Prospects for the Global Metal Industry

International Metalworkers' Federation

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FOREWORD

The International Metalworkers Federation commissioned the Prognos Research Institute in Basel, Switzerland to carry out an investigation into the development prospects for the metal industry worldwide. A draft report was produced and debated at the IMF Executive Committee meeting in Santiago, Chile in December 1999. As a result of these discussions, the original text was revised and a number of modifications were made, particularly in **Chapter 3.**

The report examines the position of the metal industry in the world economy and in selected countries and regions, and outlines forecasts for future development trends in this industry and its environment. Two sectors of the metal industry are the subject of special focus: motor vehicles and radio, TV and communication equipment.

The report begins with an assessment **Chapter 1**. The significance of the metal industry is illustrated on the basis of data on employment, production and foreign trade, broken down by region and selected countries. The essential structure within the metal industry is also shown.

Building on this, **Chapter 2** contains an analysis of the development of the metal industry from 1987 to 1997. The analysis contains detailed reports on the development of production, employment, foreign trade and investment activity in the metal industry and serves as a basis for explaining long-term trends, such as regional and sectoral structural changes, as well as causes and effects.

The evaluation of the future economic development of the metal industry is not deduced solely from extrapolating current trends. The report seeks to identify those variables which speed up, slow down or even reverse existing trends. These include political decisions on general conditions, *inter alia* future world economic development in general. **Chapter 3** focuses in depth on these questions and depicts likely trends.

Chapter 4 contains quantitative forecasts for production and employment trends up to the year 2005. In addition to the results for the metal industry as a whole, the prospects for the two sub-branches mentioned above are given special consideration. The most important trends and results are explained in some detail and justified.

1 The position of the metal industry within the world economy

When measured by its share of GDP worldwide, the **metal industry** is an **important component of the world economy**. In sub-branches such as for example metal production, non-electrical machinery, electrical machinery and transport equipment, it employs some 70 million worldwide, who account for nearly half of the goods produced in the manufacturing sector and more than half of all merchandise exported worldwide (in terms of value). Consequently, the metal industry is both a driving force of the world economy and is influenced to a large extent by the overall world economic climate.

1.1 The importance of the metal industry

In 1996, **companies** in the metal industry **produced** 49% of global added value in manufacturing industry, which corresponded to **11% of GDP worldwide** (see table 1). The importance of the metal industry within the framework of the manufacturing industry is extraordinarily large in all countries and parts of the world. However, there are differences that depend on the level of development, i.e. the level of industrialisation and income levels in the countries. In the industrialised countries[1], the share of added value in the manufacturing industry is slightly above average. In North America[2] and Japan, the metal industry accounts for over 50% of total production by the manufacturing industry. In the developing countries, the corresponding figure is considerably lower (36%).

Table 1: Value added in the metal industry 1996, percentage share of manufacturing and economy

	Share of Manufacturing	**Total economy**
Industrialised countries[1)]	49.7	11.2
European Union (15)	46.3	10.6
Japan	55.1	14.2
North America[2)]	52.2	10.6
Developing countries[1)]	35.8	8.8
World	48.7	11.1

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Source: UNIDO; Prognos estimates

1)As defined by UNIDO 2) USA and Canada

Worldwide, some **70 million people** are employed in the metal industry (informal sector not included). In the industrialised countries, this represents some 47% of total employment in the manufacturing industry and 18% of those gainfully employed overall (see table 2). The corresponding figure for Germany, i.e. 57%, is well above half of those employed in the manufacturing industry. When we look at the metal industry's share of employment and added value of total manufacturing and economy in the individual regions, we see clearly that **productivity** in the metal industry, in comparison to the manufacturing industry overall, is slightly higher than average but much lower than in the economy as a whole. This is due on the whole to very high productivity rates in the mining, energy supply and financial sectors.

Table 2: Employment in the metal industry 1996, percentage share of total manufacturing and economy

	Share of manufacturing	**Total economy**
Industrialised countries	47.0	18.0
Germany	56.5	13.8
USA	46.6	6.9
Japan	50.3	11.2
South Korea	48.2	-
China[1)]	41.2	15.0

Source: UNIDO; Prognos estimates.

1) Formal employees

In addition, the **export volume** of the metal industry (1997: **US$ 2,239 billion**) underscores the value of this branch for the world economy. In 1997, this industry accounted for 57% of world exports of the manufacturing industry and 41% of world exports (see table 3). In North America and Latin America, Western Europe and Asia, the metal industry accounts for well over half of all manufacturing exports in terms of added value. In Japan, this share even exceeds three-quarters, whereas in Central and Eastern Europe it is less than a half and in Africa only around one-quarter. The latter countries mainly operate as commodity exporters.

Table 3: Exports of metal products 1996, percentage share of total manufacturing and merchandise exports

	Share of Manufacture exports	Merchandise exports
North America[1)]	64.8	49.3
Latin America	58.9	30.6
Western Europe	53.5	42.0
European Union (15)	54.7	43.4
Asia	60.3	44.8
Japan	77.1	72.9
Central and Eastern Europe	46.8	25.8
Africa	26.1	7.1
World	57.0	41.0

Source: WTO

1) USA; Canada

1.2 Structure of the metal industry

The metal industry comprises a very broad and **heterogeneous product range**, which stretches from the production of basic metals to the manufacturing of simple hand tools and to electronic elements as well as aircraft and space vehicles.

1.2.1 Value added structure

Very roughly, the metal industry may be broken down into the sub-category of "**metal manufacturing and first handling**" as well as "**metal processing**". The production and first handling of metals (iron and steel, non-ferrous metals) accounted for 12% of overall added value in 1996. However, 88% of added value was produced in the field of metal processing (metal goods; transport machinery, non-electrical machinery, electrical machinery, fine mechanics) (see table 4). The production of basic metals and their initial processing is therefore of lesser importance for the overall production value of the metal industry when compared with processing, i.e. the manufacturing of metal goods. In the industrialised and developing countries, the **value added structure** of the metal industry worldwide, however, **varies greatly**. In the industrialised countries, the production share of metal production is only 11%, as against 22% for the developing countries.

Table 4: Sectoral structure in the metal industry 1996, percentage share of value added by region

	Industrialised countries	EU 15	Japan	NA[1)]	Developing countries	World
Metal production	**10.9**	**11.2**	**11.6**	**6.7**	**21.5**	**12.2**
Iron and steel	7.4	8.2	8.9	4.2	15.6	8.5
Non-ferrous metals	3.4	3.0	2.7	2.5	5.9	3.7
Metal processing	**89.1**	**88.8**	**88.4**	**93.3**	**78.5**	**87.8**
Metal products	11.9	14.0	12.3	9.6	10.6	11.6
Non-electrical machinery	27.8	26.3	22.9	33.1	15.4	27.2
Electrical machinery	25.8	25.3	32.5	23.2	26.5	25.4
Transport equipment	18.9	20.1	18.7	18.6	24.0	19.1
Prof., scient. equipment	4.8	3.0	2.0	8.8	2.0	4.5
Metal industry	**100**	**100**	**100**	**100**	**100**	**100**

Source: UNIDO; Prognos estimates 1) USA; Canada

The **most important branches** of the metal industry, on an individual basis, are **non-electrical machinery** (value added share in 1996 – 27%), **electrical machinery** (25%) as well as **transport equipment** (19%). Taken together, these branches of metal production accounted for 72% of production worldwide in 1996. In the industrialised countries, production structures are quite similar. The only exception is Japan, where electrical machinery, not non-electrical machinery, is the largest sub-branch with a share of 33%. In the developing countries as well, electrical machinery is the largest branch, primarily due to the domination of the Asian emerging nations in this field.

With 87% in the **industrialised countries,** the metal industry accounted for **far and away the largest share** of added value (see table 5). Although the developing countries were able to make gains in the past, their share of added value is low (13%). In comparison to total manufacturing, where the industrialised countries only account for 78% of added value, the industrialised countries' domination is significantly more pronounced in the metal industry.

When broken down by individual branch, however, clear differences can be seen in regional structures. In commodity-intensive branches of metal production, added value is significantly higher than average in the developing countries (22%). However, in the technology-intensive and capital-intensive branches of metal processing, the industrialised countries' added-value share averages 89%. Within the triad (North America, Japan, European Union), the breakdown is clearly different. The EU features above-average production shares in the field

of metal goods, North America for non-electrical machinery and Japan for electrical machinery.

Table 5: Regional structure in the metal industry 1996, percentage share of value added

	Industrialised countries	EU 15	Japan	NA[1)]	Developing countries	**World**
Metal production	**77.6**	**30.6**	**18.4**	**17.2**	**22.4**	**100**
Iron and steel	76.7	32.0	20.1	15.5	23.3	100
Non-ferrous metals	79.7	27.2	14.3	21.2	20.3	100
Metal processing	**88.7**	**33.0**	**19.6**	**30.7**	**11.3**	**100**
Metal products	89.0	38.1	20.0	24.5	11.0	100
Non-electrical machinery	93.1	32.4	16.6	38.2	6.9	100
Electrical machinery	87.1	31.4	23.8	27.2	12.9	100
Transport equipment	84.5	32.9	18.1	28.8	15.5	100
Prof.,scient. Equipment	88.4	33.7	19.6	29.7	11.6	100
Metal industry	**87.4**	**32.7**	**19.5**	**29.1**	**12.6**	**100**
Memorandum item						
Manufacturing	78.3	29.4	16.0	26.4	21.7	100

Source: UNIDO; Prognos estimates.

1) USA; Canada

1.2.2 Foreign trade structure

In 1997, companies in the metal industry exported merchandise to the tune of US$2,239 billion, broken down as follows: 94% from metal processing and less than 6% from metal production (see table 6). Just as for production, exports of basic metals for Central and Eastern European countries (export share 35%), Africa (41%) and also Latin America (11%) played a much more important role than exports of processed metal goods. The largest individual goods heading are **office and telecom equipment**, which account for 30% of exports, compared to 22% for **transport equipment**.

The leading export nations are the **US, Japan** and **Germany**. Taken together, these three countries account for some 42% of total export volume (see table 8). As far as the 15 leading export nations are concerned, the metal industry accounts for over 80% of metal industry exports worldwide. Within this category, the Asian countries of **Singapore, the Republic of Korea, the Republic of China (Taiwan) and Malaysia** accounted for by far the largest

annual average increases in exports between 1990 and 1997. In 1997, these countries had a 12% share of world exports. Taken together, Latin America, Western Europe and Asia accounted for over 93% of total exports. On the whole, this picture reflects these countries' important role in the export of other goods from the manufacturing industry. Western Europe's high share of total export value of the metal industry stems from the "multitude of borders" in Europe. If trade flows between the individual states in the US were considered, Western Europe's share of exports would be considerably smaller.

Table 6: Exports of metal products by region and sector 1997, US$ billion

Exports Billion US $ 1997	**N**orth **A**merica	**L**atin **A**merica	**W**estern **E**urope	**EU 15**	**CEE**	**Africa**	**Asia**	**Japan**	**World**
Metal products	446	85	955	913	46	9	689	307	2239
Iron and steel	9	9	69	64	16	4	33	16	141
Machinery and transport equipment	436	76	886	849	30	5	656	291	2098
Automotive products	109	28	249	246	n.a.	n.a.	99	80	496
Office and telecom equipment	132	19	187	183	n.a.	n.a.	328	95	673
Others	195	30	450	420	n.a.	n.a.	228	116	929
Memo Items									
Manufactures	688	145	1785	1669	99	34	1143	398	3927
Total merchandise exports	903	279	2276	2105	179	123	1379	421	5305

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Source: WTO

Table 7: Exports of metal products by region and sector 1997, percentage share

Regional structure, percentage	**N**orth **A**merica	**L**atin **A**merica	**W**estern **E**urope	**EU 15**	**CEE**	**Africa**	**Asia**	**Japan**	**World**
Metal products	20	4	43	41	2	0	31	14	100
Iron and steel	7	7	49	45	11	3	24	11	100
Machinery and transport equipment	21	4	42	40	1	0	31	14	100
Automotive products	22	6	50	50	-	-	20	16	100
Office and telecom equipment	20	3	28	27	-	-	49	14	100
Others	21	3	48	45	-	-	25	12	100
Memo items									
Manufactures	18	4	45	43	3	1	29	10	100
Total merchandise exports	17	5	43	40	3	2	26	8	100
Sectoral structure; percentage	**N**orth **A**merica	**L**atin **A**merica	**W**estern **E**urope	**EU 15**	**CEE**	**Africa**	**Asia**	**Japan**	**World**
Metal products	100	100	100	100	100	100	100	100	100
Iron and steel	2	11	7	7	35	41	5	5	6
Machinery and transport equipment	98	89	93	93	65	59	95	95	94
Automotive products	25	33	26	27	-	-	14	26	22
Office and telecom equipment	30	22	20	20	-	-	48	31	30
Others	44	35	47	46	-	-	33	38	41

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Source: WTO

Table 8: Leading exporters of machinery and transport equipment, US$ billion, percentage share and growth rates

Exporters	Value 1997	Share of world exports 1990	Annual percentage of change 1990-97
United States	352.6	16.8	10
Japan	291.1	13.9	5
Germany	254.0	12.1	3
United Kingdom	130.0	6.2	8
France	118.2	5.6	6
Italy	90.2	4.3	5
Canada	83.7	4.0	9
Singapore	82.5	3.9	18
Domestic exports	49.0	2.3	15
Re-exports	33.4	1.6	22
Korea, Rep. of	68.1	3.2	15
China, Rep. of	65.2	3.1	14
Hong Kong, China	61.8	-	17
Domestic exports	7.6	0.4	1
Re-exports	54.3	-	21
Mexico	59.7	2.8	21
Netherlands	59.3	2.8	10
Belgium-Luxembourg	47.0	2.2	6
Malaysia	44.0	2.1	23
Above 15	1753.0	83.5	-

Source: WTO

If we look at **trade flows** in the metal industry with regard to supplier and recipient countries, it is clear that nearly half of total exports of the metal industry are **intercontinental**. Twenty-seven per cent of exports of metal goods were within Western Europe, 14% within Asia and 7% within North America (see table 9). Some two-thirds of total EU exports were between EU countries. The largest export volume in intercontinental trade was from Asia to North America (US$ 195 billion).

Table 9: Regional flows of metal industry exports 1997, US$ billion and percentage shares

	Regional flows 1997	
	US$ billion	**Percentage shares**
Intra-WE	609.7	27.2
WE-Asia	109.4	4.9
WE-North America	94.3	4.2
Intra-Asia	312.9	14.0
Asia-WE	118.9	5.3
Asia-North America	194.9	8.7
Intra North America	164.4	7.3
NA-WE	80.8	3.6
NA-Asia	159.3	7.1
Other	394.7	17.6
Total	2239.2	100.0

Source: WTO

1.2.3 Employment structure

The **sectoral employment structure**, that is, the percentage share of employees for the individual economic branches in the metal industry, reflects by and large the production structure within the metal industry. On a worldwide basis, 85% of all of the 70 million metalworkers are active in metal processing and only 15% in metal production (see table 10). In Latin America, Asia (excluding Japan) and Africa, the share of those employed in metal production is above average (over 20%), which however corresponds to these regions' production structures. In the OECD countries, where added value in metal processing is higher than average compared to the rest of the world, this figure is also higher than average, with 91% employed in metal processing.

However, the **regional employment structure**, that is, the breakdown of those employed by region and individual countries, reflects production differences between the various parts of the world rather than their regional production shares. Although only 42% of all metalworkers are employed in the OECD countries, they account for some 87% cent of value added worldwide in the metal industry (see table 10). In contrast, the 40 million employees (58%) in non-OECD countries account for only 13% of the added value. Metalworkers in OECD countries are on average ten times more productive than metalworkers in non-OECD countries. Here, it should be borne in mind that productivity rates may differ sharply both inside and outside the OECD and also between the individual branches of the metal industry.

In China, the world's most densely populated country, some 22 million metalworkers represent one-third of all those employed in the metal industry, yet China's share of added value is less than 2%. This means that Chinese metalworkers are only about 6% as productive as the world average.

Table 10: Employment in the metal industry 1997, percentage share by region and sector

	Metal production		Metal processing		Metal industry	Regional structure
	in 1000	in %	in 1000	in %	in 1000	in %
EU	1045	9.2	10275	90.8	11320	16.7
Germany	282	7.8	3355	92.2	3637	5.4
France	194	10.4	1674	89.6	1868	2.8
Italy	136	11.7	1029	88.3	1165	1.7
United Kingdom	164	8.2	1833	91.8	1997	2.9
North America	702	7.7	8388	92.3	9090	13.4
USA	615	7.4	7751	92.6	8366	12.3
Latin America	731	26.0	2494	74.0	3225	4.7
Mercosur	459	28.0	1181	72.0	1640	2.4
Mexico	216	16.0	1137	84.0	1353	2.0
Asia	6249	17.5	29460	82.5	25709	52.6
Japan	420	8.0	4851	92.0	5271	7.8
Australia	57	17.1	276	82.9	333	0.5
China	4380	20.0	17570	80.0	21950	32.3
Africa	194	2.0	776	80	970	1.4
South Africa	83	17.1	402	82.9	485	0.7
Central and Eastern Europe (CEE)	1183	16.4	7211	83.6	8626	12.7
OECD	2574	9.0	26006	91.0	28580	42.1
World	**10104**	**14.6**	**58604**	**85.0**	**68940**	**100.0**

2 Development trends in the metal industry 1987-1997

2.1 Production trends

Between 1987 and 1997, worldwide production in the metal industry posted an average annual **growth** of **3.2%** (see table 11 and figure 1). Out of this total, the OECD countries' growth was lower than average, with an annual increase of only 3%. **Growth impulses were stronger** in the developing countries, in particular in **Asia and South America**, which were able to increase their production by an annual average of 5.7%. However, production growth was not uniform. Rather, it followed essentially the general economic growth trend in the OECD countries which account for the overwhelming share of production. Up to 1989/1990, the metal industry was able to post gains as a result of a growth phase in the world economy. However, once the world economic outlook clouded over and the OECD countries entered a recession, which lasted until 1993/94, metal industry production also declined. It was only at the start of a steady growth phase in North America and later in other OECD countries that production in the metal industry grew significantly again. In contrast, production increased at a very steady pace in the developing countries. However, as these countries account for smaller shares of world production within the metal industry, this was not enough to make up for economic fluctuations in the OECD countries.

Figure 1: Production trends in the metal industry 1987-1997; Index 1990 = 100

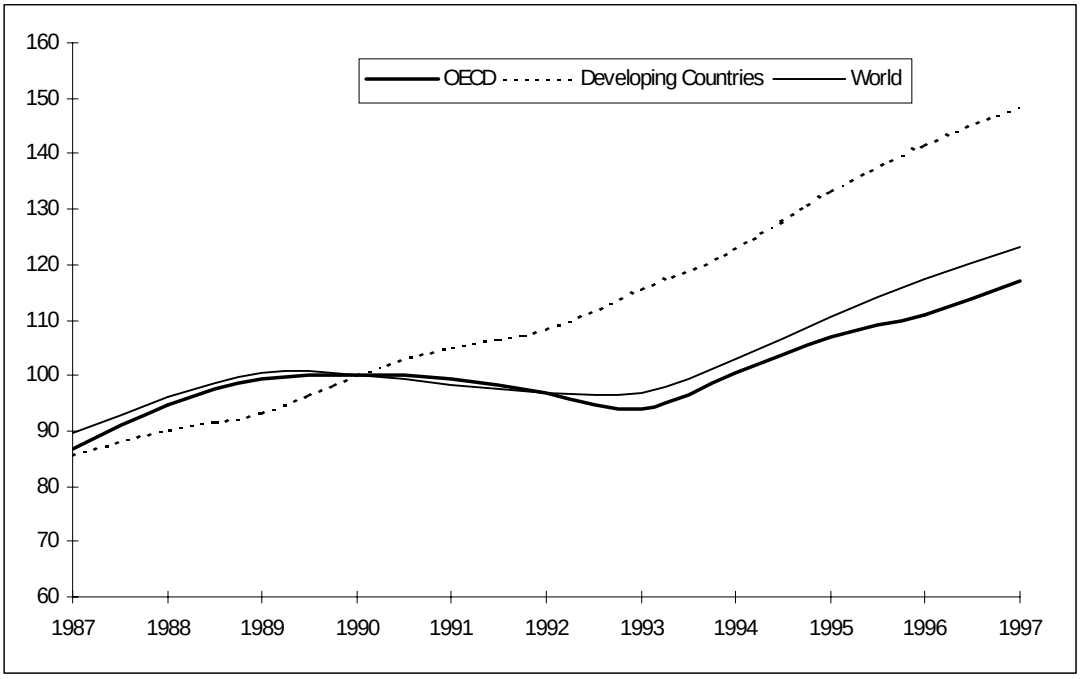


Table 11: Production of the metal industry, 1987 – 1997; Index 1990 = 100

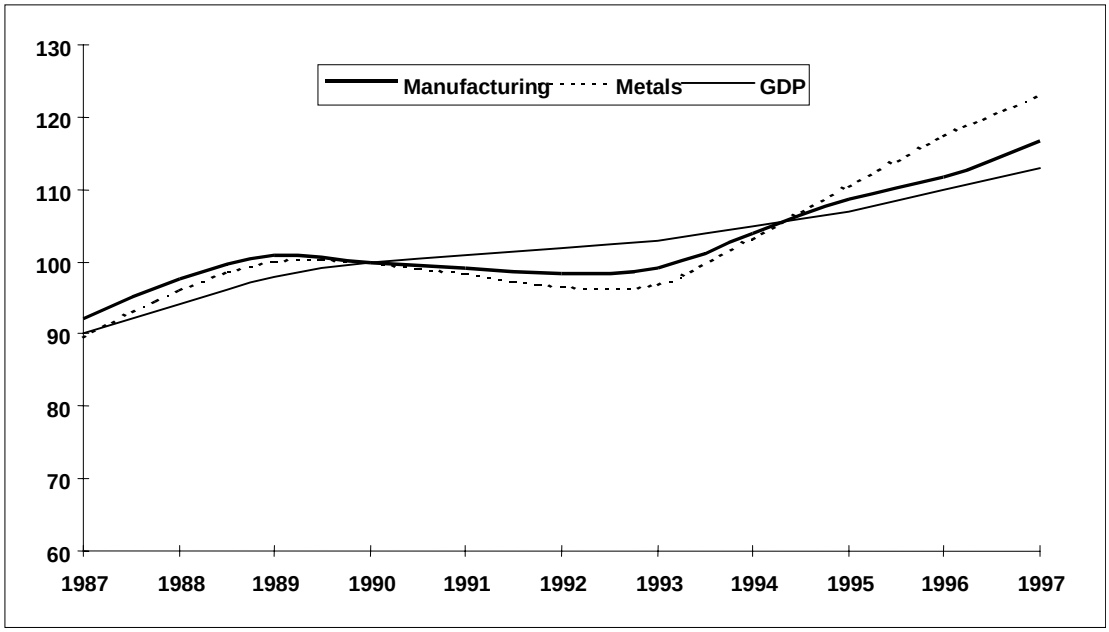
	1987	1992	1997	87/97	87/92	92/97
EU	92.2	94.9	104.6	1.3	0.6	2.0
Germany	86.0	105.0	104.5	2.0	4.1	-0.1
France	85.9	93.8	97.5	1.3	1.8	0.8
Italy	89.3	92.8	110.7	2.2	0.8	3.6
United Kingdom	85.5	90.1	106.8	2.2	1.0	3.5
North America	91.4	102.2	148.7	5.0	2.3	7.8
USA	91.3	102.8	156.2	5.5	2.4	8.7
Latin America	104.1	100.8	125.9	1.9	-0.6	4.6
Mercosur	115.4	92.0	127.7	1.0	-4.4	6.8
Mexico	79.5	107.8	146.0	6.3	6.3	6.3
Asia	78.1	98.7	122.3	4.6	4.8	4.4
Japan	78.2	93.7	99.1	2.4	3.7	1.1
Australia	84.7	94.1	109.8	2.6	2.1	3.1
Africa						
South Africa	88.5	88.4	99.0	1.1	0.0	2.3
Central and Eastern Europe	99.6	77.4	60.9	-4.8	-4.9	-4.7
OECD	87.8	97.6	122.5	3.4	2.1	4.7
World	**89.7**	**96.7**	**123.1**	**3.2**	**1.5**	**4.9**

Source: UNIDO, Prognos estimates.

Economic fluctuations in the metal industry are more pronounced than in the overall economy, and economic trends in the metal industry tend to be out of step with the overall economy (see figure 2). This is due to the fact that the metal industry primarily produces capital goods. Metal industry clients curtail their investments as soon as the order book starts to decline, that is, even before economic growth actually slows down. On the other hand, they start to invest when the volume of orders increases and customers expect excess capacity, that is, before capacity is actually fully utilised.

On the whole, production growth in the metal industry was higher than manufacturing growth overall (1987/1970: 2.4% p.a.). Other manufacturing branches, such as textiles, clothing and paper, are moving increasingly towards saturated markets for consumer goods. In contrast, the metal industry benefited from ever-keener competition, which customers are experiencing in the market. Owing to increasing competition, metal industry customers are becoming more capital intensive. Demand for capital goods is rising faster than demand for consumer goods. The result is that the **metal industry's relative share of the manufacturing industry** has **risen** overall.

Figure 2: Production trends in the metal industry, in the manufacturing industry World economic growth 1987 -1997; Index 1990 = 100



When measured by the long-term trend adjusted for cyclical factors, production growth in the metal industry is on a par with world economic growth. As a result, the **relative importance of the metal industry for the world economy** between 1987 and 1997 by and large **remained the same**. Against the background of the general process of de-industrialisation in the industrialised countries (see table 12), as reflected by the fact that growth and employment shifted to the service sector, this development is significant.

Table 12: Manufacturing value added to GDP, 1980, 1990 and 1996

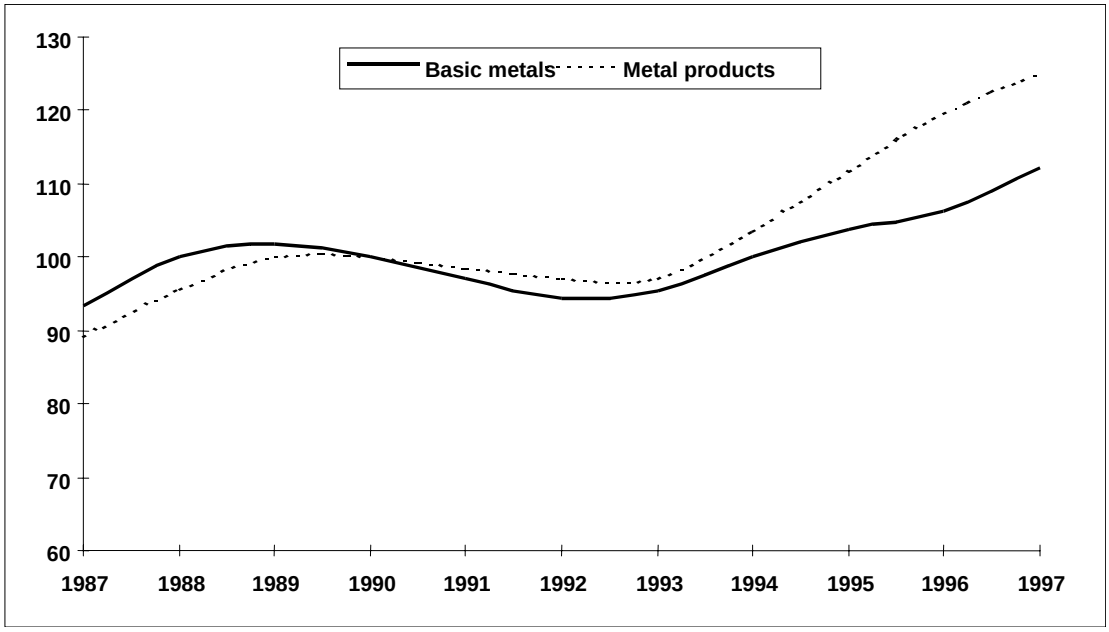
	1980	1990	1996
USA	18.6	18.2	20.5
Japan	25.1	20.8	25.8
EU	26.2	24.4	22.9
Latin America	26.5	24.1	22.9
Brazil	31.8	26.3	23.9
Southeast Asia	21.5	25.2	29.0
Africa	11.5	13.2	12.6
CEE	31.4	31.7	29.3
	1980	**1990**	**1996**
Low-income	15.2	18.5	20.4
Middle-income	18.2	22.1	23.3
High-income	22.0	21.9	21.3

Source: UNIDO

2.1.1 Sectoral production trends

In the past, the different branches of the metal industry have benefited in varying degrees from this overall positive production trend. Inside the metal industry, **winners and losers** can be spotted. Between 1987 and 1997, annual growth in the **metal processing** sector, at 3.4%, was significantly higher than in **metal production** (1.8% p.a., see figure 3). This is due to the above-mentioned **structural change** and to technological progress. Demand for basic metals fell, because economic growth overall took place more in the service sector and less in the commodity-intensive industrial sector. Moreover, due to progress in materials technology, other materials such as synthetic substances (competition from substitutes) replaced metals or the necessary quantities were reduced. World production of pig iron, the most important basic metal, fell from 119 kg/capita in 1975 to 97 kg/capita in 1997. Growth in this branch came from the production of higher-value, refined metals and alloys (aluminium, ferrochromium).

Figure 3: Overall production trends in the metal industry broken down by sector 1987 -1997; Index 1990 = 100



On the other hand, the branches of metal processing (**non-electrical machinery, electrical machinery, transport equipment**) **benefited** from these overall influencing factors. There is rising demand for modern, high-quality capital goods, which reduce production costs and increase product quality. In the developing and emerging countries, demand is rising with the expansion of production capacity as well as increases in income levels. Within metal processing, the highly technologically intensive branches of the electrical machinery industry and the non-electrical machinery industry recorded the highest production growth increases.

Because of these different trends, the sectoral structure within the metal industry has changed since 1980 (see Tables 13 and 14). Due to the above-mentioned reasons, metal production lost grounds in terms of added value, whereas metal processing increased its share to 88% by 1996. In 1996 as in 1980, **non-electrical machinery** was the **largest branch**. Together with **electrical machinery**, the branch with the **largest share gains**, these two branches accounted for over half of total added value. The metal products industry, which has a relatively low technological intensity, was a clear loser in terms of added value.

Table 13: Sectoral structure of the metal industry 1980, 1990, 1996, percentage share of value added

	1980	1990	1996
Metal production	**15.7**	**12.8**	**12.2**
Iron and steel	11.3	9.0	8.5
Non-ferrous metals	4.4	3.8	3.7
Metal processing	**84.3**	**87.2**	**87.8**
Metal products	15.3	12.7	11.6
Non-electrical machinery	23.8	25.3	27.2
Electrical machinery	18.1	22.3	25.4
Transport equipment	21.5	21.8	19.1
Prof. , scient. equipment	5.6	5.0	4.5
Metal industry	**100**	**100**	**100**

Source: UNIDO; Prognos estimates

2.1.2 Regional production trends

Regional market shares in the metal industry, that is, the production shares of the individual countries and regions out of world production, have also changed significantly in recent years (see table 14). **Structural shifts** are due first to the uneven overall economic development in the regions, that is, the growth of market outlets, and second to the increasing international division of labour. As the import and export restrictions of the past are continually being eliminated, markets for metal goods have become **world markets**. Isolated home markets are becoming rarer and rarer. In places where a few domestic suppliers used to compete, a host of international rivals vie today as suppliers. Since quality differences in products have become less and less important owing to technological progress and transfers of know-how, price has become the decisive sales argument and production costs have become a key success factor. Companies are either shifting their production sites to countries in which they can produce on the most cost-effective basis (**transfer of production sites**) or buying primary products, which they used to produce themselves, from cheaper suppliers. On the other hand, companies in countries with cost advantages enjoy a competitive edge and are able to increase their market shares.

Table 14: Sectoral and regional structure in the metal industry 1980, 1990, 1996, percentage share of added value

Sectoral structure		Industrialised countries			EU			Japan			North America			Developing countries			World		
percentage	ISIC	1980	1990	1996	1980	1990	1996	1980	1990	1996	1980	1990	1996	1980	1990	1996	1980	1990	1996
Iron and steel	371	11	8	7	10	8	8	15	10	9	8	5	4	15	15	16	11	9	9
Non-ferrous metals	372	4	4	3	3	3	3	3	2	3	4	3	2	7	6	6	4	4	4
Metal production	37	15	12	11	13	12	11	18	12	12	12	8	7	22	22	22	16	13	12
Metal products	381	15	13	12	16	14	14	18	13	12	14	12	10	13	12	11	15	13	12
Non-electrical machinery	382	24	26	28	26	26	26	23	26	23	20	23	33	19	16	15	24	25	27
Electrical machinery	383	18	22	26	20	22	25	16	27	32	16	19	23	19	25	27	18	22	25
Transport equipment	384	21	22	19	21	23	20	22	19	19	24	26	19	25	23	24	21	22	19
Prof., scient. equipment	385	6	5	5	3	3	3	2	3	2	14	12	9	2	2	2	6	5	5
Metal processing	38	85	88	89	87	88	89	82	88	88	88	92	93	78	78	78	84	87	88
Metal industry	37/8	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Regional structure		Industrialised countries			EU			Japan			North America			Developing countries			World		
percentage	ISIC	1980	1990	1996	1980	1990	1996	1980	1990	1996	1980	1990	1996	1980	1990	1996	1980	1990	1996
Iron and steel	371	88	83	77	33	31	32	22	23	20	17	14	16	12	17	23	100	100	100
Non-ferrous metals	372	85	83	80	28	27	27	12	14	14	21	20	21	15	17	20	100	100	100
Metal production	37	87	83	78	32	30	31	19	20	18	18	16	17	13	17	22	100	100	100
Metal products	381	92	91	89	40	39	38	21	22	20	22	22	25	8	10	11	100	100	100
Non-electrical machinery	382	93	93	93	41	35	32	17	22	17	20	22	38	7	7	7	100	100	100
Electrical machinery	383	90	89	87	42	34	31	15	26	24	20	19	27	10	11	13	100	100	100
Transport equipment	384	89	90	85	37	35	33	18	19	18	26	28	29	11	11	16	100	100	100
Prof., scient. equipment	385	91	91	88	40	36	34	17	22	20	22	23	30	9	9	12	100	100	100
Metal processing	38	91	91	89	40	35	33	17	22	20	22	23	31	9	9	11	100	100	100
Metal industry	37/8	90	90	87	39	35	33	18	22	19	21	22	29	10	10	13	100	100	100
Memo item																			
Total manufacturing		86	83	78	35	31	29	14	17	16	24	23	26	14	17	22	100	100	100

Source: UNIDO, Prognos Estimates

The competitive situation and the extent of regional changes are not the same in all branches of the metal industry. In general, competition between industrialised countries and developing countries is characterised by the production factors employed in the branches. **Emerging and developing countries** enjoy **advantages** in branches which produce on a relatively **labour-intensive** basis and in which they have access to the necessary raw materials. In contradistinction, **industrialised countries** have relative advantages in branches which produce on a human capital-intensive basis, i.e. which are characterised by substantial **R&D spending**. The capital intensity of the branches is of renewed importance, since capital is overwhelmingly mobile worldwide and companies in countries with a stable political and social framework are able to meet their financing needs on international financial markets.

In the metal industry as a whole, the share of added value for the **developing countries** rose from 9.7% in 1980 to 12.6% in 1996 (see table 14). If **non-electrical machinery** is left aside, these countries won market shares in all branches. They posted above average gains in **metal production**, **metal goods** and **transport vehicles**. In these economic branches, predominantly standardised mass-produced goods are manufactured on a labour- or capital-intensive basis and R&D spending is low. In the non-electrical machinery and electrical machinery industries, a comparatively high level of innovation is required, expenditure is high and it is not very feasible to separate production and development in different sites. In these fields, the market share losses of the industrialised countries were comparatively small. Within the triad formed by North America, Japan and the European Union, structural shifts were more strongly characterised by cyclical trends. It is quite obvious, however, that the **European Union lost market shares** while **North America clearly gained**.

Regional structural shifts in the metal industry are less pronounced than structural shifts for the manufacturing industry as a whole. Here, the value added share of the industrialised countries in 1980 was already lower at 85.6% in 1980, and fell by 7 percentage points to 78.3% in 1996. This is probably due to the fact that in the manufacture of mass-produced articles such as clothing, textiles, paper and also chemical products, price competition is even keener than in the metal industry. Another key reason is that markets for consumer goods were becoming more important in the developing and emerging countries due to their large populations and increasing income levels.

2.2 Employment trends

As explained above, world production in the metal industry rose between 1987 and 1997 by some 3.2% p.a. However, total employment in the metalworking sector moved in the opposite direction. **Employment** during the same period fell **by an average 0.4% p.a.** (see table 15). Due to productivity increases, fewer and fewer employees are needed to produce equivalent or even larger quantities. In the past, production growth was smaller than productivity increase, as a result of which jobs were lost.

The 3% difference between production growth and employment growth does not correspond to the productivity increase during the time period under review, because special influences must be factored in as a result of the economies in transition in Central and Eastern Europe and capacity effects. Roughly speaking, the worldwide **productivity increase** was between **3 and 4%** on average. However, there are clear differences between the individual countries. In general, the productivity increase in the industrialised countries was due to keener competition, and the significance of wages and salaries as a cost component was higher than in the emerging and developing countries.

Figure 4: Overall employment and production trends in the metal industry, average yearly change as a percentage

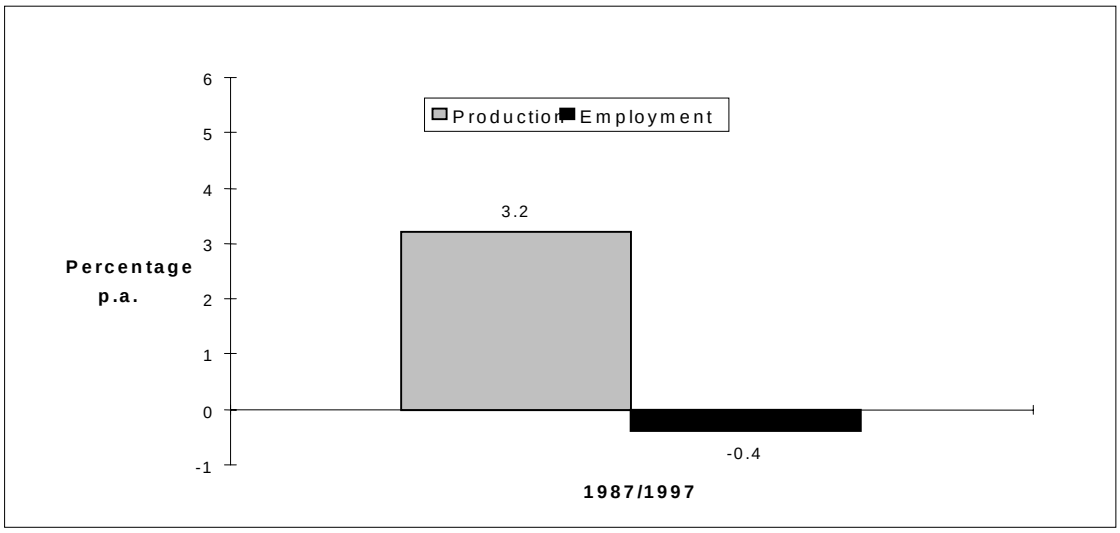


Table 15: Employment in the metal industry 1987 – 1997

	Employment thousands			Regional share percentage			Annual change percentage p.a.		
	1987	1992	1997	1987	1992	1997	87/97	87/92	92/97
World	71,088	71,917	68,940	100.0	100.0	100.0	-0.4	0.2	-1.0
EU (15)	13,460	12,750	11,320	19.1	17.9	16.7	-1.7	-1.1	-2.4
Germany	4,934	4,724	2,637	7.0	6.6	5.4	-3.0	-0.9	-5.1
France	2,146	2,059	1,868	3.0	2.9	2.8	-1.4	-0.8	-1.9
Italy	1,382	1,283	1,165	2.0	1.8	1.7	-1.7	-1.5	-1.9
U. K.	2,258	1,971	1,997	3.2	2.8	2.9	-1.2	-2.7	0.3
North America	9,220	8,525	9,090	13.1	11.9	13.4	-0.1	-1.6	1.3
USA	8,506	7,885	8,366	12.1	11.0	12.3	-0.2	-1.5	1.2
Latin America	2,312	2,433	2,993	3.2	3.4	4.3	0.8	1.0	4.6
MERCOSUR	1,430	1,546	1,640	2.0	2.2	2.4	1.4	1.6	1.2
Mexico	882	887	1,353	1.2	1.2	2.0	5.3	0.1	10.5
Asia	32,308	35,475	35,709	45.8	49.7	52.6	1.0	1.9	0.1
Japan	5,387	5,730	5,271	7.6	8.0	7.8	-0.2	1.2	-1.7
Australia	407	348	333	0.6	0.5	0.5	-0.2	1.2	-0.9
China	20,898	22,360	21,950	29.6	31.3	32.3	0.5	1.4	-0.4
Africa	1,020	954	970	1.4	1.3	1.4	-0.5	-1.3	0.3
South Africa	510	477	485	0.7	0.7	0.7	-0.5	-1.3	0.3
CEE	12,547	11,562	8,626	17.8	16.2	12.7	-3.7	-1.6	-5.7
OECD	30,842	29,703	28,.580	43.7	41.6	42.1	-0.8	-0.8	-0.8

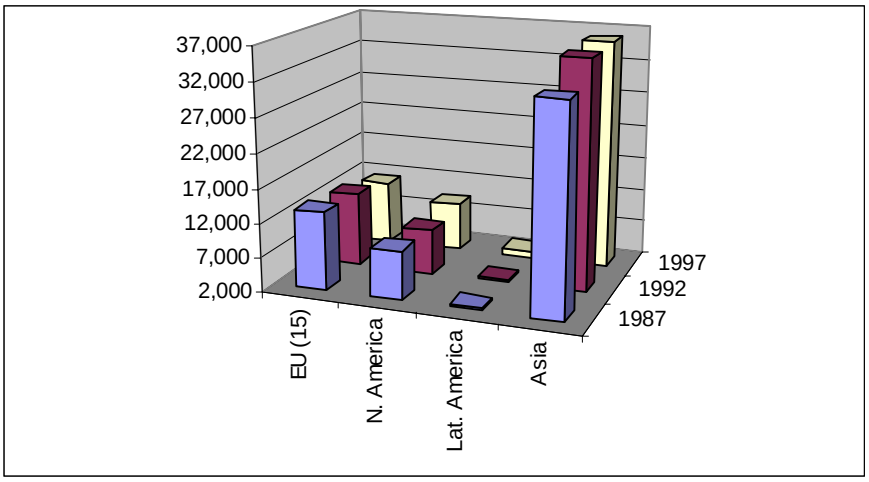
Source: UNIDO, Prognos estimates. For Mexico, International Metalworkers' Federation.

Employment trends in the individual regions are the combined result of production and productivity increases. In the **OECD countries**, with a few exceptions (the Republic of Korea, Ireland, Turkey), **jobs were lost** (see table 15). Even in cases where job losses have been slowed by a more favourable economic climate, as in the EU of late, or new jobs have even been created, as in the US, this was not enough to make up for previous losses.

On the whole, employment in the OECD countries fell by 0.8% annually between 1987 and 1997. However, in **Asia** (without Japan), **jobs were created** with an above-average annual production increase (+1.2%). Growth was concentrated in Indonesia, the Republic of Korea, Malaysia, the Republic of China (Taiwan), Thailand and Singapore, where employment rose by an annual average of 6.2%. In **Central and Eastern Europe**, some **4 million jobs were slashed** in connection with the

process of transition. If Central and Eastern Europe are left aside, world employment in the metal industry between 1987 and 1997 posted an insignificant annual increase of 0.2%. Employment gains in Asia and Latin America, which were also the result of production transfer from the industrialised countries, precisely make up for jobs lost in industrialised countries. However, they are not enough to raise employment levels in the metal industry worldwide.

Figure 5: Employment in the metal industry 1987 - 1997



2.3 Cross-border investments

International companies invest abroad, that is, they set up production facilities there or purchase existing companies to open up **new markets** which they cannot service effectively from their domestic sites. In this connection, investment is based on exploiting specific conditions in the host country. Costs are not the only consideration taken into account, even though these play a key role, but also general legal conditions, R&D or the availability of know-how, the lack of or inadequate environmental restraints and labour laws. Here, investment flows between countries and regions are an accurate indicator of long-term production trends. Cross-border investments reflect expectations as to the growth of markets and the competitiveness of sites.

In 1997, the world volume of cross-border **direct investments in all sectors amounted to US$ 400 billion** (foreign direct investment inflows). Between 1992 and 1997, the volume rose by an annual average of 17.9%, i.e. it more than **doubled** in this time frame (see table 16). Out of total foreign direct investment inflows, the industrialised countries in Western Europe, North America and Japan accounted for 61% (US$ 173 billion). The developing countries posted increases well above average. Their average share doubled between 1986 and 1991 to 35%. Within this group of countries, the **Asian and Latin American countries were best** at attracting international investments. For example, average investment inflows to China, at US$ 32 billion, exceeded combined inflows into Germany, Japan, France and Italy. When measured in terms of volume and growth, the **African continent is not a key player,** as it has clearly not succeeded in integrating into the world economy.

Cross-border mergers and acquisitions in the metal industry show that it is no exception to the overall process of globalisation. Out of the 100 largest transnational companies worldwide, in 1996, 38 belong to the metal industry[3]. The volume of mergers and acquisitions rose between 1992 and 1997 by 17.1% p.a. to **US$ 64 billion** and reached US$91.6 billion in 1998 (see table 17).

Inside the metal industry, investment activity was most intense in metal production, especially automobiles, and data processing equipment (see figure 6). The market for iron and steel and non-ferrous metals (**metal production**) shows, as mentioned above, that there was only modest production growth against a background of strong cyclical fluctuations. Market share gains by suppliers from emerging countries are higher than average. On a world scale, there is **excess capacity**, which leads to keen price competition. Companies are expanding their capacity through take-overs and mergers, in order to be able to survive despite these general market conditions. In so doing, they achieve **economies of scale** and are able to increase their market shares and market power.

In the **automobile industry,** in addition to the prevailing **excess capacity**, high **R&D expenditures** are the cause of corporate mergers. Research can only cover costs if a sufficiently large number of units is produced and sold. Automobile manufacturers are at present pursuing a so-called platform strategy, whereby a company develops and produces its various automobile brands and models on a common basis (platform), thereby lowering average development costs.

The concentration process in the **electrical and electronic engineering industry** stems from the dominance of suppliers from low-wage countries. **Despite very high growth,** there is keen **price and cut-throat competition** on the market for standard electrical and electronic goods. Due to technological progress, product life cycles are very short and cost advantages can only be achieved through mass production if the quantities produced rapidly can be sold just as quickly. Small and medium-sized suppliers will only survive competition from large companies which produce and sell worldwide if they can find a market niche.

3 Companies are classified according to foreign assets (see World Investment Report 1998).

Table 16: Foreign direct investment inflows 1986 – 1997, US$ billion, total economy

US $ bill.	Average 1986-91	1992-97	1992	1993	1994	1995	1996	1997
World	159	284	176	218	243	331	338	400
Developed countries	130	173	120	139	142	211	195	233
Western Europe	66	98	86	84	78	123	100	115
EU	63	92	84	81	72	117	92	108
North America	55	63	24	48	54	70	83	99
Japan	1	1	3	0	1	0	0	3
Germany	3	3	3	2	2	13	-3	0
France	9	20	22	21	16	24	22	18
Italy	4	4	4	4	2	5	3	4
UK	21	21	16	16	9	23	26	37
USA	49	56	19	44	45	59	76	91
Australia	6	7	5	4	5	13	5	10
Developing countries	29	101	51	73	96	106	130	149
Africa	3	5	3	4	6	5	5	5
Latin America	9	33	18	17	29	32	44	56
Mexico	3	8	4	4	11	10	8	12
Asia	16	63	30	51	61	67	80	87
China	3	32	11	28	34	36	41	45
CEE	1	10	4	6	6	14	12	18
Percentage	**1986-91**	**1992-97**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**
World	100	100	100	100	100	100	100	100
Developed countries	81	61	68	64	58	64	58	58
Western Europe	42	34	49	39	32	37	30	29
EU	40	32	48	37	29	35	27	27
North America	34	22	13	22	22	21	25	25
Japan	0	0	2	0	0	0	0	1
Germany	2	1	2	1	1	4		
France	6	7	12	10	7	7	7	5
Italy	2	1	2	2	1	1	1	1
UK	13	7	9	7	4	7	8	9
USA	31	20	11	20	19	18	23	23
Australia	4	2	3	2	2	4	2	2
Developing countries	18	35	29	33	39	32	38	37
Africa	2	2	2	2	2	2	1	1
Latin America	6	11	10	8	12	10	13	14
Mexico	2	3	2	2	5	3	2	3
Asia	10	22	17	24	25	20	24	22
China	2	11	6	13	14	11	12	11
CEE	0	4	3	3	2	4	4	5

prognos

Source: OECD

Table 17 - Cross-Border Mergers and Acquisitions 1991-1998, US.$ Billion

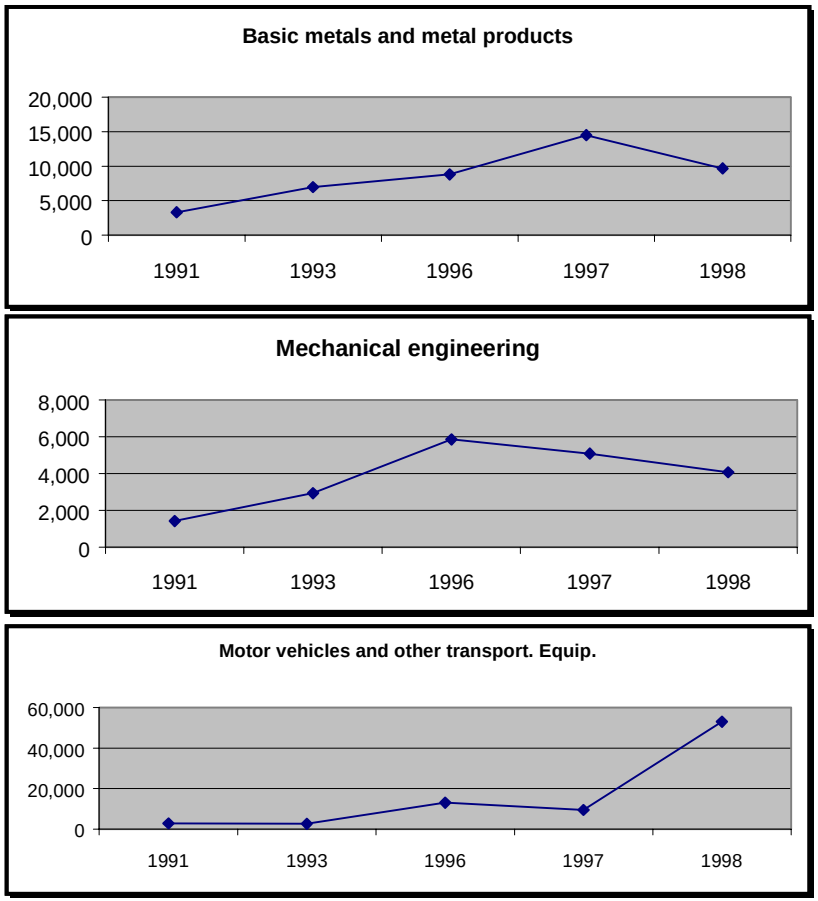
US$ billions	1991	1992	1993	1994	1995	1996	1997	1998
ALL INDUSTRIES	85.3	121.9	162.3	196.4	237.2	274.6	341.7	544.3
Primary sector	3.0	3.2	24.3	9.6	22.2	23.4	23.8	77.8
Secondary sector	47.0	64.0	63.8	109.2	105.7	96.1	117.8	189.3
Metal industry	18.3	28.9	22.6	40.3	49.2	44.9	63.8	91.6
Basic metals and metal products	3.3	7.2	6.9	10.7	14.3	8.8	14.5	9.6
Metal manufacturing	1.4	3.3	2.9	6.1	6.1	3.5	7.9	5.1
Machinery and equipment	1.4	2.5	2.9	4.6	5.5	5.8	5.1	4.1
Office machinery and data processing	1.0	0.6	0.8	0.8	2.3	1.6	2.7	3.3
Electrical and electronic engineering	7.3	9.9	6.1	9.4	11.6	10.2	11.5	9.4
Instrument engineering	1.1	0.5	0.3	1.7	1.5	1.9	12.6	7.1
Motor vehicles and other transport equip.	2.8	4.9	2.6	7.0	7.8	13.1	9.5	53.0
Tertiary sector	35.3	54.5	74.3	77.6	109.3	155.1	200.1	277.1
Percentage	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**
ALL INDUSTRIES	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Primary sector	3.5	2.7	15.0	4.9	9.4	8.5	7.0	14.3
Secondary sector	55.1	52.5	39.3	55.6	44.5	35.0	34.5	34.8
Metal industry	21.5	23.7	13.9	20.5	20.7	16.3	18.7	16.8
Basic metals and metal products	3.8	5.9	4.3	5.5	6.0	3.2	4.2	1.8
Metal manufacturing	1.7	2.7	1.8	3.1	2.6	1.3	2.3	0.9
Machinery and equipment	1.7	2.1	1.8	2.3	2.3	2.1	1.5	0.8
Office machinery and data processing	1.2	0.5	0.5	0.4	1.0	0.6	0.8	0.6
Electrical and electronic engineering	8.6	8.1	3.8	4.8	4.9	3.7	3.4	1.7
Instrument engineering	1.3	0.4	0.2	0.9	0.6	0.7	3.7	1.3
Motor vehicles and other transport equip.	3.3	4.0	1.6	3.6	3.3	4.8	2.8	9.7
Tertiary sector	41.4	44.7	45.8	39.5	46.1	56.5	58.6	50.9

Source: UNCTAD, United Nations

Figure 6

CROSS-BORDER MERGERS AND ACQUISITIONS BY SECTOR

million US Dollars



2.4 Development of foreign trade

The establishment of free-trade zones and economic blocs in North America (NAFTA), Latin America (Mercosur), Asia (ASEAN), Africa (Southern African Development Community – SADC) and Europe (EU) has opened up opportunities for cross-border trade in goods and for the **international division of labour** in the 90s. The integration of former national and regional markets has **proceeded apace**. Foreign trade has grown at a faster speed than world production. This trend can also be seen in the metal industry, where world exports of metal products outstripped production growth between 1990 and 1997 at 8% p.a. Exports were increased not only for the world as a whole but also for all regions in relation to their production growth. Consequently, foreign business contributed more to growth in the metal industry than sales on domestic markets. Growth rates were higher than average in Latin America (16%), Asia (11%) and North America (10%) (see table 18).

Table 18: Exports of metal products by region 1990 - 1997

	Region	Export US$ bill.		Share as a %	Growth % p.a.	Export balance US$ bill.	
		1990	1997	1997	1990/97	1990	1997
World		1306	2239	–	8	–	–
Asia	total	316	656	100	11	–	–
	Asia	118	313	48	15	–	–
	WE	74	119	18	7	21	9
	NA	121	195	30	7	34	36
Western Europe	total	635	955	100	6	–	–
	WE	464	610	64	4	–	–
	Asia	53	110	12	11	-21	-9
	NA	63	94	10	6	5	13
North America	total	229	446	100	10	–	–
	NA	84	164	37	10	–	–
	Asia	61	111	25	9	-61	-84
	WE	58	81	18	5	-5	-13
Latin America		30	85	–	16	–	–
CEE		–	46	–	–	–	–
Africa		–	9	–	–	–	–

Source: WTO; Prognos estimates

Western Europe and North America posted a foreign trade deficit with Asia in 1990 and 1997, i.e. they imported more from Asia than they exported there (see table 18). In Western Europe, however, exports to Asia grew faster between 1990 and 1997 than imports and the **foreign trade deficit shrank**. Western European metal working companies were able to clearly enhance their competitive position via the restructuring of production processes and increased R&D spending, thereby winning back market share. Furthermore, Asian demand for Western European, high-quality, innovative capital goods from the non-electrical machinery sector increased owing to dynamic growth in the Asian region. In this market segment, the European Union posted a very large balance-of-trade surplus. The deficit is primarily due to imports of electrical and electronic goods. In this connection, a certain specialisation has taken place in individual sectors within the metal industry between Western Europe and Asia.

The case of **North America** is, however, different. The **balance-of-trade deficit** with Western Europe and Asia, which was already comparatively high in 1990, **increased** further despite above-average export growth and expanded to include virtually all market segments. No real specialisation can be seen. The US has long been characterised by very large balance-of-trade deficits (table 18 a)and capital imports. With such a constellation, one would expect rising interest rates and devaluation trends over the long term. These factors clearly do not apply, because the US represents the largest market in the world, is very domestic market-oriented and enjoys a good credit rating on international capital markets. Another reason for the high deficit is that the American market, owing to its size, is very attractive for Asian and European companies. The incentive and the need to be present on this market is correspondingly large for global players.

Regional **trade flows** for Asia, Western Europe and North America also show that foreign trade is primarily **intra-continental.** For example, about half of all Asian exports remains in Asia. More progress has been made with regard to regional or continental integration than global integration. Trade barriers have been dismantled at a faster pace within regions (NAFTA, ASEAN, EU) than between such regions.

3 General world economic conditions

3.1 Political and economic centres of power in upheaval

The last decade of the 20th century has resulted in **far-reaching political changes worldwide.** The collapse of Communism and the end of the old bipolar world order have left a void in which the neo-liberal thinking has flourished. The opening up of China has been another powerful catalyst, leading to significant transfers of production and shifts in investment patterns. The more obvious it becomes that a seamless transition to a new world order is not possible, the more the collapse of the old order is perceived as disorder, particularly since worldwide interconnection is leading to an **increasing mutual dependency between states** and regions.

Autonomous national policy, is becoming less and less feasible. Politicians are losing their grip on politics and economic constraints are replacing political programmes. In the mature industrialised countries, risks, instead of opportunities are centre stage, which entail new challenges such as political and economic restructuring in Eastern Europe and Central Asia, the reinforcement of fundamentalist currents in the Islamic countries, continuing population growth in the poorest parts of the world, globalisation of markets and the need to preserve natural resources (see table 19).

Table 19: World population 1997- 2010, in millions

	1997	2010
Industrialised countries	833	876
USA	268	298
Japan	126	128
Western Europe	386	392
Countries in transition	342	336
Developing countries	4666	5682
Africa	743	990
Latin America	490	589
Asia (excl. Japan, China, India)	1219	1509
China	1237	1402
India	970	1183
World	5840	6894

Source: Deutsche Stiftung Weltbevölkerung and Prognos estimates

On the international level, it is not clear whether the highly developed countries - which already account for less than one-fifth of world population - will continue to enjoy per capita income 20 times higher than that of the other countries of the world. These countries' legitimate demands for a new world economic order in which they have a larger share in economic progress will become more pressing. Such demands cover not only better access to the markets of the industrialised countries and the dismantling of agricultural protectionism but also relative prices for industrial goods and raw materials, access to the necessary technologies, borrowing terms on international capital markets and - last but not least - a say in the decision-making bodies of the international organisations.

Against this background, it is possible to picture various future alternatives. Two examples, a conflict scenario and an optimistic scenario, clearly show the range of potential developments.

- A **conflict scenario** may be outlined based on the following assumptions: in the West, economic conflicts grow between the US and Europe. Russia remains a potential hotbed of tension with its ethnic problems, its policy struggles between various factions, and its remaining arsenal of nuclear weapons. Fundamentalist Islamic currents continue to gain ground in the new Central Asian republics. China takes advantage of Russia's weakness and Japan’s reluctance to play a global political role to increase its influence in Southeast Asia. South America relies increasingly on the US, and Black Africa is increasingly marginalized. In Europe, the integration process bogs down. Instead of convergence there is divergence, expansion to the East drags on, and political union remains at the stage of non-binding statements of intent. The booming equity markets, particularly in the USA, experience a crash (e.g. signs of inflation, an output slowdown, or increasingly volatile financial markets lead to a loss of investor confidence), which triggers off a serious economic downturn in the USA. The dollars value falls abruptly, US imports decline, setting off contractions in the rest of the world. This leads to growing instability worldwide, which, combined with increasingly strong population growth in the developing countries and the resultant resource shortages and distribution problems, would increase the threat of military confrontations and migratory pressure from South to North and from East to West. A long and deep recession cannot be excluded.

- The **optimistic scenario** proceeds from the following assumptions: politico-military détente continues. The US assumes a role of leadership in economic development, rather than that of world policeman. Western Europe increases its influence. With the support of the West, the pace of democratisation and economic restructuring in Russia picks up. Susceptibility to anti-Western currents remains low in the Central Asian countries thanks to an improvement of their economic situation, and the Arab countries opt for co-operation rather than confrontation with the West. China and Russia discover common development interests, also pushed by Japan, which simultaneously takes on greater world political responsibility. The UN acquires a more positive image and more influence, and organisations such as the OSCE and the new APEC Pacific community become increasingly important with regard to regional dialogue. In Europe, the momentum for integration gains strength: progress is made

with regard to both the broadening and the deepening of the European Union. Important progress is made in designing a new global financial architecture, which stabilizes volatile capital flows and exchange rates. Export surplus countries adopt policies to consume more and export less-- the US trade deficit shrinks without severe impact on world output. US, EU and Japanese central banks and treasury departments cooperate in ensuring a soft landing for the dollar. In this scenario, the outcome would be greater political and economic stability worldwide, and leave room for the lower-income countries to catch up without implying income reductions for wealthy industrialised countries.

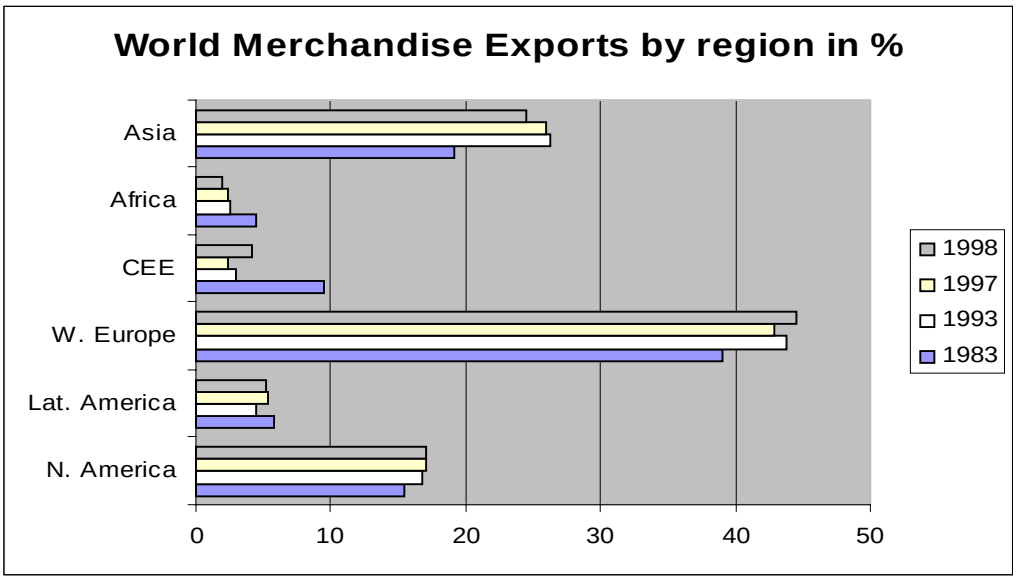
Regardless of which of the two scenarios turns out to be closer to reality, both clearly show that **political and economic developments are closely interrelated**. Economic interests are an important motivating factor in politics, and politics has a decisive impact on the general conditions in which economic relations develop worldwide.

3.2 Globalisation of markets

Trend extrapolations do not suffice to deduce the new world order and, consequently, it is unclear how the relative economic weights between North and South, between West and East and the resultant structure of the world economy will be determined. It is also worth taking a look at past world economic development, because the challenges stemming from continuing market globalisation are not entirely new, even though they are more daunting than before. In 1997, world exports of goods amounted to US$ 5.3 trillion. In the early 80s, **world trade** only totalled US$ 2 trillion. Expansion during this period was not steady. Conditioned by the dampening influences which the second oil price shock and the international debt crisis brought in their wake, there was even a temporary drop between 1980 and 1985. Yet the subsequent increase was all the stronger. Even when price increases and the decline of the dollar exchange rate, which overstate the extent of expansion, are factored in, average real annual growth for 1987 to 1997 was a good 6.6%. Developing countries were able to post above average growth, but industrialised countries had below average export growth, while the former state controlled economies posted a significant decline - after the collapse of the old system, from which major countries such as the CIS states still have not recovered.

However, the industrialised countries continue to account for some 68% of world trade, with Western Europe representing almost 45% of this figure. The developing countries have a good 29% share, while the former East bloc countries along with Russia and the other CIS States hold a mere 3% share (see figure 6). The structure of international trade only becomes clear when trade flows are broken down by region. Almost half of all world trade takes place between the industrialised countries. Nearly one-third comes from trade between the industrialised and developing countries. The remainder - a scant fifth – is split evenly between trade among developing countries and the internal and external trade of the former East bloc countries .

Figure 7



Source: WTO

Leaving aside the former East bloc countries, which are still preoccupied by economic restructuring and finding their place in the global market, we can see that worldwide trade in goods has increased at a significantly faster clip than the production of goods. The latter increased between 1987 and 1997 by an annual average of more than 2.3%, as against a growth rate of some 2% in the industrialised countries and a good 5% in the developing countries. Undoubtedly, within a certain framework, trade can be an important contributing factor to economic growth, but a simple comparison of trade and output growth rates does not suffice to prove this in a particular case.

Since the end of the 80s, the dismantling of trade barriers has accelerated noticeably. The introduction of the EU Single Market has helped in this respect, as has the elimination of the borders, which for decades separated Western Europe from Eastern Europe. Moreover, as countries have understood that they could not demand free access to other countries' markets while keeping their own markets, this has furthered liberalisation in other parts of the world. Added to this is the quantum leap in communications technologies, which makes market-relevant information available across the globe instantaneously. Moreover, economic pressure to take advantage of cross-border activities has increased, because shorter product cycles due to technological advances has shortened time spans for recouping R&D costs, which in turn require larger markets to absorb higher volumes of output. All this means that on a worldwide scale, not only goods but also services and capital are becoming more and more mobile.

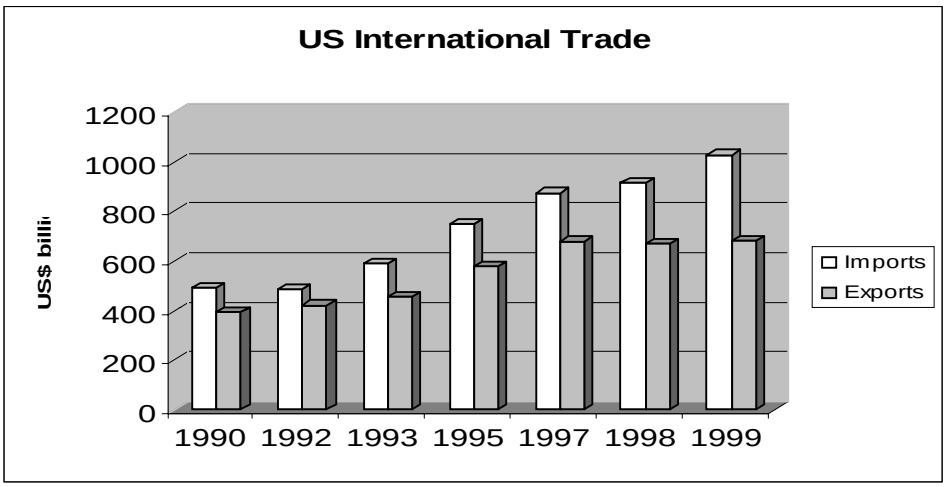
The result is twofold: with market globalisation, **new sales opportunities** have opened up in all parts of the world but international competition has become stiffer. The times when developing countries only produced commodities and agricultural goods are a thing of the past. In the meantime, they are crowding on to the world market with finished products.

Whereas this initially applied to consumer goods such as textiles, shoes and household appliances, it now holds true for cars, machinery and other capital goods as well. There is no gainsaying that the emergence of new competitors has led to **increased adjustment needs in the industrialised countries**. Industries that are no longer able to compete will have to either increase their labour productivity through product and process innovations, or shift part of their production to lower-cost countries. In this respect, it is clear that market globalisation has led to steady job losses. From the point of view of the overall economy, this is only a partial explanation for the high unemployment in many industrialised countries. Another part is the restrictive economic policies favored by neo-liberal politicians and financial markets, which have led governments in industrial democracies to abandon pursuit of full employment policies. Finally, particularly in Western Europe, countries and enterprises have not managed to create as many new jobs as the ones that they lost through increased competition, because they have fallen short on product innovation and finding new markets.

Parallel to the dismantling of trade barriers worldwide, there has been a proliferation of regional trading blocs and integration initiatives in Europe, and later in Asia (ASEAN, APEC), as well as North and South America (NAFTA, Mercosur) and Africa (SADC). By advocating free trade and the reliance on markets as the instruments for boosting growth and allocating resources, these groups and initiatives have played a major role in the globalisation process. The trend towards regionalisation means not only the emergence of new economic zones but also of new political decision centres.

World trade is also threatened by serious imbalances. Of the dominant world economies only the USA is running a trade deficit -- it has become the consumer of last resort (see figure 8). The USA can only sustain this imbalance because the dollar is the de-facto world money, but volatile financial markets threaten this apparent stability. The world's lenders will not keep lending to the USA indefinitely to support the enormous and still growing trade deficit. This fact points to the fundamental error of national strategies for economic growth that see "foreign" trade as the sole means of growth and development. Simple logic requires that for every net exporter there has to be a net importer, and huge permanent deficits threaten the global economy. If crises are to be avoided and economic development to be ensured, domestic consumption (everywhere but in the USA) must receive at least as much attention as trade promotion. This implies stimulating internal demand through adequate income and wealth redistribution policies.

Figure 8



Source: US Department of Commerce

Whilst **trade liberalisation** hold the potential for contributing to employment creation and poverty reduction, it is **exacerbating competition and inequalities** between and within countries. The failure of negotiators in Seattle to launch a new round of trade liberalisation talks has shown that there is a host of contentious issues and growing trade tensions in the world economy. The danger of a trade policy race is not that far-fetched. This is all the more true as the Asian crisis, which broke out suddenly in the autumn of 1997, casts a pall on world economic development. First of all, the unexpected collapse of the securities and foreign exchange markets in the Southeast Asian emerging countries and the subsequent crises in Russia and Brazil clearly showed that global capital markets are in urgent need of some controls. This means much more than simply ensuring accounting procedures that are transparent in accordance with international standards.. The opening of national capital markets, pursued by the IMF with World Bank support, made the uncontrolled capital flows that precipitated the crises possible. This policy must be reconsidered and an appropriate system of government put in place.

In industrialised countries, particularly Western Europe, the reactions to the keener competition that results from globalisation are primarily the outsourcing of production to emerging and transition economies and cost-cutting programmes. From an overall economic viewpoint, production outsourcing reflects the stronger international division of labour: in the countries to which production has been shifted, it may lead to more employment and higher income. Provided income increases are equitably shared and capital is accumulated and domestically reinvested, foreign direct investment may also permit the receiving countries' to increase imports of goods and services. In the industrialised countries, outsourcing increases the need to gear the production structure more to higher-value, intensive value added goods. Cost-cutting programmes reduce the need for structural change but also reduce income

opportunities for workers. This clearly indicates that it would be better for all those engaged in international trade if the **industrialised countries** were to implement an offensive rather than defensive strategy, whereby they **actively promote employment and income growth and structural change through innovation** and **seek advantages by means of improved products and processes rather than cost competition with the developing and transition countries** .

As far as world economic development is concerned, the prospects vary according to whichever strategies dominate.

- If it is assumed that economic expansion in Western Europe and Japan will be reinforced, that the liberalisation of world markets will continue, and that general political conditions will be marked by co-operation rather than confrontation, world output will grow more strongly and trade can continue to grow rapidly. Relying on comparative advantages, which the industrialised countries enjoy with regard to the production and export of capital- and knowledge-intensive goods, would promote economic growth in this case. As this results in higher tax revenues, a higher savings volume, and increased corporate self-financing, it would allow the capital needs of the developing and transition economies to be met without any negative impact on international interest levels. Recovery from crises in Asia and Latin America would be strengthened and even Africa could reckon with growth rates that outstrip population increases. In Europe, these trends would especially benefit the weaker transition economies of the former Soviet block. In Western Europe, increased infrastructure investments and restructuring assistance for traditional industries would preserve incomes and employment even as structural change increases the output share of services and "new" industries. Although productivity would grow more strongly due to structural change, demand for labour would still rise.

- The prospects are much gloomier, however, if we assume that financial instability, and trade conflicts gain the upper hand, and that in the political arena conflict strategies will come to the fore. In this case, the world may face a prolonged recession, and world trade may decline. Even in the absence of global recession, growth and trade may slow markedly. Although, in the absence of recession, the developing countries may post higher growth rates than the industrialised countries, development would be uneven -- the average would be boosted by the Southeast Asian developing countries and China. The losers would be countries like India, but also Latin America and especially Africa. At best, in the industrialised countries, economic growth would remain within narrow limits. Higher public demand for credit and comparatively low savings rates would leave the Western European countries little room for capital exports to Eastern Europe, thereby slowing down the catching-up process. From a regional point of view, the developed regions of Western Europe would become even more important under such conditions, whereas in the former East bloc countries there will see individual pockets of development at most. In Western Europe important impulses for structural change will be lost.

3.3 Outlook for world economic development

Although the second half of the 80s was marked by a strong economic upturn throughout the world, the early 90s were characterised by a clear growth slowdown, especially in the industrialised countries. This development followed a typical cyclical pattern, where an upturn becomes a downturn at the latest by the time overall economic demand outstrips production capacity, prices spiral upwards and central banks steer a restrictive course to keep a grip on price hikes. The reaction was straight out of the textbooks: restrictive monetary policy made it more attractive to save than to go into debt, borrowing-based spending was put off, and falling demand made it less urgent to increase capacity further and fill vacancies. This cautious attitude spread from investments to household consumption, and thus to a growing number of economic sectors.

The first to be hit by the downturn, in 1990, were the US and some other industrialised countries such as Canada, Australia and New Zealand, but also the United Kingdom, Sweden and Finland. The following year, the other Western European countries were affected. Only Germany, with its special economic situation, was initially able to withstand the spreading economic downturn, only to succumb in 1992, the same year the recession hit Japan. Whereas things were already looking up in the US by that time and growth rates up to 1997 were as high there as during the second half of the 80s, the upturn was sluggish and not without setbacks in most of Western Europe. More intense competition, lasting cuts in State deficits to meet criteria for admission to European economic and monetary union, and the task of reforming social security systems all tended to depress a "cyclical" recovery. Japanese economic problems have persisted throughout the second half of the 1990s.

In spite of lower economic growth in the industrialised countries in the 1990-1997 period and the sharp of production in the former East bloc countries, after the collapse of the state run economies, which exerted an additional negative effect, overall world economic growth at 3.4% slightly exceeded the corresponding figure for the previous decade. In this connection, a decisive factor was **faster growth in the developing countries**, especially in the emerging economies of Southeast Asia but also in a host of Latin American countries, which, throughout 1997, brought rising capital inflows and a sharp increase in exports, leading in turn to stronger investment.

In **1998**, the **world economy** clearly **slowed down**. Triggered by the crisis in Asia, the effects were also felt clearly in the industrialised countries in the form of falling exports. Added to this were the production losses in Russia and South America. In the industrialised countries, the restrictive impact of the crisis was delayed somewhat and felt with varying degrees of intensity. Japan was hardest hit by the drop in imports from the Asian developing and emerging countries owing to this area’s key importance for the Japanese economy. In the US and Western Europe, the effects were confined within narrower bounds. All in all, world economic growth fell by 2.1 % owing to the crises in Asia, South America and Russia and their impact on the industrialised countries in 1998.

At the same time, millions of people have seen their existence plunge below poverty levels. Poverty has come back to Southeast Asia after dropping from 60% of the population 20 years ago to 20% just before the crisis. Another important feature is the development of the informal sector which absorbs most of the new jobs created in Latin America and in Africa. It is also expanding in Asia and growing in significance in many industrialized countries and economies in transition. Whereas until the early 90's the informal sector has grown mainly from direct entry, since the end of the decade, people are shifting from the formal to the informal sector.

Today, the **danger of inflation** is **less than before** in comparable phases of the economic cycle. In the current upturn, prices have not risen as they did in the second half of the 80s and in upward phase of preceding cycles. On the contrary, despite stronger world economic growth, inflation rates have fallen further everywhere in recent years. Consumer price rises in the industrialised countries, are about 2%, as compared to an average of 4.9% for the 80s and 8.7% for the 70s. This appears to be due less to monetary factors than to the real economic changes, above all keener international competition, which constrains wages, and encourages cost reduction in general. These tend to lower inflation thereby making it easier for central banks to keep interest rates low.

While the stock markets have recovered from the **Asian crisis, the cost of lay-offs and wage cuts will be felt for many years.** In addition, the current recovery does not tell us much about medium and long-term prospects. As indicated by the optimistic and pessimistic scenarios, there are alternative lines of development for the global economy and various main features, depending on the positive general conditions and economic strategies, lead to the development that is taken as a basis. It is unlikely, of course, that either of the two scenarios will prove 100 % accurate, for the following reasons:

– Assuming that future political conditions will be characterised solely by co-operation implies overlooking existing clashes of interest between country groups and their exponents; conversely, the knowledge that in the final analysis the spread of conflict does not benefit anyone is likely to help contain conflicts.

– The same holds true for trade policy. Here, there will be further trade liberalisation steps, but opponents will also find arguments and followers in their attempts to slow down the process.

– The need to reduce unemployment or keep it from rising to unacceptable levels is likely to slow structural changes in a host of industrialised countries.

It is to be expected that once the after-effects of the Asian crisis have subsided – **world economic growth** will with the intensification of international trade return to almost the rate posted from the mid-80s to the mid-90s. This means that rates for **1997 to 2005** should average around 3% p.a. (see table 20).

– In the **industrialised countries** of North America and Europe, annual growth rates of 2.6% and 2.5% respectively will lag less behind the world average as has been the case

over the past decade. The US will in all likelihood remain the front-runner of the triad. Although economic gaps in Western Europe will narrow, they will not disappear altogether because the Europeans find it difficult to bring EU expansion into line with EU deepening. Due to its necessary domestic reforms, Japan is only making slow progress and was hardest hit by the Asian crisis at the beginning of the period under review.

– During the period under review, the former **East bloc countries** are expected to post below-average, but rising growth rates (1997/2005: 0.7% p.a.). Naturally, there will be significant differences between countries like Poland, Hungary, Czech Republic, Slovakia, Slovenia and the Baltic States on the one hand and Russia and the CIS States on the other. Whereas the former have gradually introduced market economy reforms and restructured their economies and hope to join the EU some time during the next decade, the latter are still a long way from meeting the requisite political and economic criteria. Consequently, they will probably not realize much of their development potential between now and the year 2005.

– As a group, the **developing and emerging countries in Asia**, with average growth of 4.1%, offer the most favourable economic prospects even though, owing to present difficulties, expansion is not rising as steeply as in past years. The trend will continue at the fastest rate in China. It must however be noted that GDP growth in China has fallen by half since 1992 when it reached 14%.

– The **South American countries** will have to make do with more restrained growth. In 1999, overall production declined further. Even if it heads back upwards thereafter, average growth will lag behind the world economy.

If we posit an intermediate scenario as a starting point and if we further factor in the Asian crisis, average annual **world trade growth** is estimated at **5.6%** from 1997 to 2005. This is a bit lower than in from the mid-80s to the mid-90s (6.4%annually) but significantly higher than during 1975 to 1985 (4.1% annually).

Table 20: World economic development, 1987–2005

	Gross domestic product Annual percentage change			
	87/97	**97/05**	**97/01**	**01/05**
World	3.4	3.0	2.7	3.3
EU (15)	2.3	2.5	2.4	2.5
Germany	2.6	2.3	2.4	2.2
France	2.1	2.5	2.7	2.3
Italy	1.7	2.0	1.9	2.1
United Kingdom	2.2	2.2	2.0	2.3
North America	2.5	2.6	2.6	2.5
USA	2.6	2.6	2.6	2.5
Latin America	2.3	2.3	1.3	3.4
MERCOSUR	2.0	1.8	0.6	3.1
Mexico	3.0	4.1	3.8	4.4
Asia	4.8	2.3	1.1	3.4
Japan	2.9	1.0	-0.5	2.5
Australia	3.2	3.4	3.6	3.2
China	9.7	6.8	7.2	6.5
Africa	2.4	3.4	3.9	2.8
South Africa	1.3	2.3	1.6	3.0
Central and Eastern Europe	-2.7	0.7	-0.6	2.0
Memo Items				
OECD	2.6	2.5	2.2	2.8
Asia excl. China, Japan	6.9	2.7	1.3	4.1
Asia excl. Japan	7.9	4.1	3.3	4.9

Consequently, **international competition** is expected to **remain intense**. Chances that price trends on world markets will be moderate are now relatively good. This holds true for commodity prices, especially oil prices, as well as for prices for industrial goods. A contributory factor is that the risk of job losses has a tendency to lower labour costs everywhere and that international capital markets now quickly and effectively punish countries which attach insufficient importance to stability than before by forcing currency depreciation and interest rate hikes.

4 Forecasts for development in the metal industry

The following consists of forecasts for the metal industry and for the sub-branches of the automobile industry and the radio, TV and communications equipment industry, as seen against world and regional production and employment trends, for 1997 to 2005. The forecasts are based on the results worked out in the second chapter in relation to past trends, and on the expected general world economic conditions (see chapter 3). As far as the forecast timeframe is concerned, the periods of 1997 to 2001 and 2001 to 2005 are presented separately[4].

4.1 Background and basic assumptions

The main macroeconomic factors, which influence the development of the metal industry in the medium and long term, should be viewed within a rough framework. The integration of the emerging and developing countries in Asia and South America as well as that of the Central and Eastern European countries will move ahead once the crisis situation is overcome. In the future, world trade will also expand faster than world production, and the developing countries will become more important for the world economy. Competition in the metal industry will remain keen, as a result of which there will only be limited manoeuvring room as far as prices are concerned.

For the metalworking companies in the leading industrialised countries, it will therefore be necessary to concentrate on the production of goods for which they enjoy potential advantages over new competitors, i.e. goods that can be produced on a capital- or human capital-intensive basis. On the other hand, they will steadily lose market share to new rivals when it comes to goods that tend to be labour intensive and are produced with limited capital investment and little know-how.

In addition to the restructuring of the product mix, the increasing international division of labour is also affecting production processes. There are potential cost savings everywhere where part of production is shifted to sites with lower costs for the same quality or primary products are purchased on more favourable terms from other companies. Thus, the metalworking companies of the industrialised countries intend on the one hand to internationalise their production sites or, on the other, to limit production to specific parts of the value added chain, which contain only high value added components.

As far as the industrialised nations are concerned, the long-term, above-average high growth rates for non-triad countries are not only hastening the rise of new rivals but also offering new growing dynamic markets. Whereas in some market segments of the metal industry, for

[4] The first period is not, strictly speaking, a forecast, but rather a partial estimation based on past trends.

example, the automobile industry, signs of saturation can be seen within the triad, there are considerable basic needs in the emerging countries and in Eastern Europe. Accordingly, these markets will become more important than before for metalworking companies in the industrialised nations.

The metal industry, which encompasses a very broad range of products, is characterised by different development paths in the individual segments. Companies with internationally competitive and innovative products and production processes will benefit on the whole, because they will open up new dynamic marketing areas with development potential. The branches of non-electrical machinery, automobile industry, aircraft and spacecraft as well as parts of the electrical industry should fall into this category. However, companies which face additional competition from up-and-coming countries on their traditional markets and which have neither quality nor price advantages to offer will be driven out of the market. This will probably include companies in metal manufacturing and the production of simple metal goods.

Wherever companies from the industrialised countries are obliged to withdraw, the up-and-coming countries will make steady progress. However, given the large number of such countries and their companies, competition between these companies will also be intense. Accordingly, it will be of prime importance for these countries, on the basis of current production advantages that primarily lie in the cost sphere, to make a sustained innovation push and narrow the technological gaps separating them from industrialised producers. Here, the winners will primarily be countries that participate in the international transfer of know-how and also have access to the international capital market. For international companies and investors, risks relating to their investment decisions must be quantifiable. Moreover, access to a sufficiently large marketing area is a key decision-making criterion. Experience shows that these requirements are a stable political climate, reliable general conditions, and membership of integrated economic blocs. Countries that meet these conditions will be the first to benefit from the international division of labour and integration.

4.2 Metal industry as a whole

4.2.1 Production trends

On the basis of the above assumptions, metal industry production worldwide between 1997 and 2005 is expected to show average **growth of 2.8 % p.a.** (see table 21). During the period under review, production growth will be lower than in the past but will remain on a par with GDP worldwide.

The decisive factor for production trends in the metal industry between 1987 and 1997 was the dynamic developing countries in Asia and South America as well as cyclical trends in North America. European national economies, on the other hand, featured below-average growth rates and production in Central and Eastern Europe collapsed within the framework of the transition process.

The present situation shows other trends and therefore points to a different development between now and 2005. The **Asian countries** will only recover slowly from the dramatic collapses that occurred during the 1998 crisis. Above-average production increases in comparison to world production can only be expected at the end of the period under review. On average for the entire period from 1997 to 2005, Asia can only be expected to post slightly above-average growth. The primary uncertainty when it comes to assessing production trends has to do with China. If it manages to obtain full WTO membership by 2005, i.e. if China opens its borders up to imports, the competitive position of the Chinese companies and State firms will worsen considerably. At this point in time, this development is every bit as difficult to predict as the stability of the political system. On the whole, it is assumed that China will feature very high production growth relative to the world average but smaller than in the past.

The effects of the Asian crisis can also be felt in **South America.** In 1999, production fell in most South American countries, after a growth slowdown in 1998. No economic upturn can be expected before the year 2000. Over the long run, the South American countries will benefit from the sought-after expansion of Mercosur as well as increasing economic co-operation between North and South America. As a link and a NAFTA member, Mexico will post the largest production gains. The sought-after co-operation agreement between Latin America and the European Union is not expected to produce any positive effects by the year 2005. In South America, above-average growth is expected in the metal industry for the period after 2001, in comparison to world production trends.

Table 21: Production of the metal industry, 1987 – 2005

	Annual percentage change			
			Forecast	
	87/97	**97/05**	**97/01**	**01/05**
World	3.2	2.8	2.7	3.0
EU (15)	1.1	2.4	2.6	2.3
Germany	2.0	1.9	2.2	1.6
France	1.3	2.1	2.3	2.0
Italy	2.2	2.4	2.5	2.2
United Kingdom	2.2	2.2	2.4	2.0
North America	5.4	3.2	3.8	2.6
USA	5.5	3.2	3.9	2.6
Latin America	2.4	2.8	2.0	3.7
MERCOSUR	1.2	2.1	1.1	3.0
Mexico	6.3	4.6	4.4	4.8
Asia	5.8	3.2	2.2	4.1
Japan	2.4	0.7	-0.5	2.0
Australia	2.6	3.1	3.2	3.0
China	11.3	5.9	5.7	6.0
Africa	n.a.	n.a.	n.a.	n.a.
South Africa	1.1	2.4	1.5	3.2
Central and Eastern Europe	-4.8	0.6	-0.4	1.5
Memo Items				
OECD	3.0	2.4	2.4	2.4
Asia excl. Japan	10.3	4.7	3.9	5.5

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In **North America**, the boom will peter out slowly. By the end of the period under review, the increase will be below average. On the other hand, production growth in **Europe** will pick up and will run at a higher rate throughout the entire period than in the past.

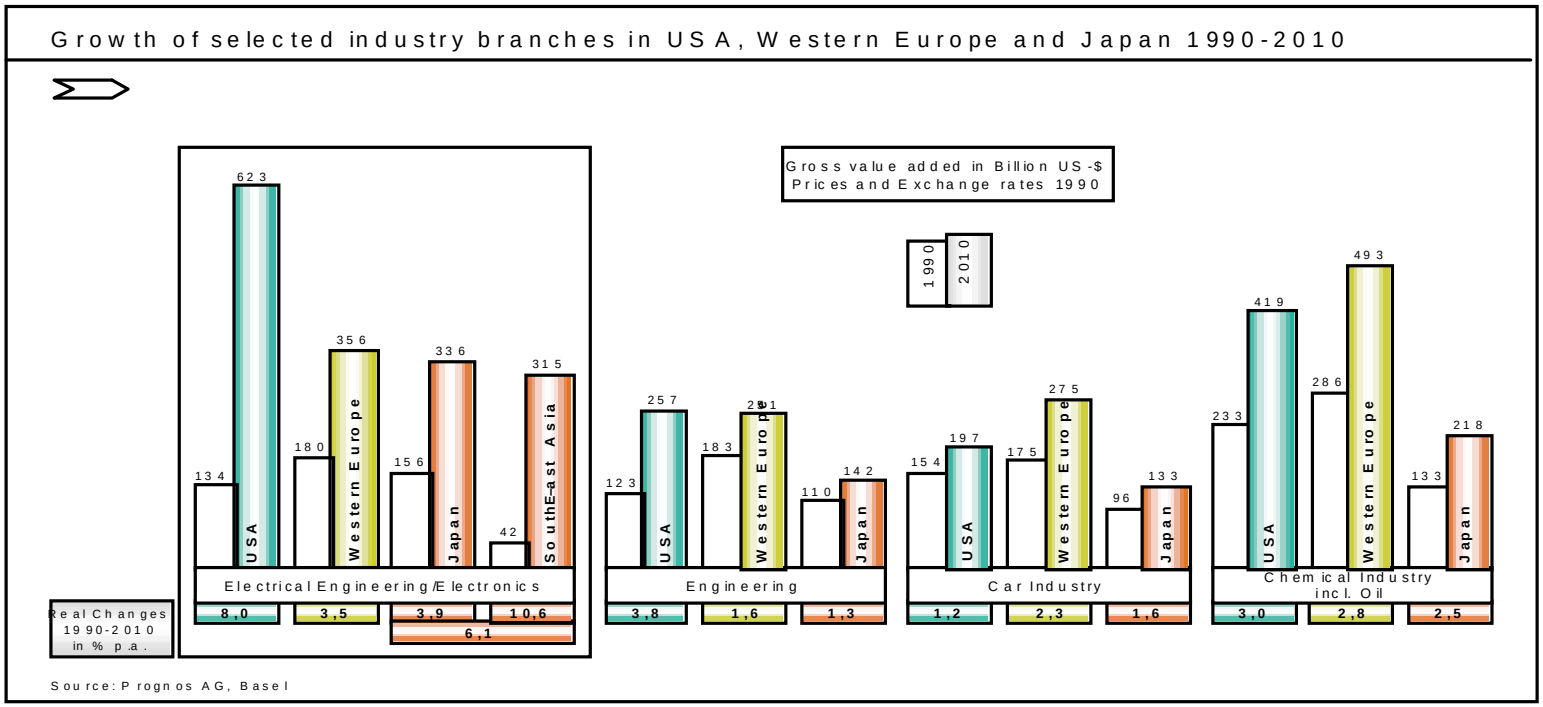
In **Central and Eastern Europe**, the contraction process is by and large over and a consolidation phase is beginning. Over the long run, production increases can once again be expected. In this connection, candidates for admission to the European Union will continue to perform significantly better than Russia. However, this estimation is full of uncertainties. Possible setbacks in the transition process would also have a negative impact on production and employment in the metal industry.

Regional growth differences will on the whole be **smaller than in the past.** In the emerging and developing countries of Asia and South America, a phase of continuous growth at a slower pace is beginning after a decade of dynamic growth rates followed by stunning production losses. North America and Europe are characterised by opposing cyclical trends, while the far-reaching adjustment measures in Central and Eastern Europe have not yet come an end.

On the basis of this development, there will be fewer **shifts in the regional production structures** in the metal industry. The market share gains of emerging and developing countries will be **smaller in the future**. However, there will be no change in the long-term trend, i.e. these countries will keep on gaining world market share. Production increases in the Asian and South American countries will be higher over the long term than in the industrialised countries, because the emerging and developing countries are still in the process of catching up. On the other hand, it cannot yet be assumed that the Central and Eastern European countries will further increase their market share worldwide. Here, the main obstacle is the uncertain growth outlook for Russia. The African continent (significant data is not available) will not become more important during the period under review as a production site or a marketing area. Nothing would appear to indicate that the African countries are entering a growth phase comparable to the dynamic performance of certain Asian countries in the past. Nevertheless forecasts for South Africa indicate that production in the metal industry will grow at a 3.2% per annum, that is slightly above world average.

The position and **importance of the metal industry for the world economy will remain high** during the period under review, because the lower production growth in the metal industry is the result of a less favourable economic outlook. The products of the **metal industry** are **future oriented** and will benefit from long-term demand, even though trends may vary depending on the individual branch (see figure 9). The clear structural shifts visible in the past (see chapter 2) will remain in evidence until 2005.

Fig.9


Growth of selected industry branches in USA, Western Europe and Japan 1990-2010
Gross value added in Billion US-$
Prices and Exchange rates 1990
1990
2010
Electrical Engineering/Electronics
USA
Western Europe
Japan
SouthEast Asia
134
623
180
356
156
336
42
315
Real Changes 1990-2010 in % p.a.
8,0
3,5
3,9
6,1
10,6
Engineering
123
257
183
291
110
142
3,8
1,6
1,3
Car Industry
154
197
175
275
96
133
1,2
2,3
1,6
Chemical Industry incl. Oil
233
419
286
493
133
218
3,0
2,8
2,5
Source: Prognos AG, Basel

4.2.2 Employment trends

World employment in the metal industry will continue to decline. Between 1997 and 2005, it is estimated that there will be an average **decline in employment of 0.6% p.a.** (see table 22). Owing to lower production growth and continuing high productivity, employment will fall more sharply than between 1987 and 1997 (- 0.2% p.a.). Against the backdrop of the present crises in Asia and South America and uncertainty as to future economic development in Central and Eastern Europe, this estimation of future job losses is rather conservative. In practice, however, development trends may vary sharply at the regional level when compared with the past. This cannot be explained solely by considering world employment, because opposite effects cancel each other out.

Between 1987 and 1997, there were significant job losses in the metal industry in Central and Eastern Europe owing to the transition process. In the majority of the OECD countries, job losses were steady due to productivity increases that outstripped production growth. In the developing countries, particularly in Asia, employment was boosted by high production growth. The positive employment effects in the latter countries and the negative effects in the OECD countries cancelled each other out. On the whole, employment in these countries remained relatively constant. Consequently, the decline in employment worldwide between 1987 and 1997 was due to a large extent to trends in the Central and Eastern European countries in transition.

Due to changes in regional production, the present employment situation is characterised by other trends. In the **Central and Eastern European countries** where the transition process is well advanced, employment should continue to decline up until 2005 though at a much slower pace than between 1990 and 1997. For the period between 2001 and 2005, job losses will average -0.5% p.a.

In the **Asian** developing countries (excluding China), employment in the metal industry will follow a completely different pattern than in the past. The production collapses in 1997 and 1998 and the slow recovery process will lead on average between 1997 and 2001 to a decline in employment of 3 to 4 % p.a. Since it is assumed that long-term production increases will not equal the dynamic performance of the pre-crisis era, the period between 2001 and 2005 is expected to show only a slight average decline in employment. These gains will in all likelihood be smaller than job losses during the crisis years. Consequently, overall employment during the entire period under review will decline by an average of 1 to 2% p.a. In these countries, the **number of persons employed** in the metal industry will be **less in 2005 than in 1997.** There is no chance that jobs will be created on the same scale as between 1987 and 1997 (3 to 4% p.a.). Regarding China, WTO membership will accelerate economic opening and liberalisation. It is to be expected that the reforms mandated by the WTO will result in the closure of numerous state-owned entreprises and the dismissals of thousands of metalworkers. As restructuring proceeds, China is going to experience higher unemployment which will have destabilising effects in the country and, possibly, in the whole region.

Table 22 : Employment in the metal industry, 1987 - 2005

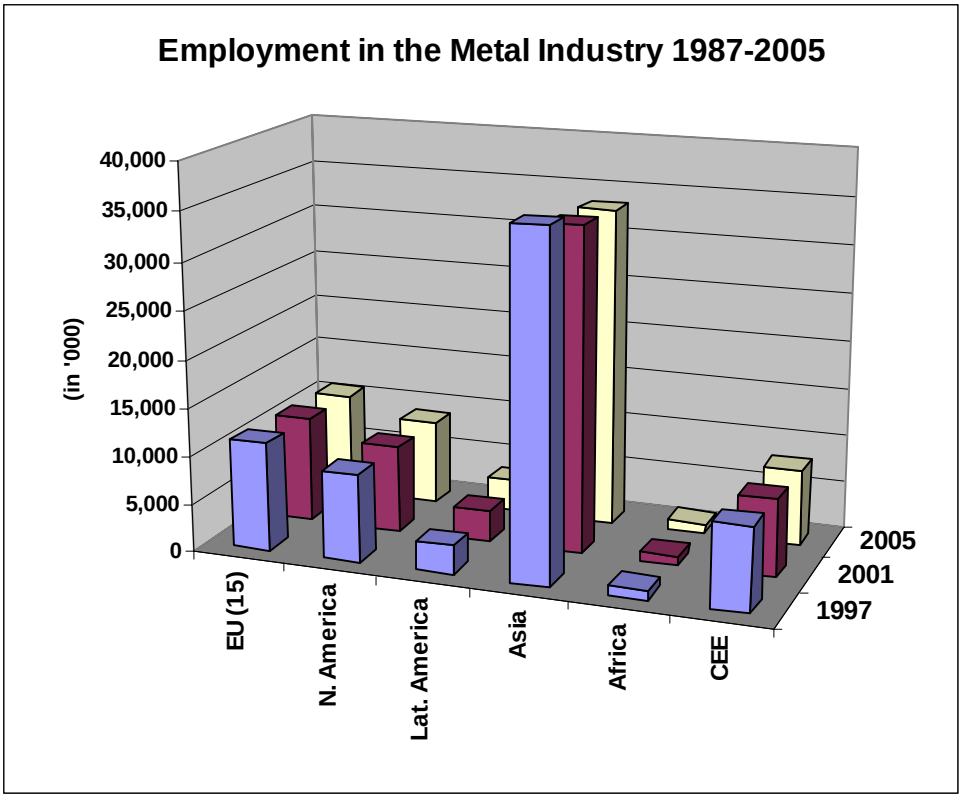
	Employment (thousands)			Annual percentage change				Percentage share		
	1997	2001	2005	87/97	97/05	97/01	01/05	1987	1997	2005
World	70,011	67,558	66,783	-0.2	-0.6	-0.9	-0.3	100.0	100.0	100.0
EU (15)	11,320	11,095	10,831	-1.7	-0.6	-0.5	-0.6	19.1	16.7	16.8
Germany	3,637	3,565	3,452	-3.0	-0.7	-0.5	-0.8	7.0	5.4	5.4
France	1,868	1,839	1,788	-1.4	-0.6	-0.4	-0.7	3.0	2.8	2.8
Italy	1,165	1,155	1,133	-1.7	-0.4	-0.2	-0.5	2.0	1.7	1.8
U. K.	1,997	1,950	1,904	-1.2	-0.6	-0.6	-0.6	3.2	2.9	3.0
North America	9,090	9,018	8,910	-0.1	-0.3	-0.2	-0.3	13.1	13.4	13.9
USA	8,366	8,299	8,167	-0.2	-0.3	-0.2	-0.4	12.1	12.3	12.7
Latin America	2,993	3,263	3,390	3.0	1.7	2.3	1.0	3.2	4.3	5.0
MERCOSUR	1,640	1,620	1,686	1.4	0.3	-0.3	1.0	2.0	2.4	2.6
Mexico	1,353	1,643	1,704	5.3	3.2	5.3	0.9	2.0	2.0	2.5
Asia	35,709	33,751	33,347	1.0	-0.9	-1.4	-0.3	45.8	52.6	51.9
Japan	5,271	4,862	4,633	-0.2	-1.6	-2.0	-1.2	7.6	7.8	7.2
Australia	333	328	321	-2.0	-0.4	-0.4	-0.5	0.6	0.5	0.5
China	21,950	21,601	21,257	0.5	-0.4	-0.4	-0.4	29.6	32.3	33.1
Africa	970	997	1,025	-0.5	0.7	0.7	0.7	1.4	1.4	1.6
South Africa	485	500	515	-0.5	0.8	0.8	0.8	0.7	0.7	0.8
CEE	8,626	8,120	7,959	-3.7	-1.0	-1.5	-0.5	17.8	12.7	12.4
Memo Items										
OECD	28,580	27,676	27,018	-0.8	-0.7	-0.8	-0.6	43.7	42.1	42.0
World excl. CEE	59,243	57,015	56,355	0.2	-0.6	-1.0	-0.3	82.2	87.3	87.6
Asia excl. Japan	30,438	28,889	28,715	1.3	-0.7	1.3	-0.2	38.2	44.8	44.6

Prognos; For Mexico, International Metalworkers' Federation

In the major **OECD** industrialised countries, past trends will continue more or less unchanged. **Employment** in the metal industry **will decline** by an average 0.7% p.a. between 1997 and 2005. Although production increases in these countries will be lower than in the past, the decline in employment is not expected to become more pronounced. Companies have adjusted to changes in general economic conditions worldwide and have reoriented their production sites and processes and modified their product mixes. To a large extent, the decline in employment is due to the closure of companies that were uncompetitive or unable to afford the adjustment processes. Although one-time effects also played a part in the past, they will become less important in the present and up to 2005 in relation to the long term trend.

However, employment trends in the metal industry are expected to diverge in the individual OECD countries. **Japan** has been hardest hit by the Asian crisis and is further burdened down by structural problems. On average, the decline in employment from 1997 to 2005 (-1.6% p.a.) will be significantly larger than between 1987 and 1997. In the **US** metal industry, new jobs were created between 1992 and 1997. Due to less favourable economic expectations, a trend reversal is expected in this connection. For the entire period under review, employment is expected to decline within the framework of the long-term average (-0.3% p.a.). In contrast, the economic outlook is more positive in **Europe**. Due to higher production growth than in the past, production trends will remain relatively unchanged and the decline in employment will slow down. Although the employment outlook for Europe is improving, it is not expected that additional jobs will be created in the long run. The declines in employment will merely slow down due to cyclical effects. On the contrary, employment in Mexico is expected to continue its upward trend though at a lower pace than in the 90s.

Figure 10



4.3 Automobile industry

With **7.7 million employees worldwide**, the automobile industry is one of the largest branches of the metal industry. In the OECD countries, which account for some 89% of world automobile production, some 14% of all metalworkers were employed in the automobile industry in 1997. This share worldwide is around 9%. Production breaks down relatively evenly between North America, Europe and Asia, with about 30% each. The leading

producers are the US (1997 share: 27%), Japan (21%) and Germany (12%). In 1998, 52.6 million motor vehicles were produced worldwide, of which 72% were passenger cars and 28% were commercial vehicles.

The automobile industry is of great importance for the metal industry, but **is not a dynamic growth market**. On a long-term basis, production growth for the automobile industry has merely kept up with growth for the metal industry as a whole. In the industrialised countries, private vehicle ownership is already at a very high level and is tending towards saturation. In these countries, replacement purchases are more important than new acquisitions. Consequently, cyclical fluctuations are very pronounced. However, the developing countries in Asia and South America as well as the Central and Eastern European countries experienced dynamic growth. The overall economic trend was a decisive factor for growth in these countries. Rising per capita income has gone hand in hand with rising ownership of passenger vehicles. In addition, the volume of goods transported (hence demand for commercial vehicles) rises when economic growth increases. In the developing countries, growth was achieved by selling more units, whereas growth in the industrialised countries concentrated on adding value. Since the world market as a whole offers only modest potential for growth, competition is very strong, i.e the major automobile groups will tend to outbid each other and the market will be characterized by cutthroat competition. Companies are forced to bring out new models at ever shorter intervals in order to persuade consumers to buy new cars, thereby enabling them to hold on to their market share. With shorter product life cycles, the only way to recoup development costs for new models is to increase the number of units sold or to spread development costs out among several models. **In the long run,** there is **only room for a few large players** on this market, which produce and sell worldwide (global players).

4.3.1 Production trends

At **2.1% p.a.,** average production growth in the automobile industry between 1997 and 2005 will be significantly **lower than in the past** and will thus be less than growth for the metal industry as a whole (see table 23). This is due to weaker growth impulses from the developing countries and market saturation in the industrialised countries.

By the year 2001, the **Asian** developing countries will have only managed to return to pre-crisis production levels. Consequently, these countries will only show zero growth between 1997 and 2001. In 1998, motor vehicle production in these countries fell 19%, after posting increases of over 10% in previous years. In individual countries, such as Malaysia and South Korea, production even plummeted by as much as 50%. For the second half of the period under review (2001 to 2005), further increases are expected that will be significantly higher than the growth of world output. However, at some 6% p.a., such increases will only be half as big as before the crisis.

Table 23: Production of the automobile industry, 1987 – 2005

	Production* US $ million			Annual percentage change				Share of percentage		
	1997	2001	2005	87/97	97/05	97/01	01/05	1987	1997	2005
World	1,287,382	1356,769	1525,298	3.0	2.1	1.3	3.0	100	100	100
EU (15)	387,537	436,177	485,226	2.6	2.8	3.0	2.7	31.3	30.1	31.8
Germany	150,596	169,497	190031	1.7	2.9	3.0	2.9	13.3	11.7	12.5
France	71,672	80,668	89,739	2.8	2.8	3.0	2.7	5.7	5.6	5.9
Italy	31,346	34,197	36,582	0.7	1.9	2.2	1.7	3.1	2.4	2.4
United Kingdom	50,040	54,164	59,091	3.2	2.1	2.0	2.2	3.8	3.9	3.9
North America	413,697	447,798	494,286	3.0	2.2	2.0	2.5	32.1	32.1	32.4
USA	342,871	368,233	406,460	2.6	2.1	1.8	2.5	27.8	26.6	26.6
Latin America	43,538	50,933	60,739	9.6	4.2	4.0	4.5	1.8	3.4	4.0
MERCOSUR	27,139	31,505	37,141	8.1	4.0	3.8	4.2	1.3	2.1	2.4
Mexico	16,069	19,532	24,197	13.3	5.2	5.0	5.5	0.5	1.2	1.6
Asia	394,376	363,760	417,423	3.8	0.7	-2.0	3.5	28.3	30.6	27.4
Japan	270,484	239,458	259,197	1.4	-0.5	-3.0	2.0	24.5	21.0	17.0
Australia	8,250	7,154	7,445	0.4	-1.3	-3.5	1.0	0.8	0.6	0.5
China	56,933	71,876	90,742	32.1	6.0	6.0	6.0	0.4	4.4	5.9
Africa	n.a.	n.a.	n.a.	-	-	-	-	-	-	-
South Africa	4,735	5,226	5,769	1.5	2.5	2.5	2.5	0.4	0.4	0.4
CEE	43,500	52,875	61,856	-2.8	4.5	5.0	4.0	6.1	3.4	4.1
Memo Items										
OECD	1,139,994	1,187,454	1,312,371	2.7	1.8	1.0	2.5	91.2	88.6	86.0
World excl. CEE	1,243,882	1,303,894	1,463,442	3.3	2.1	1.2	2.9	93.9	96.6	95.9
Asia excl. Japan	123,892	124,302	158,226	13.1	3.1	0.1	6.2	3.8	9.6	10.4

* 1990 prices prognos

The effects of the crisis in the Asian developing countries have also spread to the **Japanese automobile industry**. Combined with unfavourable domestic economic trends, this led to a quantitative production drop of 8% in 1998. Even if further production increases are possible after 2001, quantitative production is expected to decline by an average of 0.5% between 1997 and 2005, i.e. relatively less than during the mid-90s. However, production losses between 1992 and 1997 of 1.1% p.a. were *inter alia* the result of transfers of production via the establishment of production sites in North America and Europe (transplants). Consequently,

the effects of the expected production losses will hit the Japanese automobile industry much harder than the production transfers of the past.

The **Latin American automobile industry** is facing a crisis at the moment. In Brazil, the leading producer in the region, some 20% fewer passenger cars were produced in 1998 than in 1997. Owing to the gloomy overall situation, the other South American countries were also unable to post the same increases as in the past. Over the long term, due to an overall economic improvement, growth of some 4 to 5% p.a. is expected, a figure which is clearly above the increase in world output but does not match the pre-1997 increases.

As the transition process in **Central and Eastern Europe** moves ahead, this region is becoming increasingly important as a future-oriented market and production site. Since 1995, the number of vehicles produced has been rising once again. In view of the low rate of per capita vehicle ownership, an overall positive economic trend points to an above-average demand potential. As the Eastern European markets are still sealed off to imports through customs duties and trade barriers, rising demand is expected to result in production growth of 4 to 5% p.a. for 1997 to 2005. Exports to the European Union are essential for certain countries (Poland, Czech Republic).

In **North America** and the **European Union**, an average production increase of 2 to 3% p.a. is expected for the entire period under review. As has already been explained, per capita vehicle ownership is very high in these countries and most long-term growth will come from added value. In the US, following a boom in the mid-90s, the volume of production already declined by 1% in 1998. As signs of weakening overall economic growth in North America can already be seen, production growth for the automobile industry will clearly lag behind the previous pace of growth. As far as the EU is concerned, however, the expected cyclical upturn should also benefit the automobile industry. In these countries, quantitative production of passenger cars rose by some 8% in 1998 to 16.5 million units. For the period as a whole, forecasts call for growth higher than in North America and slightly better than between 1987 and 1997. In the past, the European automobile industry, in particular in Germany, was able to improve its international competitive position in comparison to the early 90s through restructuring and mergers.

As for worldwide automobile production, due to these regional trends, only a slight production increase is expected - a factor that will not fail to affect the employment situation.

4.3.2 Employment trends

Worldwide **employment** in the automobile industry is not expected to rise as it did between 1987 and 1997; rather, it is forecast to fall by an average of **0.7% p.a.** between 1997 and 2005 (see table 24). As explained in the introduction, competition is extremely keen on automobile markets, which are predominantly saturated. As a result, automobile groups are forced to resort to mergers or joint ventures to take advantage of opportunities for cost savings via synergies. This has led to productivity increases which, combined with lower production growth, have resulted in corresponding job losses. The same trend could also be seen in the past, and will also be decisive as far as future employment trends in the automobile industry are concerned. In this connection, trends in the different regions will differ on the basis of varying production expectations.

As far as **North America** is concerned, for the entire period under review, an average annual decline in employment of 1% is expected. Since North American production growth in the automobile industry is lower than in the past and lags behind productivity increases, jobs will also be lost. In the first half of the period under review, this decline was steeper than usual. In the US, the major industrialised country with the highest number of employees in the automobile industry, new jobs were created in the automobile industry due to comparatively high production increases between 1992 and 1997. In comparison to the European countries, it can be seen that employment trends in the US react very rapidly to changes in output. When the volume of orders increases, employment also increases, and when production drops, employment also falls quickly.

In the **EU** countries, the trend is the opposite. Against a backdrop of more positive output trends, job losses have been less pronounced than in the past and are expected to show a long-term average of - 0.5% p.a. for 1997 to 2005. However, given the long-term trend in the prevailing competitive situation, it cannot be expected that additional jobs will be created. This assessment is based *inter alia* on the sharp decline in employment experienced in the past. In 1997, these countries employed 10% fewer persons in the automobile industry than in 1987.

In **Latin America**, employment in the automobile industry in the year 2005 is forecast to be higher than in 1997. Due to the current crisis, jobs are being eliminated at present, especially in Brazil. In coming years, the jobs eliminated will be filled again, but nothing more. Even if production trends are more favourable than expected, due to under-utilised capacity and potential productivity increases, no strong growth can be expected as far as employment is concerned. On the other hand, employment is expected to rise in Mexico owing to more favourable production trends.

Marginally more positive trends as regards world employment in the automobile industry are expected for the **Central and Eastern European countries.** Here, the decline in employment should level out by around the year 2001, after which the number of employees in the automobile industry will stagnate or rise slightly. As some 500,000 jobs (30%) were eliminated

in these countries between 1992 and 1997 the expected trend should be viewed as a very positive development.

In **Asia**, the only region in the world that posted a significant increase in employment between 1987 and 1997, fewer people will work in the automobile industry in 2005 than in 1997. Excluding China, average employment is expected to decline by 1 to 2% p.a. for 1997 to 2005. No up-to-date information is available on the impact of the Asian crisis on employment. It may, however, be assumed that in individual countries such as South Korea, Malaysia and Indonesia, employment fell by some 20 to 30% as a result of production drops in 1998. Owing to relatively under-average production growth following the crisis, it is unlikely that job losses in 1998 will have been offset by the end of the period under review. Consequently, employment in the automobile industry in these countries will be lower in 2005 than in 1997. In **Japan** as well, owing to gloomy production expectations, a higher-than-average decline in employment is expected between 1997 and 2001. Overall in the period under review, one can count on a loss of 100,000 jobs. In **China**, the country with the most automobile-sector employees worldwide, it is not expected that any additional jobs will be created by the year 2005. As the productivity of the some 2 million employees is very low in comparison to other countries, productivity is expected to rise sharply. This being so, it is very optimistic to assume that no jobs will be lost.

Table 24: Employment in the automobile industry, 1987 – 2005

	Employment			Annual percentage change				Share in percentage		
	thousand									
	1997	2001	2005	1987/97	1997/05	1997/01	2001/05	1987	1997	2005
World	7,797	7,502	7,397	0.7	-0.7	-1.1	-0.4	100	100	100
EU (15)	1,735	1,714	1,666	-1.0	-0.5	-0.3	-0.7	26.8	22.5	22.9
Germany	696	685	663	-1.5	-0.6	-0.4	-0.8	11.3	9.0	9.1
France	289	282	275	-1.9	-0.6	-0.6	-0.6	4.9	3.7	3.8
Italy	188	186	186	-0.5	-0.1	-0.2	0.0	2.8	2.4	2.6
United Kingdom	246	235	224	-0.4	-1.2	-1.2	-1.2	3.6	3.2	3.1
North America	1,122	1,069	1,039	0.4	-1.0	-1.2	-0.7	15.0	14.5	14.3
USA	984	930	904	0.4	-1.1	-1.4	-0.7	13.1	12.7	12.4
Latin America	295	324	333	0.1	1.6	2.4	0.7	2.8	3.8	4.5
MERCOSUR	132	127	129	-0.1	-0.3	-1.0	0.4	1.9	1.7	1.8
Mexico	158 [1)]	192	199	102.0	3.2	5.3	0.9	1.1	2.1	2.7
Asia	3,488	3,324	3,258	4.6	-0.9	-1.2	-0.5	31.0	45.2	44.7
Japan	775	672	659	0.5	-2.0	-3.5	-0.5	10.3	10.0	9.0
Australia	55	49	47	-0.9	-1.9	-3.0	-0.8	0.8	0.7	0.6
China	1,950	1,950	1,950	5.9	0.0	0.0	0.0	15.3	25.3	26.8
Africa	n.a.	n.a.	n.a.	-	-	-	-	-	-	-
South Africa	37	39	40	0.6	1.0	1.0	1.0	0.5	0.5	0.6
CEE	1,120	1,033	1,054	-4.1	-0.8	-2.0	0.5	23.7	14.5	14.5
Memo items										
OECD	3,953	3,742	3,651	0.0	-1.0	-1.4	-0.6	54.9	51.2	50.2
World excl. CEE	6,603	6,362	6,226	1.9	-0.7	-0.9	-0.5	76.3	85.5	85.5
Asia excl. Japan	2,713	2,652	2,599	6.2	-0.5	-0.6	-0.5	20.8	35.1	35.7

Source: Prognos; * INEGI and CMAP, Mexico

Owing to these regional employment trends, the automobile industry worldwide is expected to show an average decline in employment of 0.7% p.a., or in other words a **loss of 400,000 to 500,000 jobs.** Nevertheless, some 540,000 jobs were created in the automobile industry between 1987 and 1997, despite the fact that 500,000 to 600,000 jobs were eliminated in Central and Eastern Europe during that same period as a result of the transition process.

Figure 11

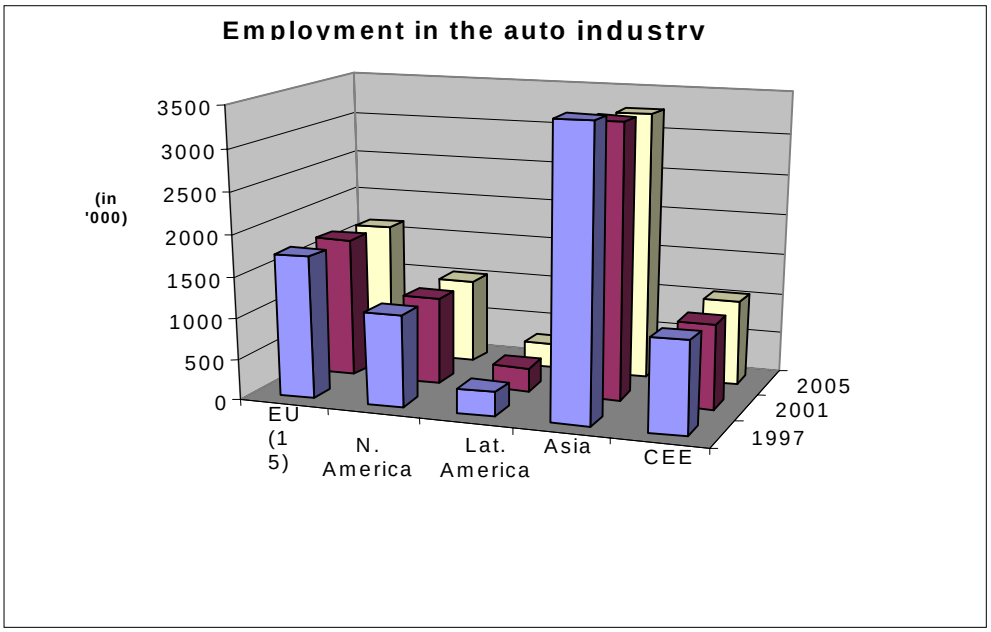
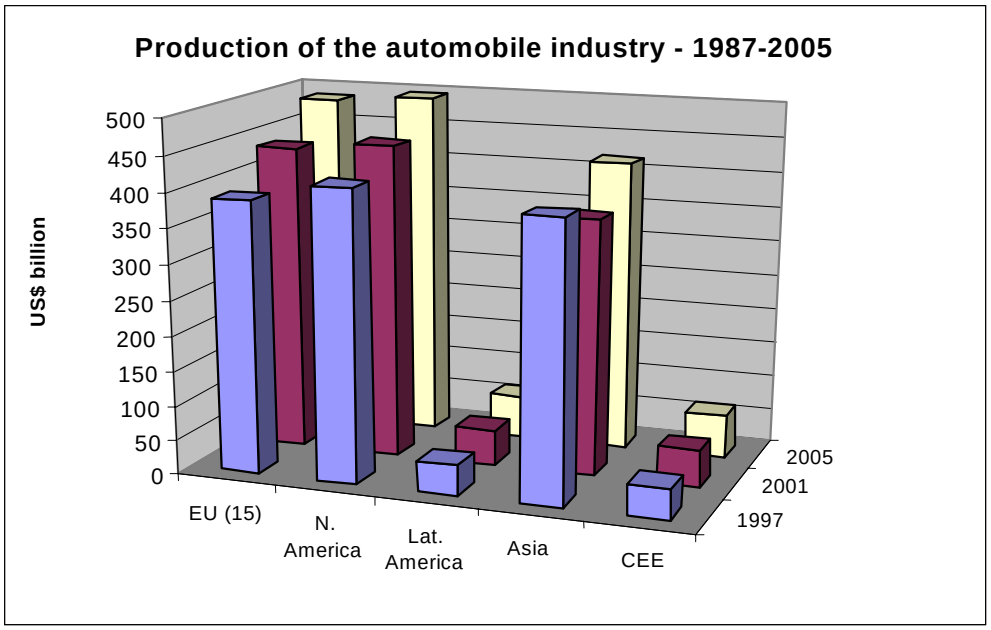


Figure 12



4.4 Radio, TV and communication equipment

This branch includes the manufacturing of radios and televisions, recording devices and VCRs, communication devices and facilities such as electronic components. Companies in this sector often have close ties with companies that manufacture computer equipment. There is a strong need for integration between the two branches. On the one hand, producers in the branch analysed manufactured components that are used in the production of computer equipment. On the other hand, technological advances in the field of new media (digital TV, mobile telephones, and automobile electronics) require product compatibility. As a result, this branch, which employs some 6 million workers worldwide, is subject to very dynamic and rapid change.

In terms of employment, this branch, with a share of 9% within the metal industry, is somewhat less important than the automobile industry. However, a look at average production increases for this branch, which averaged 9% p.a. from 1987 to 1997, shows that this economic branch is one of the **growth locomotives for the metal industry**. Nevertheless, market trends in the 90s are characterised by varying trends in the individual market segments. C**ommunications and electronic parts** recorded **above-average growth** due to product innovations and the liberalisation of telecommunications markets (mobile telephones) in Europe and the US. Structural change in the industrialised countries towards an information society has created a significant demand potential. On the other hand, growth in the **entertainment electronics** is very **modest**. A very high share of households is equipped with TVs, stereo systems and radios in the industrialised countries. Markets for mass-produced goods are bordering on saturation. Only fields such as product innovation, e.g. 16:9 broadband TVs or Dolby surround facilities, are showing above average growth. In the long run, this branch is hoping that digital technology for audio, video and recording media will boost growth.

The branch as a whole is characterised by **keen international competition**. As far as **standardised mass-produced goods** are concerned, Asian suppliers dominate due to cost advantages (wage costs). Half of all production in terms of value originates in Asia. When taken together, China and South Korea produce some 40% of all TVs manufactured worldwide (130 million units) and some two-thirds of all sound broadcasting devices. Due to falling average costs and rising production quantities (economies of scale), the branch features **steadily falling prices** and continuous **excess capacity** in almost all market segments, thereby placing considerable **concentration pressure** on manufacturers.

Worldwide **employment has only benefited slightly** in the past from dynamic production increases. Owing to productivity advances and insufficient competitiveness in the entertainment electronics industry as compared with Asian emerging countries, jobs were lost in Europe, the US and Japan between 1987 and 1997. New jobs were created in Asia (excluding Japan) and Mexico.

4.4.1 Production trends

Production for this branch is expected to increase by an annual average of around 6%, a slower pace than in the past (1987/1997 9 % p.a.) but faster than in the metal industry overall (see table 25). It is to be expected that **the branch will continue to be a growth locomotive** in the metal industry (see Figure 13). The pace of expansion will be slower than in the past, first of all because the restricted outlook for world economic growth will dampen increases in income and household consumption. Second, the production increases of the past were a result of the liberalisation and deregulation of telecommunications markets in the industrialised countries which, to a certain extent, have now been completed.

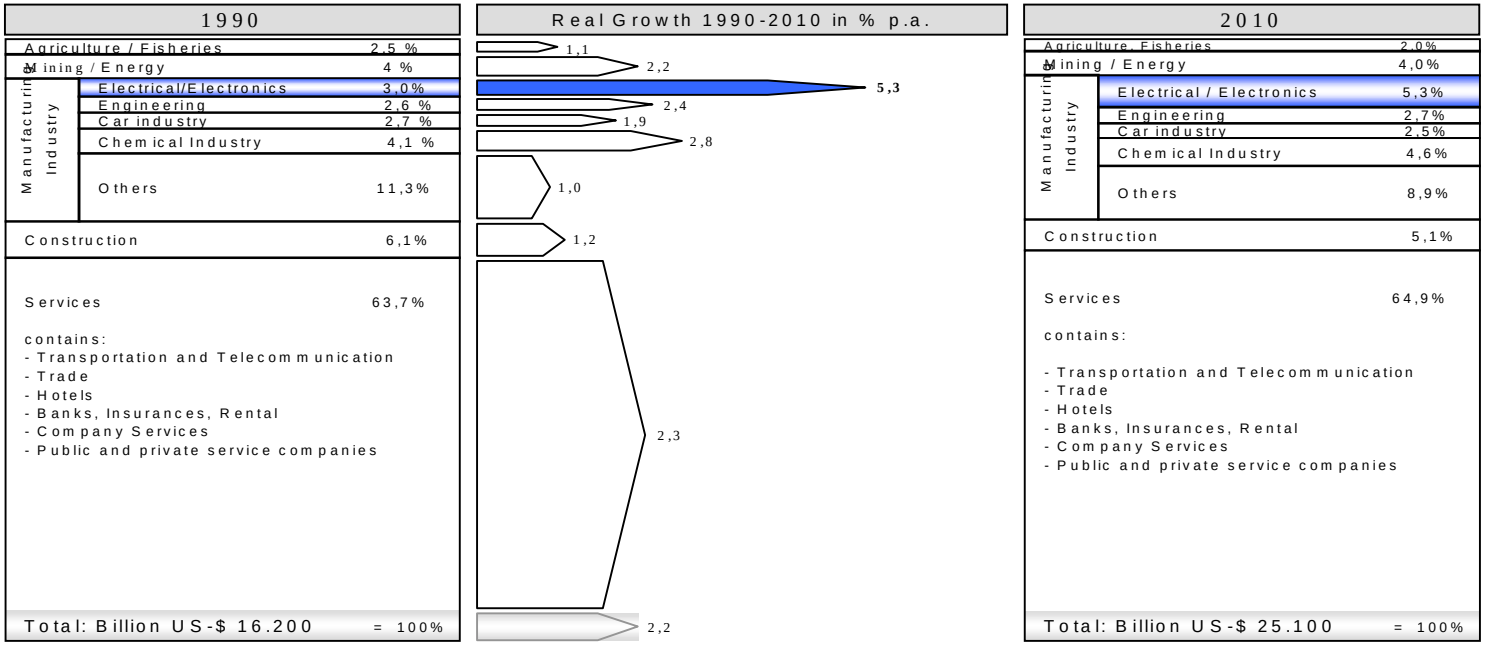
The latter is especially true for **North America**. In the US, the number of mobile phone subscribers nearly quadrupled between 1993 and 1997, and is significantly higher with 200 subscribers per 1,000 inhabitants than in France and Germany (some 100 subscribers per 1,000 inhabitants). Production increases stemming from the introduction of new technologies will therefore be somewhat lower during the period under review. All in all, average production growth in North America is expected to slow down to about 6 % p.a. for 1997 to 2005. In this connection, lower household demand for entertainment electronics equipment is only of secondary importance, as these devices are primarily imported, not produced in North America.

In the **European Union**, however, the long-term trend does not point to a slowdown in production growth. Production is expected to grow at an annual rate of 7% between 1997 and 2005, as in the past. Since telecommunications markets were deregulated later than in North America, market penetration of the new media is still relatively weak in Europe. Communications equipment technology and electronic components, which account for some 80% of production within the branch in Europe, still offer significant demand potential worldwide (see Figure 14). Moreover, the market adjustment in the entertainment electronics field, i.e. the crowding-out of non-competitive companies, is by and large over. This segment's share of overall production in the branch was a scant 22 % in Europe.

Figure 13

Industrialised Countries - Trends of the gross added value in branches 1990-2010

The Electrical / Electronics Industry – a branch with a growth above average



Source: Prognos AG, Basel; Prices and Exchange rates 1990

Figure 14

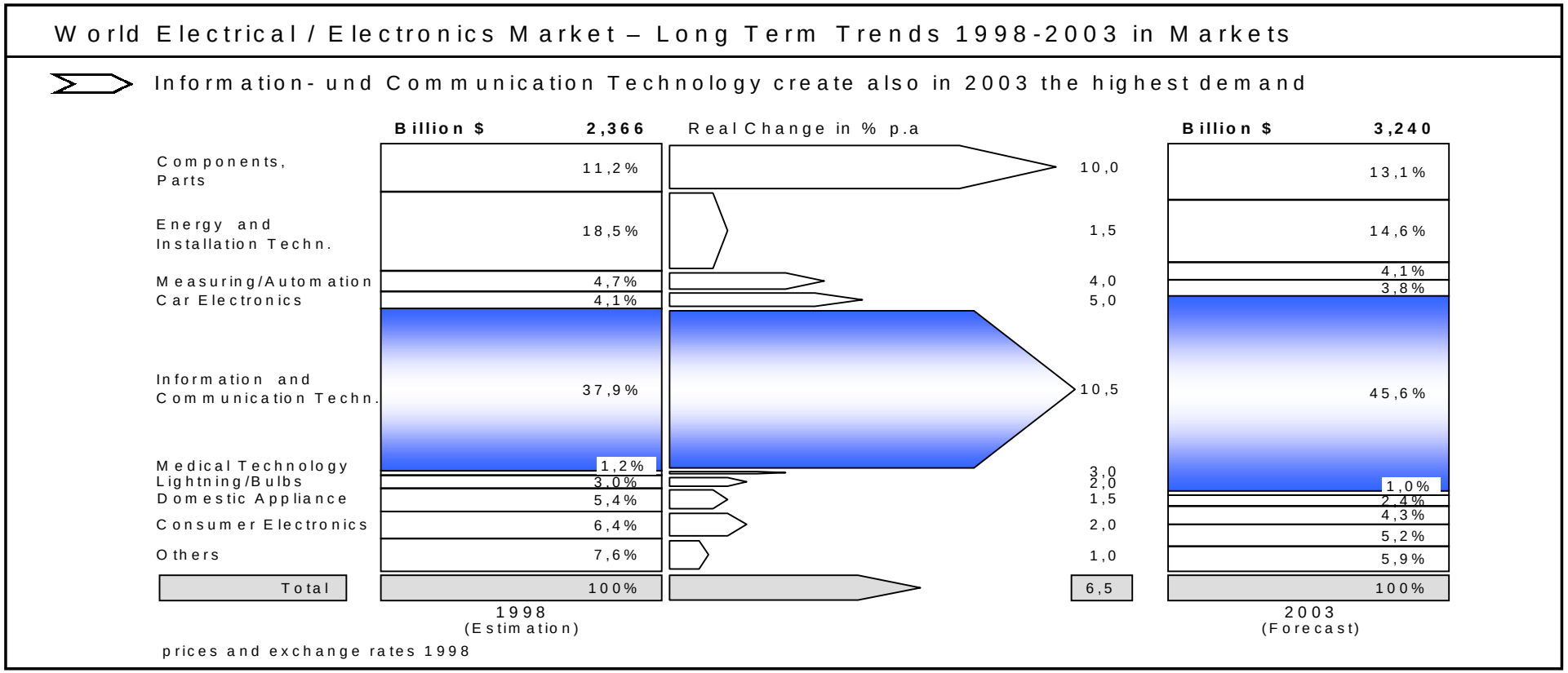

World Electrical / Electronics Market – Long Term Trends 1998-2003 in Markets
Information- und Communication Technology create also in 2003 the highest demand
Billion $ 2,366
Real Change in % p.a
Billion $ 3,240
Components, Parts
Energy and Installation Techn.
Measuring/Automation
Car Electronics
Information and Communication Techn.
Medical Technology
Lightning/Bulbs
Domestic Appliance
Consumer Electronics
Others
Total
11,2%
18,5%
4,7%
4,1%
37,9%
1,2%
3,0%
5,4%
6,4%
7,6%
100%
10,0
1,5
4,0
5,0
10,5
3,0
2,0
1,5
2,0
1,0
6,5
13,1%
14,6%
4,1%
3,8%
45,6%
1,0%
2,4%
4,3%
5,2%
5,9%
100%
1998
(Estimation)
2003
(Forecast)
prices and exchange rates 1998

Table 25: Production of the radio, TV and communication equipment industry, 1987 – 2005

	Production* US $ billion			Annual percentage change				Share of percentage		
	1997	2001	2005	87/97	97/05	97/01	01/05	1987	1997	2005
World	1,038,419	1,308,675	1,621,909	9.0	5.7	6.0	5.5	100	100	100
EU (15)	240,232	339,107	412,187	7.1	7.0	9.0	5.0	27.5	23.1	25.4
Germany	66,430	83,866	98,112	4.5	5.0	6.0	4.0	9.7	6.4	6.0
France	37,850	46,007	55,922	5.0	5.0	5.0	5.0	5.3	3.6	3.4
Italy	26,383	41,514	54,417	12.9	9.5	12.0	7.0	1.8	2.5	3.4
United Kingdom	44,705	65,453	79,558	7.9	7.5	10.0	5.0	4.7	4.3	4.9
North America	268,069	346,159	420,758	9.8	5.8	6.6	5.0	24.0	25.8	25.9
USA	250,774	322,612	399,660	9.8	6.0	6.5	5.5	22.5	24.1	24.6
Latin America	10,192	14,338	19,445	8.3	8.4	8.9	7.9	1.0	1.0	1.2
MERCOSUR	5,640	7,673	9,687	2.9	7.0	8.0	6.0	1.0	0.5	0.6
Mexico	4,552	6,665	9,758	28.5	10.0	10.0	10.0	0.1	0.4	0.6
Asia	515,567	603,141	761,451	9.5	5.0	4.0	6.0	47.3	49.6	46.9
Japan	229,817	243,919	274,533	4.0	2.2	1.5	3.0	35.2	22.1	16.9
Australia	499	731	994	8.9	9.0	10.0	8.0	0.0	0.0	0.1
China	81,854	115,544	163,099	15.0	9.0	9.0	9.0	4.6	7.9	10.1
Africa	n.a.	n.a.	n.a.	-	-	-	-	-	-	-
South Africa	4,359	5,930	8,068	19.8	8.0	8.0	8.0	0.2	0.4	0.5
CEE	n.a.	n.a.	n.a.	-	-	-	-	-	-	-
Memo										
OECD	832,854	1,071,438	1297,386	7.6	5.7	6.5	4.9	90.8	80.2	80.0
Asia excl. Japan/ China	203,896	243,678	323,819	20.1	6.0	4.6	7.4	7.4	19.6	20.0
Asia excl. Japan	285,750	359,221	486,918	18.4	6.9	5.9	7.9	12.1	27.5	30.0

* 1990 prices

prognos

In **Asia**, the region that experienced the fastest growth over the past decade, only an average production increase of 5% is expected between 1997 and 2005. The pace of expansion will only match that of world production. The growth dynamics of the past were due, on the one hand, to the transfer of production from Europe and North America to the Asian emerging countries. In the field of entertainment electronics, we can no longer expect relocation from the industrialised countries and production share gains of the same magnitude as in past years, as mentioned above. In recent years, production sites in Asia have already been shifted to countries with the lowest production costs. For example, the production of TVs, sound broadcasting devices and telephones in the Republic of China (Taiwan) has been declining for years. On the other hand, demand for simple electronic devices is rising in the area due to rising household income. Owing to the worsening of income prospects as a result of the Asian crisis, household consumption will also increase at a more modest pace. Domestic and intra-regional demand will post smaller increases. All in all, it may be assumed that average production growth will be some 2% in Japan between 1997 and 2005, as compared with some 7% for Asia, excluding Japan. As a result, the branch will expand much more slowly in the region than in the past.

In **Latin America**, it is expected that the period between 1997 and 2005 will be characterised by consistently high production growth in excess of average world production. The region will benefit from the proximity of North America. Mexico will run a foreign trade surplus with the US, i.e. it will export more goods from this branch to the US than it imports from it. Nevertheless, the entire region is a net importer as far as trade with the US is concerned. Although the effects of the present crisis situation cannot be predicted, the proximity of the US, the country with the largest production and the largest world market for goods from this branch, will in all likelihood continue to have a positive impact on the South American countries. Over 90% of all of Latin America's exports go to North America. Since the founding of NAFTA in 1994, exports rose by an average of 20 % p.a. between 1994 and 1997.

4.4.2 Employment trends

Owing to the above-mentioned production expectations, the number of **employees** worldwide in the radio, TV and communications equipment industry will **decline until the year 2005.** Although the branch is one of the growth locomotives in terms of production trends within the metal industry, employment is expected to decline between 1997 and 2005 by some 1% p.a. on account of the very high productivity increases. Consequently, the decline in employment will more or less be on a par with the trend for the metal industry as a whole. One thing is certain: there will not be any slight increase in employment as in the past (see table 26 and figure 15).

In the **OECD** countries, in 1997 there were around 400,000 less employees working in the branch than a decade previously, even though production had risen by some 8% p.a. This trend is expected to continue. In **Japan**, the country with the most employees among the major industrialised countries, job losses were higher than average at 2.5% p.a. In the OECD

countries as a whole, average decline in employment at some 2% p.a. was higher than in the past, owing to lower production expectations.

Figure 15

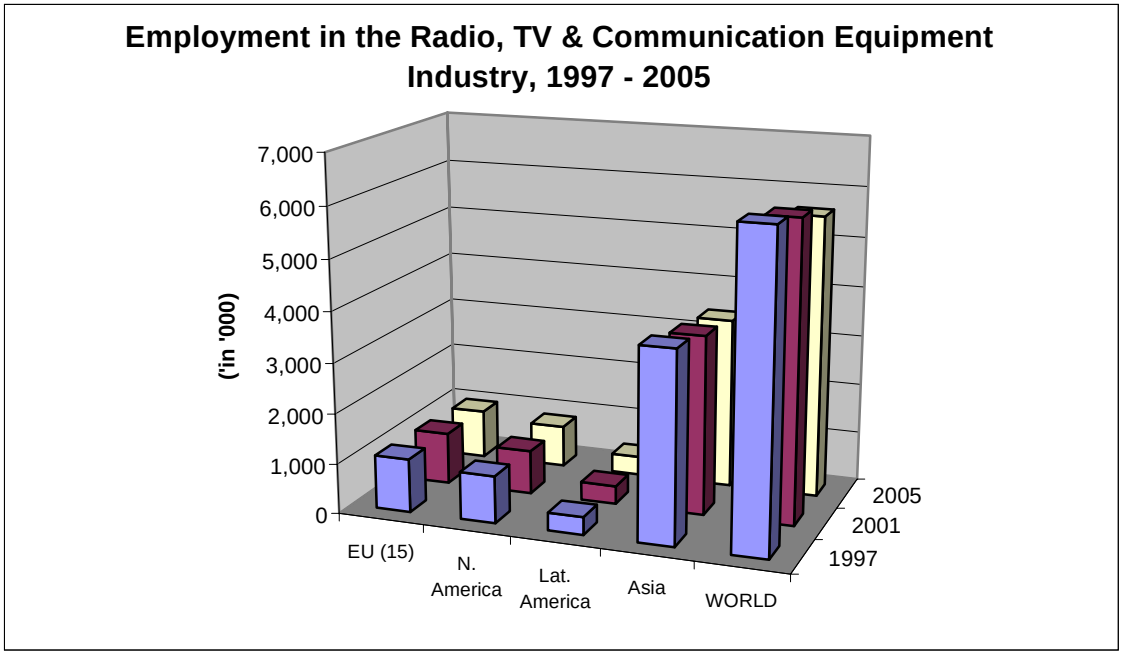
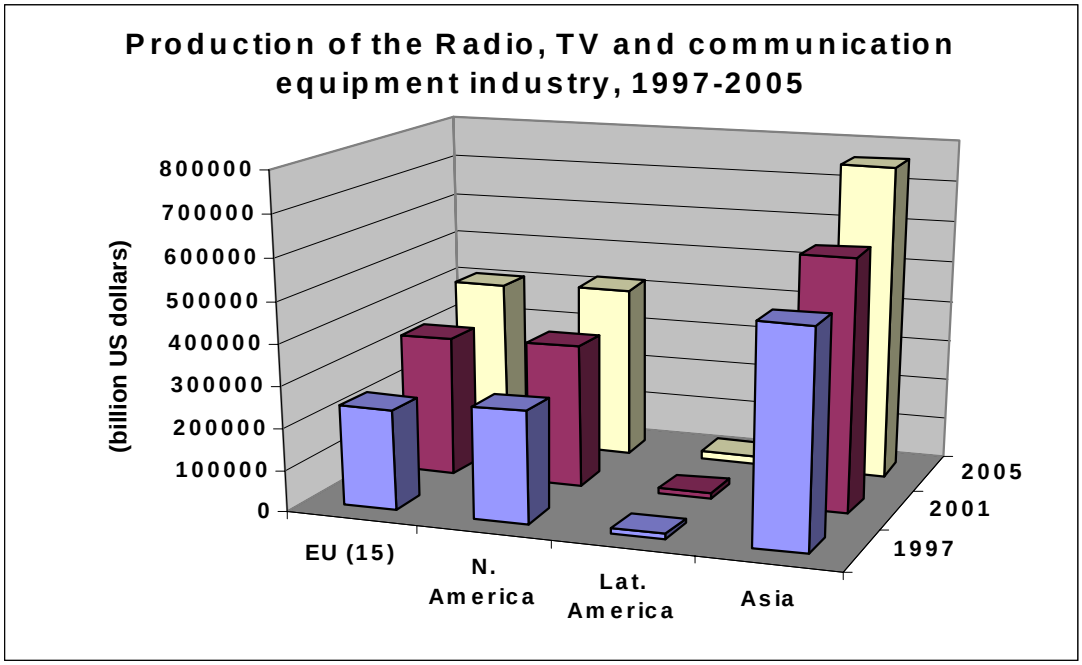


Figure 16



In the **Asian emerging countries**, a **negative trend reversal** for employment will occur. Whereas some 600,000 new jobs were still created in these countries between 1987 and 1997, it is expected that 200,000 jobs will be lost by the year 2005. In this connection, these countries' high market shares in individual branch segments play a key role, in addition to the negative impact on the Asian crisis on employment. These countries compete more intensely with each other than in other economic branches and less with the industrialised countries. Production is concentrated in sites within the region with the lowest production costs or shifted to such sites. As a result, the new jobs come at the expense of other Asian countries, not the industrialised countries. Only the above-mentioned trend in China stands in the way of an even steeper decline in employment in the region. As explained above, there is real uncertainty as to China's further overall economic development. As a result, the expectation that employment will decline by some 1% p.a. from 1997 and 2005 in the Asian countries excluding Japan is very optimistic.

Except for Mexico, employment in **Latin America**, which is at a low level, is forecast to show modest growth. As far as worldwide employment in the branch is concerned, these countries are also of secondary importance as far as production is concerned.

Table 26: Employment in the radio, TV and communication equipment industry 1987– 2005

	Employment thousands			Annual percentage change				Share in percentage		
	1997	2001	2005	1987/97	1997/05	1997/01	2001/05	1987	1997	2005
World	6,149	5,871	5,651	0.4	-1.1	-1.2	-1.0	100.0	100.0	100.0
EU (15)	1,068	1,034	974	-2.1	-1.2	-0.8	-1.5	23.1	17.9	18.0
Germany	330	317	300	-3.7	-1.2	-1.0	-1.4	8.4	5.5	5.5
France	220	216	203	-2.0	-1.0	-0.5	-1.5	4.7	3.7	3.8
Italy	66	65	62	-1.1	-0.8	-0.5	-1.0	1.3	1.1	1.1
United Kingdom	243	238	211	-0.5	-1.8	-0.5	-3.0	4.4	4.1	3.9
North America	943	870	836	-0.1	-1.5	-2.0	-1.0	16.5	15.8	15.4
USA	880	812	780	-0.1	-1.5	-2.0	-1.0	15.5	14.8	14.4
Latin America	351	401	416	0.4	2.3	3.5	0.9	2.8	5.7	7.3
MERCOSUR	125	128	132	0.7	0.6	0.5	0.8	2.0	2.1	2.4
Mexico	226 [1)]	274	284	16.0	3.2	5.3	0.9	0.8	3.7	5.0
Asia	3,771	3,550	3,410	1.4	-1.3	-1.5	-1.0	57.2	63.2	63.0
Japan	890	804	727	-1.1	-2.5	-2.5	-2.5	17.3	14.9	13.4
Australia	2	2	2	-4.0	0.0	0.0	0.0	0.1	0.0	0.0
China	1,650	1,637	1,637	0.4	-0.1	-0.2	0.0	27.5	27.7	30.3
Africa	n.a.	n.a.	n.a.	-	-	-	-	-	-	-
South Africa	16	16	16	-2.2	0.0	0.0	0.0	0.3	0.3	0.3
CEE	n.a.	n.a.	n.a.	-	-	-	-	-	-	-
Memo items										
OECD										
World excl. CEE	3,221	2,983	2,785	-1.2	-1.8	-1.9	-1.7	63.3	54.0	51.5
Asia excl. Japan/China	1,231	1,109	1,046	5.6	-2.0	-2.6	-1.4	12.5	20.6	19.3
Asia excl. Japan	2,881	2,745	2,683	2.3	-0.9	-1.2	-0.6	40.0	48.3	49.6

Source: Prognos

[1)] INEGI

Appendix

Delimitation

The metal industry is made up of the following sub-branches (International Standard Industrial Classification, Rev 2):

Metal Production

3710 Iron and steel basic industries

3720 Non-ferrous metal basic industries

Metal Processing

3810 Manufacture of fabricated metal products (ISICs 3811-3819)

3820 Manufacture of machinery except electrical (ISICs 3821-3829)

3830 Manufacture of electrical machinery (ISICCs 3831-3839)

3840 Manufacture of transport equipment (ISICs 3841-3849)

3850 Prof. and scientific equipment (ISICs 3851-3853)

Sources

The basic data was taken from the following sources:

United Nations Industrial Development Organisation (UNIDO)

- Industrial Demand-Supply Balance Database 1998, 4-Digit level of ISIC Code
- Industrial Statistics Database 1998, 4-Digit level of ISIC Code

United Nations Conference on Trade and Development

- World Investment Report 1998

World Trade Organisation (WTO)

- Annual Report 1998, International trade statistics

Organisation for Economic Co-operation and Development (OECD)

- International Direct Investment Statistics Yearbook 1998
- World Economic Outlook, June 1999