

# RESTRUCTURING OF MANUFACTURING INDUSTRY IN THE CENTRAL AND EAST EUROPEAN COUNTRIES

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## **Abstract:**

This paper analyses various aspects of industrial restructuring across all ten Central and East European (CEE) candidate countries for EU membership during the last decade and provides also some comparisons with current EU Member States. The impressive structural adjustments that have taken place in CEE industries since the beginning of transition brought the structure of manufacturing industry in the majority of CEE candidate countries fairly close to the European pattern both in terms of production and employment. Technology-driven industries account for a growing share of exports in nearly all candidate countries, while labour-intensive industries have growing export shares only in less advanced candidates such as Bulgaria, Romania and in the Baltic states. The initial export specialization pattern of the more advanced CEE candidate countries has thus nearly completely reversed; a remarkable upgrading towards more sophisticated and less capital-intensive industries has occurred.

**Keywords:** EU candidate countries, industrial restructuring, trade specialization, integration, foreign direct investment

**JEL Classification:** F14, F15, L6, P52

## **1. Introduction**

This empirical paper analyses various aspects of industrial restructuring across all ten CEE candidate countries for EU membership (CEEs: Bulgaria, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia) and provides also some comparisons with current EU Member States.

The second section analyses structural adjustments in output and employment, as well as related changes in labour productivity, that have taken place in CEE manufacturing industries during the last decade. These adjustments reflect varying progress with transition, factor endowments and the activity of foreign investors. Regression analysis confirms that higher foreign direct investment (FDI) penetration of a branch has a clearly positive impact on output growth, labour productivity and unit labour costs improvements. The next part provides evidence about

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emerging patterns of CEEs' trade specialization by looking at the evolution of sectoral export shares, revealed comparative advantages (RCAs) and the factor content of CEE industries' exports to the EU after 1995. Trade integration between the EU and the CEEs, fostered by the EU-CEE Association Agreements, progressed with remarkable speed during the 1990s. After liberalization, the traditional economic theory would suggest that trade specialization is driven by varying factor endowments and productivity differences. Stylised facts on the evolution of CEEs' specialization patterns in manufacturing trade with the EU suggest that the initial export specialization pattern of many CEEs has recently nearly completely reversed. In the more advanced CEEs, more sophisticated and less capital-intensive industries are gaining in importance and export patterns are becoming similar to those of EU Member States. The varying specialization patterns are again presumably linked to the individual countries' progress in transition and FDI activities.

## 2. Basic Patterns of Changing Output and Employment Structures

The majority of CEEs have inherited a huge industrial sector from the period of central planning. Due to considerable structural distortions and production inefficiencies, the high degree of industrialization initially turned out to be a drawback rather than an advantage: it implied, among other problems, also the underdevelopment of other sectors, especially of services (see Landesmann, 2000).<sup>1)</sup> In all CEEs, industry initially suffered over-proportionately from the "transformational recession". Industry, and especially its manufacturing part, declined in both absolute and relative terms during that period. A number of factors such as the loss of traditional export markets, sudden trade liberalization, restrictive macroeconomic policies and insufficient restructuring played a role. The industrial recession was mostly over around 1993 (in Poland, where it had started earlier, already in 1992),<sup>2)</sup> though it occasionally returned in several CEEs later on (in Bulgaria, Romania, the Czech Republic, and Slovakia). The Baltic states (especially Latvia and Lithuania) struggled with a severe industrial crisis well into the mid-1990s. In the more advanced CEEs industry has been able to recover at least part of its previous position during the second half of the 1990s thanks to **active restructuring** and privatization efforts, fostered especially by inflows of FDI. Nevertheless, in the year 2000 only Hungary and Poland produced more industrial goods, by 50 % and 70 % respectively, than in 1990. In contrast, in Bulgaria and Romania industry shrank by more than 40 % during the last decade, in the Baltic states by half, while in the remaining candidate countries the cumulative output decline amounted to between 10 % and 15 %.

**Manufacturing industry employment** underwent even more dramatic changes during the last decade. As a rule, employment declined even more than output and over five million manufacturing jobs were lost in the region during the last decade. These changes reflect the general labour market developments in the candidate countries during the 1990s such as declining overall employment, shifts from industry to the service sector and, last but not least, the emergence of high open

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1) Unless otherwise stated, the WIIW Annual Database Eastern Europe and WIIW Industrial Database are used as the main source of data. Due to frequent changes in statistical reporting and varying enterprise coverage, data for the first half of 1990s are not fully comparable with later periods.

2) Unlike other CEEs, the Polish industry underwent a crisis already during the first half of the 1980s and in 1988-1989 as well (see WIIW, 1991, p. 104).

unemployment.<sup>3)</sup> In the second half of the 1990s, only Hungary (and partly also Poland) could modestly increase manufacturing industry employment; in the remaining candidate countries manufacturing employment has continued to fall. Employment adjustments occurred with a certain time lag, first due to delayed lay-offs and, thereafter, because there was hardly any expansion of manufacturing jobs (again in both absolute and relative terms). As far as the importance of the manufacturing industry as a job provider is concerned, only Hungary has managed to keep the share of manufacturing industry in total employment at the initial (1990) level (about 25 % of the total), and even recorded a slight increase in manufacturing jobs after 1997. In the majority of the remaining CEEs the number of manufacturing jobs recently stabilised at around 60 % of the initial (1990) level, though the labour shedding does not generally seem to be over yet. Still the manufacturing industry is an important job provider in many candidate countries; the highest employment shares in manufacturing industry are currently observed in the Czech Republic and in Slovenia (around 30 % of the total).

As far as the specialization of manufacturing industry is concerned, we get a mixed picture – especially regarding production structures. The high and growing production specialization in the CEEs is in sharp contrast to the weak tendency towards specialization observed in the EU over the past decade (see European Commission, 1999, pp. 2-15). Generally, manufacturing industry production in the candidate countries is now **more specialized** than in the EU and thus potentially more vulnerable to various shocks. In terms of employment, the candidate countries' specialization of manufacturing industry is somewhat less pronounced, though still high. Typically, among the top three most important producing sectors in the CEEs are food, beverages and tobacco, transport equipment as well as basic metals and fabricated metal products in Central and Eastern Europe. In the Baltic states food, beverages and tobacco, textiles and wood products are usually among the top producing sectors.

After a decade of downsizing and fast reshaping, **the structure of manufacturing industry** in the majority of CEEs is now fairly close to the European pattern both in terms of production and employment structures. Compared to the EU average industry structure, the latter according to Eurostat data, there are now (year 1999, EU: year 1998) higher shares of food and beverages, textiles, wood products and basic metals industries in some candidate countries (see Figures 1a and 1b). On the other hand, the CEEs have lower shares than the present EU Member States in machinery and equipment, chemicals and – with the notable exception of Hungary – in electrical and optical equipment as well. The majority of CEEs have nowadays an industrial structure which is positioned somewhere between the less advanced EU Member States (Greece, Portugal and Spain) and the more advanced EU incumbents (Germany, France and the United Kingdom). Manufacturing output and employment structures in Bulgaria, Romania and in the Baltic states tend to be more distinct from both the EU and the remaining CEEs.

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3) For more details on labour market developments see European Commission – Eurostat (1999).

Figure 1a  
**Manufacturing Production Structure in Comparison to the EU (1999)**

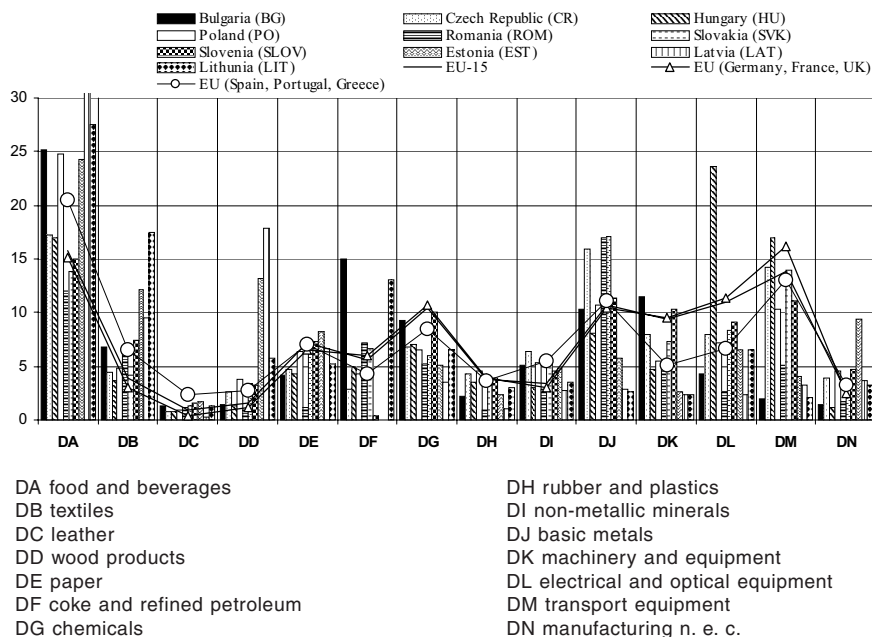
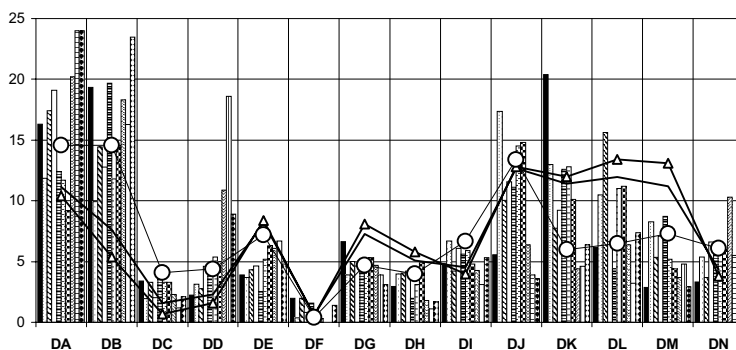


Figure 1b  
**Manufacturing Employment Structure in Comparison to the EU (1999)**



Source: WIIW Industrial Database and Eurostat.

### 3. Branch Patterns of Productivity Catching-up

The above described structural changes reflect, *inter alia*, the different speeds of restructuring and resulting efficiency gains or losses at branch level. They vary across individual countries and over time; the time path of these differences reflects mainly the uneven progress in transition and the activity of foreign investors. The

changes of production and employment shares translate into different sectoral growth rates of labour productivity (estimated as gross production at constant prices per employed person). During the first period of transition (passive restructuring lasting until about 1993), an initial productivity drop, due to the collapse of output and delayed lay-offs, occurred in the majority of CEEs. However, a **productivity recovery** started in most candidate countries thereafter and their productivity growth has recently been higher than in the EU, implying some productivity catching-up.<sup>4)</sup> Hungary's performance has been most impressive: its manufacturing industry labour productivity rose by more than 14 % per year during 1993 – 1999 and thus more than doubled during this period. Poland's cumulative productivity improvement exceeded 75 % (growth rate of more than 10 % per year), somewhat more than in the Czech Republic and Slovakia as well as in Slovenia, Estonia and Latvia (all between 40 % and 60 %). Productivity gains were much lower in Romania (30 %, 4.4 % per year); in Bulgaria and Lithuania productivity continued to fall (see Table 1). Apart from Hungary and Poland, productivity improvements were associated with a further shrinkage of manufacturing employment.

Table 1

**Relative Productivity Growth in Manufacturing Industry Branches** (average annual change in % for total manufacturing and relative growth differences in percentage points, 1993 – 1999)

	BG <sup>1)</sup>	CR	HU	PO	ROM	SVK	SLOV	EST <sup>2)</sup>	LAT	LIT
Manufacturing	-5.5	6.4	14.4	10.2	4.4	4.9	5.3	10.9	5.8	-4.9
DA Food	2.5	-4.6	-7.8	-3.7	-4.5	-3.1	-2.8	-6.9	-3.6	-0.5
DB Textiles	-1.7	-6.8	-8.5	-3.8	-2.7	-11.7	-0.6	8.3	0.7	-7.2
DC Leather	-5.6	-9.8	-7.7	-1.1	2.1	-4.3	-7.5	5.8	-10.4	-5.0
DD Wood	7.0	-5.6	-4.8	-3.9	-8.3	-11.8	-5.5	14.1	-2.2	-10.0
DE Paper	-1.4	1.9	-1.6	1.4	-1.1	4.4	-7.0	-7.2	-0.8	-24.0
DF Fuels	-9.8	-2.1	-12.2	-6.7	-6.1	4.4	-20.1	.	.	1.1
DG Chemicals	-8.9	-0.5	-11.4	-1.8	-6.3	0.2	0.5	-5.8	-10.6	6.3
DH Rubber	-1.9	1.1	-4.6	-0.5	-5.0	-3.8	-1.1	7.6	8.9	9.6
DI Minerals	4.9	-1.5	-4.8	1.3	-0.4	-1.0	1.7	4.9	6.9	4.3
DJ Metals	-0.3	-3.7	-2.1	-1.8	-0.8	-5.8	2.7	4.0	12.2	6.8
DK Machin.	7.0	1.7	-2.7	2.9	0.8	-1.6	-2.4	5.9	-8.3	-9.0
DL El. equip.	6.2	12.2	21.9	7.7	16.3	2.8	7.6	9.7	5.1	12.4
DM Transport	-4.8	4.3	19.7	10.4	11.6	21.0	3.2	-3.1	-6.4	16.1
DN Others	6.8	0.7	-6.5	-2.0	10.5	-2.2	1.9	3.2	.	2.6

1) 1997 – 1999.

2) 1994 – 1998.

Note: Calculation of relative gains:  $DX(93-99) - D(93-99) = \text{relative gain } DX$ ; ( $X = A, B, \dots, N$ ). D = total manufacturing.

Source: WIIW Industrial Database.

Compared to the initial phase of transition, we detect a **new branch-specific pattern of productivity growth** – often quite opposite to that observed in the period of passive restructuring during the early 1990s.<sup>5)</sup> Looking at the relative labour

4) Manufacturing productivity in the EU grew by about 3 % per year during 1996 – 2000. The fastest productivity growth recorded Finland and Ireland – about 9 % per year (see European Commission, 2001, p. 59). For illustration, the estimated annual rate of productivity convergence between East and West German manufacturing industry during 1992 – 1997 amounted to 7.4 % (see Barrel, te Velde, 2000, p. 290).

5) See also Urban (2000). However, data for the initial transition period are incomplete and less reliable.

productivity changes in the period 1993 – 1999 by individual branch (relative to the manufacturing industry average see Table 1), one can distinguish two groups of industries. Roughly speaking, in most CEEs only two industries are among the branches with above-average productivity growth: electrical and optical equipment and transport equipment – as well as (less clearly) other manufacturing comprising mainly furniture. In the Baltic states (and in the Czech Republic), above-average productivity growth occurred also in rubber and plastics, other non-metallic mineral products, and basic metals and fabricated metal products. Manufacturing of electrical and optical and of transport equipment has been a clear productivity growth leader in nearly all candidate countries. In Hungary, productivity in these two branches was growing by more than 30 % per year during 1993 – 1999; in the Czech Republic, Poland, Romania and in Slovakia at double-digit annual rates as well. As a rule, these industries have also attracted a considerable amount of FDI (see below).

On the other hand, branches with below-average productivity growth were usually the manufacturing of food, beverages and tobacco, textiles, leather, wood products, coke and refined petroleum and chemicals (see Table 1). In some cases, labour productivity in these branches has even declined in absolute terms. Apart from the majority of manufacturing branches in Bulgaria and Lithuania, this has happened e.g. in the leather industry in the Czech Republic and in Slovenia, in the wood industry in Romania and Slovakia, etc. In general, there is clear evidence that the more sophisticated manufacturing branches (electrical, optical and transport equipment being among the most prominent examples) have strongly improved their productivity performance recently while the initial success of some traditional sectors (such as food and beverages, rubber and plastics and non-metallic minerals) has vanished in the more recent period of transition.

#### **4. Investment and the Role of Foreign Direct Investment in Sectoral Performance**

There is broad agreement in the literature that foreign direct investment (FDI) is playing an important role in restructuring and improving the competitiveness of manufacturing. A recent UNCTAD study has identified a strong relationship between inward FDI and manufactured exports performance for a number of both developed and developing countries (see UN, 1999). The impact of FDI rises with the technology intensity of exports, especially in the case of developing countries. The study has found that a 1 % rise in FDI per capita leads to a 0.8 % increase in high technology exports. In countries without strong national innovation systems and exports led by national enterprises, 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). Moreover, when the evolution of dynamic comparative advantage is assisted by FDI there is a problem of sustainability and upgrading, especially as wages rise and cheaper competitors appear. Last but not least, the question of spillovers between foreign-owned and domestic sectors has to be tackled in order to avoid that isolated points of advancement develop while the rest of the economy falls behind.

Foreign direct investment has been one of the driving forces of industrial restructuring in CEEs as well. These countries have inherited from the past a largely obsolete capital stock that frequently turned out to be non-viable in the conditions of a market economy.<sup>6)</sup> And, contrary to frequently held opinions, there is some re-

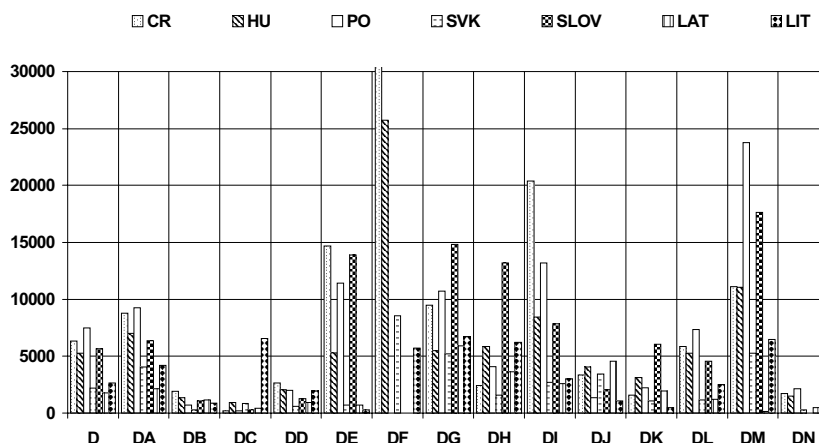
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6) Due to valuation and other conceptual and statistical problems there are no reliable data on candidate countries' capital stocks.

cent evidence that transition economies lag behind advanced market economies also in terms of the quality of their workforce.<sup>7)</sup> The modernization of existing assets and the training of human resources require extensive efforts and huge 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 capital stocks. However, the evidence for direct links between FDI performance and growth or restructuring and productivity spillovers in transition economies is mixed, partly also due to the scarcity of reliable data (see UNECE, 2001).

Figure 2

**Manufacturing Industry FDI Stocks per Employee (in USD, 1999)**



Source: WIIW Industrial Database. See Table 1 for description of NACE codes.

Detailed FDI data by manufacturing industry branch are sporadic and comparable statistics is available only for seven CEEs. Manufacturing industry has been an important target of FDI in the CEEs, attracting nearly half of all inward FDI stock as of end-1999 (except for the Baltic states where the shares are lower). FDI penetration in the manufacturing industry (FDI stock per employee) is high in the Czech Republic, Hungary, Poland and – surprisingly – also in Slovenia. All CEEs display a similar pattern – an uneven FDI distribution across branches, reflecting not only the varying attractiveness of individual branches for foreign investors and their investment motives, but also the different privatization policies pursued by the individual CEEs.<sup>8)</sup> FDI inflows have been high in both domestically oriented branches such as the food, beverages and tobacco industry (especially in the Czech Republic, Hungary, Poland and Slovenia) and pulp and paper, as well as in predominantly export-oriented branches such as the chemicals and especially the transport equipment industries.

A number of recent studies have analysed the impacts of FDI on CEE manufacturing. Barrel and Holland (2000) found some evidence that FDI helps to speed up

7) 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, chapter 6).

8) Resmini (2000) analysed panel data for European FDI in CEEs and found sector-specific determinants of FDI already for the period 1991 – 1995 (see also Hunya, 2000a).

restructuring. Hunya (2000b) demonstrated a clearly positive link between foreign penetration and various components of international competitiveness at both the aggregate and sectoral levels of manufacturing. We have investigated the branch-specific relationships between FDI stock per employee (in USD, year 1999 – see Figure 2) and various branch performance indicators during 1993 – 1999 for the above seven CEEs.<sup>9)</sup> Robust regressions (all variables in log-linear form) with country-specific dummies show a statistically significant impact of sectoral FDI penetration on output growth, as well as on labour productivity growth and (less clearly – the estimated coefficient is significant at 10% level) on unit labour costs (ULC) improvements. All parameters have the expected signs and are statistically significant. Higher FDI penetration is associated with faster growth of output, with bigger productivity increases and with lower growth of unit labour costs (see Table 2).

Table 2

**Branch-specific Effects of FDI Penetration (year 1999) on Output, Productivity Growth and ULC Improvements in CEEs' Manufacturing (1993 – 1999)**

<b>Model 1: <math>\ln\text{outgr} = \text{cons} + b * (\ln\text{fdi})</math></b>						
Regression with robust standard errors				Number of obs	= 96	
				F ( 7, 88)	= 8.82	
				Prob > F	= 0.0000	
				R-squared	= 0.2444	
				Root MSE	= .56793	
$\ln\text{outgr}$	Coef.	Robust std. err.	t	P >  t	(95% conf. interval)	
$\ln\text{fdi}$	.0960262	.047664	2.01	0.047	.0013041	.1907484
cons	4.417662	.394494	11.20	0.000	3.633687	5.201637
<b>Model 2: <math>\ln\text{product} = \text{cons} + b * (\ln\text{fdi})</math></b>						
Regression with robust standard errors				Number of obs.	= 96	
				F ( 7, 88)	= 4.34	
				Prob > F	= 0.0004	
				R-squared	= 0.2540	
				Root MSE	= .39053	
$\ln\text{product}$	Coef.	Robust std. err.	t	P >  t	(95% conf. interval)	
$\ln\text{fdi}$	.0810696	.0334910	2.42	0.018	.0145132	.1476259
cons	4.488041	.2753069	16.30	0.000	3.940926	5.035155
<b>Model 3: <math>\ln\text{ulc} = \text{cons} + b * (\ln\text{fdi})</math></b>						
Regression with robust standard errors				Number of obs.	= 96	
				F ( 7, 88)	= 36.45	
				Prob > F	= 0.0000	
				R-squared	= 0.7447	
				Root MSE	= .35844	
$\ln\text{ulc}$	Coef.	Robust std. err.	t	P >  t	(95% conf. interval)	
$\ln\text{fdi}$	-.0476279	.0271675	-1.75	0.083	-.1016175	-.0063617
cons	5.013555	.2238641	22.40	0.000	4.568674	5.458436

Note: We used Huber-White robust estimators. Results for country-specific dummies are not reported. Industry-specific dummies were not statistically significant.

9) One has to be aware of severe problems of data comparability since FDI data coverage differs (see Hunya, 2000a).

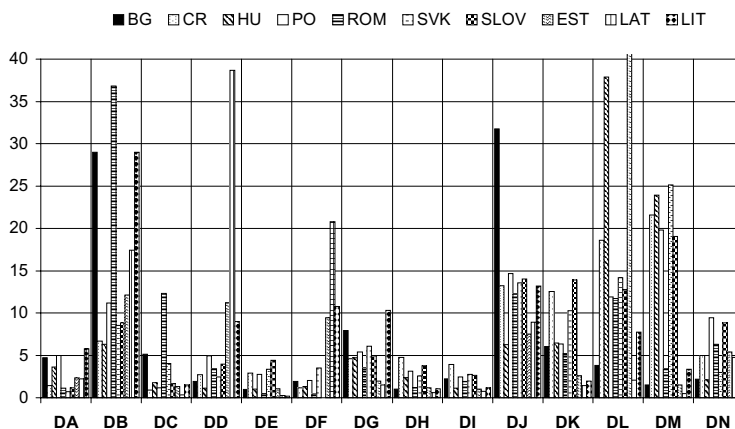


## 5. Central and East European Export Specialization and Revealed Comparative Advantages in Trade with the European Union

This section analyses sectoral specialization patterns in CEEs' trade with the EU and attempts to find out whether there have been any branch- or country-specific differences linked to the varying factor endowments or comparative advantage. After the trade liberalization and re-orientation starting at the beginning of the 1990s, the EU is today the most important trading partner for all CEEs. The shares of the EU in total manufacturing exports range from 40 % (Bulgaria) to more than 70 % (Hungary), import shares range from 40 % (Bulgaria) to nearly 70 % (Slovenia) and the manufacturing industry accounts for more than 90 % of EU-CEE trade. CEEs' manufacturing exports to the EU increased by more than 50 %, in current euro terms, between 1995 and 2000, much faster than exports of other competitors on the EU market (total extra-EU manufacturing imports grew by 30 %).<sup>10</sup> Hungary, Estonia and the Czech Republic – all attractive FDI destinations – recorded the fastest export growth. The CEEs' **market share** in extra-EU imports reached nearly 12 % in 2000, about half of the US market share in the EU and surpassing the share of Japan. EU manufacturing exports to the candidate countries grew with nearly equal speed during this period, also much faster than overall extra-EU manufacturing industry exports (+15 %). About 12 % of all extra-EU manufacturing exports went to the candidate countries in 2000 (as compared to 9.4 % in 1995).<sup>11</sup> The importance of the EU market for CEEs' manufacturing exports and imports is thus al-

Figure 3a

**Structure of Central and East European Manufacturing Exports to the EU** (in % of total manufacturing, year 2000)

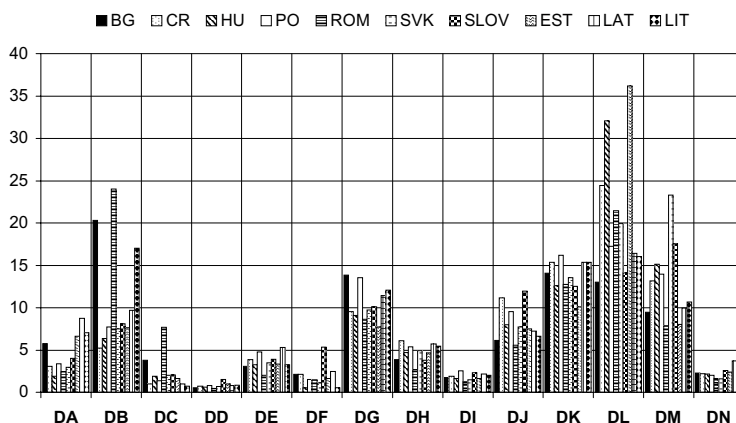


10) Data on EU manufacturing industry trade are based on the Eurostat COMEXT Database. This database provides up-to-date, detailed and consistent mirror statistics which is not available from other sources. However, only a part of manufacturing trade (in most countries a larger part) is covered. In order to secure equal country coverage, our analysis focuses on the period after 1995 (since the last EU enlargement). It has to be kept in mind that Austria is an important trading partner of CEEs, and Finland and Sweden trade extensively with the Baltic states. The CEE(7) market share in extra-EU(12) manufacturing imports amounted to about 3 % in 1990 and 7.2 % in 1995 (see Havlik, 2000).

11) In 1990, less than 3 % of EU(12) manufacturing exports went to the CEE(7) (see Havlik, 2000, p. 91).

Figure 3b

**Structure of Central and East European Manufacturing Imports from the EU** (in % of total manufacturing, year 2000)



Source: Own calculations based on Eurostat COMEXT Database. See Table 1 for description of NACE codes.

ready roughly comparable to that of the internal market for the current EU Member States.

In most branches and countries, the share of the EU in total manufacturing industry trade has been overwhelming (exceptions are typically food and beverages as well as coke and refined petroleum exports). CEEs' manufacturing trade with the EU has been **increasingly specialized** on just a few key industries. In Hungary, for example, electrical, optical and transport equipment account for more than 60 % of manufacturing exports, just as textiles and wood products in Latvia. Typically, among the **most important exporting branches** are textiles and textile products, basic metals and fabricated metal products, electrical and optical equipment and transport equipment, in the Baltic states also wood and wood products (see Figure 3a). Import specialization has been less pronounced, but growing as well: in 2000, the biggest import shares are reported for textiles, chemicals, machinery and equipment, electrical and optical equipment and transport equipment (see Figure 3b).

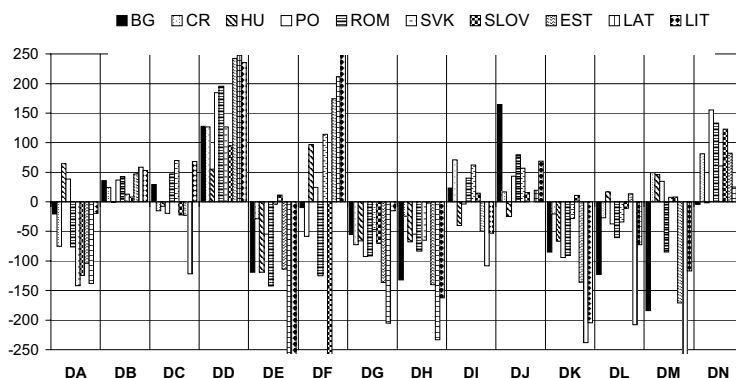
A more concise picture of trade specialization is provided by the indicator of revealed comparative advantage.<sup>12)</sup> The RCAs shown in Figure 4 indicate that in the year 2000 there were only two branches where all CEEs had a revealed **comparative advantage** (positive RCA) in trade with the EU: textiles and textile products and wood and wood products. Besides, nearly all CEEs have positive RCAs also in basic metals and fabricated metal products (except Hungary) and in manufacturing n.e.c. (mainly furniture – here except for Bulgaria and Hungary). There were also two branches where all CEEs had a **comparative disadvantage** (negative RCA): chemicals and rubber and plastics. Nearly all CEEs have negative RCAs also in pulp and paper (except for Slovenia), machinery and equipment n.e.c. (again except for

12) RCAs compare the relative shares of exports and imports of a particular branch with the share of the country's total manufacturing exports and imports. We use here the following definition of revealed comparative advantage:  $RCA^i = \ln(E^i/I^i)/(E^{tot}/I^{tot}) * 100$ . A higher  $RCA^i$  reveals a comparative advantage of branch  $i$  (see Balassa, 1965).

Slovenia) and electrical and optical equipment (except for Hungary and Estonia). The remaining branches are more heterogeneous in terms of RCAs: food and beverages have positive RCAs only in Hungary and Poland, transport equipment in the Czech Republic, Hungary, Poland, Slovakia and Slovenia. Textiles, leather, wood, basic metals and furniture thus can be identified as branches where CEEs enjoy revealed comparative advantages in trade with the EU whereas the opposite is true for chemicals, rubber, paper, machinery and equipment. In line with economic theory, CEEs seem to have a comparative advantage in labour (textiles) and resource (wood products and basic metals) intensive branches, whereas in capital and technology intensive branches (e.g. chemicals, machinery and equipment) they usually have comparative disadvantages.

Figure 4

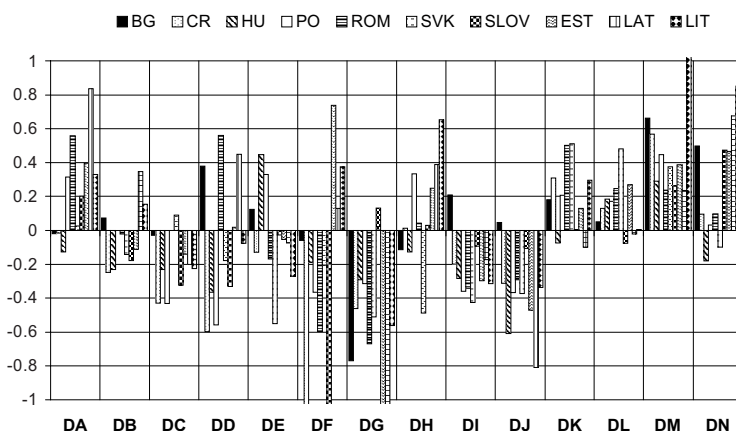
**Revealed Comparative Advantages of CEEs in Manufacturing Trade with the EU (year 2000)**



Source: Own calculations based on Eurostat COMEXT Database. See Table 1 for description of NACE codes.

Figure 5

**Revealed Comparative Advantage Improvements of CEEs in Manufacturing Trade with the EU (average 1999 – 2000 over 1995 – 1996)**



Source: Own calculations based on Eurostat COMEXT Database. See Table 1 for description of NACE codes.

Due to the still ongoing structural adjustments and FDI flows, the pattern of RCAs has naturally been changing. One possibility to capture these changes in a more systematic manner is to look at RCA improvements (or deterioration) over time. Figure 5 shows average RCAs in 1999 – 2000 compared to 1995 – 1996. Positive numbers here indicate either a **growing revealed comparative advantage** (or declining comparative disadvantage) of a branch during the period concerned. *Vice versa*, negative numbers indicate either a growing comparative disadvantage (or a declining comparative advantage).<sup>13</sup> All CEEs record substantial RCA improvements in transport equipment industry, and most of them also in food and beverages, machinery and equipment, electrical and optical equipment and machinery n.e.c. (mainly furniture). Pronounced RCA declines, that is a **deteriorating trade competitiveness**, can be observed in chemicals (here except for Slovenia), other non-metallic mineral products (except for Bulgaria), and basic metals and fabricated metal products (except for Bulgaria). Besides, more advanced CEEs usually have deteriorating RCAs in labour-intensive branches such as the textiles, leather and wood industries. Several branches with both improving and deteriorating RCAs have attracted over-proportional amounts of FDI (see Figure 2). Indeed, statistical evidence for a systematic relationship between accumulated FDI stock and RCA changes has been inconclusive: we infer that the process of industrial restructuring has not been completed yet.

## 6. Factor Inputs, Skills and Trade Specialization

Detailed Eurostat trade data (at NACE 3-digit level) permit to analyse the evolution of the **factor and skill content** of CEEs' exports to the EU. Earlier studies have shown that these countries started, in their trading structure with the EU, with a profile typical of less developed economies: their representation in exports of the labour-intensive branches was above-average, in the capital, R&D and skill-intensive branches below-average (particularly in the latter two), while their representation in exports of energy-intensive branches was, except for Hungary, above-average – which reflects the heritage of cheap energy supplies within the CMEA in the CEEs' industrial export structure (see Dobrinsky, 1995; Landesmann, 2000).

Over time, important changes took place in the CEEs' export structure vis-à-vis overall EU imports and in their RCAs in these different categories of industries: the most remarkable change took place in Hungary: from sizeable deficits in its exports in the areas of capital, R&D and skill-intensive industries, it either completely eroded these deficits to zero or even achieved surpluses relative to the overall EU import structure. This pattern was followed in a much less spectacular manner by Poland and the Czech Republic, where deficits in the representation of skill, R&D and capital-intensive branches were reduced. For these economies and also for the Slovakia the relatively strong presence of energy-intensive branches was substantially reduced while this was not at all the case of Romanian and Bulgarian exports to the EU. 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 more advanced CEEs on the other.

Discontinuity in statistics does not permit us to pursue this analysis in the same manner for the more recent period. But following the methodology recently applied for the EU Member States, we shall use here the new **taxonomy of industries**

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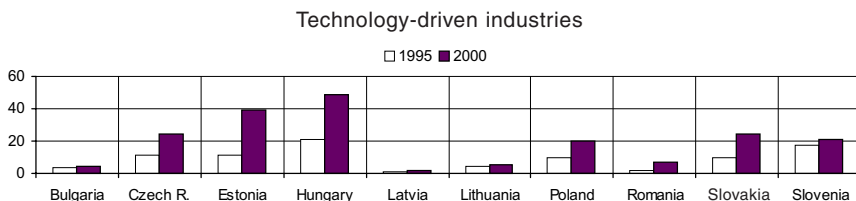
13) These changes are captured in Figure 5 by differences of averaged logarithms which can roughly be interpreted as a RCA growth index.

(again at NACE 3-digit level) where industries are clustered by input combinations and employment skills (see European Commission, 1998, 1999, Box 2.1; for details on the new taxonomy of industries see Peneder, 2001). Figures 6a and 6b show the evolution of shares in candidate and selected EU countries' exports to the EU(15), where industries are classified by different factor inputs, for the years 1995 and 2000. One can see that **technology-driven industries** account for a growing share of exports in all CEEs, with the highest shares (and most spectacular increases) in the more advanced CEEs such as Hungary, Estonia, Slovakia and the Czech Republic – similar to a number of EU states such as Austria, Finland, Portugal, Spain, Sweden and Ireland. This group of industries is nearly absent in the exports of less advanced CEEs such as Bulgaria, Romania, Latvia and Lithuania, or, for that matter, Greece. Capital-intensive industries still account for a large, though mostly diminishing, share of exports in both CEEs and (less so) EU countries. On the other hand, **labour-intensive industries** have growing export shares in Bulgaria, Romania and the two Baltic states while their importance has been declining in other CEEs – just as in the majority of EU Member States. A comparison with present EU Members shows that Greece and Portugal have a higher share of labour-intensive exports (more than 20 %) than the Czech Republic, Slovakia and Slovenia, whereas the share of this category in Austria and Italy is about the same as in Hungary.<sup>14)</sup> Only the less advanced CEEs such as Bulgaria, Romania, Poland and the Baltic states specialise most in labour-intensive industries.

A detailed look at the **employment skills** composition of exports (again using the above-mentioned taxonomy of industries – see Peneder, 2001) reveals a high concentration on **low-skill industries** in the exports of Bulgaria, Romania and Lithuania (and Greece) whereas the importance of this group of industries diminishes in the rest of Europe (see Figures 7a and 7b). Again, in the more advanced CEEs such as the Czech Republic, Estonia, Hungary, Slovakia and Slovenia the representation of **low-skill industries** lies below the EU average and compares favourably even with the more advanced EU states such as Austria, France and Italy. The **upper-skill segment** (high-skill industries) has been rapidly gaining importance in the exports of Hungary, and less distinctly so also in the Czech Republic, Slovakia and Slovenia. Hungary's share in high-skill industries' exports has already reached the EU average and surpassed the shares of these industries in the exports of a number of more developed EU countries (e.g. Austria, Finland and Sweden).

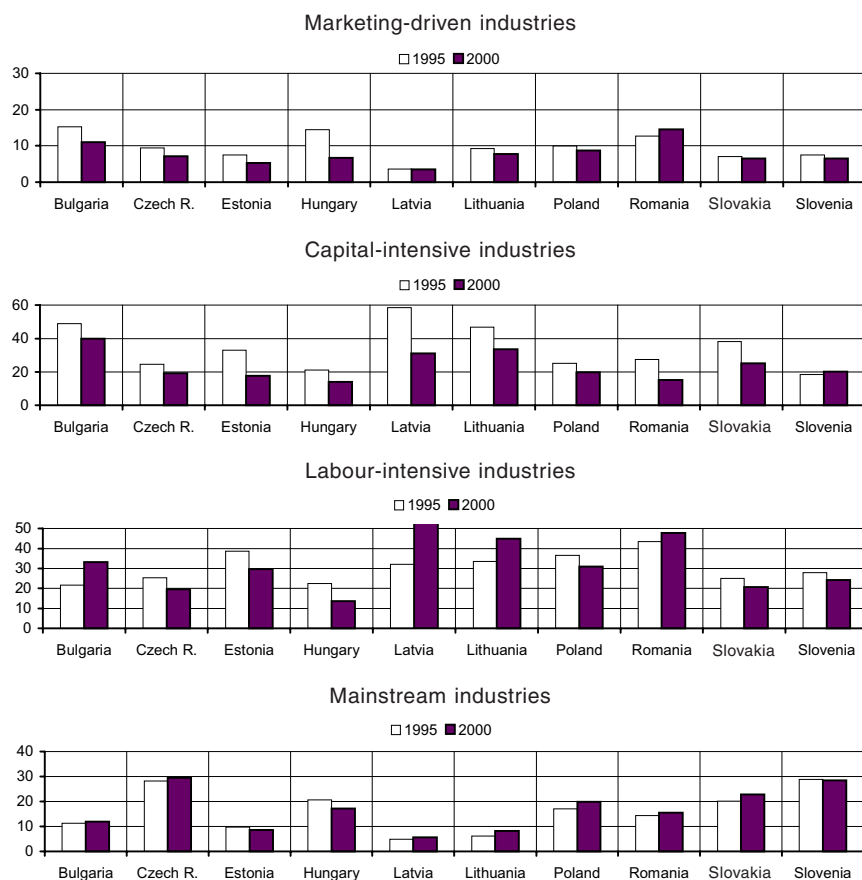
Figure 6a

**Shares in CEEs' Exports to the EU by Factor Inputs (taxonomy I)**



14) The latter country's exceptionally high export share of technology driven industries is similar to that of Ireland and most likely also reflects the impact of large FDI inflows (see European Commission, 1998, Table 7.6).

Figure 6a (cont.)



Source: Own calculations based on Eurostat COMEXT Database.

Figure 6b

**Shares in Selected EU Countries' Exports to the EU by Factor Inputs (taxonomy I)**

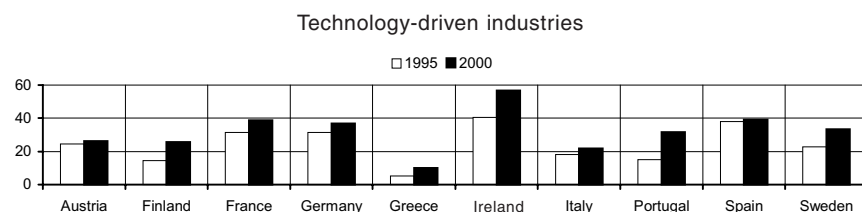
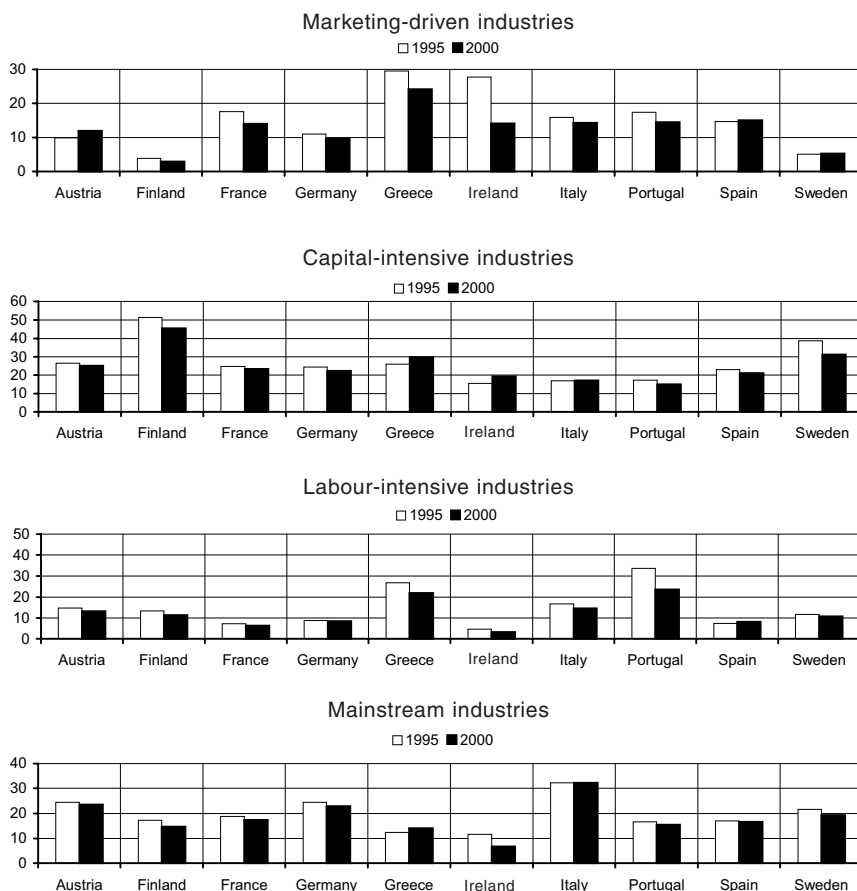


Figure 6b (cont.)



Source: Own calculations based on Eurostat COMEXT Database.

Figure 7a

**Shares in CEEs' Exports to the EU by Labour Skills (taxonomy II)**

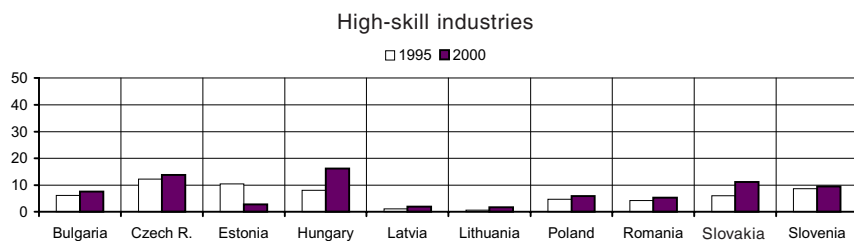
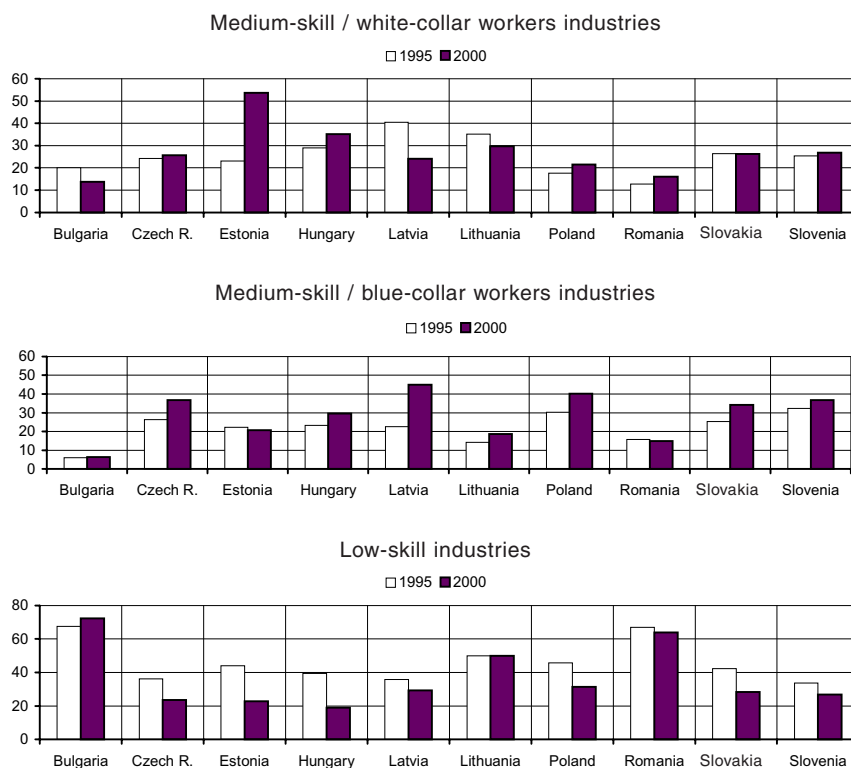


Figure 7a (cont.)



Source: Own calculations based on Eurostat COMEXT Database.

Figure 7b

**Shares in Selected EU Countries' Exports to the EU by Labour Skills (taxonomy II)**

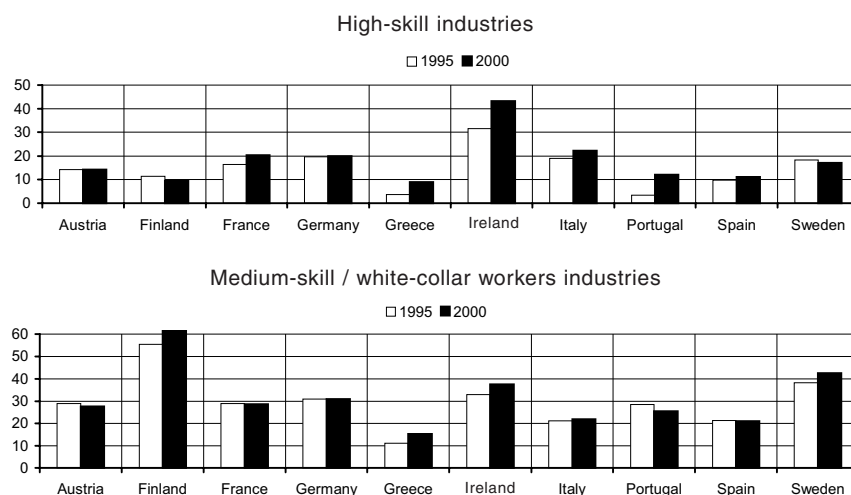
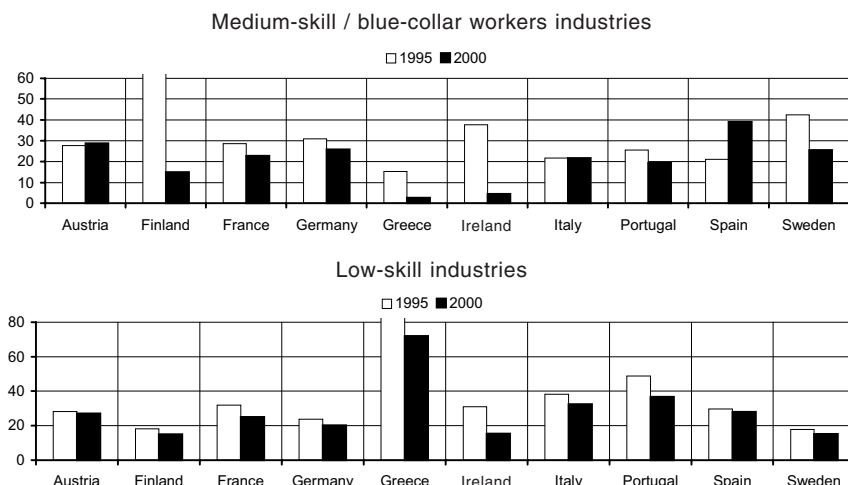




Figure 7b (cont.)



Source: Own calculations based on Eurostat COMEXT Database.

## 7. Conclusion

The impressive industrial restructuring that has taken place in the CEE candidate countries over the past decade has brought their industry close to European production and employment structures. However, the CEEs' manufacturing industry is on the whole less diversified than industry in the EU, and there is also a distinct specialization pattern in the more advanced CEEs on the one hand, and in the less advanced reform lags behind on the other. The new branch-specific pattern of productivity growth mirrors the varying progress with transition and is associated mainly with the activity of foreign investors. The latter has a clearly positive impact on output and productivity growth, as well as on efficiency improvements at the branch level.

After trade liberalization, the EU has become the most important trading partner of all CEEs. Their exports still specialise on just a few traditional industries: textiles, wood products, basic metals and furniture, though improving comparative advantages have recently appeared also in food and beverages, transport, electrical, optical equipment and machinery. The positive shifts in the export structure are confirmed by a more detailed analysis as well: increasingly, CEEs' export specialization reflects both the countries' traditional factor endowments (mainly cheap labour and available resources), but more recently also technological spillovers and skill upgrading which has been fostered by FDI inflows. Again, the more advanced CEEs record an impressive move towards technology-driven and high-skilled labour-intensive industries whereas in the less advanced countries capital-intensive and low-skilled labour-intensive industries prevail. In their production, employment and export structures, the more advanced CEE candidate countries (the Czech Republic, Hungary, Estonia, Slovakia and Slovenia) thus display features which clearly illustrate their close integration (and structural similarity) with the EU, whereas the remaining CEEs are still lagging behind.

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