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Structural Change, Convergence and Specialization in the EU Accession Countries

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Industrial Development

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Structural change, convergence and specialization in the EU accession countries

Introduction to the wiiw Structural Report 2003

This report gets published six months before the next wave of EU Enlargement takes place in May 2004. The purpose of the report is to point to the longer-term development processes which are taking place in the countries of Central and Eastern Europe (CEECs). We shall cover the following topics in the introduction which are also then analysed in more depth in the contributions to this volume:

– Macro-developments, growth processes, and catching-up

– Broad patterns of structural convergence

– Detailed patterns of industrial specialization

– Labour market developments and regional disparities

– The impact of FDI and the impact of EU Enlargement

– Policy challenges for the CEECs in the medium- and long-run

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Macro-developments, growth processes, and catching-up

We start with a short description of the growth processes which characterized the CEECs from about the mid-1990s onwards. As is well-known, the growth paths of the CEECs in the early 1990s were strongly characterized by the immediate effects of the 'transfomational recession' (see Kornai, 1993) which led to sharp initial falls in GDP levels. From about 1993/94 the CEECs have embarked upon – what seems like – a new growth path which in the aggregate looks rather steady (see Figure 1a) and is significantly higher than that of the EU-15 (for the period 1995-2002, GDP of the AC-8[1] grew at 3.6% p.a. while that of the EU-15 at 2.2%). The aggregate GDP path hides of course strong heterogeneity across the accession countries (ACs) as to the timing and causes of substantial slowdowns (or even recessions) in growth even until the most recent period.

[1] AC-8 refer to the eight accession countries of Central and Eastern Europe which shall become members of the European Union by 2004: the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia and Slovenia. AC-10 includes also Bulgaria and Romania.

Figure 1a

Growth of GDP in the ACs and the EU

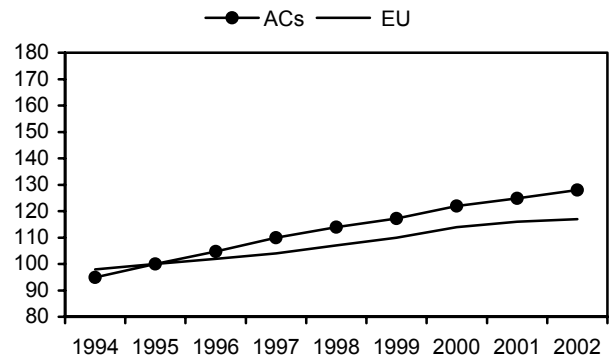


Figure 1b

Employment in the ACs and the EU

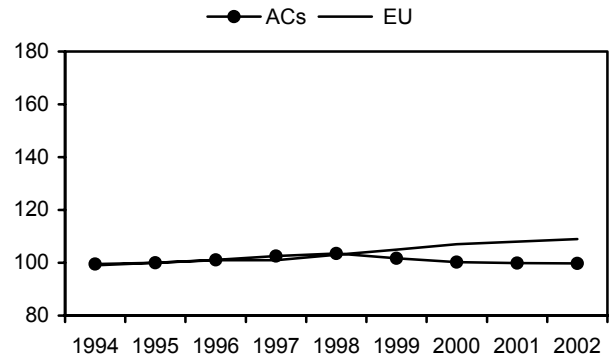
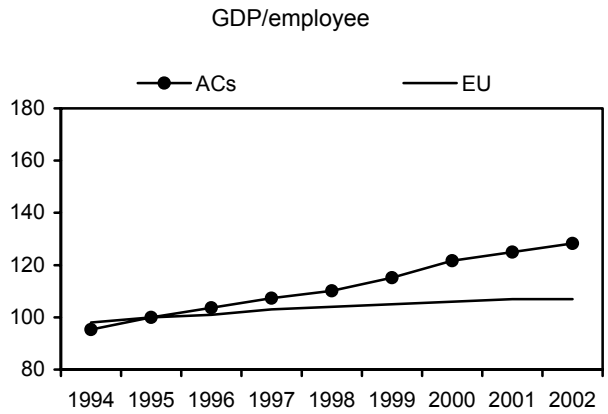


Figure 1c

Macro-productivity in the ACs and the EU



Source: wiiw Database incorporating national statistics, Wifo and wiiw calculations using AMECO.

At the individual country level (see Figures 2a and b)[2] GDP growth was and is quite volatile. All the ACs – with the exception of Slovenia with an exceptionally stable macroeconomic performance – underwent periods of rather dramatic slowdowns or outright recessions over the period 1994-2002. Transition economists speak here of 'secondary transformational recessions' as these slowdowns/recessions often bear the hallmarks of structural crises (such as corporate restructuring or banking crises) which reflected 'unfinished business' in transformation. This certainly applies to the Hungarian slowdown in the mid-1990s and the Czech and Slovak crises in the late 1990s, while the more recent slowdowns in Poland and Hungary reflect mismanagement of macroeconomic policy (in particular, how to deal with difficult issues of external and internal balance and/or they reflect political business cycle phenomena such as the recent Hungarian experience). Our understanding of the situation is that amongst the ACs, business cycles in the future will be less determined by the legacies of transformation and more by the features which were characteristic of the recent Polish and Hungarian experiences, i.e. how to deal with continued vulnerability on the external accounts and complicated problems of fiscal adjustment (see Figures 3a and 3b on current accounts and fiscal balances respectively). We shall return to the policy challenges to be faced by the new member countries over the coming years below.

Let us now move from GDP growth to aggregate employment and productivity growth. Figures 1b and 1c show the developments in aggregate employment in the ACs and the EU-15 and in 'macro-productivity' (defined as GDP per employed person). We can see that in spite of better GDP performance in the ACs than in the EU over the period 1994-2002, there was a worse performance in aggregate employment and, hence, an even better relative performance in macro-productivity than in GDP. Hence, at this aggregate level, one can speak of 'jobless growth' in the ACs (see also Figure 4). At closer examination of the time series by country, one can perceive that some countries did manage to stabilize or even increase aggregate employment levels over certain periods in the past, but this seems to require GDP growth rates around 3.5-4%, i.e. rates which are substantially higher than those required in the EU to stabilize employment (see Figure 5). The recent downturn in growth below these rates, meant that aggregate employment levels were falling.

Taking the developments of GDP and employment together, we do witness significant convergence in 'macro-productivity' between the group of accession countries and the EU-15 after the initial phases of the transition (see Table 1): over the period 1995-2002, macro-productivity increased in the AC-8 by 3.6% p.a., in the EU-15 by 1.0%. Table 1 also contains comparative growth performance of AC-8 and the EU-15 in manufacturing: here

[2] Figures 2 and all following figures can be found in the appendix.

Table 1a

Catching-up of the ACs vis-à-vis the EU, aggregate economy, 1995-2002

	Growth rate in %			Growth rate in %		ACs' growth differential against EU	
	Cumu-lated	Annual average		Cumu-lated	Annual average	Cumu-lated	Annual average
AC-8[1)]			**EU-15**				
GDP	28.0	3.6	GDP	11.2	1.3	16.8	2.2
Employment	-0.3	0.0	Employment	-9.1	-1.2	8.8	1.2
Macro-productivity[2)]	28.3	3.6	Macro-productivity	20.9	2.6	7.4	1.0

Table 1b

Catching-up of the ACs vis-à-vis the EU in manufacturing, 1995-2002

	Growth rate in %			Growth rate in %		ACs' growth differential against EU	
	Cumu-lated	Annual average		Cumu-lated	Annual average	Cumu-lated	Annual average
AC-8[1)]			**EU-15**				
Production	54.0	6.4	Production	38.6	4.3	15.4	2.1
Employment	-14.0	-2.1	Employment	-11.9	-2.1	-0.9	0.0
Productivity[3)]	79.1	8.7	Productivity	62.7	6.5	16.4	2.2

Notes: Gross production and productivity in real terms. – 1) Central and East European first-round accession countries, comprising the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, the Slovak Republic and Slovenia; weighted average. – 2) Macro-productivity refers to GDP/Employment. – 3) Productivity = Production/Employment

Source: wiiw Database, incorporating national statistics, WIFO and wiiw calculations using AMECO

the growth differential over the period 1995-2002 amounts to 4.3% p.a. for production, -2.1% for employment and 6.5% p.a. for labour productivity. Given the differential employment performance between the EU-15 and the group of accession countries so far, the convergence process in GDP per capita is slightly lower than in GDP per employed person.

As regards projections into the future, wiiw calculates with a 1.5-2.5% p.a. growth differential between the ACs and the EU over a time horizon of the next, say, 8-10 years which is quite in line with 'standard' estimates of convergence parameters in the growth literature (see e.g. Barro and Sala-i-Martin, 1995, Temple, 1999). Of course, the initial GDP per capita gaps are quite different amongst the ACs and hence a discussion of 'potential' and 'actual' catching-up must take account of that.[3] Concerning these trend growth

[3] We do not support a rather mechanical application of the Barro/Sala-i-Martin formula that the higher the initial gap the greater the forecasted growth rate. Especially in the case of the transition countries in which growth is dependent upon institution-building and behavioural change, more non-linear processes are at work. Hence the distinction between 'potential' (for which the mechanical rule could be applied) and 'actual' catching-up (for which it cannot). Also the concept of conditional convergence is rather inappropriate in this context: As it is normally applied, one assumes that the long-run steady-state differences in institutional environments can be extracted from historical time series (hence

'forecasts', the following *caveats* have to be made: first, these are estimates of 'real convergence' in GDP per employee or GDP per capita; however, a very important additional issue is also nominal convergence on top of real convergence and we shall return to this point later on. Secondly, there are widely different estimates of real convergence depending upon measurements.[4] Thirdly, historical evidence suggests that one should be cautious to apply a uniform cross-country framework to assess the growth prospects of would-be catching-up economies; very specific (economic, institutional, political) circumstances within a country and in its external environment have to be taken into account to assess the growth prospects of individual economies. The widely diverging experiences of the cohesion countries (Ireland, Greece, Portugal, Spain) testify to this point[5].

Broad patterns of sectoral structural convergence

The broad sectoral patterns of structural change have been summarized in the past under the headings 'deagrarianization', 'deindustrialization' and 'tertiarization' (see e.g. Landesmann, 2000a, 2000b). It is well-known that the transition economies inherited a legacy of a very large industrial sector relative to their over-all level of GDP (see e.g. Urban, 2001, for an application of the Chenery-type approach to analysing structural distances from a 'norm' of sectoral composition; see also an assessment of broad sectoral convergence processes in Chapter 1 of this report) and within that a large share of capital- and energy-intensive industries. The other side of the coin, was an underdeveloped services sector and often, when such services were provided, they were provided within the large industrial combines. The move towards a market economy implied a sharp trend to adjust this legacy: the share of industry declined both in output and employment and the share of services expanded. Within the services sector, there was also a substantial change in the shares of market- and non-market services which implied important shifts in employment patterns; these are discussed in detail in the contribution by Hermine Vidovic in Chapter 3 of the report.

Regarding agriculture, there is a significant difference in this sector's share in GDP and in employment between the EU-15 and the accession countries, pointing to a particularly bad relative productivity position of this sector relative to the West European economies. The

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one assumes stationarity in institutional differences). This is an obviously inappropriate assumption to make in the case of 'transforming economies'.

[4] We are dealing here with a host of index number problems. In particular there are big differences in calculations made with GDP series at constant prices or GDP measured in current purchasing power parities; on this see the discussion in Laski and Römisch (2003). It turns out that these measurement problems lead not only to significant differences in the calculation of catching-up rates but also to violations of transitivity in the rankings of catching-up processes of different economies.

[5] See Laski and Römisch (2003) for a detailed discussion of the growth experiences of the cohesion economies in the wake of their entry to the European Community.

process of ‘de-agrarianization’ (fall in this sector’s share in output and employment) is thus expected to continue, even though we witnessed in the earlier phases of transition the opposite tendency in some transition economies (Bulgaria and Romania in particular), with agriculture fulfilling a temporary ‘sponge’ function in the wake of a dramatic employment shake-out from industry and insufficient employment opportunities being created by the services sector (on developments in the agricultural and food processing sectors see Chapter 8).

Thus, while one can speak of an overall process of ‘convergence in structures’ at the broad sectoral level (i.e. downsizing of the industrial and agricultural sectors, and an expansion of the services sector) of the CEECs in relation to the advanced Western European economies, there is also an interesting recent phenomenon which points towards a recovery of the industrial sector in some of the more advanced transition economies (Hungary, Czech and Slovak Republics) which may keep this sector in a more prominent position as compared to its share in most Western European economies. This has to do with an evolving position of some of the CEECs in the intra-European division of labour which gives them more prominence as producers and (potential) net exporters of industrial goods while remaining net importers particularly in the area of advanced business and some other market services. This is not unlike previous historical experiences of catching-up economies (see the role of industry in post-war Germany, Austria, Japan, etc. in comparison to the US and the UK).

Detailed patterns of specialization

Let us now discuss in more detail the evolving patterns of industrial specialization of the CEECs within Europe.

One of the surprising tendencies of industrial and trade specialization of the CEECs in the (economically) integrated European economy witnessed over the past decade was the relatively rapid catching-up of some ACs in technologically more sophisticated branches and also the relatively fast upward movement in intra-branch product quality. This picture is compatible with an analytical approach in which the potential exists to turn comparative advantages in favour of those areas in which initially bigger gaps (in productivity and product quality) exist (see Landesmann and Stehrer, 2000 and 2001, for the formulation of such an analytical framework and their contribution in Chapter 2 of this volume for its application to the recent CEEC experiences). The existence of such a potential does not automatically imply its utilization and in this way the approach makes room for a wide diversity of qualitative catching-up patterns and evolving positions of catching-up economies in the international division of labour. This is exactly the picture which we currently observe in the evolution of different groups of CEECs in the European division of labour: a group of advanced accession countries has moved rapidly ahead in adjusting

their industrial structures to those of the more advanced EU members, it experienced fast catching-up processes in more sophisticated industrial branches and its pattern of industrial and trade specialization within the integrated European economy has changed rather rapidly. Another group of CEECs (particularly Bulgaria and Romania and some of the Baltic states) continues to show a rather traditional pattern of trade and industrial specialization in low-skill, labour-intensive as well as natural resource-intensive branches and this pattern shows, for some time now, features of a 'lock in'. This diversity of industrial and trade specialization expresses itself in a two-pronged integration process of CEECs into the industrial landscape of an integrated European economy: on the one hand, we observe a relatively strong position of CEECs in some of the more traditional industrial branches characterized by high labour, low skill and low technology intensity and, on the other hand, the fastest dynamism or growth takes place in the industrial areas which require higher skills and technological expertise. We shall now give a few illustrations of this picture of the emerging division of labour in the 'enlarged European' economy.

Figure 6 shows the evolution of production shares over the period 1995-2001 by industrial branches. We can see here that the absolute shift in production shares by the CEECs took place in three groups of industries: a group of labour-intensive industries (DA, DB), a group of natural-resource-intensive industries (wood based industries DD and DN, the latter largely consisting of the furniture industry, as well as non-metallic mineral products DI) and a group of more sophisticated engineering industries (DL, DM and also DH, an ancillary industry to the fast growing transport equipment sector).[6] The comparison with the Southern cohesion countries (Greece, Spain, and Portugal) is interesting here: these economies also gained in overall shares, but the structure of their gains is quite distinct from the gains of the AC-8; their gains are much more strongly oriented towards the natural-resource-intensive (DD, DF, DI, DJ, DN) and the labour-intensive spectrum of industries (DB, also DD, DN) and less in the area of engineering industries (except for the machinery industry DK).

The next few figures refer to the evolving structure of trade integration: Figure 7 looks at changes in the shares of different producers in total EU-15 imports (which includes intra-EU-15 trade). Here we can make some comparison with the evolving positions of non-European exporters in EU-15 markets. The strong growth of China's position in EU markets, with an industrial profile partly similar and partly different from the AC-10 is particularly interesting: it also shows a double-pronged growth in shares in both labour-intensive, low-skill branches (DB, DC) as well as in technologically more demanding branches (such as DK and DL). The relative losses of market shares by Japanese producers is also remarkable, especially in electrical engineering and motor vehicles.

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[6] See Appendix to Chapter 7 for the industrial classification used in these figures.

Figures 8a and 8b refer to changing market share positions in 'intra-enlarged European trade' flows. *Intra-enlarged European trade* is defined as comprising intra-EU-15 trade flows as well as the trade flows between the EU-15 and the AC-10 in both directions.[7] It is interesting here to detect, firstly, the differences between the group of AC-8 and AC-10 and, secondly, between changes in absolute shares and in the percentage growth of shares. As regards the difference between the AC-8 and the AC-10, we can see that most of the growth in absolute shares in the more sophisticated engineering branches (DK, DL, DM, and the ancillary branch DH) is due to the first round accession countries, the AC-8. The growth in the more labour-intensive, low-skill branches (DB, DC, DD) is, significantly, due to the second round accession countries Bulgaria and Romania (who make up the difference between the AC-8 and the AC-10).

Turning to the difference between the change in absolute shares and the percentage growth in shares, we can see clearly that the percentage growth in trade shares was much higher in the more sophisticated group of industries (DK, DL, DM and ancillary industry DH) than in the other groups of industries. This last point is dramatically underlined in the next two sets of figures which show the changes in shares and percentage growth of shares in the groups of industries which have been defined by industrial organization and skill intensity criteria (Figure 9 and Figure 10 respectively; details on the classification used are given in Chapter 2). What can clearly be seen is that by far the highest growth rates in market shares for the AC-8 have taken place in the technology-driven industries and in the range of high-, and medium-skill industries. This confirms the analytical framework discussed earlier that a significant group of ACs has successfully exploited the potential of fast catching-up rates in industries in which they started off with a significant initial gap. This changed substantially the relative positions of these economies in the European division of labour over the period of observation. The dynamics in market shares complements results obtained from analysing differential branch productivity growth and product quality upgrading, rather strong tendencies for increasing intra-industry trade, and the allocation, role and impact of FDI in technology transfer and in upgrading (all of this is examined in Chapters 1 and 2 of the report; see also Chapter 7 on the processes of product-quality upgrading in the CEECs' export performance and Chapter 4 on the role of FDI in this upgrading process).

[7] In the construction of the intra-enlarged EU trade flows matrix, the data for intra-AC-10 trade flows should have also been included. However, these data were not available in the same form and had therefore to be excluded at this stage.

Labour market developments and regional disparities

We have already discussed the major shifts which have taken place in employment structures at the broad sectoral level. We shall now discuss some more detailed features of labour market developments in the ACs.

The qualitative nature of the structural upgrading process discussed in the previous section is also discernible in the pattern of demand for skills. It is well known that the ACs experienced a dramatic fall in overall employment levels over the 1990s, most of it taking place in the first phase of transition (for details on this see Vidovic, 2000 and 2002). What is less well known is that this loss of employment is almost entirely accounted for by the least skilled members of the labour force (see the information supplied in Chapters 2 and 3 of the report). Hence the evolution in the demand for skill types supports the view of the qualitative nature of the structural upgrading process which has been and is continuing to take place in the accession countries. Problematic is the emergence of a picture in some of the CEECs which points towards a situation of ingrained 'structural unemployment' which reached very high levels in some of the accession countries (particularly Poland and Slovakia, and amongst the lagging CEECs Bulgaria and Croatia, as well as the rest of the Western Balkans). Amongst the reasons for the development of a longer-term structural unemployment situation in CEECs we must count the difficulty to adjust the labour supply to the new requirements of the job market: fast structural change requires new skills and adaptation of old skills, and here there is a difficulty to develop with sufficient speed a responsive structure of human capital investment and of educational and training institutions in periods in which public finance is strained. There is also evidence of extremely low regional mobility which could respond to the fast changing nature of the geographic location of economic activity and amongst the reasons for such low geographic mobility one needs to count major problems in the housing market and insufficient transport infrastructure which would encourage more commuting (on this, see e.g. Fazekas, 2002). The fact is that we are witnessing the emergence of very problematic features in CEEC labour markets, with high youth unemployment, a wide dispersion of regional unemployment rates, discouragement effects on participation rates for women, the young and the older cohorts of the labour force, etc.

Let us now comment further on the process of strong regional differentiation which has characterized economic development in the ACs since 1989. Regional differentiation (in income levels, price levels, employment and unemployment rates, wage rates) has increased sharply, with the most positive developments taking place in capital cities and in the regions bordering the EU (see the analysis by Roman Römisch in Chapter 6 of this report). It is in these regions that the bulk of FDI has taken place, where the market services sector has developed most rapidly and where industries have expanded which require higher technology and skill inputs. On the other hand, there is also a pronounced process of regional peripherization underway, concentrated in regions away from EU

borders, away from the capital cities and in regions which have either a higher share of agriculture (lower share of services) or which were in the past concentrations of heavy industry, the legacy of past communist industrialization and regional policy strategies. Hence the problem of regional uneven development is here to stay in ACs and constitutes a major challenge for national and EU cohesion policies.

As regards labour market implications of this process of regional differentiation, it is clear that labour markets are relatively tight in the regions bordering EU countries; there are exceptions to this, such as the Southern Bohemian border region which either had a rather large share of agriculture and/or a significant share of 'problematic industries' (such as textiles industries or producers of machinery for agricultural purposes); similar is the region in North-Eastern Slovenia which had a specialization in heavy industry or some of the Polish regions bordering the East German regions. Apart from these, AC regions bordering the EU are characterized by relatively high employment growth (or less of a decline in employment levels), a stronger wage push, higher productivity growth and, as mentioned before, a strong concentration of FDI (in fact, inequality measures show a much higher degree of inequality in the regional allocation of FDI than in regional income per capita; see again Fazekas, 2002, on this). Evidence suggests that there are labour shortages (particularly of skilled labour) in AC border regions to the EU, although recent declines in macroeconomic growth has produced a slack in demand.

The impact of FDI and the impact of EU Enlargement

There is by now an emerging consensus amongst economists that FDI plays an important role in furthering the process of industrial restructuring, in upgrading technology, organizational capacity and product quality. It is clear from the contribution by Gábor Hunya (Chapter 4) that the enterprises with foreign ownership participation (the so-called FIEs) have performed better in terms of productivity growth, investment and export activity than the purely domestically owned enterprises (the DCs). The area in which only few research results are available so far, is whether the FIE sector has significant positive spillover benefits on the DC sector; here the results are so far ambivalent and hence more research is required (see, however, Damijan et al., 2001); the limited evidence with regard to spillover effects of FDI in CEECs is in line with the research results obtained on this question globally (see UNCTAD, 2002, 2003; UN-ECE, 2001). At the country level the early years of transition have shown a strong concentration of FDI activity in a few countries (particularly Hungary). In the more recent period, however, there has been significant catching-up by the other countries of the first round accession group, as these countries have accelerated privatization processes and have changed their policies vis-à-vis FDI. There is hence evidence that, at least for the group of first-round accession countries, international investors are willing to invest in the region as a whole as they feel that the framework conditions for their operations have become generally favourable.

Within country-distribution of FDI across regions remains, however, highly uneven, as has been pointed out earlier.

The actual process of accession is generally regarded to contribute another boost towards the integration of this region into international firms' activities; the literature speaks here of the setting up of international production networks (or IPNs). Accession is expected to make IPNs from both European firms as well as other international companies operating in Europe more attractive, as accession implies institutional convergence, greater reliability and enforceability of legal rules, enforcement of EU competition and trade policy, upgrading and recognition of technical standards, etc. On the other hand, it will change the characteristics of IPNs as international companies could, in the past, exploit the differences in institutional and legal conditions in CEECs as compared to EU countries, such as differences in environmental, health and safety regulations, etc. As these conditions converge, the scope for exploiting the 'non-level playing field' will mean that such IPN activities will have to shift further East or South and IPN activities in the new member countries will become more of a 'horizontal' rather than 'vertical' nature.

As regards the impact of the takeover of the *acquis communautaire* (acquis), one can say that the impact will be differently felt by different sectors and types of enterprises (see also wiiw, 2001, 2003). For most sectors the additional costs will be dominated by adherence to the Union's environmental regulations, both through the upgrading of production facilities and through increased charges for waste management. Other kinds of horizontal legislation that are likely to affect investment requirements of individual firms are occupational health and safety requirements, compliance with single market standards covering individual product specifications (on this, see Brenton, 2002), and employment legislation. In addition there are expected to be increases in direct and indirect charges for public services. Many industries in the CEECs have already gone through substantial restructuring and modernization programmes in expectation of EU membership; however, there is a clear asymmetry in preparation of industries and firms with foreign ownership and those in mostly domestic ownership. Recent surveys show that only half of the companies in CEECs have started preparations for the Single Market and less than 10% claim to be fully informed on current EU legislation (see Eurochambres, 2003). Furthermore, the current level of compliance with existing EU legislation is generally low. Hence, the front-loaded costs of the takeover costs of the *acquis* in CEECs are going to be high (estimates of these costs range between EUR 80 to 100 billion – see Commission, 2003) and the asymmetry in performance caused by the different ability to comply between foreign and domestically owned enterprises is likely to increase. Promotion of SMEs, institutional and administrative support, as well as an intensification of cross-border cooperation and networking are thus crucial to avoid substantial adjustment problems in the CEECs. On the other hand, over the longer run, compliance with the *acquis* will open

new market entry possibilities for CEE companies, initiate general upgrading and restructuring and thus further the competitiveness of the CEECs in the single market.

Policy challenges for the CEECs in the medium and long run

For the immediate future, monetary policy and choice of exchange rate regime will be crucial: as is well-known, there is, first, a divergence of opinion amongst economists[8] about the desirability of a quick entry by the ACs into EMU (the minimum is a two-year 'successful' membership of the ERM framework) and, secondly and more importantly, a difference of opinion also between the monetary authorities in the ACs (Central Banks, Monetary Policy Councils) which determine monetary and exchange rate policy and that of the EU Commission and that of the ECB. The monetary authorities in the ACs are, to varying degrees, very much in favour of quick entry into EMU while the EU Commission and the ECB are more cautious in this respect, looking for a period in which nominal and real convergence is gradually achieved in line with the conditions for EMU entry. The likely outcome will be that most ACs will give overriding priority to a fast EMU entry and subordinate most other goals to this target. Both strategies, to stay out of EMU for a longer period of time as well as attempts to join very quickly are hazardous: In short, staying out means that AC currencies will continue to be subject to exchange rate instability, partly reflecting their 'structural' current accounts positions, partly simply due to the *acquis* obligation for complete capital accounts liberalization which raises the possibility for speculative attacks. On the other hand, the strategy to join quickly requires a period of almost complete exchange rate stability in relation to the Euro and hence sustained disinflation; using monetary policy tools to achieve this (i.e. relatively high temporary interest rates) can strengthen even further the vulnerability to speculative attacks.

Apart from a focused use of monetary policy to achieve fast EMU entry, the Maastricht criteria require, of course, fiscal targets which are currently violated in quite a few of the ACs (see earlier Figure 3). Again, the ambition for quick EMU entry will require rather dramatic adjustments in this respect and, in case of a conflict between fiscal and monetary authorities, the latter can attempt to impose their will on the former. This tussle was already symptomatic for the developments in Hungary and Poland over the past few years and explains much of the rather unstable and volatile macroeconomic experience in the two economies. In any case, the attempt to join EMU rather quickly flies, firstly, in the face of the generally accepted logic of the Balassa-Samuelson process of necessary real appreciation (see on this Halpern and Wyplosz, 2001; for recent trends in real appreciation, see Figure 11) and, secondly, might cause instability in the macroeconomic growth processes due to either restrictive monetary policy and/or speculative attacks on the

[8] See the contributions by Begg et al. (2002), Coricelli and Jazbeg (2001), Halpern and Wyplosz (1997, 2001) etc.

exchange rates and/or undue speed in the fiscal consolidation process. We hence speak here of *potential 'EMU dips'* in the growth processes of the ACs over the coming years.

Having early EMU entry in mind will also imply a reorientation in CEECs towards supply-side policies. This is in line with the experiences of current EU member states. Sustainability of fiscal positions will become paramount and have important implications for the restructuring of social security systems. As the labour market situation is in many of the CEECs already in a precarious state, one can expect strong pressures in regional and sectoral labour markets and here a strong challenge arises with respect to both active labour market policies as well as in other areas which affect labour market outcomes (the workings of housing markets, in educational and training institutions, regional infrastructure and policies to attract FDI into peripheral regions). In some of these areas, the new member countries will be assisted through the additional funds which will be made available to them through the EU's set of cohesion policies. While the allocation and use of these funds will not exceed much the levels of pre-accession aid over the period of the duration of the current Financial Framework (see, on this, Landesmann and Richter, 2003), once the next Financial Framework comes into operation (i.e. from 2007 onwards), the flows can be quite substantial, more or less in line with the experiences of previous cohesion countries. The use of these funds are, furthermore, focussed on particular uses which would otherwise be under-funded given the rather precarious fiscal situation in some of the CEECs, and hence can show substantial effects over the longer-run (see, however, the fierce debate on the effectiveness of EU regional policy in recent contributions, e.g. Boldrin and Canova, 2001 and 2003, Hallet, 2000, Moucque, 2000).

The new members in the Enlarged European economy (En-EU)

The new members are going to have an immediate *level* and then a *growth* effect on the En-EU. The first effect derives from the simple arithmetic of generating a new average:

The move from a European Union of 15 members to one with 25 members would imply a fall in GDP per capita in 2002 of 10% if the aggregation is performed at current exchange rates, and of 14% if the aggregation if performed in purchasing power parities. On the other hand, we have already pointed out that the higher growth performance of the CEECs compared to the EU-15 over the period 1994-2004 (see previous Figure 1 and Table 1) implies a 0.3% per annum positive growth stimulus in 'macro-productivity' for the EU-25 as compared to the EU-15 over that period (for more details on this, see wiiw, 2003).

We have no reason to presume that this dynamic impact of the new members on the growth performance of the Enlarged European Union (En-EU) will disappear in the future. In fact, with growing weights of the new members, this impact will be further strengthened. However, we have also emphasized that the ACs are not a homogenous group of

countries, but that we observe a range of catching-up experiences. This is not unlike the experiences we observed with the cohesion countries in the past (Greece, Ireland, Portugal, Spain). Relevant theoretical and empirical results from the analysis of the impact of integration and convergence (see e.g. Crespo-Cuaresma et al., 2002) suggest that regional integration does support convergence, but there might be phases in which this impact becomes weak. Institutional development, also in the light of making effective use of the support which the EU could provide in the form of Structural Funds schemes, will be important. Also important will be the stability of political structures and the persistence and sustainability of the macroeconomic policy framework. With regard to the latter, we have already pointed to the problems which accession countries will encounter in relation to the exchange-rate, monetary and fiscal policy framework required to allow entry into the EMU. With regard to stability of political structures, there is evidence that accession countries have, also in the recent past, undergone quite pronounced political swings which can translate into political business cycles. The underlying causes are partly the less consolidated structures of political representation by political actors/parties compared to Western Europe, but also the result of still ongoing painful processes of transformation and structural reforms with their effects on income and wealth distribution, on labour markets, regional disparities and positions of different demographic and professional groups with respect to social security. Combined with the strained fiscal situation and vulnerability on external accounts, these factors could contribute to relatively strong volatility in growth trajectories in ACs (for more general evidence and analytical arguments pointing towards stronger volatility in growth of lower-income economies, see Azariades, forthcoming.)

From the structural point of view we have pointed out that the past decade has witnessed rather dramatic upgrading processes of industrial structures in ACs, although they did not proceed at the same pace across all the ACs. For the ACs a group, there were substantial increases in the shares which they occupy in EU-25 production and trade structures and there were very interesting developments with regard to industrial and trade specialization. There is a relatively strong presence of ACs in three groups of manufacturing industries: in labour-intensive, low-skill branches, in natural-resource-intensive branches and in more sophisticated, medium- to high-skill branches. Over time, the more advanced of the ACs have definitely shifted their specialization away from the low-skill, labour-intensive branches and towards the technologically more demanding and skill-requiring branches. The strong evidence of industrial structures of the advanced ACs converging towards the EU average and the strong tendencies towards increased intra-industry trade and within industry upgrading are in line with this. Furthermore, the qualitative catching-up process was not restricted to the manufacturing sector, but has also been taking place in the market services sector. Just as in manufacturing, the role of foreign-owned companies was crucial in facilitating such an upgrading process. The accession process itself is likely to see a boost in cross-border corporate linkages and thus support the mechanisms of technological and organizational know-how transfer. Operating in an integrated economic

space which encompasses a much wider range of income and productivity levels, but provides a labour force with rather high educational attainment, will be a major opportunity for European companies for vertical and horizontal differentiation and integration of their activities. Especially for neighbouring countries (such as Austria, Germany, Italy, Greece) such opportunities extend beyond large corporate players also to small and medium-sized companies. It will be interesting to see in which way the European corporate landscape adjusts to the opportunities which a much more heterogeneous European Union offers.

The European economic space does not, however, has its strict border-line with the Enlarged European Union, as there is a wide rim of countries to the East, South-East and South, for which the European Union is the dominant economic 'hub'. There are by now a number of studies which analysed the impact which the entry of the first round of accession countries might have on 'Europe's periphery' (see the contributions by Rosati, Havrylyshyn and Gligorov et al., all forthcoming). These contributions attempt to analyse and quantify the possible impact which trade and FDI diversion (in favour of the new members) might have on the neighbouring rim, as well as the possible beneficial growth and spillover effects. Here again, the stability and institutional anchorage which the EnEU can provide to this group of low-income, potentially catching-up economies will be crucial. In relation to Europe's periphery, tendencies of a multi-tier Europe have deepened rather than narrowed over the past decade and this will be another major challenge which will have to be faced by political decision-makers in the En-EU on top of making the Enlargement process itself a success.

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Appendix

Figure 2a

Annual GDP growth rates

change in % against preceding year

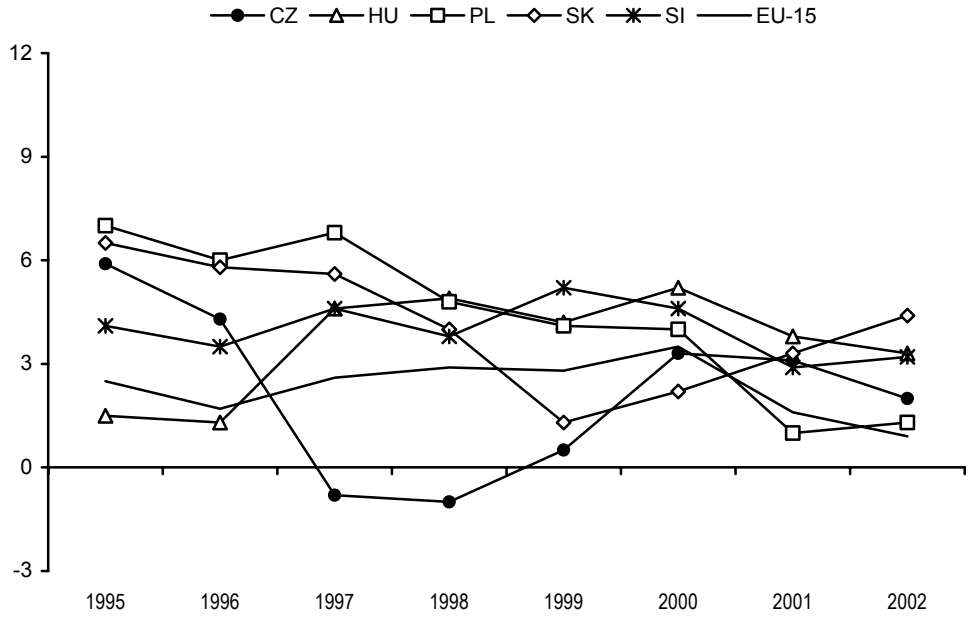
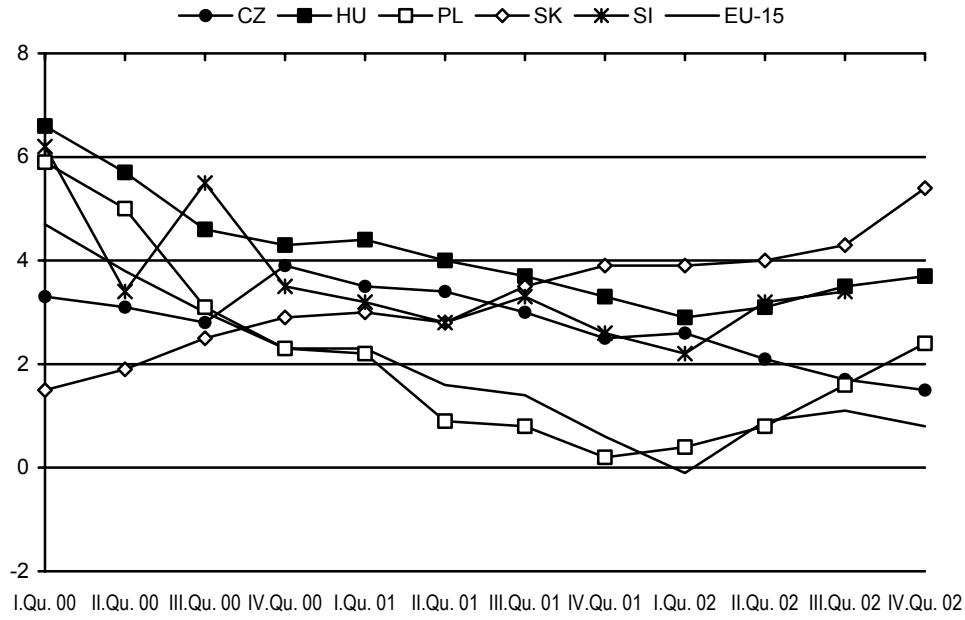


Figure 2b

Quarterly GDP growth rates

in %, year-on-year

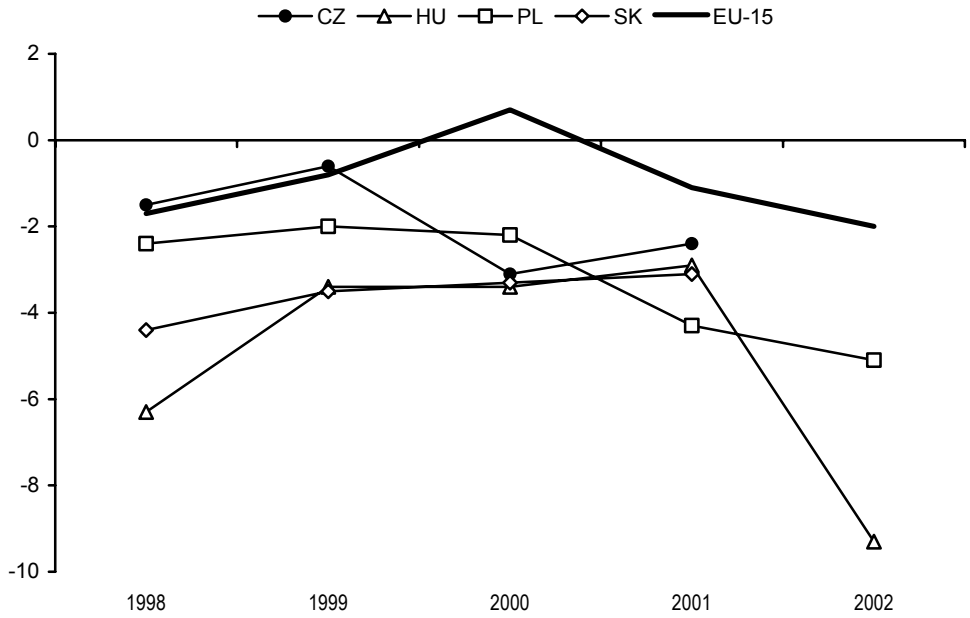


Source: wiiw Database incorporating national statistics.

Figure 3a

General government budget balance[1)]

in % of GDP

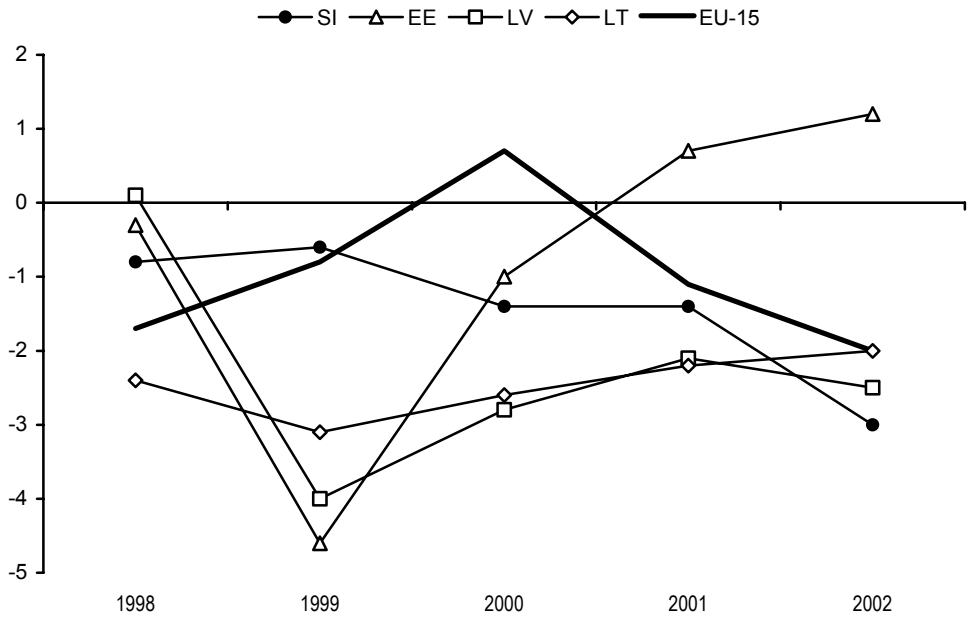


Note: 1) Poland: Central government budget balance.

Figure 3b

General government budget balance

in % of GDP

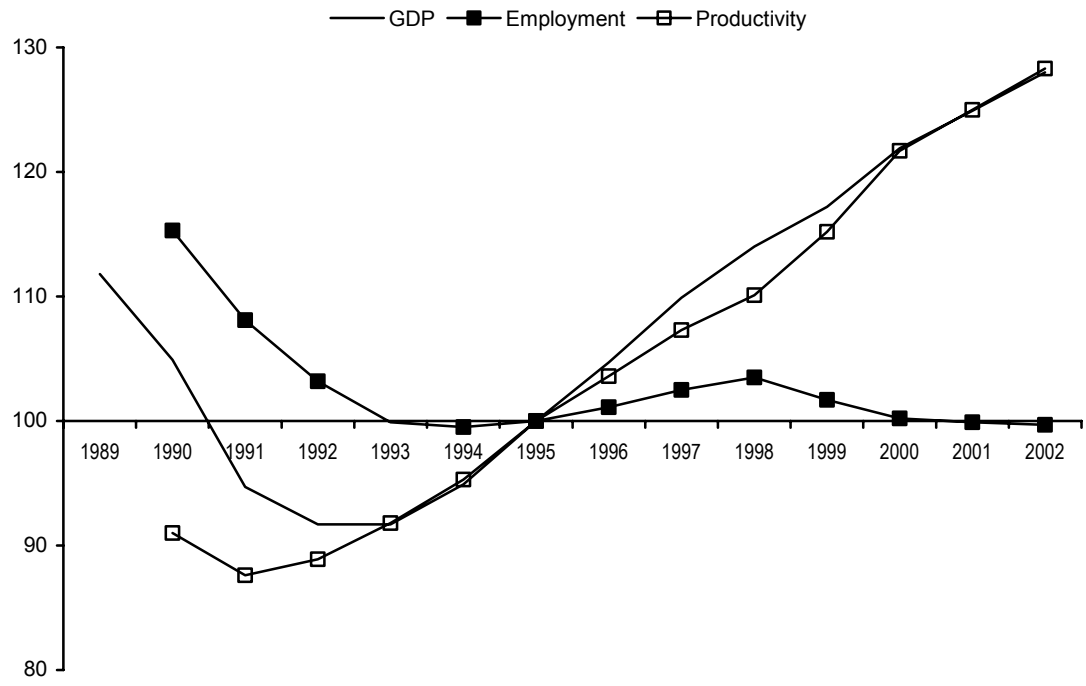


Source: wiiw Database incorporating national statistics; OECD.

Figure 4

GDP, employment and productivity in AC-8

1995 = 100

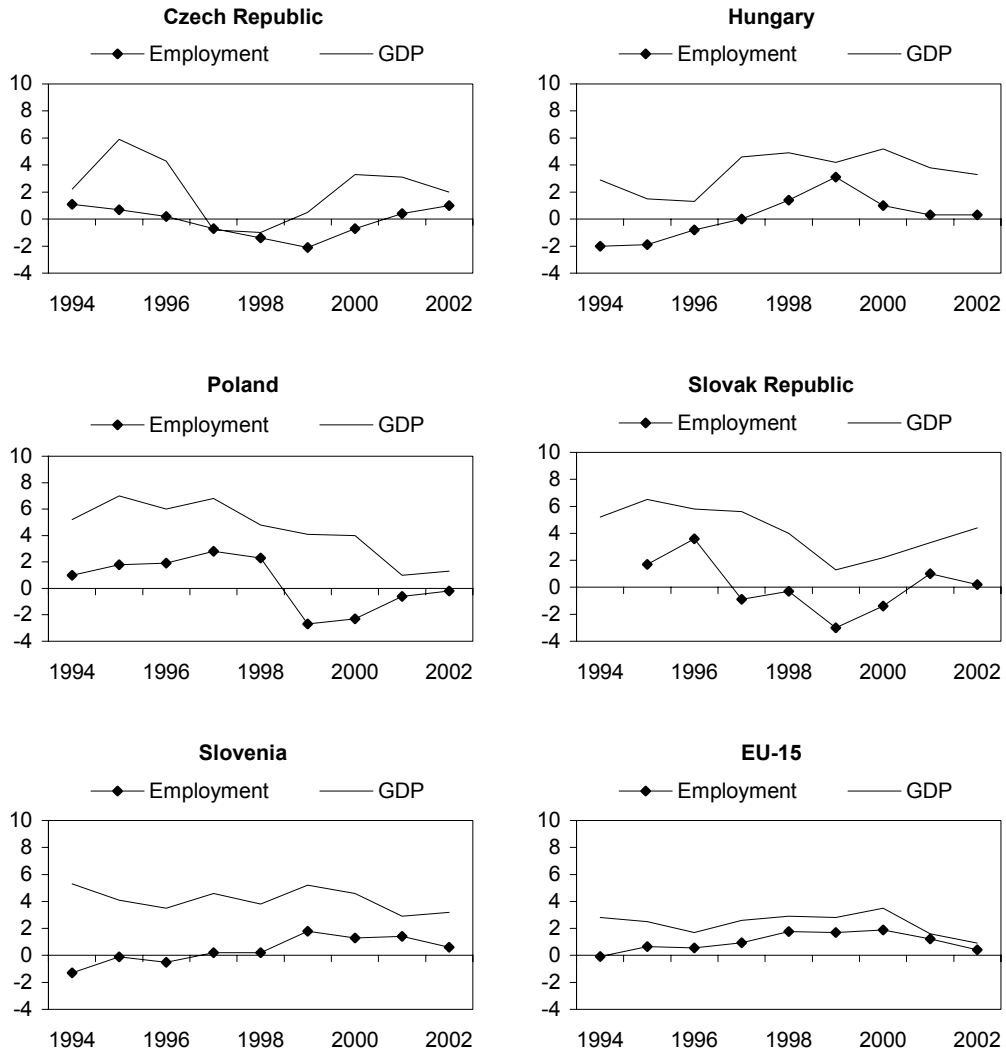


Source: wiiw Database incorporating national statistics.

Figure 5

Annual growth rates – GDP and employment

change in % against preceding year

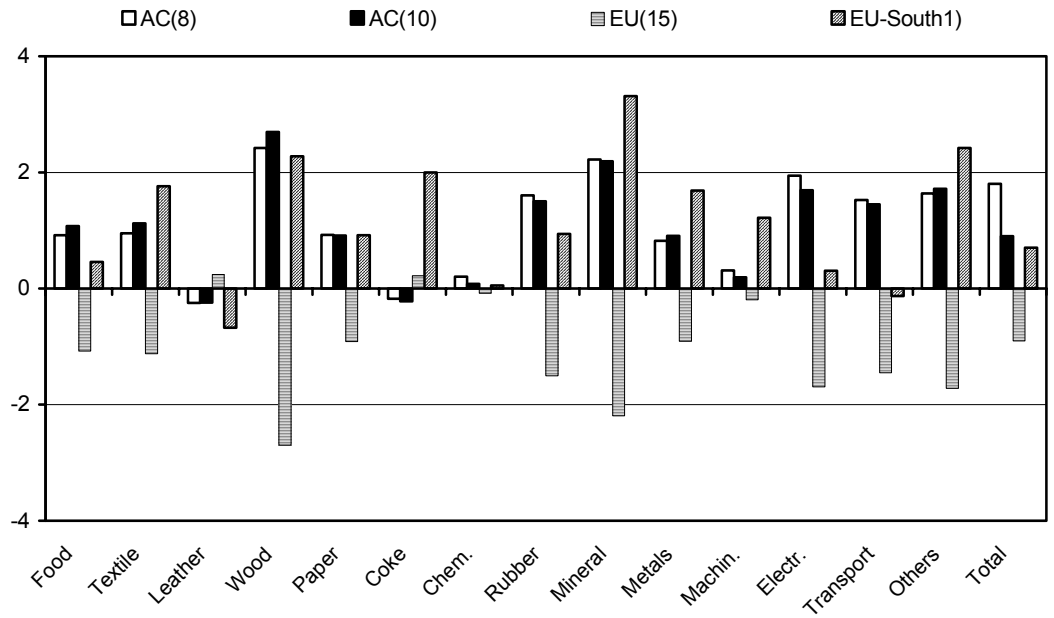


Sources: wiiw-Database incorporating national statistics; AMECO; ECO.

Figure 6

Change in industry production shares in enlarged Europe, EU-25, 1995-2000

in percentage points



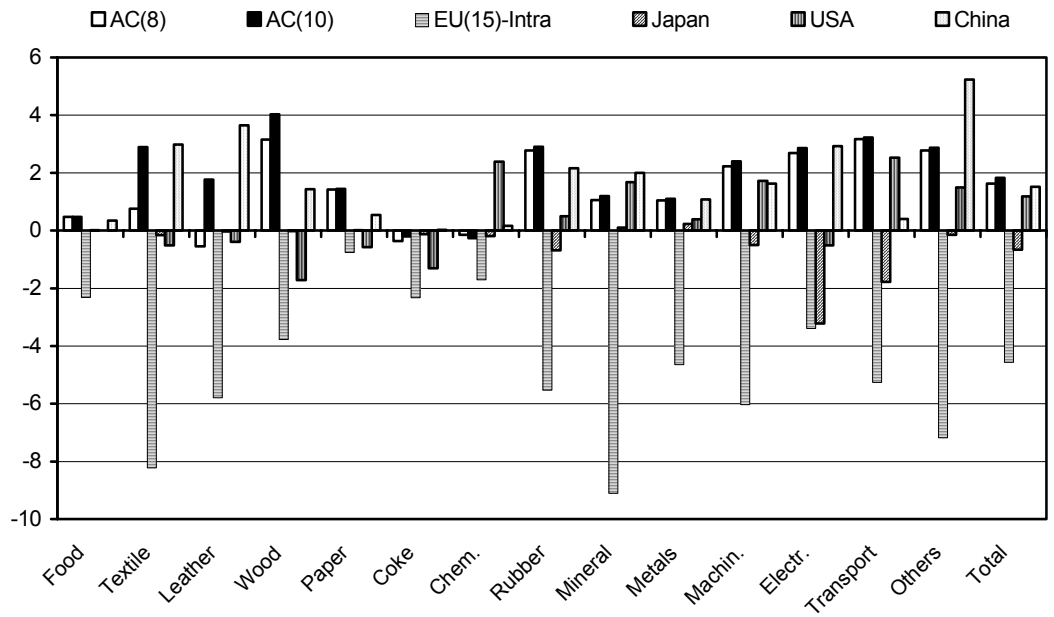
Note: 1) EU-South: Greece, Portugal, Spain.

Source: wiiw Database and AMECO.

Figure 7

Change in shares in trade with EU-15, 1995-2001

in percentage points

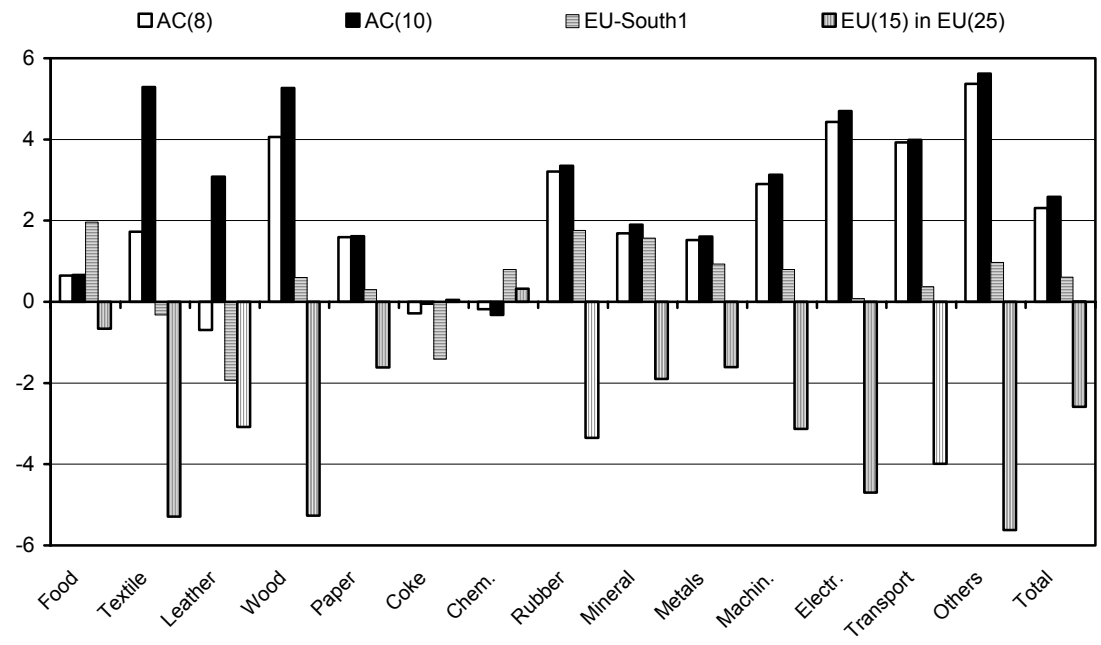


Source: wiiw estimates based on Eurostat Comext Database.

Figure 8a

Change in shares in enlarged intra-Europe trade, EU-25, 1995-2001

in percentage points



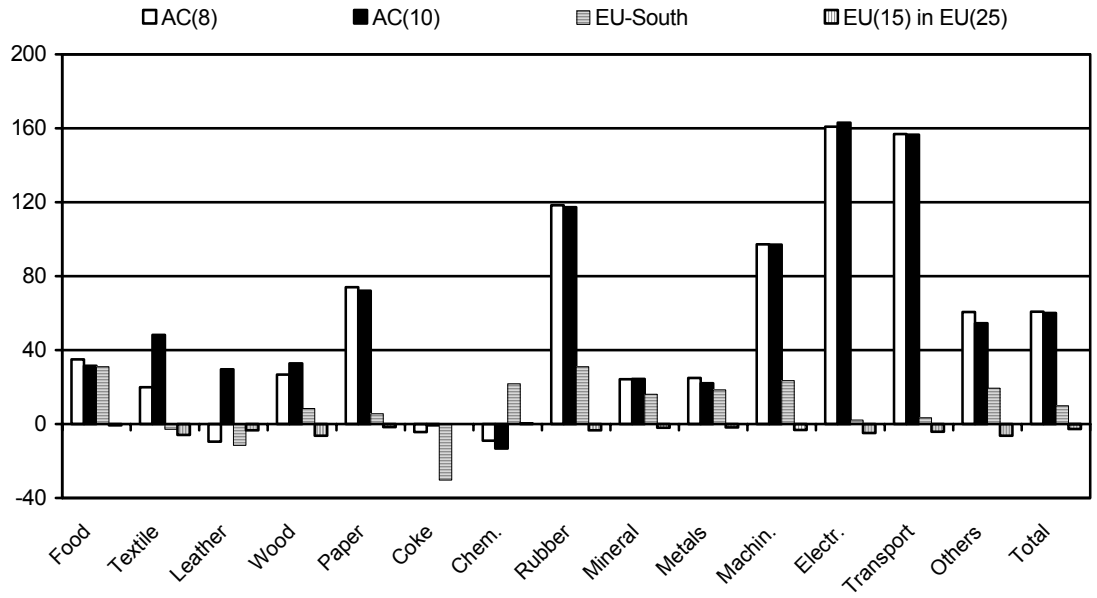
Note: 1) EU-South: Greece, Portugal, Spain

Source: wiiw estimates based on Eurostat Comext Database.

Figure 8b

Growth in shares in enlarged intra-Europe trade, EU-25, 1995-2001

in %

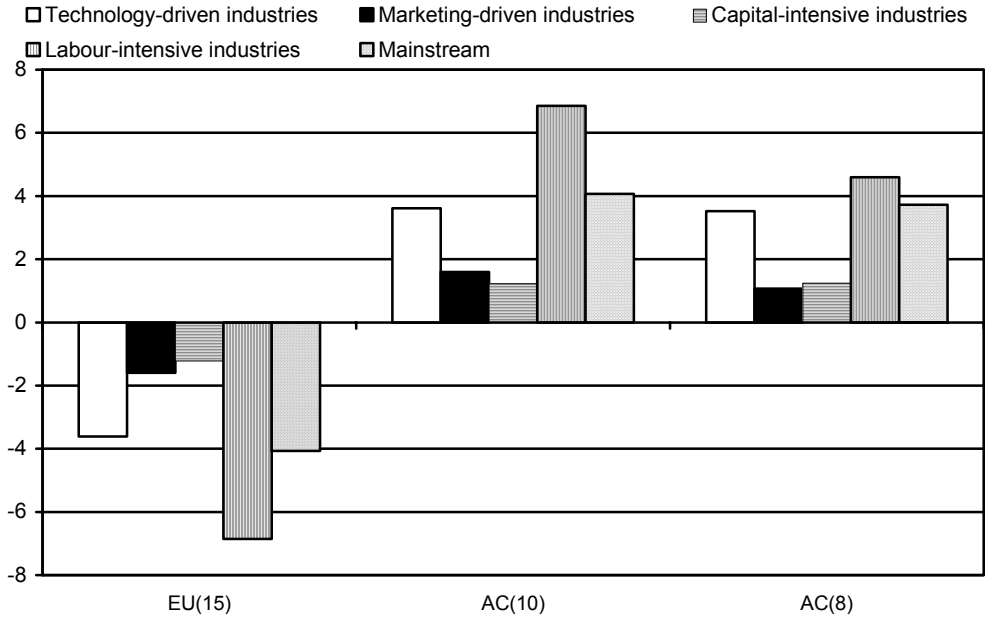


Note: 1) EU-South: Greece, Portugal, Spain.

Source: wiiw estimates based on Eurostat Comext Database.

Figure 9a

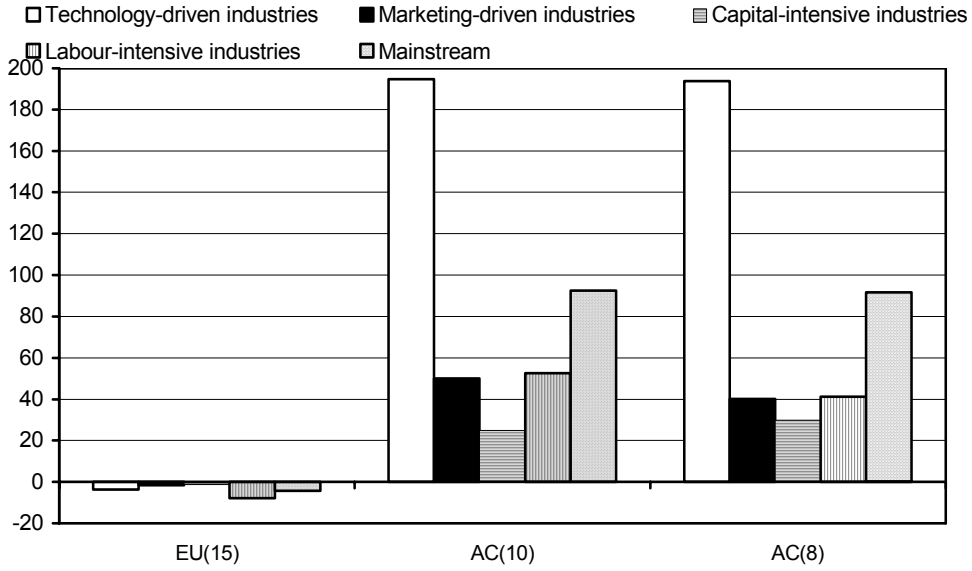
Change in export market shares, 1995-2001, by industry categories (absolute, in percentage points) in enlarged intra-EU trade, EU-25



Source: wiiw estimates based on Eurostat Comext Database.

Figure 9b

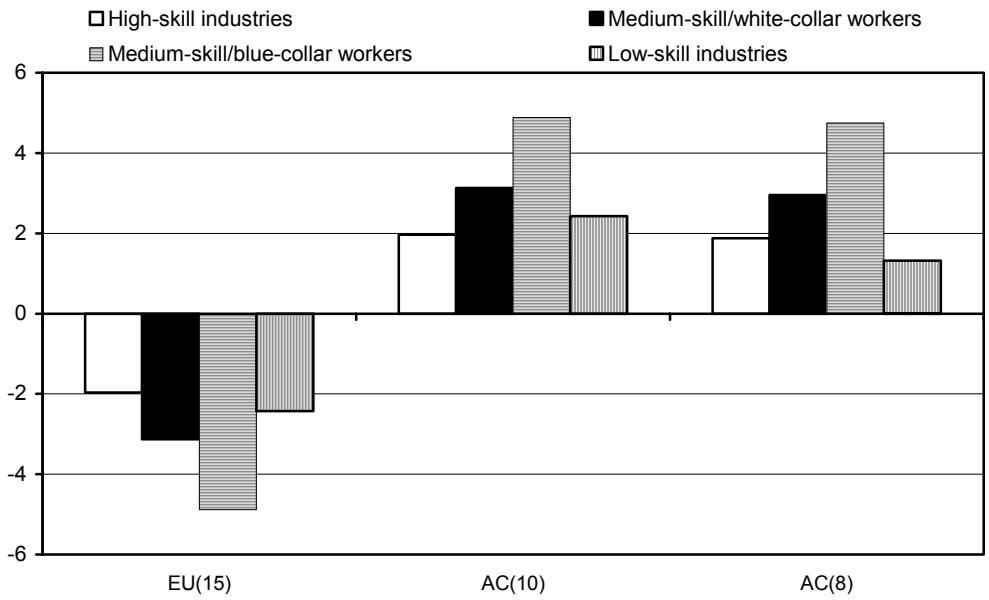
Growth in export market shares, 1995-2001, by industry categories (in %) in enlarged intra-EU trade, EU-25



Source: wiiw estimates based on Eurostat Comext Database.

Figure 10a

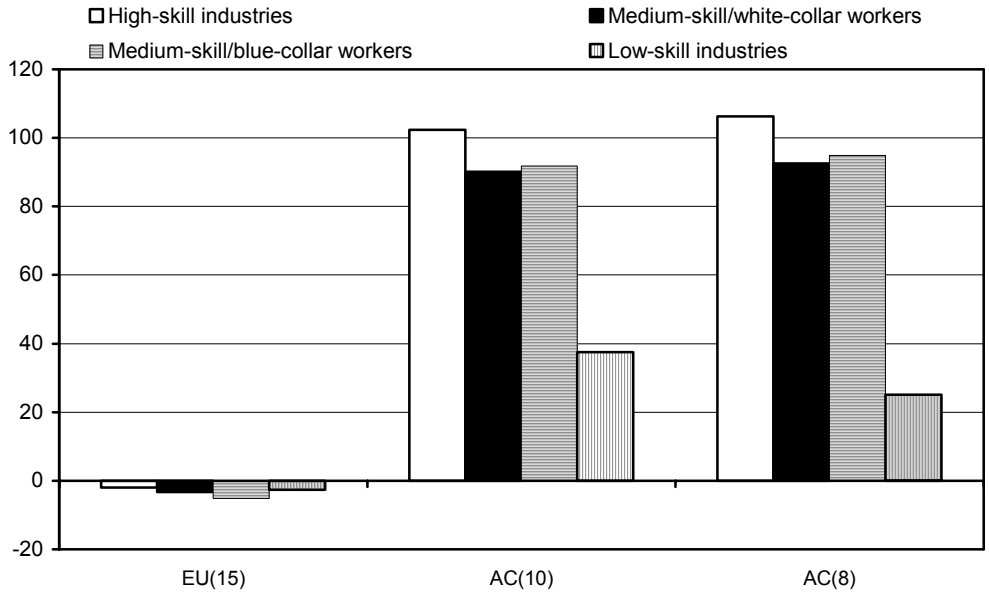
Change in export market shares, 1995-2001, by skill categories (absolute, in percentage points) in enlarged intra-EU trade, EU-25



Source: wiiw estimates based on Eurostat Comext Database.

Figure 10b

Growth in export market shares, 1995-2001, by skill categories (in %) in enlarged intra-EU trade, EU-25

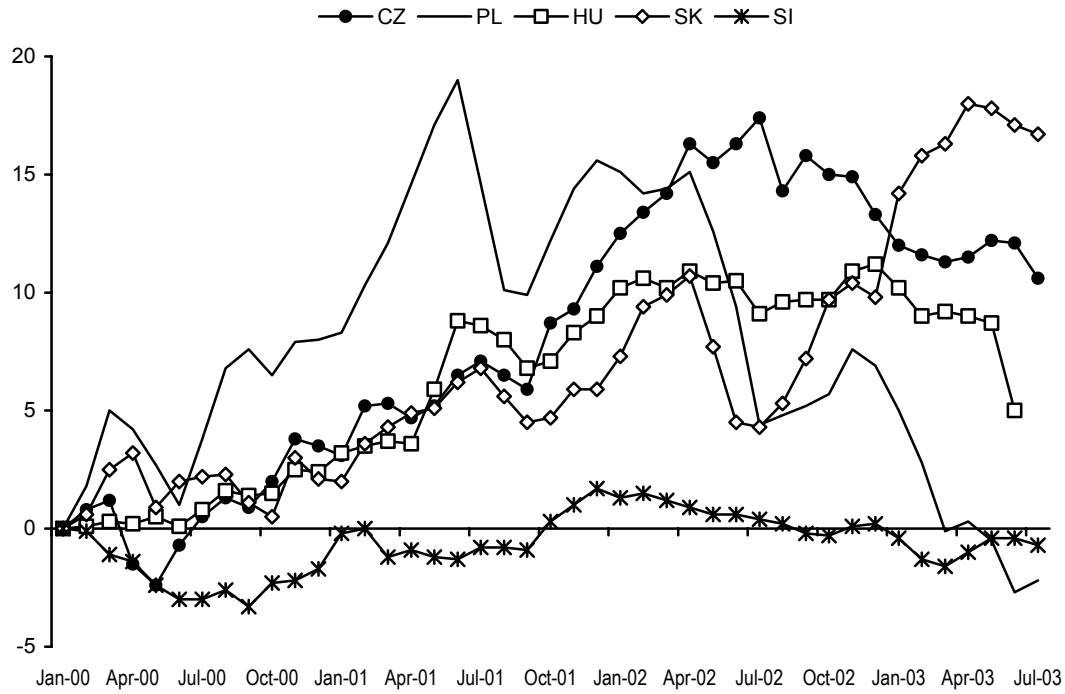


Source: wiiw estimates based on Eurostat Comext Database.

Figure 11

Real exchange rates*

EUR per national currency, deflated with PPI, Jan 2000 = 100



Note: *) Increasing line means real appreciation.

Source: wiiw Database incorporating national statistics.

Peter Havlik and *Waltraut Urban* *Chapter 1*

Industrial developments in the accession countries*

Abstract

This paper deals with industrial developments in the Accession Countries (ACs) and the likely implications of the EU's enlargement. After a brief review of longer-term structural trends and ACs' catching-up at the macro level, the analysis focuses on the manufacturing industry – in particular on productivity, labour costs, FDI patterns and trade specialization.. The manufacturing sector of the ACs is relatively small compared to the EU-15, yet rapidly growing. The recent impressive productivity growth in ACs has been associated with persistent job losses; productivity levels are still less than half of the EU average. Industries identified as 'productivity winners' show a better cost competitive performance. The lowest unit labour costs are observed in Hungary and in the Slovak Republic, due to their comparatively high labour productivity, and in Bulgaria and Romania, because of their extremely low wages. FDI inflows have been high in both domestically oriented industries and in predominantly export-oriented industries such as electrical & optical equipment and transport equipment. ACs' manufacturing trade with the EU has become increasingly specialized and most ACs record improvements of revealed comparative advantage in machinery & equipment n.e.c., electrical & optical equipment, transport equipment and furniture as well as in the food & beverages industry. The ACs have gained market shares in the enlarged EU-25, mostly at the expense of falling market shares of France, Germany, Sweden, Belgium/Luxembourg and Denmark. In structural terms, the ACs seem to compete on the European market mainly with exports of Spain, Portugal, Ireland, Austria, Germany and France.

1 Development of GDP, employment and macro-productivity

In the first half of the 1990s, economic growth in the EU (including Finland, Sweden and Austria, which joined in 1995) decelerated and a few EU countries even experienced negative GDP growth rates in some years; in 1993/94 Europe as a whole was hit by a severe recession. In the aggregate, the EU countries had a cumulated GDP growth of just close to 8% (annual average 1.5%) during the period 1990-1995 (see Table 1). The group of accession countries (with the exception of Cyprus and Malta) – in the following termed AC-8 – went through the first phase of the 'transition process' in which GDP and GDP per capita recorded dramatic declines, due to supply as well as demand shocks caused by the

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Table 1

Long-term productivity catching-up of accession countries vis-à-vis the EU

County groups	1990-1995				1995-2002				1990-2002			
	growth rate in %		growth differential against EU in pp		growth rate in %		growth differential against EU in pp		growth rate in %		growth differential against EU in pp	
	cumu-lated	annual average	cumu-lated	annual average	cumu-lated	annual average	cumu-lated	annual average	cumu-lated	annual average	cumu-lated	annual average
AC-8[1]												
GDP	-4.7	-1.0	-12.5	-2.5	28.0	3.6	11.2	1.3	22.0	1.7	-4.0	-0.3
Employment	-13.3	-2.8	-11.3	-2.4	-0.2	0.0	-9.0	-1.2	-13.5	-1.2	-20.0	-1.7
Macro-productivity	9.9	1.9	-0.2	0.0	28.2	3.6	20.9	2.6	41.0	2.9	22.8	1.5
Cyprus												
GDP	25.1	4.6	17.2	3.1	28.0	3.6	11.2	1.3	60.1	4.0	34.2	2.1
Employment	10.8	2.1	12.9	2.5	8.5	1.2	-0.2	0.0	20.3	1.6	13.7	1.0
Macro-productivity	12.9	2.5	2.8	0.5	17.9	2.4	10.6	1.4	33.1	2.4	14.9	1.0
Malta												
GDP	22.8 [2]	5.3 [2]	16.8 [2]	3.8 [2]	25.9	3.3	9.1	1.1	54.7 [3]	4.0 [3]	30.9 [3]	1.9
Employment	8.1	1.6	10.2	2.0	4.2	0.6	-4.6	-0.6	12.7	1.0	6.1	0.5
Macro-productivity	15.6 [2]	3.7 [2]	7.1 [2]	1.6 [2]	20.8	2.7	13.5	1.7	39.7 [3]	3.1 [3]	23.2 [3]	1.7
AC-8 + BG and RO												
GDP	-6.3	-1.3	-14.2	-2.8	23.2	3.0	6.5	0.8	15.4	1.2	-10.5	-0.7
Employment	-13.2	-2.8	-11.0	-2.3	-3.5	-0.5	-12.3	-1.7	-16.3	-1.5	-22.8	-2.0
Macro-productivity	7.9	1.5	-2.2	-0.4	27.8	3.6	20.4	2.5	37.9	2.7	19.7	1.3
EU-15												
GDP	7.9	1.5	-	-	16.8	2.2	-	-	26.0	1.9	-	-
Employment	-2.0	-0.4	-	-	8.8	1.2	-	-	6.6	0.5	-	-
Macro-productivity	10.1	1.9	-	-	7.4	1.0	-	-	18.2	1.4	-	-

Notes: 1) Central and east European fist-round accession countries, comprising the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, the Slovak Republic and Slovenia. - 2) 1991-1995.-3) 1991-2002.

Source: wiiw Database incorporating national statistics, WIFO and wiiw calculations using AMECO.

loss of traditional export markets, the break-up of existing supply chains and decision-making structures, sudden trade liberalization and restrictive macroeconomic policies. During this period, the AC-8 experienced a cumulated decline of GDP of 4.7% (-1% per annum). This translates into a substantial *negative* growth differential for the AC-8 vis-à-vis the EU. Malta and Cyprus, on the other hand, developed quite dynamically during that period and enjoyed growth rates well above the EU average – due to successful economic restructuring and rapid expansion of the tourism sector, which is an important pillar of both economies (see Table 1 and Figure 2).

From 1993/94 onwards, economic recovery gained momentum in the AC-8 and their average growth began to exceed that of the EU. However, a closer look reveals that most of these countries experienced further – at times sharp – interruptions in their growth processes due to delayed corporate restructuring and occasional financial crises (often called 'secondary transformational recessions') and/or macroeconomic imbalances, most often caused by unsustainable current account deficits. Also, the growth process became more differentiated across the region, with the two second-round accession countries, Romania and Bulgaria, lagging behind significantly. For the period 1995-2002, the average annual growth rate of GDP was 3.6% for the AC-8.[9] Malta and Cyprus continued to grow fast, though at a slower pace than in the first half of the 1990s, reaching similar growth rates as the AC-8 now.

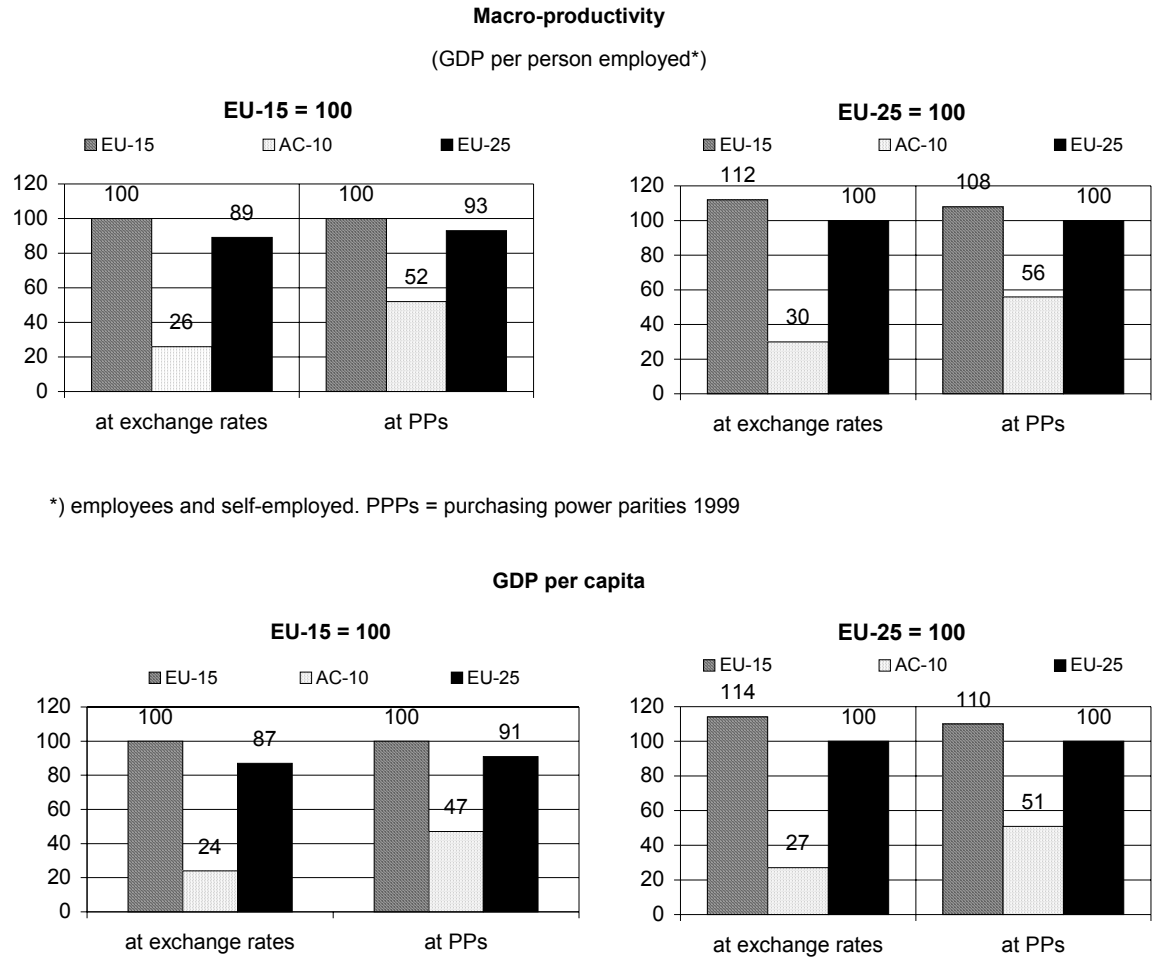
In the EU, GDP growth accelerated moderately after 1995, with an average annual growth rate of 2.2% over the period 1995-2002. The growth differentials turned in favour of the accession countries and reached 11.2 percentage points in cumulative terms and 1.3 percentage points per annum for the AC-8 and similar rates for Malta and Cyprus as well. Taking into consideration the whole period 1990-2002, there is a difference in cumulative GDP growth of -10.5% for the AC-8 relative to the EU and of -4% if Bulgaria and Romania were included. Malta and Cyprus on the other hand recorded impressive positive growth differentials of about 30 percentage points in cumulative terms (about 2% per annum – see Table 1).

Employment in the AC-8 declined even more strongly than GDP in the first years of transition (-2.8% per annum) and did not recover after 1995. For the whole period 1990-2002, the cumulated employment decline in the AC-8 reached 13.5% (Table 1) with notable differences across the region. Low employment levels are thus still a major issue in the Central and East European accession countries. The employment situation looks

[9] 3% if Bulgaria and Romania, which reached very meagre average annual growth rates of 0.5% and 0.4% respectively, were included.

Figure 1

Levels of macro-productivity and of GDP per capita in the accession countries and in the EU, 2001



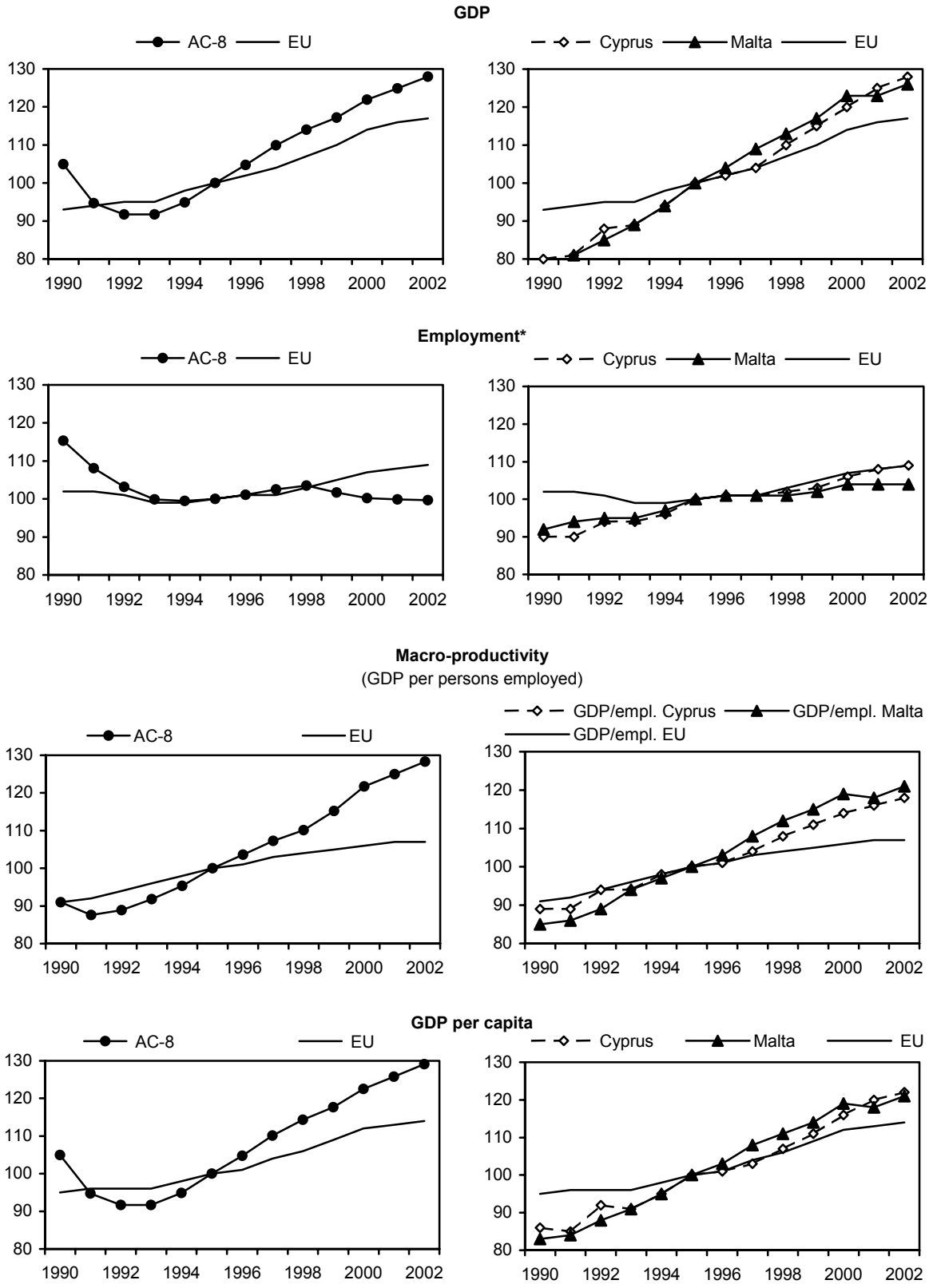
Source: wiiw calculations using national statistics and Eurostat (2001).

relatively better in Cyprus and Malta although employment growth in the latter decelerated significantly during the second half of the 1990s (unemployment rates were well below the EU average in both countries in 2001). In the EU, overall employment declined in the first half of the 1990s as well, but to a much lesser extent than in the Central and East European accession countries. In the second half of the 1990s, employment rose only moderately (1.2% annually), resulting in a cumulated increase of employment throughout the whole period 1990-2002 of 6.6% (0.5% per annum).

Low employment growth thus remains an unsolved issue in both the EU and most ACs; it will become a major challenge for the enlarged Europe, particularly in view of the Lisbon Strategy stipulations. Coming now to aggregate measures of income and productivity,

Figure 2

Growth of GDP, employment and macro-productivity in the ACs and the EU (1995 = 100)



* employees and self-employed

Source: wiiw Database incorporating national statistics, WIFO and wiiw calculations using AMECO.

macro-productivity of the AC-8 rose on average at a similar pace as in the EU in the period 1990-1995 (see Table 1; macro-productivity is defined as GDP per employed person – employees and self-employed). But productivity gains in the AC-8 resulted mainly from massive labour shedding which overcompensated the fall in output. Thus, productivity gains reflected the painful adjustment process going on in these countries rather than a successful modernization of their economies. GDP *per capita*, as a common measure for living standards, declined substantially in particular in the first years of transition (see Figure 2). In Malta and Cyprus, on the contrary, substantial productivity gains went hand in hand with rising output and employment.

In the second half of the 1990s, the rise of macro-productivity strongly accelerated in the AC-8 and this time productivity growth was supported by fast rising GDP at relatively constant employment levels. Productivity growth was significantly higher in the AC-8 than in the EU (3.6% per annum as compared to 1% in the EU). The impressive process of 'productivity catching-up' of the accession countries after 1995 is clearly demonstrated in Figure 2. The cumulated 'productivity gain' of the AC-8 vis-à-vis the EU over the whole period 1990-2002 reached impressive 22.8 percentage points. Cyprus and Malta, too, showed high productivity growth in the second half of the 1990s, surpassing the EU average but remaining below that of the AC-8. In Bulgaria and Romania, restructuring was delayed and productivity gains after 1995 were still mainly based on labour shedding. Also, productivity growth remained below that of the EU in both countries. However, in Bulgaria a certain process of catching-up in macro-productivity vis-à-vis the EU started after the 1997/1998 financial crisis.

Despite impressive catching-up in the recent period, the level of macro-productivity in the accession countries is still very low compared to the EU average, leaving ample space for further productivity growth and catching-up after the accession. In the year 2001, the average level of macro-productivity (compared at current exchange rates) for all ten first-round accession countries taken together was only 26% of the average EU-15 level. Measured at purchasing power parities (PPPs), which correct for undervalued currencies still prevailing in many accession countries, the average level of macro-productivity still reached just 52% of the EU-15 average (56% if compared to a fictive enlarged EU-25; see Figure 1).[10]

[10] However, for the more advanced ACs such as Cyprus, Malta and Slovenia, macro-productivity measured at exchange rates has already reached between 50 % and 60 % of the EU-15 level and between 70% and 80%, if PPPs were used for conversion. Due to the high levels of unemployment in some of the Central and East European accession countries GDP per capita for the AC-10 reached only 24% (at exchange rates) and 47% (at PPPs) of the EU-15 level.

2 Changes in the broad sectoral structure of the accession countries

In the Central and East European accession countries, economic developments in the transition period were characterized by large shifts in the sectoral composition of GDP and employment, indicating a clear tendency of adjustment towards the broad economic structures in the EU. The ACs started off with a larger agricultural and industrial sector on the one hand and a smaller services sector than the EU countries on the other (see Figures 3 and 4).[11] The broad shifts occurring after 1990 in the ACs can thus be summarized under the headings of de-agrarianization, de-industrialization and tertiarization. However, there are a few interesting cases of 're-agrarianization' and 're-industrialization' as well. But while the former are considered to be of a transitory nature, the latter may become a more common phenomenon in the future. In Cyprus and Malta, given the different political and economic background, the sectoral shifts are less pronounced.

An overall tendency for de-agrarianization, de-industrialization and tertiarization can be observed in the EU throughout this period as well, but much more moderate than in the ACs (see Figures 3 and 4). There is also one example of *re-industrialization* within the EU, namely that of Ireland, where the share of industrial value added in GDP increased from 32% in 1990 to 37% in 2001 – yet employment shares remained constant.

De- and re-agrarianization

In all AC-8, the shares of agriculture in GDP *and* employment fell dramatically between 1990 and 2001 ('de-agrarianization').[12] Employment declined significantly in absolute terms as well. But in Bulgaria and Romania the share of employment in agriculture has increased, pointing to a kind of 're-agrarianization'. In fact, in Romania employment in agriculture increased even in absolute terms.

However, this results from the severe employment crises in both countries due to the dramatic decline in industrial employment and the so far limited absorption capacity of the services sectors. Despite massive de-agrarianization in the AC-8, the shares of agriculture in GDP and employment of these countries is on average still higher than in the EU. But in the more advanced ACs such as the Czech Republic, Hungary and Slovenia, the

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[11] Under the previous regime, industry was emphasized at the expense of services and, furthermore, service activities were often supplied within big industrial combines, which meant that they were classified under 'industry' and to some extent 'agriculture' as well. Most services were considered 'unproductive labour' and their contribution to the efficient functioning of the economy was neglected (Stare and Zupancic, 2000). Also, many modern services that play an important role in market economies (such as marketing, financial services, real estate and other business services) were simply not needed under socialism. (Soubbotina and Sheram, 2000).

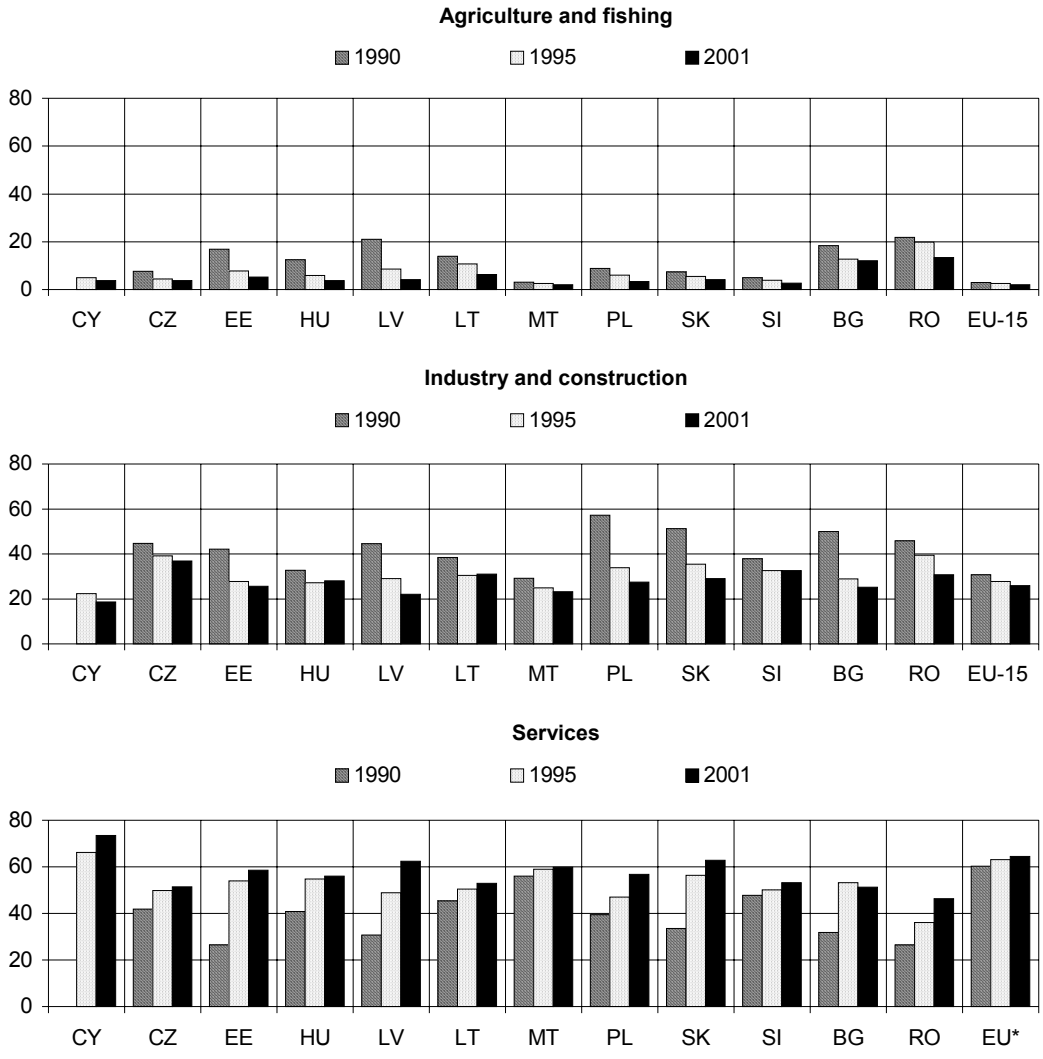
[12] Sector shares in this chapter are defined as gross value added (GVA) of agriculture (industry, services) in gross domestic product (GDP). Because of the so-called 'Financial intermediation services indirectly measured' (FISIM), which are included in GDP but not in gross value added, the so defined shares of the three sectors will not add up exactly to 100 %.

difference to the EU was minimal in gross value added (GVA), though not in terms of employment. In general, the differences between GVA shares and employment shares in agriculture are larger in the ACs than in the EU, due to the relatively low productivity in the former countries' agriculture as compared to the other sectors of the economy. With competitive pressures rising and modernization in agriculture accelerating after accession, we may thus expect considerable pressure on agricultural employment in the new EU member countries. This will be particularly true for Poland, some of the Baltic countries and the second-round accession countries, where the differences between GVA shares and employment shares in agriculture are huge (compare Figures 3 and 4).

Figure 3

Comparison of AC and EU value added structures in 1990, 1995 and 2001,

% of GDP



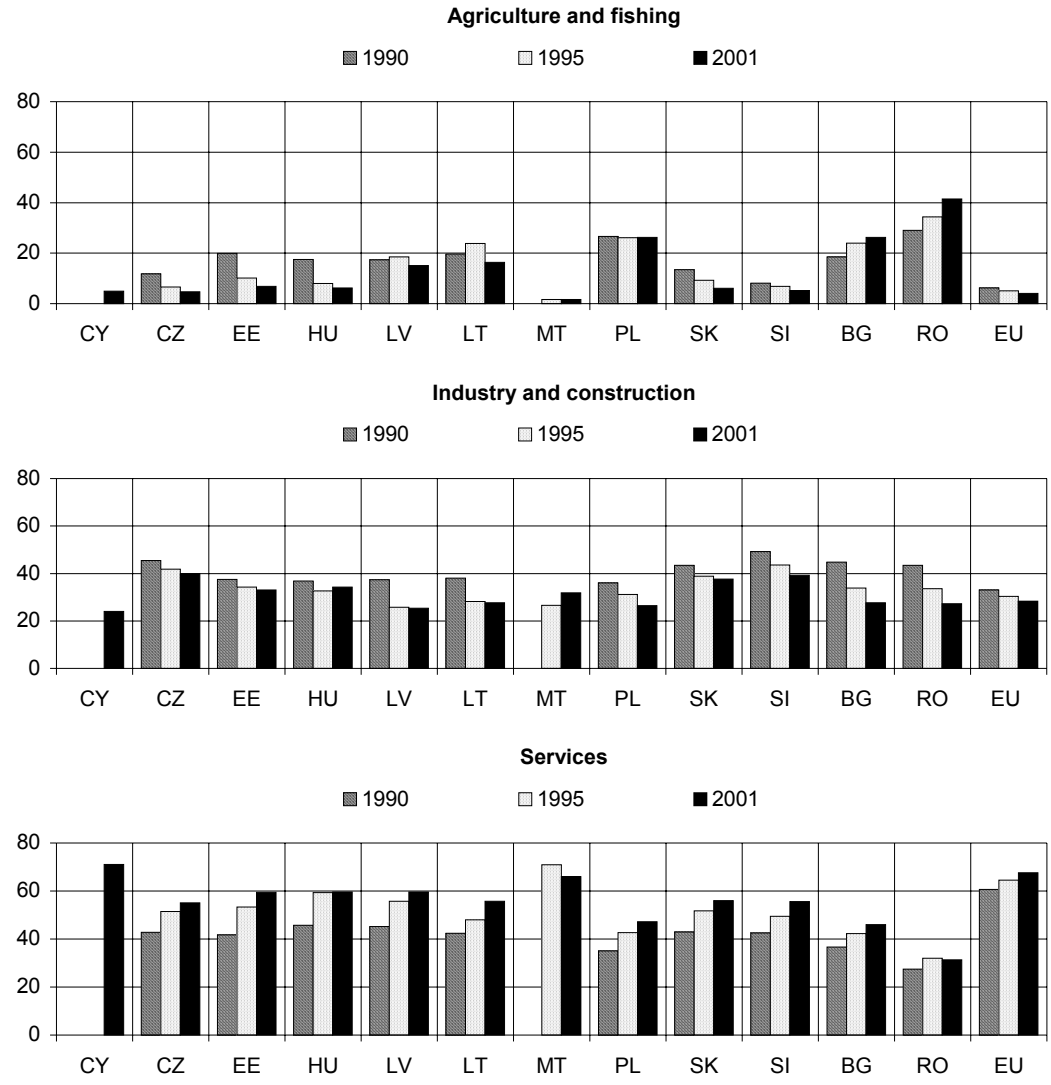
*) Year 2000.

Sources: wiiw Database incorporating national statistics; WIFO and wiiw calculations using AMECO.

Figure 4

Comparison of AC and EU employment structures in 1990, 1995 and 2001,

% of total



Sources: wiiw Database incorporating national statistics; WIFO and wiiw calculations using AMECO

De- and reindustrialization

The share of industry (comprising manufacturing, mining, water & electricity supply and construction) declined strongly in terms of both GVA and employment in most ACs. This decline was more pronounced in the first years of transition and levelled off after 1995. Industrial employment dropped also sharply in absolute terms. However, by 1998/1999, labour shedding in industry bottomed out and employment started to rise slightly in some ACs (e.g. in Hungary, in the Czech and Slovak Republics). In Hungary, even an increase

of the share of industry in GDP *and* in employment can be observed. Interestingly, Bulgaria and Romania have significantly reduced their large industrial sector. From an overall point of view, the GVA shares of industry in GDP in most ACs are now broadly in line with the EU (26% in 2001), with some exceptions (e.g. Czech Republic, Slovakia, Slovenia). But, AC employment shares of industry still tend to be higher than in the EU on average (28%).

Yet, as illustrated by the example of Hungary, there might be the possibility for a few additional accession countries to experience some kind of re-industrialization in the future. Low labour costs and the pool of skilled labour make the ACs an attractive location for export-oriented industrial production and, as demonstrated by many south-east Asian economies, strong export orientation might well lead to a higher share of industry in GDP and employment than would be typical for a certain stage of economic development.[13]

Tertiarization

The *share of services,* in both GDP and employment, has increased significantly in most ACs, indicating a clear 'catching-up' in this sector. However, at the beginning of transition, the rise of GVA and employment shares was mainly of a 'passive nature', reflecting a less pronounced decline of employment in services than in industry and agriculture. Only when growth of the overall economy gained momentum, employment in services started to rise in absolute terms as well. Despite rapid expansion, the shares of services in GDP and employment in the ACs were in 2001 still distinctly lower than in the EU where they reached 64.5% and 68% respectively. Notable exceptions are Cyprus and Malta, which have a relatively large services sector, due to tourism taking a key position in their economies. Services shares are particularly low in the second-round accession countries, Bulgaria and Romania. Moreover, in all ACs the gap vis-à-vis the EU is largest in the field of financial and other business services (marketing, consulting, auditing etc.).[14] With rising income levels and a sound development of the industrial sector, there is still a wide scope for the services sector to catch up well beyond accession. The services sector will thus remain the major provider of new employment.

3 Industrial competitiveness and 'catching-up' in the ACs

3.1 Introduction

Since the beginning of the transition, the ACs have gone through a dramatic process of systemic change and structural adjustment.

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[13] Urban (2001).

[14] For a more extensive analysis of the services sector development ACs, see Vidovic (2002).

Table 2

Size of ACs' manufacturing output and employment in an enlarged EU-25, year 2000

		EU-15	AC-8	AC-10	AC-8	AC-10	AC-8	AC-10	AC-8	AC-10	EU-15	AC-8	AC-10	AC-8	AC-10
		mn euro	mn euro		share in	share in	mn euro	mn euro	share in	share in				share in	
		ER	ER	ER	EU + AC-8	EU + AC-10	PPP99	PPP99	EU + AC-8	EU + AC-10		employment		EU-25	
		output	output	output	in %	in %			in %	in %		persons		in %	
DA	Food products; beverages and tobacco	677137	41986	49296	5.8	6.8	89747	112951	11.7	14.3	3628791	887349	1155462	18.5	24.2
DB	Textiles and textile products	191116	10508	12788	5.2	6.3	22573	29822	10.6	13.5	2019285	690964	1180370	21.6	36.9
DC	Leather and leather products	45213	1872	2372.6	4.0	5.0	3990	5543	8.1	10.9	460228	118463	222475	17.4	32.6
DD	Wood and wood products	95116	7254	8196	7.1	7.9	15269	18172	13.8	16.0	872053	263625	346724	21.6	28.4
DE	Pulp, paper & paper products; publishing & printing	378126	13010	14138	3.3	3.6	27822	31452	6.9	7.7	2354033	256553	316314	9.6	11.8
DF	Coke, refined petroleum products & nuclear fuel	297024	13676	18263	4.4	5.8	30431	45279	9.3	13.2	140882	49002	81417	22.0	36.6
DG	Chemicals, chemical products and man-made fibres	499193	15686	18683	3.0	3.6	33857	43435	6.4	8.0	1685692	231251	336794	11.4	16.7
DH	Rubber and plastic products	188730	9346	10056	4.7	5.1	20160	22425	9.7	10.6	1418223	221270	270350	13.1	16.0
DI	Other non-metallic mineral products	169585	11039	12423	6.1	6.8	23930	28335	12.4	14.3	1275748	311233	420658	18.3	24.8
DJ	Basic metals and fabricated metal products	550730	26618	32295	4.6	5.5	58512	76426	9.6	12.2	4067882	642635	860348	13.0	17.5
DK	Machinery and equipment n.e.c.	442313	13087	14768	2.9	3.2	28373	33841	6.0	7.1	3077852	503329	728462	13.2	19.1
DL	Electrical and optical equipment	594809	25018	26392	4.0	4.2	55238	59618	8.5	9.1	3310000	529201	640356	13.4	16.2
DM	Transport equipment	670849	27602	29103	4.0	4.2	61440	65987	8.4	9.0	2635429	358468	503467	11.4	16.0
DN	Manufacturing n.e.c.	143091	8420	9535.7	5.6	6.2	17805	21287	11.1	12.9	1433867	314166	436643	16.8	23.3
D	**Total manufacturing**	**4943033**	**225345**	**258533**	**4.4**	**5.0**	**489604**	**595031**	**9.0**	**10.7**	**28379964**	**5382289**	**7504620**	**15.0**	**20.9**

Note: Output (gross production) values in the year 2000 converted with current exchange rates (ER), resp. purchasing power parities for 1999 (PPP99) from Eurostat (2001).

Source: **wiiw** estimates based on national statistics, Eurostat and New Cronos (SBS).

The manufacturing sector of the ACs, compared to aggregate production in the EU, is relatively small. Taken together, production of all ten ACs (AC-10) – including Bulgaria and Romania, but without Cyprus and Malta – made up only about 5% of the total production in the enlarged EU-25 in the year 2000. However, in view of the still grossly undervalued currencies, the 'real' shares of ACs' manufacturing are higher – around 10% of the total EU-25 manufacturing, and in some industries such as wood products, non-metallic minerals, food & beverages and manufacturing n.e.c. (mainly furniture) even more than that – see Table 2. Industries which are particularly small in relation to the EU are, for instance, machinery and equipment n.e.c. and chemicals. As far as employment is concerned, ACs account for one fifth of EU-25 manufacturing jobs, with particularly high employment shares in the textiles, leather, wood, coke and refined petroleum industries (coke and refined petroleum is an important employer in Romania).

Large differences between production and employment shares point to the substantial productivity gaps between the ACs and the present EU member states. A crucial issue in the context of enlargement is whether (and how) these gaps will be reduced in future. Will ACs' production shares in an enlarged EU-25 increase or, rather, will their employment shares decline? What will be the speed of these adjustments? These and other questions will be addressed below.

3.2 Productivity catching-up and labour costs in ACs' manufacturing

Given the lack of comparable data for manufacturing employment in some ACs in the early 1990s, we will focus the analysis of manufacturing labour productivity on the period after 1995.[15] Between 1995 and 2002, manufacturing production in the AC-8 rose much faster (6.4% per annum) than in the EU (2.1% per annum; see Table 3). This translates into a growth differential in favour of the ACs of 4.3 percentage points per year, substantially higher than the growth differential for GDP during the same period (compare Section 1). On the other hand, manufacturing employment in the ACs declined strongly (-2.1% per annum) while it stayed more or less constant in the EU, resulting in a negative growth differential for the AC-8 vis-à-vis the EU of -2.1 percentage points per annum, again significantly higher than for total employment. As a result, ACs' productivity catching-up, already impressive at the GDP level, was even more pronounced in manufacturing: between 1995 and 2002, the cumulated productivity gain in manufacturing amounted to 79% for the AC-8 and 16.4% for the EU. The annual growth differential was 6.5 percentage points, by far exceeding the growth differential in terms of macro-productivity.

[15] No data for manufacturing production in real terms are available for Cyprus and Malta.

Table 3

Labour productivity catching-up of the ACs vis-à-vis the EU in manufacturing, 1995-2002

	Growth rate in %		ACs' growth differential Against EU in pp			growth rate in %	
	cumu-lated	annual average	cumu-lated	annual average		cumu-lated	annual average
AC-8[1)]					**EU-15**		
Production	54.0	6.4	38.6	4.3	Production	15.4	2.1
Employment	-14.0	-2.1	-11.9	-2.1	Employment	-0.9	0.0
Productivity	79.1	8.7	62.7	6.5	Productivity	16.4	2.2

Notes: Gross production and productivity in real terms.-1) Central and East European first-round accession countries, weighted average.

Sources: wiiw Database, incorporating national statistics, WIFO and wiiw calculations using AMECO

Figure 6 shows indexes of production and employment for individual ACs in the period 1995-2002 and indicates an impressive *productivity recovery* in most countries. Hungary even managed to slightly increase the number of manufacturing jobs, in the remaining ACs productivity gains were associated with further lay-offs of workers. Hungary's outstanding productivity performance in recent years thus resembles that of Ireland; Estonia, Poland and Slovakia outperform Austria, Denmark and Finland, which have been the best performers in terms of productivity growth among the present EU member states (Figure 7). In these ACs and, as will be shown below, in a few industrial branches, there has been a spectacular productivity catching-up. But in contrast to the EU where manufacturing employment has been stagnating, productivity catching-up in most ACs has been associated with considerable job losses. The new EU member states will require specific employment strategies (training, support of SMEs, regional policies, etc.) to stabilize employment levels in manufacturing (and to create new employment opportunities in other sectors) while simultaneously maintaining the recent pace of productivity improvements.[16] Otherwise there is a danger that the present labour market problems may further aggravate.

The ACs' productivity gaps for the whole economy discussed in Section 1 above are similar to those in the manufacturing industry – although their proper assessment poses considerable methodological and statistical problems (see BOX 1). Table 4 provides several alternative estimates of manufacturing labour productivity levels (compared to

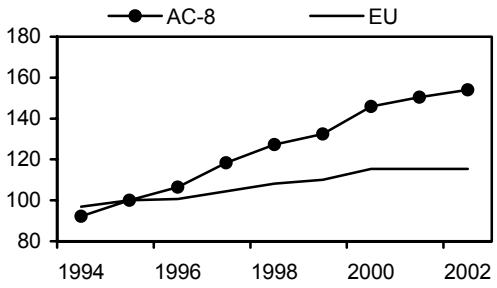
[16] See Celin (2003) for a more detailed discussion of employment strategies in the ACs.

Figure 5

Growth of manufacturing production, employment and labour productivity in the ACs and the EU

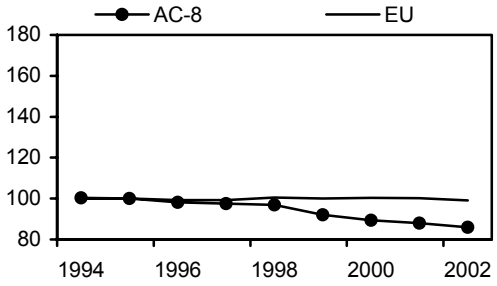
Manufacturing production

1995 = 100



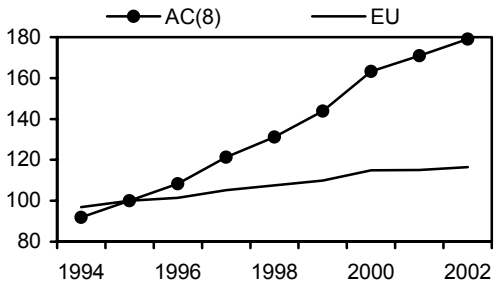
Manufacturing employment

1995 = 100



Labour productivity in manufacturing

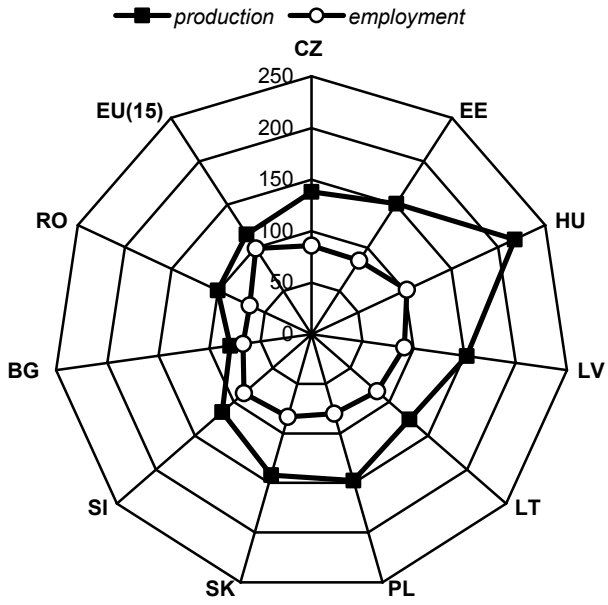
1995 = 100



Source: wiw Database, incorporating national statistics, WIFO and wiiw calculations using AMECO.

Figure 6

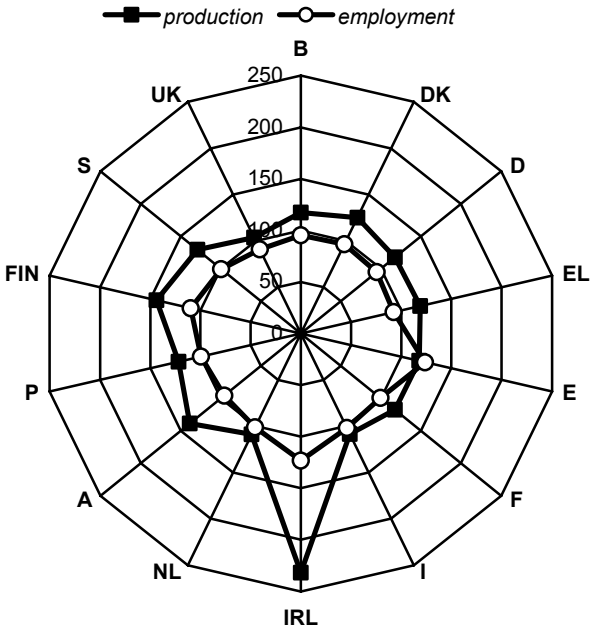
Manufacturing production, employment and labour productivity growth in ACs, 2002 (1995=100)



Source: Own calculations based on wiiw Industrial Database and AMECO.

Figure 7

Manufacturing production, employment and labour productivity growth in the EU, 2002 (1995=100)



Source: Own calculations based on AMECO.

EU-15 average) and their sectoral variation.[17] Hungary's productivity leadership in manufacturing (roughly half of the EU average productivity level) is confirmed, Slovenia's productivity (about the same as in the Czech Republic) is surprisingly low given its relatively high per capita income. There are large productivity gaps among individual ACs and also the sectoral variation of labour productivity is relatively high (such comparisons are of course affected by varying capital intensity of individual industries).

A comparison of labour productivity changes across individual industries displays a quite clear pattern: The most obvious 'productivity winner' in the 1995-2001 period was the electrical & optical equipment industry, performing much above average in all ACs, followed by the transport equipment industry and manufacturing n.e.c. (mainly furniture – see Table 5). In the Baltic states, non-metallic mineral products and basic metals are clear productivity winners as well. Typical 'productivity losers' are the food & beverages industry, textiles & textile products, leather & leather products, wood & wood products, paper & printing, coke & petroleum products and chemicals. In general, we find certain evidence that technologically more sophisticated industries have strongly improved their productivity performance, while traditional sectors using standard techniques and low skilled labour have been falling behind. Note that these productivity growth patterns already point towards our initial (Gerschenkron) hypothesis that specialization patterns of catching-up economies may get directed towards the medium-/higher-tech branches (as was the case especially in Hungary) where initially the gap might have been the largest. This depends on the existence (or mobilization) and utilization of 'capabilities' (to use Abramovitz' terms) to facilitate such differential catching-up. This was apparently not the case in Bulgaria and Romania and the experience in this respect was also quite differentiated amongst the other more advanced ACs.

Not only productivity matters for competitiveness but also labour costs play their role in shaping relative cost structures and hence the competitive position of different industries. Survey results show that average monthly labour costs in ACs' manufacturing amounted to just 14% of EU average in the year 2000 (Eurostat, 2003b). In Slovenia, the average monthly labour costs in manufacturing (gross wages, including indirect labour costs, converted at current exchange rates) reached just one third of EU average. In Poland,

[17] Productivity is defined as gross production per employee. For a cross-country comparison, data in national currencies were converted with purchasing power parities (PPPs). PPPs were adopted from the ECP 1999 – see Eurostat (2001). The first data set presented in Table 4 (PPP99 for GDP) results from national productivity figures converted with 1999 purchasing power parities for the whole GDP. This conversion leads to higher productivity estimates for the ACs. The second data set uses as a conversion factor partial PPPs for gross fixed capital formation (PPPCAP99) where the price levels in the ACs are relatively high (presumably due to imports of machinery and equipment). This conversion thus leads to lower productivity estimates for the ACs. Given the close correspondence of the latter productivity estimates to the theoretically superior UVR-based productivity data (see BOX 1) for the Czech Republic, Hungary and Poland (UVRs are not available for other ACs), and assuming that a similar correspondence between UVR and PPPCAP99 exists for other ACs as well, one can assume that productivity levels expressed at PPPCAP99 are probably closer to reality – at least for manufacturing industry as a whole.

ranking second, it reached only 22%, and at the low end, labour costs in Bulgaria and Romania hovered at around 5% to 7% of EU average (see Table 6). Labour cost differences *among* individual industries are substantial (but there are only small differences in (relative) indirect labour costs). Differences in labour costs *across* industries in the ACs are generally low (except Hungary, Bulgaria and Romania), and lower than in the EU. Wage levels are positively correlated with the varying sectoral productivity performance as branches with better productivity performance can afford to pay higher wages (but productivity dispersion in the ACs is much higher than wage dispersion – see the standard deviations given in Tables 4 and 6). Generally, ACs' labour costs (wages) have been growing rather fast recently, in the last couple of years pushed up by currency appreciations. Notably, nominal (EUR-based) wages in all ACs (except Slovenia) rose faster than in the EU during 1995-2001 (here the annual growth of wages was less than

BOX 1

Manufacturing labour productivity in international comparison

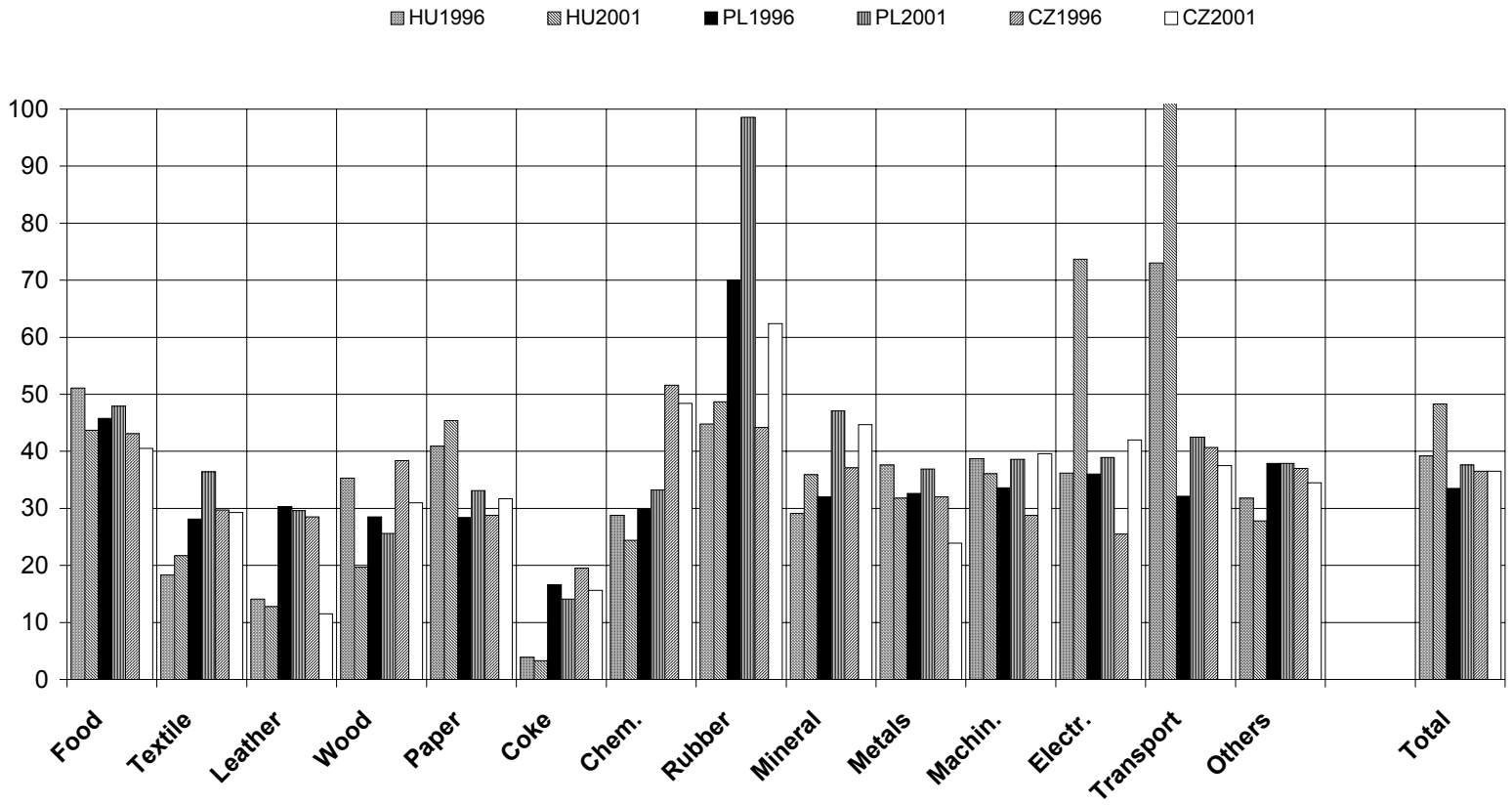
International productivity level comparisons are hampered by the conversion of the national output data to a common currency. The use of market exchange rates is not appropriate for this purpose (especially for ACs, mainly due to their still grossly undervalued currencies and widely fluctuating exchange rates). Alternative proxy converters are either purchasing power parities (PPPs), or – much better – branch-specific unit value ratios (UVR) which compare prices of representative products. UVR estimates (for the year 1996) are available only for the Czech Republic, Hungary and Poland relative to Germany from a recent research project jointly conducted by the wiiw and the University of Groningen.[18] The estimated Hungarian manufacturing industry labour productivity was slightly less than 40% of the German level in 1996, the respective Czech-German productivity relation was 35%, the Polish-German productivity relation was 25%, all with fairly large sectoral differences. Figure 8 shows productivity comparisons with Austria for the year 2001, after extrapolation from the above quoted 1996 UVR-based benchmarks with country and branch-specific rates of productivity growth.

Hungarian manufacturing productivity reached close to half of Austrian level by the year 2001 and there was a closure of productivity gap by nearly 10 percentage points since 1996. In Poland, the closure of the gap was negligible, and there was no productivity catching-up in Czech manufacturing relative to Austria during this period. A closer look at the performance of individual branches shows that relatively smaller productivity gaps (and impressive productivity catching-up) were observed especially in manufacturing of rubber and plastics, electrical and optical equipment and transport equipment, but virtually no catching-up occurred in other branches. Hungary's labour productivity in transport equipment industry was apparently higher than in Austria. On the other hand, productivity gaps in food & beverages, leather, wood products as well as in manufacturing n.e.c. (mainly furniture) were especially large in all three ACs, and in some cases these gaps have even widened since 1996.

[18] See Monnikhof and van Ark (2002).

Figure 8

Manufacturing labour productivity (UVR-based), years 1996 and 2001 (Austria = 100)



Source: wiiw Database, own estimates based on Monnikhof and van Ark (2002).

Table 4

Labour productivity levels in the manufacturing industry, year 2001

		Czech Republic	Estonia 2000	Hungary	Latvia	Lithuania 2000	Poland	Slovak Republic	Slovenia	Bulgaria	Romania
	Manufacturing total, productivity in EUR (at PPP99 for GDP)	102043	51974	124238	42657	50402	84403	108235	82728	50842	47171
	EU 2000 = 100	58.6	29.8	71.3	24.5	28.9	48.5	62.1	47.5	29.2	27.1
	Manufacturing total, productivity in EUR (at PPPCAP99)	70763	30361	83372	25964	28677	63032	63513	70327	32449	33576
	EU 2000 = 100	40.6	17.4	47.9	14.9	16.5	36.2	36.5	40.4	18.6	19.3
	Manufacturing total, productivity in EUR (at exchange rates)	40812	22464	52668	18350	19519	38427	36234	54081	12542	11365
	EU 2000 = 100	23.4	12.9	30.2	10.5	11.2	22.1	20.8	31.1	7.2	6.5
	Manufacturing total = 100										
DA	Food products; beverages and tobacco	132.4	129.1	88.2	126.4 [1)]	113.6 [1)]	118.4	105.5	159.7	133.0	214.7
DB	Textiles and textile products	48.0	64.8	25.5	54.1	68.7	36.9	24.9	48.5	32.6	34.9
DC	Leather and leather products	30.3	67.5	20.4	39.3	96.8	44.0	30.6	44.6	33.7	28.9
DD	Wood and wood products	106.3	113.4	40.9	101.1	69.7	78.0	52.9	54.4	82.7	79.4
DE	Pulp, paper & paper products; publishing & printing	116.0	141.7	96.2	105.3	98.3	128.1	135.2	103.1	95.4	142.6
DF	Coke, refined petroleum products & nuclear fuel	1103.4	.	244.6	.	691.8	614.3	598.7	30.8	840.6	751.4
DG	Chemicals, chemical products and man-made fibres	166.3	163.6	130.0	95.7	273.5	157.9	128.8	211.4	183.0	180.3
DH	Rubber and plastic products	104.2	107.1	84.6	160.1	147.1	105.9	111.0	90.2	76.8	118.1
DI	Other non-metallic mineral products	90.2	128.7	68.4	129.2	67.9	87.4	72.4	87.9	119.9	77.9
DJ	Basic metals and fabricated metal products	88.2	89.4	76.7	78.9 [2)]	67.8	98.7	106.3	79.4	132.0	165.2
DK	Machinery and equipment n.e.c.	75.7	79.0	57.7	73.9	44.8	67.2	63.6	114.0	63.9	68.2
DL	Electrical and optical equipment	80.1	80.1	163.3	113.1 [3)]	109.4	113.5	69.4	80.0	78.8	69.9
DM	Manufacture of transport equipment	159.4	112.9	279.5	71.0	85.2	135.3	295.6	237.3	58.5	70.6
DN	Manufacturing n.e.c.	71.6	66.8 [4)]	37.1	78.1	60.8	69.4	76.6	86.0	47.2	52.6
	Standard deviation	261.6	30.4	76.1	42.9	161.7	137.7	143.8	59.1	198.2	176.3

Notes: 1) Without ISIC 16: Tobacco products. - 2) Without ISIC 27: Basic metals. - 3) Without ISIC 30: Office, accounting and computing machinery and ISIC 33: Medical, precision and optical instruments, watches and clocks. - 4) DF+DN. - PPP99 for GDP and PPPCAP99 are purchasing power parities from Eurostat (2001) – see footnote 9.

Sources: wiiw estimates based on national statistics, OECD, EUROSTAT and UNIDO.

Table 5

Relative productivity gains, winner and loser branches, 1995-2001

(average annual change in % for total manufacturing (D) and relative annual gains DA to DN, in percentage points) [1)]

		Czech Republic	Estonia [2)]	Hungary	Latvia	Lithuania [2)]	Poland	Slovak Republic	Slovenia	Bulgaria	Romania
D	**Manufacturing total**	**7.2**	**10.6**	**12.7**	**7.5**	**6.4**	**9.6**	**8.2**	**3.6**	**2.2**	**5.4**
DA	Food products; beverages and tobacco	-3.9	-7.2	-8.8	-4.8	-4.3	-3.6	-4.1	-0.6	-2.0	6.7
DB	Textiles and textile products	-4.9	2.8	-6.5	0.5	-2.3	-1.4	-8.6	0.2	-0.6	-5.1
DC	Leather and leather products	-16.1	3.7	-9.1	-2.1	9.8	-2.6	0.3	-6.0	-2.0	-2.8
DD	Wood and wood products	-1.8	15.4	-8.0	-2.0	0.1	-1.7	-2.9	-8.6	6.1	-4.2
DE	Pulp, paper & paper products; publishing & printing	-1.7	0.8	-0.8	-0.6	-5.2	-1.2	3.6	-7.0	-4.9	-8.2
DF	Coke, refined petroleum products & nuclear fuel	-2.6	.	-7.9	.	-12.2	-4.7	-4.0	.	-1.5	0.5
DG	Chemicals, chemical products and man-made fibres	0.4	4.8	-9.5	-4.2	11.2	-0.8	-2.2	2.3	1.3	-3.6
DH	Rubber and plastic products	1.4	-2.6	-7.4	10.2	0.0	-0.2	-2.9	-2.0	-2.2	-7.6
DI	Other non-metallic mineral products	-0.4	4.6	-5.0	11.2	1.3	1.0	-2.4	1.6	5.3	1.1
DJ	Basic metals and fabricated metal products	-6.8	4.1	-6.1	3.3	-3.2	-1.7	-6.7	-2.1	2.8	-0.8
DK	Machinery and equipment n.e.c.	5.4	3.7	-6.9	-5.3	-2.7	0.7	-0.2	-1.5	3.3	4.6
DL	Electrical and optical equipment	13.3	7.0	18.7	18.1	24.0	4.4	2.7	3.3	7.4	-0.8
DM	Transport equipment	2.8	5.6	6.7	-0.2	13.3	6.3	18.8	6.5	-3.2	6.0
DN	Manufacturing n.e.c.	1.2	1.2	-5.3	1.0	-4.2	-0.6	0.8	3.1	7.2	6.3

Notes: 1) Calculations of relative gains: DA (1995-2001) - D (1995-2001) = relative gain DA. - 2) 1995-2000.

Sources: wiiw estimates based on national statistics, own calculations.

Table 6

Labour costs in the manufacturing industry (monthly averages), year 2001; growth rates 1995-2001 in %

		Czech Republic	Estonia [1]	Hungary	Latvia [1]	Lithuania [1]	Poland	Slovak Republic	Slovenia	Bulgaria	Romania
			2000			2000					
	Manufacturing total (in EUR, at exchange rate)	581.0	305.0	672.6	263.0	235.3	728.9	445.8	1116.7	167.1	222.0
	EU 2000=100	17.7	9.3	20.5	8.0	7.2	22.2	13.6	34.0	5.1	6.8
	Manufacturing total (in EUR, at PPP99 for GDP)	1317.6	654.1	1404.5	543.1	527.5	1297.0	1215.0	1731.2	621.8	634.8
	EU 2000=100	40.1	19.9	42.8	16.5	16.1	39.5	37.0	52.7	18.9	19.3
	Average growth rate (EUR based) 1995-2001	10.3	13.3 [2]	7.9	11.8	20.9 [2]	15.4	9.0	3.3	8.1 [3]	8.0
	Average growth rate (national currency based) 1995-2001	10.2	14.5 [2]	16.5	8.2	13.1 [2]	18.5	11.2	9.5	72.1 [3]	58.3
	Average growth rate 1995-2001 (real, CPI)	3.5	4.4 [2]	2.1	1.9	5.0 [2]	6.3	2.9	1.1	-2.0 [3]	-0.4
D	Manufacturing total (2001) =100										
DA	Food products; beverages and tobacco	96.3	100.3	97.5	104.1 [4]	97.1 [4]	93.9	91.6	109.9	100.2	87.6
DB	Textiles and textile products	69.8	80.8	59.7	90.5	88.3	63.1	65.9	74.8	69.8	66.4
DC	Leather and leather products	64.2	79.8	59.3	68.2	80.7	64.9	68.5	78.0	65.4	64.5
DD	Wood and wood products	77.9	100.2	63.0	87.2	65.8	72.3	74.6	83.6	71.3	62.8
DE	Pulp, paper & paper products; publishing & printing	115.4	164.7	109.4	142.5	136.3	127.8	118.3	118.3	107.2	129.7
DF	Coke, refined petroleum products & nuclear fuel	154.7	103.0 [5]	231.4	.	.	202.2	165.5	108.7	246.6	233.0
DG	Chemicals, chemical products and man-made fibres	123.8	.	159.9	123.0	172.3	149.6	117.9	159.6	144.4	163.8
DH	Rubber and plastic products	102.2	99.3	102.6	79.7	96.5	97.2	114.7	101.4	87.9	106.3
DI	Other non-metallic mineral products	106.0	134.9	105.3	100.7	102.7	104.1	107.6	100.0	119.7	103.1
DJ	Basic metals and fabricated metal products	105.0	115.8	89.5	92.6 [6]	96.1	106.8	119.9	98.9	131.1	133.6
DK	Machinery and equipment n.e.c.	105.4	104.2	100.2	94.6	105.4	107.7	99.4	97.2	108.4	118.7
DL	Electrical and optical equipment	99.6	113.2	106.6	100.4 [7]	132.0	119.6	92.3	101.4	102.1	121.8
DM	Transport equipment	121.2	121.2	129.3	106.6	150.0	121.2	127.3	110.2	110.7	130.1
DN	Manufacturing n.e.c.	83.7	91.9	66.0	87.3	85.8	77.0	85.0	85.0	69.9	71.3
	Standard deviation	22.8	21.9	44.2	18.1	29.2	35.6	25.8	20.2	44.5	44.4

Notes: 1) Calculated with gross wages. - 2) 1996-2001. - 3) 1995-2000. - 4) Without ISIC 16: Tobacco products. - 5) DF+DG. - 6) Without ISIC 27: Basic metals. - 7) Without ISIC 30: Office, accounting and computing machinery and ISIC 33: Medical, precision and optical instruments, watches and clocks.

Sources: wiiw estimates based on national statistics and Eurostat (2003b).

4% in this period). Although this can be considered a positive sign with regard to cohesion and catching-up, the rapid wage increases are putting a strain on the ACs' international cost competitiveness – unless these are compensated by a corresponding rise in productivity and other efficiency improvements.[19]

With respect to labour costs one can observe the following pattern: First, the gaps are much more even across sectors than was the case with productivity. Second, and this is a very important point for the comparative cost dynamics, the growth (or closure) rates for wage rates (gaps) were much more similar across sectors than it was the case for the (differential) productivity increases. Last but not least, labour cost gaps (relative to the EU) are much bigger than gaps in productivity implying low unit labour costs in the ACs (see below).

The relative movements of labour costs (wage rates) and productivity determine the evolution of unit labour costs (ULCs). Over the period 1995-2001, manufacturing ULCs (see BOX 2 for definition) increased in nearly all ACs. The only exceptions are Hungary, where ULCs in manufacturing declined at an average annual rate of 7.8% during this period (cost competitiveness improved), and Romania, were ULCs stayed at the same level (Table 7). When analysing the factors (components) behind the changes of ULCs, Figure 9 in BOX 2 show that wage increases (in national currency units, NCU) were the major factor driving ULC changes in most ACs, at least until about 1998. Only occasionally were wage increases 'neutralized' by strong currency depreciations – for instance in Hungary and in Slovakia (1995-1998). In the last couple of years, wage increases in local currency were modest in most ACs, but currency *appreciation* has pushed up wage costs in euro. The effect of productivity gains as a counterbalance to rising wage costs has gained in importance over the years (with the exception of 2001 when the world-wide recession hit also the manufacturing sector in the ACs). The analysis of factors behind ULC changes thus points to considerable cost pressures that come from currency appreciation rather than from nominal wage increases; these cost pressures had been only partly compensated by corresponding productivity gains.

Sectoral differences of ULC changes are determined mainly by varying dynamics of labour productivity (as already mentioned, changes in wage rates differ much less across industries; the exchange rate movements are, of course, the same for all industries in one country). Therefore, we may expect that the industries we have identified above as 'productivity winners' will show either a lower increase *or* a faster decline of ULCs than total manufacturing, i.e. a better than average cost competitive performance. 'Productivity loser'

[19] At the same time, CPI-deflated real labour costs increased only moderately in most ACs, except in Bulgaria and Romania which report real wage declines during this period – see Table 6.

Table 7

Relative changes in unit labour costs, 1995-2001

(average annual change in % for total manufacturing (D) and relative gains DA to DN, in percentage points) [1)]

		Czech Republic	Estonia[2)]	Hungary	Latvia	Lithuania[3)]	Poland	Slovak Republic	Slovenia	Bulgaria	Romania
D	**Manufacturing total**	**3.9**	**2.5**	**-1.2**	**3.9**	**14.1**	**2.6**	**0.8**	**1.9**	**7.6**	**1.7**
DA	Food products; beverages and tobacco	3.0	2.8	6.2	1.8	2.0	3.3	2.9	-1.6	1.2	-7.8
DB	Textiles and textile products	3.1	-2.3	2.5	0.2	2.1	-1.4	7.3	-1.5	3.3	2.8
DC	Leather and leather products	11.4	-4.7	6.2	1.6	-10.7	0.3	-0.9	6.0	4.1	2.0
DD	Wood and wood products	-2.2	-10.0	3.3	3.5	0.8	-0.6	0.0	7.8	-7.0	-3.8
DE	Pulp, paper & paper products; publishing & printing	1.1	4.5	-2.1	3.4	1.3	1.7	-2.6	7.4	6.4	14.7
DF	Coke, refined petroleum products & nuclear fuel	1.2	.	7.7	.	.	3.4	3.2	.	3.8	6.8
DG	Chemicals, chemical products and man-made fibres	-0.4	.	8.7	6.3	-10.6	2.5	2.2	-1.4	-0.3	4.3
DH	Rubber and plastic products	-1.4	0.0	5.8	-11.7	2.9	-1.9	2.7	0.3	-3.8	3.7
DI	Other non-metallic mineral products	0.3	1.2	3.4	-6.0	-0.9	-0.8	2.5	-2.0	-4.8	0.3
DJ	Basic metals and fabricated metal products	4.5	-2.5	2.7	-1.6	2.5	0.0	5.3	1.9	-3.2	1.6
DK	Machinery and equipment n.e.c.	-5.8	-1.8	4.7	5.8	4.0	-0.1	-0.1	1.4	-4.5	-5.0
DL	Electrical and optical equipment	-11.1	-3.1	-11.9	-13.8	-5.9	-2.7	-2.9	-3.5	-6.5	1.1
DM	Transport equipment	-0.3	-4.9	-5.4	2.5	-8.0	-4.5	-12.0	-5.2	-3.3	-5.3
DN	Manufacturing n.e.c.	-2.7	n.a.	3.5	.	3.0	-0.8	-0.3	-3.7	-9.5	-8.5

Notes: 1) Calculation of relative gains: DA (1995-2001) minus D (1995-2001) = relative change DA. Positive values indicate weaker, negative values better competitive (cost) performance than total manufacturing (D). - 2) 1995-2000. - 3) 1996-2001.

Sources: wiiw estimates based on national statistics.

BOX 2

Decomposition of Unit Labour Costs (ULCs)

Unit labour costs (ULC) are defined as labour costs per unit of gross manufacturing output (OUT). Labour costs are average gross wages plus indirect wage costs per person (W) multiplied by the number of persons employed (EMP).

$$ULC = (W * EMP) / OUT$$

Labour productivity (LP) is defined as output per employed person:

$$LP = OUT / EMP$$

Changes in labour productivity (dLP) can be approximated as:

$$dLP = dOUT – dEMP$$

Thus, unit labour costs may be rewritten:

$$ULC = W / (OUT / EMP) = W / LP$$

Accordingly, any change in unit labour costs (dULC) can be decomposed in the following way:

$$dULC = dW – dLP = dW – dOUT + dEMP$$

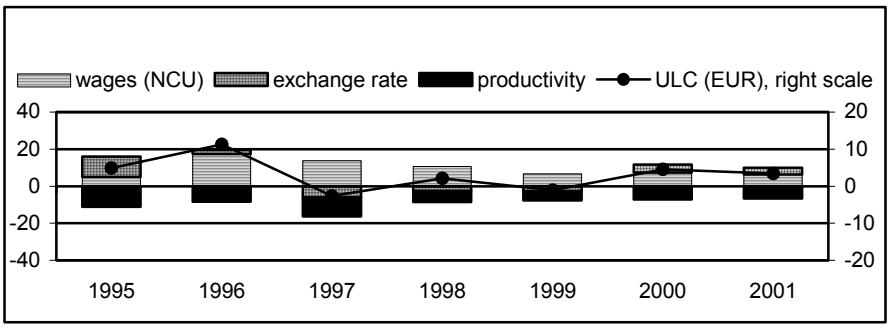
ULCs will rise (cost competitiveness decline) when the labour cost increase is higher than the increase in productivity and vice versa. Productivity changes are determined by the relative growth of output and employment: For instance, LP will increase if output growth is faster than employment growth. At given labour costs, this will lower ULC and increase the cost competitiveness of a respective industry.

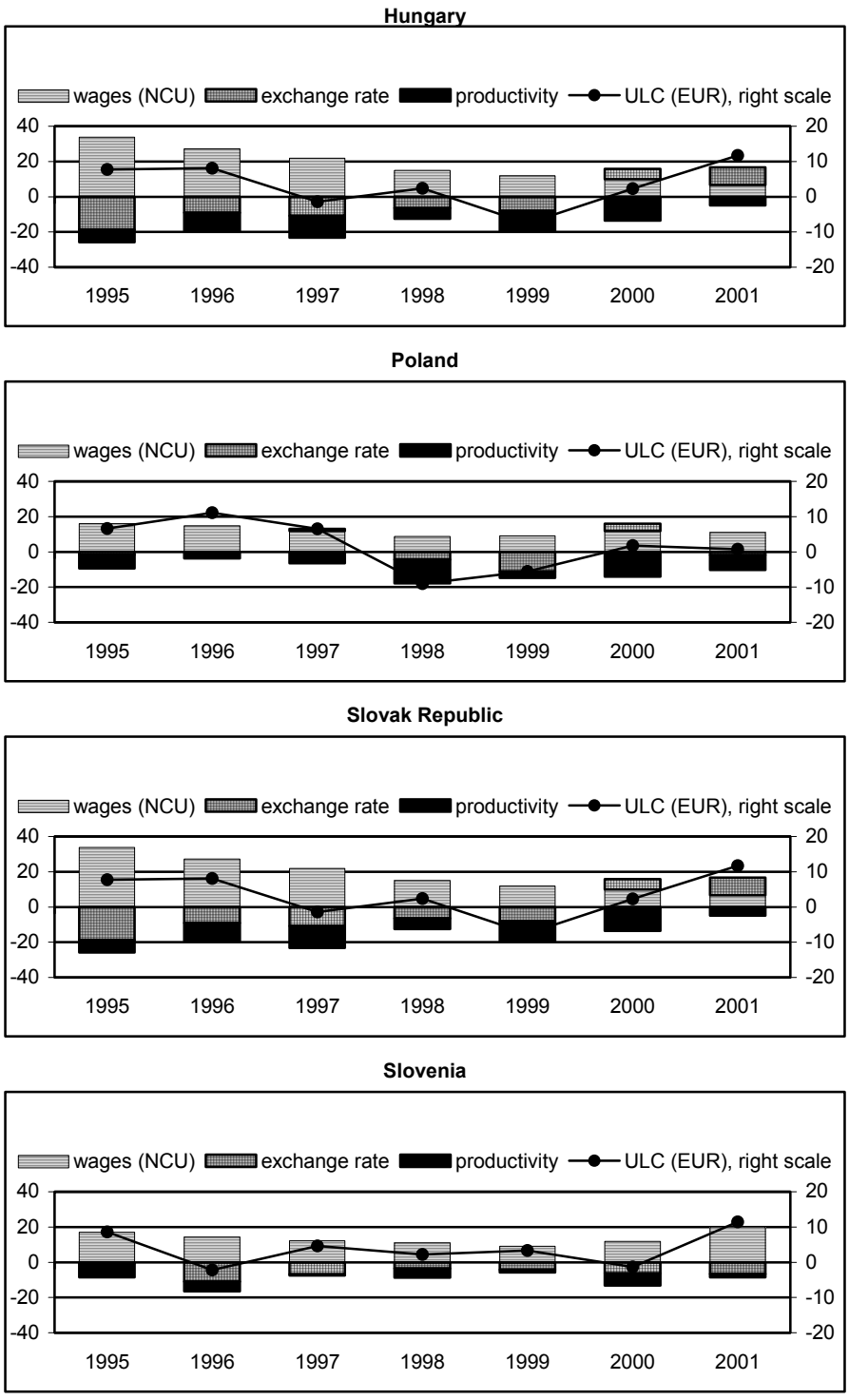
For cross-country comparisons, labour costs in national currency are converted in EUR (at current exchange rates) and thus variations of the exchange rate will have an impact on manufacturing ULC as well. (Currency appreciation will push up wages in all industries in EUR and thus ULC as well, currency depreciation will lower wages in EUR and thus reduce ULC of the respective country).

Figure 9

Manufacturing industry ULCs: annual changes in % and contribution of its components in selected ACs

Czech Republic





Source: wiiw estimates based on national statistics.

branches, on the other hand, will probably show either a stronger increase *or* a smaller decline of ULCs than manufacturing average, pointing to a weaker competitive cost performance. This is confirmed in Table 7 where relative ULC changes in individual industries (relative to total manufacturing over the period 1995-2001) indicate a better than

average competitive performance for 'productivity winners' identified above. These are usually the technologically more sophisticated industries such as electrical & optical equipment, the transport equipment industry, but also manufacturing n.e.c. (furniture). Industries signalling a weaker competitive performance in most ACs are mainly the 'productivity losers': the food & beverages industry, textiles, leather & leather products, wood products, paper & printing, coke & petroleum products and chemicals.[20]

Cross-country comparisons of ULCs levels are hampered by the same problems as the above discussed productivity comparisons. Tables 8a and 8b provide two sets of data based on alternative productivity estimates (PPPCAP99-based ULC estimates in Table 8b are closer to reality for reasons discussed above) relative to Austria.[21] Even the upper boundary of ULCs indicates *considerable competitive (cost) advantage* of ACs' manufacturing. The lowest ULCs were in Hungary and in the Slovak Republic, due to their comparatively high labour productivity, and in Bulgaria and Romania, because of their extremely low wages. The Baltic states show a combination of both, relatively low wages and low productivity, while the Czech Republic and Poland are characterized by both relatively high wages and high productivity. Sectoral ULCs' variations are considerable again (and estimates are less reliable); in some branches (leather products in the Czech Republic, Hungary and Slovenia, wood products in Slovenia, etc.) there is no comparative cost advantage any more.

In the first years of accession, the increasing pressures to sustain stable exchange rates with the Euro in preparation to EMU membership might lead to a deterioration in cost competitiveness of the accession countries. The degrees to which productivity developments and wage moderation might compensate these tendencies will differ across different ACs, just as we saw that productivity trajectories have already been different and the productivity-wage dynamic has also proceeded in different ways across economies and in different time periods. Nonetheless, we expect those accession countries which attempt to join the EMU rather quickly to face a hard task to avoid a deterioration in competitiveness in the short run.

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[20] Needless to say, we use here only labour productivity. Different rates of capital accumulation could account for some of the difference (see also Section 3.3 below).

[21] Because of delayed data for many EU countries and problems of consistency especially at the level of individual industries, we use here Austria as a reference country.

Table 8a

International comparison of ULCs in manufacturing industry, year 2001
PPP99 for GDP, Austria 2001 = 100

		Czech Republic	Estonia [1] 2000	Hungary	Latvia [1]	Lithuania [1] 2000	Poland	Slovak Republic	Slovenia	Bulgaria	Romania
D	**Manufacturing total**	**27.9**	**40.0**	**26.3**	**42.1**	**31.9**	**42.0**	**20.0**	**65.6**	**16.0**	**22.7**
DA	Food products; beverages and tobacco	23.7	37.3	33.8	41.5	34.3	38.7	20.1	52.5	14.0	11.6
DB	Textiles and textile products	31.0	38.0	47.7	53.5	31.7	55.6	40.8	78.3	26.5	34.4
DC	Leather and leather products	74.1	58.0	95.8	89.4	34.8	77.5	55.0	143.5	38.8	64.5
DD	Wood and wood products	23.4	38.8	45.5	39.7	36.2	43.6	32.1	113.0	15.4	20.1
DE	Pulp, paper & paper products; publishing & printing	27.2	45.4	29.5	55.6	39.7	41.4	17.3	74.3	17.7	19.8
DF	Coke, refined petroleum products & nuclear fuel	21.2	.	135.3	.		75.1	30.1	.	25.5	40.5
DG	Chemicals, chemical products and man-made fibres	25.6	.	40.2	68.7	25.2	49.4	22.7	61.5	15.6	24.1
DH	Rubber and plastic products	22.4	30.7	25.8	17.4	17.7	31.2	17.2	59.7	14.8	17.3
DI	Other non-metallic mineral products	24.6	31.5	30.3	24.6	38.2	37.5	22.0	55.9	11.9	23.9
DJ	Basic metals and fabricated metal products	28.6	43.5	26.3	41.4	36.2	38.9	19.3	70.1	13.6	16.3
DK	Machinery and equipment n.e.c.	32.7	44.2	39.1	45.1	63.1	57.6	26.5	47.9	23.2	32.6
DL	Electrical and optical equipment	31.8	51.5	15.7	33.9	33.9	40.4	24.1	76.0	18.9	35.0
DM	Transport equipment	29.7	59.8	17.2	87.8	82.1	53.2	12.4	43.0	42.7	59.2
DN	Manufacturing n.e.c.	25.4	.	37.3	37.0	37.2	37.1	18.2	51.6	18.8	26.0

Notes: PPP99 for GDP are purchasing power parities from Eurostat (2001). - 1) Labour costs approximated with gross wages.

Sources: wiiw estimates based on national statistics and Eurostat.

Table 8b

International comparison of ULCs in manufacturing industry, year 2001
PPPCAP99, Austria 2001 = 100

		Czech Republic	Estonia [1] 2000	Hungary	Latvia [1]	Lithuania [1] 2000	Poland	Slovak Republic	Slovenia	Bulgaria	Romania
D	**Manufacturing total**	**38.5**	**65.6**	**37.5**	**66.2**	**53.6**	**53.8**	**32.6**	**73.9**	**24.0**	**30.5**
DA	Food products; beverages and tobacco	32.7	61.1	48.2	65.3	57.7	49.6	32.8	59.1	21.0	15.5
DB	Textiles and textile products	42.8	62.2	68.1	84.2	53.4	71.2	66.6	88.2	39.7	46.3
DC	Leather and leather products	102.3	95.0	136.8	140.7	58.5	99.3	89.8	161.6	58.2	86.7
DD	Wood and wood products	32.3	63.6	64.9	62.5	61.0	55.9	52.4	127.3	23.1	27.0
DE	Pulp, paper & paper products; publishing & printing	37.6	74.5	42.2	87.5	66.9	53.0	28.2	83.7	26.6	26.7
DF	Coke, refined petroleum products & nuclear fuel	29.2	.	193.0	.	.	96.3	49.1	.	38.2	54.5
DG	Chemicals, chemical products and man-made fibres	35.3	.	57.3	108.1	42.5	63.3	37.0	69.3	23.5	32.4
DH	Rubber and plastic products	30.9	50.4	36.8	27.3	29.8	40.0	28.0	67.2	22.2	23.3
DI	Other non-metallic mineral products	34.0	51.7	43.3	38.8	64.3	48.0	36.0	62.9	17.9	32.1
DJ	Basic metals and fabricated metal products	39.5	71.4	37.5	65.2	60.9	49.9	31.5	79.0	20.4	21.9
DK	Machinery and equipment n.e.c.	45.1	72.5	55.8	71.0	106.3	73.8	43.3	54.0	34.8	43.9
DL	Electrical and optical equipment	43.9	84.4	22.4	53.4	57.1	51.8	39.3	85.6	28.4	47.1
DM	Transport equipment	41.0	98.0	24.5	138.1	138.2	68.2	20.2	48.5	64.0	79.6
DN	Manufacturing n.e.c.	35.1	.	53.3	58.3	62.6	47.6	29.6	58.2	28.3	35.0

Notes: PPPCAP 99 are purchasing power parities from Eurostat (2001). - 1) Labour costs approximated with gross wages.

Sources: wiiw estimates based on national statistics and Eurostat.

3.3 Foreign direct investment and ACs' manufacturing

Foreign direct investment (FDI) plays an important role in restructuring and competitiveness. In bringing resources such as additional capital, technology and managerial know-how, as well as access to markets, FDI helps to raise productivity and expand exports. In countries without a strong national innovation system and exports coming mainly from national enterprises (as used to be the case in ACs), the question is how to cope with the pace of technical change and make inroads into markets held by more advanced countries (that is, to catch-up). When the evolution of dynamic comparative advantage is supported by FDI there is a problem of sustainability and upgrading, especially as wages rise and cheaper competitors appear (risk of relocation). Furthermore, the question of spillovers between foreign-owned and domestic sectors is an important one in order to avoid that isolated pockets of advancement develop with the help of FDI while the rest of the economy falls behind.

FDI has been one of the driving forces of restructuring in ACs. These countries have inherited from the past a largely obsolete capital stock that often turned out to be non-viable in the conditions of a market economy.[22] And, contrary to a frequently held opinion, there is some evidence that they may lag behind advanced market economies also in terms of the quality of their workforce.[23] The modernization of existing assets and the training of human resources require extensive efforts and large financial resources that are generally scarce. That is why foreign investment, especially FDI, has been seen to play a prominent role in upgrading both human and physical capital stocks. However, the evidence for direct links between FDI penetration and growth, restructuring and/or productivity spillovers in transition economies is mixed, partly also due to the scarcity of reliable FDI data.[24]

Manufacturing industry has been an important target of FDI in the ACs, attracting about 40% of all inward FDI stock as of end-2001 (except for the Baltic states where the shares were lower). FDI penetration (manufacturing FDI stocks in per cent of GDP) is highest in the Czech Republic, Poland, Estonia and Slovakia. Detailed FDI data by manufacturing branches (available only for eight ACs and not fully comparable – see Table 9) show a highly uneven branch distribution, reflecting not only the varying attractiveness of individual sectors for foreign investors and their investment motives, but also the different privatization policies pursued by individual countries. FDI inflows have been high in both domestically oriented industries such as food & beverages (important in all countries

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[22] Due to valuation and other conceptual and statistical problems there are no reliable data on ACs' capital stocks.

[23] Despite achievements in formal education, the skills – especially at the level of managerial and other skilled employment – required in a market economy are deficient; see EBRD (2000).

[24] See UN ECE (2001), Havlik (2003a) and Table 9 for FDI data coverage.

Table 9

Foreign direct investment stocks in manufacturing industry, end-2001, in % of total manufacturing FDI

NACE code	Activities	Czech Republic	Estonia	Hungary	Latvia	Lithuania	Poland	Slovak Republic	Slovenia
			2000	2000		2000			
DA	Food products; beverages and tobacco	11.8	22.5	24.2	28.7	40.1	25.2	13.9	5.2
DB	Textiles and textile products	3.4	13.8	3.8	12.3	16.2	1.1	1.2	2.6
DC	Leather and leather products	0.1	.	0.6	0.5	0.0	0.1	0.8	.
DD	Wood and wood products	1.5	16.4	1.1	16.1	4.9	5.9	1.0	0.4
DE	Pulp, paper & paper products, publishing & printing	7.2	.	4.2	4.9	3.8	7.2	5.5	16.9
DF	Coke, refined petroleum products & nuclear fuel	2.3	1.0	8.2	0.0	6.4	.	7.5	.
DG	Chemicals, chemical products and man-made fibres	6.2	8.7	5.5	9.5	.	6.0	6.9	16.4
DH	Rubber and plastic products	6.2	1.1	4.7	3.2	4.0	2.8	1.7	10.9
DI	Other non-metallic mineral products	14.1	.	6.2	6.3	5.6	14.0	5.0	6.6
DJ	Basic metals and fabricated metal products	9.1	3.9	6.1	7.9	1.7	2.0	41.2	8.2
DK	Machinery and equipment n.e.c.	4.2	3.3	5.3	6.3	1.1	1.2	4.1	12.3
DL	Electrical and optical equipment	13.9	2.9	19.5	1.8	7.9	7.7	4.8	10.3
DM	Transport equipment	19.0	6.9	9.6	0.4	7.2	24.7	5.7	9.7
DN	Manufacturing n.e.c.	1.0	.	1.0	2.3	1.2	2.2	0.7	0.4
	Other non-classified industries	.	19.5	.	.	.	.	.	.
D	**Manufacturing**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
D	**Manufacturing FDI stocks, EUR mn**	**11539.7**	**612.8**	**4079.3**	**428.7**	**721.8**	**24828.9**	**2327.6**	**1317.2**
	FDI stocks total, EUR mn	**30717.2**	**2843.0**	**11079.7**	**2520.6**	**2509.2**	**60311.1**	**5313.0**	**3637.1**
	Share of manufacturing in total FDI stock, in %	*37.6*	*21.6*	*36.8*	*17.0*	*28.8*	*41.2*	*43.8*	*36.2*
	Share of manufacturing FDI stock in GDP, in %	*18.2*	*11.0*	*8.1*	*5.1*	*5.9*	*12.2*	*10.2*	*6.3*

Remarks:

Czech Republic: equity capital, reinvested earnings, loans.

Estonia: equity capital, reinvested earnings, loans.

Hungary: nominal capital based on corporation-tax declarations.

Latvia: equity capital, reinvested earnings, loans.

Lithuania: equity capital, reinvested earnings, loans.

Poland: equity capital, reinvested earnings gross; projects over USD 1 million capital based on PAIZ data.

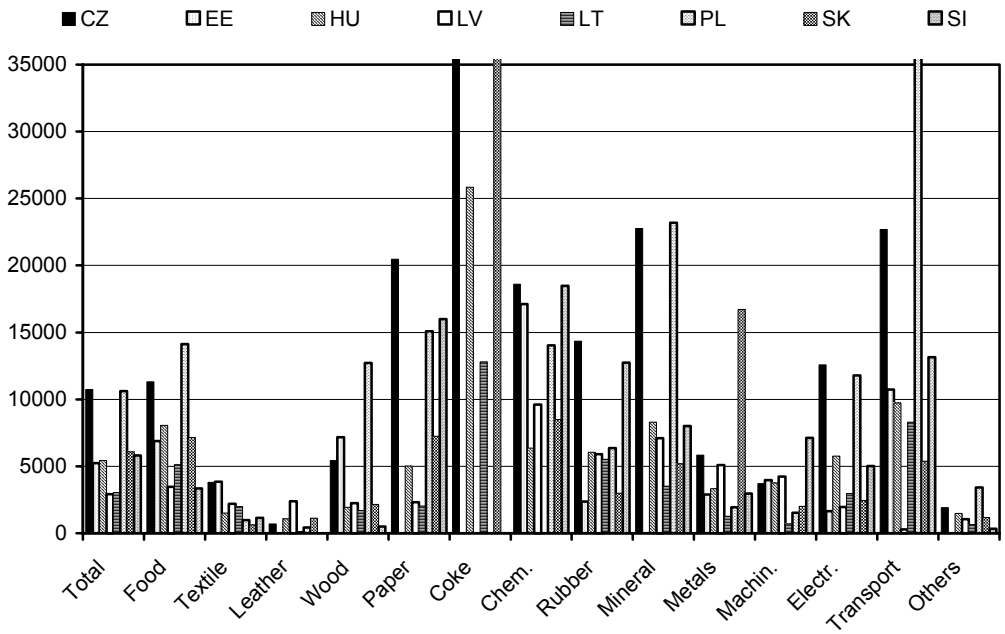
Slovak Republic: equity capital, reinvested earnings - in the corporate sector.

Slovenia: equity capital, reinvested earnings, loans.

Source: wiiw-WIFO FDI Database, national statistics.

Figure 10

Manufacturing industry FDI stocks per employee in EUR, year 2001



Note: See Table 9 for definitions of FDI coverage.

Source: wiiw-WIFO FDI Database, national statistics.

except Slovenia), as well as in predominantly export-oriented industries such as electrical & optical equipment and transport equipment. In the Baltic states, FDI in textiles & textile products as well as in wood & wood products play a major role. FDI penetration of the manufacturing industry (FDI stock per employee) is particularly high in the Czech Republic and Poland (see Figure 10), it displays a broadly similar pattern of an uneven distribution across branches. Havlik (2003a) brings some robust statistical evidence for positive impacts of FDI penetration on productivity and ULC improvements at the branch level. Hunya (2002) shows that enterprises with foreign investment participation have on average twice as high labour productivity as domestically owned enterprises; the former are also more export-oriented. Last but not least, Damijan et al. (2003) investigate on a panel data set for more than 8000 firms in ACs various channels of technology transfer through FDI and its impact on productivity growth. Surprisingly, they find that only in some ACs (Estonia, Hungary and Slovenia) foreign affiliates grow much faster in terms of total factor productivity than local firms. Moreover, though it is mainly FDI that is accountable for productivity spillover for local firms, the link between FDI, innovation and absorption capacity of local firms in ACs is so far rather weak.

The FDI-led process of a rapid expansion of new production and export capacities has been underway in the majority of ACs. Multinational (and other Western) companies exploit ACs' cost advantages and increase production and exports from these new locations even

when aggregate external demand is low. In a period of global economic slowdown and a general squeeze on profit margins, Western companies are even more sensitive to costs and may tend to accelerate the relocation of production to lower cost ACs. Growing production, rising exports and market shares of ACs in the recent period are thus a medium-term development reflecting transition-related changes in the international division of labour. Due to their comparative advantages and the existing differences in labour costs, the ACs are likely to gain after accession further production and export market shares in Europe (see also UN ECE, 2003).

One of the important implications of accession is of course the likelihood of a further strengthening of cross-border production networks between accession countries and incumbent (especially neighbouring) EU states. The reduction of entry barriers and the 'level playing field' implicit in the implementation of the *acquis*, the lowering of border transaction costs and the improvement in transport (and other logistic) infrastructure would all go in the direction of widening and deepening production integration between new and old members.

3.4 Enlargement and trade competitiveness of ACs

Trade integration between the EU and the ACs progressed with remarkable speed after sweeping liberalizations at the beginning of the 1990s. Stipulated by Association Agreements, the EU has become the most important trading partner for all ACs, accounting now for 50-55% (Lithuania and Bulgaria) to 75% (Hungary) of their total exports. From this point of view, most ACs are thus already now more integrated into the EU than many present member states. Import shares are as a rule lower, largely because energy and raw materials are imported from outside the EU (mainly from the CIS). Most ACs are having negative trade balances with the EU, only Hungary (since 1997), the Czech Republic and Slovakia (both since 1999) record trade surpluses with the EU. Preliminary data from national statistics indicate a further improvement of trade balances and additional ACs' market share gains in the EU in 2003 (see Havlik et al., 2003c, UN ECE, 2003).

ACs' manufacturing trade with the EU (more than 90% of their total trade with the EU) represents not only its largest but also the most dynamic part:[25] ACs' market share in extra-EU imports grew from 9.5% in 1995 to 13.2% in 2001 (5% of total EU imports). About 13% of all extra-EU manufacturing exports went to the ACs in 2001 (as compared with 9.5% in 1995 – see Havlik, 2003b). Trade balances with the EU have been traditionally negative in manufacturing, but the ACs' trade deficit dropped to EUR 10.9 billion in 2001 (from a peak

[25] In order to analyse ACs' manufacturing trade we use the Eurostat Comext database, which collects all trade with the EU countries as reporting countries.

of EUR 18.4 billion in 1997). Poland registered the largest trade deficit in the region (EUR 8 billion) in 2001, followed with a large distance by Slovenia and the Czech Republic. In the other ACs trade deficits were smaller, while Hungary and the Slovak Republic managed to achieve surpluses in manufacturing trade with the EU (since 1999). Due to different growth rates of exports and imports between 1995 and 2001, trade balances improved in the Czech Republic, Hungary, Slovakia and Estonia.

Table 10

Intra-industry trade with the EU-15, Grubel-Lloyd indexes (GL)

	1995	1996	1997	1998	1999	2000	2001
Czech Rep.	0.645	0.660	0.709	0.729	0.729	0.741	0.765
Estonia	0.440	0.485	0.474	0.475	0.475	0.405	0.433
Hungary	0.578	0.601	0.606	0.611	0.606	0.642	0.631
Latvia	0.290	0.265	0.299	0.278	0.271	0.232	0.222
Lithuania	0.273	0.288	0.294	0.307	0.347	0.317	0.298
Poland	0.455	0.463	0.470	0.486	0.508	0.553	0.568
Slovak Rep.	0.534	0.574	0.577	0.541	0.553	0.570	0.559
Slovenia	0.651	0.661	0.670	0.684	0.674	0.673	0.683
Bulgaria	0.401	0.419	0.413	0.415	0.401	0.391	0.402
Romania	0.327	0.336	0.341	0.333	0.371	0.407	0.426

GL= 1 -Σ (ABS(x^{ij}-m^{ij}) / Σ (x^{ij}+m^{ij}), where x^{ij} and m^{ij} are country's i's exports and imports in sector j's in trade with the EU-15; calculated from data at NACE rev. 1 3-digit level.

Source: Eurostat Comext database, own calculations.

There is ample evidence for growing intra-industry trade in line with the 'new' trade theory which suggests that trade among industrialized countries is largely motivated by product differentiation and economies of scale. Intra-industry trade has been most pronounced in the Czech Republic, Slovenia and Hungary, whereas it has been the lowest in Lithuania and Latvia (Table 10). Between 1995 and 2001, intra-industry trade grew most rapidly in the Czech Republic and Poland, whereas it slightly declined in Latvia and Estonia. Intra-industry trade has been of particular importance in textiles, as well as in electrical, optical and transport equipment.[26]

[26] However, outward processing trade (OPT) is important in these industries, pointing to vertical intra-industry trade. OPT is a form of international co-operation on a contractual basis between independent firms from different countries. The contractor exports mainly semi-processed goods to the subcontractor, who refines, assembles and finishes the product, which is then re-imported to the contractor's country. For a detailed study on OPT trade in relation to ACs see Pellegrin (2001).

Table 11

Qualitative assessment of ACs' manufacturing industry trade competitiveness (based on sectoral trade balances with the EU during 1995-2001)

		CZ	EE	HU	LV	LT	PL	SK	SI	BG	RO	Positive countries	Number of "+" cases (30 max)	Number of "-" cases (30 max)
DA	Food products; beverages and tobacco	---	--	++	--	-	-	--	--	++	--	2	4	15
DB	Textiles and textile products	+++	+++	+	+++	+++	+	++	---	+++	+++	9	22	3
DC	Leather and leather products	--	--	--	--	+	---	+++	---	++	+++	4	9	14
DD	Wood and wood products	++	+++	+	+++	++	+++	+++	+	++	+++	10	23	0
DE	Pulp, paper & paper products; publishing & printing	--	-	--	---	--	--	+	---	--	---	1	1	20
DF	Coke, refined petroleum products & nuclear fuel	---	+++	++	++	+++	-	+	---	-	--	5	11	10
DG	Chemicals, chemical products and man-made fibres	---	---	---	---	--	---	---	---	---	---	0	0	29
DH	Rubber and plastic products	---	---	---	---	---	---	---	-	---	---	0	0	28
DI	Other non-metallic mineral products	+++	--	---	--	--	--	++	-	+	+	4	7	12
DJ	Basic metals and fabricated metal products	+	--	---	+	+	+	++	-	+++	++	7	11	6
DK	Machinery and equipment n.e.c.	-	---	---	---	---	---	-	-	---	--	0	0	23
DL	Electrical and optical equipment	-	+++	+++	---	---	---	--	---	---	---	2	6	21
DM	Transport equipment	+++	---	+++	---	---	---	+++	-	---	---	3	9	19
DN	Manufacturing n.e.c.	+++	+++	+	+	+++	+++	+++	+++	-	+++	9	23	1
Number of positive sectors		6	5	7	5	6	4	9	2	6	6			
Number of "+" cases (out of 42 max)		15	15	13	10	13	8	20	4	13	15			
% of "+" cases		35.7	35.7	31.0	23.8	31.0	19.0	47.6	9.5	31.0	35.7			
Number of "-" cases (out of 42 max)		18	21	19	24	19	24	11	25	19	21			
% of "-" cases		42.9	50.0	45.2	57.1	45.2	57.1	26.2	59.5	45.2	50.0			

Legend for evaluation:

---	Rising deficits
--	Low or stable deficits
-	Declining deficits
+	Small or declining surplus
++	Stable surplus
+++	Growing surplus

Sources: wiiw evaluation based on Eurostat Comext Database.

Table 12

Correlation of market share gains/losses between 1995 and 2001 in the enlarged EU-25

	Czech Rep.	Estonia	Hungary	Latvia	Lithuania	Poland	Slovak Rep.	Slovenia	AC-8	Bulgaria	Romania	AC-10	EU-25(intra)	EU-15(intra)
Market share gain/loss in EU-25 imports	**0.70**	**0.10**	**0.79**	**0.01**	**0.07**	**0.47**	**0.20**	**-0.02**	**2.31**	**0.04**	**0.25**	**2.59**	**-2.59**	**-5.01**
Correlations of market share gain/loss														
EU15(intra)	-0.689 *	-0.265 *	-0.413 *	-0.050	-0.056	-0.563 *	-0.553 *	-0.031	-0.767 *	-0.055	-0.229 *	-0.797 *	0.797 *	1.000 *
EU25(intra)	-0.738 *	-0.450 *	-0.492 *	-0.115	-0.128	-0.758 *	-0.578 *	-0.041	-0.950 *	-0.104	-0.322 *	-1.000 *	1.000 *	0.797 *
Greece	0.095	-0.142	0.051	0.007	-0.019	-0.023	0.136	0.039	0.041	-0.222 *	-0.166	-0.019	0.019	-0.125
Ireland	-0.245 *	-0.023	-0.026	0.017	0.020	-0.195	-0.004	-0.013	-0.196	-0.067	-0.067	-0.209 *	0.209 *	0.168
Portugal	-0.022	-0.141	0.025	-0.081	-0.287 *	-0.038	-0.164	0.138	-0.073	-0.380 *	-0.400 *	-0.201 *	0.201 *	0.195
Spain	-0.236 *	-0.111	-0.104	0.002	-0.036	-0.144	-0.379 *	-0.065	-0.260 *	-0.024	-0.005	-0.250 *	0.250 *	0.181
Austria	-0.136	-0.104	-0.230 *	0.037	0.156	-0.286 *	-0.103	-0.138	-0.288 *	-0.121	0.011	-0.279 *	0.279 *	0.164
Germany	-0.168	-0.069	-0.212 *	0.064	0.096	-0.179	-0.085	-0.128	-0.229 *	0.049	0.016	-0.211 *	0.211 *	0.081
Italy	0.037	0.178	-0.003	0.033	-0.040	0.075	-0.190	0.032	0.055	-0.198	-0.245 *	-0.025	0.025	-0.055
France	-0.152	-0.089	-0.202 *	-0.001	-0.040	-0.281 *	-0.033	0.022	-0.270 *	0.046	-0.121	-0.287 *	0.287 *	0.313 *
Denmark	0.007	-0.287 *	0.099	-0.075	-0.198	-0.115	0.083	0.187	-0.054	0.050	-0.027	-0.056	0.056	-0.003
Sweden	-0.077	-0.510 *	-0.135	-0.414 *	-0.143	0.012	-0.118	0.268 *	-0.170	0.058	-0.107	-0.187	0.187	0.142
Finland	-0.008	0.073	0.113	-0.244 *	-0.042	0.105	0.060	0.046	0.062	-0.050	-0.089	0.032	-0.032	-0.015
Netherlands	-0.076	-0.081	0.168	0.024	-0.042	0.059	0.048	0.080	0.059	0.074	-0.089	0.036	-0.036	0.056
Belgium & Luxemburg	-0.118	0.037	-0.105	-0.012	0.147	-0.109	-0.011	-0.247	-0.152	0.283 *	0.483 *	0.003	-0.003	0.148
United Kingdom	0.014	0.015	-0.025	0.052	-0.139	-0.097	-0.148	0.074	-0.061	-0.149	-0.058	-0.083	0.083	-0.004

	Greece	Portugal	Spain	Ireland	Austria	France	Germany	Italy	Netherlands	Sweden	Finland	U. Kingdom	Belg&Lux	Denmark
Market share gain/loss in EU-25 imports	**-0.07**	**0.15**	**0.53**	**1.12**	**0.12**	**-0.85**	**-0.87**	**-1.10**	**-0.02**	**-0.51**	**-0.10**	**-0.23**	**-0.42**	**-0.35**
Correlations of market share gain/loss														
EU15(intra)	-0.125	0.195	0.181	0.168	0.164	0.313 *	0.081	-0.055	0.056	0.142	-0.015	-0.004	0.148	-0.003
EU25(intra)	0.019	0.201 *	0.250 *	0.209 *	0.279 *	0.287 *	0.211 *	0.025	-0.036	0.187	-0.032	0.083	-0.003	0.056
Greece	1.000 *	0.069	-0.157	0.053	0.004	-0.047	-0.060	0.035	-0.090	-0.064	0.024	0.105	0.001	0.028
Ireland	0.053	-0.025	-0.171	1.000 *	-0.086	-0.005	0.006	-0.092	-0.024	-0.047	0.017	0.012	-0.088	0.025
Portugal	0.069	1.000 *	-0.086	-0.025	0.080	-0.050	-0.135	0.273 *	-0.038	-0.034	-0.030	-0.018	-0.033	-0.005
Spain	-0.157	-0.086	1.000 *	-0.171	0.020	-0.184	-0.157	0.100	-0.137	0.127	-0.047	0.279 *	0.039	0.073
Austria	0.004	0.080	0.020	-0.086	1.000 *	0.102	0.320 *	-0.076	-0.085	-0.262 *	-0.525 *	0.018	-0.195	0.003
Germany	-0.060	-0.135	-0.157	0.006	0.320 *	-0.002	1.000 *	-0.338 *	-0.206 *	-0.005	-0.301 *	-0.146	-0.263 *	-0.270 *
Italy	0.035	0.273 *	0.100	-0.092	-0.076	-0.147	-0.338 *	1.000 *	-0.320 *	-0.066	0.180	0.077	-0.237 *	-0.020
France	-0.047	-0.050	-0.184	-0.005	0.102	1.000 *	-0.002	-0.147	-0.180	-0.026	-0.204 *	-0.357 *	-0.209 *	0.124
Denmark	0.028	-0.005	0.073	0.025	0.003	0.124	-0.270 *	-0.020	0.068	0.060	-0.233 *	-0.098	-0.078	1.000 *
Sweden	-0.064	-0.034	0.127	-0.047	-0.262 *	-0.026	-0.005	-0.066	0.020	1.000 *	0.189	-0.165	-0.029	0.060
Finland	0.024	-0.030	-0.047	0.017	-0.525	-0.204	-0.301 *	0.180	-0.005	0.189	1.000	0.068	0.281 *	-0.233 *
Netherlands	-0.090	-0.038	-0.137	-0.024	-0.085	-0.180	-0.206 *	-0.320 *	1.000 *	0.020	-0.005	-0.120	0.043	0.068
Belgium & Luxemburg	0.001	-0.033	0.039	-0.088	-0.195	-0.209 *	-0.263 *	-0.237 *	0.043	-0.029	0.281 *	0.055	1.000 *	-0.078
United Kingdom	0.105	-0.018	0.279 *	0.012	0.018	-0.357	-0.146	0.077	-0.120	-0.165	0.068	1.000 *	0.055	-0.098

Note: '*' = significant at 5 % level

Source: Own calculations based on Eurostat Comext database (correlations of 95 3-digit NACE subsections of manufacturing).

Table 11 provides a crude 'qualitative' assessment of competitiveness of 14 individual NACE subsections based on the evolution of sectoral trade balances during the period 1995-2001. This enables us to broadly identify strong and weak industries in each of the ACs.[27] In a sectoral perspective across countries, the 'best' performer is the wood & wood products industry, in which all ACs enjoy a stable or growing trade surplus with the EU, followed by manufacturing n.e.c. (mainly furniture) and textiles & textile products. In contrast, serious problems with trade competitiveness are detected for industries such as chemicals, rubber & plastic products, machinery & equipment n.e.c. as well as paper & printing, all with a high frequency of trade deficits. In a cross-country perspective, Slovak manufacturing has the highest number of surplus industries and scores best also in terms of the number of '+' cases (about 48% of the maximum score). The weakest competitive position of manufacturing is found in Slovenia and Poland.

Over the period 1995-2001, the ACs have made strong inroads into the EU market in a number of widely heterogeneous industries. In some of these industries, the ACs already became major suppliers to the EU-15 market. The aggregate market share gain of ACs in total (both extra and intra) EU manufacturing imports (1.8 pp between 1995 and 2001) occurred mainly at the expense of intra-EU trade (-4.6 pp reduction of market share) as well as EU imports from Japan (-0.7 pp). USA, South Korea and especially China recorded market share gains in the EU as well (Havlik, 2003b). During this period, ACs' market share in an enlarged EU-25 grew by 2.6 pp (to 6.1%), largely at the expense of reduced market shares of France, Germany, Sweden, Belgium/Luxembourg and Denmark (Table 12).[28] Judged by the correlation between the respective export market share gains and losses across all 3-digit NACE subsections of manufacturing, the ACs seem to compete mainly with exports of Spain, Portugal, Ireland, Austria, Germany and France.[29] AC-8 *market share gains* in EU-25 were correlated with *market shares losses* of industries in intra-EU trade (including exports of Austria, France, Germany and Spain). However, only a limited number of correlation coefficients shown in Table 12 are statistically significant. Based on this evidence, the Czech Republic competes on the European market with Ireland and Spain; Hungary with Austria, Germany and France; Poland with Austria and France; Estonia with Denmark and Sweden. Bulgaria and Romania compete mostly with the Southern cohesion countries Greece and Portugal as well as with Italy.

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[27] We get a similar picture when using conventional indicators of revealed comparative advantage (RCA) – see Havlik (2003a).

[28] In order to analyse the competitive position of ACs in an enlarged EU-25, we have created a trade matrix that comprises intra-EU trade plus the trade of EU member states with ACs. Eurostat Comext Database covers ACs only as trade partners of the present EU member states. Trade among ACs is not included.

[29] Positive correlation indicates market share gains (losses) in the same industries whereas negative correlation suggests that market share gains (losses) were associated with losses (gains) of other competitors on the EU market.

3.5 Takeover of the *acquis* and implications for ACs' manufacturing

While EU accession will not bring about any additional dramatic changes for industry (owing to the already existing high degree of integration in this area) in either 'old' or 'new' EU member states, there will be some sectors (e.g. steel in several ACs) and areas (SMEs and border regions in both 'old' and 'new' member states) that might be adversely affected. For the ACs' manufacturing sector as a whole, and from a strictly business point of view, complying with the *acquis communautaire* will require considerable additional investments, increases in direct and indirect charges for public services, and it is likely to 'crowd out' other investments (wiiw, 2001). For most sectors the additional costs will be dominated by adherence to the Union's environmental regulations, both through the upgrading of production facilities and through increased charges for waste management. Other kinds of horizontal legislation that are likely to affect future investment requirements of individual firms are occupational health and safety requirements, and employment legislation. In addition, industry will be affected by single market standards covering individual product specifications. Many industries in the ACs have already gone through restructuring and modernization programmes and are well prepared for these legal requirements. However, this applies mostly to industries which display high FDI penetration (see above) whereas the domestically owned companies are in a much worse shape. The recent Eurochambres Survey shows that only half of companies in the ACs have started preparations for the Single Market and less than 10% of respondents claim to be fully informed on current EU legislation (Eurochambres, 2003). The level of compliance with existing EU legislation is generally low. More concerted institutional and administrative efforts are urgently needed in order to improve the readiness of companies in ACs for the EU market.

The sectors most affected by the acquis include the chemical and pharmaceutical sector, basic metals and fabricated metal products, food industries, and the transport equipment sector – all of which are important for the ACs. The overall most costly requirements come from the environmental acquis, although the occupational health and safety requirements and the single market legislation will also heavily affect certain sectors and industries. Among those exposed to acquis requirements, sectors with EU-oriented production, high levels of FDI, consistent investment growth rates and an enterprise structure dominated by large companies are generally best prepared for the obligations of EU membership. Apart from the initial adjustment costs, the industries should benefit from the common standards introduced through the acquis. Products will only be subject to one conformity assessment procedure even when they are exported, as opposed to different procedures for the national and international markets. This will in many cases reduce production costs considerably.

The takeover of the environmental *acquis communautaire* will be costly (the investments required are estimated to range between EUR 80 to 100 billion in the ACs – see Commission of the European Communities, 2001, 2003), and the ability of domestically

owned enterprises to cope with increased competition is low. Small companies and companies operating only on the domestic market are generally less prepared for the Single Market (Eurochambres, 2003). The present dichotomy between modern, foreign-dominated industries (and companies) and domestically owned enterprises (see Hunya, 2002) could even increase. Promotion of SMEs, networking and cross-border cooperation, as well as improved institutional and administrative capacities, will be crucial for overcoming potential problems arising in the enlarged European market. In the present EU member states, acquis compliance of the ACs will open new opportunities for investment and cost-optimizing strategies, and will further strengthen the creation of more complex production networks that draw on complementary production factors, thus making it possible to enhance the competitiveness of European companies in the global context.

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Michael Landesmann and *Robert Stehrer** *Chapter 2*

Structural patterns of East-West European integration: strong and weak Gerschenkron effects

Abstract

This paper discusses the evolution of competitiveness, industrial and trade specialization in the manufacturing sector of the countries of Central and Eastern Europe (CEECs). It is shown that the paths taken by the different CEECs have been quite diverse and we apply a combination of a catching-up plus trade specialization model to understand the patterns of specialization emerging in Central and Eastern Europe. We start with a theoretical outline of our argument and move on to discuss patterns of productivity and wage catching-up across industries which give rise to interesting movements in comparative cost dynamics. This is complemented with an analysis of the evolution of CEECs patterns of trade specialization, including measures of product quality upgrading. We add information about the industrial allocation of FDI and comparative educational attainment as well as on the evolution of labour demand by skill groups. All the above yields an interesting (and at times unexpected) picture of the evolving division of labour in an Enlarged Europe.

1 Introduction

In this paper we analyse structural developments and the evolution of competitiveness in the countries of Central and Eastern Europe (CEECs). Since the beginning of the transition in 1989 the CEECs have gone through a dramatic process of systemic change and structural adjustment in which their integration into trade and production links with Western Europe has played a major role. This paper describes the processes of structural adjustment which have taken place and we shall take a particular stance with regard to the patterns of production and trade specialization which have emerged in this process of East-West European integration. EU enlargement will of course be a major step in this process towards full integration, but the basic outlines of the division of labour which is emerging in this 'enlarged Europe' have already become visible prior to that.

Underlying our analysis is a theoretical model (see Landesmann and Stehrer, 2000 and Stehrer, 2001) which attempts to combine a model of catching-up with international trade

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specialization and thus falls into the category of the dynamic modelling of trade and growth (for other approaches, see Krugman, 1986, Grossman and Helpman, 1991, Taylor, 1993). The basic outlines of the model are simple and have been guided by the 'stylized facts' observed in growth patterns of successful and less successful catching-up economies. Such economies start off with substantial productivity (and product quality) gaps and such gaps are not the same across all industrial branches. Typically, the gaps are greater in the technologically more advanced branches and less in the technologically less demanding ones. This has the following implications: full catching-up has a longer way to go in the technologically more advanced branches and this can be interpreted in two ways. On the one hand, it is 'more difficult' to catch up fully in such branches as it requires a much greater effort in learning, skill acquisition and often a big jump in organizational and managerial capacities; on the other hand, it means that the scope for differential productivity growth (and for product quality upgrading) between the 'technology leader' and the catching-up economy ('the laggard') is higher where the initial gap is larger.

This is a simple application of the Gerschenkron hypothesis ('advantage of backwardness') which states that the 'potential' for growth is highest where the 'initial gap' is the highest (Gerschenkron, 1962). This principle has, of course, been widely applied at the aggregate level and is the background for the much tested 'convergence' hypothesis in the many recent aggregate growth studies (for a survey of such studies see Temple, 1999). What is special in our model is that we apply this principle at the industrial level with the implication that those industries have the greatest potential for productivity growth and product quality up-grading that start off with the biggest 'initial gaps'. Of course, as pointed out early on by Abramovitz (1986), actual growth is not necessarily equal to potential growth as countries (and in our case industries) might not be able to exploit this potential. Abramovitz emphasized here the importance of 'social capabilities', i.e. a wide range of institutional and behavioural requirements which are necessary such that actual catching-up comes as close as possible to potential catching-up. This analysis opens a wide range of possible catching-up patterns. In the case of our more disaggregated analysis it also means that the *dynamics of comparative advantages* which determines a country's position in the international division of labour can follow quite different patterns for catching-up economies. At a more concise level, the dynamics of specialization advantages and disadvantages is determined by the timing of 'switchovers' in the comparative cost structures across industrial branches. Here the dynamics of relative productivity growth rates and of wage rates across industrial branches plays a decisive role. We have examined these patterns of comparative advantages across the historical experiences of a wide range of catching-up economies in a number of analytical and empirical studies (see Landesmann and Stehrer, 2001, and Stehrer and Wörz, 2001) and will show in this paper that the approach gets also validated in the analysis of patterns of catching-up and trade specialization of CEECs after the transition.

In an extension of this approach, it is possible to show that the allocation of *foreign direct investment (FDI)* across industrial branches is similarly affected by the dynamics of comparative advantages although in this context we also emphasize the role which price-cost margins (Schumpeterian profits) play in determining (particularly foreign) investment activity[30]. In the present paper we shall also show that – similarly to the uneven productivity dynamics mentioned above – *product quality up-grading* also proceeds at different speeds across industrial branches and this also represents another important aspect of catching-up. Just as the model implies that the range of experiences with respect to catching-up patterns and hence of the positions that economies occupy in the international division of labour can be quite wide, this is borne out by the diversity of experiences we observe in Central and Eastern Europe.

We shall now give an overview of the structure of the paper: Section 2 summarizes gives an theoretical outline of the growth and trade specialization framework we use in the interpretation of the ongoing catching-up processes. Section 3 takes a closer look at structural change within the manufacturing sector and reveals at this level some of the interesting emerging patterns of industrial specialization of CEECs. Section 4 reports on the main determinants of industrial cost competitiveness, i.e. productivity, wage rates and labour unit costs and shows in which industry groupings (lower-tech, resource-based, higher-tech) the strongest inroads were made in relative productivity and unit cost developments. Section 5 discusses trade performance und uses various classifications guided by industrial organization and skill content criteria to show the qualitative pattern of trade specialization emerging in CEECs in relation to the European Union (EU). We also discuss in some detail the patterns of product quality up-grading mentioned above. A simple regression analysis completes the section. Section 6 gives some evidence on FDI allocation across industrial branches and section 7 looks at the educational attainment in the CEECs and at labour market developments in CEECs in particular in relation to the positions of different skill groups. The argument here is that the positions of skill groups reflect the patterns of catching-up and industrial specialization discussed in the previous sections of the paper. The concluding section provides an outlook on the impact which EU enlargement will have on the further integration processes between Central and Eastern and Western Europe.

[30] Foreign direct investment – through technology transfers – in turn affects the dynamics of catching-up and hence the dynamics of trade specialization. See Landesmann and Stehrer, 2002, for an attempt to extend our theoretical model by endogenizing foreign direct investment flows and its impact.

2 Catching-up patterns with 'weak' and 'strong' Gerschenkron effects

In the following we shall adopt a very simple, stylized version of the model developed in Landesmann and Stehrer (2000, 2002) as well as Stehrer (2002). We formulate, first, a simple process of catching-up in productivity levels – in the form of a differential equation[31] – at the level of an individual industry *i* between a 'catching-up economy' *c* and a productivity leader *L*.

$$\dot{a}^{c}_{li,z} = \gamma_{i,z}(a^{c}_{li,z} - a^{L}_{li,z})$$

where $a^{c}_{li,z}$ refers to the (inverse of the) level of labour productivity in industry *i* in country *c* and $a^{L}_{li,z}$ to that in the lead economy *L* (where *z* refers to different skill groupings, *z=u,s*, where *u* stands for skilled and unskilled labour respectively).[32] On the left-hand side, we have the rate of change of the former variable. This simple formulation allows us to differentiate between a 'weak' and a 'strong' Gerschenkron effect, named after the author of the famous concept of the 'advantage of backwardness' (see, Gerschenkron, 1962). Take two industries at a point in time and assume that the productivity growth rates of both these two industries in the lead country are the same. We can then distinguish two cases which lead to differential productivity growth (and hence of catching-up) in the two industries in the catching-up economy:

First, assume that the convergence parameter takes on the same value in both industries. In this case, differences in the rates of productivity growth arise simply because the gaps in productivity levels to the leader, i.e. the terms $(a^{c}_{li,z} - a^{L}_{li,z})$, differ between the two industries. In fact, we shall observe higher productivity growth in the industry with the higher contemporaneous gap. We call this the 'weak' Gerschenkron effect. This effect drives 'convergence' in the recent growth theoretical literature which, however, is mainly concerned with the aggregate level. In our case we look at the Gerschenkron effect at the disaggregated, industrial level which has - as we shall see - important implications for the dynamics of comparative advantage.

In the second case, we allow the convergence parameters to differ between the two industries. In the case where this parameter - which we can call the catching-up or learning parameter - is higher in the industry with the higher productivity gap, we shall speak of the 'strong' Gerschenkron effect.

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[31] A 'dot' on top of a variable refers to the differentiation of that variable with respect to time.

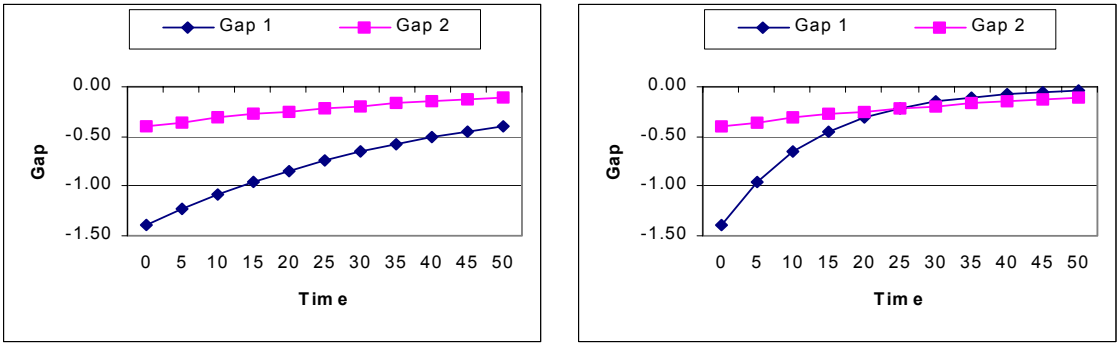
[32] More complicated functional forms could be adopted such as a logistic pattern of catching-up (see Landesmann and Stehrer, 2000).

Figure 1 shows the two hypothetical situations in which productivity gaps in the two industries have been plotted. Panel a) depicts the case where both industries have the same rate of convergence; in Panel b) we assume that the industry with the higher initial gap has a higher convergence parameter (reasons for this will become clear below). In a Ricardian interpretation the second pattern implies a switchover in comparative advantages.

Figure 1

Paths of catching-up in productivity levels

Panel a) weak Gerschenkron pattern; Panel b) strong Gerschenkron pattern



Panel a) Panel b)

There are three further ingredients to our stylized 'structural model' of catching-up:

One refers to the behaviour of wages, the other to the emergence of 'transitory rents', and the third to the impact which differential rents have upon the attractiveness of different sectors to investors (particularly foreign investors) which in turn contributes towards a faster speed of 'learning' and technology transfer. Let us deal with these in turn.

The dynamics of relative wage costs: Given the specification of relative productivity catching-up discussed above, we now have to add the behaviour of industry wages in order to analyse the dynamics of relative (labour) unit cost dynamics across sectors. Labour unit costs of sector *i* amount to $\sum_z a^c_{li,z} w^c_{li,z}$ where $w^c_{li,z}$ refers to the wage rate paid in sector *i* in country *c*. Wage rates are driven by three factors: by bargaining over 'transitory rents' which are industry-specific (see below), by economy-wide conditions with respect to the rate of unemployment, and by a long-run tendency of wage rates to equalize across sectors

$$\dot{w}^c_{i,z} = f\left(s^c_{i\,+}, u^c_{z\,-}, w^c_{i,z\,-} - \bar{w}^c_z \right)$$

where the s_i^c refers to transitory rents arising in sector *i*, u_z^c to the (economy-wide) rates of unemployment for skill group *z*, and $\bar{w}_{i,z}^c$ to the average wage rate of skill group *z* in the economy as a whole. We can see that relative (labour) unit costs will fall in a sector where relative productivity growth exceeds relative wage growth. As there are two economy-wide terms in the wage equation, the above formulation implies that sectors with relatively fast productivity growth will experience somewhat faster wage growth compared to other sectors (because of the emergence of transitory rents which affect industry-specific wage growth), but relative wage growth will be less than relative productivity growth (because of the impact of the economy-wide terms). Hence relative unit (labour) costs in this sector will fall. As productivity growth is furthermore specified in relation to an international productivity leader (see above), this relative unit cost dynamics also implies a shift in comparative cost dynamics in favour of this sector.

Next we come to the emergence of 'transitory rents'. Without going into the micro-foundations of price-setting, we simply postulate that prices do not adjust immediately to unit costs plus (long-run) mark-up. As a result *transitory rents* s_i^c arise unevenly in different sectors as a function of the speed of relative unit cost movements, and the speed of price-to-cost adjustment.

$$s_i^c = p_i^c - (1+\pi)c_i^c$$

Finally, we relate the attractiveness of different sectors to investment activity in general and FDI in particular to the emergence of relative rents. The relative investment rates (and particularly relative FDI involvement) in different sectors affect in turn, the speed of 'learning' (or of 'technology transfer') in different sectors. This provides a powerful mechanism of 'endogenizing' relative catching-up rates of different sectors and hence supports the possibility of a 'strong Gerschenkron' effect.

$$\dot{a}_{li,z}^c = \gamma_{i,z}(FDI_i^c)(a_{li,z}^c - a_{li,z}^L)$$

Overall the model maps out the following scenario: Uneven rates of catching-up (starting with the 'weak' Gerschenkron effect) give rise to uneven productivity growth of sectors. Given the sector- and economy-wide factors of wage rate determination, there will be uneven unit-cost movements such that relative unit costs fall in sectors with the higher initial gaps. With delayed price to cost adjustment, there will be the emergence of transitory rents in those sectors with the strongest relative productivity performance. This in turn affects the relative attractiveness of different sectors to investment activity in general and to FDI in particular. It provides a mechanism to endogenize the 'speed of technology transfer' and hence shifts comparative cost dynamics and rent dynamics further in favour of industries in which initial productivity gaps were particularly high. In Landesmann and

Stehrer (2000) we presented empirical evidence supporting this type of emergence of 'comparative advantage switchovers' in successful catching-up economies.

The dynamics of comparative advantages described by this model has, of course, implications for the demand for different skill groups of workers in both the 'lead' and the 'catching-up' economies. We can show in our model analysis (see Landesmann and Stehrer, 2000, and Stehrer, 2002) that the aggregate demand for different skill groups is a function of four factors:

– the skill composition of labour demand in the different sectors which are defined by the labour input coefficients for different skill types (level effect);
– changes in the skill composition which result, on the one hand, from 'skill biases' in the processes of technological change as well as from substitution effects due to relative wage changes (across skill groups);
– rates of (non-skill specific) rates of productivity growth (or catching-up) in different sectors;
– the evolution of output levels (driven by domestic and trade structures) of different sectors.

The last factor is endogenized in our model through the evolution of demand (for details see Landesmann and Stehrer, 2000) and we can thus focus on the other three factors. It will be a plausible assumption that the gaps in productivity levels get reflected also in gaps of skill composition. Hence, in the Gerschenkronian fashion, a large overall gap in productivity levels also implies a large gap in skill compositions and thus in the potential rate of (skill biased) technological change. Consequently the rates at which the relative demand for skilled labour changes in different sectors in the catching-up economy will be a function of the initial gaps. An uneven catching-up process in a Gerschenkronian fashion will thus mean automatically a skill-biased process of technological catching-up. On the other hand, the relative wage (substitution) effect could go in the other direction as higher rents in the more skill-intensive sector lead to an increased skill-premium.

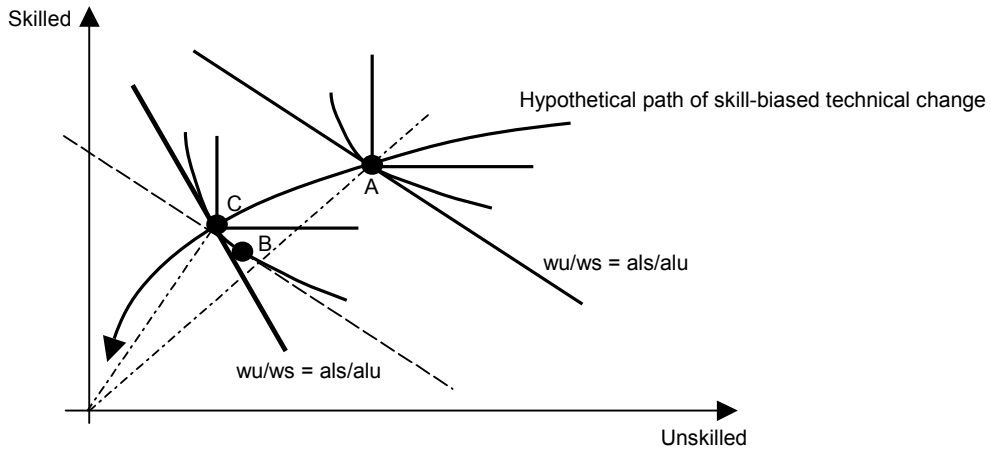
The skill-biased nature of a catching-up process (both output and skill composition catching-up effects) thus indicates that a – successful (i.e. Gerschenkronian) – catching-up economy will experience increased relative demand for skilled labour.[33] This could be counteracted either by very fast rates of (skill neutral) technical progress in the sector which uses skilled labour more intensively and/or by strong substitution effects induced by large (transitory or permanent) skill-premia. The latter are, of course, also a function of the supplies of skilled vs. unskilled labour.

[33] We shall present in section 7 evidence concerning the evolution of the demand for skills in some of the CEECs.

By endogenizing the dynamics of the relative labour demands for skilled and unskilled labour in the course of a catching-up process (as well as the relative slack variables on the labour markets), the model has also all the ingredients to study the 'pull' and 'push' factors of international migration flows.

Figure 2

Path of technical change



A to C: shift due to skill-biased catching-up process; C to B: potential substitution effects because of rising skill premia

3 Convergence and divergence in manufacturing structure

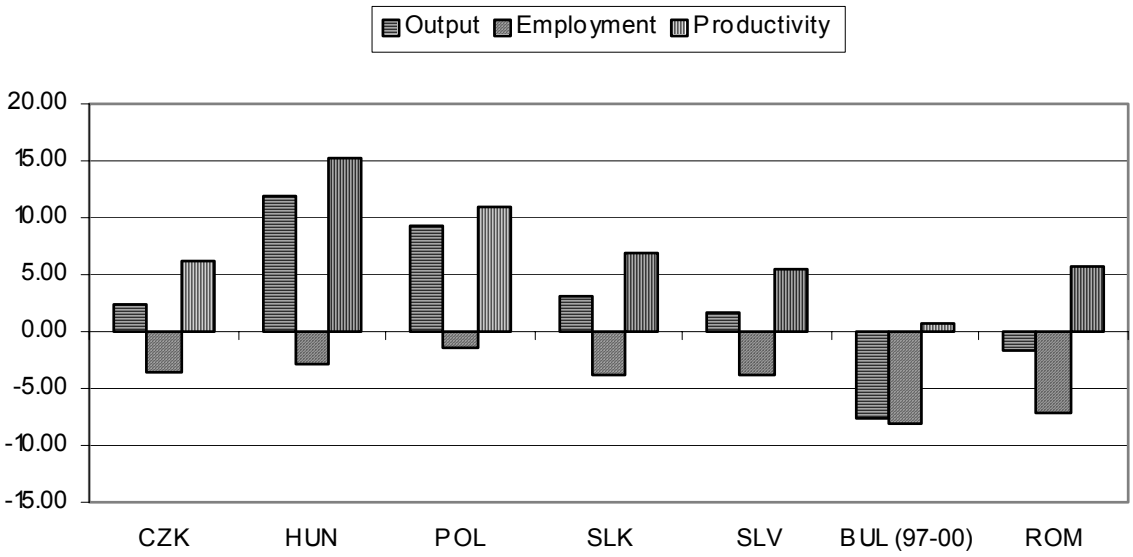
Let us now look more closely at the ongoing structural change within the manufacturing sector in the CEECs. We use data from The Vienna Institute for International Economic Studies (wiiw) industrial database, which reports several variables at the NACE rev. 1, 2-digit level (DA-DN) for seven Central and Eastern European countries. In this paper we restrict the analysis to the period 1993-2000, i.e. after the transformational crises. The data, which are mostly collected from national sources, are likely at times to be inconsistent over the years (e.g. as data sources changed or for methodological reasons, such as coverage of the small enterprise sector). To overcome these problems we tested the series for significant changes in the growth rates to check when a structural break was indicated by using dummies in the estimates on growth rates. If this procedure indicated a significant break the data series was adjusted accordingly.

Let us first get an overview of growth processes in aggregate manufacturing over the period 1993-2000, i.e. after the immediate impact of the ‘transformational recession’. Figure 3 shows the trend (per annum) growth rates of output, employment and labour productivity. We can see that trend employment growth over this period in manufacturing was negative in all of the transition countries. It ranged from –8.1 and –7.1% in Bulgaria

and Romania to –1.4% in Poland. Output growth was even more diverse, with negative growth over that period in Bulgaria and Romania and a wide spectrum of growth rates amongst the 'more advanced' of the candidate countries. The relatively high growth rates in manufacturing output in Hungary (11.9) and Poland (9.4) are particularly striking with rather modest trend growth in the other three economies. (Labour) productivity growth results directly from the difference in output and employment growth and shows again a quite wide range of diversity, with Hungary and Poland again the forerunners driven by high output growth, followed by a range of economies with per annum average growth rates in labour productivity of 5-7%. It is clear from these figures that the relationship between output and employment growth is quite differentiated across the transition countries and, most likely (as would be seen if the time series were analysed more closely) unstable across time, reflecting major periods of restructuring and other periods when labour hoarding takes place in the wake of output declines.

Figure 3

Growth rates of employment, output, and productivity (1993-2000)



Source: wiiw Industrial Database; own calculations.

We now move on to present a qualitative picture of the ongoing structural changes within manufacturing. For this purpose we do not report developments in all the 14 industries contained in the database but aggregated the industries into three broader categories (note that these do not cover all manufacturing industries):

– *low-tech, labour-intensive industries:* food products, beverages and tobacco (DA), textiles and textile products (DB), and leather and leather products (DC);
– *resource-intensive industries*: wood and wood products (DD), coke, refined petroleum products and nuclear fuel (DF), chemicals, chemical products and man-made fibres (DG), and other non-metallic mineral products (DI);

– *medium- to high-tech industries*: machinery and equipment (DK), electrical and optical equipment (DL), and transport equipment (DM).

Table 1a reports data on employment and output shares (both at prices 1996 and at current prices) and the wage structure for the seven Central and Eastern European countries and Austria as the benchmark.[34] Further Table 1b shows deviations of the variables from Austria in percentage points.

One can see that all countries started in 1993 with high shares in low-tech industries relative to Austria. In employment Hungary and Poland with more than about 20 and 16 percentage points above Austrian shares were the countries with the highest shares in low-tech industries. The lowest deviation from Austria can be observed for the Czech Republic. This corresponds to the data on output shares (either at current or constant 1996 prices). With regard to employment shares in medium-/high-tech industries only the Czech Republic and Slovakia showed initially higher employment shares than Austria, reflecting a strong position of the engineering sector in these two economies. In terms of output shares, the medium-/high-tech sectors had in all countries lower output shares than the benchmark Austria (although for some countries these deviations were quite small). In the resource-intensive sectors the shares relative to Austria are smallest on average both in terms of employment and output shares.[35]

More interesting than these starting values are, however, the trends over time. Employment shares in low-tech sectors have been declining slightly in the Czech Republic, Hungary, Poland, Slovakia and Slovenia but have increased dramatically in Bulgaria (from about 30% to about 43%) and in Romania. On the other hand one can see slight increases of employment shares in the medium-/high-tech sectors in the Czech Republic and very large increases in Hungary (from 23% to 32%). Relative to Austria all countries except the Czech Republic and Hungary now show lower employment shares in medium-/high-tech sectors than in 1993. For the resource-intensive sectors there are no clear trends across countries and changes are small.

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[34] An average of EU economies would have been preferable for this comparison, but Austria was singled out as a benchmark country for reasons of data availability.

[35] One reason for this pattern is the relatively large share of resource-intensive industries in Austria.

Table 1a

Changes in the structure of manufacturing, 1993 and 2000

	Employment shares			Output shares (at prices 1996)			Output structure (at current prices)		Wage structure	
	1993	2000	Employment growth (p.a.)	1993	2000	Output growth (p.a.)	1993	2000	1993	2000
Austria										
Low-tech	19.59	17.83	-2.33	20.99	15.50	2.25	21.66	15.44	84.51	80.40
Resource-intensive	17.16	15.64	-1.96	23.67	19.68	3.33	22.62	21.82	103.38	105.44
Medium-high-tech	28.48	31.24	0.23	26.94	35.10	9.55	27.98	31.90	108.54	111.04
Czech Republic										
Low-tech	24.65	22.69	-4.80	27.07	19.94	-0.81	28.31	19.26	88.54	83.20
Resource-intensive	14.22	17.16	-1.72	20.60	18.00	1.97	18.59	19.48	105.63	113.70
Medium-high-tech	31.53	33.05	-3.28	25.60	36.35	7.76	26.37	31.97	99.46	106.84
Hungary										
Low-tech	39.20	36.95	-3.91	34.73	16.64	1.83	34.66	19.17	85.44	77.15
Resource-intensive	16.55	15.27	-4.11	27.58	11.28	-0.73	25.95	17.18	124.54	133.67
Medium-high-tech	22.67	32.01	1.32	16.70	56.80	24.40	18.61	46.76	101.93	111.51
Poland										
Low-tech	35.56	33.08	-2.59	34.86	27.49	5.61	35.91	28.67	88.55	81.92
Resource-intensive	15.63	16.82	-0.54	21.76	19.56	7.31	22.80	22.34	106.47	110.55
Medium-high-tech	26.22	22.70	-3.51	19.22	24.40	12.10	18.64	22.31	105.16	113.94
Slovakia										
Low-tech	27.52	26.85	-0.03	26.38	17.83	-0.78	25.22	18.52	85.59	85.60
Resource-intensive	17.08	16.18	-1.27	24.27	20.87	2.94	25.26	19.61	111.33	103.71
Medium-high-tech	31.70	28.62	-1.68	18.10	32.90	9.99	18.46	27.29	95.74	105.39
Slovenia										
Low-tech	29.21	26.08	-3.83	27.10	23.67	0.11	26.78	21.34	95.44	86.41
Resource-intensive	14.29	15.40	-0.89	18.90	19.63	1.76	20.09	18.08	110.85	113.48
Medium-high-tech	26.84	25.88	-2.69	25.29	29.61	4.30	25.51	29.71	97.20	101.06
Bulgaria										
Low-tech	29.22	43.28	-3.73	29.82	31.37	-4.15	32.67	29.60	97.38	81.21
Resource-intensive	13.46	14.22	-8.61	25.58	31.72	-2.26	25.25	36.66	128.30	135.91
Medium-high-tech	29.21	22.31	-13.33	14.59	13.58	-6.82	17.82	12.39	105.94	102.52
Romania										
Low-tech	32.05	37.90	-4.80	29.54	33.71	0.09	33.77	29.95	86.96	76.62
Resource-intensive	15.60	15.49	-7.54	28.76	23.11	-5.06	24.49	26.72	110.97	114.15
Medium-high-tech	28.92	24.66	-9.63	14.42	18.77	1.65	19.79	14.75	103.96	127.10

Table 1b

Structure of manufacturing and changes in relation to Austria (difference from Austria), 1993 and 2000

	Employment			Output shares (at prices 1996)			Output structure (at current prices)		Wage structure	
	1993	2000	Employment growth (p.a.)	1993	2000	Output growth (p.a.)	1993	2000	1993	2000
Czech Republic										
Low-tech	5.06	4.86	-2.47	6.08	4.44	-3.06	6.66	3.82	4.03	2.81
Resource-intensive	-2.94	1.52	0.25	-3.07	-1.67	-1.36	-4.03	-2.34	2.25	8.26
Medium-high-tech	3.04	1.81	-3.51	-1.34	1.25	-1.78	-1.61	0.07	-9.09	-4.20
Hungary										
Low-tech	19.56	18.74	-1.52	14.22	-0.43	-0.53	13.07	2.26	0.87	-2.19
Resource-intensive	-0.46	-0.90	-2.32	3.93	-9.44	-3.73	2.65	-4.56	21.53	28.81
Medium-high-tech	-6.54	1.35	1.49	-10.38	22.75	15.17	-8.13	13.68	-6.55	-0.81
Poland										
Low-tech	15.97	15.25	-0.26	13.87	11.98	3.36	14.25	13.23	4.04	1.52
Resource-intensive	-1.53	1.18	1.42	-1.91	-0.11	3.98	0.18	0.52	3.09	5.11
Medium-high-tech	-2.27	-8.54	-3.73	-7.72	-10.70	2.56	-9.34	-9.59	-3.39	2.90
Slovakia										
Low-tech	7.87	8.63	2.35	5.87	0.75	-3.14	3.63	1.61	1.02	6.25
Resource-intensive	0.08	0.01	0.53	0.62	0.15	-0.06	1.96	-2.13	8.32	-1.15
Medium-high-tech	2.48	-2.04	-1.52	-8.98	-1.16	0.76	-8.28	-5.79	-12.74	-6.93
Slovenia										
Low-tech	9.62	8.24	-1.50	6.11	8.17	-2.14	5.12	5.90	10.92	6.01
Resource-intensive	-2.87	-0.25	1.07	-4.77	-0.05	-1.57	-2.53	-3.74	7.48	8.05
Medium-high-tech	-1.65	-5.36	-2.91	-1.65	-5.49	-5.24	-2.48	-2.20	-11.35	-9.98
Bulgaria										
Low-tech	9.58	25.07	-1.34	9.31	14.29	-6.52	11.08	12.70	12.81	1.86
Resource-intensive	-3.54	-1.95	-6.82	1.92	11.00	-5.26	1.95	14.92	25.29	31.05
Medium-high-tech	-0.01	-8.36	-13.16	-12.49	-20.47	-16.05	-8.92	-20.69	-2.54	-9.80
Romania										
Low-tech	12.40	19.69	-2.41	9.03	16.64	-2.27	12.18	13.04	2.39	-2.73
Resource-intensive	-1.40	-0.68	-5.75	5.10	2.39	-8.06	1.19	4.98	7.96	9.29
Medium-high-tech	-0.30	-6.00	-9.46	-12.65	-15.28	-7.58	-6.96	-18.33	-4.53	14.78

These trends in employment shares can either result from changes in output or changes in (labour) productivity (ignoring possible interactions between these two variables). Compared to Austria the output shares of low-tech industries at constant 1996 prices have fallen dramatically in the Czech Republic, Hungary, Poland and Slovakia and remained almost stable for Slovenia. On the other hand the shares of these industries compared to Austria have risen in Bulgaria and Romania from nine to about 16%.[36] This shows a clear pattern of specialization amongst the CEECs. Regarding the medium-/high-tech sectors one can see the opposite tendencies for output measured at constant prices. Hungary increased its share dramatically from about 17% to more than 55%, the Czech Republic from 25% to 36%, and Slovakia from 18% to about 33%. In the other countries output shares of high-tech industries also increased, but at lower rates and remained more or less stable in Bulgaria. The rising share of high-tech output in Romania is due to the decreasing share of resource-intensive industries (especially chemicals and chemical products (DG)). Output shares of high-tech industries at current prices were rising in all countries except for Bulgaria and Romania. Again a clear and diverse pattern of industrial specialization gets revealed.

With respect to the wage structure one would expect that on average wage rates are relatively higher in the higher-tech sectors (e.g. by the assumption that the skill intensity is higher for these sectors or the higher productivity of these sectors). However, the general picture in 1993 was that average wages have been highest in all countries in the resource-intensive sectors and lowest in the low-tech sectors. Comparing this with the year 2000 we can indeed see a catching-up of relative wage rates in the medium-/high-tech branches and a falling-behind in the low-tech branches. The question for comparative costs is whether such changes proceed above or below relative productivity level adjustments which will be explored in the next section of the paper. One can also find a trend towards a convergence of wage structures (e.g. compared to the Austrian as a representative of a Western European wage structure) although this process seems to be slow.

Note that the analysis of output and employment patterns already points towards our initial (Gerschenkron) hypothesis that specialization patterns of catching-up economies may get directed towards the medium-/higher-tech branches (as was the case especially in Hungary) where initially the gap might have been the largest. This requires the fastest catching-up in areas in which the initial gaps are the highest and this in turn depends on the existence (or mobilization) and utilization of 'capabilities' (to use Abramovitz' terms) to facilitate such differential catching-up. This was apparently not the case in Bulgaria and Romania and the experience in this respect was also quite differentiated amongst the other (more advanced) candidate countries. We now turn to the productivity and cost side of

[36] It is however interesting to see that the output shares of the low-tech industries at current prices have fallen in all countries (most strongly again in Hungary and the Czech Republic), the difference to the constant price output shares being driven by changes in relative prices.

production in order to look at the development of productivity gaps and the evolution of comparative cost structures more directly. After that we study the emerging patterns of trade specialization.

4 Productivity, wage rates and unit labour costs

Not only productivity matters for competitiveness but also wage rates play their role in shaping relative cost structures and hence the competitive position of different industries from the cost side. In Table 2 we have summarized the data again for the three types of industries (low-tech, resource-intensive, and medium-/high-tech).

Using the same database as before, we focus now on productivity, wage rates and unit labour costs. For productivity levels we use employment and data on output which are first expressed in national currency units (NCU) at prices 1996. For comparative analysis these can be converted either by using nominal exchange rates (EXR) or PPP rates (PPP) for the year 1996.[37] Output for industry i in country c in year t is denoted as $PR^c_{i,t}$. Data on wages and salaries $W^c_{i,t}$ are first obtained in NCU at nominal values. These data are converted into a common currency (euro) using either current EXR or current PPP.[38] Data on employees $E^c_{i,t}$ refer to average employment levels over the years.

Labour productivity is calculated as $LPR^c_{i,t} = PR^c_{i,t} / E^c_{i,t}$. Further, unit labour costs are defined as $ULC^c_{i,t} = LPR^c_{i,t} / \left(W^c_{i,t} / E^c_{i,t}\right)$. In Table 2 wage rates, productivity levels and unit labour costs are compared to Austria (= 100). The variables for Austria have been calculated analogously. Table 2a presents the data using the nominal exchange rates (EXR) conversion and in Table 2b the gaps are derived from PPP comparisons (both wage rates and productivity levels). The difference between the two tables thus reflects the development of the ratio between the exchange rate and the PPP rate. In the following we shall discuss first the three variables expressed at exchange rates.

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[37] For this analysis we are constrained to using PPP rates for GDP as a whole. For selective countries we have been able to obtain industry-level unit value ratios to adjust for industry level differences in price levels, but this database is not large enough to allow the more extensive comparative analysis presented here.

[38] One might ask why one should look at wage rates also in PPP terms as one is interested in comparative actual wage costs. The reason could be that one might want to conjecture what wage costs would be when price levels between the CEECs and the EU have converged. One could see such a comparison as an exercise multinationals might be interested in if they want to judge relative wage cost differentials also for the longer run when the severe undervaluation of the CEECs' national currencies would get eroded. In this case, workers would still ask at least for the same real wage rate as they now obtain, an estimate for which would be the wage rate at PPP rates.

4.1 Productivity

Expressed in nominal exchange rates all countries showed a large gap in 1993. The best performing country was Slovenia, reaching a productivity level of about 27% (relative to Austria). Bulgaria and Romania only reached a productivity level of about 5% to 6% of the Austrian level.

There are however differences when looking at industry groups. In all countries the gaps to Austria were the largest in the medium-/high-tech industries and smallest in the low-tech industries, the measured difference in the productivity gaps between these two sets of industries was generally between 5 and 10 percentage points.

Over time rapid changes in these patterns occurred. All countries experienced positive productivity growth from 1993 to 2000 (see Figure 3 earlier in the paper). But not all countries succeeded in closing the gap relative to the benchmark Austria. In aggregate manufacturing only the Czech Republic, Hungary, and Poland had higher productivity growth than Austria. All other countries had lower productivity growth and thus the gap widened.

But here again there are marked differences across types of industries. Hungary closed the gap in the high-tech industries with a (per annum) rate of closure of the gap of 15% and reached a level of about 50% that of Austria. Similarly Poland closed the gap most rapidly in the high-tech sector with a rate of 6% and the Slovak Republic of 2%. Slovenia and Bulgaria were falling back relative to Austria in all three sectors, but the gap widened more (at a higher rate) in the low-tech and resource-intensive industries than in the medium-/high-tech industries. Finally, also Romania succeeded in closing the gap in the low- and the medium-/high-tech industries but started from an extremely low level.

Thus information on productivity catching-up seems to confirm in most instances the Gerschenkron hypothesis at the industrial level, i.e. that faster rates of catching-up can be achieved in industries in which the initial gaps were higher.

Table 2a

Nominal productivity and wage at EXR and unit labour costs, 1993 and 2000

	Wage			'Nominal productivity'			Unit labour costs[1)]		
	1993	Growth rate	2000	1993	Growth rate	2000	1993	Growth rate	2000
Czech Republic									
Manufacturing total	7.79	8.80	14.42	13.93	0.04	13.97	18.76	8.76	34.65
Low tech	8.50	8.77	15.93	16.44	-0.74	16.63	18.47	9.52	33.76
Resource intensive	6.97	8.95	13.34	15.72	-4.81	13.88	20.47	13.76	66.95
Medium-high tech	7.36	9.63	14.25	11.47	2.52	13.46	21.66	7.11	35.48
Hungary									
Manufacturing total	11.22	0.69	11.77	18.22	7.79	31.45	22.82	-7.51	13.49
Low tech	12.02	0.87	12.70	17.28	3.04	21.10	27.92	-2.58	23.65
Resource intensive	11.52	0.94	12.52	16.79	-2.41	14.29	39.73	2.95	40.41
Medium-high tech	10.73	1.53	11.87	13.91	13.52	49.93	28.72	-12.39	9.23
Poland									
Manufacturing total	7.94	9.60	15.54	15.58	2.98	19.19	20.10	6.62	31.96
Low tech	8.43	9.56	16.64	15.89	3.16	19.89	22.43	6.40	33.56
Resource intensive	7.86	9.47	15.44	14.40	1.48	16.69	23.96	7.99	39.53
Medium-high tech	7.88	10.28	16.35	11.54	6.32	17.87	28.33	3.96	36.19
Slovak Republic									
Manufacturing total	6.71	6.71	10.74	15.42	-2.74	12.72	13.51	9.46	26.18
Low tech	7.13	8.38	13.12	17.78	-5.37	12.56	14.53	13.75	34.60
Resource intensive	6.16	6.14	9.38	12.27	0.49	12.10	17.57	5.65	26.75
Medium-high tech	5.98	7.97	11.41	9.17	2.92	22.63	20.55	5.05	24.37
Slovenia									
Manufacturing total	21.65	4.98	30.67	27.60	-3.15	22.15	43.87	8.12	77.46
Low tech	27.51	4.04	37.22	34.58	-1.91	30.89	52.18	5.95	71.76
Resource intensive	23.86	4.51	34.70	33.90	-5.55	29.43	41.70	10.06	77.00
Medium-high tech	19.63	5.39	28.49	28.02	-0.21	27.57	41.55	5.60	69.04
Bulgaria									
Manufacturing total	4.24	0.86	4.51	6.72	-3.31	5.33	13.49	4.18	18.07
Low tech	5.57	-0.78	5.20	7.61	-3.13	6.15	16.30	2.35	19.91
Resource intensive	5.05	-0.65	4.70	7.45	-2.47	5.30	19.22	1.82	19.36
Medium-high tech	4.31	0.07	4.19	3.49	-1.12	3.36	26.51	1.19	27.05
Romania									
Manufacturing total	2.93	2.98	3.61	5.34	-2.03	4.63	10.08	5.01	14.31
Low tech	3.27	1.63	3.67	7.05	1.03	7.90	11.13	0.60	11.38
Resource intensive	2.77	3.80	3.55	6.10	-3.54	4.37	9.92	7.34	15.83
Medium-high tech	2.88	5.46	4.24	2.61	2.37	3.11	20.68	3.09	25.23

[1)] Defined as wage at EXR/Productivity in PPP 1996

Table 2b

Productivity, wage and unit labour cost gaps at PPP, 1993 and 2000

	Wage			Productivity			Unit labour costs[1)]		
	1993 (AUT=100)	Growth rate	2000	1993	Growth rate	2000	1993	Growth rate	2000
Czech Republic									
Manufacturing total	28.91	3.62	37.26	41.51	0.04	41.62	47.59	4.49	65.16
Low tech	31.58	3.59	41.16	48.96	-0.74	49.55	47.18	5.80	65.52
Resource intensive	25.89	3.77	34.46	46.82	-4.81	41.35	54.62	7.91	135.73
Medium-high tech	27.32	4.45	36.81	34.18	2.52	40.11	54.94	3.75	71.73
Hungary									
Manufacturing total	28.28	0.59	29.47	49.16	7.79	84.84	61.52	-9.29	32.11
Low tech	30.29	0.77	31.79	46.61	3.04	56.91	77.35	-7.21	50.04
Resource intensive	29.05	0.85	31.33	45.28	-2.41	38.55	101.45	-3.34	71.86
Medium-high tech	27.05	1.43	29.72	37.52	13.52	134.69	72.10	-13.34	22.62
Poland									
Manufacturing total	22.61	5.40	33.00	39.48	2.98	48.63	51.12	3.76	66.52
Low tech	24.01	5.36	35.34	40.27	3.16	50.39	56.98	2.92	68.02
Resource intensive	22.41	5.27	32.79	36.48	1.48	42.30	55.17	5.47	79.70
Medium-high tech	22.44	6.08	34.72	29.24	6.32	45.29	76.72	0.30	74.89
Slovak Republic									
Manufacturing total	24.22	3.59	31.14	49.70	-2.74	41.02	50.23	3.33	63.41
Low tech	25.72	5.26	38.04	57.31	-5.37	40.49	56.77	5.74	80.61
Resource intensive	22.22	3.01	27.20	39.57	0.49	38.99	58.58	4.29	79.69
Medium-high tech	21.59	4.84	33.07	29.56	2.92	72.95	77.68	-1.13	58.35
Slovenia									
Manufacturing total	43.39	2.51	51.74	49.35	-3.15	39.60	86.60	2.28	101.61
Low tech	55.13	1.57	62.79	61.83	-1.91	55.22	105.14	1.19	107.08
Resource intensive	47.81	2.05	58.53	60.61	-5.55	52.62	77.83	6.41	110.56
Medium-high tech	39.34	2.93	48.06	50.10	-0.21	49.29	83.22	-1.95	81.52
Bulgaria									
Manufacturing total	7.19	-6.90	4.44	31.45	-3.31	24.94	79.32	-5.24	54.96
Low tech	9.45	-8.54	5.12	35.63	-3.13	28.80	90.06	-5.56	66.33
Resource intensive	8.56	-8.40	4.63	34.88	-2.47	24.80	100.58	-5.98	64.10
Medium-high tech	7.30	-7.69	4.13	16.34	-1.12	15.75	135.35	-5.38	87.53
Romania									
Manufacturing total	15.67	-2.91	12.79	29.04	-2.03	25.20	51.51	1.09	55.60
Low tech	17.50	-4.26	13.02	38.37	1.03	43.01	49.34	0.35	48.14
Resource intensive	14.82	-2.09	12.57	33.17	-3.54	23.80	56.65	1.79	66.37
Medium-high tech	15.44	-0.43	15.05	14.19	2.37	16.93	99.40	4.05	123.16

[1)] Defined as wage at PPP/Productivity at PPP

4.2 Wage rates

With respect to wage rates one can observe the following pattern. First, the gaps in wage rates are much more even across sectors than was the case with productivity. The gaps in wage rates (at current nominal exchange rates) extended from Slovenia with a level of about 20% the Austrian wage rate level in 1993 to Romania with only 3%. Second, and this is a very important point for the comparative cost dynamic, the growth (or closure) rates for wage rates were much more similar across sectors than was the case for the (differential) productivity growth rates.

4.3 Unit labour costs

The relative movements of wage rates and productivity determine the evolution of unit labour costs which is, of course, an important measure of the general (cost) competitiveness of countries but more importantly, for our purposes, of the relative competitiveness of different industries.

Looking at the dynamics, we can see that in aggregate manufacturing the wage versus productivity growth was such that over the period 1993-2000 unit labour costs were rising (relative to Austria) in all countries with the exception of Hungary (see Table 2a). In Hungary, the unit labour costs were falling quite strongly due to a very strong performance in relative productivity growth and very moderate relative wage growth. In Bulgaria and Romania one can see a moderate wage growth but an increase in the productivity gap relative to Austria. In the other countries, wage growth is higher than productivity growth, leading to rising unit labour costs relative to Austria.

Differences in the dynamics across industry groupings are remarkable especially for those sectors in which countries experienced large productivity growth rates (as wage growth is rather similar across sectors). Especially Hungary reduced relative unit labour costs in the medium-/high-tech sectors from 66% (the Austrian level) in 1993 to about 22% in 2000.

The important point which emerges from cross-industry comparisons is that for some countries the productivity catching-up (closure of the gap) is rather rapid in the medium-/high-tech industries in which the initial gaps were the highest. We reiterate the important point that this pattern very much confirms the ‘Gerschenkron hypothesis’ as applied to the industry level (and as stated in the introduction of the paper). For other countries no such differential productivity catch-up can be observed; in the language of Abramovitz, such countries either did not have the ‘capabilities’ or did not mobilize these to make use of the high learning (and technology transfer) potential in those industries in which the initial technological gaps were the highest. On the other hand, we observe that the pattern of wage catching-up (or wage growth) is much more even – than productivity

growth – across sectors, and hence comparative cost structures move in favour of those sectors which experience faster productivity catching-up; in Hungary and to a lesser degree also in a number of other CEECs these are the medium- to high-tech sectors. This is exactly the pattern which was also found in research on the dynamics of comparative costs across a much wider range of catching-up economies (see Landesmann and Stehrer, 2001). Let us now move on to examine whether these underlying patterns of comparative cost dynamics get also revealed in the evolving trade structures of CEE economies.

4.4 Convergence

Finally we report a regression analysis on productivity catching up where we applied the concept of β-convergence at the industrial level. Pooling all industries (i.e. the ten industries classified above) and all ten countries (i.e. including the Baltics as well) we estimated the following catching-up equation:

$$g_i^c = \beta GAP_i^c + d_i + d^g + \varepsilon_i^c$$

In this regression we allowed further for country groups[39] d^g (CEEC-5, CEEC-2, Baltics) and industry-specific effects d_i. Table 3a reports the results for the whole sample (including all ten countries); estimates over the period 1993-2000.

As one can see, we find significant convergence for the whole sample at a rather high rate; the implied half time ($\ln 0.5 / \beta$) is about 10 years. For the Gerschenkron hypothesis we must however distinguish industry (group) specific slope coefficients. Thus we estimated the following equation:

$$g_i^c = \alpha + \sum_{j=1}^{3} \beta_j GAP_{i(i \in J)} + d_i + d^g + \varepsilon_i^c$$

i.e. we allowed for different slope coefficients for the three industry groups. Results are presented in Table 3b.

[39] The group dummies refer to the group of CEEC-5 (Czech Republic, Hungary, Poland, Slovakia, Slovenia), CEEC-2 (Bulgaria, Romania) and the Baltic states.

Table 3

Productivity convergence

(estimation period: 1993-2000)

Table 3a

Total sample (10 industries, 10 countries)

(Dummies not reported)	
Coeff.	-0.069
p-value	0.003
Obs.	98
F-value	3.57
R^2	0.353
R^2 adj.	0.254

Table 3b

Total sample (10 industries, 10 countries); different slope coefficients

(Dummies not reported)	
Low-tech	-0.109
p-value	0.015
Resource-intensive	-0.091
p-value	0.004
Medium-tech	-0.035
p-value	0.239
Obs.	98
F-value	3.37
R^2	0.379
R^2 adj.	0.266

Table 3c

Total sample (10 industries, 10 countries); different slope coefficients

(Dummy for DM; Dummies not reported)	
Low-tech	-0.048
p-value	0.016
Resource-intensive	-0.045
p-value	0.023
Medium-tech	-0.046
p-value	0.015
Obs.	98
F-value	2.47
R^2	0.160
R^2 adj.	0.095

Here we find significant convergence for the low-tech and resource-intensive industries, however, no convergence for the medium-high-tech industries. Further industry-specific effects are no longer significant; only industry 10 (DM) shows a significantly different pattern. Introducing a dummy for industry DM only, all slope coefficients become significant as well as of similar magnitude and imply a half-time of about 15 years. This result confirms our weak Gerschenkron hypothesis. On the other hand, the fact that the coefficients are rather similar implies that we cannot find a strong Gerschenkron effect for the whole sample. This does not however mean that the strong Gerschenkron effect does not take place in specific industries and specific countries. Indeed, having a closer look at the data reveals that especially industry DM performs rather strongly in Hungary, Poland, Lithuania and the Czech Republic.

Thus we conclude that although the strong Gerschenkron effect is not a general phenomenon in the CEECs, specific industries (especially DM) in specific countries are however following this pattern.

5 Trade performance and trade specialization

In this section we start with an overview of broad sectoral patterns of trade performance and then move towards a more detailed qualitative examination of trade specialization. As will be seen below, the analysis of evolving patterns of trade specialization will turn out to be consistent with the previous observations regarding the dynamics of differentiated productivity catching-up (across countries and industries) and the implications drawn from this regarding comparative cost dynamics. To complete the analysis of trade performance we shall show that indicators of product quality up-grading (measured by the closure of export price gaps) also support the picture drawn here regarding the evolution of comparative advantage dynamics across the different CEE economies.

5.1 Trade specialization in manufacturing

In order to analyse structures and tendencies of trade specialization of CEECs within manufacturing we use the Comext database which collects all trade with the EU countries as reporting countries. The database includes data at a very detailed (8-digit) level. The very detailed level will be used in section 5.2 when examining relative export prices as indicators for relative product quality. In this section we shall examine trade structures at the level of industry groupings which themselves are constructed as aggregates of industries defined at the 3-digit NACE level. The industry groupings used are the same ones which were defined for the series of *European Competitiveness Reports* (see European Commission, 1999 and 2000) and the *wiiw Competitiveness study* (wiiw, 2001).

Earlier studies (see e.g. Landesmann, 2000) have shown that the Central and East European countries' trading structure with the EU-12 started in 1989 with a profile typical of less developed economies: the representation of exports of the labour-intensive industrial branches was above-average (in relation to EU imports as a whole), in the capital-, R&D- and skill-intensive branches below-average (particularly in the latter two), while the representation of exports of energy-intensive branches was above-average – which reflected the heritage of cheap energy supplies within the CMEA. Over time, important changes took place in the CEECs' export structure to the EU and in the revealed comparative advantage indicators (*RCAs*) in the different categories of industries. The most remarkable change took place in Hungary: from sizeable deficits in its export structure in the areas of capital-, R&D- and skill-intensive industries, these deficits either eroded completely or turned into surpluses. This pattern was followed in a much less spectacular manner by the Czech Republic and Poland, where deficits in the representation of skill-, R&D- and capital-intensive branches were also reduced. For these economies and also for the Slovak Republic the relatively strong presence of energy-intensive branches declined substantially, while this was not the case with Romanian and Bulgarian exports to the EU (particularly in the latter case, dependence upon energy-intensive exports to the EU increased markedly until 1998). Also the picture with respect to labour-intensive industries was remarkably different in the cases of Romania and Bulgaria, on the one hand, and the CEEC-5 on the other: in the first two, labour-intensive branches became the predominant segment of their exports to the EU, while the dependence upon labour-intensive branches got somewhat reduced in the other countries.

Discontinuity in statistics does not allow us to present a full analysis of patterns of trade specialization going back to 1989 and we focus instead on the period 1995 to 2000 (from 1995 onwards 15 EU reporting countries are represented in the Comext database and consistent CN-NACE classification converters can be used). As mentioned above we shall employ for this analysis a qualitative grouping of industries (derived from an aggregation of 3-digit NACE industries) which was being used in the EU Competitiveness Reports and has hence the advantage of immediate comparability with the analysis conducted there for the EU member countries. Two 'taxonomies' are applied: one based on the use of cluster-analytic techniques where industries are clustered (and industry groupings identified) by the use of a number of industrial organization and input use criteria (*taxonomy I*). This led to the distinction of five industry groupings: mainstream, labour-intensive, capital-intensive, marketing-driven and technology-driven. In the other taxonomy (*taxonomy II*) industries are grouped by skill intensity (low-skill, medium-skill / blue-collar, medium-skill / white-collar, high-skill). The correspondence between NACE 3-digit industries and the two taxonomies can be seen in Appendix Table A1 and more detail on the underlying methodology can be obtained from Peneder (2001).

Table 4

Export structure of CEECs compared to EU-North and EU-South

Table 4a

Export shares (taxonomy I – factor intensities) – differences to EU-North

	Czech Republic		Hungary		Poland		Slovak Republic		Slovenia		Bulgaria		Romania	
	1995	2000	1995	2000	1995	2000	1995	2000	1995	2000	1995	2000	1995	2000
1 mainstream	7,65	8,95	-0,83	-3,42	-4,37	-0,56	-1,34	2,02	6,96	7,84	-10,32	-8,95	-7,28	-5,13
2 labour-intensive	14,37	8,13	11,11	2,07	25,88	19,44	13,59	8,90	16,64	12,58	10,46	21,50	32,33	35,84
3 capital-intensive	0,36	-4,10	-3,09	-10,15	1,70	-3,35	13,79	1,96	-5,52	-3,09	25,41	16,53	3,68	-7,99
4 marketing-driven	-6,22	-4,47	-1,07	-4,85	-5,44	-2,73	-7,80	-4,94	-7,99	-5,01	-0,58	-0,03	-2,59	3,08
5 technology-driven	-16,16	-8,51	-6,12	16,35	-17,77	-12,80	-18,24	-7,95	-10,10	-12,32	-24,97	-29,05	-26,14	-25,79

	Estonia		Latvia		Lithuania		EU-South		EU-North (Shares)	
	1995	2000	1995	2000	1995	2000	1995	2000	1995	2000
1 mainstream	-10,66	-12,24	-14,21	-15,27	-14,88	-12,46	-6,60	-7,37	21,67	20,82
2 labour-intensive	27,39	18,06	20,75	46,93	22,49	34,18	12,37	1,84	11,39	11,60
3 capital-intensive	8,01	-5,51	31,36	7,99	22,38	9,33	-3,23	2,56	23,81	23,37
4 marketing-driven	-8,00	-6,33	-10,90	-8,12	-6,26	-3,63	4,56	7,00	15,53	11,62
5 technology-driven	-16,73	6,01	-27,00	-31,53	-23,74	-27,42	-7,11	-4,02	27,60	32,59

Table 4b

Export shares (taxonomy II – skill intensities) – differences to EU-North

	Czech Republic		Hungary		Poland		Slovak Republic		Slovenia		Bulgaria		Romania	
	1995	2000	1995	2000	1995	2000	1995	2000	1995	2000	1995	2000	1995	2000
1 low-skill	6,54	-3,32	9,41	-7,79	17,08	4,77	12,68	1,42	3,94	-0,08	38,28	45,81	38,06	36,64
2 medium-skill/blue-collar	7,33	16,52	3,92	9,36	11,27	20,15	5,80	13,82	12,85	16,61	-13,42	-14,23	-3,90	-5,40
3 medium-skill/white-collar	-7,11	-8,09	-2,34	0,92	-14,05	-11,91	-5,43	-7,53	-6,39	-7,20	-11,90	-20,14	-19,28	-17,64
4 high-skill	-6,77	-5,11	-10,99	-2,49	-14,30	-13,01	-13,05	-7,71	-10,40	-9,34	-12,96	-11,44	-14,87	-13,60

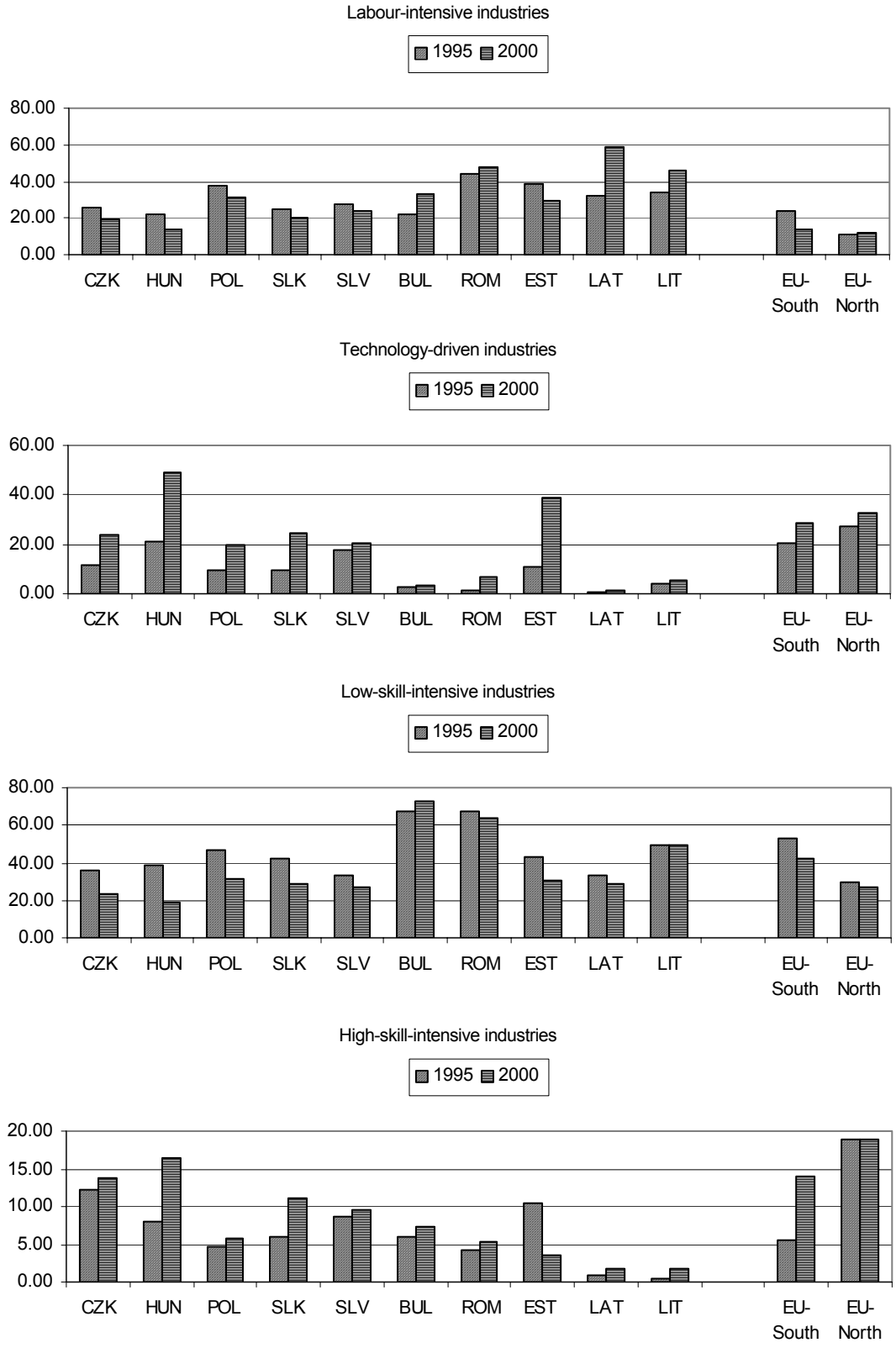
	Estonia		Latvia		Lithuania		EU-South		EU-North (Shares)	
	1995	2000	1995	2000	1995	2000	1995	2000	1995	2000
1 low-skill	13,29	4,01	3,68	2,10	19,75	22,05	23,36	14,88	29,41	26,97
2 medium-skill/blue-collar	2,76	7,95	3,08	24,77	-5,28	-1,34	1,67	-2,75	19,59	20,56
3 medium-skill/white-collar	-7,50	3,26	11,25	-9,75	4,07	-3,56	-11,49	-7,28	32,00	33,62
4 high-skill	-8,55	-15,21	-18,00	-17,12	-18,53	-17,15	-13,54	-4,85	19,00	18,86

Note: Differences of export shares between CEECs and EU-South to EU-North; export shares for EU-North.

Source: Comext data base and own calculations.

Figure 4

Shares of different industry groupings in exports to EU



Source: Comext database; own calculations.

In Table 4 we have calculated (in Table 4a for taxonomy I and in Table 4b for taxonomy II) the percentage points by which certain industry groupings are more or less represented in the export structures of the CEECs compared to the export structure of the EU Northern countries (all EU countries except for Spain, Portugal and Greece). The figures for the EU Southern cohesion countries have been similarly calculated as differences in the percentage representation of their exports to the EU in the different industry groupings relative to that of the EU-North. Finally for the EU Northern countries the actual percentage representation of the industry groupings in their total (intra-EU) exports are presented. In Figure 4 we have picked out the shares in countries' exports to the EU of those industry groupings where the qualitatively most striking differences can be observed: the labour-intensive and technology-driven groupings of taxonomy I and the low-skill and the high-skill groupings of taxonomy II.

We can see the following:

– In general there is still a relatively stronger representation of the labour-intensive branches in the CEECs export structures to the EU (compared to the EU Northern countries' export structures). For Poland, Bulgaria, Romania and the Baltic states this dependence is very strong – in fact much stronger than for the EU-South, and for Bulgaria, Romania, Latvia and Lithuania this dependence has, furthermore, sharply increased over the period 1995 to 2000. For the other countries, this 'over-representation' of labour-intensive branches – relatively to the advanced EU member countries – has declined, for some quite sharply. For Hungary a (branch) specialization in this direction no longer exists.

– With respect to technology-intensive branches, which accounted for about 33% of EU Northern EU exports, the CEECs started off in 1995 (earlier figures would indicate that this was even more the case before that) with sizable 'deficits' in these areas. Over the period 1995 to 2000 these deficits have declined substantially in Hungary, the Czech and Slovak Republics, Estonia (in fact, in Hungary and Estonia they have turned into surpluses), and in Poland more mildly. In Bulgaria, Romania, Latvia and Lithuania these deficits have remained at very high levels and in most cases have further increased.

– The picture is similar if we look at the two extreme categories of *taxonomy II*, i.e. the relative representation of low-skill- and high-skill-intensive industries respectively in the countries' export structures to the EU. Again we can see that the CEECs all started off with an over-representation of the low-skill-intensive branches in their exports to the EU (just as the Southern EU countries did). This overrepresentation fell quite dramatically in the case of a number of CEECs (the Czech and Slovak Republics, Hungary, Poland, Slovenia and Estonia), but again remains at a very high level in Bulgaria, Romania and Lithuania.

– In the high-skill industries, deficits remain in all CEECs (as they do in the Southern EU countries) but the picture shows again quite a bit of differentiation across the CEECs, so that the percentage differences (to EU-North) are below 10% in the case of the Czech and Slovak Republics, Hungary and Slovenia.

Thus the picture which emerges is of strong differentiation across the CEECs by a number of indicators of revealed comparative advantage (see also the wiiw Competitiveness Report, wiiw, 2001, for further indicators and analysis) in their structures and, furthermore, tendencies of trade specialization. While some of the CEECs have reduced dramatically (or even lost completely) their inter-industry specialization towards labour-intensive, low-skill branches and made some inroads into technology-driven and skill-intensive branches, others show clearly that their specialization structures got 'locked in' (at least so far) in the labour-intensive, low-skill sectors. We take this as support of our basic hypothesis that catching-up patterns can give rise to '*comparative advantage switchovers*' if countries can utilize the high potential for productivity growth (and, as we shall see below, of product quality up-grading) in industries in which the initial technological (and product quality) gaps are rather high. Alternatively, countries which cannot utilize this potential remain locked in a specialization pattern which remains the typical one between (technologically) advanced and less advanced economies.

However, we have still to be cautious at this stage: What we have analysed in this section was a distinct pattern of *inter-industry specialization* which emerges in trade between the CEECs and the EU. However, the analysis of inter-industry specialization is only one aspect of trade specialization; the other would be *intra-industry specialization*, i.e. the specialization on particular production stages or on product quality segments within an industry. This will be the subject of the next section 5.2.

Before we come to this, we just want to point out that there is also well-established strong evidence (see Landesmann, 2000 and wiiw, 2001) for *growing intra-industry trade* between the more advanced CEECs and the EU. This is in line with the 'new' trade theory which suggests that trade among industrialized countries is motivated by product differentiation and economies of scale. Measured by Grubel-Lloyd indices, intra-industry trade has been most pronounced in EU trade of the Czech Republic, Slovenia and Hungary whereas it has been lowest in Latvia, Lithuania and Romania. Moreover, over the period 1995-2000, intra-industry trade has been growing most rapidly in the Czech Republic and (less pronounced) in Poland; it stagnated either at a relatively high level in Hungary, Slovenia and the Slovak Republic, or at a low level in the remaining candidate countries. Compared with the early period of transition (and even more so with the pre-transition period), intra-industry trade between the more advanced CEECs (the Czech and Slovak Republics, Hungary and Poland) and the EU has increased further whereas it has more or less stagnated in Bulgaria and Romania. Judging also by the high shares in exports and imports, intra-

industry trade (including outward processing trade) has been of particular importance in textiles as well as in electrical, optical and transport equipment. Again, the evidence on the levels and rates of change of intra-industry trade points towards a strong differentiation amongst the CEECs.

5.2 Product quality and quality up-grading of CEE exports to the EU

In this section we use export unit values to proxy differences in product quality of different producers of tradable goods (in our case CEE exporters and EU producers). If products are defined at a very detailed level and comparisons are made in the same market (in our case, the EU market) then – under certain conditions concerning market structure – differences in price do reveal differences in 'product quality' (including consumer loyalty to particular producers, marketing and product design differences, after sales services, etc.). The importance of price differences in trade even at the most detailed level of product classifications (in our case at the 8-digit CN level) has given rise to a number of studies of the phenomenon of '*vertical intra-industry trade*', i.e. trade in products with quality differences (see Greenaway, Hine and Milner, 1994, Fontagné and Freudenberg, 1997, Jansen and Landesmann, 1999). It has been pointed out in previous studies that 'vertical intra-industry trade' is particularly relevant in trade relations between East and West European countries (see Burgstaller and Landesmann, 1999, Aturupane, Djankov and Hoekman, 1999).

We shall present some of the most recent evidence on the present position of the CEE producers in vertical intra-industry trade relations with the EU. The analysis of whether CEE producers trade at the low-, medium- or high-quality end of the product range can serve as an important indicator for industrial strengths and weaknesses of CEE producers and, furthermore, can give rise to interesting analyses of emerging production networks (see Baldone et al, 2001). We shall also analyse whether there is evidence a narrowing down of the 'price/quality gaps' between CEE and EU producers and how this 'product quality catching-up' is proceeding across the different candidate countries. In the following we shall briefly introduce the methodology adopted to analyse product quality gaps at the product and industry level.

5.2.1 Methodology of the calculation of relative unit values

In the calculation of relative unit values of traded products we use the Comext trade database at the most detailed 8-digit level. Denoting the value of exports to the EU of commodity i by country c in year t by v_{it}^{c} and the quantity (measured in tons) by x_{it}^{c}, the export unit value is defined as

$$u_{it}^{c} = v_{it}^{c} / x_{it}^{c} \quad (1)$$

The unit values of country c's exports to the EU are then compared to the unit values of total EU imports (from the world, including intra-EU trade) by calculating the logs of the unit value ratios

$$r_{it}^{c} = \ln (u_{it}^{c} / u_{it}^{EU}) \quad (2)$$

where u_{it}^{EU} denotes the unit value of total EU imports for a particular commodity i in year t. Taking the logarithm of $(u_{it}^{c} / u_{it}^{EU})$ ensures a symmetric aggregation across products for ratios larger and smaller than 1 (see below). In logs, the ratio is thus larger (smaller) than zero if the export unit value of country c is larger (smaller) than the unit value of total EU imports.

We shall not present information at the very detailed (8-digit) product level but aggregate the unit value ratios to the level of (3-digit NACE) industries and further to industry groupings. This is done by constructing a weighted sum of the unit value ratios r_{it}^{c} across the products belonging to a particular industry j (or an industry group). The weight used for a particular commodity i in such an aggregation is the share of its export value in the industry's exports of country c. Denoting the set of commodities i belonging to an aggregate j (industry or industry grouping) by $i \in I(j)$ the weights are calculated as

$$w_{it}^{c} = v_{it}^{c} / \sum_{i \in I(j)} v_{it}^{c} \quad (3)$$

The unit value ratio for a particular aggregate j is then

$$r_{jt}^{c} = \sum_{i \in I(j)} r_{it}^{c} w_{it}^{c} \quad (4)$$

This measure can be interpreted analogously to the unit value ratios for a particular commodity as mentioned above. For ease of interpretation we report however

$$uvr_{jt}^{c} = \exp(r_{jt}^{c}) - 1 \quad (5)$$

to which we also refer as *unit value ratios* of industry (or industry grouping) j. This measure can then be more easily interpreted than the log values, namely as the percentage deviation from the average EU import unit value. We shall also refer to these ratios as '*export price/quality gaps*'; they can be positive or negative.[40]

[40] As the Comext trade data can contain errors at the detailed product level, we have – in our procedure of calculating unit value ratios – deleted very extreme levels of relative unit values. The criterion we used to classify an observation as an outlier was derived from the levels of the so-called 'adjucant values' in the distribution of the unit value ratios in the following way: The lower (upper) adjucant values are defined as the 25^{th} (75^{th}) percentile of the data minus (plus) 1.5 times the interquartile range (i.e. the range from the 25^{th} to the 75^{th} percentile). The lowest adjucant value in the

5.2.2 Aggregate export price gaps and numbers of products exported to the EU

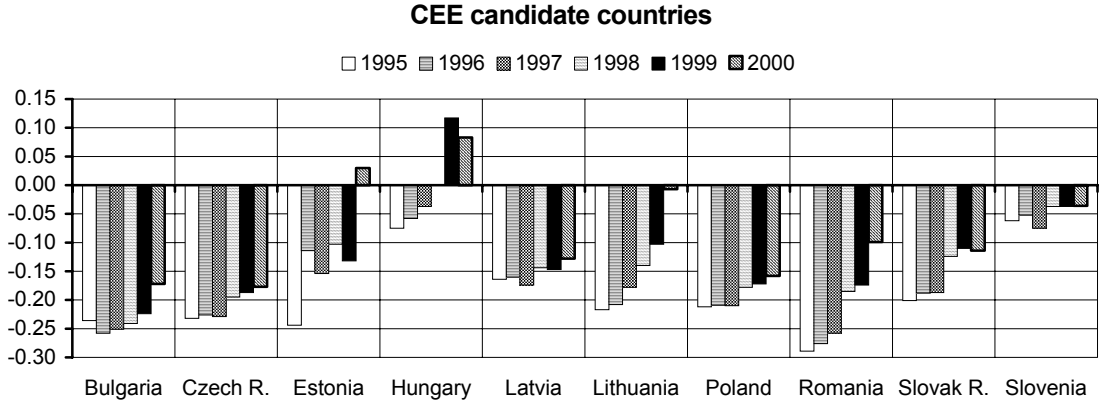
As a first overview of relative unit value ratios uvr_t^c (or 'export price/quality gaps') at the aggregate level (i.e. calculated across all manufacturing products traded with the EU) we can see in Figures 5a and 5b a comparison of these unit value ratios between the ten CEE candidate countries and the EU members for the years 1995 to 2000.[41] Remember that the zero level refers to the average price line for total EU imports and the values off the zero price line can be interpreted as (positive or negative) export price gaps (in %) relative to that average.

In the first instance, we can see that – in the aggregate – EU members sell their products at prices above those of total EU imports, while candidate countries sell their products on EU markets below those of total EU trade. Exceptions amongst the EU member states are the Southern EU countries (Greece, Spain and Portugal), which sell at or just below the measured average (and weighted) price levels of total EU imports.

One can see some remarkable differences across the candidate countries. In 1995 the best performing country was Slovenia with a gap of about 6.4% and Hungary with 7.5%. Latvia performed third with about 16% followed by Slovakia with a 20% gap. The other countries experienced gaps of 22% (Latvia) to 29% (Romania). Over time all countries succeeded in catching up in export unit prices, only Bulgaria remained more or less stable

Figure 5a

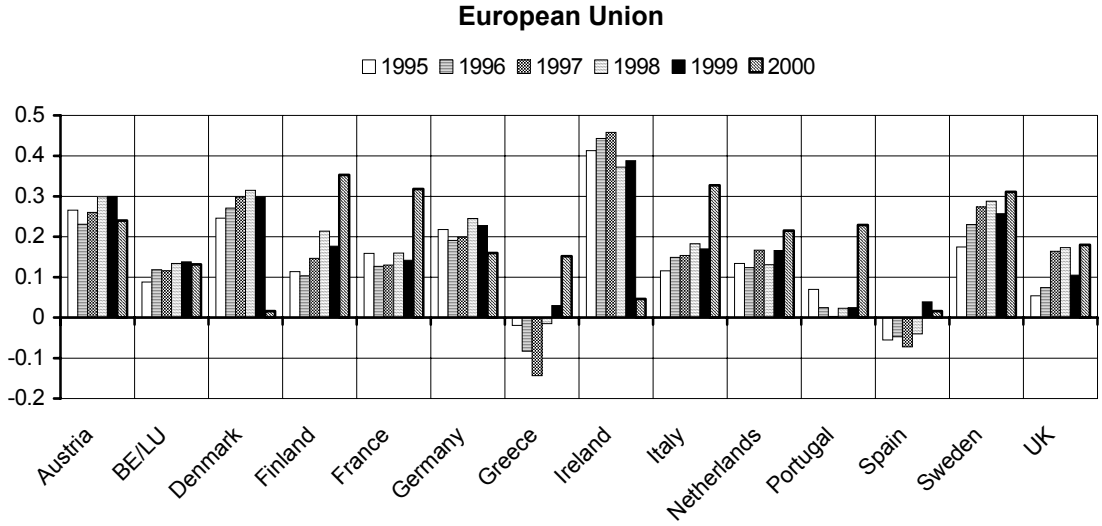
Export price gaps – all manufacturing products traded with the EU



data was found for Bulgaria in 1995 with about 2.5 (≈ -ln 12) and the highest adjucant value for Slovenia in 1999 with about 1.75 (≈ ln 5.75). In the calculations we dropped observations where $r_{jt}^c > \ln | 20 |$, i.e. at a value larger than the highest and lowest adjucant values in the sample. This means that observations where the ratio (u_{it}^c / u_{it}^{EU}) was higher than 20 or lower than 1/20 have been classified as outliers and removed from the sample. Using this criterion we think that extreme outlier values have been removed without biasing the data.

[41] Because of a break in the NACE industry classification and hence in the product-to-industry converters, we shall limit our analysis in this section to the years 1995 to 2000. For an analysis of developments over the earlier period, see the studies by Burgstaller and Landesmann (1999), and Stehrer, Landesmann and Burgstaller (1999).

Figure 5b



Note: Export price gaps have been calculated from detailed product-by-product comparisons and are expressed in percentage deviations from the average price of the products traded in EU markets (i.e. all imports to the EU including intra-EU).

Source: Own calculations based on Eurostat Comext Database.

at a gap of 23-25%. Hungary and Slovenia were the leaders also in 2000, although these two countries have changed their ranking. The two Baltic countries (Estonia and Lithuania) also experienced remarkable catching-up processes. Further, Romania reduced its gap from 29% in 1995 to about 17% in 2000.

We now move on to check on '*product coverage*', i.e. the range of products exported by country c relative to the range of products traded in the EU market as a whole. This indicator can be seen as a measure to which degree a country participates in the range of (horizontally or vertically) product differentiated trade (within an industry or industry grouping or in the aggregate). The number of products exported by a country depends, of course, on the size of the economy (one expects that smaller economies export a smaller range of goods than larger ones) but also other determinants such as technologies adopted, abilities to participate in horizontal product differentiation, transport costs, market barriers, etc. Figures 6a and 6b present the product coverage ratios (i.e. the number of products exported by country c relative to the total number of products imported by the EU) in 1995 and 2000. Such product coverage ratios have also been calculated for individual industries and industry groupings but will not be presented here, although we shall refer to these in the text.

We can see that the CEE candidate countries with the highest coverage ratios (Czech Republic, Hungary and Poland) have product coverage ratios in line with those for Austria, Denmark and Sweden, but substantially below the smaller ('core') EU countries, Belgium and Netherlands, as well as the larger EU member states (France, Germany, Italy, Spain, UK). Romania, the Slovak Republic and Slovenia have product coverage ratios in line with

Finland, Ireland and Portugal, while the small Baltic states and Bulgaria show coverage ratios below that of Greece (the EU country with the smallest coverage). At this aggregate level, we can conclude that CEE candidate countries have reached coverage ratios below the 'old' EU member states, but quite close to the more recent entrants. Except for Bulgaria, the coverage ratios have increased for all candidate countries over the period 1995 to 2000, although at slow rates.

Figure 6a

Product coverage of CEE exports, EU-15 imports = 1

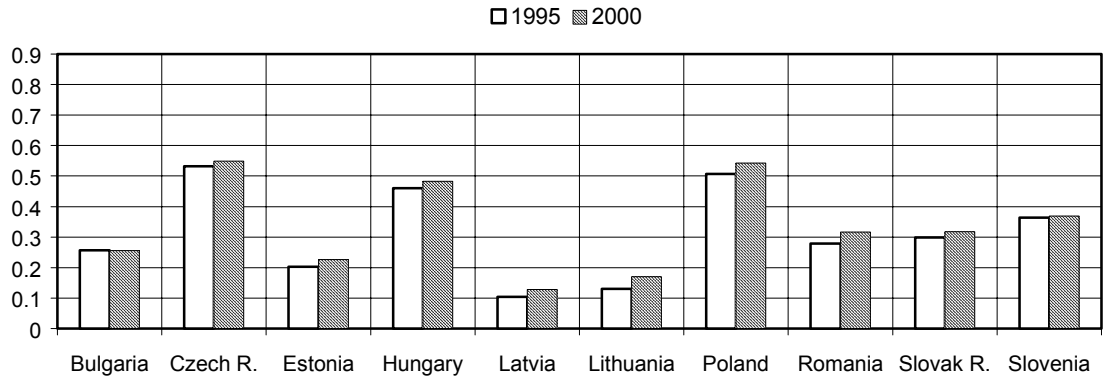
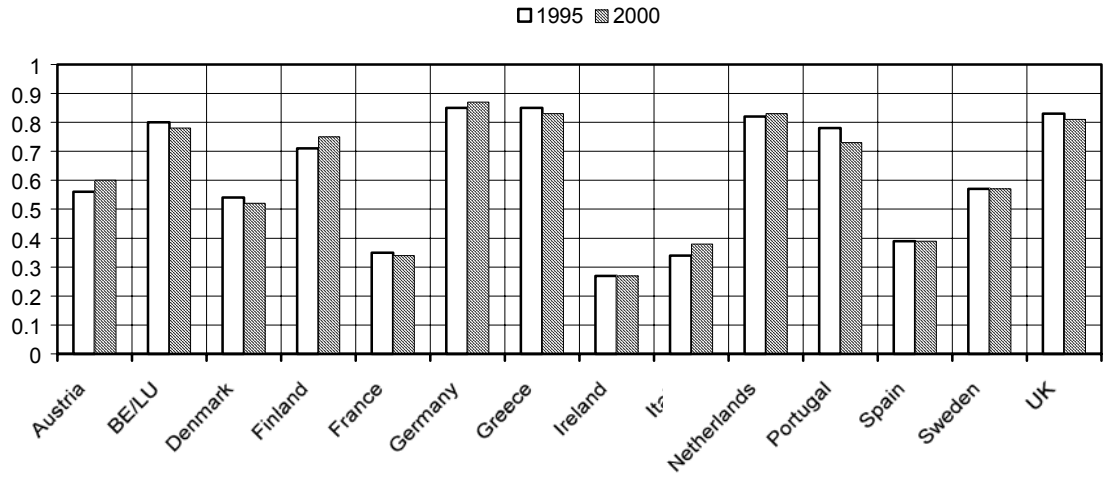


Figure 6b

Product coverage of EU exports, EU-15 imports = 1



Note: Product coverage refers here to the share of product items exported by a country to the EU relative to the total number of product items traded in EU markets (i.e. in total EU imports including intra-EU trade).

Source: Own calculations based on Eurostat Comext Database.

5.2.3 Unit value ratios at the level of industry groupings

We now return to the taxonomies used in section 5.2 which led to the identification of different industry groupings either by factor input criteria or industrial organization features and look at variations in the positions of CEE producers in unit value ratios across the different industry groupings thus identified.

Table 5 presents the calculated unit value ratios uvr_{jt} ('export price gaps') across the five identified industry clusters and for the whole group of CEE candidate countries. The last column also shows the (per annum) growth rates of unit value ratios over the period 1995 to 2000.

Table 5

Unit value ratios for taxonomy I (factor inputs) – aggregate over all CEE candidate countries, in %

Industry clusters	1995	1996	1997	1998	1999	2000	p.a. growth 1995-2000
1 mainstream	-35.5%	-37.2%	-34.2%	-29.3%	-26.8%	-28.2%	1.46%
2 labour-intensive	-23.7%	-18.5%	-21.9%	-16.0%	-14.4%	-14.0%	1.94%
3 capital-intensive	-12.3%	-12.9%	-12.3%	-13.1%	-11.7%	-7.7%	0.91%
4 marketing-driven	-16.6%	-15.6%	-16.8%	-13.2%	-16.1%	-15.2%	0.29%
5 technology-driven	-23.4%	-21.3%	-16.2%	-10.2%	-2.5%	0.1%	4.71%

Note: Unit value ratios refer here to the ratios of export prices sold by a particular country to the EU (in the different industry categories) relative to the average import prices in total EU trades (in the respective industry categories).

Source: Own calculations based on Eurostat Comext Database.

We can see the following: The highest gap in 1995 was in the industries classified as 'mainstream' with a gap of about 35%. In labour-intensive and technology-driven industries the gap was about 23%. The best performer in 1995 was the group of industries classified as 'capital-intensive' with a gap of only 12%. Important for our story of the dynamics of catching-up is that the *growth rates were highest in the technology-driven industries* with an exponential (per annum) growth rate of about 4.7%, second highest in the mainstream industries with 1.5% and the labour-intensive industries with 1.9%. This pattern of growth changed the ranking of industries in 2000, where the technology-driven industries reached the average EU import price level. The mainstream industries show now the biggest gap with about 28%.

The pattern of the gaps and the catching-up in the particular classes for the individual candidate countries can be seen in Figure 7. In this figure the y-axes are scaled identically for all groupings of industries. The figures thus allow to compare levels and developments for countries and industry groups simultaneously. We can see that:

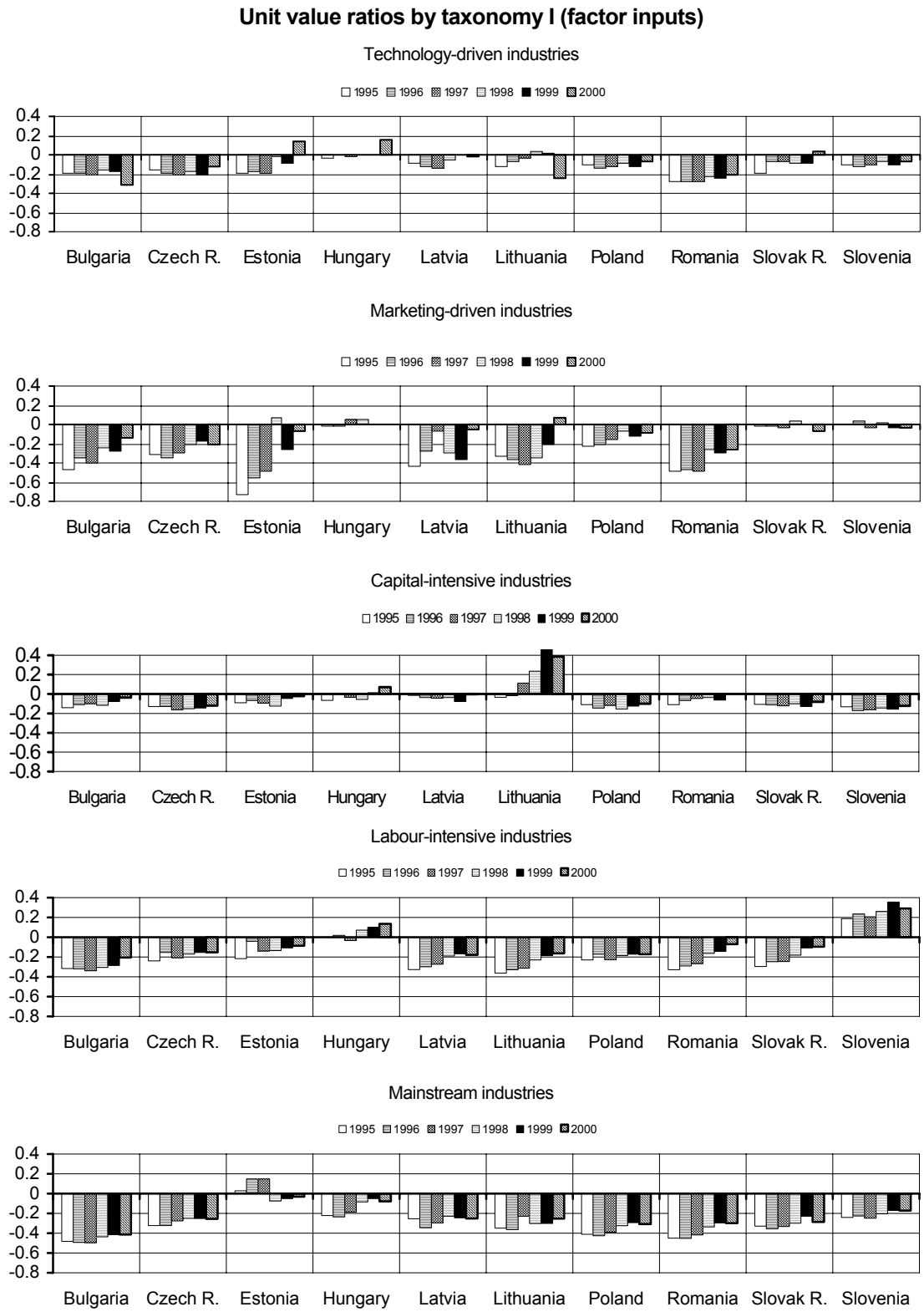
– In the technology-driven industries the most successful countries are Hungary, the Slovak Republic and Slovenia where the unit value ratios uvr_{jt}^{c} are at a level of about zero and have been strongly increasing for Hungary. The other countries had a gap in 1995 between 20% (Poland) and more than 70% (Estonia). There have been catching-up processes taking place in almost all countries (especially remarkable for Estonia). All the countries succeeded in diminishing the gaps which were between 10% and 30% in 2000. Hungary achieved above-average unit value ratios in this industry grouping (+20% in 2000).
– Such a catching-up process cannot be observed in the marketing-driven industries where the gap is more or less stable at about 10% to 20% for most countries. The best performers are again Hungary and Lithuania which succeeded in fully catching up with the average price levels. Other quite well performing countries are Estonia, Latvia, the Slovak Republic and Slovenia. On the other hand, Bulgaria, the Czech Republic and Romania show a gap of about 20% or even more.
– The capital-intensive industries were the industries for which the gap in 1995 was smallest with a gap of about only 12% as stated above. Here only very little convergence can be observed with the remarkable exception of Lithuania.
– In the labour-intensive industries the gap in 1995 ranges from 10% (Czech Republic, Estonia, Romania, Slovak Republic) to about 30% (Bulgaria). Here Slovenia sticks out with 'positive gaps' of +25% and Hungary also reached a level above the average.[42]
– Finally, the industries classified as mainstream show high gaps in 1995 (on average 35%) with at times remarkable catching-up processes taking place in all countries so that the gaps reach about 25% on average in 2000. Here the best performing country is Estonia with export unit values comparable to the EU average.

Further one may look at the number of products exported to the EU over time. The catching-up process in quality levels may stem from either an increase in quality of particular commodities or from the widening of the range of products exported in the more sophisticated types of industries.

Thus we take a look at the *product coverage ratios* in the five industry groupings. In order to control for a country's overall product coverage ratio, we look at the product coverage ratios in each of the industry groupings relative to the national average. Taking an (arithmetic) average of these relative coverage ratios in the different industry groupings across all candidate countries, we find that they have high relative coverage ratios in mainstream and labour-intensive branches (on average +37% and +75% respectively

[42] We should remark here that high relative export prices can also reveal that producers have become uncompetitive in certain branches. A closer analysis requires a joint examination of price and market share movements, a point developed by Aiginger in his analysis (Aiginger, 1997).

Figure 7



Note: Unit value ratios refer here to the ratios of export prices sold by a particular country to the EU (in the different industry categories) relative to the average import prices in total EU trades (in the respective industry categories).

Source: Own calculations based on Eurostat Comext Database.

above the national average in 2000) and have – again relative to the respective national product coverage ratios – a relatively low product coverage in the marketing- and the technology-driven industries (-36% and -34% respectively). Over time (i.e. over the period 1995-2000), however, the product coverage ratios increased (relative to the national average) the most in two areas: labour-intensive products (+7%) and in technology-driven products (+8%), and fell in the capital-intensive industries (-12%). We shall return with a summary assessment of these developments in coverage ratios after presenting the equivalent results obtained from applying taxonomy II based on skill groupings.

Utilizing the alternative classification (*taxonomy II* introduced above) industry groups are classified according to relative labour skill requirements. Again we first present in Table 6 the 'export price gaps' for the aggregate of the candidate countries by these four industry groupings over the period 1995-1999 and again the p.a. growth rates in the last column. The export price gaps for the different accession countries are then given in Figure 8 (the y-axes are again scaled identically to allow cross-industry comparisons).

Table 6

Unit value ratios for taxonomy II (labour skills) – aggregate over all CEE candidate countries, in %

Industry clusters	1995	1996	1997	1998	1999	2000	p.a. growth 1995-2000
1 low-skill	-13.7%	-13.6%	-12.9%	-8.9%	-8.0%	-7.6%	1.2%
2 medium-skill / blue-collar	-29.0%	-22.5%	-24.8%	-19.2%	-15.6%	-14.0%	3.0%
3 medium-skill / white-collar	-18.4%	-21.8%	-20.0%	-13.5%	-15.0%	-7.2%	2.2%
4 high-skill	-53.7%	-51.9%	-44.1%	-42.1%	-26.4%	-34.6%	3.8%

Note: Unit value ratios refer here to the ratios of export prices sold by a particular country to the EU (in the different industry categories) relative to the average import prices in total EU trades (in the respective industry categories).

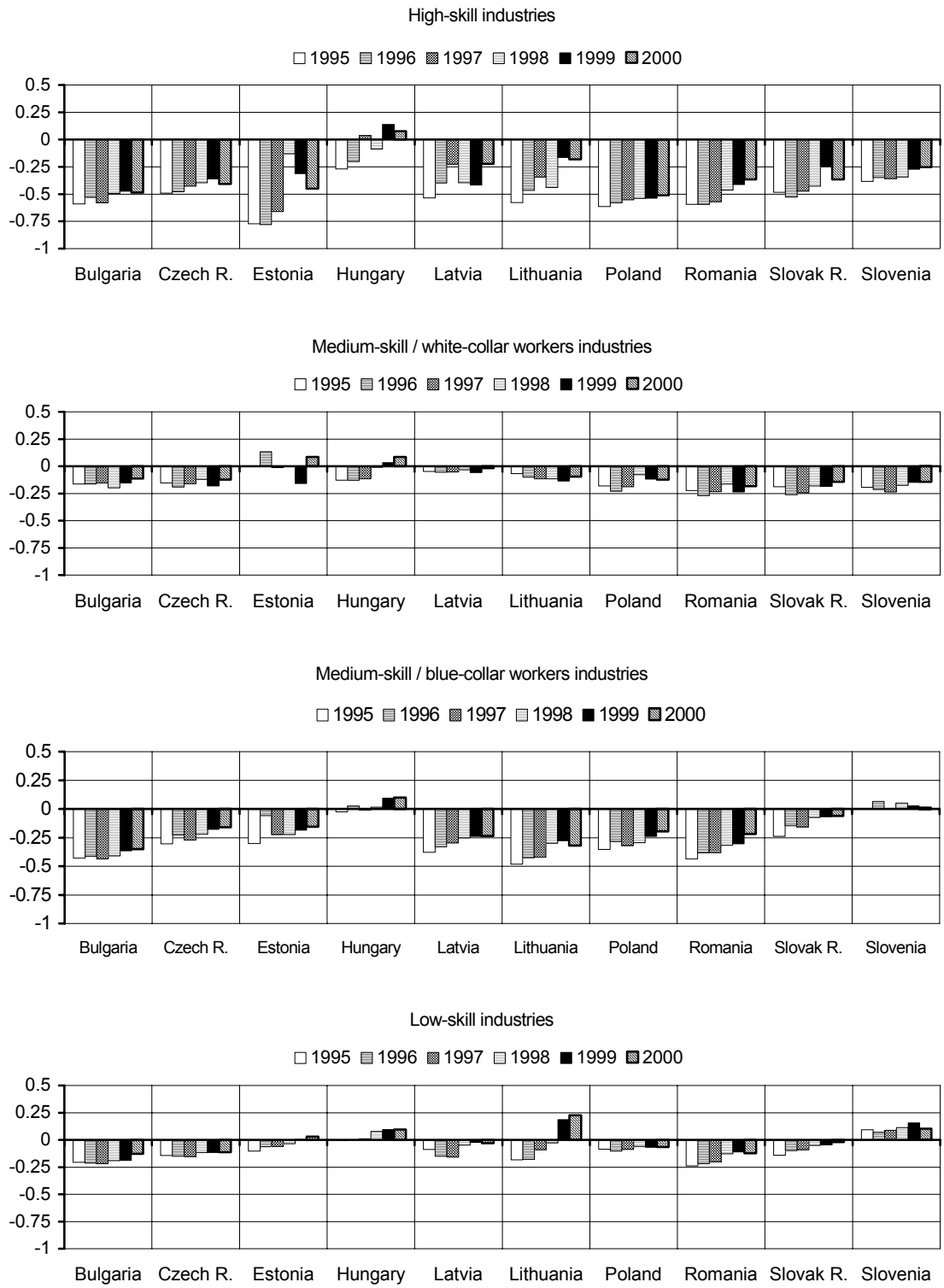
Source: Own calculations based on Eurostat Comext Database.

Table 6 shows that for candidate countries as a whole the largest gap in 1995 could be measured in the industries classified as 'high-skill-intensive' industries with a gap of about 50%. The smallest gap in 1995 could be observed in the 'low-skill-intensive' industries. Between the two medium-skill-intensive industry groupings the gap is smaller in the medium-skill/white-collar industries (with about 18%) compared to the medium-skill/blue-collar industries with about 30%. The highest growth rates of the unit value ratios over the period 1995 to 2000 occurred in the high-skill industries (the class of industries with the highest gaps in 1995) with an exponential growth rate of about 3.8% and for the medium-skill/blue-collar industries with a growth rate of about 3%.

Looking at Figure 8 we can again observe that the highest gaps in 1995 can be observed in the *high-skill* and *medium-skill/blue-collar workers industries* with gaps of about or even

Figure 8

Unit value ratios by taxonomy II (labour skills)



Note: Unit value ratios refer here to the ratios of export prices sold by a particular country to the EU (in the different industry categories) relative to the average import prices in total EU trades (in the respective industry categories).

Source: Own calculations based on Eurostat Comext Database.

more than 50% in some countries (especially in Bulgaria, Estonia, Poland and Romania). In the other two categories, *medium-skill/white-collar workers* and *low-skill industries*, the gap in 1995 was about 20% to 25%. But here are some remarkable country differences. Especially Hungary performed better than the other countries in all four categories and has by 2000 no negative export price gaps in any of the industry groupings and a particularly good performance in the high-skill grouping.

As to product coverage ratios, we just want to mention again the fact that with regard to movements over time, it is in the high-skill industries that the CEE product coverage ratios are rising the fastest compared to the other types of industry groupings; this is the case in all countries with the exception of Bulgaria. This means that (beside the quality improvement of individual commodities) it is the other component of a catching-up process which is particularly important in the high-skill industries, i.e. the widening of the range of exported products. This is in line with what we mentioned earlier for the technology-driven industries.

5.3 Regressions on export price catching-up

We now report the results of some simple cross-section regressions. The underlying data points used for the regressions are the export unit ratios by industry groupings and by country (see Figures 7 and 8). On average we saw that the gaps are highest (in 1995) in the high-skill industries followed by the medium-skill/blue collar industries. In the latter the range of gaps in 1995 is largest.

We shall first refer to the results using the skill taxonomy
1... low-skill
2... medium-skill/blue collar
3... medium-skill/white collar
4... high-skill

To get some estimates on the speed of convergence we estimated the following simple cross-section model:

$$\Delta y = \alpha + y_{1995} + \varepsilon$$

where Δy is the growth rate of the unit value ratio between 1995 and 2000. For the overall sample (i.e. pooling the regressions over industry types) we get the results shown in Table 7a):

Table 7

Convergence in unit value ratios (by skill intensity groups)

Table 7a

Total sample

	Total sample	Selected sample
Coeff.	-0.040	-0.061
p-value	0.049	0.000
Obs.	40	36
F-value	4.13	25.11
R^2	0.098	0.425
R^2 adj.	0.074	0.408

Table 7b

Total sample (selected), estimations by skill group

	low skill	med skill/ blue collar	med skill/ white collar	high skill
Coeff.	-0.044	-0.040	-0.072	-0.009
p-value	0.205	0.078	0.061	0.879
Obs.	9	10	7	10
F-value	1.95	4.07	5.83	0.02
R^2	0.218	0.337	0.538	0.003
R^2 adj.	0.106	0.254	0.446	-0.122

However, there are some data points which are outliers: Lithuania in the low-skill sectors, and Romania, Estonia and Hungary in the medium-skill/white-collar sector show very high growth rates. Dropping these data points we get the following results (see Table 7b). This second results performs much better as the R^2 is rising to 42%. The results show that the catching-up parameter is quite high. The half-time of catching-up is about 11 years (for the second estimation).

However, there are marked differences across industry groups: The next set of regressions are undertaken for each industry group separately:

As can be seen, convergence takes place only in the medium-skill/blue and medium-skill/white collar industry groups. Half-time is lower in the medium-skill/white collar group (Note however that the number of observations in these separate industry-group estimations is very small.) Thus significant convergence takes place only in the medium-skilled industries and the speed of convergence is faster in the medium-skill/white collar industries.

Next we refer to the alternative industry taxonomy:

1... Mainstream
2... Labour-intensive
3... Capital-intensive
4... Marketing-driven
5... Technology-driven

Table 8

Convergence in unit value ratios (by factor intensity industry groups

Table 8a

Total sample

	Total sample
Coeff.	-0.192
p-value	0.000
Obs.	50
F-value	17.49
R^2	0.267
R^2 adj.	0.252

Table 8b

Total sample, estimations by factor intensities

	mainstream	labour intensive	capital intensive	marketing driven	technology driven
Coeff.	-0.058	-0.029	0.005	0.007	-0.365
p-value	0.310	0.237	0.960	0.01	0.024
Obs.	10	10	9	10	10
F-value	6.81	1.63	0.00	0.01	7.68
R^2	0.460	0.169	0.000	0.001	0.490
R^2 adj.	0.392	0.066	-0.142	-0.124	0.426

Table 8c

Total sample (selected), estimations by factor intensities

	labour intensive	technology driven
Coeff.	-0.168	-0.087
p-value	0.063	0.098
Obs.	8	8
F-value	5.18	3.82
R^2	0.463	0.389
R^2 adj.	0.374	0.287

The results for the pooled sample are listed below (Table 8a). Again, we find quite high convergence parameters which are highly significant. Running the regressions on each industry group separately we can see that the pooled result is driven only by convergence in the 'mainstream' segment and the 'technology driven' segment (Table 8b).

The result in the latter case is however somewhat driven by quite high growth rates for Estonia and Romania. Dropping these two observations yields the results listed in Table 8c. The result for technology-driven industries remains significant at the 10% level, but the speed of convergence is significantly lower. Similarly, for industry group 2 ('labour-intensive'), Hungary and Slovenia show relatively high growth rates. We find high convergence also for this group of industries when these two countries are dropped from the sample. The dropped countries Hungary and Slovenia (i.e. countries with relatively high initial unit values) perform then even better than the other countries.

6 The allocation of foreign direct investment across branches

We finally look at two important factors which are generally regarded as important in determining the course of catching-up and the pattern of specialization of the Central and Eastern European countries. We refer here, firstly, to the role of foreign direct investments (FDI) as important carriers of technological and managerial know-how transfer and, secondly (in section 7), to the role of human capital whose existence is seen as crucial in facilitating the adoption of new technologies and as influencing a country's pattern of trade and industrial specialization.

There is broad agreement in the literature that FDI plays an important role in restructuring and in improving competitiveness (see the general evidence world-wide e.g. in UNCTAD, 2001, Barrel and Holland, 2000, and for the CEECs, see e.g. Hunya, 2000). Table 9 reports data on FDI stocks in 2000 for seven Central and Eastern European countries. These data were collected from national sources and/or foreign investment agencies. As there are methodological problems in comparing the data across countries (especially for Hungary and Poland) we shall only discuss the structure of FDI within the countries.

Manufacturing industry has been an important target of FDI in most candidate countries attracting nearly half of the inward FDI stock as of end-2000 (exceptions are the Baltic states and no data are presented for Bulgaria and Romania in Table 9). The sectoral distribution of FDI is highly uneven, reflecting the varying attractiveness of individual branches for foreign investors as well as differences in the privatization policies pursued by the individual candidate countries (see Hunya, 2000). Generally FDI inflows have been high in both the domestically oriented food, beverages and tobacco industry (DA)

Table 9

Foreign direct investment (FDI) stock in manufacturing industry, 2000

USD million

NACE	Activities	Czech Republic[1)]	Hungary	Poland	Slovak Republic	Slovenia	Estonia	Latvia	Lithuania
DA	Food products; beverages and tobacco	**1125.6**	**918.4**	**4961.9**	**229.0**	**38.5**	**128.2**	**100.2**	**269.3**
DB	Textiles and textile products	203.6	142.6	254.4	20.6	12.7	78.6	32.5	108.6
DC	Leather and leather products	4.1	22.8	17.2	15.3	12.4	.	1.8	0.3
DD	Wood and wood products	89.7	40.4	240	17.1	5.6	93.6[3)]	57.9	33.0
DE	Pulp, paper & paper products, publishing & printing	587.7	159.4	1470.3	105.9	191.6	.	17.9	25.2
DF	Coke, refined petroleum products & nuclear fuel	210.9	515.9[2)]	.	151.6	.	6.0	0.0	42.8
DG	**Chemicals, chemical products and man-made fibres**	398.0		1285.1	117.1	173.2	49.6	38.1	.
DH	Rubber and plastic products	104.2	176.7	591.4	21.3	141.4	6.3	10.5	26.7
DI	Other non-metallic mineral products	1467.8	233.6	2785.7	97.9	73.3	.	23.7	37.6
DJ	Basic metals and fabricated metal products	624.2	194.6	403.4	819.2	88.5	22.3	25.7	11.6
DK	Machinery and equipment n.e.c.	218.7	199.1	317.1	80.4	144.7	18.5	21.5	7.4
DL	Electrical and optical equipment	662.2	680.6	1575.1	80.0	122.4	16.6	5.9	53.0
DM	Transport equipment	989.5	366.0	5167.7	122.3	133.9	39.1	1.3	48.1
DN	**Manufacturing n.e.c.**	100.5	38.3	393.5	7.8	4.5	.	8.1	7.9
D	**Manufacturing**	**6786.7**	**3688.4**	**19462.8**	**1885.4**	**1142.7**	**567.7**	**345.0**	**671.5**
	FDI total	**17552.1**	**10104.0**	**45772.0**	**3692.2**	**2808.5**	**2645.4**	**2081.3**	**2334.3**

Notes: 1) 1999. - 2) Includes DF+DG. - 3) Includes DD+DE.

Remarks: Czech Republic: equity capital, reinvested earnings, loans.
Hungary: nominal capital based on corporation-tax declarations.
Poland: equity capital, reinvested earnings gross; projects over USD 1 million capital based on PAIZ data.
Slovak Republic: equity capital, reinvested earnings - in the corporate sector.
Slovenia: equity capital, reinvested earnings, loans.
Estonia: equity capital, reinvested earnings, loans.
Latvia: equity capital, reinvested earnings, loans.
Lithuania: equity capital, reinvested earnings, loans.
Croatia: equity capital.

Source: National Banks, Statistical Offices and Foreign Investment Agencies.

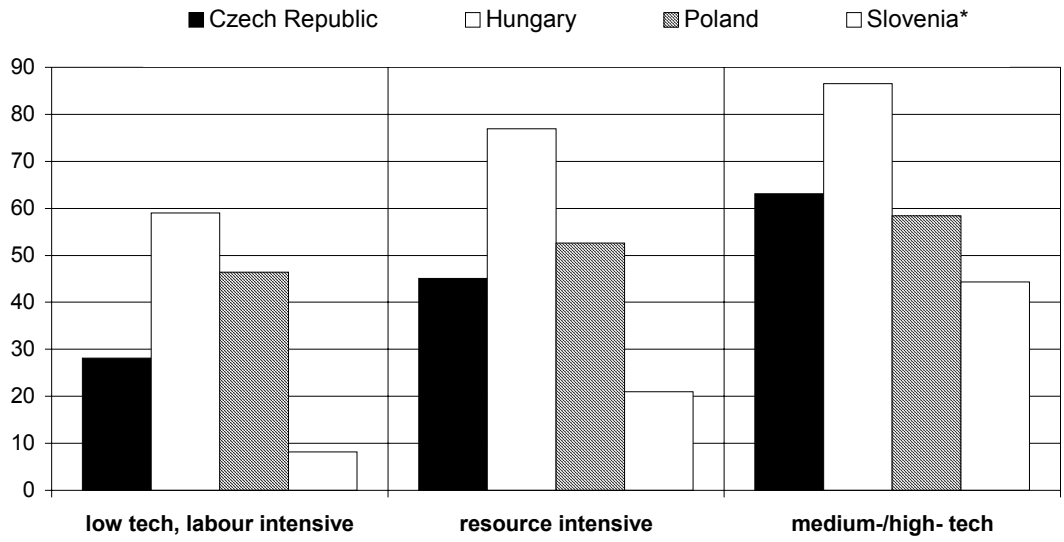
especially in the Czech Republic, Hungary, Poland, Slovakia, Latvia and Lithuania, in some natural resource-based industries such as non-metallic mineral products (DI), as well as in export-oriented branches such as electrical, optical (DL) and transport equipment (DM) industries.

Using again our previous classification into low-tech, medium-/high-tech, and resource-intensive industries and looking at the shares of sales from FIEs (enterprises with some degree of foreign ownership; for details on this database see Hunya, 2002) in total industry sales, we can see that in all four countries depicted in Figure 9 the FIEs account for a higher share of sales in the medium-/high-tech than in the low-tech or the resource-intensive branches. This is quite consistent with the picture of structural change and trade specialization depicted for the more advanced of the CEECs in the previous sections of this paper.

Figure 9

The share of FIEs in different industry groupings

1999 in %



* Slovenia without tobacco.

Overall, there are two points we want to make with regard to FDI:

– The presence of FDI across CEECs remains very uneven and hence the role it can perform in facilitating the up-grading of the CEECs' industrial structures will actually be performed to different degrees. This is compatible with a picture of differentiated catching-up patterns across the CEECs as pointed out in the previous sections of the report.

– The distribution of FDI across branches (although this point needs further elaboration which will not be undertaken in this paper) indicates that FDI is attracted also to branches which can be classified as medium-/high-tech and thus plays a role in the

productivity and quality up-grading process in these branches (for further evidence on the impact of foreign ownership involvement in further productivity improvements and export performance in CEECs, see Hunya, 2002).

7 The role of educational attainment and labour market developments with regard to different skill groups

It is well known that the large cumulative employment drops in the CEE region since 1989 has been reflected in falling labour force participation rates in all CEECs. A comparison between the transition countries covered here and the EU-15 shows that, despite these considerable falls, participation rates are still higher than the EU average (68%) in the Czech Republic, Slovakia and Romania, similar to the EU-15 level in Poland, and lower than in the EU in Hungary and Bulgaria. Employment rates (total number of employed relative to the population aged 15-64) also show a wide range, from close to 70% in Romania and the Czech Republic (in 1998) to 54% in Hungary. A comparison of employment rates in CEECs and the EU in 1998 shows that the average CEEC-7 rate stood at 62.7%, slightly higher than the EU average of 61%. Furthermore, the gender gap in employment rates remained smaller in the CEECs compared to most countries in the EU. Unemployment rates amounted to between 9% and 19% in the CEECs by the year 1999 which reflects the development of the labour force (particularly the participation rate) on the one hand and that of employment levels on the other. Unemployment rates across the region have reached a range not dissimilar to the EU in the early 1990s.

The labour market structure of the accession countries with respect to skill levels and educational attainment must be seen against the background of these changes in participation rates. A first glance at comparable data across CEECs and a comparison with EU Northern and EU Southern economies reveals high shares of upper secondary education (see Table 10).

The data presented in Table 10 were collected from national labour force surveys and compared to data for European countries reported in European Commission (2001). Although there are methodological difficulties these data provide a rough overview of the structure of educational attainment.

Table 10 shows that most countries have a share of lower upper secondary educational levels in the working-age population of about 30% (lowest in the Czech Republic with 24%) which is at more or less the same level as for the EU Northern countries. Higher shares are only reported for Bulgaria and Romania with more than 40%. This can be compared to the EU Southern countries which show a share of almost 60%. With respect to the other

Table 10

Educational shares

		Czech Republic	Hungary	Poland	Slovenia	Slovak Republic	Estonia	Latvia	Lithuania	Bulgaria	Romania	EU-South	EU-North
Population													
Age group 15-64 by education													
< upper secondary	**%**	23.8	38.5	33.1	33.9	28.8	26.2	30.6	31.3	43.9	43.2	58.0	28.6
upper secondary	**%**	67.0	50.3	58.3	53.9	63.5	51.3	55.3	36.8	42.7	49.9	29.2	49.5
Tertiary	**%**	9.1	11.2	8.6	12.1	7.6	22.5	14.1	31.9	13.4	6.9	12.8	21.9
Labour force													
Age group 15+ by education													
< upper secondary	**%**	10.4	18.4	15.8	20.7	9.4	12.4	13.8	12.4	22.9	35.7	54.9	23.5
upper secondary	**%**	77.8	65.4	71.9	62.8	80.0	58.5	66.7	44.9	56.8	55.9	28.3	51.6
Tertiary	**%**	11.8	16.2	12.3	16.5	10.6	29.1	19.4	42.6	20.3	8.4	16.8	24.9
Employment													
Age group 15+ by education													
< upper secondary	**%**	8.8	17.4	14.8	19.9	6.9	10.7	12.7	11.4	19.2	36.8	54.7	22.3
upper secondary	**%**	78.7	65.5	71.3	62.8	80.7	57.4	66.3	42.6	57.7	54.4	28.2	51.8
Tertiary	**%**	12.6	17.1	13.9	17.3	12.4	31.8	21.0	45.9	23.1	8.7	17.1	25.9
Unemployment													
Age group 15+ by education													
< upper secondary	**%**	26.7	32.4	20.8	31.9	19.8	23.9	20.8	18.0	39.0	20.0	56.1	38.0
upper secondary	**%**	69.2	64.1	75.0	62.9	77.2	65.1	69.5	57.4	53.0	75.6	29.5	48.7
Tertiary	**%**	4.1	3.5	4.2	5.3	2.9	11.0	9.8	24.6	7.9	4.4	14.4	13.3

Source: Employment and labour market in Central European countries, European Commission, 2001 and own calculations.

aggregates the Central and Eastern European countries have on average higher shares of upper secondary and much lower shares in tertiary education than the EU Northern and even slightly lower shares in tertiary education than the EU Southern countries.

However, the shares of different educational groupings in the labour force and in employment can differ from those in (working-age) population as participation rates differ across countries and educational levels. Whereas the relative shares between population, labour force and employment across the different educational groups corresponds roughly for the EU Southern and EU Northern countries, there are bigger differences in relation to the Central and Eastern European countries. The share of lower upper secondary educational levels in the labour force and in employment is in most cases much below the share in total population which reveals a very low participation rate. Correspondingly the relative shares of people with upper secondary education and tertiary education in the labour force and in employment are relatively higher.

The skill structure of unemployment similarly reflects this picture and also differs from the EU Northern and EU Southern countries. People with upper secondary educational levels amount to about 60% to 70% of unemployed compared to 30% in EU-South and 50% in EU-North. On the other hand the share of people with lower upper secondary level is lower (the reason might be the lower participation rate) whereas the share for people with tertiary education is much lower. Unemployment rates are particularly low amongst the persons with tertiary education, even in comparison with the EU Southern and EU Northern countries. This points towards a structural problem, i.e. the lack of highly-skilled workers/employees. However, these data mask further severe deficiencies with respect to particular occupations. E.g. the EBRD (2000) reports a lack of skills especially in managerial and other high-skilled employment which corresponds to the relatively low shares in tertiary education.

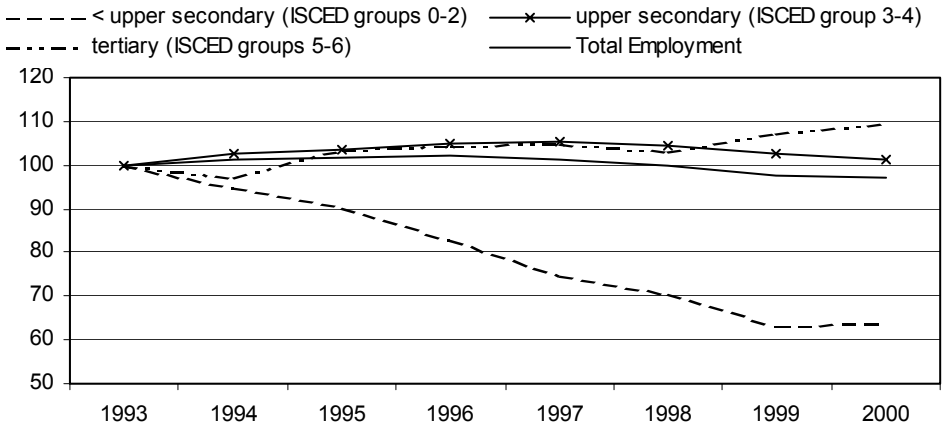
Figures 10 show the evolution of employment levels by skill groupings (ISCED classification) for six of the CEE candidate countries. The compilation of this dataset from national labour force surveys was laborious and the data series have different starting points as the compilation of LFS data started at different dates in the different economies. The uniform picture which emerges is that there were strong negative employment developments in the lowest skill categories while there were positive labour market pressures for the higher skill groupings (mostly those with tertiary education, in some countries those with upper secondary educational levels).

Although the above definitely requires much more detailed analysis, the evidence obtained with regard to strong labour demand pressures for the highly skilled in the transition countries is consistent with the picture of a catching-up process with qualitative up-grading which has been developed in the earlier sections of this paper.

Figure 10

Czech Republic: Changes of employment in skill categories

(Index: 1993 = 100)

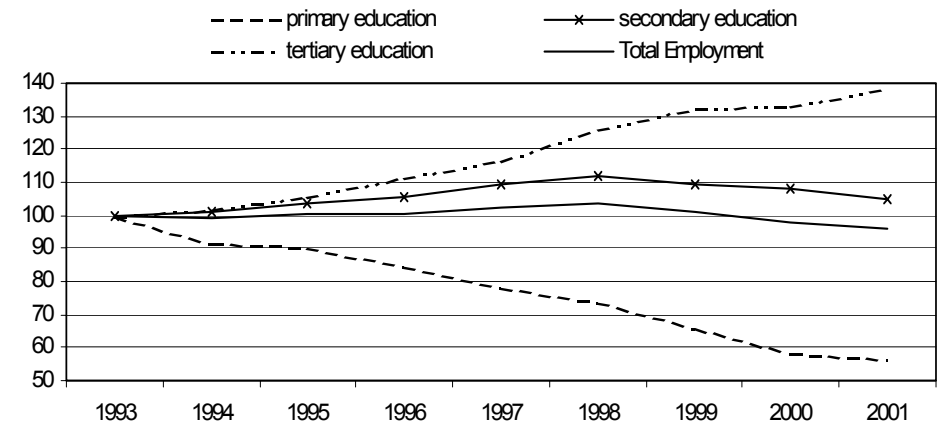


Hungary: Changes of employment in skill categories

(Index: 1992 = 100)

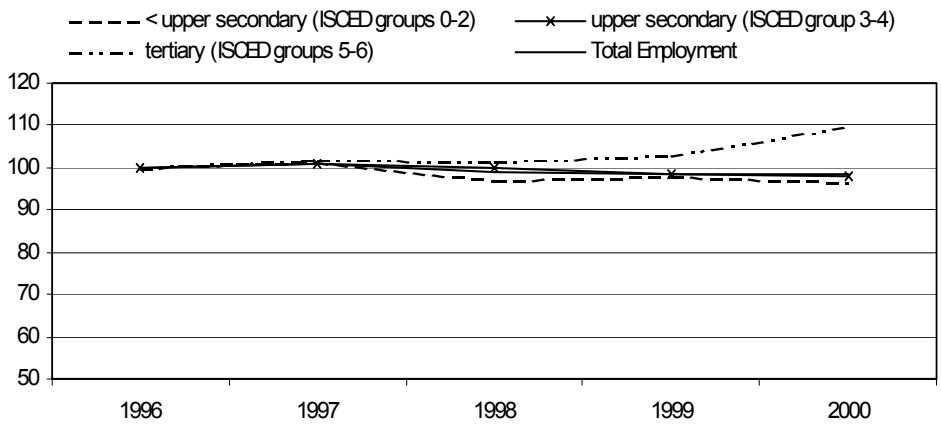
Poland: Changes of employment in skill categories

(Index: 1993 = 100)



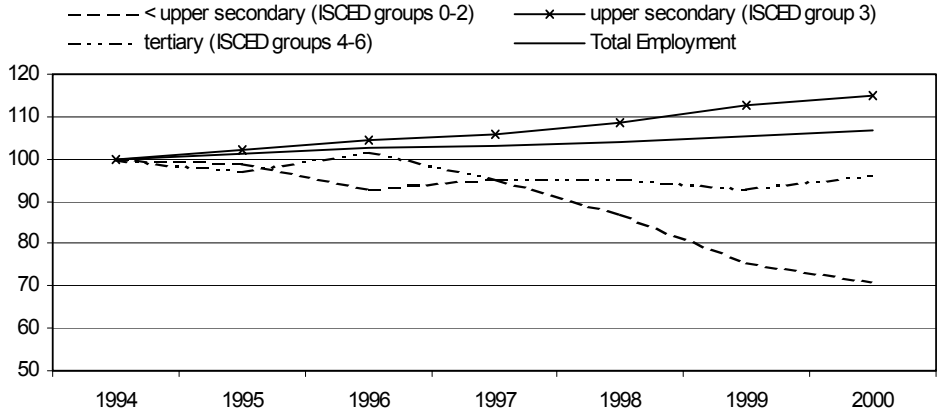
Romania: Changes of employment in skill categories

(Index: 1996 = 100)



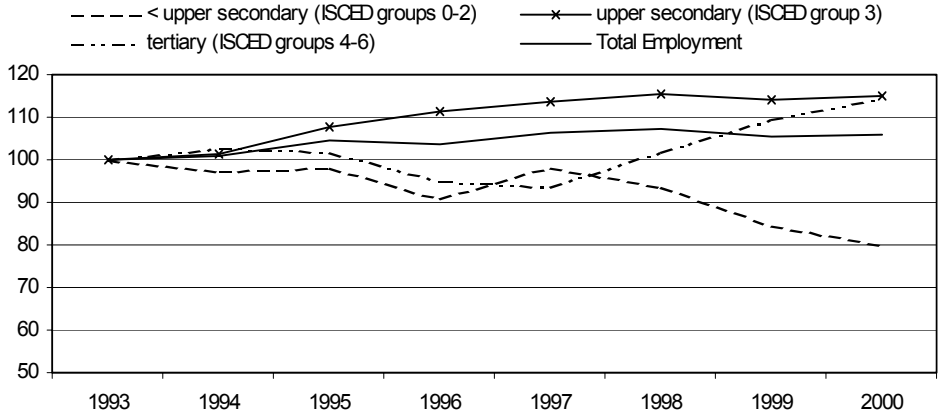
Slovak Republic: Changes of employment in skill categories

(Index: 1994 = 100)



Slovenia: Changes of employment in skill categories

(Index: 1993 = 100)



8 Summary

This paper has attempted to analyse the evolving patterns of industrial specialization in Central and Eastern Europe. We have shown that a differentiated picture emerges, with some countries catching up relatively fast in technologically more sophisticated branches and also improving their positions in intra-branch product quality. This picture is compatible with an analytical approach in which the potential exists to turn comparative advantages in favour of those areas in which initially bigger gaps (in productivity and product quality) exist. This is an application of the Gerschenkron hypothesis ('advantage of backwardness') at the industrial level. However, the existence of such a potential does not automatically imply its utilization (a point which Abramovitz emphasized). The approach makes room for a wide diversity of qualitative catching-up patterns and evolving positions of catching-up economies in the international division of labour. This is what we observe with respect to the countries in Central and Eastern Europe where one set of countries got (so far) 'locked in' in a rather traditional pattern of trade and industrial specialization (in low-skill, labour-intensive branches), while other CEECs (to varying degrees) show a much more dynamic pattern of integration into the European division of labour.

We have substantiated this picture of diversity by analysing first the broad patterns of structural change in Central and Eastern Europe (section 2) and then the changes in employment and production structures within manufacturing (section 3). We then moved towards examining the evidence for a dynamically evolving structure of comparative advantage with a detailed assessment of differential patterns of productivity and unit (labour) cost growth across branches (section 4) and with an analysis of inter-industry trade specialization and differential (export) product quality up-grading within industrial branches (section 5). Finally, we sketched the roles of foreign direct investment (section 6) and of the existence and utilization of educational attainment (section 7) as important factors in determining the positions of individual countries (the analysis could similarly be extended to regions) in the evolving division of labour in the European economy as a whole. We could show that the picture concerning labour demand for different skill groups supports our analysis with respect to the up-grading of industrial structures in the more advanced of the CEE candidate countries.

As regards EU enlargement our analysis shows clearly that different CEECs are in different positions with regard to their achieved levels of catching-up, and this refers not only to overall levels but – probably more importantly – to the qualitative nature of their structural transformations and their positions in cross-European trade structures. We expect such differentiation to have a bearing on how they will cope with the additional adjustments required by the accession process itself and on what footing they will be able to participate in the integrated structures of the enlarged European economy. This, of course, also has implications for the instruments which will be required to deal with the problems of cohesion which will get further accentuated not only as a result of the

accession process itself but as a result of the existence of a set of other economies which are highly integrated with the EU but will not join in the first round.

Differentiation across regions shows a similar picture of differentiation across countries (see Fazekas, 2002 and Chapter 6 in this volume). Some regions are catching up in terms of industrial up-grading, they are very successful in attracting FDI which accounts for a large share of overall exports, while other regions remain 'locked in' in low-skill areas of production, with low shares of well-educated personnel and little evidence for up-grading. This dimension of country and regional differentiation constitutes thus a great challenge for cohesion policies in the candidate countries and in the enlarged European Union.

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Appendix

Table A1

WIFO taxonomies

	NACE rev. 1	*Taxonomy I* factor inputs	*Taxonomy II* labour skills
Meat products	151	4	1
Fish and fish products	152	4	1
Fruits and vegetables	153	4	1
Vegetable and animal oils and fats	154	4	1
Dairy products; ice cream	155	4	1
Grain mill products and starches	156	4	1
Prepared animal feeds	157	4	1
Other food products	158	4	1
Beverages	159	4	1
Tobacco products	160	4	1
Textile fibres	171	3	1
Textile weaving	172	2	1
Made-up textile articles	174	2	1
Other textiles	175	1	1
Knitted and crocheted fabrics	176	1	1
Knitted and crocheted articles	177	1	1
Leather clothes	181	2	1
Other wearing apparel and accessories	182	2	1
Dressing and dyeing of fur; articles of fur	183	2	1
Tanning and dressing of leather	191	4	1
Luggage, handbags, saddlery and harness	192	4	1
Footwear	193	4	1
Sawmilling, planing and impregnation of wood	201	2	2
Panels and boards of wood	202	2	2
Builders' carpentry and joinery	203	2	2
Wooden containers	204	2	2
Other products of wood; articles of cork, etc.	205	2	2
Pulp, paper and paperboard	211	3	3
Articles of paper and paperboard	212	1	3
Publishing	221	4	3
Printing	222	4	3
Coke oven products	231		
Refined petroleum and nuclear fuel	232	3	3
Nuclear fuel	233		
Basic chemicals	241	3	3
Pesticides, other agro-chemical products	242	5	3
Paints, coatings, printing ink	243	1	3
Pharmaceuticals	244	5	4
Detergents, cleaning and polishing, perfumes	245	4	3
Other chemical products	246	5	3
Man-made fibres	247	3	3
Rubber products	251	1	1
Plastic products	252	1	1
Glass and glass products	261	1	1
Ceramic goods	262	2	1
Ceramic tiles and flags	263	3	1
Bricks, tiles and construction products	264	2	1
Cement, lime and plaster	265	3	1
Articles of concrete, plaster and cement	266	1	1
Cutting, shaping, finishing of stone	267	2	1
Other non-metallic mineral products	268	1	1

(Table A1 continued)

Table A1 (continued)

WIFO Taxonomies	**NACE rev. 1**	***Taxonomy I*** **factor inputs**	***Taxonomy II*** **labour skills**
Basic iron and steel, ferro-alloys (ECSC)	271	3	1
Tubes	272	1	1
Other first processing of iron and steel	273	3	1
Basic precious and non-ferrous metals	274	3	1
Structural metal products	281	2	2
Tanks, reservoirs, central heating radiators and boilers	282	4	2
Steam generators	283	2	2
Cutlery, tools and general hardware	286	4	2
Other fabricated metal products	287	1	2
Machinery for production, use of mech. power	291	1	4
Other general purpose machinery	292	1	4
Agricultural and forestry machinery	293	1	4
Machine-tools	294	2	4
Other special purpose machinery	295	1	4
Weapons and ammunition	296	1	4
Domestic appliances n. e. c.	297	1	3
Office machinery and computers	300	5	4
Electric motors, generators and transformers	311	1	3
Electricity distribution and control apparatus	312	5	3
Isolated wire and cable	313	1	3
Accumulators, primary cells and primary batteries	314	1	3
Lighting equipment and electric lamps	315	1	3
Electrical equipment n. e. c.	316	2	3
Electronic valves and tubes, other electronic comp.	321	5	3
TV, and radio transmitters, apparatus for line telephony	322	5	3
TV, radio and recording apparatus	323	5	3
Medical equipment	331	5	3
Instruments for measuring, checking, testing, navigating	332	5	3
Optical instruments and photographic equipment	334	5	3
Watches and clocks	335	4	3
Motor vehicles	341	5	2
Bodies for motor vehicles, trailers	342	2	2
Parts and accessories for motor vehicles	343	3	2
Ships and boats	351	2	2
Railway locomotives and rolling stock	352	2	2
Aircraft and spacecraft	353	5	4
Motorcycles and bicycles	354	1	2
Other transport equipment n. e. c.	355	1	2
Furniture	361	2	2
Jewellery and related articles	362	2	2
Musical instruments	363	4	2
Sports goods	364	4	2
Games and toys	365	4	2
Miscellaneous manufacturing n. e. c.	366	4	2

	Taxonomy I :	**Taxonomy II :**
Industry clusters:	1. Mainstream	1. Low-skill industries
	2. Labour-intensive industries	2. Medium-skill/blue-collar workers
	3. Capital-intensive industries	3. Medium-skill/white-collar workers
	4. Marketing-driven industries	4. High-skill industries
	5. Technology-driven industries	

Source: M. Peneder (2001), *Entrepreneurial Competition and Industrial Location*, Edward Elgar, Cheltenham, UK.

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