

WIIW INDUSTRY STUDIES
1999/1

**Development and
Prospects of the
Mechanical
Engineering Sector
in the Central and
Eastern European
Countries**

WIIW INDUSTRY STUDIES

In this new series, The Vienna Institute for International Economic Studies (WIIW) publishes results which stem from its research on structural developments in CEEC economies. In 1996/97 the WIIW has started to build up its Industrial Database Eastern Europe which comprises time series for the Czech Republic, Hungary, Poland, Slovakia, Slovenia, Bulgaria and Romania.

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- *Basic metals and fabricated metal products*
- *Machinery and equipment n.e.c*
- *Electrical and optical equipment*
- *Transport Equipment*
- *Manufacturing n.e.c.*

Each of these studies presents a detailed picture of the development and prospects of the particular industry in central and eastern Europe. The first part of each study concentrates on: the patterns of production and employment; international competitiveness and trade performance with the EU (productivity, labour costs, price and quality indicators, revealed comparative advantage, etc.); and foreign direct investment. The second part provides more detailed industry data and valuable information about the leading domestic firms and the foreign investors in the industry.

*Michael Landesmann
Research Director, WIIW*

*For details concerning the new **Industrial Subscription Service** and the **WIIW Industrial Database Eastern Europe** see the back of this report.*

March 1999

Doris Hanzl

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Prospects of the
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Executive Summary

*The mechanical engineering sector is a major supplier of **technologically advanced equipment** and thus plays a key role in every economy. Under the communist system, the sector was given priority and was therefore of great importance in all Central and Eastern European countries (CEECs). Strongly determined by business cycles, the mechanical engineering sector experienced a deep transformational recession after 1989 and continues to have **economic difficulties**: Since 1996 growth rates are again on a decline and turned negative in most CEECs in 1996 or 1997.*

The first part of the study investigates the development and prospects of the mechanical engineering sector in the following countries:

- Bulgaria*
- Czech Republic*
- Hungary*
- Poland*
- Romania*
- Slovakia*
- Slovenia*

*With regard to its size, the mechanical engineering sector assumes a **mid-range position** in total manufacturing output today. In Bulgaria, the Czech Republic, Slovenia and Slovakia it still has the largest shares in the region. But while downsizing has occurred in the three latter countries, the large size of the mechanical engineering sector in Bulgaria indicates a lack of restructuring. When compared with the more advanced EU countries, including Austria, all CEECs show a structural deficit in mechanical engineering, whereas against the less advanced EU countries they maintain a structural surplus in this sector.*

In the first phase of transition, which lasted from 1989 to around 1992, the output of the mechanical engineering sector declined relatively more than total manufacturing, except in Hungary and Romania. This overall negative development was due to a reduced domestic demand for investment goods and the loss of CMEA markets. The situation improved somewhat from 1993 on, but still only in Poland and Romania did the mechanical engineering sector achieve slightly above-manufacturing-average growth.

*Although total employment fell in the mechanical engineering sector, the latter continues to be a **major employer** in total manufacturing. The gap between production and employment shares narrowed but still remained quite evident, indicating a below-average productivity level.*

As is typical for all CEECs and all sectors of manufacturing, wages, productivity and unit labour costs in the mechanical engineering sector were and are much lower than in Western countries, for which we have used Austria as a point of reference. In general, wages in the mechanical engineering sector hovered about the manufacturing average in all countries, while productivity was substantially below average, leading to relative unit labour costs which were essentially higher than the manufacturing average. With wages

growing faster than productivity in the Czech and Slovak Republics as well as in Slovenia, relative unit labour costs increased there, while they fell in Hungary, Poland and Romania. However, unit labour costs are still much lower than the Austrian level.

Ranges for CEECs' unit labour costs in the mechanical engineering sector are as follows, calculated as a percentage of the Austrian level (1996):

Czech Republic	31% - 47%	Romania	24% - 60%
Hungary	22% - 36%	Slovakia	29% - 45%
Poland	31% - 42%	Slovenia	48% - 58%

(Lower range calculated at purchasing power parities (PPP) for GDP, upper range at PPP for fixed capital formation; Austria 1995 = 100, at 1996 levels)

In CEECs' exports to the EU, the mechanical engineering sector was and continues to be of mid-range importance in total manufacturing in most CEECs. The sector plays a more important role only in Slovenia and the Czech Republic. During transition the patterns of exports and imports became more uniform throughout the region. In all CEECs exports from 'other machinery and equipment', including for example internal combustion engines or compressors and pumps, took a major share of mechanical engineering exports. The quality of mechanical engineering exports from CEECs to EU markets, as measured by the price/quality gap indicator, was substantially lower than for other countries exporting to the EU in 1989, but improved until 1996. In general, consumer goods exports of the 'domestic appliances n.e.c.' sub-branch showed a better quality than investment goods exports of the rest of the sector.

The mechanical engineering sector is more **significant as an import sector** than as an export sector and ranks first in Poland and second in all other CEECs in total manufacturing imports, due to the high replacement demand for outdated equipment in general. Thus imports play an important role in transferring technological progress. However, higher absolute imports than exports led to growing sectoral trade deficits in all countries, with a particularly high deficit in Poland.

On the EU market, CEECs mechanical engineering exports had a market share of 2% in 1989, which increased to 6.5% in 1997. When compared to total manufacturing exports, however, these market shares were slightly below the average of 2.8% in 1989 and of 6.9% in 1997. CEECs' mechanical engineering exports to Austria were of particular importance and accounted for 30% of Austria's non-EU mechanical engineering imports in 1997.

The mechanical engineering sector has not been a prominent target for foreign direct investment, which might be due to the rather fragmented and highly differentiated structure of that sector. Moreover, this sector has been plagued by outdated machinery, long pay-off periods, difficulties in converting military production and a demand that is mostly satisfied

by imports. The only exception was Slovenia, which attracted a relatively larger proportion of FDI to this sector.

In general, the development of the mechanical engineering sector in the CEECs is rather problematic and constrained by both external and internal factors. In addition, country specificities also exist, which are shaping **future prospects**. The decline in the performance of the mechanical engineering sector was sharpest in the Czech and Slovak Republics, as well as in Slovenia, but appears to have already hit the bottom in the first two countries. However, the future performance in the Czech Republic might, on the other hand, be handicapped by the heavy indebtedness of large firms. In Poland and Hungary, the mechanical engineering sector experienced positive average growth rates from 1993 on, but only in the former did it perform better than the manufacturing average. Romania and especially Bulgaria still have a large need to restructure their mechanical engineering sector. Further adjustment and integration into the global economy will be necessary in all countries however, to achieve sustainable growth in the future.

The second part of the study presents a more detailed micro-analysis of the mechanical engineering sector, containing **company profiles** of major domestic enterprises and foreign investors.

Within the mechanical engineering sector, 'domestic appliances' exhibit different characteristics than the generally produced investment goods, comprising mainly standardized products of low complexity. Specialization on domestic appliances has taken place in Slovenia, dominated by **Gorenje**, the second largest enterprise in the country. It produces all kinds of white-goods and is an important exporter and employer. In Poland, the domestic appliances sector accounted for 13% of total sales in mechanical engineering, with companies like the state-owned **Polar** or **Amica Wronki**. Foreigners do not only try to reach the market by imports but also through foreign investment. The Swedish company **Electrolux**, for example, bought the Hungarian **Lehel Refrigerator** factory.

In the other sub-branches, small and medium-sized enterprises mainly produce specialized investment goods, covering an extremely wide range of products. Because of this company structure, large enterprises are rare in most countries, with the exception of the Czech Republic or the large **Balkancar-Holding**, manufacturer of fork-lift trucks, in Bulgaria. Domestic companies faced severe conditions after the collapse of the socialist system and are still in trouble, such as the Polish agricultural tractor producer **Ursus**, or the Slovenian company **Litostroj**. Very dramatic is the situation of the large companies in the Czech Republic, such as the huge conglomerate **Škoda Plzen**. After an expansion strategy, it is now constrained by huge debts and has to resell some firms again. One prominent example of a foreign investor is the Swiss-Swedish company **Asea Brown Boveri**, which has settled down in all CEECs, except in Slovenia.

Developments and Prospects of the Mechanical Engineering Sector in the Central and Eastern European Countries

PART I: INDUSTRY SURVEY

The first part of the report provides a thorough survey of the 'mechanical engineering sector', strictly speaking the 'machinery and equipment n.e.c.'¹ sector' in the Central and Eastern European Countries (CEECs).² The first section analyses trends in growth and structure in the mechanical engineering sector, including characteristics and changes of production and employment. The next section considers indicators of international competitiveness, presenting wages, productivity and unit labour costs. The third section examines various aspects of trade performance with the European Union, while section four takes a closer look on foreign direct investment in this sector. A conclusion provides an outlook on future prospects. It is followed by the second part, which gives further detailed information on sub-branches and on company profiles of major domestic and foreign enterprises. Finally, an appendix presenting additional tables and figures completes the whole report.

Much of the analysis of the mechanical engineering sector in the first part is based on data from the WIIW Industrial Database of the Central and Eastern European Countries, including the Czech Republic, Hungary, Poland, Romania and Slovakia, and where comparable data were available, also Bulgaria³ and Slovenia.

1 Overview: Trends in growth and structure

Mid-range position in total manufacturing output

Generally, the mechanical engineering sector is a major supplier of technologically advanced products to other industries and thus plays a key role in the diffusion of technology. It mainly produces specialized investment goods in small and middle-sized enterprises, where economies of scales may not be realized. In the command economy, the mechanical engineering sector enjoyed high prestige and was of great importance in all CEECs, due to the heavy industrialization strategy of this system. In addition, specialization on mechanical engineering was characteristic for the former Czechoslovakia and also partly for Bulgaria under the former Council for Mutual Economic Assistance (CMEA) division of labour.

¹ Not elsewhere classified.

² Termed 'DK' in the NACE rev. 1 classification, the mechanical engineering sector (division 29) includes 'machinery for production and use of mechanical power, except aircraft, vehicle and cycle engines' (29.1), 'other general purpose machinery' (29.2), 'agricultural and forestry machinery' (29.3), 'machine-tools' (29.4), 'other special purpose machinery' (29.5), 'weapons and ammunitions' (29.6) and domestic appliances n.e.c.' (29.7).

³ However, proper data for Bulgaria and Romania are sometimes not available or not perfectly comparable.

After the collapse of communism, the mechanical engineering sector was hit hard by the decline of investment demand and was forced to downsize. Equipment was outdated and the technological gap in the sector large. However, it could not be closed through foreign direct investment because the inflow was low. New modern machinery was mostly imported so that the largest part of the economies imports were made in the field of mechanical engineering products, embodying technological progress in this way. As a consequence, the importance of the mechanical engineering sector in total manufacturing declined in terms of production in most countries and thus took a mid-range position in total manufacturing in 1997 (see Table 1)⁴:

Table 1

Industrial production in total manufacturing (at current prices), 1997

	Bulgaria ¹⁾	Czech Republic	Hungary	Poland	Romania ²⁾	Slovak Republic	Slovenia ³⁾
D Manufacturing total	100.0	100.0	100.0	100.0	100.0	100.0	100.0
DA Food products; beverages and tobacco	20.4	18.6	21.4	24.8	21.7	16.2	15.2
DB Textiles and textile products	6.2	4.5	3.7	5.7	6.9	3.5	8.0
DC Leather and leather products	1.6	0.9	0.8	1.2	1.8	1.1	2.4
DD Wood and wood products	1.1	2.1	1.5	3.4	2.4	1.8	4.0
DE Pulp, paper & paper products; publishing & printing	3.2	4.5	4.4	5.6	3.2	6.4	8.2
DF Coke, refined petroleum products & nuclear fuel	16.1	3.6	6.7	4.7	7.8	9.0	1.1
DG Chemicals, chemical products & man-made fibres	12.5	7.1	9.7	7.5	9.6	9.1	9.4
DH Rubber and plastic products	2.5	3.8	3.6	4.0	2.6	4.4	4.2
DI Other non-metallic mineral products	5.0	6.2	3.3	4.7	4.7	4.3	4.0
DJ Basic metals and fabricated metal products	13.6	17.3	10.0	12.0	16.3	18.3	12.1
DK Machinery and equipment n.e.c.	10.8	9.1	5.2	6.6	6.9	7.8	9.2
DL Electrical and optical equipment	3.8	6.6	16.9	6.6	5.4	6.2	8.2
DM Transport equipment	2.2	12.1	11.7	8.7	7.2	9.4	9.3
DN Manufacturing n.e.c.	1.1	3.7	1.2	4.5	3.7	2.4	4.6

Notes: 1) Mechanical engineering includes fabricated metal products and casting of metals, normally included in the basic metals and fabricated metals sector (DJ). - 2) 1996. - 3) 1995.

Source: WIIW Industrial database.

Production shares at current prices stood at 9% in Slovenia and the Czech Republic, 8% in the Slovak Republic and 7% in Romania and Poland. Only in Bulgaria, the production

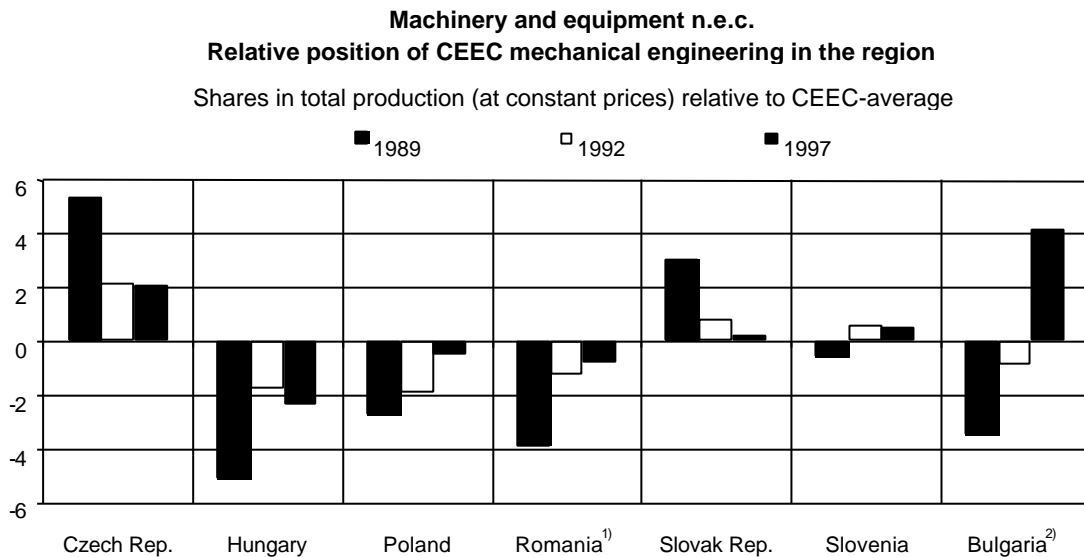
⁴ Except in this table, all following comparisons were made with output data at constant prices: Poland 1992, Romania 1993, Hungary 1992, Czech and Slovak Republics 1993, Slovenia 1995 prices. Evolution over time can be tracked with this indicator, but it always implies some arbitrariness as to the relative price structure adopted for the base year, especially in the periods of major adjustments.

share was larger and accounted for 11% of total manufacturing output,⁵ whereas in Hungary it was only about 5%. The relative size of the mechanical engineering sector in these two countries is mainly due to specialization patterns inherited from the past.

Mechanical engineering in the Czech Republic and Slovenia being the ‘regional leaders’

Compared to the other countries in the region, the mechanical engineering sector was largest in Bulgaria and the Czech Republic, followed by Slovenia and the Slovak Republic in 1997 (see Figure 1). While downsizing has occurred in the three latter cases, the large size in Bulgaria indicates a lack of restructuring. In Romania, Poland and especially Hungary the mechanical engineering sector was comparatively smaller.

Figure 1



Notes: 1) Romanian figures from 1990, 1992 at constant prices, 1996 at current prices.- 2) Bulgarian data are not consistent over the whole period. Data before 1996 can be compared with those for 1996 and 1997 only to a limited extent.

Source: WIIW Industrial database

The size of the mechanical engineering sector in the CEECs lies somewhere between the more advanced EU-countries ('EU-North') and Austria and the less-advanced EU-countries ('EU-South').⁶ When compared to the former, the CEECs showed a structural deficit,⁷ while they maintained a structural surplus against the EU-South countries. Using

⁵ However, some care has to be taken in the case of Bulgaria, because of different definitions of sectors. See Figure 1.

⁶ Thereby 'EU-North' denotes Belgium, Germany, France and Great Britain; 'EU-South' denotes Greece, Portugal and Spain.

⁷ We compare the share of the mechanical engineering sector in total production of the CEECs to the share in Austria, 'EU-North' and 'EU-South'. The resulting positive and negative deviations are interpreted as 'structural surpluses' or 'structural deficits' of the CEECs as compared to the group of Western countries under consideration. For the EU-North

this indicator, the downsizing of the mechanical engineering sector in the Czech and Slovak Republics, and to a lesser extent also in Slovenia is quite evident: These countries exhibited a structural surplus against the more advanced EU-countries at the beginning of transition but recorded a dramatic fall during transition and a subsequent turn into a structural deficit in 1992/1993 (see Appendix, Figure A1 and Table 2).

Difficult situation in the succession of recovery phases

During the first phase of transition, which lasted from 1989 to 1992, all CEECs experienced a deep transformational recession and production in the mechanical engineering sector declined along with the larger economy. In fact, relative to total manufacturing, its decline was even more pronounced, so that this sector may be called a 'loser'⁸ of this period, except in Hungary and Romania. However, also in these two countries differences in growth rates between the mechanical engineering sector and total manufacturing were relatively small (see Table 3). The large decline in the output of the mechanical engineering sector may be attributed to its production of investment goods, the demand for which usually falls strongly during recessionary periods, and the collapse of the CMEA-market, by which it was particularly hit. During the second phase of transition, from 1993 on, the performance of the mechanical engineering sector improved in all countries. Positive average annual growth rates occurred in Poland, Romania and Hungary, and in the first two countries it even became a narrow 'winner' in this period.⁹ In Hungary, the outstanding growth of the transport equipment and especially the electrical and optical equipment sector raised the average manufacturing growth rate and thus made the mechanical engineering sector a 'loser'. However, in the Czech and Slovak Republics and Slovenia the mechanical engineering sector remained a 'loser' in this period as well. In absolute terms, only Poland surpassed the 1989 production level by 1997, while all other countries are still performing at significantly lower levels than at the beginning of transition (see Table 3 and Figure 2). Slovakia, with only 30% of 1989 production ranks last, followed by the Czech Republic, with 40%. In both countries, this enormous decline might be partly due to the vanishing of past specialization patterns, the collapse of the formerly important CMEA-market and the break-apart of Czechoslovakia. In addition, Slovakia might be overproportionately hit because of formerly being an important site for armaments production, the conversion of which is especially difficult. The Czech Republic, on the other hand, might be handicapped by the voucher privatization method and the immense indebtedness of its large enterprises (see Part II). Slovenia's performance, on the other hand, was also weakened by its reduced home market.

and EU-South countries, basis data from 1992, for Austria data from 1993 is used. However, this does not effect the analysis because structures in the Western countries stayed relatively unchanged.

⁸ 'Losers' of transition are industries, which performed worse than total manufacturing in terms of production growth, 'winners' those which performed better, see Urban, W. (1997), page 4.

⁹ Production growth is calculated here at constant prices. These figures may, however, not always be reliable for Romania. Calculated at current prices, the mechanical engineering sector was a loser in both periods in Romania, and in the second period it even emerged as the largest loser. The situation of the mechanical engineering sector is therefore not that good, as indicated by constant figures.

Table 2

Machinery and equipment n.e.c.
Shares in production (at constant prices)
Manufacturing = 100

	1989	1992	1996	1997
EU-North	.	9.6	.	.
EU-South	.	2.9	.	.
Austria	8.5	8.9	9.0 ¹⁾	.
Bulgaria ²⁾	.	.	9.7	11.4
Czech Republic	16.2	10.4	8.7	9.3
Hungary	5.7	6.5	6.1	4.9
Poland	8.1	6.4	7.0	6.7
Romania	6.9	7.1	6.9 ³⁾	.
Slovak Republic	13.9	9.1	8.0	7.5
Slovenia	10.3	8.9	8.6	7.8

Notes: 1) 1995. - 2) Since 1996 DK includes fabricated metal products, casting of metals. - 3) 1996 at current prices.

Source: WIIW Industrial database

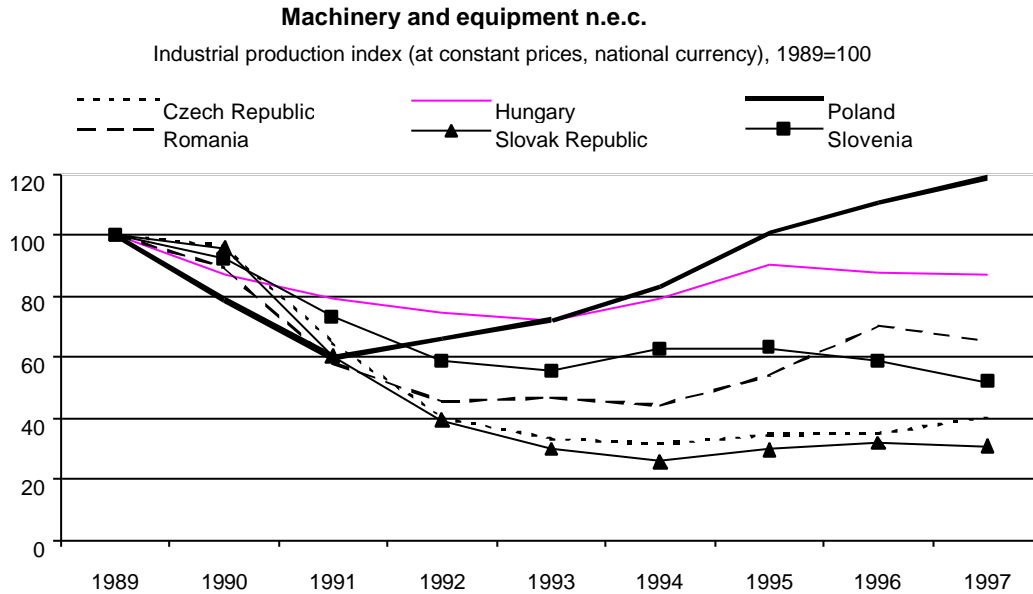
Table 3

Machinery and equipment n.e.c.
Production growth

	Average annual changes in %		Relative to total manufacturing		Index 1989=100
	1990-92	1993-97	1990-92	1993-97	
Czech Republic	-26.3	0.0	-12.6	-2.1	40.1
Hungary	-14.2	3.1	0.7	-6.0	87.0
Poland	-18.8	12.5	-6.3	1.0	118.8
Romania	-23.2	7.5	0.5	0.7	65.2
Slovak Republic	-26.7	-4.8	-11.1	-3.8	30.7
Slovenia	-16.3	-2.4	-4.1	-2.6	51.8

Source: WIIW Industrial database.

Figure 2



Source: WIIW Industrial database

Still an important employer

As an employer, the mechanical engineering sector was and continues to play an important role in total manufacturing: In 1997, it was the largest employer in Bulgaria and the Slovak Republic, with 23% and 15% of total employment in manufacturing, and ranked

Table 4

Machinery and equipment n.e.c.				
Shares in employment				
Manufacturing = 100				
	1989	1992	1996	1997
EU-North	.	11.0	.	.
EU-South	.	4.2	.	.
Austria	10.7	10.3	11.7	11.9
Bulgaria ¹⁾	.	.	24.6	22.8
Czech Republic	22.8	17.2	15.1	14.0
Hungary	11.1	10.1	8.2	.
Poland	13.9	11.9	10.2	.
Romania	.	15.8	13.6	.
Slovak Republic	.	19.1	15.5	15.4
Slovenia	9.7	9.3	10.0	10.3

Note: 1) Since 1996 DK includes fabricated metal products, casting of metals.

Source: WIIW Industrial database.

Table 5

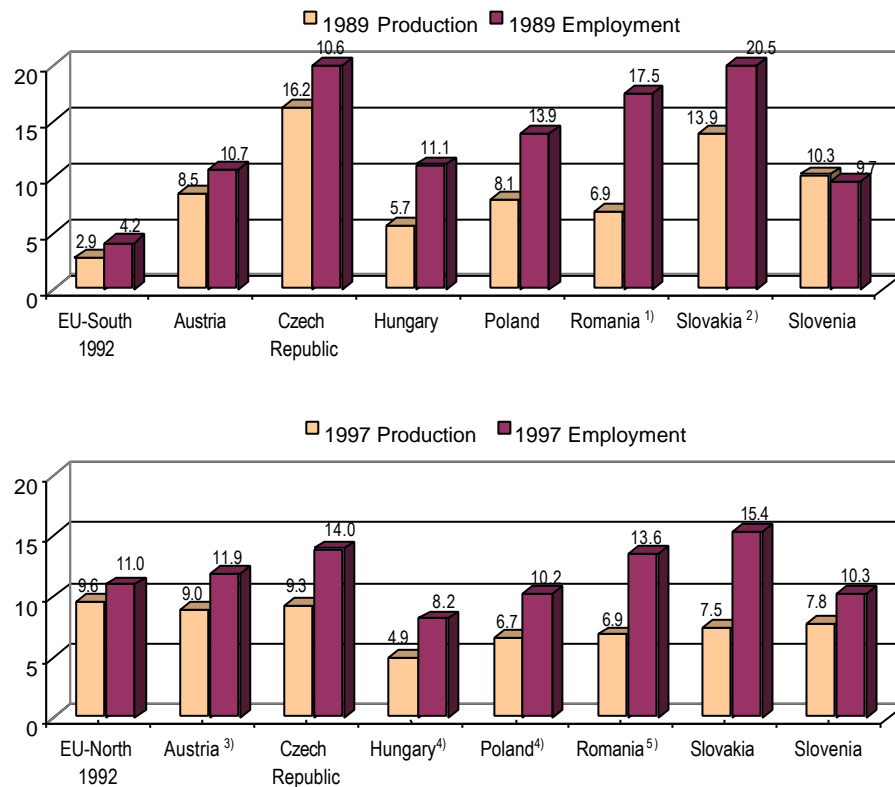
Machinery and equipment n.e.c.				
Employment				
thousand persons				
	1989	1992	1996	1997
Bulgaria ¹⁾	.	.	139	97
Czech Republic	378	203	148	162
Hungary	130	87	52	.
Poland	462	328	287	.
Romania	.	444	293	.
Slovak Republic	.	101	69	68
Slovenia	36	26	22	22

Notes: 1) Since 1996 DK includes fabricated metal products, casting of metals. -2) 1996. -3) 1990=100.

Source: WIIW Industrial database.

Figure 3

Machinery and equipment n.e.c.
Shares in production (at constant prices) and employment in total manufacturing, in %



Notes: 1) Employment share 1990.- 2) Employment share 1991.- 3) Production share 1995.-4) Employment share 1996.- 5) Employment and production share (at current prices) 1996.

Source: WIIW Industrial database

second in the Czech Republic and Romania (1996), with 14% each. In Slovenia and Poland (1996) mechanical engineering ranked fourth, with 10%, and in Hungary (1996) fifth, with 8% (see Table 4). However, during transition employment declined drastically, so that absolute levels were considerably lower in 1997 than in 1989: In 1997, the mechanical engineering sector recorded only about 40% of the 1989 level in Hungary, the Czech Republic and Slovenia, 60% in Poland (see Table 5).

In general, employment shares were several percentage points higher than output shares in all CEECs in 1989, except in Slovenia. The gap was largest for Romania, with a difference of eleven percentage points. During transition, these differences narrowed in most countries but still the gap remained quite evident, leading to a productivity level below average (see Figure 3). Because of around average labour intensity in the mechanical engineering sector in general, these large gaps might be partly due to the phenomenon of labour hoarding.

2 International competitiveness

As typical for all CEECs and all sectors of manufacturing, wages, productivity and unit labour costs in the mechanical engineering sector were and are generally much lower than in Western countries. In 1996,¹⁰ nominal wages rates (per employee) in the mechanical engineering sector, for example, were even below 10% of the Austrian level in most CEECs, with the exception of Slovenia, where wages reached 20% of the Austrian level, and Romania and Bulgaria, where they measured only approximately 3%. These three countries also showed extremely high respectively low levels in productivity and unit labour costs, whereas the other four countries were more uniform: In the Czech Republic, Hungary and Poland productivity accounted for approximately 34% of the Austrian level, in Slovakia for 26%. Unit labour costs hovered around 28% in these four countries (see Figure 4).¹¹

During transition, wages as well as productivity grew throughout the region (see Table 6). Annual average growth rates of wages were lowest for Hungary and highest for the Czech Republic, whereas productivity grew fastest from a very low level in Romania and slowest from a relatively high level in Slovenia. However, as the wage increase was higher than the productivity increase in the Czech and Slovak Republics as well as in Slovenia, unit labour costs grew there, while they fell in Hungary, Poland and Romania.¹²

¹⁰ The last year, for which data is available for all countries.

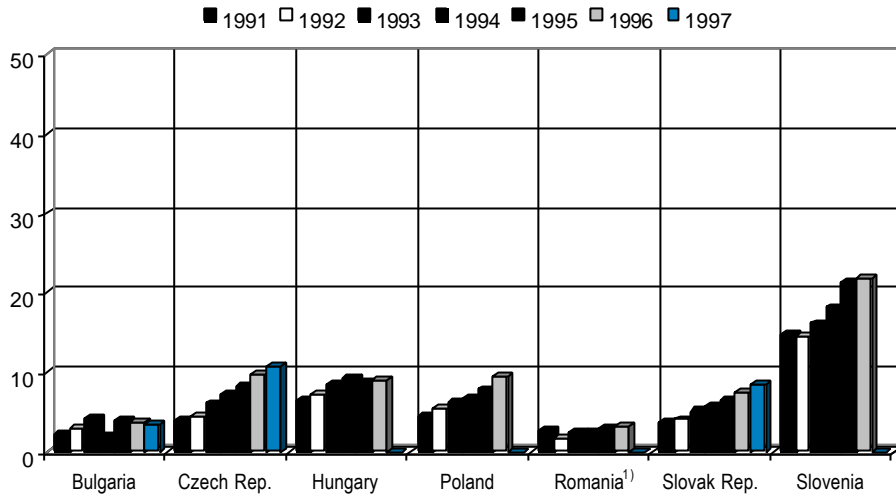
¹¹ As these figures are strongly affected by different productivity estimates, Table A2 in the Appendix shows the lower and upper range for estimated unit labour costs in 1996, using alternative productivity measurements.

¹² For Bulgaria it is not possible to compute growth rates, because data are not consistent over the whole period. Data before 1996 can be compared with those for 1996 and 1997 only to a limited extent.

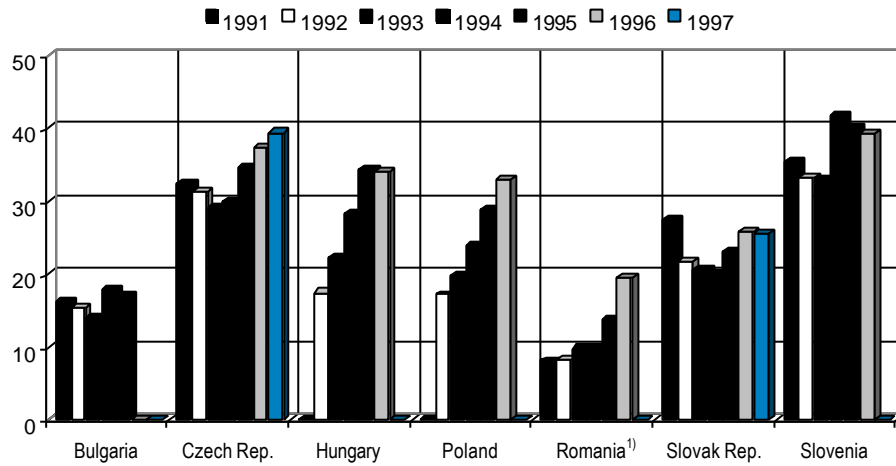
Figure 4

Machinery and equipment n.e.c.

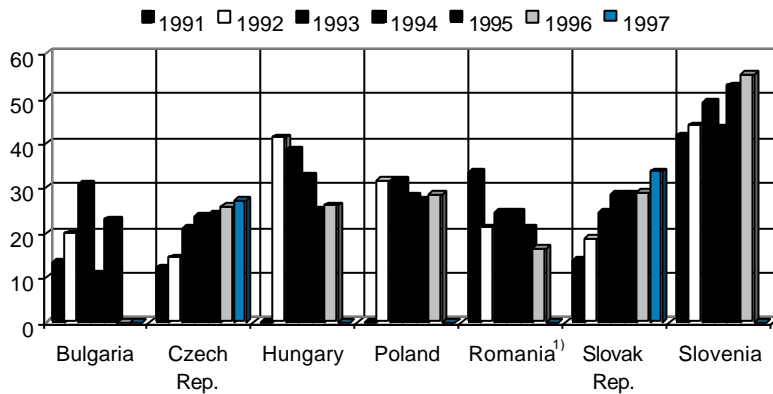
Wages (ECU), Austria 1995 = 100



Productivity (PPP), Austria 1995 = 100



Unit labour costs (ECU), Austria 1995 = 100



Notes: 1) Net wages; all other countries gross wages.

Source: WIIW Industrial database

Table 6

Machinery and equipment n.e.c.							
Average annual growth rates, 1993-1997							
in per cent							
	Productivity	Output	Employment	Exports to EU (ECU basis)	Wage rates (ECU basis)	Unit Labour Costs (ECU basis)	Investment
Czech Republic	7.8	0.0	-7.2	30.5 ¹⁾	18.6	10.0	22.2 ²⁾
Hungary	18.1 ³⁾	3.1	-12.0 ³⁾	16.4	5.4 ³⁾	-10.7 ³⁾	22.4 ⁴⁾
Poland	17.7 ³⁾	12.5	-3.3 ³⁾	16.8	14.5 ³⁾	-2.7 ³⁾	n.a.
Romania	23.8 ³⁾	7.5	-9.9 ³⁾	29.4	16.5 ³⁾	-5.8 ³⁾	-5.8 ⁴⁾
Slovak Republic	3.4	-4.8	-7.9	33.3 ¹⁾	15.9	12.2	n.a.
Slovenia	1.1	-2.4	-3.5	12.6 ¹⁾	10.5 ³⁾	5.9 ³⁾	n.a.

Notes: 1) 1994-1997. - 2) 1993-1994. - 3) 1993-1996 - 4) 1993-1995.
Source: WIIW Industrial database.

Looking at the relative position of the mechanical engineering sector in total manufacturing of CEECs, wages hovered around the manufacturing average, with Poland and Romania having slightly higher than average wages in 1996 (the Czech Republic in 1997 too), while in all other countries wages lay below. Because productivity of the mechanical engineering sector was substantially below manufacturing average in all CEECs, unit labour costs were essentially higher than manufacturing average – from 34 percentage points in Hungary to 110 percentage points in Bulgaria (see Table 7).

Table 7

Machinery and equipment n.e.c.				
Unit Labour Costs (national currency)				
Manufacturing = 100				
	1992	1995	1996	1997
Czech Republic	162.6	172.1	170.8	154.0
Hungary	151.3	125.3	134.2	.
Poland	185.2	155.0	150.2	.
Romania	231.7	222.1	191.6	.
Slovak Republic	201.0	202.1	186.5	201.0
Slovenia	112.9	118.4	127.0	.
Bulgaria ¹⁾	189.3	207.2	210.5	162.6

Note: 1) Since 1996 DK includes fabricated metal products, casting of metals.
Source: WIIW Industrial database

3 Trade performance with the EU¹³

The mechanical engineering sector as a major importer but mid-range exporter

As an exporter to the EU, the mechanical engineering sector was and continues to be of middle importance in most CEECs: Export shares within total manufacturing exports were smallest for Bulgaria and Romania in 1997, with 5% of all manufacturing exports, followed by Poland with 6%, Slovakia with 7% and Hungary with 8%. Only in Slovenia and the Czech Republic did the mechanical engineering sector play a more important role and accounted for 13% of exports (see Appendix, Table A3). During transition, export shares slightly increased in these two countries, whereas they fell in Bulgaria and more or less stagnated in the other countries (see Appendix, Figure A2). In general, export growth from 1993 onwards was on average a little larger for the mechanical engineering sector than for total manufacturing, except for Bulgaria and Hungary. Export values increased most for the Czech and Slovak Republics together, followed by Poland and Hungary (see Figure 5).

In 1989, the mechanical engineering sector was the major manufacturing importer from the EU in all CEECs, except in Slovenia and Romania.¹⁴ In Bulgaria, for example, the mechanical engineering sector accounted for almost one third of manufacturing imports, in the other countries for more than one fifth. Since 1989 however, a declining trend emerged and import shares fell, with the exception of Romania, where import shares grew (see Appendix, Figure A2). Nevertheless, the mechanical engineering sector remained of major importance: In 1997, it still ranked first in Poland and second in all other CEECs.¹⁵ Import shares varied from 14% in Slovenia and Bulgaria, to 17% in Romania and 18% in Hungary, the Czech and Slovak Republics and Poland. Imports were mainly driven by a high pent-up demand from households and a high need for technology and know-how transfers through machinery-imports.

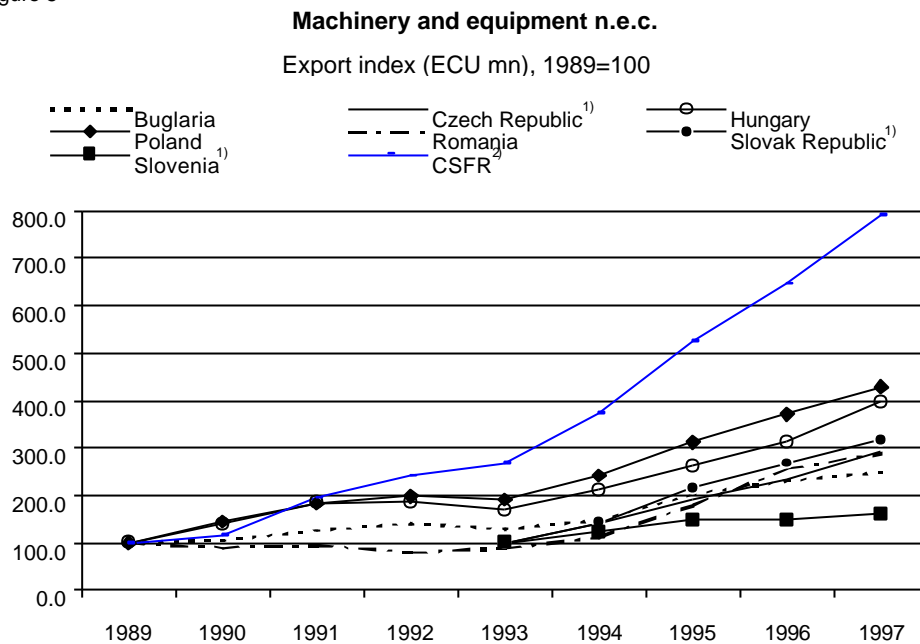
In absolute terms, imports had been higher than exports leading to a growing trade deficit in the CEECs trade in mechanical engineering goods with the EU: In Slovenia and Bulgaria the sectoral trade deficit was modest and reached less than 200 mn ECU in 1997. In Romania and Slovakia it measured about 500 mn ECU, in the Czech Republic and Hungary approximately 1 bn ECU. In Poland, however, the sectoral trade deficit doubled from 1995 to 1997 and peaked at 3 bn ECU in 1997 (see Appendix, Figure A2).

¹³ Trade with the EU is investigated in more detail because it plays an important role in the CEECs: After the collapse of the CMEA-market, CEEC trade heavily reoriented towards EU-markets: By 1997, 70% of Hungarian and Slovenian exports went to the EU, for Poland and the Czech Republic the levels were around 60%, and for Bulgaria and Slovakia around 40%. On the import side, the Slovenian imports from the EU accounted for roughly 70%, in the Czech Republic, Hungary and Poland EU imports run for a share of 60%, in Slovakia and Bulgaria for 40%.

¹⁴ The mechanical engineering sector ranked first in Bulgaria, the Czech and Slovak Republics, Hungary and Poland in 1989. It ranked third in Slovenia, and fifth in Romania.

¹⁵ The mechanical engineering sector came second behind the transport equipment sector in Slovenia, the electrical and optical equipment sector in the Czech and Slovak Republics and Hungary and behind the textile and textiles products sector in Bulgaria and Romania.

Figure 5



Notes :1) Export data for the Czech and Slovak Republics and Slovenia since 1993, 1993=100.-

2) Until 1992 CSFR, then exports from the Czech and Slovak Republics added together.

Source: WIIW Industrial database

More uniform export and import structure in 1997

On a more detailed three-digit NACE-level,¹⁶ the structure of mechanical engineering exports was quite different in the individual CEECs at the beginning of transition. However, in five of the seven CEECs, the sub-branch of 'domestic type electric appliances'¹⁷ and of 'machine-tools for working metal, and of other tools'¹⁸ was more important, that is it had shares of 10% and more in total mechanical engineering exports. A particular specialization on one sub-branch occurred in Bulgaria, with 'plant for mines, iron and steel industry, foundries etc.'¹⁹ taking 57% of all mechanical engineering exports, in Slovenia, with 'domestic type electric appliances' measuring 48%, and in Romania, with 'transmission equipment for motive power' reaching 45% of all mechanical engineering exports. During the transition, the export pattern became more uniform throughout the region: In 1997, all CEECs showed a high share of 'other machinery and equipment' in mechanical engineering exports and an increase in this sub-branch from 1989 to 1997.²⁰ In

¹⁶ NACE 1970 classification, codes 321-328, 346.

¹⁷ Hungary, Poland, Romania, Slovakia and Slovenia.

¹⁸ Bulgaria, Czech Republic, Poland, Romania, Slovakia.

¹⁹ Manufacturing of plant for mines, iron and steel industry, foundries, civil engineering, building; mechanical handling equipment (325).

²⁰ The sub-branch of 'other machinery and equipment' accounted for more than 30% of all mechanical engineering exports in Bulgaria, the Czech Republic, Hungary and Poland in 1997. It measured 26% in Romania, 24% in Slovenia and 19% in Slovakia. It includes the production of internal combustion engines (except those for road vehicles and aircraft); water wheels and turbines; compressors and pumps; space-heating, ventilating and air-conditioning

addition, in six of seven countries 'plant for mines, iron and steel industry, foundries etc.' was now important, basically because of the significance of the basic metals industry, except for Romania, which still specialised in 'transmission equipment for motive power'. Interestingly, 'domestic type electric appliances', whose standard technology is easy to be acquired, was a major exporter only in four countries: in Slovenia, with 44% of all mechanical engineering exports, in Hungary, with 24%, and in Poland and the Slovak Republic, with both 11%.

In 1989, the import structure of the mechanical engineering sector showed some differences between countries but less than in the pattern of exports. Hence, all CEECs had a higher import share of 15% and more of 'machinery for food, chemical and related industries', while in six of seven countries about 30% or more of imports came from 'other machinery and equipment'. In addition, in five of seven CEECs 'plant for mines, iron and steel industry, foundries etc.' played a more important role. By 1997, the import structure became also more uniform in the CEECs and concentrated mainly on the three before-mentioned sub-branches: All countries had an import share of more than 30% from 'other machinery and equipment', Hungary's share even accounted for 52% of all mechanical engineering imports. Moreover, six respectively five countries had also a larger share of 'machinery for food, chemical and related industries' and 'plant for mines, iron and steel industry, foundries etc.' imports, reflecting the still existing need for modernization.

Lower quality of investment goods exports than consumer goods exports

The quality of mechanical engineering exports from the CEECs, as measured by the price/quality gap indicator,²¹ was substantially lower than for that of total EU imports of mechanical engineering products in 1989 but improved over the period up to 1996. However, it remained below average quality. In addition, an important distinction between the quality of consumer goods exports (domestic appliances) and investment goods (mechanical engineering without domestic appliances) can be made: While the first category lay below average, the second one was even lower, except in Bulgaria, where both showed the same, low level (see Table 8). In investment goods exports, the highest quality among the CEECs in 1996 was achieved by Slovenia, followed by Hungary, the Czech and Slovak Republic and Poland. The lowest quality, indicated by low prices, was measured in Bulgaria and Romania. On a more detailed level, only some sub-branches could reach average-import quality standards in 1996, including 'machinery for the production and use of mechanical power' in Hungary and 'weapons and ammunition' in Poland and the Czech Republic.

equipment; refrigerating machinery (except domestic type refrigerators and domestic deep freeze units); non-electric industrial furnaces and ovens; non-electric welding equipment; taps, cocks and valves and machinery; and appliances not elsewhere specified.

²¹ See Landesmann, Burgstaller (1997).

Table 8

		Machinery and equipment n.e.c.						
		Price/quality gap indicator Average import quality = 1 ¹⁾						
		Czech			Slovak			
		Bulgaria	Republic	Hungary	Poland	Romania	Republic	Slovenia
Mechanical engineering	1995	0.430	0.487	0.598	0.439	0.395	0.470	0.672
without domestic appliances	1996	0.478	0.618	0.661	0.490	0.422	0.519	0.713
Domestic Appliances	1995	0.456	0.701	0.723	0.768	0.567	0.637	0.831
	1996	0.420	0.666	0.829	0.867	0.628	0.684	0.932

Note: Average of total (extra) EU-imports.

Source: Landesmann, M., Burgstaller, J. (forthcoming).

Market share developments

In 1989, CEEC(6)²² mechanical engineering exports to the EU (12) had a market share of 2%, which increased steadily to 6.5% in 1997 (all shares without intra-EU trade). Although exports grew five times in absolute terms, the mechanical engineering sector measured only a small share on the European market compared to, for example, the transport equipment sector, with 8% in 1996, or basic metals and fabricated metal products and the textiles and textile products sector, with both about 12% (each in 1996). In general, mechanical engineering market shares were therefore slightly below that for total manufacturing exports to the EU, which measured 2.8% in 1992 and 6.9% in 1997. The most important mechanical engineering exporting countries in 1997 were the industrially most advanced CEECs, the Czech Republic, Poland, Hungary and Slovenia, with market shares ranging from 2.5% to 1%. For the Slovak Republic, Romania and Bulgaria mechanical engineering export shares were smaller and less than 0.5% (see Table 9).

In comparison to CEEC exports to the EU, CEEC(7) mechanical engineering exports to Austria accounted for a large share of 25% of Austria's non EU-mechanical engineering imports (world-wide imports without EU) in 1995 and grew to 30% in 1997. In absolute terms, exports to Austria doubled. In 1997, the largest exporters were Slovenia, Hungary and the Czech Republic, with market shares of 9%, 8% and 7% respectively. Slovakia and Poland followed with 3% and 1.5%, Romania and Bulgaria with shares below 1% (see Table 10).

²² Bulgaria, Czech Republic, Hungary, Poland, Romania and the Slovak Republic. Data for Slovenia are available since 1993 only.

Table 9

Machinery and equipment n.e.c.
Exports to the EU(12) in ECU mn, market shares in %

	EU(12) extra-EU imports		Bulgaria		Czech Republic ¹⁾		Hungary		Poland	
	ECU mn	%	ECU mn	%	ECU mn	%	ECU mn	%	ECU mn	%
1989	31044.1		38.6	0.12	186.6	0.60	178.0	0.57	170.0	0.55
1992	34941.8		54.2	0.16	448.1	1.28	331.1	0.95	336.4	0.96
1995	40330.8		78.4	0.19	820.1	2.03	468.3	1.16	530.6	1.32
1996	44209.4		89.0	0.20	1005.7	2.27	556.5	1.26	630.3	1.43
1997	49623.5		96.2	0.19	1240.2	2.50	708.6	1.43	730.5	1.47

	Romania		Slovak Republic		Slovenia		CEEC(6) ²⁾		Total Manufacturing CEEC(6) ³⁾	
	ECU mn	%	ECU mn	%	ECU mn	%	ECU mn	%	ECU mn	%
1989	70.7	0.23	.	.	.	.	643.9	2.07	9303	2.76
1992	56.2	0.16	.	.	.	.	1226.0	3.51	16736	4.43
1995	126.4	0.31	159.4	0.40	468.0	1.16	2183.1	5.41	30661	6.44
1996	181.0	0.41	197.6	0.45	472.1	1.07	2660.1	6.02	32301	6.52
1997	203.5	0.41	233.4	0.47	509.2	1.03	3212.3	6.47	39611	6.85

Notes: 1) Until 1992 CSFR. - 2) Including Bulgaria, Czech Republic, Hungary, Poland, Romania and Slovak Republic. - 3) CEEC(6) total manufacturing exports to the EU and their market shares.

Source: WIIW database.

Table 10

Machinery and equipment n.e.c.
Exports to Austria in ECU mn, market shares in %

	Austria extra-EU(15) imports		Bulgaria		Czech Republic		Hungary		Poland	
	ECU mn	%	ECU mn	%	ECU mn	%	ECU mn	%	ECU mn	%
1995	743.4 ¹⁾		2.1	0.28	48.4	6.50	42.0	5.65	16.4	2.21
1996	1177.7		5.0	0.43	82.5	7.01	80.1	6.80	21.2	1.80
1997	1352.4		7.6	0.56	98.8	7.31	108.3	8.01	19.7	1.46

	Romania		Slovak Republic		Slovenia		CEEC(7) ²⁾			
	ECU mn	%	ECU mn	%	ECU mn	%	ECU mn	%		
1995			4.0	0.54	13.2	1.78	60.3	8.12	186.5	25.08
1996			8.2	0.69	30.8	2.62	102.9	8.74	330.8	28.09
1997			8.7	0.65	38.7	2.86	121.5	8.98	403.4	29.83

Notes: 1) 1995 data for Austria has to be interpreted carefully because of statistical problems. - 2) Including Bulgaria, Czech Republic, Hungary, Poland, Romania, the Slovak Republic and Slovenia.

Source: WIIW database.

Revealed comparative disadvantage of the mechanical engineering sector

Revealed comparative advantage values (RCA, see Table 11)²³ were negative in all CEECs in relation to the EU, indicating an overproportionate negative trade balance in the mechanical engineering sector. When compared with manufacturing as a whole,²⁴ the data showed a comparative disadvantage for the mechanical engineering sector in all CEECs in 1997, which was highest for Romania and Bulgaria, followed by Slovakia, Poland and Hungary. Only in the Czech Republic and especially Slovenia the relative comparative disadvantage was rather small (see Table 12). Although most sub-branches within the mechanical engineering sector experienced negative trade balances, some exceptions existed: Sub-branches showing a positive trade balance for a prolonged time period included 'machine-tools for working metals, and of other tools' in Bulgaria, 'domestic type electric appliances' in Hungary and Slovenia, and 'transmission equipment' in Romania and Slovakia (see Table 13).

Table 11

Mechanical engineering RCAs

	1989	1992	1996	1997
Austria	-0.23	-0.17	-0.27	-0.27
Bulgaria	-0.82	-0.47	-0.39	-0.38
Czech Republic	.	.	-0.37	-0.29
Hungary	-0.55	-0.33	-0.40	-0.43
Poland	-0.66	-0.57	-0.63	-0.67
Romania	0.38	-0.66	-0.62	-0.54
Slovak Republic	.	.	-0.47	-0.48
Slovenia	.	.	-0.07	-0.15
Greece	.	.	-0.95	.
Portugal	.	.	-0.67	-0.68
Spain	.	.	-0.41	-0.44

Measured as: $RCA_i = (\text{exports}_i - \text{imports}_i) / (\text{exports}_i + \text{imports}_i)$.

Source: WIIW calculations

Table 12

Relative position of mechanical engineering RCAs

	1989	1992	1996	1997
Austria	-0.11	-0.06	-0.07	-0.10
Bulgaria	-0.28	-0.35	-0.41	-0.46
Czech Republic	.	.	-0.19	-0.15
Hungary	-0.45	-0.31	-0.35	-0.37
Poland	-0.59	-0.49	-0.41	-0.40
Romania	-0.08	-0.58	-0.55	-0.51
Slovak Republic	.	.	-0.41	-0.41
Slovenia	.	.	-0.01	-0.04
Greece	.	.	-0.36	.
Portugal	.	.	-0.49	-0.47
Spain	.	.	-0.28	-0.31

Measured as: $RCA(\text{mechanical engineering sector}) - RCA(\text{total manufacturing})$

Source: WIIW calculations

²³ Measured as $RCA_i = (\text{exports}_i - \text{imports}_i) / (\text{exports}_i + \text{imports}_i)$.

²⁴ Measured as $RCA(\text{mechanical engineering sector}) - RCA(\text{total manufacturing})$.

Table 13

Detailed RCA structure in machinery and equipment n.e.c., 1997

	Bulgaria	Czech Republic	Hungary	Poland	Romania	Slovak Republic	Slovenia
321 Agricultural machinery and tractors	-0.73	-0.29	-0.18	-0.45	-0.55	-0.49	-0.58
322 Machine-tools for working metal, and other tools and equipment with use with machines	0.48	-0.07	-0.57	-0.61	-0.40	-0.35	-0.40
323 Textile machinery and accessories; sewing machines	-0.78	-0.05	-0.75	-0.84	-0.89	-0.39	-0.82
324 Machinery for the food, chemical & related industries	-0.66	-0.52	-0.53	-0.81	-0.89	-0.73	-0.61
325 Plant for mines, iron and steel industry, foundries, civil engineering, building; mechanical handling equipment	0.09	-0.23	-0.13	-0.61	-0.47	-0.29	-0.14
326 Transmission equipment for motive power	-0.32	-0.08	-0.58	-0.14	0.70	0.20	-0.13
327 Other machinery and equipment for the use in specific branches	-0.85	-0.39	-0.68	-0.85	-0.79	-0.63	-0.53
328 Other machinery and equipment	-0.38	-0.30	-0.60	-0.69	-0.58	-0.71	-0.29
346 <i>Domestic type electric appliances</i>	<i>-0.88</i>	<i>-0.59</i>	<i>0.30</i>	<i>-0.58</i>	<i>-0.39</i>	<i>-0.20</i>	<i>0.51</i>
32 Machinery and equipment n.e.c.	-0.38	-0.29	-0.43	-0.67	-0.54	-0.48	-0.15

Measured as: $RCA_i = (\text{exports}_i - \text{imports}_i) / (\text{exports}_i + \text{imports}_i)$.

Source: WIIW database

4 Significance of foreign direct investment

In general, the mechanical engineering sector has not been a prominent target for foreign direct investors, with the only exception of Slovenia. The mechanical engineering sector is largely unattractive for foreign investors because of its rather fragmented and highly differentiated structure. Moreover it has been plagued by outdated technology, long pay-off periods, difficulties in converting military production and a demand that is mostly satisfied by imports. Nevertheless, some FDI occurred in this sector, mainly in the sub-branches of 'machinery for the production and use of mechanical power' (e.g. Asea Brown Boveri) and of 'other general purpose machinery' (in particular in the production of elevators). In addition, 'domestic appliances' also attracted foreign investors.²⁵

In the distribution of the nominal capital of all foreign investment enterprises (FIEs)²⁶ in total manufacturing, the share of the mechanical engineering sector was and remained relatively low in most CEECs: In 1996, mechanical engineering's FIEs accounted for 3% of total nominal capital in the Czech Republic, 5% in Hungary, and 7% in the Slovak Republic.²⁷ Only in Slovenia the share was significantly larger and measured 10% in 1996

²⁵ Università' Commerciale Luigi Bocconi (1997), page 66. It is to note, that significant differences exist within the mechanical engineering sector: While all sub-branches produce specialized investment goods, the 'domestic appliance' sub-branch produces consumer goods, which can achieve economies of scale and whose technology is easily transferable (see also Part II).

²⁶ Firms with any share of foreign ownership, including minority stakes.

²⁷ Czech Republic own capital, Slovak Republic output of companies, see Figure 3.

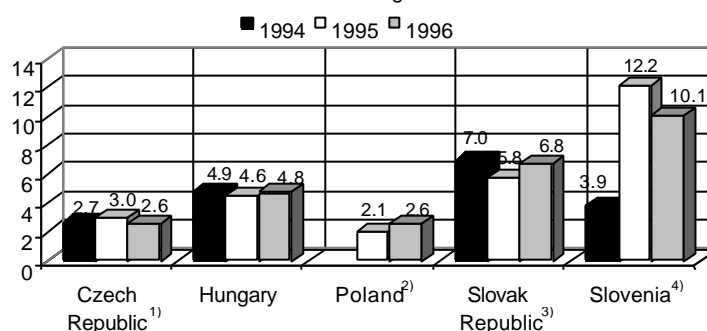
(see Figure 6A). Although the data for Poland are not perfectly comparable,²⁸ the share of the mechanical engineering sector was also very small and reached about 3% of the equity capital of all manufacturing entities with foreign participation in 1996.

Foreign penetration of the mechanical engineering sector (as measured by the share of the nominal capital of the sector's FIEs in the nominal capital of all mechanical engineering companies) was below the average manufacturing penetration rate in most CEECs, except Slovenia. In general, however, in line with the overall greater role FDI plays in Hungary, foreign penetration was highest in this country, where 56% of the nominal capital in the mechanical engineering sector came from foreign investment enterprises in 1996, compared to 19% in Slovenia, 17% in Slovakia and only 6% in the Czech Republic (see Figure 6B). In Poland, the percentage was also relatively small and measured approximately 12% in 1996.

Figure 6

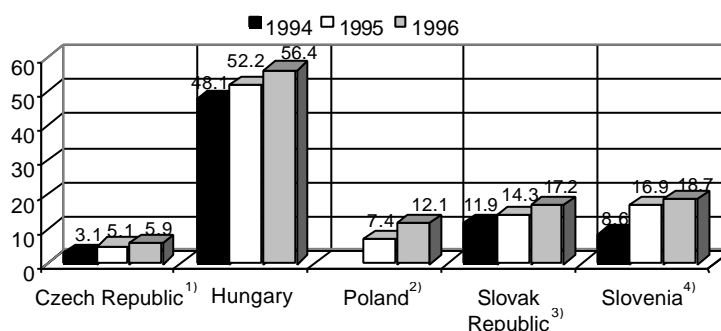
Machinery and equipment n.e.c
A. Position of mechanical engineering in the distribution of foreign capital

Percentage share of the mechanical engineering sector in total manufacturing's
nominal capital of foreign investment enterprises (FIEs)
Manufacturing = 100



B. Foreign penetration of the mechanical engineering sector

Share of nominal capital of mechanical engineering FIEs in
the nominal capital of all mechanical engineering companies (FIEs + all others)



Notes: 1) Own capital.- 2) Polish data from Zagozdzinska, I. (1998) and Polish Statistical Yearbook of Industry (1997). - 3) Output of companies, including office machinery.- 4) 1994 including medical, precision and optical equipment.
Source: WIIW database.

²⁸ Data for the Czech Republic, Hungary, the Slovak Republic and Slovenia come from Hunya, G. (1998), data for Poland from Zagozdzinska, I. (1998) and the Polish Statistical Yearbook of Industry (1997).

5 Prospects

The mechanical engineering sector in the Central and Eastern European Countries experienced a deep transformational recession and continues to be in economic difficulties: Growth rates tumbled after the collapse of communism, underwent a period of recovery since 1992/1993 and finally peaked in 1995, when all CEECs showed positive growth rates in mechanical engineering. Since then however, they are again on a decline, turning even negative in most countries in one of the following two years. Only Poland had a declining, but positive growth rate in 1997, and the Czech Republic also showed a positive growth of 15%. In the latter case this might have been due to the increase of investment by domestic firms in the course of their restructuring programmes, and the successful entering of the US market by some Czech firms, such as ZPS Zlin or TOS Kurmin (see Part II). As the mechanical engineering sector is especially vulnerable to business cycle movements, its development may have been partly influenced by the general economic slow-down in Western Europe from 1995 to 1996. This worrying trend of the last few years is aggravated by growing sectoral trade deficits, revealed comparative disadvantages and generally low export quality and may also not be reversed through inflows of foreign direct investment, as foreign investors so far are preferring other sectors. On the other hand, the price/quality gap indicator has improved during transition.

In general, the performance of the mechanical engineering sector declined most in the formerly specialized countries of the *Czech and Slovak Republics*, as well as in *Slovenia*. Mainly hit by the disintegration of the domestic market, this sector remained a 'loser' in the second period of transition and continues to perform at very low levels. It appears, however, that in the first two countries, it has already hit the bottom. On the other hand, due to current serious problems in the Czech's largest sector's company Škoda Plzen production may decline again despite recovery in 1997. In *Hungary, Poland* and *Romania* mechanical engineering recorded positive average growth rates between 1993 and 1997 and in the latter became also a narrow 'winner'.

Some country specificities remain and will shape the future prospects of the sector in different ways: The *Czech Republic*, for example, showed a relatively large export share, as well as a good performance on the Austrian and EU-market but is handicapped by heavy indebtedness of large companies. *Hungary's* mechanical engineering sector only had a small share in total manufacturing but a high foreign penetration, a relatively higher export quality and also a larger export share on foreign markets. *Poland* was the only country which has reached above 1989-production levels, but recorded an extraordinary large sectoral trade deficit. *Slovenia* showed the largest share of foreign direct investment in the mechanical engineering sector, a comparatively large export share, a specialization on domestic appliances, the largest market share in Austria and almost positive RCA-values. Wages and unit labour costs, however, reached the highest levels. In *Bulgaria*, the mechanical engineering sector is in a crisis as the sector is in desperate need of

restructuring and hence its large share in production and employment is indicating rather the lack of restructuring.

In general, the development of the mechanical engineering sector in the CEECs is rather problematic and constrained by external as well as internal factors. In order to achieve sustainable future growth, further adjustment and integration into the global economy has to take place.

PART II: COMPANY PROFILES

The second part of the report presents a more detailed micro-analysis of the mechanical engineering sector and contains the following information by each country (data may however vary from country to country due to different availability and sources):

- Detailed output structure of the sector
- Company analysis by company size and type
- Profitability
- Important domestic enterprises
- Major foreign direct investors

It is important to note, that within the mechanical engineering sector, the domestic appliances ('household appliances' or 'white-goods') sub-branch exhibits different characteristics than the rest of the sector, which affects the presentation of this section. In general, the mechanical engineering sector produces investment goods and its components. Investment goods are mostly specialized, its mass-production is not possible. Therefore small and middle-sized enterprises dominate the market and concentration is low. By contrast, the domestic appliance sub-branch supplies durable consumer goods, which are standardized and of low complexity. Hence mass-production is common and market concentration high. Strong price competition prevails in the market. Because of these characteristics, domestic appliances, besides standardized machinery and components from the CEECs entered into fierce price competition with West European products.²⁹

Bulgaria

The 1998 privatization programme for state-owned companies defined the machine-building sector as one of the priority segments for privatization and included the following companies:³⁰

- Balkancar-Holding in Sofia: Due to its subsidiaries the Balkancar-Holding is the main manufacturer of fork lift trucks in Bulgaria. It is the main shareholder of 17 companies in Bulgaria and 14 companies abroad.
- ZMM JSCo. in Sofia: The company's product mix includes multi-unit and special purpose machines, machine-tools, lathes, casting and more. It employs about 960 persons and exports 75% of its sales. Also earmarked for privatization are ZMM-Pobeda SPJSCo. in Sliven and ZMM-Stomana SPJSCo in Silistra.
- Beroe JSCo in Stara Zagora: The company produces tyre making machines, wave reducers and lathes, employs about 800 persons and exports 92% of its sales.

²⁹ See Europäische Kommission (1997).

³⁰ Privatization-Agency Bulgaria Internet-Homepage (<http://www.privatisation.online.bg>).

- Zavod ZA Shilifovachni Mashini SPJSCo in Assenovgrad: The producer of metal-cutting machines employs about 200 persons.
- Siloma SPJSCo in Silistra: Also producing butting machines and unique equipment, the company employs approximately 370 persons.
- Assansiorostroene SPJSCo. in Sofia: The company engages in lift installations and spare parts, employs about 340 persons and sells its products mainly on the domestic market (96% of sales).
- Nord SPJSCo. in Devnia: The company produces iron, steel, non-ferrous metal parts and chemical and other equipment and employs about 200 persons.
- Kamt SPJSCo in Karnobat: The company produces agricultural machinery and employs about 130 persons.

Major foreign investors include:³¹

- Plansee Tizit GmbH, Austria: The Austrian company acquired a 79% share in the machine building company Instrument Gabrovo in July 1996. It has contracted a future investment of DM 1.5 mn.
- EURO TEC Co Ltd., Japan: In September 1996, the Japanese company bought Mikroelektronika, a Bulgarian company producing machine tools.
- ‘Pramlet-Bulgaria’, Czech Republic: In November 1996, the company acquired 75% in Feromagnit-Pernik, an engineering company. It undertook liabilities and contracted a future investment of USD 1.3 mn.
- Mraz: At the end of 1996, a French-Irish-Bulgarian consortium bought 67% of Mraz, a Bulgarian refrigerator company. It undertook liabilities of USD 1 mn and contracted a future investment of USD 1 mn.
- Sparky Trading GmbH, Germany: In June 1997, the German company acquired 70% of Agromashina in Russe, a machine building company. It had undertaken liabilities and also committed itself to further investment.
- Liebherr: In late 1998, the Swiss company Liebherr announced to build a wholly owned refrigerator plant in Bulgaria. It will cost USD 30mn, produce up to 500,000 refrigerators a year and employ 300 people. The low-cost refrigerator (retailing price DM 300, in comparison to high-performance refrigerators at DM 1,500 in Germany) plant is said to open by late 1999. It will then compete with international suppliers, including Whirlpool from the US, Sweden’s Electrolux and General Domestic Appliances, a JV between BEC from the UK and General Electric from the US.³²

³¹ List of Privatisation deals with foreign participation, concluded in the period 1993-1998. See Privatization-Agency Bulgaria Internet-Homepage ([http:// www. privatisation.online.bg](http://www.privatisation.online.bg)).

³² Financial Times (1998), October 2.

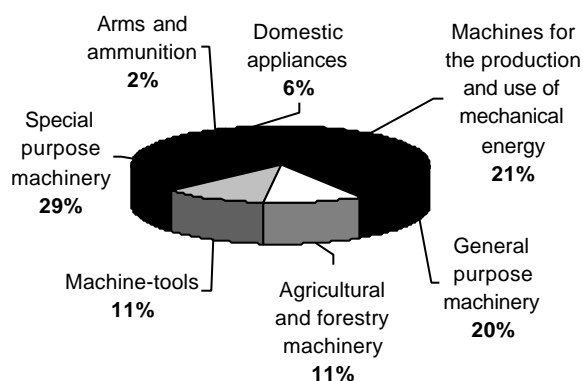
Czech Republic

In terms of total sales, three sub-branches accounted for 70% of total mechanical engineering sales in 1996, including 'special purpose machinery' with 29%, 'machines for the production and use of mechanical energy' with 21%, and 'general purpose machinery' with 20%. 'Agricultural and forestry machinery' and 'machine tools' followed with 11% both. 'Domestic appliances' and 'arms and ammunition' were relatively small sub-branches (see Figure 7).

In September 1998, about 8,500 companies were registered in the mechanical engineering sector, which made up about less than 4% of all manufacturing enterprises.³³ Of these, about 74% were small private firms and 24% business enterprises, which is a relatively large percentage, including private (1,660) and public limited liability companies (150). In addition, there were 47 state-owned enterprises.

Figure 7

**Czech Republic: Total sales of own products and services
in the machinery and equipment n.e.c. sector, 1996**



Source: Ministry of Industry and Trade & Union of Industry and Transport of the Czech Republic (1998).

Major engineering companies in the Czech Republic, ranked by 1997 revenue:³⁴

- Škoda Plzen a.s.:³⁵ Founded in 1859, Škoda Plzen is the largest and most venerated Czech engineering company. It reported a revenue of 23.5 bn Czech Koruna (CZK) in 1997 and employed about 24,000 people, down from 38,000 at its height. It's an all comprehensive firm: Sales in 1996 split according to product line: power engineering equipment 24%, engineering equipment and parts 21%, metallurgical products 14%, heavy engineering machinery and equipment 9%, services 9%, automobiles 8% and

³³ They were responsible for 9% of manufacturing output (at current prices) in 1997.

³⁴ Prague Business Journal (1998), page 123 and 126.

³⁵ Not to be confused with Škoda automobilová a.s., the car manufacturer with the Volkswagen AG as the major shareholder.

other vehicles and transport systems 6%.³⁶⁾ When privatization began in the early 1990s, the Czech government originally considered selling Škoda to a strategic foreign partner. However, after unsuccessful talks, the management and a consortium of banks bought the technically bankrupt company and transformed it into a holding company.³⁷ Some restructuring occurred, including a cut in the workforce, the restructuring of debt and the closure of divisions. Škoda Plzen then followed an expansion strategy, starting in the developing countries (e.g. steam turbine plant in China) and then turning to the West (Umformtechnik Erfurt in Germany). However, most of the acquired companies made heavy losses, such as the Czech truck-makers Tatra and Liaz, contributing to an increasing debt burden. Škoda Plzen reported a loss of CZK 3.8 bn (USD 119.8 mn) in 1997, from CZK 2.21 bn (USD 81 mn) in 1996.³⁸ Debts reached CZK 12.9 bn (USD 406 mn) in 1997, from CZK 9.2 bn (USD 338 mn) in 1996.³⁹ At the end of 1998, the company was in severe trouble and thus forced, mainly by its creditor banks, to sell several units, including its power station. At the moment, Škoda Plzen also tries to sell the lorry-maker Tatra. At the beginning of 1999, the chief executive officer Lubomír Soudek was dismissed.

- CKD Praha Holding a.s.: CKD is the second largest Czech engineering company and produces rolling stock, energy components and heavy equipment. In 1997, it reported revenues of CZK 13.1 bn and employed about 14,000 people, down from 28,000 at its height. As Škoda Plzen, the privatized CKD⁴⁰ is heavily indebted and has only recently requested government help, that is loan guarantees. Capital is urgently needed to finance its enlarged production of rail cars.
- ZPS Zlin a.s.: The company reported revenues of about CZK 6 bn in 1997 and employed about 1,800 people. ZPS is a large machine-tool producer. Like Skoda Plzen, it followed an expansion strategy, buying two smaller machine-tool makers, forming a joint-venture with a third and looking for acquisitions in Slovakia.⁴¹ In 1998, ZPS Zlin founded a joint-venture in Germany. However, the company is also troubled by debts.⁴²
- Zetor a.s.: Zetor reported revenues of CZK 5.8 bn in 1997 and employed about 4,600 people. Founded in 1946, it became one of the largest European tractor manufacturers.

³⁶ Škoda Plzen Annual Report 1996 (1997).

³⁷ On 2 May 1997, the ownership structure looked like this: 21,5% Nero s.r.o. (Mr. Soudek's company), 8.7% National Property Fund, 8.0% Komerční banka, 15.1% small private shareholders, 5.3% Česká Pojišť'ovna, a.s., 3.1% Restitution Investment Fund, a.s., 2.6% VÚB KUPÓN, a.s., 2.1% IP Fund of Komerční Banka, a.s. and 33.6% other legal persons. Škoda Plzen Annual Report (1996). According to the Prague Post (1999), March 3-9, the ownership structure today includes: 25% Nero, 18% foreign shareholders, 17% small shareholders, 15% Deutsche Börse Clearing, 10% Komerční Banka, 9% National Property Fund, and 6% Investiční a Pošt'ovní Banka (IPB).

³⁸ Compared to a loss of CZK 432 mn (USD 16 mn) in 1995 and a surplus of CZK 90 mn (USD 3 mn) in 1994.

³⁹ Compared to CZK 3.9 bn (USD 146 mn) in 1995 and CZK 2.1 bn (USD 73 mn) in 1994.

⁴⁰ The major shareholder of CKD is Inpro.

⁴¹ Business Central Europe (1996), July/August.

⁴² Financial Times (1999), January 19.

Due to radical changes in the course of the collapse of the former communist system⁴³, Zetor experienced problems. However, two debt reductions and a co-operation with the American tractor maker Deree & Company improved the business. Besides the Czech Motorkov group, the American company is one of the two major distribution channels of Zetor. Today Zetor exports 82% of total production.⁴⁴

- CZ Strakonice a.s.: The company reported revenues of CZK 3.2 bn in 1997 and employed about 3,000 people. Founded in 1919 as an armaments factory, CZ Strakonice later produced bicycles and motorcycles. In the 70s, it reoriented towards the automobile industry. Today it is an important supplier of machinery for the auto industry, especially for Škoda Automobilová in Mladá Boleslav. Although facing difficulties in the course of the transformational recession, the company consolidated in 1994. It bought shares in a research institute, Klima Prachatice, and the German company MAS. In late 1998, the competition office approved a merger between CZ Strakonice, Klima Prachatice, the Prague Institute of Machine Tools and Machinery and Desta Decín, a producer of heavy loading and lifting vehicles.⁴⁵
- Mora Moravia a.s.: The company reported revenues of CZK 3 bn in 1997 and employed about 3,000 people. Founded in 1825, Mora Moarvia produces cooking appliances, domestic heating appliances, aircraft engines parts and titanium bicycle components. It exports about 55% of its products and has a 91% market share in cooking appliances on the Czech and Slovak market and 84% in heating technique. In 1994, the state enterprise was privatized and in 1996 the Mora Moravia joint-stock company established.⁴⁶
- Zd'as a.s.: The company reported revenues of CZK 2.6 bn in 1997 and employed about 3,700 people. It produces rolling mills and forming machines.
- Hutní Montáže Ostrava a.s.: The company reported revenues of CZK 1.8 bn in 1997 and employed about 2,500 people. Its product mix includes building equipment, storage tanks, power-plant installations and steel construction equipment. About 52% of Hutní Montáže is owned by Vojenské stavby, 41% by the National Property Fund (NPF).
- MSA a.s.: The company reported revenues of CZK 1.1 bn in 1997 and employed about 1,000 people. Established in 1992, MSA manufactures valves and pumps, as well as turn-key projects, of which it exports about 77%.⁴⁷
- Česká Zbrojovka a.s.: The company reported revenues of CZK 1 bn in 1997 and employed about 2,500 people. Founded in 1936, Česká Zbrojovka produces small arms, aircraft engine components, precision castings, gears, pistols, rifles and guns, of which it exports about 90%.⁴⁸

⁴³ Including the break-up of Comecon, the imposition of tariffs on tractors, agricultural reforms and the division of the former Czechoslovakia.

⁴⁴ Univesita' Commerciale Luigi Bocconi (1997), page 66.

⁴⁵ Prager Wirtschaftszeitung (1996), Nr. 36, 5. September.

⁴⁶ Mora Moravia Internet-Homepage (<http://www.mora.cz>).

⁴⁷ MSA Internet-Homepage (<http://www.msa.cz>).

⁴⁸ Česká Zbrojovka Internet-Homepage (<http://www.czub.cz>).

- Královopolská Brno a.s.: Královopolská reported revenues of CZK 980 mn in 1997 and employed about 1,200 people. It produces equipment for the chemical and petrochemical industries, cranes and steel equipment, and water purification systems. Financial restructuring is needed quickly, otherwise this company would be threatened by bankruptcy.⁴⁹

Major foreign direct investors include:

- Asea Brown Boveri (ABB): The Swiss-Swedish engineering group has several subsidiaries in the Czech Republic. Of these, ABB Energetické systémy s.r.o. produces equipment for power and heating plants, industrial boilers, steam and gas turbines. It reported a revenue of CZK 10.96 bn in 1996 and employed 2,700 persons. Formerly, it was a joint venture with První Brněnská Strojírna Brno s.r.o. (PBS), but in 1997, ABB bought all shares.
- Korado a.s.: In July 1997, the EBRD bought a 44.3% stake in Korado a.s., the Czech maker of heating radiators, for USD 32 mn. It actually produces 750,000 radiators a year compared to 20,000 before its privatisation in 1991. With this new investment it can increase the production to 2.8 mn in the first phase and to 5 mn under the second. It works with Swiss and German machines and is said to be the most modern plant in Europe. In the Czech Republic Korado has a market share of 60%. The new plant will allow an increase in export sales in nearby markets where the firm already has a foothold, that is in eastern Germany, the former Soviet Union, Poland and Croatia.⁵⁰ Korado reported a revenue of CZK 1.5 bn in 1997 and employed about 840 people.

Hungary

In terms of overall output of the mechanical engineering sector, the 'repairs and technological fitting work of machines and equipment' was the largest sub-branch in 1996, accounting for about 27% of gross output (see Table 14). It was followed by 'domestic appliances' and 'special purpose machinery', with 21% and 18% respectively. On a more detailed level, the product group of 'domestic electric appliances' was the largest.

Export orientation of the mechanical engineering sector was only slightly above total manufacturing in 1996, showing an export-ratio of 45% compared to 40%. However, in 'machinery for textile, apparel and leather production' even 95% of sales were exported. There were also several other product groups with a ratio larger than 60% (see Table 14).

⁴⁹ Central European Business Weekly (1998), September 4-10.

⁵⁰ East West (1997), Number 646, July 31, page 13 and Business Central Europe (1997), September, page 36.

Table 14

**Hungary: Gross output, total sales and export sales
in machinery and equipment n.e.c.**

	Gross output		Total sales	Export sales	Export sales/ Total sales
	1996 HUF mn	1996 %	1996 HUF mn	1996 HUF mn	1996 %
291 Power machines	15447	7.2	15059	8103	53.8
2911 Engines, turbines, except aircraft, vehicle and cycle engines	5620	2.6	5597	3766	67.3
2912 Pumps, compressors, taps and valves	5115	2.4	5009	1617	32.3
2913 Bearings, rears, gearing and driving elements	4713	2.2	4454	2721	61.1
292 General purpose machinery	33570	15.5	34256	17066	49.8
2921 Furnaces of industrial ovens	916	0.4	912	152	16.7
2922 Lifting and handling equipment	6126	2.8	6140	2218	36.1
2923 Refrigerating or freezing equipment and air-conditioners	17065	7.9	17770	10758	60.5
2929 Other general purpose machinery	9463	4.4	9433	3937	41.7
293 Agricultural machinery	19862	9.2	19791	13150	66.4
2931 Tractors	*	*	*	*	*
2932 Agricultural and forestry machinery	19862	9.2	19791	13150	66.4
294 Machine-tools	5218	2.4	5180	2993	57.8
295 Special purpose machinery	39108	18.1	39149	21826	55.8
2951 Machinery for metallurgy	3766	1.7	3768	795	21.1
2952 Machinery for mining, quarrying and construction	12587	5.8	12987	8229	63.4
2953 Machinery for food, beverage and tobacco processing	7452	3.5	7248	3352	46.2
2954 Machinery for textile, apparel and leather production	803	0.4	814	773	95.0
2955 Machinery for the manufacturing n.e.c.	11137	5.2	11008	7142	64.9
2959 Other special purpose machinery	3363	1.6	3323	1536	46.2
296 Repairs & technological fitting work of machines & equipment	57650	26.7	57672	6820	11.8
2961 Repairs of machinery and equipment	33911	15.7	33928	2500	7.4
2962 Technological fitting work of machinery and equipment	23739	11.0	23744	4319	18.2
297 Domestic appliances	45048	20.9	45445	26511	58.3
2971 Domestic electric appliances	37393	17.3	38065	23505	61.7
2972 Non-electric domestic appliances	7654	3.5	7381	3006	40.7
DK Manufacture and repair of machinery and equipment	215904	100.0	216552	96468	44.5

Note: Hungarian Classification.

Source: Yearbook of Industry and Construction Statistics Hungary (1997).

Regarding the company structure, there were about 2,500 active corporations with legal entity in the mechanical engineering sector in 1996, representing nearly 13% of all manufacturing corporations in Hungary. Approximately 67% of these companies employed 10 or fewer people, and only 1% employed more than 300 people. The remaining 32% lay in between, with a tendency toward smaller companies. In terms of legal form, 93% of all active corporations were private-limited companies (2,360 firms) and 3% public limited-liability companies (75 firms). In 1996, an additional 2,010 incorporated businesses (without legal entity) existed in the mechanical engineering sector, including different forms of partnerships, which accounted for 12% of all unincorporated manufacturing businesses. There were no sole proprietors in the mechanical engineering sector.

Overall, the mechanical engineering sector achieved a relatively small gross operating surplus of 19.7 bn Hungarian Forint (HUF) in 1995, accounting for only about 5% of the total manufacturing surplus.

Major foreign direct investors:

- Daewoo: In summer 1996, South Korea's Daewoo won the right to buy a majority stake in the Hungarian roller-bearing plant MGM.⁵¹
- Asea Brown Boveri (ABB): Although mainly producing in the field of electronics, the Swiss-Swedish company also engages in some parts of mechanical engineering. As of December 1995, the ABB group comprised five companies in Hungary, established in 1990 and 91, mainly operating in Budapest. By 1997 however, it had grown to eight Hungarian companies, with over 2,000 employees.⁵²
- Thyssen: In 1995, the Hungarian plant of the German Thyssen Industrie, manufacturer of investment goods, was inaugurated in Kecskemét. It started with 45 people and expanded its employees to 150-200 by 1996. Thyssen Production Systems Kft. produces machine tools mainly for the car industry, including car body welding lines and tube rimming equipment. The equipment was imported from closed-down German factories. An expansion of production and further investment is possible.⁵³
- Electrolux: In 1991, the Swedish white goods producer acquired the Hungarian Lehel Refrigerator Factory. It spun-off non-core activities, including automotive coolers, soda water making equipment and radiators, reduced staff, bought new machines and developed an individual product portfolio. Hence, Lehel Hütögépgyár Kft. was always profitable and had a growing domestic market share (87% in 1994). Exports amounted to approximately 50% of total output.⁵⁴ In 1997, the company reported net sales of HUF 41 bn and employed about 3,160 people. In August 1998 however, Lehel suffered

⁵¹ Business Eastern Europe (1996), July 15.

⁵² ABB is engaged in all Central and East European Countries, except Slovenia. Other ABB establishments are mentioned in the text.

⁵³ Ballai, J. et al (1997), page 165.

⁵⁴ Gács (1996), page 105.

major losses from a fire. Besides producing refrigerators in Hungary, Electrolux opened a new vacuum cleaner plant in 1998.

Poland

In terms of total sales of the mechanical engineering sector, the sub-branch of 'other special purpose machinery' was the largest in 1996 and accounted for one third of total sales. It was followed by 'machinery for the power industry', with about 19% and by 'other general purpose machinery' and 'agricultural and forestry machinery', with 13% each (see Table 15).

Table 15

Poland: Total sales and average employment in machinery and equipment n.e.c.

	Total sales (sold production)				Employees ¹⁾	
	1995 PLN mn	1996	1995 %	1996 %	1996 in 1000	%
29.1 Machinery for power industry	2691	3205	19.1	19.6	43.1	17.5
29.2 Other general purpose machinery	1817	2055	12.9	12.6	34.9	14.2
29.3 Agricultural and forestry machinery	1809	2343	12.9	14.4	34.2	13.9
29.4 Mechanical instruments and machine tools	785	901	5.6	5.5	21.9	8.9
29.5 Other special purpose machinery	5002	5409	35.6	33.1	85.1	34.6
29.6 Other (arms and ammunition)	78	89	0.6	0.5	.	.
29.7 Domestic appliances n.e.c.	1882	2319	13.4	14.2	26.8	10.9
DK Machinery and equipment n.e.c.	14064	16321	100.0	100.0	246.0	100.0

Notes: Data in the first part of this report and data in this table are not comparable because of different methodology

1) Other (29.6) together with domestic appliances n.e.c. (29.7).

Source: PAIZ (1998b).

In the company structure, there were altogether 10,500 entities in the mechanical engineering sector in 1996, but only 770 or 7.3% employed more than 50 persons and 114 more than 501. However, these 7.3% manufactured 85% of all products of the mechanical engineering sector. In addition, 51% of enterprises with more than 50 persons belonged to the private sector, 49% to the public sector in the beginning of 1997.⁵⁵

Net profitability of the mechanical engineering sector compared less favourably to total manufacturing in 1995 and in the beginning of 1998, but the rate was higher than for total manufacturing in 1996 and 1997. The opposite was true for investment growth: In 1995 investment growth was higher for the mechanical engineering sector than for total manufacturing, in 1996 and 1997 lower (see Table 16).

⁵⁵ PAIZ (1998b), page 4.

Table 16

**Poland: Net profitability in the enterprise¹⁾ sector (%) and
real growth rates of investment outlays (%)**

	Net profitability				Investment growth rate in %		
	1995	1996	1997	I-VI 1998	1995	1996	1997
DK Machinery and equipment n.e.c.	0.8	3.4	3.8	-0.2	27.8	20.6	-0.4
D Total manufacturing	2.3	2.3	2.3	2.3	19.0	32.7	38.2

Note: 1) Firms with 50 or more employees.

Source: Podkaminer, L. (1998) and Central Statistical Office (1998).

Important domestic enterprises in different sub-branches:

- Zakłady Przemysłu Ciągnikowego (ZPC) 'Ursus' S.A.: Founded in 1883 in Warsaw, Ursus went into agricultural tractor production in 1915 and produced technologically very advanced tractors under the communist system due to the signing of a licence agreement with Massey Ferguson Perkins from Canada in 1974. As the only tractor producer in Poland, it long enjoyed a very comfortable position. However, with the collapse of the Soviet-market and the import of cheaper tractors from Russia, Ukraine, Belarus, as well as with changes in the Polish agricultural system,⁵⁶ Ursus plunged into deep financial troubles. Although debts were written off in 1994 and 1996, the company is still generating losses, which are said to reach 8 mn Polish Zlotys (PLZ) a month in 1998. Production fell from 60,000 tractors a year in its hey-days, to 15,000 units in 1997, which is half of its capacity. Employment still stands at 12,000 people. Agco, a large international farm machinery manufacturer and distributor, expressed interest in Ursus but dropped its plans at the beginning of 1998 because of the great influence of Solidarity on Ursus, which is strongly opposed to foreign investment and employment cuts. However, in summer 1998 the trade union had to accept a restructuring programme, including a reduction in workforce.⁵⁷

On the Polish 'white goods' market domestic companies, with the most important being Polar S.A., Amica Wronki S.A., Wrozamet S.A. and Zelmer, fiercely compete with foreign manufacturers, including Merloni, Bosch-Siemens, Electrolux, Whirlpool and Candy. Overall, competition is most intensive in refrigerators and washing machines. However, prospects are quite good for future growth because of low satisfaction with present home appliances and savings for new ones. Moreover, low rates of appliance turnover compared to Western Europe give room for additional growth. Demand growth is estimated to double

⁵⁶ Large state-owned farms had been liquidated and cheap government credits dropped so that new farmer stopped buying equipment.

⁵⁷ See Ursus Internet Homepage (<http://www.ikp.atm.com.pl>) and the Financial Times (1998), 14th January and 28th October.

by the year 2000. In addition, rising wages and booming consumer credits contribute to growing sales.⁵⁸

- Polar S.A.: Based in Wroclaw, the state-owned company Polar reported revenues of PLZ 580 mn in 1997 and a gross profit of PLZ 26 mn in 1997, from PLN 11 mn in 1996 (+100%). It employs about 4,900 people and is the largest manufacturer of refrigerators and washing machines in Poland: Polar controlled 41% of the refrigerator market in 1997, and 34% of the washing machine market. From a near monopoly in 1989 it now faces sharp competition from foreigners, which have 44% of the Polish refrigerator market and 66% of the washing machine market. In order to compete successfully, the company improved quality, diversified its product range and restructured its operations. However, it did not co-operate with a strategic investor, although Electrolux from Sweden expressed its interest.⁵⁹
- Amica Wronki S.A.: Based in Wronki, Amica had revenues of PLZ 640 mn in 1997 and a gross profit of PLZ 52 mn. It employs about 2,250 people and controls 15% of the Polish refrigerator market and 60% of the cooker market. It is also successful in Germany, where it gained a market share of one-third. In 1996, Amica opened a refrigerator plant and in November 1998, construction of a new washing-machine plant started, which will have an annual capacity of 400,000 units.⁶⁰

Foreign investors in Poland showed the biggest interest in special purpose machinery for industry and constructions and in machinery and equipment of general purpose. The largest foreign investors include:

- ABB, International (9)⁶¹: As of December 1997, the Swiss-Swedish company had invested USD 282 mn in Poland and plans to invest a further USD 258 mn. It produces power supply systems, turbines and electric engines and has a total of 16 joint ventures in Poland (e.g. ABB Zamech produces turbines, ABB Dolmel and Dolmel Drives produce generators and drivers respectively).
- UNP Holdings Ltd., Canada (123): The Canadian company invested USD 26.9 mn so far and produces machinery for the food processing industry and packaging equipment. It includes the following companies: UNP Industries Sp.z.o.o. in Warsaw, 51% of shares of Unipak Sp.z.o.o Gniezno., IBIS Bydgoszcz, 57% of the lift factory FADA in Gniezno, Biawar Bialystock, 60% of Huta Szkla in Antoninek and POLBITA in Warsaw.
- Beloit Corp., USA (128): The US company invested USD 25.6 mn as of December 1997 and produces machinery for the paper industry.

⁵⁸ Business Eastern Europe (1997), July 14 and ABN-AMRO (1998), June.

⁵⁹ See ABN-AMRO (1998), June.

⁶⁰ Business Eastern Europe (1998), September 21.

⁶¹ The number in brackets indicate the rank in the List of Major Foreign Investors in Poland from PAIZ, according to the sum of foreign investment. This includes contributed equity, medium- and long- term loans granted by foreign investors to companies established by them and the value of re-invested profits reduced by the dividend exported. Transactions above USD 1mn are included only. See PAIZ (1998a).

- Akiebolaget SKF, Sweden (175): Swedish firm invested USD 18 mn and has plans for a further USD 3 mn. It produces rolling bearings.
- Bosch-Siemens Haushaltsgeräte GmbH, Germany (176): This German company invested USD 17.6 mn in a plant assembling washing machines in Łódź.
- Timken Company, USA (208): Timken invested USD 12.5 mn and plans to invest again USD 12 mn. It engages in the production of rolling bearings.

Romania

Some domestic enterprises and foreign investors:

- Rulmentul Brasov: The ball-bearing company Rulmentul Brasov is the largest of six ball-bearing makers in Romania, employing about 5,300 people. However, it is heavily indebted and faces severe difficulties linked to the overall decline in domestic demand. Foreign interest for a 51% stake in the company is weak. Timken of the US (see below) and Koyoseiko of Japan have acquired two other bearing producers.⁶²
- Brasov Tractor Manufacturing Plant (BTMP): After several restructuring and privatisation failures, the supplier of agrarian technology is again on sale. Daewoo from South Korea, Diabco from Egypt and Amco from the US expressed interest.⁶³
- Arctic: In 1997, Romania's State Ownership Fund sold a 51% stake in Arctic, the country's biggest refrigerator maker with unit sales of 388,000 in 1997 to the EBRD and Société Générale Romania Fund. The initial investment amounted to USD 11.5 mn, which will be increased by 10% to 30% if Arctic meets target sales and profit for the next two years. This move made Arctic one of the first 100% privately owned Romanian companies listed on the Bucharest Stock Exchange.⁶⁴ The two investors helped finance a USD 20 mn modernization programme. However, the company is troubled by a shrinking domestic market, which accounts for 71% of sales by volume and where Arctic holds a 60% market share.⁶⁵
- Timken: In mid-December 1997, the biggest US maker of industrial roller bearings acquired a majority stake in Rulmenti Grei for USD 37 mn. The Romanian company was established in 1979, employs 1,000 people and produces bearings for all kind of industries, including steel mills and oil and gas production.⁶⁶
- Kvaerner: At the beginning of 1998, the Norwegian engineering group bought 90% of the Romanian IMGB, a producer of power, hydraulic and naval equipment. It only paid USD 500,000 but also swallowed a debt of USD 63 mn. Kvaerner also expressed interest in another Bucharest engineering company called FECNE.

⁶² Business Central Europe (1998), September.

⁶³ New Europe (1998), July 19-25.

⁶⁴ East West (1997), November 5.

⁶⁵ Business Central Europe (1998), November.

⁶⁶ Financial Times (1997), December 18.

- World Machinery Inc.: In mid 1998, the US trader acquired a majority stake in the Romanian machine tools producer SC Masini Unelte SA.⁶⁷
- AB Electolux: The Swedish electrical appliance company, bought 94% of the Romanian company Samus in late 1997/beginning of 1998.⁶⁸

Slovak Republic

At the end of October 1998, about 780 companies were located in the mechanical engineering sector, accounting for 9% of all manufacturing companies. Of these 96% were in private hands, 55% had 9 or fewer employees, 18% between 10 and 49, 16% between 50 and 249 employees, and the rest above 250 employees.

From 1996 to 1997, loss before taxation of the Slovakian mechanical equipment sector doubled to approximately 12 bn Slovak Koruna (SKK), having by far the highest loss in total manufacturing.

The largest engineering companies in Slovakia ranked by 1997 net revenues include:⁶⁹

- Slovenské Energetické Strojárne, a.s., Tlmace: The company reported net revenues of SKK 3.7 bn in 1997 and employed about 4,300 people.
- Whirlpool Slovakia, a.s., Bratislava: The company reported net revenues of SKK 3.3 bn in 1997 and employed about 370 people.
- ZTS TEES, a.s., Martin: The company reported net revenues of SKK 1.8 bn in 1997 and employed about 4,000 people. It produces agricultural and forestry tractors, bulldozers, construction machinery, engines and military technology.
- Povážské Strojárne, a.s., Povážská Bystrica: The company reported net revenues of SKK 1.3 bn in 1997 and employed 2,650 people. Formed as a weapons maker in 1929, Povážské Strojárne is now a comprehensive engineering company manufacturing small agricultural equipment, machine tools, gearboxes, aircraft engines and small motorcycles. Some divisions were spun off into independent firms (see also below).⁷⁰
- Podpolianske Strojárne (PPS), a.s., Detva: The company reported net revenues of SKK 1 bn in 1997 and employed about 2,500 people. PPS manufactures loaders and lifters.
- Trens, a.s., Trencín: The company reported net revenues of SKK 910 mn in 1997 and employed about 1,460 people. It manufactures machine tools. Founded in 1937, the former TOS Trencín (until November 1998) was transformed into a joint-stock company in May 1992 and later privatized partly through the voucher method (57%).⁷¹ It faced a difficult situation due to world recession in machine tools and transformational recession and therefore implemented a massive downsizing program. Because of the collapse of

⁶⁷ Business Eastern Europe (1998), June 29.

⁶⁸ East West (1998), February 2.

⁶⁹ Trend Top' 98 (1998), page 47.

⁷⁰ Grayson, L., Brodily, S. (1996), page 53.

⁷¹ In 1995, the structure of ownership was as follows: 49% Fund of National Property, 37% Investment Funds, 11% Individuals and 3% Restitution Investment Fund. Gács, J. (1996), page 297.

domestic demand exports increased and account for 95% of the company's production today.⁷²

- Vihorlat, a.s., Sina: Vihorlat reported net revenues of SKK 700 mn in 1997 and employed about 2,100 people. The company manufactures boilers, hydraulic elements, steel structures, engineering metallurgy products, manipulation equipment, presses and other products. Its mother company is the steel-mill VSŽ.
- Matador Machinery, a.s., Dubnica nad Váhom: The company reported net revenues of SKK 640 mn in 1997 and employed about 1,050 people.
- Kinex, a.s., Bytca: Kinex reported net revenues of SKK 600 mn in 1997 and employed about 1,200 people. It produces special bearings for textile machines, metering devices and pumps.
- Povazske Stojárne-Ložiská, a.s., Povážská Bystrica: The company reported net revenues of SKK 520 mn in 1996 and employs about 450 people. The former Valoz division of Povážské Strojárne is now a separate joint-stock company and produces heavy-duty bearings.⁷³

One example of a less successful foreign investment:

- Samsung Electronics: In 1991, the South Korean company formed a joint venture with the Slovak refrigerator factory Calex, taking a 45% stake in the venture. In its heydays Calex had 80% of the Czechoslovak market, which was, however, destroyed by the split from the Czech Republic and the flood of foreign refrigerators into both the Czech and Slovak Republic. By late 1995 Calex's market share was less than 12% in Slovakia. Problems in the joint venture emerged because of opposing interests. Samsung wanted to acquire Calex for its market share without having to take over a "bloated, inefficient" company. Calex wanted an investor in order to save it from certain death in a competitive market. The joint venture was losing some USD 6 mn a year, while Calex accumulated debts of USD 250 mn. At the beginning of 1997, the government rejected Samsung's bid for Calex and placed it on a list of strategic companies not to fall into foreign hands. In the end, the government decided to buy out Samsung's 45% stake and to reincarnate the bankrupt mother company as Novy Calex.⁷⁴

Slovenia

At the end of 1996, about 370 business units were registered in the mechanical engineering sector, that were about 8% of total manufacturing enterprises.⁷⁵ Of these, 86% employed less than 100 persons.

⁷² Gács, J. (1996), page 297.

⁷³ For more details and more companies see also Slovak Foreign Trade (1996), Number 2, page 11 and page 16.

⁷⁴ Business Central Europe (1997), April, page 36.

⁷⁵ Business units – legal persons with employed persons who are insured at the pension and disability insurance and health insurance. See Slovenian Statistical Yearbook (1997), page 69.

Major domestic enterprises and foreign investors:

- Litostroj: The former 'Tito's Litostroj Complex', a typical giant communist company, producer of fork lift trucks, turbines and pumps, got into a difficult financial position after the collapse of command economy: the number of orders diminished, liquidity dropped suddenly, losses and debts grew. The company became heavily dependent on government support, which owns 60% of the equity. An offer of ABB to buy 48% of Litostroj was rejected.⁷⁶ Litostroj is now implementing a rehabilitation programme.
- Gorenje, d.d.: Founded in 1950, Gorenje became the largest producer of white goods in the former Yugoslavia, with about 20,000 people at its height. Already in the eighties, the company closed down non profitable departments and continued to spin-off non-core sectors in the nineties (see below). Today, Gorenje is the second largest Slovenian company behind the transport company Revoz, with an income of 61 bn Slovenian Tolar (SIT) in 1997. It ranks second in terms of exports and fourth in terms of employment, with SIT 53 bn and about 4,200 people.⁷⁷ The company produces refrigerators, freezers, cookers, washing machines and dishwashers and exports 93% of its appliances. The Austrian department store Quelle is an important customer, which sells the goods under its own brand name 'Pivleg'. Gorenje is the leading company in Slovenia and has a 3% market share in the EU. It sells about 60% of its products under its own brand name.⁷⁸
- Danfoss International A/S: In 1992, the Danish company gained 100% of Danfoss Compressors d.o.o. (Ltd.), producer of hermetic compressors for refrigerators and freezers. Originally, Danfoss Compressors was founded as a production unit by Gorenje (see above) in 1981 and later sold in the course of reorganization.⁷⁹ However, the company already co-operated with Danfoss before in form of a licensing agreement. Employment stood at 160 people in 1990, 350 in 1997, and is said to increase to 540. The only domestic supplier is Rotomatika, a joint venture between Slovenian and German partners and producer of engines for compressors. About 90 to 95% of sales are destined for export, with about 60% going to the European Union.⁸⁰
- Bosch-Siemens Haushaltsgeräte GmbH (BSHG): In March 1993, the German BSHG took over the small Slovenian appliances production company, called Mali gospodinski aparati, d.o.o. (MGA). Formally, MGA was established as a producer of wall balances by Gorenje in 1970 and later co-operated with Gorenje in the form of a licensing agreement. After the acquisition, MAG's production programme had been changed by 90% and it became a competence center for the production of small appliances (coffee mills, mixers, cutting machines etc.). Besides a production department, it has an

⁷⁶ Business Eastern Europe (1997), October 27.

⁷⁷ Slovenian Business Report (1998), Fall.

⁷⁸ Gorenje Internet-Homepage (<http://www.gorenje.si>).

⁷⁹ In addition, Danfoss bought 25% in Biterm, another unit of Gorenje, which produces thermostats for refrigerators and freezers.

⁸⁰ Rojec, M. (1997a).

assembly department and a testing and development laboratory. About 90% or more of products are exported. On the domestic market it has a 60% market share. The company employed about 460 to 520 people in 1996.⁸¹

⁸¹ For further interesting details see Rojec, M. (1997b) and Mollgaard, P., Schröder, P. (1997).

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Appendix of Tables and Figures

Table A1

Key data on total manufacturing

		1989	1992	1993	1995	1996	1997	Average growth in % 1993-1997
BULGARIA								
Total exports to EU	in ECU mn	394	757	779	1563	1447	1772	18.5
Total imports from EU	in ECU mn	1316	971	1158	1700	1401	1492	9.0
Trade balance with EU	in ECU mn	-921	-214	-380	-137	46	280	.
Exports to the EU: Market shares	in %	0.12	0.20	0.20	0.33	0.30	0.31	.
CZECH REPUBLIC								
Industrial production (at current prices)	in CZK mn	558350	652893	655289	810383	894694	1330877	19.5
Industrial growth (at constant prices)	in %	.	-7.9	-8.2	8.2	4.6	7.1	2.1
Employment	in 1000	1659	1181	1098	1018	983	1161	.
Employment growth	in %	.	-13.2	-7.0	-2.4	-3.4	-2.5	-4.1
Wage growth (ECU basis)	in %	.	20.0	33.7	16.5	17.0	8.2	18.1
Productivity growth	in %	.	4.8	-1.6	11.3	8.3	9.2	6.4
ULC growth (ECU basis)	in %	.	14.5	35.8	4.7	8.1	-0.9	11.0
Total exports to EU	in ECU mn	.	.	4385	7367	7950	9660	21.8 ¹⁾
Total imports from EU	in ECU mn	.	.	5613	9472	11409	12885	23.1 ¹⁾
Trade balance with the EU	in ECU mn	.	.	-1228	-2105	-3460	-3225	.
Exports to the EU: Market shares	in %	.	.	1.13	1.56	1.61	1.68	.
HUNGARY								
Industrial production (at current prices)	in HUF mn	146110	1497321	1721479	2945435	3827038	5194777	36.5
Industrial growth (at constant prices)	in %	.	-17.4	3.4	7.1	3.7	22.8	9.1
Employment	in 1000	1171	860	747	652	633	.	.
Employment growth	in %	.	-14.5	-12.9	-4.0	-2.9	.	-7.3 ²⁾
Wage growth (ECU basis)	in %	.	14.5	18.4	-6.6	3.7	.	5.1 ²⁾
Productivity growth	in %	.	.	18.6	11.6	6.9	.	14.3 ²⁾
ULC growth (ECU basis)	in %	.	.	-0.2	-16.3	-3.0	.	-8.0 ²⁾
Total exports to EU	in ECU mn	2177	3548	3522	5945	6605	8981	20.4
Total imports from EU	in ECU mn	2665	3738	4585	6377	7382	10092	22.0
Trade balance with the EU	in ECU mn	-488	-189	-1063	-432	-778	-1111	.
Exports to the EU: Market shares	in %	0.65	0.94	0.90	1.25	1.33	1.55	.
POLAND								
Industrial production (at current prices)	in PLN mn	.	78975	104441	211533	244193	292266	38.7
Industrial growth (at constant prices)	in %	.	3.9	10.4	11.5	9.5	12.5	11.5
Employment	in 1000	3326	2767	2700	2809	2803	.	.
Employment growth	in %	.	-13.1	-2.4	4.3	-0.2	.	0.3 ²⁾
Wage growth (ECU basis)	in %	.	2.6	13.8	14.9	18.2	.	13.7 ²⁾
Productivity growth	in %	.	.	13.1	6.8	9.8	.	10.9 ²⁾
ULC growth (ECU basis)	in %	.	.	0.6	7.6	7.6	.	2.5 ²⁾
Total exports to EU	in ECU mn	2835	5910	6497	9994	10133	11828	14.9
Total imports from EU	in ECU mn	3289	6952	8658	12394	16030	20465	24.1
Trade balance with the EU	in ECU mn	-454	-1043	-2161	-2400	-5897	-8637	.
Exports to the EU: Market shares	in %	0.84	1.58	1.68	2.12	2.06	2.06	.

Table A1 (continued)

Table A1 (continued)

		1989	1992	1993	1995	1996	1997	Average growth in % 1993-1997
ROMANIA								
Industrial production (at current prices)	in ROL bn	.	5484	15302	50600	76198	.	93.1 ²⁾
Industrial growth (at constant prices)	in %	.	-23.1	-0.56	11.24	14.0	-16.3	6.8
Employment	in 1000	.	2811	2590	2192	2148	.	.
Employment growth	in %	.	-12.5	-7.9	-9.7	-2.0	.	-6.5 ²⁾
Wage growth (ECU basis)	in %	.	-37.0	34.5	16.6	5.8	.	15.1 ²⁾
Productivity growth	in %	.	-12.1	7.9	23.1	16.3	.	16.6 ²⁾
ULC growth (ECU basis)	in %	.	-28.3	24.6	-5.3	-9.1	.	-1.3 ²⁾
Total exports to EU	in ECU mn	1654	1333	1582	3081	3275	4012	24.6
Total imports from EU	in ECU mn	611	1545	1958	3274	3747	4254	22.5
Trade balance with the EU	in ECU mn	1043	-211	-376	-193	-472	-242	.
Exports to the EU: Market shares	in %	0.49	0.35	0.41	0.65	0.66	0.69	.
SLOVAK REPUBLIC								
Industrial production (at current prices)	in SKK mn	.	.	266525	362939	390233	419028	12.0 ¹⁾
Industrial growth (at constant prices)	in %	.	-15.6	-18.6	8.9	2.5	2.6	-1.0
Employment	in 1000	.	527	472	452	447	439	.
Employment growth	in %	.	-12.6	-10.4	1.0	-1.1	-3.6	-3.9
Wage growth (ECU basis)	in %	.	11.3	23.6	14.4	14.8	13.1	15.5
Productivity growth	in %	.	-3.5	-9.1	7.8	3.6	6.5	3.0
ULC growth (ECU basis)	in %	.	15.3	36.0	6.1	10.8	6.2	12.1
Total exports to EU	in ECU mn	.	.	1069	2521	2748	3221	31.7 ¹⁾
Total imports from EU	in ECU mn	.	.	1084	2516	3125	3729	36.2 ¹⁾
Trade balance with the EU	in ECU mn	.	.	-15	5	-378	-508	.
Exports to the EU: Market shares	in %	.	.	0.28	0.53	0.56	0.56	.
SLOVENIA								
Industrial production (at current prices)	in SIT mn	.	809602	998161	1423672	.	.	.
Industrial growth (at constant prices)	in %	.	-14.7	-4.1	2.0	-0.5	-2.7	0.1
Employment	in 1000	370	282	257	232	220	213	.
Employment growth	in %	.	-10.3	-9.0	-5.1	-5.5	-4.0	-6.1 ²⁾
Wage growth (ECU basis)	in %	.	-4.8	14.6	16.5	3.2	.	11.0 ²⁾
Productivity growth	in %	.	-5.3	5.6	8.2	6.0	2.0	6.7
ULC growth (ECU basis)	in %	.	0.5	8.5	7.7	-2.6	.	2.9 ²⁾
Total exports to EU	in ECU mn	.	.	2808	3736	3684	3960	9.0 ¹⁾
Total imports from EU	in ECU mn	.	.	2852	4065	4217	4886	14.4 ¹⁾
Trade balance with the EU	in ECU mn	.	.	-44	-329	-534	-926	.
Exports to the EU: Market shares	in %	.	.	0.72	0.79	0.74	0.69	.

1) 1994-1997. - 2) 1993-1996.

EU: European Union (12)

Czech Republic: Up to 1996 enterprises with 100 employees or more, since 1997 industrial output index calculated from production statistics of businesses with 20 employees or more.

Hungary: Enterprises with more than 25 employees, from 1997 enterprises with more than 10 employees.

Poland: Industrial production at current prices: From 1993 excluding VAT; including import duties; from 1996 basic prices, the years before producer prices. Average monthly gross wages: Enterprises with more than 5 employees.

Slovak Republic: Enterprises with 25 and more employees, from 1997 enterprises with 20 and more employees.

Slovenia: Employment in enterprises, companies and organizations: 1989-1996 private enterprises are included only if they have 3 or more persons in paid employment and armed forces staff. From 1997 including private enterprises with 1 and 2 employees. Wages in enterprises, companies and organizations.

Source: WIIW database

Table A2

Machinery and equipment n.e.c.
Estimated ranges for Unit Labour Costs in 1996, Austria 1995 = 100

	Czech Republic	Hungary	Poland	Romania	Slovak Republic	Slovenia ¹⁾
PPP for GDP (lower range)	31	22	31	24	29	48
PPP for fixed capital formation (upper range)	47	36	42	60	45	58

Notes: PPP=Purchasing power parities; gross wages used for calculation.
1) 1995
Source: WIIW

Table A3

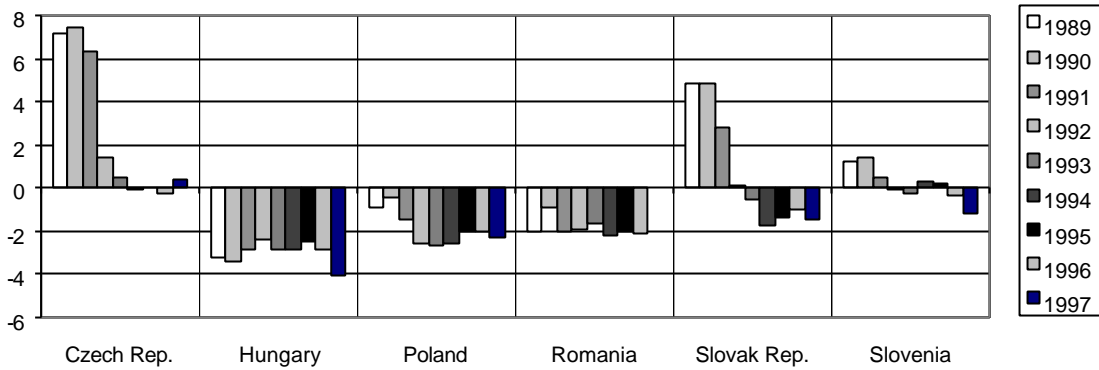
Exports to the EU in total manufacturing, 1997

	Bulgaria	Czech Republic	Hungary	Poland	Romania	Slovak Republic	Slovenia
D Manufacturing total	100.0	100.0	100.0	100.0	100.0	100.0	100.0
DA Food products; beverages and tobacco	4.9	1.7	5.5	6.2	1.0	1.5	1.4
DB Textiles and textile products	25.5	9.1	10.2	16.5	37.9	11.5	14.3
DC Leather and leather products	7.6	1.6	3.5	1.7	13.0	4.6	2.7
DD Wood and wood products	2.4	3.5	1.6	5.7	2.4	2.5	3.9
DE Pulp, paper & paper products; publishing & printing	1.8	2.6	0.8	2.3	0.3	3.6	3.5
DF Coke, refined petroleum products & nuclear fuel ¹⁾							
DG Chemicals, chemical products & man-made fibres	15.3	7.0	6.0	5.9	5.0	9.1	4.0
DH Rubber and plastic products	1.3	5.0	2.2	2.7	1.2	3.3	3.1
DI Other non-metallic mineral products	2.7	5.0	1.4	3.4	2.5	3.3	2.6
DJ Basic metals and fabricated metal products	26.1	17.8	8.7	18.2	17.5	18.1	17.2
DK Machinery and equipment n.e.c.	5.4	12.8	7.9	6.2	5.1	7.2	12.9
DL Electrical and optical equipment	3.1	15.4	28.2	11.3	4.3	12.8	11.7
DM Transport equipment	0.5	13.7	21.6	10.8	2.1	19.5	18.3
DN Manufacturing n.e.c.	3.3	4.7	2.4	9.1	7.8	3.1	4.3

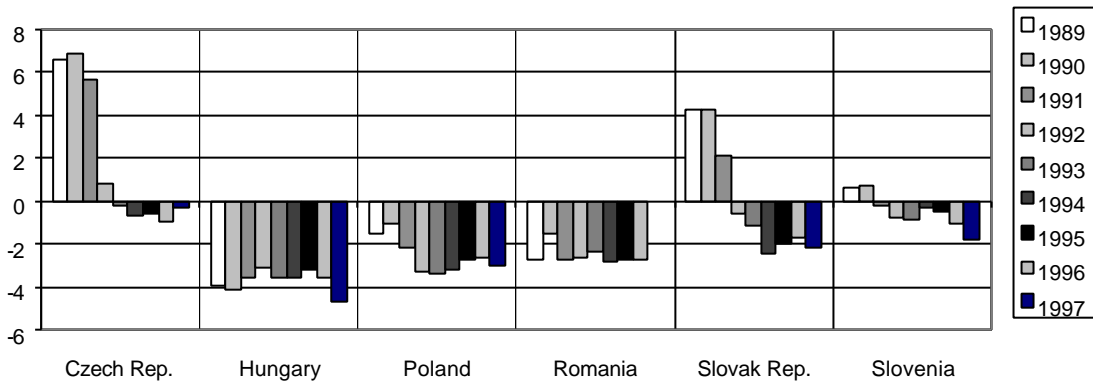
Notes: 1) Data for coke, refined petroleum products & nuclear fuels not available.
Source: WIIW Industrial database

Figure A1

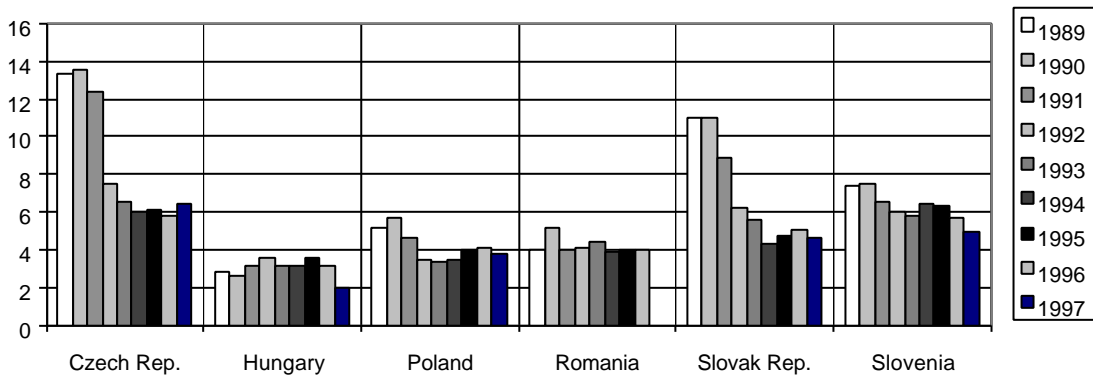
Machinery and equipment n.e.c.
Shares of CEECs (at constant prices) relative to other countries
Shares in total production relative to Austria (1993)



Shares in total production relative to EU-North (1992)



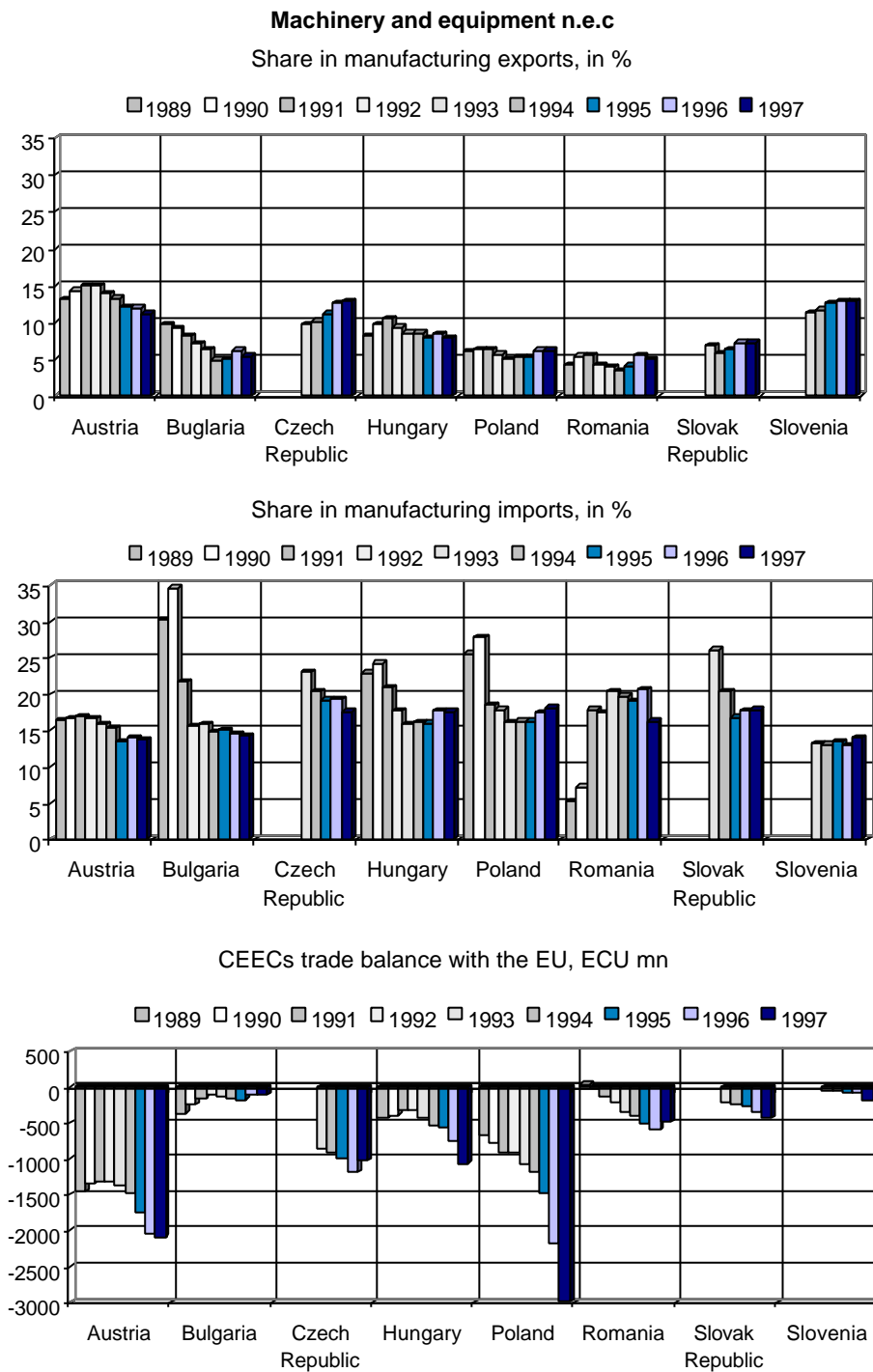
Shares in total production relative to EU-South (1992)



Notes: Romanian shares until 1993 at constant prices, 1994-1996 at current prices

Source: WIIW Industrial database

Figure A2



Source: WIIW database

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Industrial production (current prices), national currency mn
Production structure (current prices), manufacturing = 100
Industrial production (constant prices), national currency mn
Production structure (constant prices), manufacturing = 100
Production growth, annual changes in %
Employment, thousand persons
Employment structure, manufacturing = 100
Employment growth, annual changes in %
Average monthly gross wages (national currency)
Average monthly gross wages (ECU)
Average monthly gross wages (DEM)
Average monthly gross wages (USD)
Average monthly gross wages, manufacturing = 100
Average monthly gross wages, annual changes, real (deflated with CPI)
Labour productivity, manufacturing = 100
Labour productivity, annual changes in %
Unit Labour Costs (national currency), manufacturing = 100
Unit Labour Costs (national currency), annual growth rates in %
Unit Labour Costs (ECU), annual growth rates in %
Unit Labour Costs (DEM), annual growth rates in %
Unit Labour Costs (USD), annual growth rates in %
Unit Labour Costs ECU, Austria = 100
Exports to the EU, 1000 ECU
Imports from the EU, 1000 ECU
Foreign trade with the EU, Balance, 1000 ECU

WIIW Industrial Database Eastern Europe

Tables contained in the database:

By NACE industries		Dimension
D	Manufacturing total	Countries X 1989-98
DA	Food products; beverages and tobacco	Countries X 1989-98
DB	Textiles and textile products	Countries X 1989-98
DC	Leather and leather products	Countries X 1989-98
DD	Wood and wood products	Countries X 1989-98
DE	Pulp, paper & paper products, publishing & printing	Countries X 1989-98
DF	Coke, refined petroleum products & nuclear fuel	Countries X 1989-98
DG	Chemicals, chemical products and man-made fibres	Countries X 1989-98
DH	Rubber and plastic products	Countries X 1989-98
DI	Other non-metallic mineral products	Countries X 1989-98
DJ	Basic metals and fabricated metal products	Countries X 1989-98
DK	Machinery and equipment n.e.c	Countries X 1989-98
DL	Electrical and optical equipment	Countries X 1989-98
DM	Transport Equipment	Countries X 1989-98
DN	Manufacturing n.e.c.	Countries X 1989-98
By country		Dimension
	Czech Republic	NACE X 1989-1998
	Hungary	NACE X 1989-1998
	Poland	NACE X 1989-1998
	Romania	NACE X 1989-1998
	Slovak Republic	NACE X 1989-1998
	Slovenia	NACE X 1989-1998
	Bulgaria	NACE X 1989-1998
By year		Dimension
	1989	NACE X Countries
	1990	NACE X Countries
	1991	NACE X Countries
	1992	NACE X Countries
	1993	NACE X Countries
	1994	NACE X Countries
	1995	NACE X Countries
	1996	NACE X Countries
	1997	NACE X Countries
	1998	NACE X Countries

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Verein "Wiener Institut für Internationale Wirtschaftsvergleiche" (WIIW),
Wien 1, Oppolzergasse 6

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Nachdruck nur auszugsweise und mit genauer Quellenangabe gestattet.

P.b.b. Verlagspostamt 1010 Wien