CHAPTER 4
STRUCTURAL CHANGE IN THE TRANSITION ECONOMIES, 1989-1999

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4.1 Introduction

A paper on "structural change" in transition economies should start with a discussion, or at least a definition, of what is meant by structural change. For the purpose of this paper structural change is referred to in two ways:

- changes in compositional structures (of output, employment, exports, etc.);

- changes in behaviour: we can think of this as changes in the ways different variables relate to each other, such as output-employment relationships or FDI-import/export dynamic, etc.

The issue of structural change is, of course, of great relevance to transition economies as fundamental "regime changes", particularly those which transform the basic principles of allocation, as well as changing external economic relationships (from a largely autarkic CMEA bloc towards external liberalization), induce change in both these senses. Furthermore, there are a number of relationships which attract the economist's interest in "structural change":

- the relationship between "economic structure" and the level of economic development;

- "economic structure" as an indicator of a country's position in the international division of labour;

- "structural change" as an indication of an economy's dynamism or lack of dynamism (and, in the case of transition economies, of the speed and direction of its transformation towards a well-functioning market economy).

We shall refer to all the above issues, although mostly not in a rigorous manner, in the following sections of this paper, which point to some of the important structural features in transition economies and their development over the past decade. The analysis in this paper is restricted to a subsample of transition economies, namely the central and east European countries (CEECs) – with the exception of the Baltic states – which are currently also candidate countries for EU accession. While it would be interesting to extend the analysis to a wider range of transition economies, we were restricted by the use of a disaggregated database, which allows reliable cross-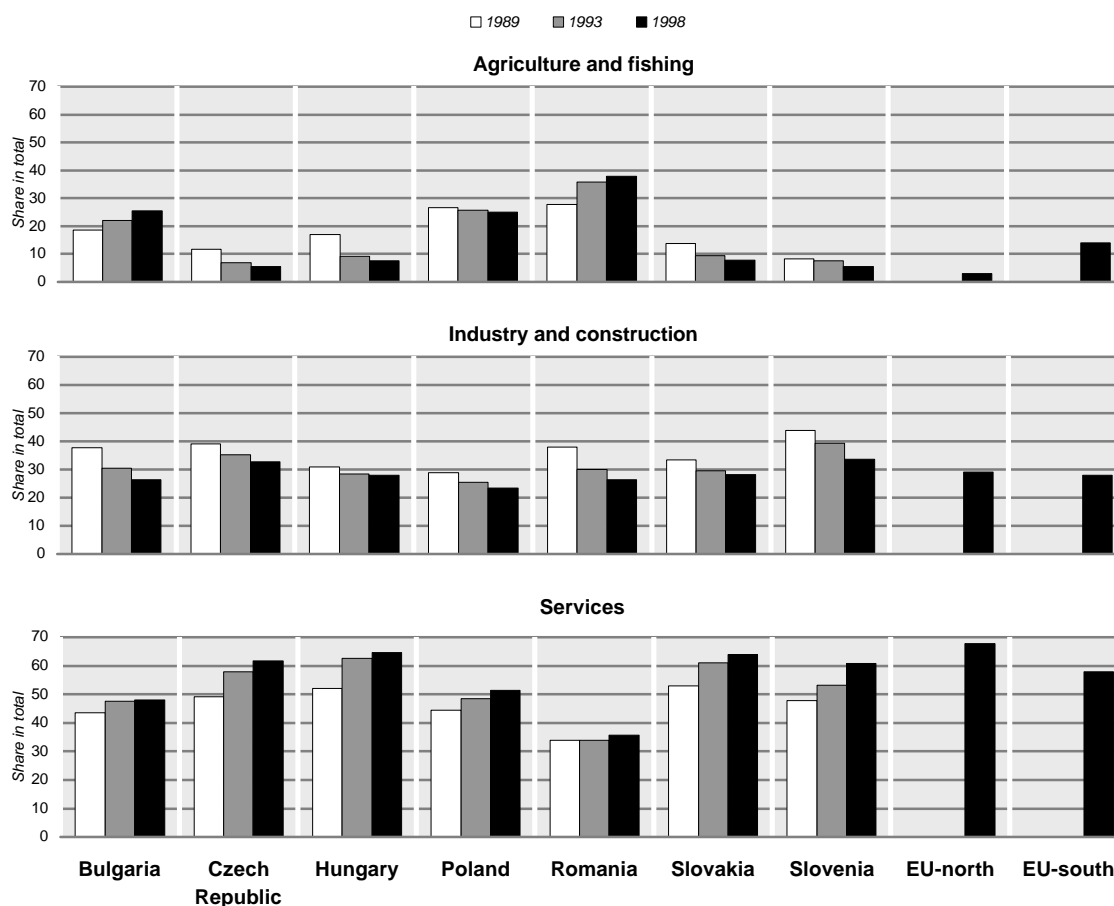country comparative analysis of patterns of structural change.[223] Furthermore, we shall only deal with a subset of issues which come under the heading of "structural change": the focus of the analysis will be on changes in the structures of production, employment and in the positions of CEECs in the European division of labour, i.e. on the CEECs' international specialization. We shall leave out important topics such as institutional change, changes in the geographic pattern of economic activity, micro-/firm-level changes and changes in income and wealth distribution. All these are essential issues in a fuller analysis of structural change in transition economies, but they cannot all be squeezed into one overview.

The structure of the paper is as follows: section 4.2 presents the broad patterns of sectoral change, i.e. the processes of de-agrarianization, deindustrialization and tertiarization which have taken place since the beginning of transition. Section 4.3 looks at the broad picture of developments in employment levels, participation rates and unemployment. Section 4.4 reviews some of the evidence on industrial restructuring and shows some interesting intercountry and interindustry differences in this respect. Section 4.5 examines whether we can detect patterns of convergence in structure with different groups of EU economies. Section 4.6 reviews the development of interindustry and intra-industry specialization of CEECs in international trade with the EU. Section 4.7 reports the results of an econometric analysis of patterns of industry level catching up, the first part dealing with catching up in productivity levels and wage rates, and the second with catching up in product quality (measured by export unit values at a very detailed product level). Section 4.8 discusses the role which FDI plays in industrial restructuring and in the process of industrial specialization of the central and east European (CEE) economies. Section 4.9 summarizes some of the main results and concludes with some remarks on the possible impact of EU accession on patterns of structural transformation and further east-west European integration.

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[223] The database upon which the analysis in this paper mostly relies is The Vienna Institute for International Economic Studies Industrial Database (WIIW-IDB).

CHART 4.2.1

Comparison of CEECs' employment structures in 1989, 1993 and 1998 with those in the EU
(Percentages)

☐ *1989*   ▨ *1993*   ■ *1998*

Agriculture and fishing

Industry and construction

Services

Bulgaria   Czech Republic   Hungary   Poland   Romania   Slovakia   Slovenia   EU-north   EU-south

Source: WIIW Industrial Database incorporating national statistics.

4.2 Broad patterns of structural change

In this section the patterns of structural change which have taken place in the CEECs at the broad sectoral level are briefly reviewed.

Charts 4.2.1 and 4.2.2 show the evolution between 1989 and 1998 of the shares of the three classical sectors (agriculture, industry, services) in value added and employment respectively; chart 4.2.2 also allows a comparison of the sectoral composition between the CEECs and two groups of EU countries, the "EU north" (composed of Belgium, France, Germany and the United Kingdom) and the "EU south" (composed of Greece, Portugal and Spain). The following tendencies can be observed.
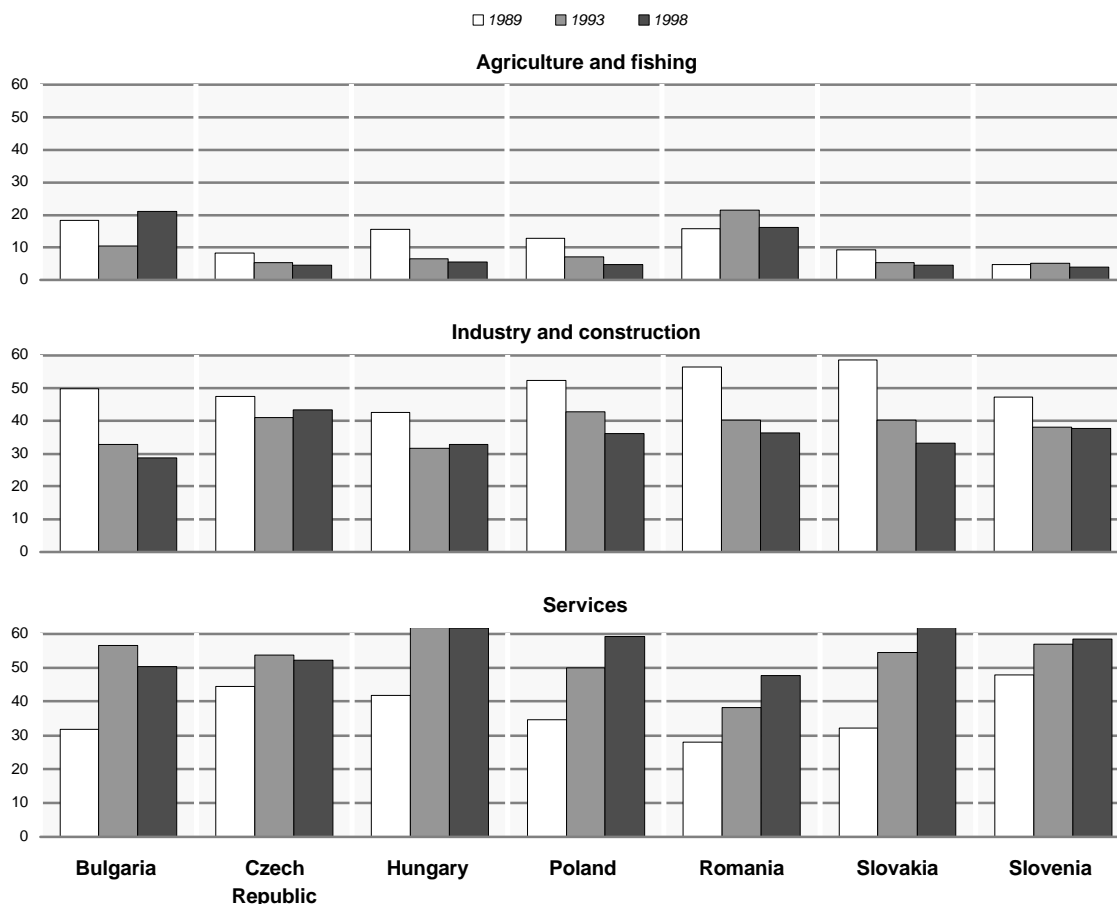
(i)   De- and re-agrarianization

While there was a tendency in most of the CEECs to reduce the size of the agricultural sector, there are exceptions to this: in some economies the share of the labour force in agriculture (and in Romania even the absolute number) has increased; this is true for Bulgaria and Romania, while for all the other CEECs there are falls in the share (and dramatic losses in absolute numbers) of

agricultural employment. Interestingly, in the economies with the larger agricultural sectors (Bulgaria, Poland, Romania) percentage declines (or even increases) in the employment shares of this sector were smaller than in the countries which started off with a smaller agricultural sector (Czech Republic, Hungary, Slovakia, Slovenia). Hence, regarding the "primary sector", the transition brought about processes both of "de-agrarianization" as well as – in some countries – of "re-agrarianization". The latter should be considered a transitory phenomenon, resulting from the severe employment crisis in the industrial sector (especially in countries such as Bulgaria and Romania) and the, so far, limited absorption capacity in the services sector. There are also interesting discrepancies in the movements of value added shares and employment shares in agriculture: the shares of agriculture in value added were also declining in the most recent period in those economies in which there were previously signs of "reagrarianization" (Bulgaria and Romania); this development supports the view that the phenomenon mainly reflects the dramatic overall jobs crisis in these countries.

(ii)   Deindustrialization

CHART 4.2.2

Value added structures in the CEECs,1989, 1993 and 1998
(Percentages)

☐ *1989*   ▨ *1993*   ■ *1998*

Agriculture and fishing

Industry and construction

Services

Bulgaria | Czech Republic | Hungary | Poland | Romania | Slovakia | Slovenia

Source: WIIW Industrial Database incorporating national statistics.

Broadly, one can speak of a general process of "deindustrialization" with falling absolute employment levels in the industrial sector (comprising manufacturing, mining, water and electricity supply, and construction). In terms of share, however, there are some interesting exceptions to the general decline of employment in the industrial sector. In Hungary the shares of employment in the industrial sector have recovered after an initial drop at the beginning of the transition and value added shares have risen in Hungary and the Czech Republic and stabilized in Slovenia. In relation to both the EU north and the EU south, some of the CEECs maintain, at the end of the first decade of transition, a high share of manufacturing/industry in both the value added and employment (for employment shares see chart 4.2.1). There are differences in the value added and employment shares: the Czech Republic and Slovenia, followed by the Slovak Republic and Hungary are the countries with the highest employment shares in industry, while the Czech Republic, Slovenia and Romania, followed by Poland, are those with the highest shares in value added. These

differences reflect, of course, differences in relative sectoral productivity levels, e.g. the extremely low productivity level in Romanian agriculture raises industry's share in value added in spite of its own low level of productivity. The levelling off of relative employment losses in manufacturing in some of the CEECs (such as Hungary and Poland) and the persistence of manufacturing's relatively high share of value added could be an indication of the attractiveness of some of the CEECs as locations for some of Europe's industries within the context of an overall European division of labour. We shall return to this issue in later sections of this paper.

(iii) Tertiarization

As regards the "tertiary sector", there are clear signs of a catching-up process of the CEECs in the relative size of this sector (although, as in the west, the changes are partly due to statistical reclassifications and the out-sourcing of service activities previously undertaken within the other sectors). Again, the relative increase of

the importance of the service sectors in the CEECs over the last decade has not necessarily been in line with the size of the initial gap (relative to the west European employment structure). Thus, in countries such as the Czech Republic, Hungary, Slovakia and Slovenia, there were very substantial increases in the shares of the services sector, while in Bulgaria, Poland and Romania, where the initial shares of the services sector in overall employment were relatively low, the increases in shares were rather modest. In absolute terms, the employment gains in the services sector were far from sufficient to compensate for the employment losses in the other two sectors.

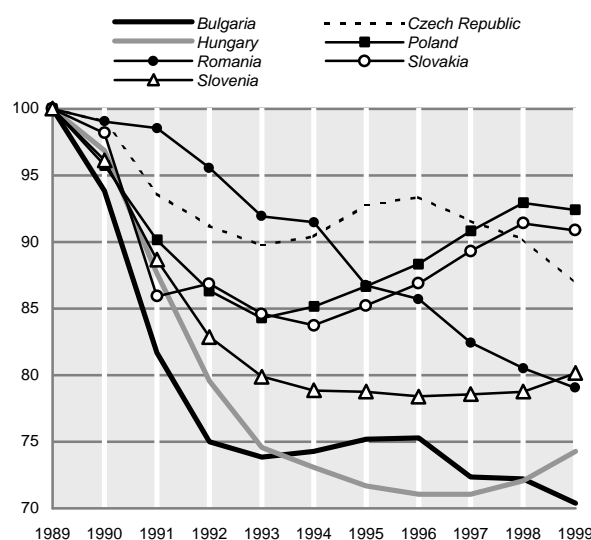## 4.3 Employment, participation rates and unemployment

Structural shifts as well as the overall macroeconomic developments since 1989 have fundamentally affected overall employment levels, participation rates and unemployment. The falls in total employment since the beginning of the transition were very substantial (see chart 4.3.1). They were concentrated in some countries (Hungary, Poland) in the early phases of the transition, 1990-1993, while in others, such as Romania and Slovakia, there were also substantial declines after 1993. The relationship between GDP growth and employment (see table 4.3.1) reveals big changes between the periods 1990-1993 and 1993-1999 and also great diversity across countries in terms of relative GDP growth and the responsiveness of employment to GDP growth.

The large cumulative employment drop in the CEE region is reflected in falling labour force participation rates in all CEECs since the beginning of the transition.[224] A comparison between the transition countries covered here and the EU-15 shows that, despite considerable falls in the initial period of transition, participation rates are higher than the EU average (68 per cent) in the Czech Republic, Romania and Slovakia, similar to the EU-15 level in Poland, and lower than in the EU in Bulgaria and Hungary. Employment rates (total number of employed relative to the population aged 15-64) also vary considerably, from close to 70 per cent in the Czech Republic and Romania (in 1998) to 54 per cent in Hungary. A comparison of employment rates in the CEECs and the EU in 1998 shows that the average rate of the seven transition economies (CEE-7) stood at 62.7 per cent, slightly higher than the EU average of 61 per cent. The gender gap in employment rates in the CEECs remained smaller than in most countries in the EU.

Unemployment rates (table 4.3.2) had risen to between 7 and 15 per cent in the CEECs (by LFS statistics) by 1999, a reflection of the relative development of employment levels on the one hand and

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[224] H. Vidovic, "Recent labour market developments in CEECs", The Vienna Institute for International Economic Studies (WIIW), *The Vienna Institute Monthly Report,* No. 4 (Vienna), 2000, pp. 9-19.

CHART 4.3.1

Employment trends in the CEECs, 1989-1999
(1989=100)

Source: WIIW Industrial Database incorporating national statistics.

TABLE 4.3.1

GDP and employment growth in the CEECs, 1990-1999
(Cumulative growth, per cent)

	GDP			*Employment*		
	1990-1993	*1994-1999*	*1990-1999*	*1990-1993*	*1994-1999*	*1990-1999*
Bulgaria	-26.7	-7.2	-32.0	-26.2	-4.7	-29.6
Czech Republic	-13.1	9.6	-4.7	-10.3	-3.2	-13.1
Hungary	-18.1	21.3	-0.7	-26.8	-0.4	-27.1
Poland........................	-12.4	39.0	21.7	-15.7	9.6	-7.6
Romania	-23.9	-0.5	-24.3	-8.1	-14.0	-21.0
Slovakia	-25.0	34.0	0.5	-15.4	0.7	-14.9
Slovenia	-15.6	29.2	9.1	-20.1	0.3	-19.8

Source: WIIW Industrial Database incorporating national statistics.

of the labour force (particularly of participation rates) on the other. The Czech "unemployment miracle" which lasted until 1996 has evaporated. The slight falls of the unemployment rates in the mid-1990s in most countries of the region and their deterioration in the late 1990s reflected, first, higher GDP growth in the region and, more recently, a slowdown (after 1999 positive growth is recorded again). Unemployment rates across the region are now within a range not dissimilar to the EU in the 1990s and reflect more strongly the patterns of GDP growth.

Unemployment and employment rates in the CEECs, 1996 and 1998 [a]

(Percentages)

	Unemployment rates		Employment rates						
	1996	*1998*	*1996*			*1998*		
	Total	*Total*	*Total*	*Men*	*Women*	*Total*	*Men*	*Women*
Bulgaria	13.6	14.1	55.3	59.2	51.4	54.2	58.3	50.2
Czech Republic	3.9	6.5	69.5	77.8	61.3	67.6	76.0	59.2
Hungary	9.9	7.8	53.0	60.6	45.8	54.2	61.1	47.5
Poland..	12.3	10.6	60.4	67.3	53.7	60.8	68.0	53.8
Romania	6.7	6.3	71.3	78.4	64.3	70.8	77.3	64.3
Slovakia...	11.3	12.5	62.1	69.6	54.7	60.3	66.9	53.7
Slovenia...	7.3	7.9	63.0	67.4	58.7	65.1	69.5	60.5
EU-15	10.8	10.0	60.3	70.4	50.2	61.1	71.1	51.2

Source: Eurostat, *Central European Countries' Employment and Labour Market Review, Employment in Europe 1999.*

[a] Based on labour force surveys.

4.4 Patterns of industrial restructuring

This section concentrates on features of the *process of restructuring* which took place in the *industrial (or manufacturing) sector* and examines the developments over two phases: the phase immediately after the beginning of the transition (1990-1993) and the phase after that (1993-1998).

Chart 4.4.1 depicts annual growth rates of production, employment, labour productivity, investment and exports by the industrial sectors of the CEE-7. It shows clearly the features of the two distinct developmental phases since the beginning of the transformation: deep "transformational recessions" followed by economic recoveries in the CEE-5[225] (with, however, interruptions in growth, evident in the annual time series), while there was still a negative growth rate of production for Bulgaria and Romania.

Over the more recent period 1993-1998, the CEECs have continued to differ: the strongest resumption of industrial production was in Hungary and Poland, while (labour) productivity growth was highest in Hungary (where production growth was accompanied by continued employment declines), followed by Poland (with high output growth and nearly stable employment levels); productivity growth was more moderate in the Czech Republic, Slovakia and Slovenia where more moderate trend growth rates of output went along with less labour shake-out from industry than in Hungary. Bulgaria and Romania continued to be characterized by declining industrial production, and an even sharper contraction of employment (particularly in Bulgaria), which led to moderate increases in productivity and a sharp slump in industrial investment; overall export performance remained disappointing in Bulgaria, while the Romanian experience was more successful.

In the growth profiles of the two periods some of the important peculiarities of the transition processes in the CEECs can be detected:

- There is evidence for non-market conforming behaviour particularly in the first period, and for the "laggards" also in the second period: e.g. substantial labour hoarding in the face of declining output, or investment declining less than output; however, the evidence for such behaviour (at this macro-level) is much less evident over the second period;

- The diversity of performance remains very pronounced over the second period, evidenced in the first place by the difference in performance between the CEE-5 and Bulgaria and Romania; but within the CEE-5 group there are also sharply differing trend growth rates in productivity, investment and export performance. The rapid growth rates in productivity and exports in some of them (productivity growth being high in Hungary and Poland, export growth in the Czech Republic, Hungary and Poland) provide some evidence of a move towards "active restructuring", i.e. of a change in behavioural responses by enterprises moving into new markets, upgrading the composition and quality of their products (see sections 4.5 and 4.6 below) and restructuring their production processes.

Differences in the patterns of catching up and the development of cost competitiveness can be observed in chart 4.4.2 where wage rate growth (at current exchange rates) and productivity levels have been plotted in relation to the Austrian levels over the period 1991-1998 (Austrian levels have been kept constant to avoid taking in wage and exchange rate movements on the Austrian side as well). The superior Hungarian and Polish performances can be seen leading to improving or stationary relative labour unit costs, while in the other CEE-5 (the Czech Republic, Slovakia, Slovenia) the relationship between wage growth and productivity growth was such that relative unit labour costs rose. Wage growth (at current exchange rates) in Bulgaria and Romania was very low so that moderate productivity growth led to their relatively stable unit labour costs.

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[225] The seven countries listed in table 4.3.1 less Bulgaria and Romania.

Industrial production, employees, productivity, investment and exports, 1990-1992 and 1993-1998
(Average annual growth rate, per cent)
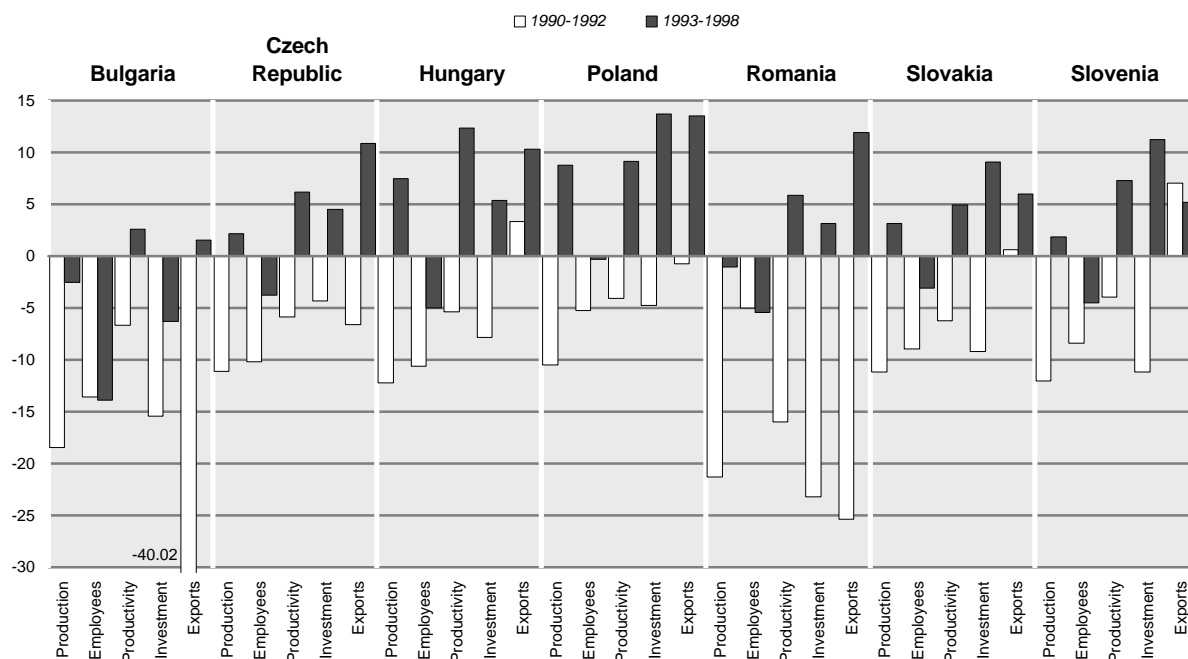
Patterns of catching up at the branch level

A cross-industry analysis shows that branch patterns of wage rate growth is less dispersed than productivity growth[226] so that interindustry differences in (labour) productivity growth also show up in changes in relative unit labour costs, i.e. the industries with above average productivity growth also improve their relative position in terms of relative unit labour costs. (This issue is discussed again in section 4.7 below, which considers the scope for changes in the structures of comparative advantage of the CEE economies within the overall European economy.)

Here, the attention is on some interesting patterns in the catching-up processes of a select group of industries. Chart 4.4.3 shows such patterns for five industries (at the NACE 2-digit level), namely textiles, leather, machinery, electrical goods and transport equipment.[227] It shows the evolution of wage and productivity levels and of unit labour costs relative to Austria over the period 1991 to 1998. Productivity levels are expressed at constant prices

of 1996 (with output levels compared at PPP rates); wage levels are compared at current exchange rates.[228]

There are quite large differences at the level of individual branches. Without going into detail and describing the different trajectories for each country and industry, some general patterns are apparent. In most CEECs the productivity levels of the five industries (relative to Austria) were initially rather higher in the "low-tech" sectors (textiles, clothing, footwear and leather products). Over time, however, the general pattern is for catching up to be stronger, and in some cases much stronger, in the "medium-/high-tech" (machinery, electrical equipment, transport) than in the low-tech sectors. In the low-tech branches, relative productivity growth is either stagnant or pretty low. Wage catching up, on the other hand, is very similar across branches, which means that there is wage drift between industries and that the countries concerned are gaining comparative (unit cost) advantages in the medium-/high-tech industries. This can also be seen by looking at the relative unit labour costs, which in most countries are rising much faster in the low-tech than in the medium-/high-tech industries.

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[226] P. Havlik and M. Landesmann, "Industrial competitiveness", paper prepared for the Spring Seminar of The Vienna Institute for International Economic Studies (Vienna), April 2000.

[227] For reasons of space only three countries are singled out; further information can be obtained from the author.

[228] For a more detailed discussion of the methodology used and further results based on industry-level PPP rates, see P. Havlik and M. Landesmann, op. cit.

CHART 4.4.2

Wages (in ECUs), productivity (at PPPs) and unit labour costs (in ECUs) in manufacturing industry, 1991-1999
(Austria 1996=100)

□ *1991* □ *1992* ▨ *1993* ▨ *1994* ▨ *1995* ▨ *1996* ■ *1997* ■ *1998* ■ *1999*
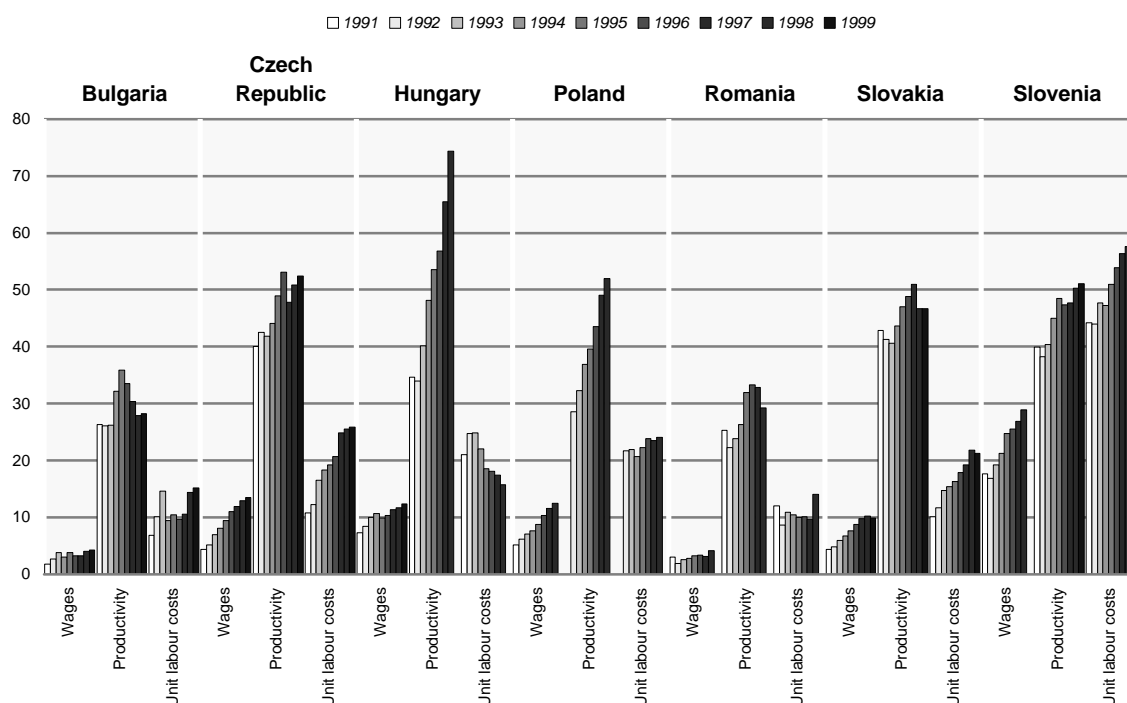
Source: WIIW Industrial Database.

Next we divide the 14 NACE 2-digit industries into three subgroups:[229] a *low-tech group* (including food products, beverages and tobacco; textiles and textile products; and leather and leather products); a *medium/high-tech group* (including machinery and equipment; electrical and optical equipment; and transport equipment), and a *resource- (and scale-) intensive group* (including wood and wood products; coke, refined petroleum products and nuclear fuel; chemicals, chemical products and man-made fibres; and other non-metallic mineral products). Initial gaps and growth rates (more precisely, annual rates of decline in the gap) in the productivity levels and wage rates of the three industrial groupings across the whole country sample (i.e. the CEE-7), over the period 1991-1997, are shown in table 4.4.1.

As regards productivity catching up, the high-tech industries were those with the highest average growth rate (16 per cent per annum) and, compared with the resource-intensive industries, show a rather high initial gap. The low-tech industries have an initial gap comparable to the high-tech industries, but a very low rate of closure of the gap (4 per cent per annum). The

resource-intensive industries had the lowest initial gap on average and a relatively high rate of closure (7 per cent per annum).
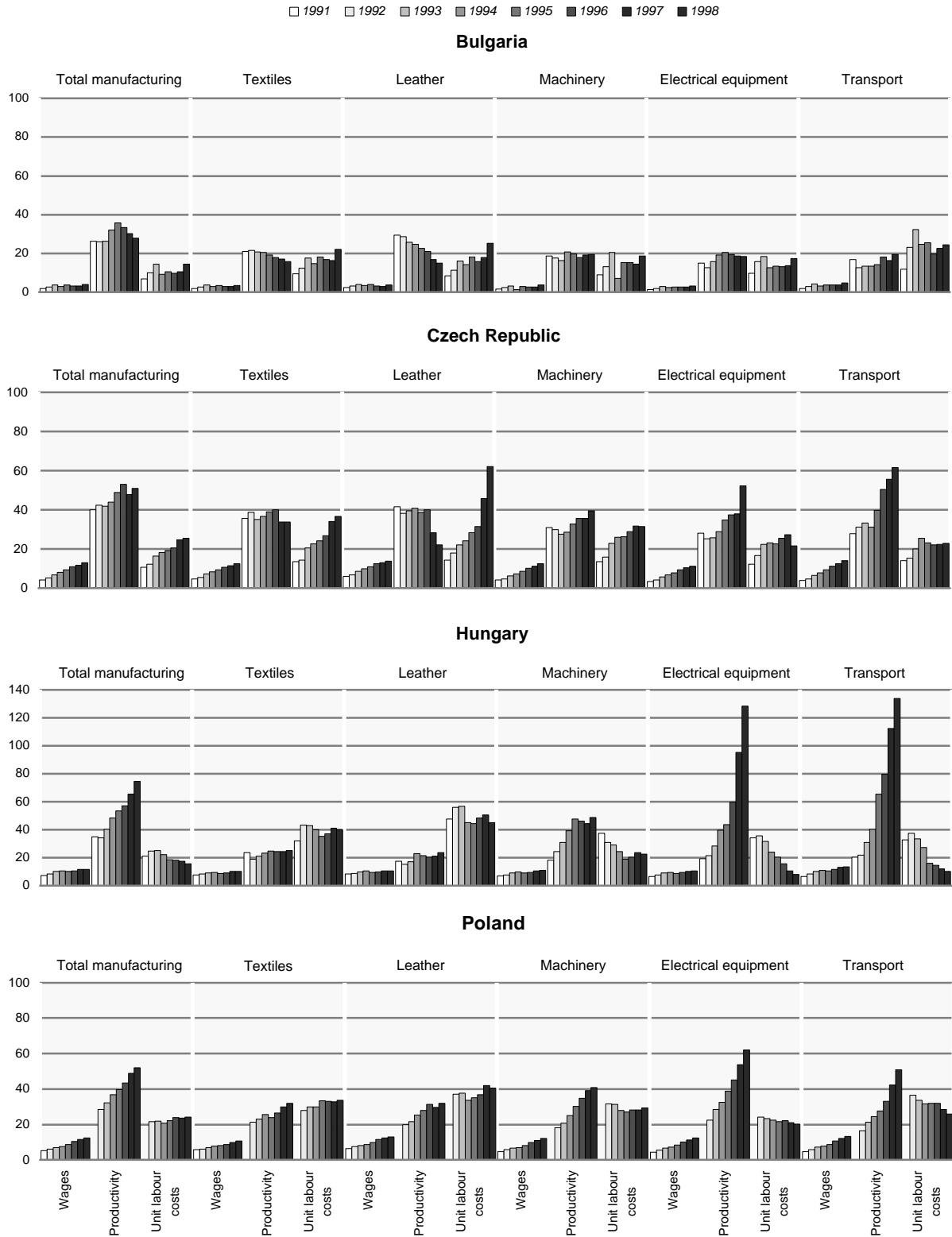
Table 4.4.1 also allows some comparisons between productivity and wage catching up across the three industrial groupings. (Note, however, that wages in this calculation are expressed in current PPPs and productivity levels at constant prices; thus the absolute values for the growth rates are not comparable, but the relative structure across branches is interesting.)

The initial gap in labour productivity levels is largest in the medium-/high-tech industries and smallest in the resource-intensive industries, with the low-tech sectors lying in between. The initial gap of wages is larger than that of productivity levels in all three groups and much more similar across industries. The pattern is quite different for the growth rates of these two variables. Productivity growth is by far the highest on average in the medium-/high-tech sectors, medium in the resource-intensive industries and lowest in the low-tech sectors. But the growth rates in wages are much more similar: they are almost the same in the medium-/high-tech and resource-intensive industries, and a little bit lower in the low-tech industries. In the low-tech and resource-intensive industries the growth of wages is higher than that of productivity; in the medium-/high-tech industries productivity growth is much higher than wage growth.

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[229] The following calculations are taken from R. Stehrer, M. Landesmann and J. Burgstaller, *Convergence Patterns at the Industrial Level: The Dynamics of Comparative Advantage*, The Vienna Institute for International Economic Studies, Working Paper, No. 11 (Vienna), 1999.

Changes in wages, productivity and unit labour costs in the CEECs, 1991-1998
(Austria 1996=100)

☐ *1991* ☐ *1992* ☐ *1993* ▨ *1994* ▨ *1995* ■ *1996* ■ *1997* ■ *1998*

Bulgaria

Czech Republic

Hungary

Poland

<div align="center">CHART 4.4.3 (concluded)</div>

<div align="center">**Changes in wages, productivity and unit labour costs in the CEECs, 1991-1998**</div>
<div align="center">*(Austria 1996=100)*</div>

<div align="center">□ *1991* □ *1992* ▨ *1993* ▨ *1994* ▨ *1995* ▨ *1996* ■ *1997* ■ *1998*</div>

Romania

Slovakia

Slovenia
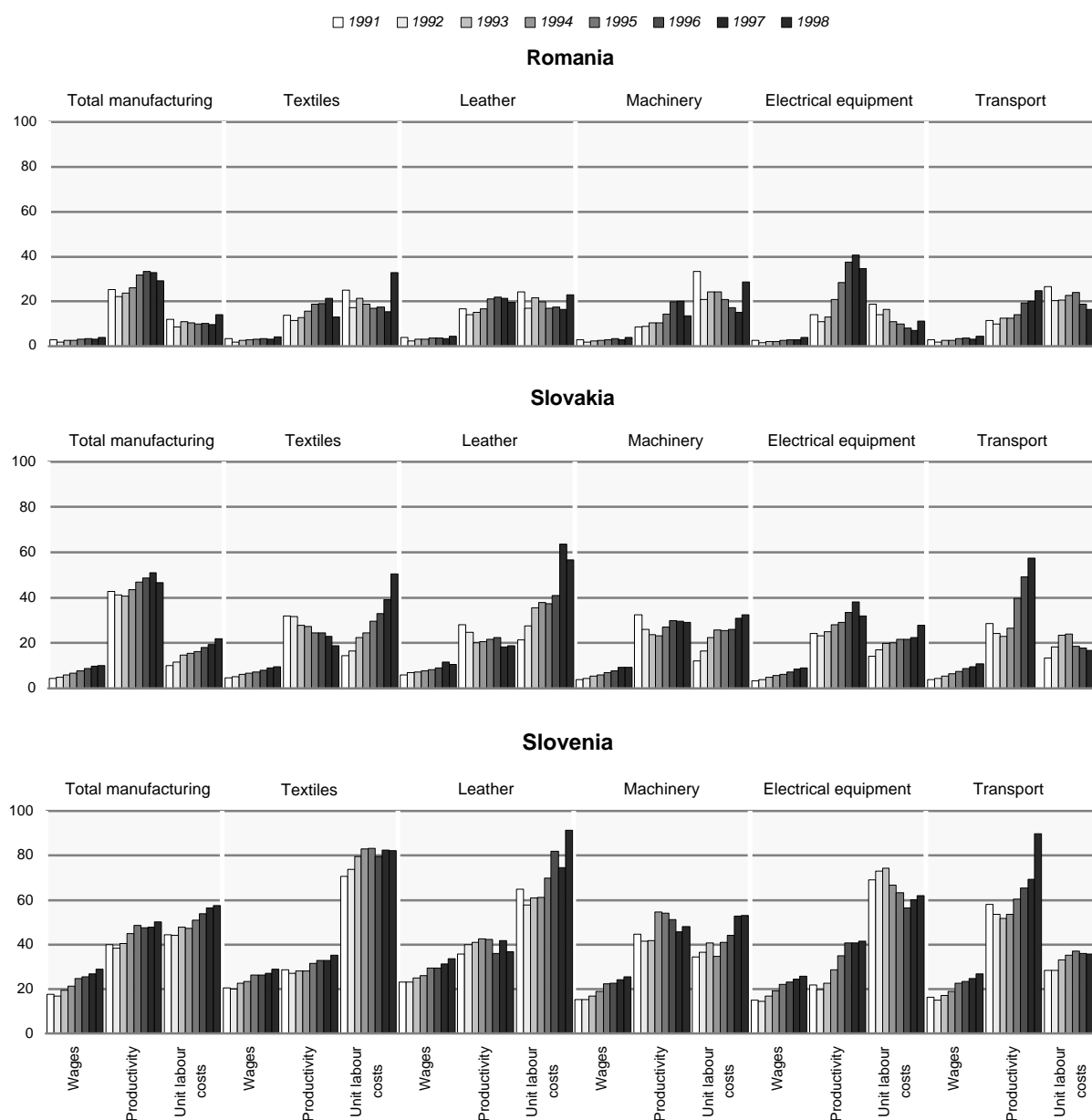
Source: WIIW Industrial Database.

Thus, whereas the comparative cost advantage in 1991 was in the resource-based industries for the CEECs, this pattern may have changed. The CEECs are gaining comparative cost advantages in the medium-/higher-tech sectors and losing them in the low-tech industries.

A number of conclusions can be drawn from this analysis of catching-up patterns at the disaggregated level. The overall pattern is that the CEE-5 are catching up in productivity levels relatively faster in the technologically more sophisticated industries than in the low-tech industries (see also section 4.8 below.) How

can such a pattern be explained? Without going into a full discussion at this stage, the general hypothesis in the "convergence" growth literature is that countries lagging further behind at a starting point of such a convergence process tend to catch up more rapidly. Applying this idea at the level of industries would suggest that the rate of closure of a productivity gap would be higher in those industries in which the initial gaps (and hence the "learning potential") were greatest. Other factors which could further substantiate such an analysis are the impact of FDI across branches, industry-specific skill endowments, and different learning curves across

	Low-tech		Resource-intensive		High-tech	
	Productivity	*Wages*	*Productivity*	*Wages*	*Productivity*	*Wages*
Gap	38.2	33.7	44.6	29.2	34.3	27.4
Growth rate	3.5	4.9	7.0	7.8	16.1	7.9

Source: Calculated from the WIIW Industrial Database.

Note: The gap is defined as the level of a variable (productivity, wage rate) in the CEECs in 1991 x 100 divided by the level of that variable in Austria in 1991. Growth rates refer to the annual percentage rate of decline in the gap between 1991 and 1997.

industries. A second important result is that the catching up of wages is much more similar across branches within the countries. Although the statistical database for the CEECs is rather small, this pattern emerges quite clearly (see also the more general results reported in section 4.7(i)). The overall result of this general pattern is that, due to the uneven industrial pattern of catching up in productivity levels across industries and, on the other hand, the wage drift across industrial branches, the CEECs as catching-up countries have the potential to increasingly gain comparative advantages in the technologically more sophisticated industries.

4.5 Convergence in structures?

A theme which has occupied researchers at The Vienna Institute for International Economic Studies (WIIW) for quite a while is the question whether there is "convergence in structures" or whether there is a tendency towards specialization in production and employment as between the CEECs and the EU economies. A summary measure of the similarity (or distance) between the industrial structures of different countries or country groupings is given in table 4.5.1: the indicator shows the similarity of output structures in manufacturing industry (based on the 2-digit NACE industrial classification). Two groups of EU reference countries are selected for comparisons with the CEECs: a group of northern countries (Belgium, France, Germany and the United Kingdom) and a group of southern countries (Greece, Portugal and Spain).

Broadly, the comparisons suggest the following:

- There is a clear difference across the CEECs in their respective degree of similarity to the northern and southern groups. The countries closest to the structure of manufacturing industry in the northern group are the Czech Republic and Slovenia followed by Slovakia. Those closest to the southern reference group are Bulgaria, Poland and Romania. The distance from the southern group is quite large for the other CEECs;

- As regards developments over time, there was a general convergence in structures between the CEE-5 and the northern EU reference group between 1992 and 1998 (with the exception of Hungary in the last two years which results mostly from a sharp increase in the share of electrical and optical equipment). Bulgaria and Romania have remained stationary in their distance from the northern reference group.

Detailed information with respect to structural comparisons between the CEECs and the two EU reference groups for the two years 1993 and 1998 is given in table 4.5.2. (CEEC output shares were calculated at current prices of 1996.) There are substantial differences in structure between the EU northern and southern manufacturing industries: there are relatively larger shares of food products, the more labour-intensive branches of textiles and leather products, and the raw-material-based wood products and non-metallic mineral products in the EU southern countries, while in the north chemicals and all the engineering products as well as transport equipment with its supplier industries (rubber and plastics) are more strongly represented. In some of the CEECs there are relatively large shares for food products (Bulgaria, Poland, Romania, while there was a large fall in their relative importance in Hungary), of wood and wood products in some of the economies with a lot of forests (Poland, Slovakia, Slovenia) as well as paper and paper products. There is also a significant inherited position of basic metals and of machinery in some of the CEECs. There are some striking, new specializations in transport equipment (the Czech Republic, Hungary, Slovakia) and the remarkable strength of Hungary in electrical equipment (including electronics). The diversity of evolving specializations in some of the CEECs is apparent, as is their position between the northern and southern EU economies as regards patterns of industrial specialization (in labour-intensive and resource-based industries, on the one hand, and capital-, technology- and skill-intensive industries, on the other).

4.6 Trade specialization

(i) Patterns of trade specialization with the EU: interindustry specialization

This section refers to research conducted at WIIW concerning the pattern of trade specialization of CEECs[230] in which the factor intensities of trade between the

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[230] M. Landesmann, "The pattern of east-west European integration: catching up or falling behind?", in R. Dobrinsky and M. Landesmann (eds.), *Transforming Economies and European Integration* (Cheltenham, Edward Elgar, 1996); P. Havlik, "Structural change, trade specialization and competitiveness of manufacturing industry in the CEECs", in M. Landesmann (ed.), *Structural Developments in Central and Eastern Europe. WIIW Report 1999*, The Vienna Institute for International Economic Studies (Vienna), chap. 3.

TABLE 4.5.1

Comparison of individual CEECs' industrial (output) structures with two groups of west European economies, [a] **1989-1998**

(Structural deviation indicator (S)) [b]

	1989	1990	1991	1992	1992	1993	1994	1995	1996	1997	1998
EU-north (Belgium, France, Germany, United Kingdom [c]											
Bulgaria	4.06	5.10	5.56	..	6.15	4.97	4.46	4.49	4.98	4.55	4.62
Czech Republic [d]	4.65	4.71	4.34	..	3.45	3.49	3.51	3.57	3.21	3.10	2.79
Hungary	3.08	3.79	4.98	5.79[e]	5.92	5.00	4.59	3.93	3.89	5.04	7.31
Poland...	4.63[e]	4.83	5.89	..	5.67	5.51	5.34	5.01	4.87	4.49	4.40
Romania [f]	4.32	4.50	4.98	..	5.57	4.27	4.01	3.40	3.67	4.40	..
Slovakia [d]	3.55	3.46	4.08	..	4.10	4.00	4.20	3.90	3.08	3.21	3.34
Slovenia	2.18	2.03	1.85	..	2.17	2.07	1.87	1.71	1.53	1.65	1.52
EU-south (Greece, Portugal, Spain) [c]											
Bulgaria	2.96	2.76	3.15	..	3.47	2.67	3.14	3.75	4.44	4.28	3.36
Czech Republic [d]	6.65	6.59	4.42	..	4.20	4.09	4.17	4.66	4.67	4.98	5.22
Hungary	3.49	3.21	3.36	3.84[e]	3.86	3.16	3.10	3.02	3.58	6.18	8.35
Poland...	3.12[e]	2.48	3.19	..	2.78	2.64	2.55	2.55	2.57	2.46	2.54
Romania [f]	2.84	2.63	2.36	..	2.81	2.37	3.64	3.54	3.04	3.60	..
Slovakia [d]	4.81	4.38	4.10	..	4.36	4.96	5.70	6.35	5.92	6.29	6.73
Slovenia	5.88	5.27	4.81	..	4.93	4.73	5.10	5.25	4.90	4.90	5.14

1992		1992

Structural deviation indicator (S) between selected west European economies

Germany/France	2.77	EU-north/EU-south	4.60
Germany/United Kingdom	2.75	Portugal/Germany	6.95
United Kingdom/France	2.48	Spain/Germany	5.25

Source: Compiled from the WIIW Industrial Database.

[a] Based on 2-digit level NACE Rev.1 data for output (at constant prices).

[b] See following formula:

$$S = \sqrt{\sum_k (sh^x_k - sh^y_k)^2 \cdot (sh^y_k / 100)}$$

x = individual CEEC compared

y = individual west European country or region compared

k = individual industry

sh^y_k = share of industry k in total output at constant prices of country y (per cent)

sh^x_k = share of industry k in total output at constant prices of country x (per cent)

[c] For EU-north and EU-south, the reference year is 1992 throughout; the regions were calculated as the unweighted arithmetic mean of the country structures.

[d] Until 1993, the Czech and Slovak parts of the former Czechoslovakia.

[e] Comparable 2-digit NACE data were available from 1990 onwards only; the figures have been aggregated from ISIC statistics by WIIW.

[f] As production shares at constant prices in Romania do not seem to be reliable after 1993, from 1994 onwards shares at current prices were used for comparison with the EU (1997 was the last year available).

CEECs and the EU were analysed.[231] The methodology focused on the 10, 20 and 30 most x-factor-intensive industries (where x stands respectively for labour, capital, R&D, skill and energy) among the full sample of 3-digit NACE industries in the CEECs and these were compared with the EU import structures or the export structures of other EU trading partners.[232] Revealed comparative advantage (RCA) indicators were also calculated for these x-factor-intensive groups of industries (see table 4.6.1 for the values of the 30 most x-factor-intensive branches).[233]

Here the results of the factor intensity analysis are summarized for the CEEC trade flows in relation to EU imports (including EU countries trading in EU markets):

- In 1989 the trade specialization profile of the CEECs with the EU was typical of a less developed economy

[231] The EU-12, i.e. the present members less Austria, Finland and Sweden, rather than the EU-15 grouping was used in order to provide a consistent time series going back to 1989.

[232] The factor intensities of the different 3-digit NACE industries have been compiled from EU sources; they have been previously used in M. Landesmann, op. cit., and P. Havlik, op. cit., where also the caveats with respect to these measures are discussed (see appendix to this chapter).

[233] The RCA of an industry is defined as: $(X_i - M_i)/(X_i + M_i)$ where X_i and M_i refer to exports and imports of industry i (to/from the EU), respectively. In the following the statistics regarding export structure comparisons are omitted to save space – they are available from the author upon request.

TABLE 4.5.2

Total manufacturing in the CEECs, 1993, 1996 and 1998
(Percentages)

	Bulgaria		Czech Republic		Hungary		Poland		Romania		Slovakia		Slovenia		Austria		EU-N(3)	EU-South
	1993	1998	1993	1998	1993	1998	1993	1998	1993	1998	1993	1998	1993	1998	1993	1998	1996	1996
Production structures (current prices)																		
Manufacturing total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Food products; beverages and tobacco..	23.9	21.7	19.4	17.1	28.1	18.9	27.3	24.6	23.6	25.1	17.9	14.7	15.4	14.9	17.5	12.5	15.3	22.9
Textiles and textile products	6.9	6.0	6.3	4.6	5.3	3.7	7.2	5.6	8.2	7.2	5.3	4.3	8.4	7.5	5.1	3.7	3.6	9.6
Leather and leather products	1.8	1.6	2.1	0.7	1.3	0.8	1.4	1.0	1.9	1.7	2.1	1.0	3.0	1.5	0.9	0.8	0.5	2.7
Wood and wood products	1.5	1.1	2.0	2.4	1.6	1.4	2.8	3.5	2.1	2.5	1.8	3.3	3.7	3.3	3.0	4.6	1.4	2.8
Pulp, paper and paper products; publishing and printing	3.0	3.8	3.8	4.6	5.1	4.0	4.4	6.0	2.9	3.1	5.5	6.0	6.3	7.3	7.5	8.4	7.5	6.4
Coke, refined petroleum products and nuclear fuel	10.8	17.8	6.0	2.5	9.4	5.8	8.6	3.9	10.2	8.0	9.2	5.9	1.2	0.3	3.2	4.6	5.2	7.0
Chemicals, chemical products and man-made fibres	9.0	12.1	6.7	6.4	10.9	8.0	7.0	6.9	8.8	7.4	9.3	6.8	10.6	10.0	8.4	6.5	10.6	8.8
Rubber and plastic products	2.7	2.8	2.5	4.1	2.9	3.5	3.3	4.3	2.7	2.2	3.8	3.5	4.6	3.9	2.9	3.9	4.1	3.4
Other non-metallic mineral products .	4.0	4.2	5.4	5.9	4.0	3.2	4.4	4.9	3.4	4.8	4.9	5.0	4.6	4.6	6.0	5.1	3.1	6.1
Basic metals and fabricated metal products	13.0	11.3	17.6	18.4	10.8	9.3	11.6	11.8	13.3	16.3	19.0	17.7	12.3	11.3	13.4	14.4	10.7	10.4
Machinery and equipment n.e.c.	6.7	9.7	9.4	9.3	6.0	4.8	6.3	6.3	7.3	5.5	8.5	7.2	7.8	10.3	9.0	10.5	10.6	3.6
Electrical and optical equipment	5.7	4.0	4.9	7.3	7.2	19.5	5.5	7.0	7.4	5.0	5.3	7.9	8.2	9.1	12.8	12.7	10.6	5.9
Transport equipment	5.0	2.6	10.6	13.0	5.4	15.7	6.8	9.7	5.1	7.7	4.6	13.9	9.5	11.2	6.1	8.2	14.1	7.9
Manufacturing n.e.c.	6.1	1.4	3.2	3.7	1.9	1.3	3.4	4.5	3.0	3.6	2.8	3.0	4.5	4.8	4.2	4.2	2.6	2.3
Employment structures																		
Manufacturing total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Food products; beverages and tobacco..	10.7	16.6	9.3	12.0	20.7	18.1	17.7	18.6	10.1	11.5	10.9	11.6	7.5	9.1	11.3	11.6	11.2	17.2
Textiles and textile products	13.5	19.3	11.0	9.9	14.4	15.4	14.9	13.8	18.3	19.6	11.7	11.3	17.3	15.0	7.9	5.6	6.4	19.2
Leather and leather products	2.8	3.5	2.8	2.1	4.1	3.5	3.0	2.3	3.7	4.4	4.9	3.4	4.4	3.6	1.4	1.2	1.0	4.4
Wood and wood products	1.8	2.2	1.9	3.1	2.4	2.2	3.5	4.3	3.1	4.2	3.1	4.9	4.9	4.8	2.8	5.7	1.9	3.7
Pulp, paper and paper products; publishing and printing	2.3	3.8	3.6	3.8	4.7	3.5	3.5	4.4	2.5	2.8	4.9	5.2	5.9	6.3	7.3	7.2	8.4	6.2
Coke, refined petroleum products and nuclear fuel	1.8	1.9	1.5	0.3	2.8	2.3	0.9	0.8	1.4	1.4	1.6	1.0	0.2	0.1	0.7	0.5	0.4	0.8
Chemicals, chemical products and man-made fibres	6.0	6.6	4.7	3.8	6.6	5.8	5.0	4.7	5.8	4.9	6.2	4.9	4.5	5.4	6.3	4.5	7.4	5.5
Rubber and plastic products	2.7	3.1	2.6	4.1	2.7	3.9	2.9	3.9	2.1	2.1	2.8	3.1	3.7	4.8	3.6	4.6	5.5	3.5
Other non-metallic mineral products .	4.9	5.0	6.1	6.2	4.7	4.7	6.2	5.9	5.3	5.5	6.2	5.8	4.7	4.9	6.1	5.7	3.7	7.3
Basic metals and fabricated metal products	10.6	5.3	17.4	17.2	10.6	8.9	11.4	11.8	12.2	12.4	11.5	14.9	15.0	14.0	15.8	16.2	13.0	11.1
Machinery and equipment n.e.c.	13.9	20.1	16.6	13.9	8.8	8.1	11.5	9.5	15.1	10.9	17.1	13.7	9.6	10.2	10.4	12.2	12.4	4.5
Electrical and optical equipment	8.6	6.4	8.4	9.9	9.4	14.3	6.7	6.4	5.4	4.8	8.5	10.2	11.0	11.2	14.3	12.3	12.6	5.3
Transport equipment	6.7	3.2	9.2	8.0	4.5	6.1	7.9	7.1	8.5	8.5	6.1	5.2	6.2	4.5	5.0	5.6	12.0	6.3
Manufacturing n.e.c.	13.7	3.1	5.0	5.7	3.5	3.1	4.9	6.5	6.6	7.0	4.5	4.8	5.1	6.1	7.0	7.1	4.1	4.9

Source: WIIW Industrial Database incorporating national statistics.

trading with more developed economies: the share of labour-intensive industrial branches was above average, and that of capital-, and especially R&D- and skill-intensive branches were below average; the share of energy-intensive branches was above-average, except in Hungary, which reflects the heritage of cheap energy supplies within the CMEA;

- Subsequently, important changes have occurred in the CEECs' export structure vis-à-vis EU imports and in their RCAs (see table 4.6.1 for the latter). The most remarkable change was in Hungary: sizeable deficits (in its exports relative to total EU imports) in the capital-, R&D- and skill-intensive industries were either completely eroded or transformed into surpluses. A similar but less spectacular change occurred in the Czech Republic and Poland where the deficits in skill-, R&D- and capital-intensive branches have been reduced. For these economies and also for Slovakia the relatively strong presence of energy-intensive branches has been substantially reduced, but this has not been the case for Bulgaria and Romania (the former's dependence upon energy-intensive exports to the EU has actually increased markedly). The picture with respect to labour-intensive industries is also remarkably different in Bulgaria and Romania as compared with the other CEECs. Romania's dependence upon labour-intensive export products has increased markedly while it has declined strongly in Bulgaria which no longer shows any positive specialization in this category;

TABLE 4.6.1

RCA values in trade with the EU-12 of the 30 most x-factor-intensive industries

	Bulgaria	Czech Republic	Hungary	Poland	Romania	Slovakia	Slovenia	Greece	Portugal	Spain	Ireland	Turkey
Capital intensity												
1989	-0.43		-0.19	0.06								
1993	-0.28	-0.11	-0.37	-0.23	-0.36	0.22	-0.24	-0.57	-0.41	-0.07	0.29	-0.40
1998	0.13	-0.13	0.16	-0.27	-0.23	0.11	-0.13	-0.63	-0.28	-0.06	0.19	-0.32
Labour intensity												
1989	-0.40		0.13	0.17								
1993	0.12	0.03	0.16	0.26	0.38	0.18	0.33	-0.16	0.28	-0.20	-0.05	0.33
1998	0.27	0.00	-0.14	0.00	0.42	0.10	0.09	-0.39	0.13	-0.16	-0.07	0.27
R&D intensity												
1989	-0.84		-0.59	-0.54								
1993	-0.64	-0.45	-0.42	-0.54	-0.72	-0.60	-0.16	-0.86	-0.50	-0.14	0.19	-0.81
1998	-0.58	-0.14	0.04	-0.47	-0.62	-0.08	-0.09	-0.87	-0.35	-0.13	0.13	-0.60
Skill intensity												
1989	-0.77		-0.54	-0.54								
1993	-0.54	-0.46	-0.38	-0.53	-0.60	-0.38	-0.05	-0.82	-0.40	-0.33	0.22	-0.76
1998	-0.49	-0.24	-0.12	-0.48	-0.55	-0.28	-0.11	-0.83	-0.33	-0.30	0.21	-0.53
Energy intensity												
1989	-0.49		-0.15	0.09	0.49							
1993	-0.01	0.07	-0.18	-0.06	-0.15	0.37	-0.01	-0.52	-0.19	-0.15	-0.12	-0.47
1998	0.25	-0.05	-0.20	-0.21	-0.07	0.10	-0.19	-0.54	-0.19	-0.16	-0.22	-0.21

Source: Compiled from Eurostat trade statistics.

Note: See appendix to this chapter for factor intensities used in the analysis.

- Comparing the CEECs' trade structure with the lower income, southern EU economies, and also with Ireland and Turkey (see table 4.6.1 for the RCA indicators), the main features are as follows:

  - With the exception of Bulgaria and Romania, the CEECs, by 1998, had a much lower share of labour-intensive industries in their exports to the EU than Greece, Portugal and Turkey; their export structure is more in line with that of Spain in this respect;

  - The same can be said with respect to the shares of R&D- and skill-intensive branches in their exports to the EU: most CEECs – again with the exception of Bulgaria and Romania are now more in line with the more advanced of the southern EU economies rather than with the less advanced ones;

  - Particularly remarkable are the developments in the structure of Hungary with the EU. Given the degree of interindustry branch specialization, Hungary's export structure and pattern of RCAs are close to Ireland's, an economy whose trading structure has similarly been shaped by the extensive involvement of FDI in its industrial development.

(ii) Patterns of trade specialization with the EU: vertical product differentiation and product quality catching up

Changes in the pattern of interindustry trade specialization should not distract from another dimension in which there are substantial differences between producers engaged in international trade, namely, "*vertical product differentiation*". This is a subject on which substantial research has been undertaken recently.[234] Vertical product differentiation refers to a situation in which producers are differentiated by the "quality" of the product variety which they sell as compared with "horizontal product differentiation" where different consumers prefer one variant over another, but where there is no agreed quality ranking across products.

The measure of "quality differentiation" is the unit price charged for a very narrowly defined product (at the 8-digit CN product level of international trade statistics) in the same market. For each industry the full (8-digit CN) product level information was used to construct an industry level (weighted) price/quality gap indicator, Q, for country c's exports to the EU:

$$z_j \quad \sum_{i \in (ii)} \ldots$$

where p^c_i is the price (per kg) at which country c sells exports of a 3-digit product item i on EU markets (which refer here to the EU-12);

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[234] J. Burgstaller and M. Landesmann, "Trade performance of east European producers on EU markets: an assessment of product quality", The Vienna Institute for International Economic Studies, *Research Reports*, No. 255 (Vienna), April 1999; M. Jansen and M. Landesmann, "European competitiveness: quality rather than price", in J. Fagerberg, P. Guerrieri and B. Verspagen (eds.), *The Economic Challenge for Europe. Adapting to Innovation Based Growth* (Cheltenham, Edward Elgar, 1999); L. Fontagné and M. Freudenberg, *Intra-industry Trade: Methodological Issues Reconsidered*, CEPII, Working Paper, No. 97-01 (Paris), January 1997; K. Aiginger, "Europe's position in quality competition", study commissioned by the European Commission, DG Enterprise, for the *Competitiveness Report 2000,* etc.

CHART 4.6.1

The price-quality gap for engineering exports to the EU, 1988-1996
(EU-12=1)
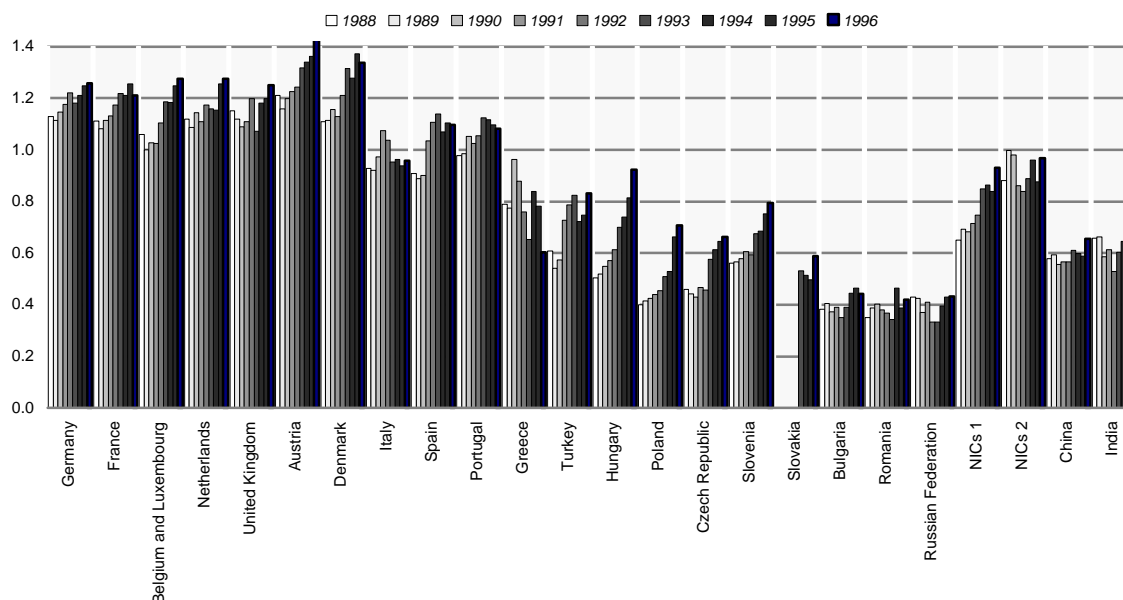
Source: Compiled from detailed (8-digit) EU trade statistics.
Note: For the definition of the price-quality indicator see text.

p^{EU}_i is the average price of product i in total EU-12 imports;

χ^c_i is the share of product item i in country c's exports to the EU-12 market, i.e.

$$\div_i = x_i \, / \sum x_i$$

where x^c_i is the[i] export value of product i for country c and, $\Sigma \, \chi^c_i = 1$, and $i \in I(j)$

where I(j) is the set of product items i belonging to (3-digit NACE) industry j.

In chart 4.6.1 the export price ("product quality") hierarchies are shown for a select group of engineering industries (all engineering products except for transport equipment) over the period 1988 to 1996.[235] There is a clear hierarchy in which the "northern EU" countries have the largest export unit values for their engineering products sold on EU markets, followed by the southern EU countries, with two groups of Asian NICs (the "four tigers", NICs1, and a second group, NICs2, composed of Indonesia, Malaysia, the Philippines and Thailand) selling at similar price levels as Greece, followed by China and India. In 1988-1991 the CEECs received extremely low (current ECUs) export prices for their engineering products on EU markets, but thereafter there

is a *rapid narrowing of the "price/quality gap" for exports from the CEE-5.* There is no evidence of a narrowing of the gap for Bulgaria, Romania, Russia and Slovakia, which remain among the "lowest price/quality" suppliers to EU markets. Among the CEE-5, the Hungarian performance is again particularly impressive. Econometric estimates of the speed of "price/quality" convergence of CEECs' export products for a number of different sectors are presented in section 4.7(ii).

4.7 Some conjectures on the dynamics of comparative advantage

In a recent study[236] an attempt was made to analyse the dynamics of catching up at the industrial level. A simple (standard) model of "convergence/catching up" was estimated at the level of individual industries and shows that the estimates of convergence parameters point to interesting dynamics of comparative advantage which might explain the pattern observed for some of the catching-up CEECs. (A model of this type has been widely estimated at the level of aggregate economies, but seldom at the level of individual industries upon which the following analysis will focus.)

As the time series for the transition economies are still rather short, it is virtually impossible to estimate a

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[235] For a more complete set of results see J. Burgstaller and M. Landesmann, op. cit.

[236] R. Stehrer, M. Landesmann and J. Burgstaller, op. cit.

catching-up model for the CEECs after say 1993. It is therefore useful to look at the historical experience of a larger group of catching-up economies (comprising southern EU economies, and a set of Asian and Latin American economies) to obtain some estimates of the "structural dynamics of catching up" which might help to evaluate the industry level developments observed in the CEECs (see section 4.4).

First some results are presented concerning catching-up patterns in *productivity levels* and *wage rates*, the variables which were discussed in section 4.4 above, and these are followed by the results of a convergence analysis for export unit values, which are interpreted as an indicator of *product quality*.

The productivity, wage or product quality gap is defined as:

$$G^c_t = ln(v^c_t/v^L_t) = ln(v^c_t)-ln(v^L_t) \qquad ... \quad (1)$$

where v denotes the relevant variables (output, value added and wages per employee and the export unit price), C is the country index, L stands for a leader or lead group, and t represents time. The long-run growth of the relevant variables and the quality gap G is estimated by ordinary least squares (OLS):

$$G^c_t = a_0 + F^c t + e \qquad … \quad (2)$$

This estimator uses the whole time series information on G^c_t and not just the first and last points. Thus the OLS estimator is robust with respect to the short-term effects of shocks and cycles. Φ^c denotes the growth rate of the gap in country c over the period. The last step is to regress the growth rate on the initial technology gap:

$$F^c = b_0 + b^c_1 G^c_0 + e \qquad … \quad (3)$$

Barro and Sala-i-Martin[237] present a similar model of catching up with the technology leader, where the growth rate of output per worker in the catching-up country depends on the growth rate of the leading country, the gap and the steady state level of the gap.[238]

(i)   Productivity and wage catching up

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[237] R. Barro and X. Sala-i-Martin, "Technological diffusion, convergence and growth", *Journal of Economic Growth*, Vol. 2, No. 1, March 1997, pp. 1-26. Elsewhere they propose a non-linear least squares regression of the form $F = b_0 + [(1-exp(b_1 T)/T] G_0 + e$ to average over the time span. The results are very similar to the linear regressions and thus only the latter are reported here. R. Barro and X. Sala-i-Martin, *Economic Growth* (New York, McGraw-Hill, 1995).

[238] Verspagen also proposes a non-linear form of equation (3), namely:

$$F^c = b_0 + b_1P + b^c_2 G^c_0 exp^{b 3(G^c_0/E)} + e$$

β_1 estimates the effect of an exogenous rate of knowledge growth in the backward country (proxied, for example, by patent data, R&D expenditures, etc. and represented by variable P). The third term introduces a non-linear relationship between the initial gap and a parameter E measuring endowments of human capital, education, infrastructure, etc. B. Verspagen, "A new empirical approach to catching up or falling behind", *Structural Change and Economic Dynamics*, Vol. 2, No. 2, 1992, pp. 359-380.

Table 4.7.1 reports the results of regression (3) for the three variables estimated over a wide range of countries excluding the CEECs.[239]

All coefficients have the expected negative sign, i.e. showing evidence for convergence, and are significant at least at the 5 per cent level. The speed of convergence of the technology gap can be computed from the estimated coefficients β_1. A coefficient of -0.024 (such as that estimated for productivity level catching up) implies that 2.4 per cent of the gap vanishes in one year. The average half-life, i.e. the time required to reduce the initial gap by one half, would then be $ln(0.5)/\beta_1 \approx 28$ years. The coefficient for wage convergence is much lower, $\beta_1 = -0.016$, and thus predicts a half-life for the gap of about 43 years. But this effect is mainly due to the inclusion of the NIC2 group. Running the regression without this group gives a coefficient of -0.026 and an R^2 of 0.76.

Catching up at the disaggregated/industrial level

After looking at convergence at the aggregate manufacturing level, it is useful to look at the evidence of convergence at a more disaggregated level (3-digit ISIC, Rev. 2) in order to test for differences between the higher- and lower- tech sectors. To do this only two typical low-tech sectors are considered (textiles ISIC321 and wearing apparel ISIC322) and two typical high- or medium-tech sectors (non-electrical machinery ISIC381 and electrical machinery ISIC383). The methodology is the same as that introduced above.

The results of the cross-country analysis of convergence patterns (equation 3) at the industrial 3-digit level for the four industries are shown in table 4.7.2. Again, all the coefficients are negative and significant, thus indicating convergence. Further, the coefficients for the two productivity measures are higher than those for wages. The striking difference is between the two types of sector. The coefficients for the two low-tech sectors (textiles and wearing apparel) are much lower than for the medium-/high-tech sectors. The half-time of convergence in the low-tech sectors is 27 years in textiles and about 46 years in wearing apparel, whereas for non-electrical and electrical machinery it is about 20 years. (It should be noted, however, that not all the differences in the coefficients are statistically significant.) This indicates a faster rate of convergence in the higher-tech sectors. On the other hand, the coefficients for wage catching up are quite similar across the sectors, which indicates again the existence of wage drift. Hence, catching-up countries are losing their comparative advantages in the low-tech sectors. The two main results can be summarized as follows: first, the two medium-/high-tech sectors (non-electric and electrical machinery), show a faster rate of productivity catching up than in the other sectors. Second, the estimated coefficients for the wage variable suggest little difference between the sectors.

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[239] See R. Stehrer, M. Landesmann and J. Burgstaller, op. cit., for details.

TABLE 4.7.1

Cross-country regression of the growth of productivity and wages per head on initial gaps in manufacturing industry [a]

	Output per employee	Value added per employee	Wages per employee
Coefficient	-0.024	-0.018	-0.016
t-value	-4.940	-3.575	-4.171
Std. Dev.	0.005	0.005	0.004
R^2	0.449	0.299	0.367
$\bar{R}^2$	0.430	0.275	0.346
F-value	24.410	12.780	17.400

Source: Basic data from UNIDO statistics.

[a] Estimated over the period 1965-1995 for a large country data set comprising all the OECD countries and a group of Asian and Latin American economies.

TABLE 4.7.2

Results of cross-country, catching-up regressions for selected industries [a]

	Output per employee	Value added per employee	Wages per employee
Textiles 321			
Coefficient	-0.025	-0.024	-0.017
t-value	-5.131	-3.707	-3.697
Std. Dev.	0.005	0.006	0.005
R^2	0.467	0.314	0.336
$\bar{R}^2$	0.450	0.291	0.311
F-value	26.330	13.740	13.670
Wearing apparel 322			
Coefficient	-0.015	-0.016	-0.018
t-value	-1.624	-2.638	-4.466
Std. Dev.	0.009	0.006	0.004
R^2	0.081	0.188	0.408
$\bar{R}^2$	0.050	0.161	0.387
F-value	2.634	6.960	19.950
Machinery (except electric) 382			
Coefficient	-0.035	-0.030	-0.018
t-value	-5.440	-5.557	-4.799
Std. Dev.	0.006	0.005	0.004
R^2	0.505	0.516	0.451
$\bar{R}^2$	0.488	0.499	0.432
F-value	29.600	30.880	23.030
Machinery electric 383			
Coefficient	-0.033	-0.029	-0.016
t-value	-5.190	-3.898	-3.832
Std. Dev.	0.006	0.008	0.004
R^2	0.473	0.336	0.336
$\bar{R}^2$	0.456	0.314	0.313
F-value	26.930	15.190	14.690

Source: Basic data from UNIDO statistics.

[a] Estimated over the period 1965-1995 for a large country data set comprising all the OECD countries and a group of Asian and Latin American economies.

(ii) Product quality catching up by CEE producers in EU markets

We start again with estimates for a large sample of countries.[240] The "product quality" indicator was calculated for each year from 1977 to 1996 (the values for 1980-1982 were interpolated because the data were lacking). The specific industries (ISIC classification) are 321 (textiles), 322 (wearing apparel), 323 (here leather products and footwear are subsumed), 382 (mechanical engineering), 383 (electrical engineering) and 385 (professional goods).

It is also necessary to identify a "price/quality leader" on whom the other countries converge, since actual price leadership can change according to industry and over time. A group of countries comprising the six core EU countries (Belgium, France, Germany, Italy, the Netherlands and the United Kingdom) and the United States were chosen to play this role (referred to as USAEUN).

Cross-country industry-level regressions on quality catching up

To allow for differences in convergence between industries they were divided into two groups (engineering, comprising ISIC industries 382, 383, 385; and textiles, clothing and leather products, comprising ISIC industries 321, 322, 323) and into country groups. From 1993, the country groups consist of the Czech Republic, Hungary, Poland, Slovakia, Slovenia and the Baltic states (CEECW) and Bulgaria, Romania, Russia, Ukraine and the rest of the CIS countries (CEECE). Unfortunately, the number of industries and years here is too small to dig deeper into differences across countries and country groups.

The estimated linear regressions, are given in table 4.7.3.[241] The first case comprises 18 countries from the above-mentioned groups and the β-coefficients are negative and significant. The average half-life of the gap, based on the equation including all six industries, is approximately 33 years. Convergence is more rapid in the textiles, clothing and leather products industries. The panel regressions show a similar picture.

In a second step, only the seven CEECs (Bulgaria, the Czech Republic, Hungary, Poland, Romania, Russia and Slovenia) are included in a sample with data starting in 1991. The estimated rate of convergence is much higher leading to an average half-life for a closure of the gap of about 10 years (when covering all six industries). Again, the process is faster for textiles, etc., while the coefficient is insignificant for the engineering industries probably because of a slow rate of closure of the gap in

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[240] The country sample is wider than the one used for the productivity and wage catching-up analysis above. It includes again the southern EU economies and a wider range of Asian and Latin American economies.

[241] To save space the results from the panel regressions are not presented. These are included in R. Stehrer, M. Landesmann and J. Burgstaller, op. cit. and available at www.wiiw.ac.at.

TABLE 4.7.3

Linear regression results for catching up in product
quality (export unit values)

	Total (6 industries)	Textile industries	Engineering industries
18 countries [a]			
Coefficient	-0.021	-0.036	-0.016
Std. Dev.	0.005	0.008	0.007
t-value	-4.339[b]	-4.642[b]	-2.338[c]
R^2.............................	0.152	0.293	0.097
$\bar{R}^2$.............................	0.144	0.279	0.079
F-value	18.830[b]	21.540[b]	5.470[c]
Obs	107	54	53
7 countries [d]			
Coefficient	-0.068	-0.064	-0.052
Std. Dev.	0.023	0.023	0.055
t-value	-2.969[b]	-2.770[c]	-0.940
R^2.............................	0.181	0.288	0.045
$\bar{R}^2$.............................	0.160	0.250	-0.006
F-value	8.810[b]	7.670[c]	0.880
Obs	42	21	21
11 countries [e]			
Coefficient	-0.149	-0.133	-0.164
Std. Dev.	0.024	0.027	0.045
t-value	-6.316[b]	-4.929[b]	-3.617[b]
R^2.............................	0.384	0.439	0.297
$\bar{R}^2$.............................	0.374	0.421	0.274
F-value	39.890[b]	24.300[b]	13.090[b]
Obs	66	33	33
6 countries [f]			
Coefficient	-0.193	-0.180	-0.208
Std. Dev.	0.024	0.042	0.038
t-value	-8.100[b]	-4.267[b]	-5.491[b]
R^2.............................	0.659	0.532	0.653
$\bar{R}^2$.............................	0.649	0.503	0.632
F-value	65.600[b]	18.210[b]	30.150[b]
Obs	36	18	18

Source: Basic data from UNIDO statistics.

[a] Southern EU, South America, South-east Asia, China and India.

[b] Significant at the 1 per cent level.

[c] Significant at the 5 per cent level.

[d] Since 1991, Bulgaria, Czech Republic, Hungary, Poland, Romania, Russian Federation, Slovenia.

[e] Since 1993, Bulgaria, Czech Republic, Hungary, Poland, Romania, Russian Federation, Slovakia, Slovenia, Ukraine, Baltic states, rest of CIS.

[f] Since 1993, Czech Republic, Hungary, Poland, Slovakia, Slovenia, Baltic states.

For the period after 1993, it is possible to include more transition economies (Slovakia, the group of Baltic states, Ukraine and a "rest of CIS" group); the estimated coefficient then rises to -0.149, with an estimated average half-life of the gap of 4.65 years (in the linear regression including all industries). The closure of the gap in export prices seems to be somewhat faster for engineering industries, with again the more "western" CEE countries being able to reduce the gap more rapidly (see the estimates for the six countries). The high values obtained for the rate of convergence parameter from the regressions for the CEECs (those from the panel regressions were even higher) may be due to a non-linear relationship between the initial gap and the speed of convergence which is not taken into account here. Such non-linearity would imply an eventual slowing down of the rate of convergence. Also, some of the results given here are not statistically reliable because of the small number of degrees of freedom in some of the panel estimations.

Nevertheless, the analysis of catching-up processes in product quality, proxied by export prices, complements well the analysis of productivity levels and of wage rates in sections 4.4 and 4.7(i). In general there is significant (econometric) evidence for convergence in export prices across a wide range of international suppliers. While the estimated catching-up parameters for the large sample of suppliers to EU markets (including those from southern Europe, South America and south and south-east Asia) over the period 1977-1996 were larger for the more labour-intensive branches (textiles, clothing and leather products) than for the technologically more sophisticated engineering branches, the opposite was the case for the central and east European countries over the shorter period 1991-1996 and even more so for the group of "western" CEECs. Hence, the conclusion in section 4.7(i) concerning the potential for a relatively fast catching up in the more advanced engineering branches in the case of the more advanced group of CEECs is supported by the analysis of catching up in export prices or product quality.
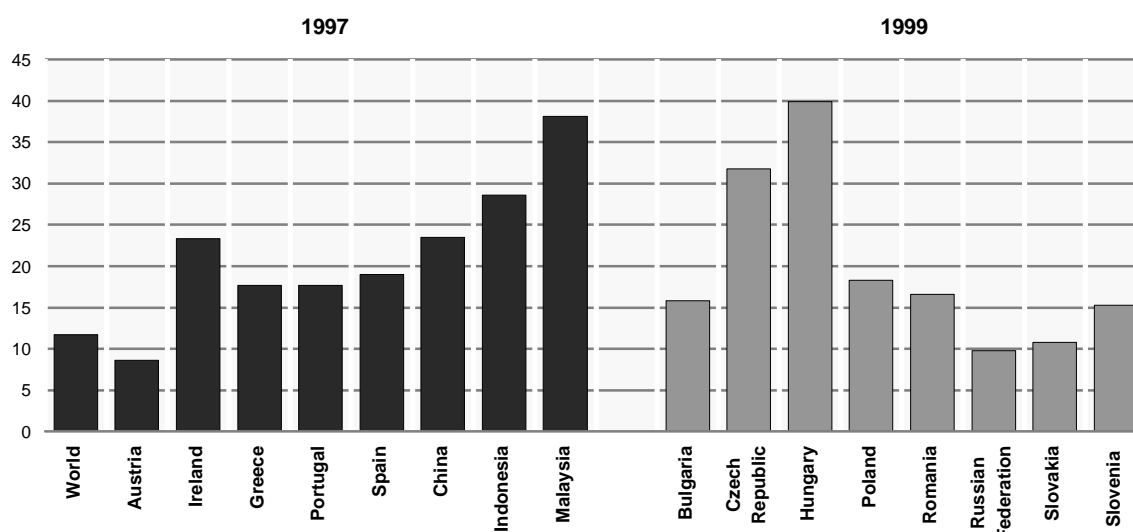
4.8 FDI involvement by branch

FDI in the transition economies has attracted a lot of attention both in research as well as in policy discussion. The topic is also a very important one for the subject matter of this paper, as much research has shown that FDI acts as a very important agent of change in transition economies. In fact, most of the company level analysis available[242] indicates that it provides the indispensable

some of the CEECE countries especially for industries 382 and 385. This is confirmed by a highly significant estimate of β_1 of –0.094 (resulting in a half-life of 7.37 years) when the regression includes only the four "western" CEECs.

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[242] See, for example, W. Carlin, J. Van Reenen and T. Wolfe, *Enterprise Restructuring in the Transition: An Analytical Survey of the Case Study Evidence from Central and Eastern Europe*, EBRD Working Paper, No. 14 (London), 1997; W. Carlin, S. Estrin and M. Shaffer, *Measuring Progress in Transition Towards EU Accession: A Comparison of Manufacturing Firms in Poland, Romania and Spain*, EBRD Working Paper, No 40 (London), 1999.

CHART 4.8.1

FDI stock as a percentage of gross domestic product, 1997 and 1999
(Percentages)

change of governance structure needed for "active restructuring". The available research in this area is vast but a few select points can be emphasized:

- Those CEECs which were able to attract substantial FDI are now among those economies with the strongest FDI presence in their economies;

- It can be shown that foreign investment enterprises (FIEs) are more capital intensive and invest more, show higher productivity levels and are more export oriented than the domestically-owned enterprises (DEs);

- While there is a wide range of motives for foreign capital to get involved in different branches (domestic market orientation, export base, strategic actions to obtain early entry advantages vis-à-vis competitors, etc.) there is no sign that FDI in the CEECs is mostly oriented towards labour-intensive, low-skill, or domestic market-oriented manufacturing branches.

We shall now proceed to present some supportive material for the above points.

Chart 4.8.1 shows the importance of FDI in the CEECs by giving the value of the FDI stock in relation to GDP. Also shown are the values for a range of non-CEE economies some of which, over the 1990s, were among the largest recipients of FDI (in relation to the size of their economies). Some of the CEECs have joined the small group of leading countries for FDI, which is remarkable given that the stock was accumulated over a much shorter period than was the case for the other economies. Before 1990 there was hardly any FDI at all in the transition economies.

However, the unevenness of the FDI presence in the CEECs is very clear, a fact which is well known and does not need to be discussed further here. An examination of FDI flows over time also reveals, among other things, the importance of privatization, its timing and when or whether the participation in the processes was opened to foreigners. This, of course, also affects the distribution of FDI across sectors and branches (see below).

Turning to performance measures of FIEs in relation to general performance,[243] table 4.8.1 presents the shares of FIEs in the manufacturing sectors of the CEE-5 in relation to a number of variables (equity capital, employment, investment, sales or output, exports).

FIEs are clearly more strongly represented in sales or output than in employment; hence the levels of (labour) productivity are higher than the manufacturing average. They are also more strongly represented in investment than in either sales or employment; hence their investment/sales and investment/employee ratios – i.e. their investment intensities – are higher than the national average, as are the capital intensities as measured by assets per employee. Finally, their export shares are higher than their sales/output shares; hence they are more export intensive than the national

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[243] We rely here on research by G. Hunya who compiled within an ACE research network a database on FIEs from company level balance sheets. G. Hunya, "Foreign direct investment in CEEC manufacturing", in M. Landesmann (ed.), *Structural Developments…,* op. cit., chap. 5. FIEs are defined as companies with some degree of foreign ownership. This broad definition is less restrictive than it seems at first sight, as foreign ownership means in most cases a decisive influence on the governance structure.

The share of foreign investment enterprises (FIEs) in key variables of manufacturing industry, 1996 and 1997
(Per cent)

	Equity capital	Employ-ment	Invest-ment	Sales/ output	Export sales
Czech Republic [a]	21.5[b]	13.1	33.5	22.6	..
Czech Republic 1997 [c]	..	16.0	31.2	26.3	42.0
Hungary	67.4[d]	36.1	82.5	61.4	77.5
Hungary 1997	71.8[d]	42.8	79.8[e]	66.7	75.4
Poland [f]	30.4	15.0	43.1	30.3	33.8
Slovakia [c]	19.4	13.0	24.7	21.6	..
Slovenia	15.6	10.1	20.3	19.6	25.8

Source: G. Hunya, "Foreign direct investment in CEEC manufacturing", in M. Landesmann (ed.), *Structural Developments in Central and Eastern Europe. WIIW Report 1999*, The Vienna Institute for International Economic Studies (Vienna), chap. 5.

[a] Companies with 100 and more employees.

[b] Own capital.

[c] Companies with 25 and more employees.

[d] Nominal capital in cash.

[e] Compared to the whole industry; corresponding figure for 1996: 68.6 per cent.

[f] Corporate sector.

manufacturing firms in total. These ratios highlight some of the key features of and the role which FIEs play in the CEE economies.

Table 4.8.2 shows the distribution of FIEs across manufacturing branches in four of the CEECs and picks out those branches where they are most heavily involved. It shows that FIE involvement is strong in a number of capital-intensive, skill-intensive and export-intensive industries (particularly, transport equipment and electrical and optical equipment) although they are also present in domestic market-oriented industries such as food, beverages and tobacco and some natural resource-intensive ones (pulp and paper in Slovenia, non-metallic minerals in the Czech Republic). The distribution of FIEs across branches gives another indication of the "revealed comparative advantage" of CEE economies, which is complementary to the analysis of trade flows (analysed in section 4.6 above). For reasons of space this point is not elaborated in this paper.

Further research could build on the comparisons referred to above between FIEs and DEs. A deeper analysis is needed of the possible development of "dual structures' in the CEECs between the FIE and the DE sectors and whether performance indicators converge or diverge between them over time. Little detailed research is currently available on this question or on the extent of "spillovers" between FIEs and DEs in a wider sense (i.e. not only in the same sectors but also across sectors) and on the method of technology and know-how diffusion (through subcontracting and supplier networks, human capital and knowledge transfers, etc.)

TABLE 4.8.2

The most significant FIE industries, ranked by output/sales ratio, 1996
(Per cent)

	FIEs' share in total output/sales of the industry (penetration)	Share of industry in total manufacturing FIE output/sale (specialization)
Czech Republic		
Transport equipment	55.0	28.0
Non-metallic minerals	45.6	11.0
Rubber, plastic	43.8	5.9
Electrical, optical equipment	30.7	8.7
Manufacturing n.e.c.	28.2	4.2
Food, beverages, tobacco	24.7	18.8
Total manufacturing	22.6	76.6
Hungary		
Coke, Petroleum	99.2	15.6
Transport equipment	84.1	10.2
Food, beverages, tobacco	51.1	20.9
Electrical, optical equipment	65.1	12.7
Chemicals	78.7	11.8
Paper, publishing	71.6	7.2
Total manufacturing	61.4	78.4
Slovenia		
Transport equipment	82.3	40.3
Machinery, equipment n.e.c.	21.3	9.7
Electrical, optical equipment	20.1	9.5
Pulp, paper, printing	19.8	8.5
Chemicals	17.4	9.0
Rubber, plastic	15.9	3.8
Total manufacturing	21.1	80.8
Slovakia		
Transport equipment	61.4	26.3
Electrical, optical equipment	37.0	9.5
Paper, printing, publishing	25.6	7.9
Textile and textile products	18.9	3.3
Machinery, equipment n.e.c.	17.2	6.8
Food, beverages, tobacco	16.5	12.2
Total manufacturing	21.6	66.0

Source: As for table 4.8.1.

4.9 Structural change in central and eastern Europe, EU accession and the further course of east-west European integration: concluding remarks

Before concluding with some remarks on the possible impact of the EU accession process on the CEECs, it may be useful to recall the principal results of this paper:

- Large-scale de-agrarianization, deindustrialization and tertiarization have taken place in the CEECs since 1989; the re-agrarianization observed in Bulgaria and Romania is judged to be a transitory phenomenon, reflecting the dramatic job losses in manufacturing and the slow development of alternative opportunities in the tertiary sectors of these economies;

- There were large (and possibly irreversible) declines in overall employment levels and employment rates, as well as changes in gender-specific participation rates;

- Industrial restructuring since 1989 has gone through a number of phases with differences across the CEE economies: in the most successful of the transition economies, as in the others, there was a dramatic transformation crisis in the first phase 1989-1992, followed by the beginnings of sustained growth (Poland). Others experienced secondary transformation crises (Hungary in the mid-1990s, Czech and Slovak Republics in the late 1990s), but also appear to have moved onto a sustained growth path. Other CEECs still face the prospect of further transformation crises;

- The pattern of industrial restructuring shows considerable diversity across the CEECs. The degree to which productivity increases are achieved through output growth or employment loss (or both), the degree to which output growth is strongly driven by exports or domestic demand, the degree to which wage growth lags behind or exceeds productivity growth, and thus affects cost competitiveness, etc., are all examples of such diversity. An interesting pattern of relative catching up across industrial branches is also apparent, but this reflects the experience of a large number of catching-up economies not just the more successful CEECs. Productivity catching up is more rapid in the medium- to higher-tech industries (such as engineering), while wage catching up is more evenly spread across branches. As result, the successful economies are gaining competitive advantages in the medium- to higher-tech industries and moving away from the low wage, labour-intensive branches;

- The analysis of trade with the EU also shows considerable differentiation among the CEECs. In 1989, the CEECs' general trade profile with the EU was typical for a less developed trading partner. Exports were mostly labour intensive and energy intensive and there were substantial deficits in R&D-, skill- and – to a lesser extent – capital-intensive branches. Over the past decade, however, the more advanced of the CEECs have markedly changed their specialization relative to the EU: specialization advantages in R&D-, skill- and capital-intensive areas have increased significantly, while those in labour-intensive branches have been substantially reduced. The star performer in this respect is Hungary, but these changes in trade specialization have also occurred in the Czech Republic and Slovenia. Bulgaria and Romania, in contrast, seem to be stuck in the specialization profile typical for less developed economies, while Poland occupies an intermediate position;

- In parallel with the change in the pattern of interindustry trade specialization, there have also been substantial changes in the quality of products produced and exported by CEE producers (i.e. in their position in "vertically differentiated" intra-industry trade). In 1989/1990 the CEE economies were at the very low quality end of the product spectrum. Econometric estimates show, however, a rapid catching up in the quality of exports from the CEE-5 between 1989 and 1996. Again, Bulgaria, Romania and Russia lag far behind in this respect;

- Finally, the important role of FDI was emphasized in developing sectors with an above-average investment propensity, productivity growth and export intensity. It was also shown that FDI was not primarily attracted towards the low wage, labour-intensive branches in the CEE-5 group.

We now conclude with some remarks on the impact of EU accession of some of the candidate countries on the further processes of structural transformation in CEECs and on patterns of east-west European integration.

East-west European economic integration has proceeded at a very rapid rate since the beginning of the transition process in 1989. It has led to a considerable increase in trade integration and to substantial FDI flows which, together with other forms of cross-border corporate activities, such as outward processing trade, have paved the way to important production linkages between central and eastern Europe and Western Europe. At least at the start of the transition, there were also substantial population and labour flows from the CEE to the EU and, with EU accession, these are expected to increase again. Thus, there are three basic forms of integration:

- through product markets via increased trade flows;

- through capital markets via FDI and other forms of cross-border firm activities;

- through labour markets via the international or interregional mobility of labour.

There are important issues involved in the extent to which these three different channels complement or substitute for one another. There is a large theoretical literature analysing which of the two outcomes is likely to be the case.[244] This issue is important for being able to evaluate the extent to which full accession to the EU – which implies full liberalization of all three channels – will affect the structures of east-west European integration. At present, integration is proceeding almost solely through the first two channels which are mostly, but not fully, liberalized, while the third is very restricted. Even as regards the first two channels, full membership of the EU implies a further regime change since full membership of the Single Market involves a dismantling of border controls, complete liberalization of access by member firms to each others' markets, the adoption of

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[244] J. Markusen, "Factor movements and commodity trade as complements", *Journal of International Economics*, Vol. 14, 1983, pp. 341-356.

EU competition policy rules, of the Common External Trade Policy, etc. This amounts to a much higher degree of liberalization of economic relationships between the CEECs and the EU and, as such, will have a further impact upon the patterns of integration and specialization in Europe.

Increased integration between the acceding countries and the EU will also affect the countries which are lagging behind in the accession process. There is a discussion among economists as to whether the sequential process by which EU accession will most likely proceed will have negative or positive effects on the "laggards", the "left-outs" and the "stay-outs".[245] The issue is whether the ease of access to EU markets, the increased attractiveness for FDI, the speeding up of convergence in macroeconomic and microeconomic policies and in the legislative process of the "first-rounders" will increase further the gaps between them and the other transition countries or whether the movement of the EU borders to the east will yield the benefits of contiguity and of spillovers to those countries which do not have the prospect of joining the EU in the short or even medium term.

The enormous diversity in the development patterns of the different CEECs has emerged clearly in almost every section of this paper, with very dynamic patterns of catching up being observed in some of the CEE countries bordering the EU and sluggishness in structural (including behavioural) transformation in the countries further east. Whether this differentiation process will continue is closely linked to the issue discussed above, namely, whether EU accession of the first group of candidate countries will further increase the gap between them and the other CEE economies and, furthermore, whether patterns of structural change and specialization in the latter become rigid ("hysteretic effects") or will gradually follow the developmental patterns observed in the more advanced transition economies. Economists are unable to forecast which of these two scenarios is the more likely.

It is clear that structural change (just as the transition process itself) has quantitative as well as qualitative dimensions. The quantitative aspect (as evidenced by the analysis of "convergence in structures" or by purely quantitative measures of the catch up in productivity) do convey the outward symptoms of differences in developmental levels and the extent of catching up and convergence in structural or behavioural terms. However, there is a qualitative side to the transformation process which requires a deeper analysis of the interaction between institutional and behavioural changes, of the transformation of organizational structures at the microeconomic level, of the complicated interface between political, economic and cultural change which, ultimately, determines why transformation takes one course rather than another, whether or not development occurs at all, and why the conditions for EU accession can be fulfilled within a particular time horizon in some CEECs and not in others. It is clear that our understanding of the qualitative side of transformation and developmental processes is far less advanced than of the quantitative (or quantifiable) side and the analysis of this paper is testimony to this. Nonetheless, the description and systematic assessment of "symptoms" is a necessary component of a proper diagnosis.

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[245] On this issue, see the contributions in M. Landesmann and D. Rosati (eds.), *The Shape of the New Europe – The Economic Implications of EU Enlargement* (London, Macmillan, 2000), forthcoming.

APPENDIX

Factor intensities used in trade structure analysis

	NACE 3-digit	Capital intensity	Labour intensity	R&D intensity	Skill intensity	Energy intensity
Iron and steel industry (as defined in ECSC Treaty)	221	7.37	7.29	0.6	33.4	10.47
Manufacture of steel tubes	222	3.16	9.48	0.6	33.4	5.02
Drawing, cold rolling and cold folding of steel	223	5.04	8.85	0.6	33.4	3.26
Production and preliminary processing of non-ferrous metals	224	6.64	6.03	0.65	33.4	7.85
Manufacture of clay products for constructional purposes	241	6.61	14	0.6	29.5	13.26
Manufacture of cement, lime and plaster	242	12.48	6.24	0.6	29.5	19.4
Manufacture of concrete, cement or plaster products for construction	243	5.2	9.93	0.6	29.5	3.41
Manufacture of articles of asbestos (except articles of asbestos-cement)	244	3.94	17.78	0.6	29.5	3.16
Working of stone and non-metallic mineral products	245	7.5	10.12	0.6	29.5	8.22
Production of grindstones and other abrasive products	246	2.56	14.01	0.6	29.5	2.09
Manufacture of glass and glassware	247	5.59	12.7	0.6	29.5	7.85
Manufacture of ceramic goods	248	3.12	17.43	0.6	29.5	5.75
Manufacture of paint, painter´s fillings, varnish, printing ink	255	4.13	8.59	4.21	53.2	1.97
Manufacture of other chemical products, mainly for industrial and agricultural purposes	256	7.71	7.02	4.21	53.2	4.57
Manufacture of pharmaceutical products	257	6.13	7.81	9.48	53.2	1.52
Manufacture of soap, synthetic detergents, perfume	258	5.39	6.83	4.21	53.2	1.12
Manufacture of other chemical products chiefly for household	259	5.93	8.59	4.21	53.2	1.93
Man-made fibres industry	260	8.47	8.15	0.59	41.6	7.57
Foundries	311	3.35	15.14	0.59	28.7	6.48
Forging; drop forging, closed die-forging, pressing and stamping	312	3.74	12.92	0.59	28.7	4.42
Secondary transformation, treatment and coating of metals	313	3.42	15.8	0.59	28.7	3.26
Manufacture of structural metal products (including integrated assembly)	314	2.38	12.29	0.59	28.7	1.24
Boiler-making, manufacture of reservoirs, tanks, sheet-metal containers	315	2	13.2	0.59	28.7	1.2
Manufacture of tools and finished metal goods (except electrical equipment)	316	3.44	13.75	0.59	28.7	1.82
Manufacture of agricultural machinery and tractors	321	2.88	10.66	1.18	40.9	1.46
Manufacture of machine tools for working metal	322	3.61	14.09	1.18	40.9	1.42
Manufacture of textile machinery and accessories	323	3.94	12.45	1.18	40.9	1.18
Manufacture of machinery for the food, chemical, related industries	324	2.94	11.75	1.18	40.9	0.92
Manufacture of plant for mines, iron and steel industry and foundries	325	2.62	11.2	1.18	40.9	1.2
Manufacture of transmission equipment for motive power	326	3.99	15.95	1.18	40.9	2.17
Manufacture of other machinery and equipment for use in specific branches of industry	327	3.81	11.43	1.18	40.9	1.06
Manufacture of other machinery and equipment	328	3.14	12.38	1.18	40.9	1.7
Manufacture of office machinery and data-processing machinery	330	8.53	6.59	6.06	75.6	0.68
Manufacture of insulated wires and cables	341	4.4	9.71	6.83	48.4	2.24
Manufacture of electrical machinery (comprising electric motors, etc.)	342	2.56	14.41	14.3	48.4	1.65
Manufacture of electrical apparatus, batteries, accumulators	343	3.83	14.48	6.83	48.4	2.43
Manufacture of telecommunications equipment	344	4	14.2	6.83	48.4	0.94
Manufacture of radio, TV receiving sets, sound reproducing, etc.	345	5.36	10.89	6.83	48.4	1.19
Manufacture of domestic type electric appliances	346	3.83	12.33	6.83	48.4	1.27
Manufacture of electric lamps and other electric lighting equipment	347	3.28	14.64	6.83	48.4	1.73
Manufacture and assembly of motor vehicles and motor vehicles engines	351	6.69	7.49	3.43	29.9	1
Manufacture of bodies for motor vehicles	352	2.2	11.78	3.43	29.9	1.1
Manufacture of parts and accessories for motor vehicles	353	4.73	12.48	3.43	29.9	1.8
Shipbuilding	361	2.23	17.26	0.76	42.3	2.13
Manufacture of standard and narrow-gauge railway	362	1.91	16.29	1.22	42.3	2.18
Manufacture of cycles, motorcycles and parts and accessories	363	3.05	12.79	1.22	42.3	1.4
Aerospace equipment manufacturing and repairing	364	3.64	10.75	14.34	42.3	1.69
Other transport equipment	365	2.09	17.28	1.22	42.3	1.35
Manufacture of measuring, checking and precision instruments and apparatus	371	2.33	15.27	3.98	47.6	0.96
Manufacture of medical and surgical equipment and orthopaedic appliances	372	3.1	17.62	3.98	47.6	1.11
Manufacture of optical instruments and photographic equipment	373	4.55	16.09	3.98	47.6	0.99
Manufacture of clocks and watches and parts thereof	374	2.32	15.73	3.98	47.6	1.05
Manufacture of vegetable and animal oils and fats	411	8.91	3.02	0.24	37.2	1.9
Slaughtering, preparing and preserving of meat	412	3.76	6.97	0.24	37.2	1.86
Manufacture of dairy products	413	6.07	4.27	0.24	37.2	1.71
Processing and preserving of fruit and vegetables	414	5.88	8.06	0.24	37.2	2.1
Processing and preserving of fish and other sea foods fit for human consumption	415	3.47	11.53	0.24	37.2	1.92
Grain milling	416	8.2	3.16	0.24	37.2	1.91
Manufacture of spaghetti, macaroni, etc.	417	9.13	5.03	0.24	37.2	1.99
Manufacture of starch and starch products	418	12.03	4.51	0.24	37.2	4.99
Manufacture of cocoa, chocolate and sugar confectionery	421	4.66	8.96	0.04	37.2	1.68
Manufacture of animal and poultry foods (including fish meal and flour)	422	7.86	3.62	0.24	37.2	1.74
Manufacture of other food products	423	6.26	5.36	0.24	37.2	1.21

(For source and notes see end of appendix.)

APPENDIX (concluded)

Factor intensities used in trade structure analysis

	NACE 3-digit	Capital intensity	Labour intensity	R&D intensity	Skill intensity	Energy intensity
Distilling of ethyl alcohol from fermented materials	424	6.24	4.2	0.24	37.2	1.42
Brewing and malting	427	12.73	6.33	0.24	37.2	2.3
Manufacture of soft drinks, including bottling of natural spa waters	428	9.53	6.88	0.24	37.2	1.71
Knitting industry	436	2.11	16.14	0.14	27.1	1.72
Manufacture of carpets, linoleum and other floor coverings	438	3.95	10.53	0.14	27.1	2.94
Miscellaneous textile industries	439	3.21	15.65	0.14	27.1	3.23
Tanning and dressing of leather	441	3.21	7.38	0.59	28.7	2.19
Manufacture of products from leather and leather substitutes	442	1.42	18.14	0.59	28.7	0.76
Manufacture of mass-products footwear (excluding wood, rubber)	451	1.35	18.64	0.14	24.5	0.98
Manufacture of ready-made clothing and accessories)	453	1.09	20.39	0.14	24.5	0.82
Manufacture of household textiles and other made-up textiles goods	455	2.08	16.44	0.14	24.5	1.49
Manufacture of furs and of fur goods	456	1.27	15.25	0.14	24.5	1.94
Sawing and processing of wood	461	4.2	11.35	0.19	23.5	1.7
Manufacture of semi-finished wood products	462	6.42	9.56	0.19	23.5	3.14
Manufacture of carpentry and joinery components	463	3.1	13.39	0.19	23.5	1.6
Manufacture of wooden containers	464	2.29	16.17	0.19	23.5	1.88
Other wood manufactures (except furniture)	465	3.17	15.68	0.19	23.5	2.66
Manufacture of articles of cork, straw, other plaiting materials	466	2.51	17.76	0.19	23.5	1.6
Manufacture of wooden furniture	467	2.38	14.13	0.19	23.2	1.55
Manufacture of pulp, paper and board	471	12.43	6.68	0.14	48.8	8.53
Processing of paper and board	472	4.92	10.95	0.14	48.8	2.52
Printing and allied industries	473	4.18	11.68	0.14	48.8	1.48
Manufacture of rubber products	481	3.44	14.34	1.14	33.7	3.9
Retreading and repairing of rubber tyres	482	4.05	15.11	1.14	33.7	4.46
Processing of plastics	483	5.16	11.63	1.14	33.7	2.94
Manufacture of articles of jewellery, goldsmiths' and silversmiths' wares	491	2.05	10.57	0.59	35.2	1.39
Manufacture of musical instruments	492	1.69	17.69	0.59	35.2	1.31
Photographic, cinematographic laboratories	493	4.06	19.4	0.59	35.2	1.53
Manufacture of toys and sports goods	494	3.02	16.91	0.59	35.2	1.38
Miscellaneous manufacturing industries	495	2.84	17.46	0.59	35.2	1.53

Source: M. Landesmann, "The pattern of east-west European integration: catching up or falling behind?", in R. Dobrinsky and M. Landesmann (eds.), *Transforming Economies and European Integration* (Cheltenham, Edward Elgar, 1996); P. Havlik, "Structural change, trade specialization and competitiveness of manufacturing industry in the CEECs", in M. Landesmann (ed.), *Structural Developments in Central and Eastern Europe. WIIW Report 1999*, The Vienna Institute for International Economic Studies (Vienna).

Notes: Factor intensity definitions are as follows: capital intensity has been measured as cumulative (5-year) investment flows per employee; labour intensity as employees/output; R&D intensity as cumulative R&D flows (5 years) per employee; skill intensity as non-production workers/total labour force; energy intensity as energy inputs in total inputs. Some of these indicators (such as R&D) were not always available at the 3-digit level; in this case the 2-digit information has been applied to all the 3-digit NACE industries belonging to the 2-digit industry.

Discussion of chapter 4

4.A Paul Hare

Why are we interested in structural change in the transition economies, and if we are, what sorts of change might we expect to observe? Further, in answering such a question, do we expect to find marked differences among the transition economies in the pace and direction of structural change that they experienced during the 1990s? If so, what differences should we expect and what, if anything, can we say about the new "equilibrium" structures to which each economy is adapting itself?

In my view, there are two important reasons for looking at structural change in these economies: the first is by now historical, the second is much more forward looking. The first, historical, reason relates to the legacy of central planning, which we know gave rise to huge structural distortions in the economies concerned. Central planning's biases towards industry, and within that towards heavy industry (including the defence-related sectors), are well documented. Less well documented, though still enormously important, are the long-term structural distortions due to the inappropriate pricing of key productive inputs. Of these, the most damaging has probably been the failure to charge realistic prices for energy, either to domestic consumers or to firms, with the result that a great deal of consumption and production in the region used energy with an astonishing profligacy. As far as production was concerned, the relatively energy-intensive branches turned out to be enormously inefficient, so that with the onset of transition such branches would be expected either to invest massively to modernize themselves, or to cease production rapidly. In addition to energy, freight costs were treated as close to zero in much of the region, resulting in numerous highly unsuitable location decisions (especially in larger countries like the former Soviet Union), and land was usually treated as costless in enterprise accounts, resulting in exceptionally wasteful use of land.

Charging properly for transport and land must make some activities less profitable than formerly, and others relatively more profitable, while also changing the efficient location of many productive units.

This inheritance implies, therefore, that regardless of future economic trends and the pace of market oriented reforms, once central planning came to an end and more rational pricing and harder budget constraints came into force, one could already expect to witness much structural change – essentially putting right the worst mistakes of the past. Moreover, these needed adaptations were rather different in different countries. Thus freight costs are not such an issue in smaller countries – except to the extent that they participated, probably inefficiently, in the then international socialist division of labour – but will have a massive impact on the location of production in Russia.

Energy pricing, likewise, was not uniformly distorted, with Hungary charging near to world prices from the early 1980s (albeit with high subsidies to households), but much of the CIS regarding energy as almost free.

The second reason for being interested in structural change is, as indicated above, more forward looking. The transition economies can be regarded as low- to middle-income countries gradually transforming themselves into market-type economies. If we then look around the world and study the typical structures of economies at a similar stage of development, it is possible to develop a picture of the "typical" structure towards which transition economies might be expected to evolve. This structure involves a higher weight of services within GDP and less of agriculture than was the case for transition economies in 1990, and within industry a lesser weight for heavy industry.

Especially for smaller countries, restructuring would also be expected to entail much higher levels of trade in proportion to GDP, and that largely directed towards the developed market economies. All of this assumes, of course, that the transition economies will indeed turn out to be typical in this sense.

Adopting this as a working hypothesis, however, one can then assess how well the transition economies are adapting to the market by studying how far they have already changed towards this "typical" structure. This, in essence, is the perspective adopted by Michael Landesmann in his paper, and it proves to be both fruitful and very interesting. A further, and illuminating, dimension to this approach is provided by reference to the possible impact of EU enlargement, and the idea of convergence to economic structures characteristic of selected groups of EU member states.

The paper draws heavily on official statistics assembled in the Vienna Institute Industrial Database, and so naturally has nothing to say about phenomena not picked up there, such as the second or informal economy. Also, the paper focuses on a subset of the transition economies, with lots of analysis reported on the Czech Republic, Hungary, Poland, Slovakia and Slovenia (the CEE-5), and some on Bulgaria and Romania (the EE-2). The CIS and the Baltic states are hardly discussed at all, except for the occasional remark. Landesmann paints a complex and interesting picture of structural change during the transition, but much of the paper is heavily descriptive – though some findings are supported by

simple regression analyses. Hence we learn a great deal about what happened in the transition economies over the last decade or so, in terms of various dimensions of structural change, but rather less about why it happened and why various changes might be interesting or important. Given this, my earlier remarks on the context of structural change in the region might help to provide a more developed framework for the paper.

A particularly interesting finding of the paper is that the CEE-5 are improving in productivity relatively more rapidly in medium and high technology branches and that this, combined with more uniform wage increases across each economy, is likely to change their comparative advantage in the same direction. Such a process, of course, is going on under the surface in any economy undergoing structural change, since expansion in some sectors generally entails drawing resources – notably labour – away from others, and this is exactly what the observed wage and productivity trends in central and eastern Europe will be signalling.

These changes are accompanied, it seems, by rather mixed evidence of convergence to EU industrial structures. In regard to trade structures, however, in particular trade with the EU, the CEE-5 show a strong shift away from labour-intensive export products, while exactly the opposite is the case for the EE-2. For narrowly defined products in the engineering sectors, product quality (as measured by export price gaps) was found to be improving rapidly in the CEE-5, not at all in the EE-2. Although there are no doubt special factors that might explain these observations, in essence they reflect transition economies at two stages – a group of five countries already a bit more advanced and striving to become full members of the EU at the earliest possible date, and a group of two still some way behind, perhaps also impeded for part of the 1990s by their unstable political configurations.

The production and trade findings in the paper are consistent with the results reported on the impact of foreign direct investment (FDI). Contrary to some expectations, FDI has not been concentrated in labour-intensive sectors, rather it has turned out to be particularly strong in several capital- and skill-intensive sectors, especially those with a strong export presence. This shows that FDI has probably contributed significantly to the improvements in relative product quality noted above. But further research is probably needed to clarify some of the complex connections involved here, notably linkages between FDI-supported projects and domestic supply chains and product marketing networks. At present, it is simply unclear how far the activities supported by FDI are tending to form isolated enclaves within the various transition economies, how far they are stimulating adaptation and new economic linkages more widely across these economies.

While noting the substantial diversity of restructuring experience in the different countries studied in depth in his valuable paper, Professor Landesmann concludes his survey of structural trends in the transition economies by making two key points:

- The five western countries (the CEE-5, namely the Czech Republic, Hungary, Poland, Slovakia and Slovenia) are performing well, are largely undergoing structural change in the expected directions, and in important sectors their exports are approaching EU quality levels (or at least moving markedly in the right direction);

- Bulgaria and Romania are both doing much less well, presumably in part because they started out from a lower level of development than the above group of countries, and in part because they have been more hesitant and far less consistent in their pursuit of economic reforms. These countries are still mostly exporting relatively labour-intensive goods, and there is not yet any solid evidence of relative quality improvements in their manufactured exports.

As noted above, the paper has little to say on Russia, Ukraine or other CIS countries, but what evidence is available is sufficient to indicate that structural transformation across the CIS has not yet progressed very far by comparison with the CEE-5.

The author not only reports on structural change in quantitative terms, but also offers some judgements about the observed changes. The latter seem to me to involve some quite difficult and indeed delicate considerations. First, they require us to take the "typical" middle-income economic structure (or EU economic structure) as a norm, in the sense that countries conforming to it are considered "advanced", those not conforming are considered "awkward". While accepting this as a convenient starting point for some purposes, I think the approach requires a degree of caution and humility in its practical application.

Second, the failure of some countries to adjust thus far could be due to perfectly legitimate reasons, for instance continuing difficulties in establishing effective post-communist government structures, or the sheer cost and difficulty associated with undoing the legacies of the past. Third, for some countries the assumed structural norm may not be valid at all, and even if there is structural change it might entail a different long-term structure altogether. For example, in the landlocked central Asian republics belonging to the CIS, it is surely likely that equilibrium relative prices (including the relevant world market prices for these countries) will be much different from those applicable to European Russia and points to the west. I am unaware of studies exploring this issue in concrete terms, but would not be surprised to find that equilibrium economic structures in these countries differed greatly from those that make sense for the more advanced transition countries bordering the European Union.

Finally, how far does the sort of careful empirical work undertaken in Professor Landesmann's paper take us in terms of possible implications for economic policy, either of the transition economies themselves or of partner countries or groups of countries such as the EU? The paper certainly confirms that countries with rapid reforms and lots of FDI have been performing better than those more hesitant about reform and unable to attract much FDI, and to that extent – at least implicitly – takes a clear stance on economic policy. However, this simple-minded interpretation of what the paper might be telling us about economic policy cannot be the full story, since it only makes sense for those countries on track for EU accession before very long. Hence the paper – useful though it is – does not provide policy guidance that can be generalized much beyond the list of countries actually studied.

For other transition countries, unlikely to join the EU either in the first wave or at all, a very different story will have to be told, since their political conditions, resource endowments, and trading opportunities differ greatly from those available to the countries expecting to accede to the EU. To tell this alternative story adequately will require additional research and a new paper.

4.B Andras Nagy

The secretariat of the Economic Commission for Europe deserves much praise for choosing Professor Landesmann (and the Vienna Institute) to overview in such a multi-faceted manner what has really happened in the transition economies since the beginning of their systemic change. The Vienna Institute has perhaps the best database on this region, and a well-experienced group of researchers helping Professor Landesmann to prepare his fine analysis.

Professor Landesmann's paper provides an excellent account of the structural changes in the transition economies, and I agree with most of his statements and observations. However my role as a discussant is not to enumerate and to evaluate the merits of the paper, but to express some doubts as to some of his viewpoints and the limitations he has imposed upon himself. For the purpose of his paper, he defines his topic as changes in the structures of output, employment, exports, etc. and how these variables relate to each other. In the last sentence of the introduction he enumerates the important issues linked to structural changes that were left out of his analysis: institutional change, the geographic distribution of economic activities, the distribution of income and wealth and micro-level changes.

In my opinion, it is a pity that these very important aspects were left out of his inquiry. The masterful handling of a vast database and of up-to-date econometric methods leaves much of the analytical potential unused, especially as regards the causes and consequences of structural change. Among the causes, the inherited and evolving new institutions play a primordial role, and drawing attention to them in the transition process (as already mentioned by Professor Berglöf) is indispensable

if policy implications are to be derived from the findings. On the other hand, changes in production, productivity, and especially in trade and capital movements cannot be explained without considering the effects of the reorientation of economic activities from the CMEA to the European Union. Within the limits of my contribution, I intend to deal with these two issues, although I think the income-distribution problem is just as relevant.

The importance of institutional change

The paper documents well and is convincing in its account of the very important structural changes that have taken place in the last decade in the transition countries in production, employment, productivity, trade, etc., and it brings out the very divergent changes in the countries reviewed. Even if there are doubts about the reliability of some of the data used, the results in most cases correspond to intuitional expectations and other observations about the evolution of these economies. However, the reader remains unsatisfied with the description of these changes if one of the major questions is not asked: what are the reasons for such differences in the catching-up and integration process between countries?

Professor Landesmann is well aware of this problem, and in the last paragraph of the paper he concludes: "there is a qualitative side to the transformation process which requires a deeper analysis of the interaction between institutional and behavioural changes … of the complicated interface between political, economic and cultural change which, ultimately, determines why transformation takes one course rather than another, whether or not development occurs at all and why the conditions for EU accession can be fulfilled within a particular time horizon in some CEECs and not in others". It is regrettable, however, that he did not even try to link the quantitative structural changes, so well described, to the qualitative side of the transformation process.

There can be little doubt that institutions and changes (or lack of change) in them are principally responsible for the great divergence in the economic performance and evolving structures among the transition economies. The unexpected collapse of the communist regimes was preceded by a long period during which resistance to change and reforms was regarded as stability, while at the same time it created a self-destructive instability. Under the guise of immobility, however, strongly divergent but significant changes occurred in the institutional structures, and in the mentalities of the population, which were inherited by the transition regimes. Surprisingly, the systemic transformation happened peacefully, without much violence. The beneficiaries of the soviet-type system put up unexpectedly little resistance, and a significant number of them actively cooperated in the demolition of totalitarian state socialism.

In the evolution of the central and east European (CEE) economies, more and more special interest organizations with collusive behaviour gradually

emerged. Monopolies developed to an unprecedented extent in all fields of economic activity, eliminating all kinds of competition. These special interest organizations became powerful lobbies, fighting for investments, subsidies, favourable prices, export contracts of low-quality products, etc. This widespread monopolistic and protectionist institutional structure contributed largely to the stagnation and decline of the CEE societies. As the initial transition was peaceful, many of these lobbies and much of the totalitarian institutional structure were not abolished.[246] The survival of influential monopolies, and the mentality linked to them, created – and after 10 years still creates – significant obstacles to reform and economic restructuring. The need for a market-type transformation and privatization emerged within the socialist system, not only in the private sector and among the population, but in the ruling groups as well. As many institutions, top administrators and managers could retain their power and influence, a significant resistance to competition, opening, efficiency increase and deregulation could be perceived.[247]

Explaining the catch-up process of the west European economies vis-à-vis the United States in the 1950s and 1960s, Eichengreen[248] offered a non-Olsonian institutional explanation. According to him, it was mainly due to a cooperative arrangement, a "willingness for workers and capitalists to defer current compensation in return for future gains". Intensive modernization of technologies and fast export growth were made possible by "monitored compliance of economic interest groups with the terms of their agreement to moderate wage claims and boost investment". It seems that something similar is happening in the CEE-5 countries, even if both the trade unions and the employers' associations are less powerful (and more discredited). It would be an interesting comparative study to find out how this works without an explicit cooperative arrangement, and how far it can explain the divergent productivity, export and investment growth of the transition countries presented in such a many-sided way in the paper.

Another important aspect of institutional development is the different scale and scope of the emergence of small private businesses in the CEE

countries. The transition to a market-type economy and the privatization process was especially assisted in those countries where the extent of private property had gradually increased before the political changes, and the opposite could be observed where it was not allowed.

To the surprise of many observers, the transition from a harsh police state to pluralistic democracy was accompanied by a significant weakening of the rule of law and by the declining efficiency of the police and the judiciary. Black, or shadow, economy and corruption have expanded, tax evasion is widespread, Mafia-type criminal activities abound and the defence of property is insufficient. There are great differences among countries in the extent of how far the rule of law has broken down, but it has influenced strongly the nature of structural change in the various economies.

The diverging economic achievements of the transition countries are strongly related to the scope, methods and timing of the privatization process. By this, I mean not only the differences between coupon privatization and the sale of state assets, but also the privileges given to the clients of the political forces in power, euphemistically called the "creation of a new, or national middle class". They are usually represented by lobbies fighting against the "selling out" of property to foreigners.

The paper rightly states that "FDI acts as a very important agent of change" and of "active restructuring", and shows very clearly how it influences employment, exports and growth. The inflow of foreign capital depends in great part on institutional arrangements, on the attraction or repudiation of multinational companies, on the bargaining of the authorities with them for different privileges, tax exemptions, and their efforts to monopolize certain sectors of the market.

The reorientation of central and east European trade

Structural change in trade has two strongly interconnected aspects: changes in its commodity composition and in the market allocation of imports and exports. The first is very well analysed in the paper, how trade specialization has developed with EU countries, but it remains one-sided without studying the modifications in the regional distribution of the CEE economies' trade.

I think it is important to raise the question as to how far trade was reoriented from the CMEA markets to the EU? Is it enough, or too much, how much trade creation and how much diversion occurred? Charts 4.B.1 and 4.B.2 show changes in the export shares of the CIS and east European countries between 1980 and 1997. The radical reorientation of trade after 1989 is highly visible: the share of western Europe in the exports of the CIS countries declined from 36 to 24 per cent in the 1980s, rose to 46 per cent in 1993, and fell back to 38 per cent by 1997. The same share in east European exports rose from 24 per cent in 1980 to 57 per cent in 1993 and to 62 per cent in 1997. Even if this increase in intra-European integration is remarkable, its level is still significantly below the export shares of Portugal or Spain, for example, with the other EU countries (82 and 71 per cent, respectively).

[246] M. Olson, *The Rise and Decline of Nations* (New Haven, Yale University Press, 1982) and "The logic of collective action in Soviet-type societies", *Journal of Soviet Nationalities*, Summer 1991. According to Olson, the postwar "economic miracles" of Japan and west Germany were due in great part to the emasculation of the totalitarian institutional structure. See also C. Mueller, *Public Choice II* (New York, Cambridge University Press, 1989); A. Schotter, *The Economic Theory of Social Institutions* (New York, Cambridge University Press, 1981). In A. Nagy, "Social choice in eastern Europe", *Journal of Comparative Economics,* No. 15, 1991, pp. 266-283, I tried to show that the relatively fast economic development of central and east European countries at the end of the Second World War was also partly due to the elimination of the totalitarian political and economic structure. Nothing similar happened in 1989.

[247] For more detail see A. Nagy, "Transition and institutional change", *Structural Change and Economic Dynamics,* No. 2, 1994, pp. 315-327.

[248] B. Eichengreen, "Institutions and economic growth: Europe after World War II", in N. Crafts and G. Tonnio, *Economic Growth in Europe Since 1945* (New York, Cambridge University Press, 1996).

Chart 4.B.1 shows that the share of CIS trade to eastern Europe fell considerably from 53 to 12 per cent between 1989 and 1997, while intra-CIS trade rose to 18 per cent. The decline of the share of CIS markets in east European exports was considerable, from 34 to 9 per cent in the same period, while the share of intra-east European trade remained virtually stable in the same period (chart 4.B.2).

Studying changes in trade shares is not enough to answer the question of how the collapse of the highly protectionist and "introverted" CMEA trade, and the gradual opening to western Europe, affected the trade of transition countries. The use of *trade intensity* indicators to analyse the influence of trade policy has proved to be very effective and has been regularly used in ECE publications.[249] The trade intensity indicator captures the effects of many factors influencing trade flows between regions, apart from the overall volume change in total exports and imports. If the effect of trade policies, discrimination, integration, traditional links, distance, etc. do not have any influence on the bilateral trade between two regions, the value of the indicator will be unity. If these factors significantly reduce or increase the trade flow, the indicator will be less or greater than unity.

Table 4.B.1 below displays how trade intensities changed in two ex-socialist and three developed regions between 1980 and 1997.

Trade between the Soviet Union and the east European countries was very intensive in the last year before the collapse of the CMEA (with coefficients 16 and 14!). The indicators declined strongly thereafter, to 4.4 and 5.1.[250] The intraregional trade of the CEE countries remained relatively intense, six to seven times higher than the weight of the region in world trade. The intensity of east European exports to western Europe more than doubled, the coefficient increasing from 0.68 to 1.58 between 1989 and 1997. The increase in the opposite direction, i.e. from west to east, was even stronger, the intensity coefficient changing from 0.44 to 1.59. The trade intensities of the east European countries with the other two developed regions – North America and Japan – remained low, and much lower than that of their trade with western Europe.
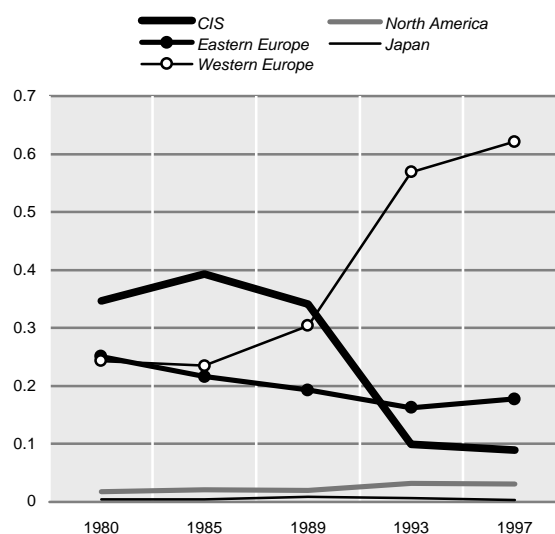
On the basis of the changes in trade shares and trade intensity, it can be concluded that although the reorientation of CEE commerce was rapid and extensive, it cannot be regarded as exaggerated. Intraregional trade has remained intensive, and there is ample room for a

CHART 4.B.1

Export share of eastern Europe, 1980-1997
(Shares)

Source: United Nations, *Monthly Bulletin of Statistics,* various February and May issues, table D.

CHART 4.B.2

Export share of CIS, 1980-1997
(Shares)

Source: United Nations, *Monthly Bulletin of Statistics,* various February and May issues, table D.

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[249] See UN/ECE, *Economic Bulletin for Europe*, Vol. 36, 1984 and Vol. 37, 1985; also see A. Nagy, "Methods of structural analysis and projection of international trade", Institute of Economics, *Hungarian Academy of Sciences Studies*, No. 13 (Budapest), 1979 and "CMEA integration and trade structure", in M. Panic and A. Vacic (eds.), *Economic Integration in Europe and North America*, Economic Studies, No. 5, UN/ECE (Geneva), 1995. A description of the method can be found in the *Economic Bulletin for Europe*, Vol. 36, 1984, p. 488.

[250] The rearrangement of countries in the regions does not make precise comparisons possible, but the general tendencies are valid.
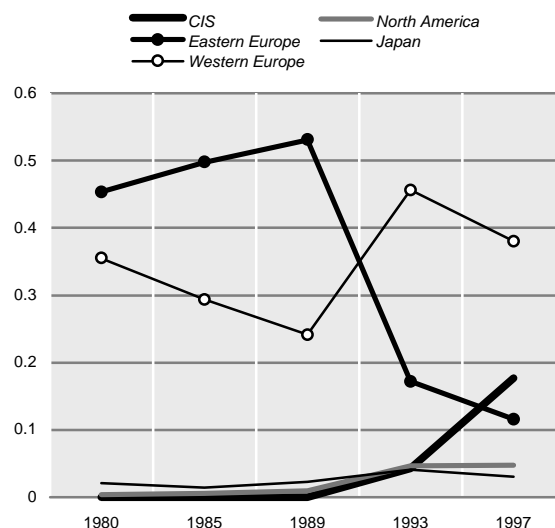
further extension of trade to developed regions other than the EU and to the developing world.

Some remarks on the data, methods and conclusions

As a consequence of the institutional changes already mentioned, the quality and reliability of the data furnished by businesses and the statistical authorities deteriorated, or was subject to biases different from those prevailing during the socialist period. It is surprising that

this is not even mentioned in Professor Landesmann's paper, and I fear that he puts excessive trust in the data he is using. As a Hungarian, for example, I should be pleased that according to his analysis, the performance of our economy is much better than those of other CEE countries. Without doubting the validity of his observation, I have the impression that – as a Hungarian saying goes – "the bride is too beautiful". I wonder, for example, to what extent the relatively high productivity figures of Hungary are due to the fact that many employees are not registered, or are employed as one-person "enterprises". Consequently, as their remuneration is not recorded among wages, productivity is lower, and unit labour costs and unemployment are higher in reality than according to the statistics.[251]

If the black and shadow economy is widespread, production and income figures are obviously inaccurate, and the results of international comparisons become more unreliable. In GDP calculations countries use different methods to take into account at least one part of the unmeasured economic activities, which make such comparisons questionable. If smuggling and falsified reporting in the trade documents is extensive, trade statistics are less reliable and the results of comparisons are more uncertain. It is evident, of course, that researchers can only use the data that is available, but they should at least warn the reader about the margins of error in the different calculations. I am sure that most of the findings in Landesmann's paper are more robust than the uncertainties I have mentioned, but it is more convincing if this is made explicit.

The paper is on a very high technical level, showing the author's excellent knowledge of econometric methods and their application. However, I think he might have taken into consideration that the participants at this meeting are not all professors and researchers. Policy makers, managers, government representatives, etc. who are present or read the proceedings of this seminar may have difficulties in following the methods employed, and would probably benefit from more explanation of some of the results.

The last section of the paper is an excellent summary of the main findings of the research effort behind it. Those who cannot, or will not, go through all the details of the analysis are strongly advised to read and disseminate its contents. It contains a number of surprising, or non-intuitional, but convincing results, besides summing up many features of the structural changes in the transition economies.

Given that Professor Landesmann's analysis is founded on a huge database and robust econometric methods, it seems to me that his conclusions about the accession of the CEE countries to the EU are too restrained and cautious. The results presented in the paper, linked to the available knowledge about the

TABLE 4.B.1

Trade intensity indicators, 1980-1999
(Total trade)

	CIS	Eastern Europe	Western Europe	North America	Japan
CIS					
1980	–	10.883	0.790	0.027	0.327
1985	–	12.349	0.737	0.025	0.232
1989...................	–	15.996	0.537	0.049	0.358
1993	3.557	8.377	1.119	0.237	0.709
1997	10.105	4.366	0.967	0.247	0.557
Eastern Europe					
1980	11.045	6.018	0.541	0.117	0.059
1985	10.436	5.358	0.591	0.103	0.071
1989...................	13.618	5.814	0.677	0.104	0.142
1993	8.239	7.939	1.395	0.159	0.103
1997	5.084	6.679	1.580	0.159	0.066
Western Europe					
1980	0.689	0.550	1.517	0.423	0.162
1985	0.612	0.430	1.651	0.548	0.227
1989...................	0.591	0.439	1.603	0.456	0.344
1993	1.102	1.451	1.665	0.420	0.361
1997	1.090	1.591	1.686	0.441	0.380
North America					
1980	0.332	0.248	0.590	1.812	1.417
1985	0.338	0.084	0.507	1.951	1.535
1989...................	0.421	0.078	0.503	1.796	1.732
1993	0.558	0.206	0.474	1.815	1.570
1997	0.303	0.161	0.474	1.859	1.491
Japan					
1980	0.683	0.149	0.368	1.786	–
1985	0.416	0.080	0.357	1.976	–
1989...................	0.448	0.074	0.456	1.893	–
1993	0.365	0.089	0.436	1.585	–
1997	0.154	0.114	0.420	1.529	–

Source: United Nations, *Monthly Bulletin of Statistics,* various February and May issues, table D.

institutional and behavioural changes behind them, could tell us more about the reasons for the conspicuous divergence of the various transition paths, and their probable future development. The statement in the last sentence of the paper is undoubtedly right, "the description and systematic assessment of 'symptoms' is a necessary component of a proper diagnosis". But my point is that we can already go beyond the description of the symptoms: we have many elements necessary not only for the diagnosis, but also for providing a "therapy" for the "ills" of the transition process, including the integration of two parts of Europe.

The main message of Landesmann's paper – and this is a very important one – is that rapid change and significant improvements in the economic performance of the transition countries are not only possible but are already underway. The paper presents convincing facts and arguments that the pessimistic views about EU enlargement and catching up – of which there is no shortage! – are unfounded if the necessary institutional reforms are introduced and sound economic policies followed.

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[251] The comparison with other countries would of course depend on how far these distortions differ from those in other countries.