels of output (or labour productivity and usually also high capital intensity) attract relatively more/less labour resources over time and hence increase/decrease their shares in total employment. A positive employment structural change effect implies that labour shifts from low to higher output producing industries.

Second, *dynamic shift* effects are captured by the sum of interactions of changes in employment shares and output growth of individual industries. If industries grow faster and increase their share of total employment, the combined effect is a positive contribution to the overall output growth (of course, the same applies if industries are characterised by a simultaneous fall in output and employment shares). In other words, the interaction term becomes larger, the more labour resources shift toward industries with faster growth. The interaction effect is however negative, if industries with fast growing output cannot maintain their shares in total employment. The negative effect is larger when more industries with high output (or productivity) growth are faced with declining employment shares.

Finally, the "*within growth*" effect corresponds to growth in aggregate output under the assumption that no structural shifts in labour have ever taken place and each industry has maintained the same share in total employment as in the base year.

We must, however, recall that the frequently observed near equivalence of within growth effect and the aggregate growth cannot be used as evidence against differential growth between industries. Even in the case that all positive and negative structural effects net out, much variation in output growth can be present at the lower level of activities. As output and productivity has a robust tendency to grow, the within growth effect is practically a summation over positive contributions only. Conversely, for each industry the sign of the contribution to both static and dynamic shift effects depends on whether labour shares have increased or decreased. The summation over all industries therefore collects positive and negative contributions, with the changes in labour shares offsetting each other. The labour shift effects are therefore meant to capture only that comparatively small increment to aggregate growth which is generated by the net difference in productivity performance of the shifting share of the labour resources. In short, offsetting effects of shifts in employment shares of industries with high and low levels of output, as well as high and low output growth, explain why shift share analyses regularly fail to reveal substantial direct contributions of structural change to aggregate growth.

Furthermore, we would like to recall that the majority of NMS have experienced an absolute fall in employment (at both aggregate and even more so in manufacturing industry) during the period covered so that output growth was usually associated with a reduction of jobs. Employment cuts characterized developments in nearly all EU countries during the crisis period 2008-2011.

**Table 3.** Shift and share analysis – longer term patterns

	Period	static shift	dynamic shift	within growth
<b>NMS</b>				
<b>BU, N2</b>	1996-2011	-0.378	0.029	8.134
<b>CZ, N2</b>	1995-2011	-0.197	-0.118	10.201
<b>EE, N2</b>	1995-2011	-0.359	-0.612	9.444
<b>HU, N2</b>	1995-2011	-0.014	-0.080	5.246
<b>LV, N2</b>	2000-2011	-0.394	-0.085	4.802
<b>LT, N2</b>	2000-2011	-0.037	0.371	6.239
<b>PL, N2</b>	2004-2011	-0.034	0.092	4.218
<b>RO, N1</b>	1999-2010	0.543	2.511	6.335
<b>SK, N2</b>	1997-2011	-0.095	-0.651	10.070
<b>SI, N2</b>	1995-2011	-1.328	-1.016	6.980
<b>CY, N2</b>	1995-2011	-0.719	0.486	3.262

Source: own calculations based on Eurostat.

Our shift and share analysis starts with the period 1995-2011 for which in the majority of EU countries data at NACE Rev. 2 in the A10 resp. A21 sectoral breakdown are available. Data on sectoral gross value added published by Eurostat refer to chain-linked volumes at 2005 reference prices; employment shares data are based on number of employed persons as in the section above. The results show highly differentiated patterns across the individual EU countries (Table 3). Typically for all NMS (no data for Malta available), the within-growth effect is positive and it dominates the overall structural change (Czech Republic and Slovakia are two outstanding examples). The growth within individual sectors thus by far dominates the overall performance.<sup>10</sup> In contrast, both static and dynamic shift effects are much smaller, frequently even negative – especially the former one (with the sole exception of Romania).<sup>11</sup> This means that employment shifts between sectors had a negative effect on overall GVA growth; the simultaneous shifts of output and employment between sectors had no unequivocal growth effects.

A close inspection of the data shows that the positive “within growth” component can be mostly attributed to manufacturing in both NMS and OMS; other sectors do not seem to play any outstanding role in this respect. In general, this effect is much larger in the NMS than in Western Europe; the shape of structural shifts in NMS is more similar (though larger) to some West European countries (e.g. Austria, Germany) than to Southern Europe.

Figure 8 provides more detailed stylized pictures of characteristic longer term restructuring patterns in selected NMS.<sup>12</sup> Figure 8 provides illustrative results for NMS with biggest structural change among NMS (Czech Republic, Hungary, Slovakia and Slovenia; Bulgaria and especially Estonia would belong to this group as well): without the “within growth” effect in manufacturing, the overall GVA increase would be much smaller. In all NMS, manufacturing industry dominates the prevailing overall “within growth” effect, in particular in the NMS (especially the Czech Republic and Slovakia. Another sector with a prevalently positive contribution to growth in most countries was trade.

**Table 4.** Shift and share analysis, 2008-2011

	static shift	dynamic shift	within growth
<b>NMS</b>			

<sup>10</sup> Similar results for CEECS were found for the period 1995-2000 (Havlik, 2003). Peneder (2002) has found similar results for West European EU countries in the period 1995-1999.

<sup>11</sup> Romanian data are available for a shorter period, only at NACE 1 classification.

<sup>12</sup> The remaining countries display much less clear restructuring patterns across individual sectors – see Appendix.

BU, N2	-0.050	0.040	-0.210
CZ, N2	-0.320	0.000	0.340
EE, N2	-0.270	0.110	-0.700
HU, N2	-0.170	0.020	0.540
LV, N2	-0.590	0.240	-1.230
LT, N2	-0.430	0.160	-0.850
PL, N2	-0.280	-0.080	1.490
RO, N1*	0.430	-0.040	-1.170
SK, N2	-0.500	-0.030	0.070
SI, N2	-0.460	0.090	-0.810
CY, N2	-0.220	0.090	-0.370

\*2008-2010  
Source: own calculations based on Eurostat.

Presumably, the period of recent crisis (2008-2011) must have had lasting effects not only the levels of economic activity and employment, but affected also sectoral structures of European countries and their growth patterns. In order to investigate these effects we have performed the shift and share analysis for this period separately. Table 4 provides the aggregate results for individual EU countries; Figure 9 again shows details by sectors in selected “characteristic” NMS.<sup>13</sup> In the Czech Republic and Slovakia (in contrast to Hungary and Slovenia), manufacturing “within growth” effect contributed positively to overall output growth. Another interesting feature is a generally positive contribution of construction in the Czech Republic compared to NMS peers.

The extent of structural shifts is again very much differentiated across individual EU countries. The overall growth effect is naturally much smaller owing to a shorter time period covering only four years, yet – the crisis notwithstanding – it is not everywhere negative (Table 4). A positive “static shift” (labour moving to “traditional sectors) is recorded in Romania, Ireland and France. A positive “within growth” effect (a growth of sectoral value added) was recorded not only in Poland (the only EU country which did not experience negative growth during that crisis period), but also in the Czech Republic and Slovakia. Explanations for these rather surprising results provide more detailed sectoral decompositions shown in Figures 8. In the Czech Republic (and in Poland), both manufacturing industry and trade determined the positive “within growth” effect (in Slovakia it was just manufacturing).

## 5 Summary and conclusions

The period of fast industrial restructuring was over in most NMS countries by the end of 1990s, though the pace of structural change in this group of countries has generally been greater than in the majority of OMS even afterwards. Patterns of structural change in terms of both output and employment have been very much differentiated, both across time and individual European countries. In general, structural changes have been more pronounced with regards to employment than output (implying large shifts in productivity performance), with broad shifts from agriculture and industry towards services. Especially Bulgaria, Romania and the Baltic states have experienced more structural change than the Czech Republic, Slovakia and Slovenia. Both groups of NMS and OMS behaved similarly with respect to restructuring during the whole period 1995-2011, as well as in the crisis sub-period 2008-2011. However, a certain revival of manufacturing in the latter period was observed in Hungary, Romania and the Baltic

<sup>13</sup> Data for the recent crisis period are more comparable: NACE 2 classification is available for all countries (except Romania). No data for Malta available.

States (as well as in Germany and Ireland). The majority of NMS still have a larger manufacturing sector than the OMS (in terms of both output and employment shares).

A decomposition of value added growth using the shift-and-share analysis over the whole period 1995-2011 shows that the “within growth” effect naturally dominates the overall structural change. This growth effect has again been much greater in the NMS than in the OMS. In this respect, NMS have also been more similar to EU-North (Austria, France, Netherlands, Finland and Sweden). Sectors with initially large employment shares have suffered cuts in practically all EU countries and the structural growth effect was mostly negative. The overall positive “within growth” effect can be attributed mostly to manufacturing.

Structural shifts during the crisis period 2008-2011 have had even more differentiated effects and, interestingly, these were not overwhelmingly negative. Positive “within growth” growth effects were recorded in a number of EU countries (apart from Poland also in the Czech Republic, Slovakia, Austria, Germany, France, Netherlands and Sweden). Again, manufacturing and trade provided key impetus for aggregate growth even in the period of crisis: a strongly positive “within growth” effect in manufacturing and trade more than compensated declines in employment in these sectors, in particular in Austria and Sweden (the opposite occurred in Finland).

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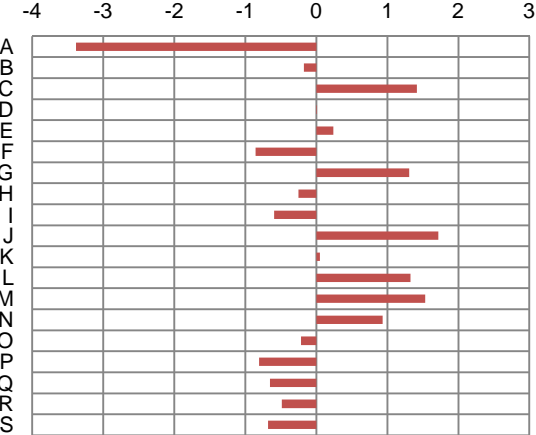
# Annex I

N1 (Nace rev. 1)		N2 (Nace rev. 2)		
A	Agriculture, hunting and forestry	A	Agriculture, forestry and fishing	
B	Fishing	B	Mining and quarrying	
C	Mining and quarrying	C	Manufacturing	
D	Manufacturing	D	Electricity, gas, steam and air cond.supply	
E	Electricity, gas and water supply	E	Water supply, sewerage, waste manag.,etc	
F	Construction	F	Construction	
G	Wholesale, retail trade, repair motor veh.	NT	G Wholesale, retail trade, repair of motor veh.	NT
H	Hotels and restaurants	NT	H Transportation and storage	T
I	Transport, storage and communications	T	I Accommodation and food service activities	NT
J	Financial intermediation	T	J Information and communication	T
K	Real estate, renting & business activities	NT	K Financial and insurance activities	T
L	Public admin., defence, compuls.soc.sec.	NMS	L Real estate activities	NT
M	Education	NMS	M Professional, scientific and techn.activities	T
N	Health and social work	NMS	N Administrative and support service activ.	NT
O	Oth. community, social & personal serv.	NT	O Public admin., defence, compuls.soc.sec.	NMS
P	Private households with employed pers.	NT	P Education	NMS
Q	Extra-territorial organizations and bodies	excluded	Q Human health and social work activities	NMS
			R Arts, entertainment and recreation	NT
			S Other service activities	NT
			T Activ.of househ.as employers & for own use	NT
			U Activ.of extraterritorial organisat.& bodies	excluded
Note:				
TS - Tradable Services	I+J	TS - Tradable Services	H+J+K+M	
NTS - Non-tradable Services	G+H+K+O+P	NTS - Non-tradable Services	G+I+L+N+R+S+T	
NMS - Non-market Services	L+M+N	NMS - Non-market Services	O+P+Q	

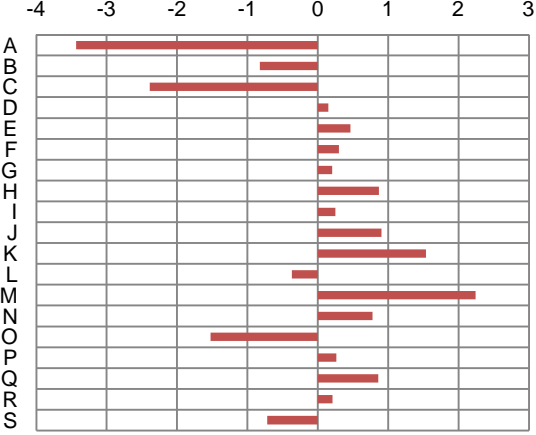


**Figure 4a.** Structural change - shares in GDP (in pp)  
NACE Rev. 2

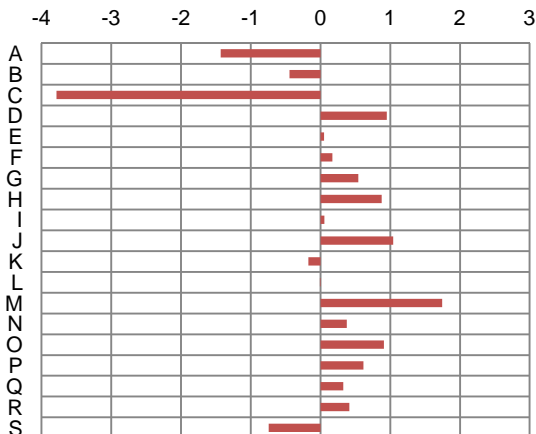
**Hungary, 2011-1995, N2**



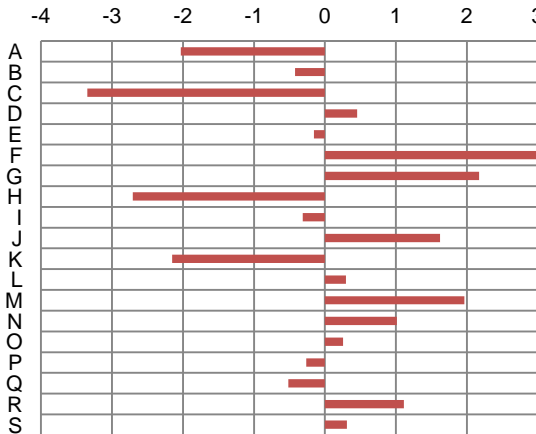
**Poland, 2011-1995, N2**



**Slovenia, 2011-1995, N2**

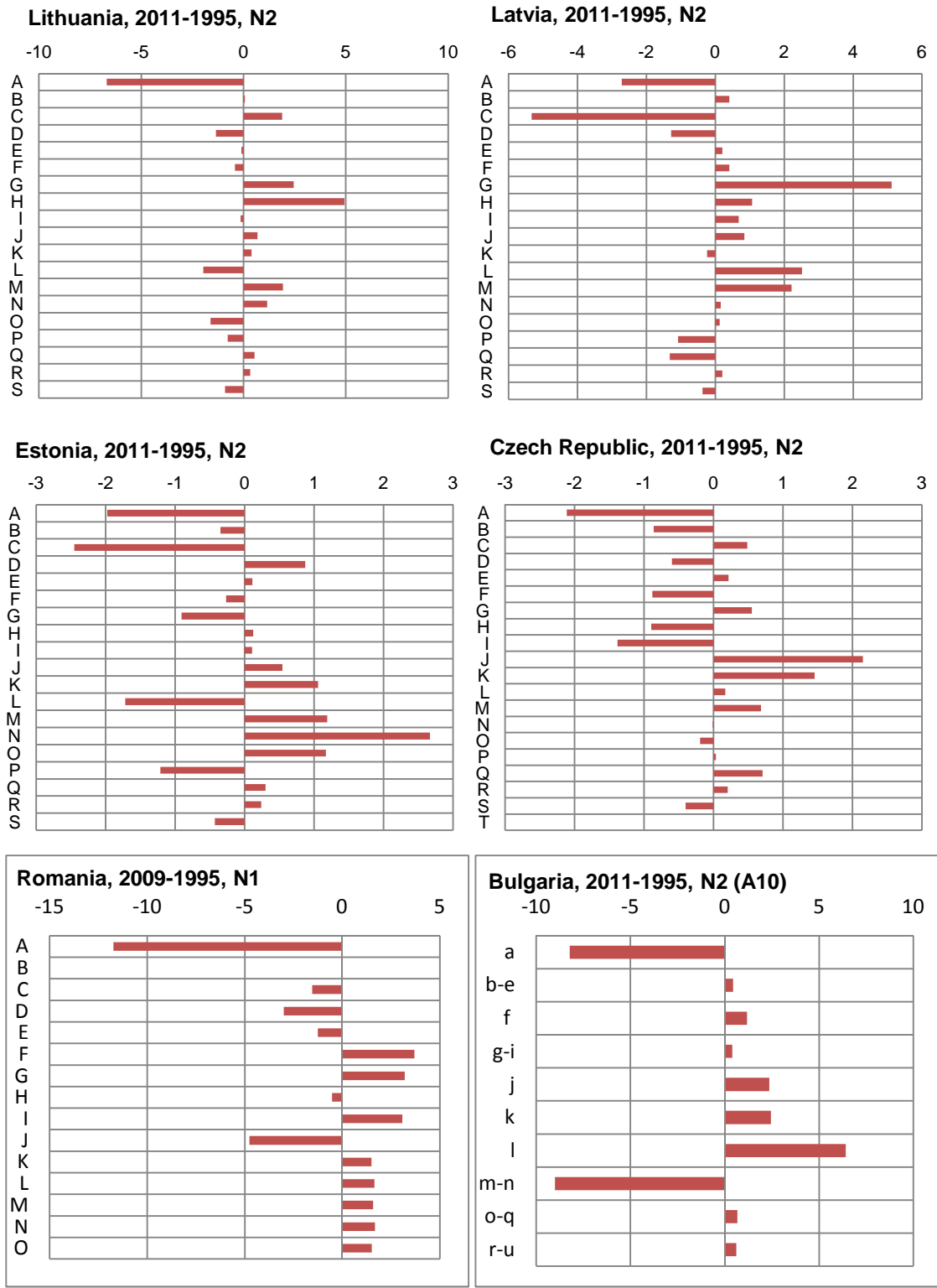


**Slovakia, 2011-1995, N2**



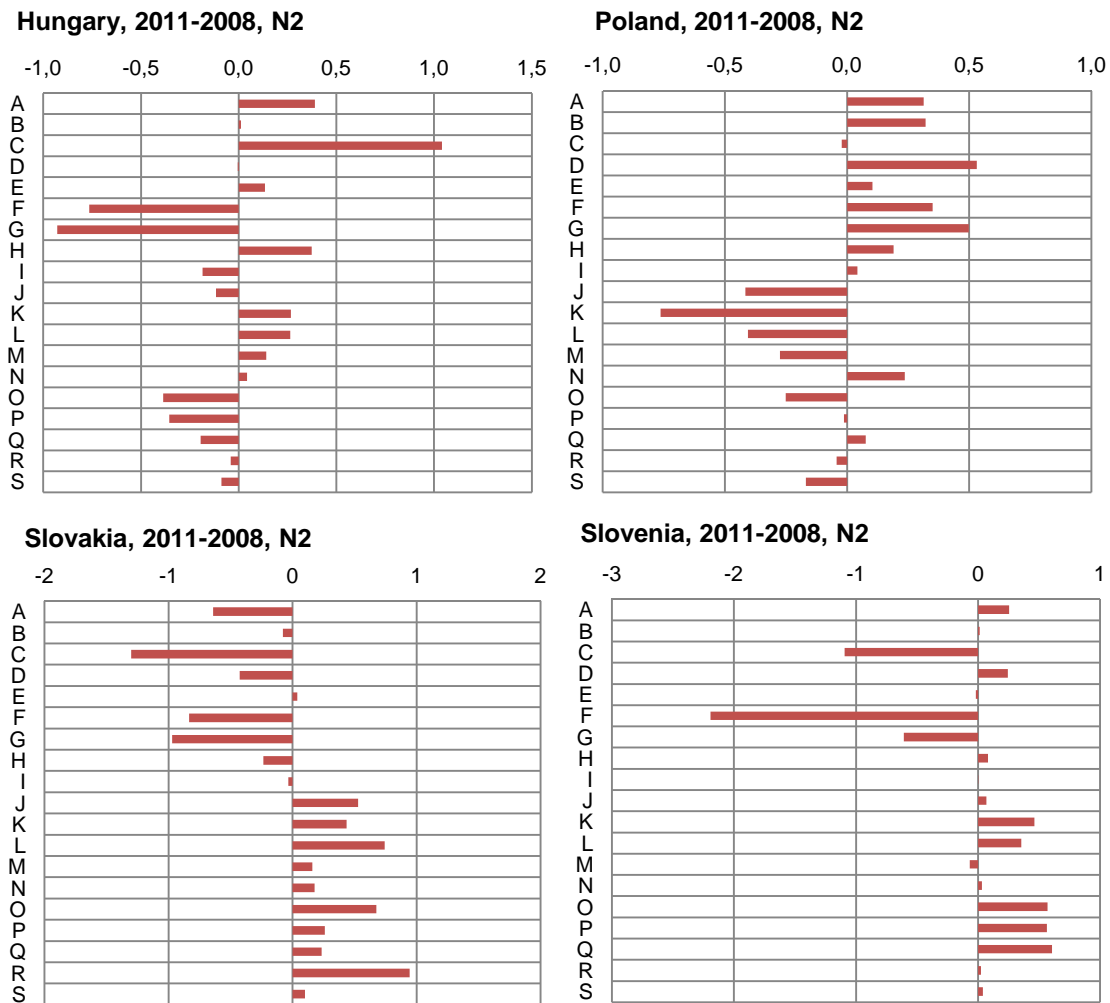
Note: see Annex I for NACE sectoral codes.  
Source: wiiw calculations based on Eurostat.

**Figure 4b.** Structural change - shares in GDP (in pp)  
NACE Rev. 2



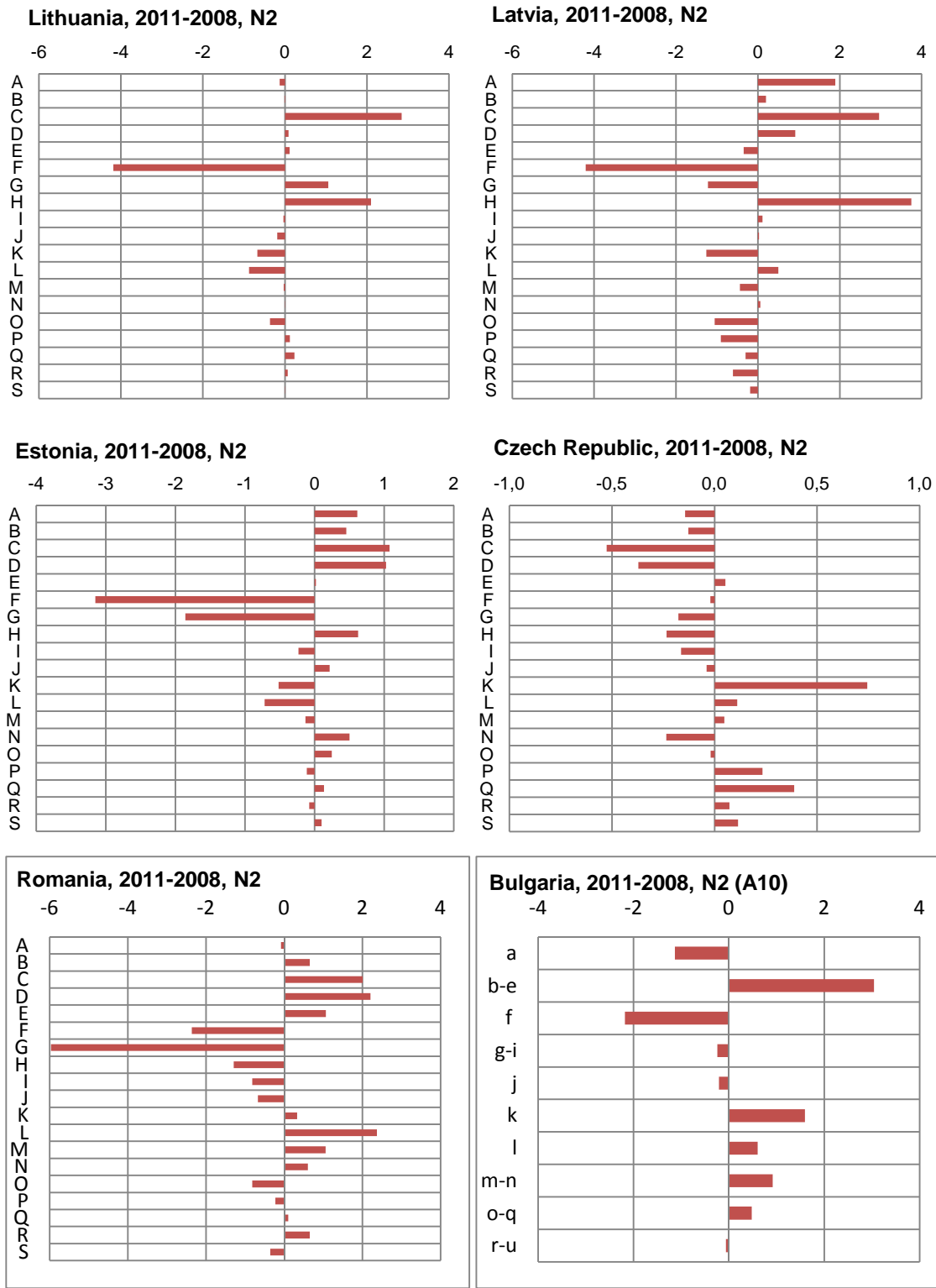
Note: see Annex I for NACE sectoral codes.  
Source: wiiw calculations based on Eurostat.

**Figure 5a.** Structural change - shares in GDP (in pp)  
NACE Rev. 2



Note: see Annex I for NACE sectoral codes.  
Source: wiiw calculations based on Eurostat.

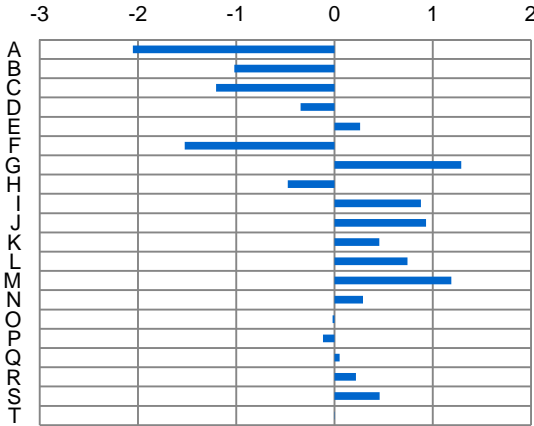
**Figure 5b.** Structural change - shares in GDP (in pp)  
NACE Rev. 2



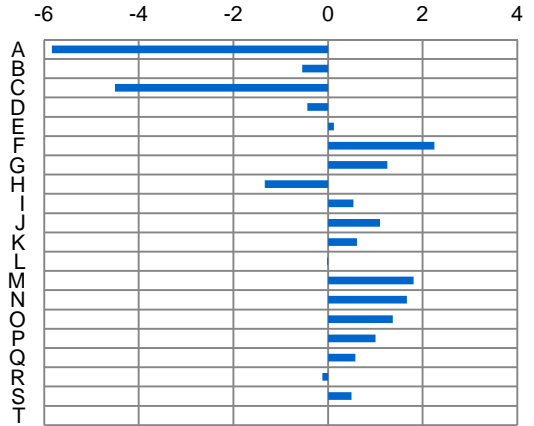
Note: see Annex I for NACE sectoral codes.  
Source: wiiw calculations based on Eurostat.

**Figure 6a.** Structural change - shares in employment (in pp)  
 NACE Rev. 2

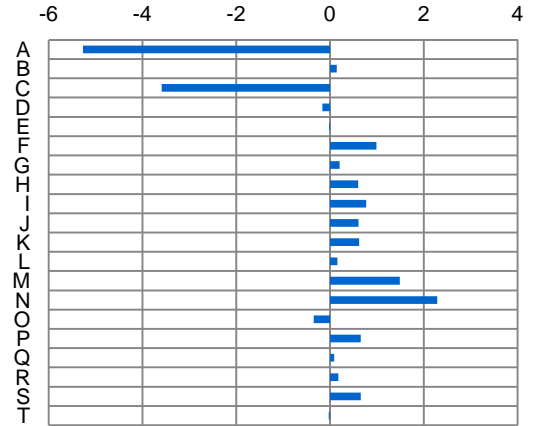
**Czech Republic, 2011-1995, N2**



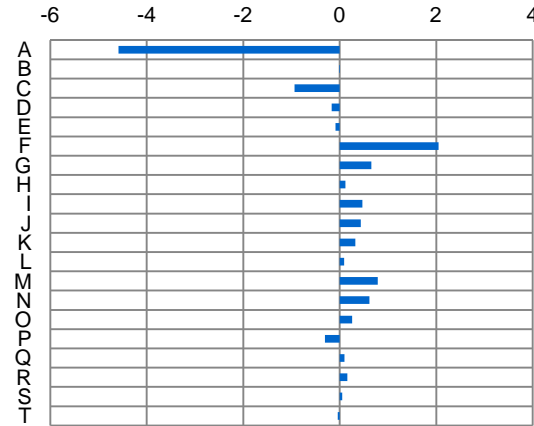
**Estonia, 2011-1995, N2**



**Latvia, 2011-2000, N2**



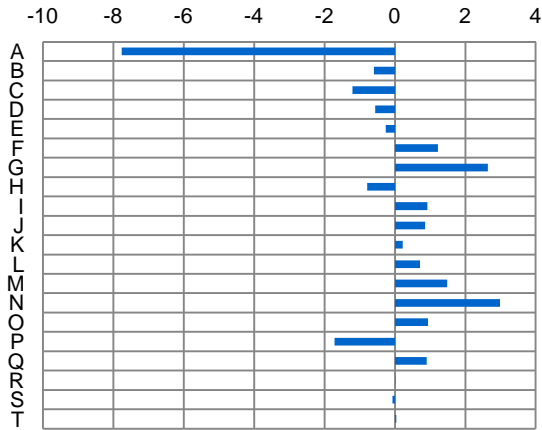
**Poland, 2011-2005, N2**



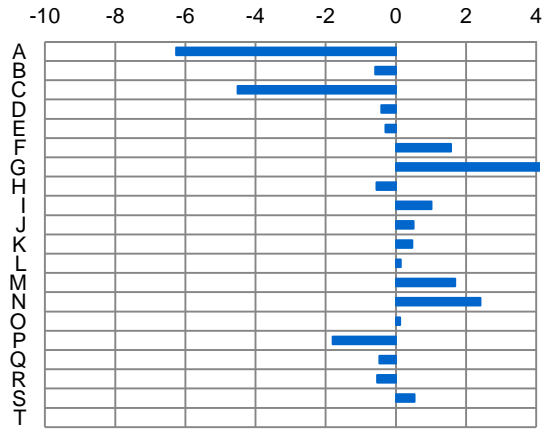
Note: see Annex I for NACE sectoral codes.  
 Source: wiiw calculations based on Eurostat.

**Figure 6b.** Structural change - shares in employment (in pp)  
NACE Rev. 2

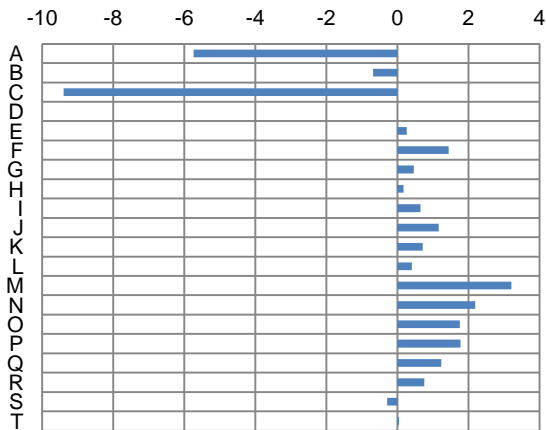
**Hungary, 2011-1995, N2**



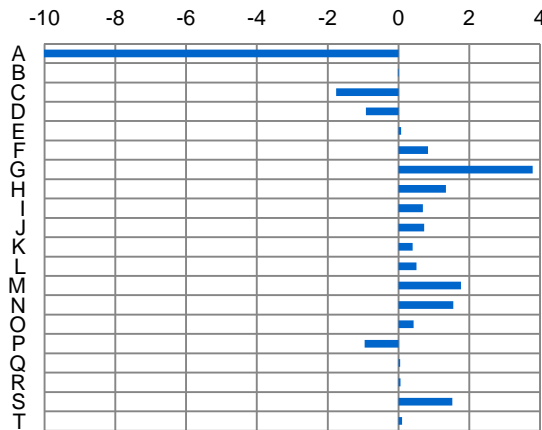
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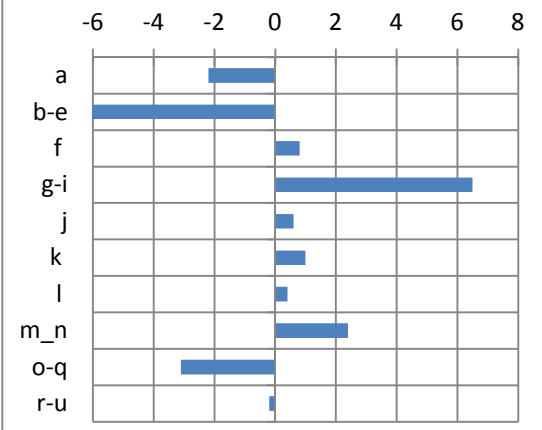
**Slovenia, 2011-1995, N2**



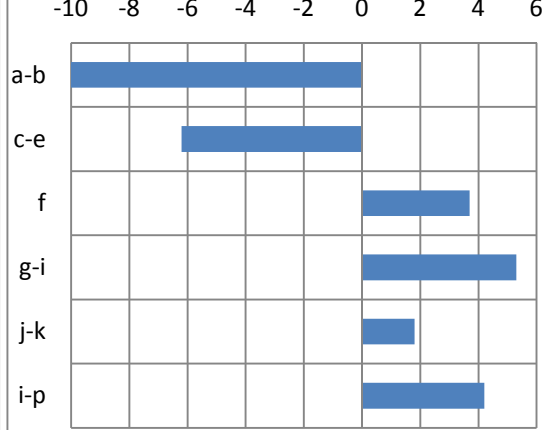
**Lithuania, 2011-2000, N2**

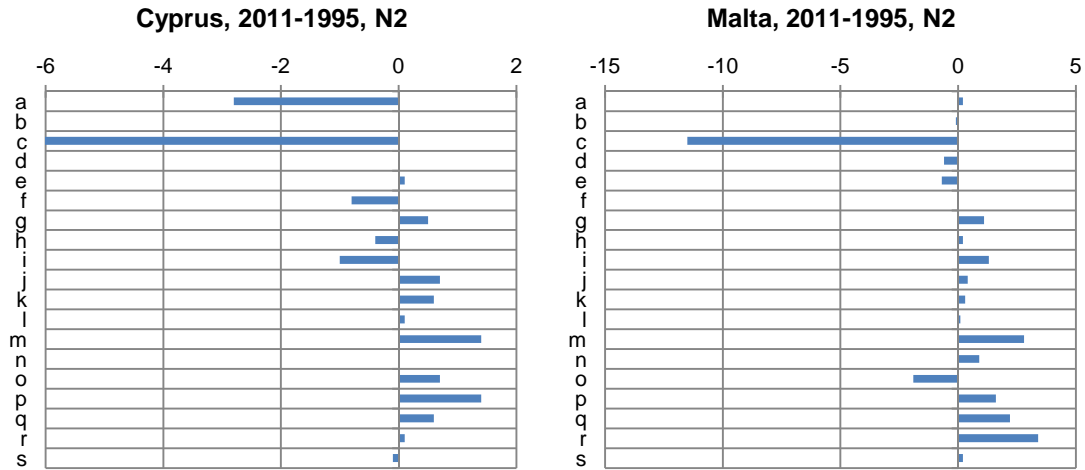


**Bulgaria, 2011-1995, N2 (A10)**

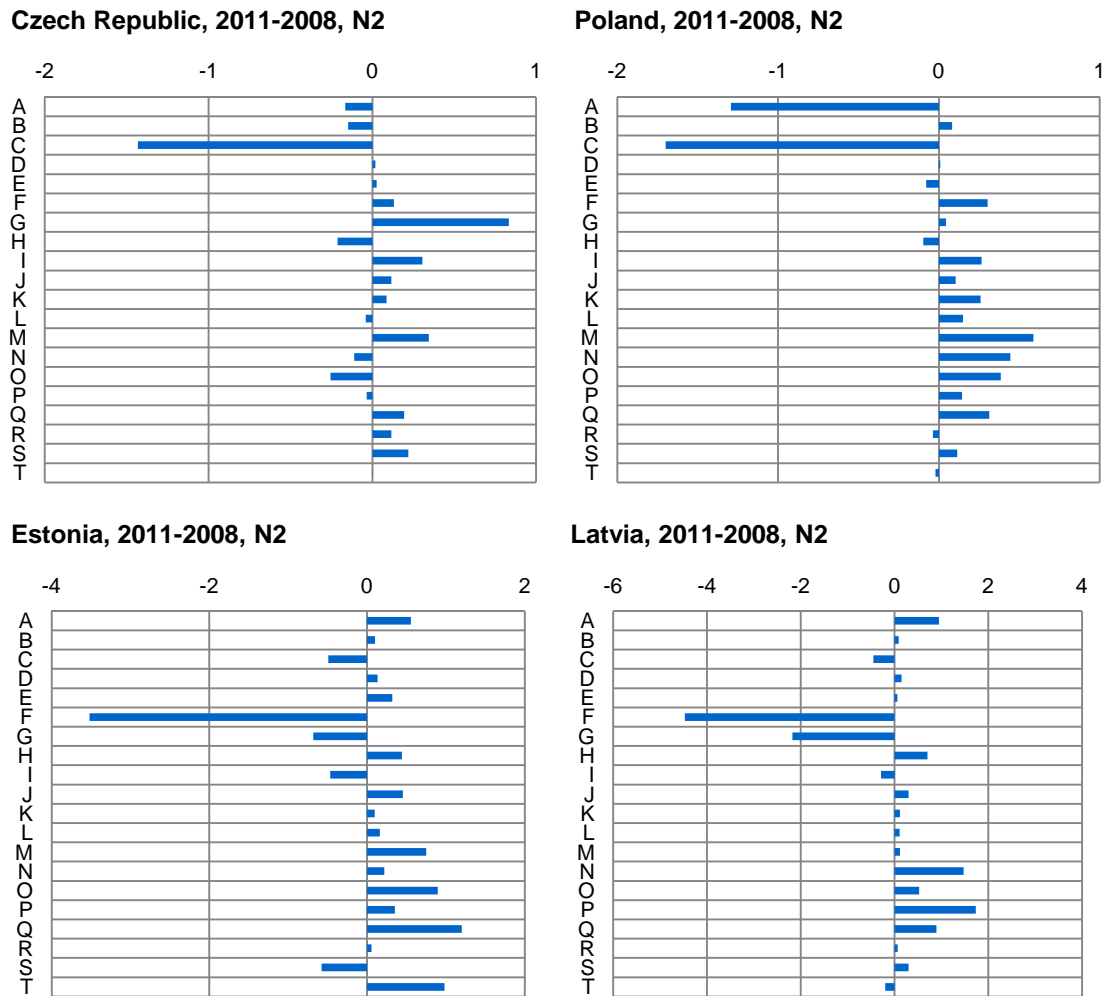


**Romania, 2010-1996, N1 (A06)**





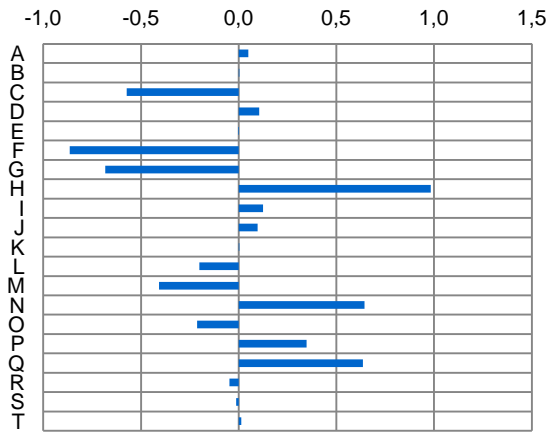
**Figure 7a.** Structural change - shares in employment (in pp)  
NACE Rev. 2



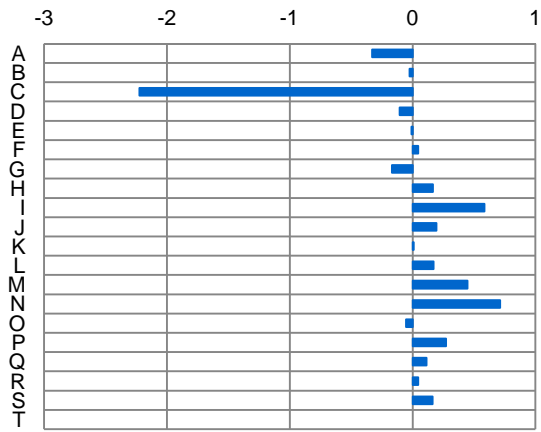
Note: see Annex I for NACE sectoral codes.  
Source: wiiw calculations based on Eurostat.

**Figure 7b.** Structural change - shares in employment (in pp)  
NACE Rev. 2

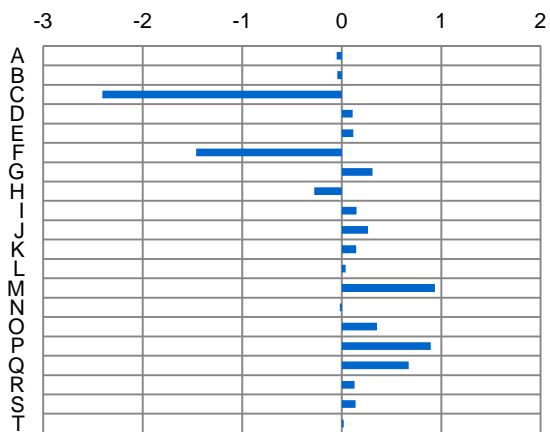
**Hungary, 2011-2008, N2**



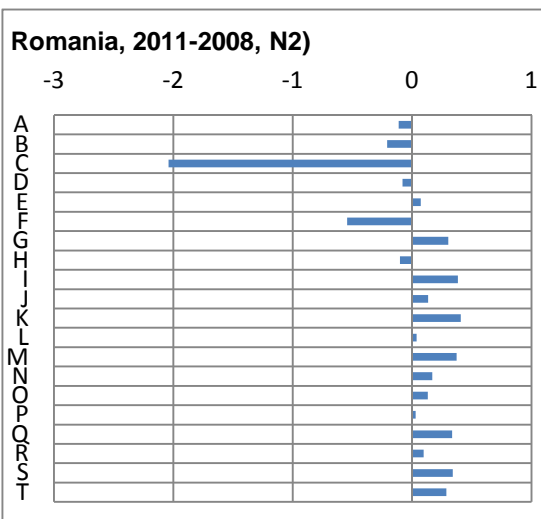
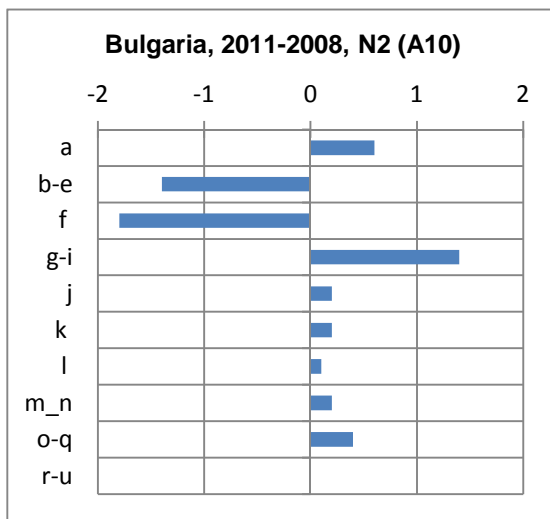
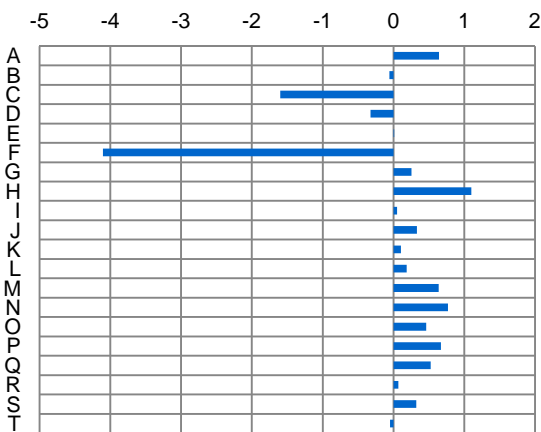
**Slovakia, 2011-2008, N2**



**Slovenia, 2011-2008, N2**



**Lithuania, 2011-2008, N2**



Note: see Annex I for NACE sectoral codes.  
Source: wiiw calculations based on Eurostat.



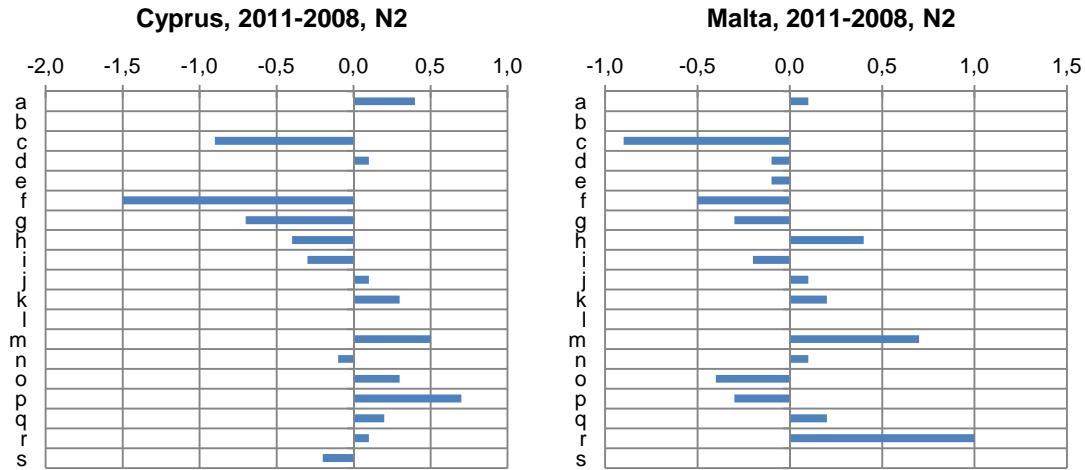
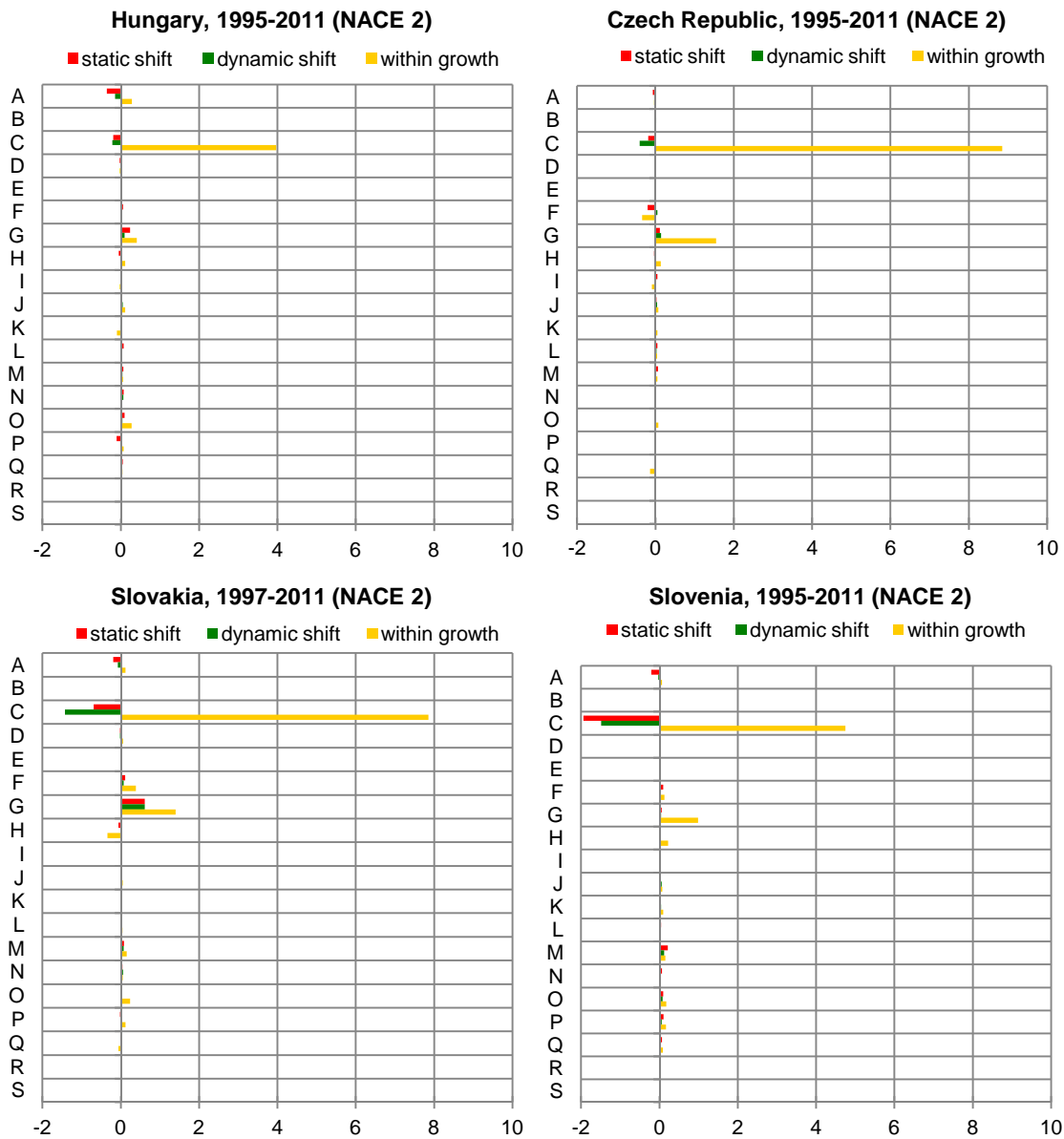


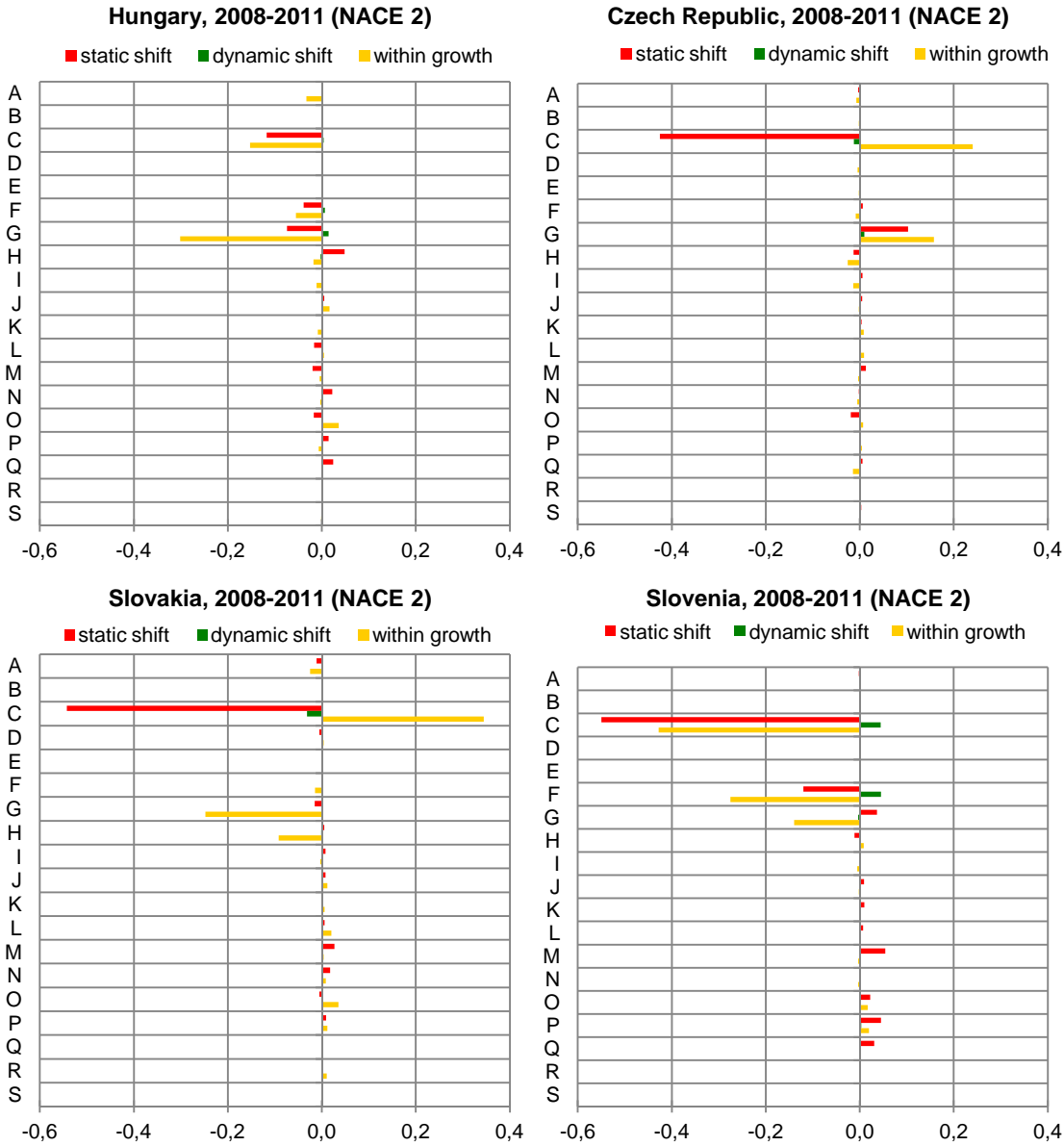
Figure 8. Shift and shares growth decomposition



Note: see Annex I for NACE sectoral codes.

Source: wiiw calculations based on Eurostat.

**Figure 9. Shift and shares growth decomposition**



Note: see Annex I for NACE sectoral codes.

Source: wiw calculations based on Eurostat.