Electrical machinery and optical equipment

This chapter covers NACE Subsection DL and is referred to as the manufacture of electrical machinery and optical equipment. There are four NACE divisions included, which cover the manufacture of computers and office machinery (NACE Division 30); the manufacture of electrical machinery and equipment (NACE Division 31); the manufacture of radio, television and communication equipment (NACE Division 32); and instrument engineering (NACE Division 33), which includes the manufacture of medical, precision and optical equipment.

NACE

30: manufacture of office machinery and computers;
31: manufacture of electrical machinery and apparatus n.e.c.;
31.1: manufacture of electric motors, generators and transformers;
31.2: manufacture of electricity distribution and control apparatus;
31.3: manufacture of insulated wire and cable;
31.4: manufacture of accumulators, primary cells and primary batteries;
31.5: manufacture of lighting equipment and electric lamps;
31.6: manufacture of electrical equipment n.e.c.;
32: manufacture of radio, television and communication equipment and apparatus;
32.1: manufacture of electronic valves and tubes and other electronic components;
32.2: manufacture of television and radio transmitters and apparatus for line telephony and line telegraphy;
32.3: manufacture of television and radio receivers, sound or video recording or reproducing apparatus and associated goods;
33: manufacture of medical, precision and optical instruments, watches and clocks;
33.1: manufacture of medical and surgical equipment and orthopaedic appliances;
33.2: manufacture of instruments and appliances for measuring, checking, testing, navigating and other purposes, except industrial process control equipment;
33.3: manufacture of industrial process control equipment;
33.4: manufacture of optical instruments, photographic equipment;
33.5: manufacture of watches and clocks.

Electrical machinery and optical equipment enterprises manufacture a diverse range of goods that can be classified as either being consumer goods (for example, telephones, radios, televisions and watches), capital goods (for example, computers and transmission equipment) or intermediate goods (for example, electronic components such as conductors and wiring) that are used by other sectors of the economy. Business investment decisions and consumer demand for electronic goods are greatly influenced by broader developments in the business cycle, and production patterns for electronic machinery and optical equipment goods tend to adapt to these changes more strongly (as shown, by way of example, in Figure 9.1) and perhaps quickly than is the case for many other manufactured goods.

The sector operates within an established legislative framework that covers issues such as product safety, energy labelling, minimum efficiency requirements, eco-design and waste. Changes to sector-specific legislation, such as to the recently re-codified low voltage directive [1], are pending the agreement of the Council and of the European Parliament to proposals made by the European Commission in February 2007 to revisions of the so-called New Approach [2], which aims to iron out product-related legislative weaknesses that prevent consumers and enterprises from fully exploiting the benefits of the Internal Market. Nevertheless, some legislative developments have come into force. In July 2007 the revised European Parliament and Council directive [3] relating to electromagnetic compatibility came into force, replacing an existing Council directive on this subject. Furthermore, since July 2006 restrictions (in terms of maximum concentration values) have been in place on the use of hazardous substances (such as lead, cadmium and mercury) in electrical and electronic equipment under the legislation on the restriction of the use of certain hazardous substances in electric and electronic equipment [4].

[1] Re-codified to 2006/95/EC in December 2006 from Council Directive 73/23/EEC.
[2] COM(2007) 37.
[3] 89/336/EEC being replaced by 2004/108/EC.
[4] Directive 2002/95/EC.

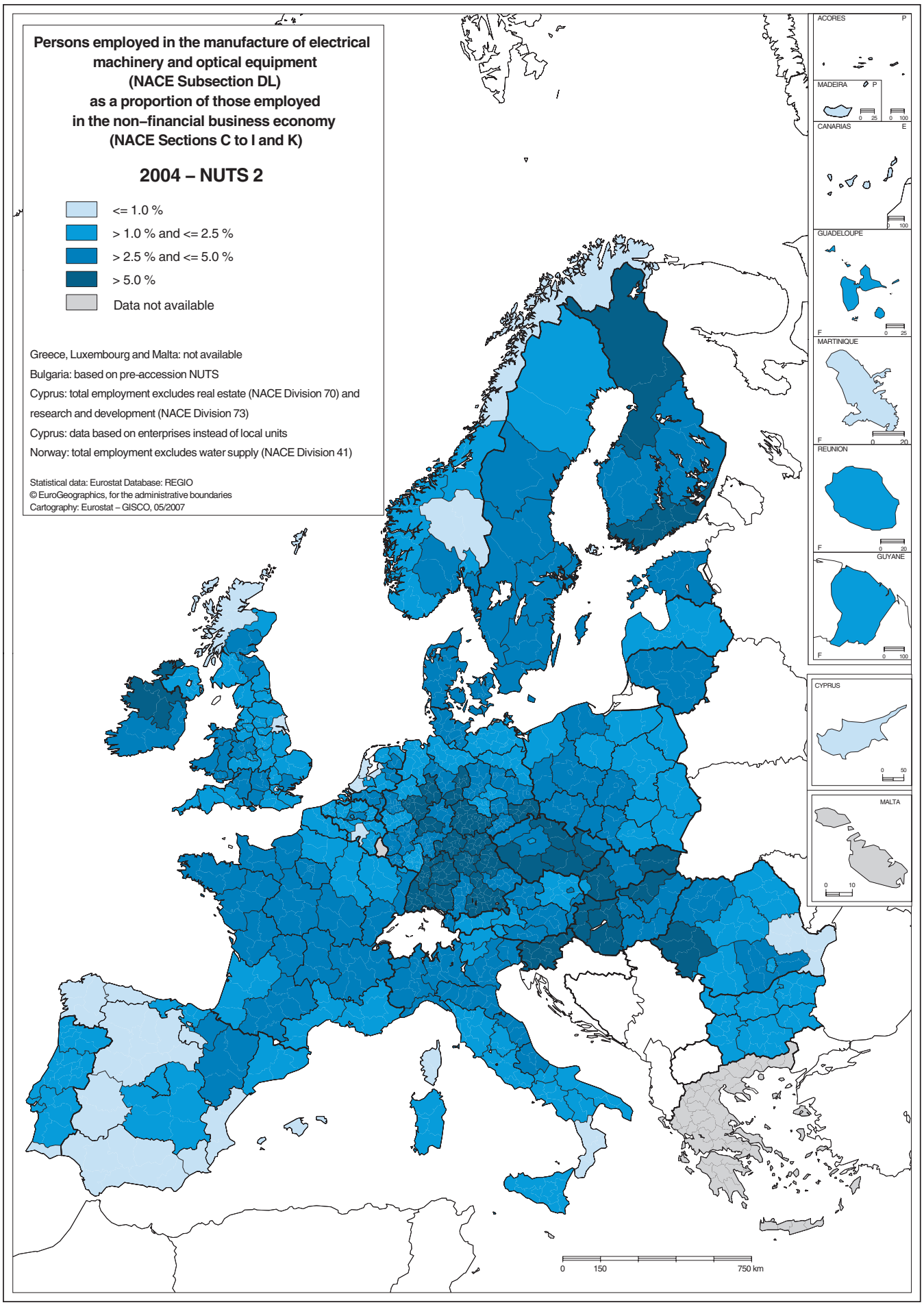

Persons employed in the manufacture of electrical machinery and optical equipment (NACE Subsection DL) as a proportion of those employed in the non–financial business economy (NACE Sections C to I and K)
2004 – NUTS 2
<= 1.0 %
> 1.0 % and <= 2.5 %
> 2.5 % and <= 5.0 %
> 5.0 %
Data not available
Greece, Luxembourg and Malta: not available
Bulgaria: based on pre-accession NUTS
Cyprus: total employment excludes real estate (NACE Division 70) and research and development (NACE Division 73)
Cyprus: data based on enterprises instead of local units
Norway: total employment excludes water supply (NACE Division 41)
Statistical data: Eurostat Database: REGIO
© EuroGeographics, for the administrative boundaries
Cartography: Eurostat – GISCO, 05/2007
ACORES
MADEIRA
CANARIAS
GUADELOUPE
MARTINIQUE
REUNION
GUYANE
CYPRUS
MALTA
0 150 750 km

Table 9.1

Manufacture of electrical and optical equipment (NACE Subsection DL)
Structural profile, EU-27, 2004 (1)

	No. of enterprises		Turnover		Value added		Employment	
	(thousands)	(% of total)	(EUR million)	(% of total)	(EUR million)	(% of total)	(thousands)	(% of total)
Electrical and optical equipment	196.4	100.0	631 408	100.0	189 687	100.0	3 600.0	100.0
Instrument engineering	92.7	47.2	127 680	20.2	51 376	27.1	1 020.0	28.3
Computers and office equipment	9.7	4.9	59 500	9.4	11 500	6.1	161.4	4.5
Electrical machinery and equipment	65.5	33.4	243 000	38.5	76 000	40.1	1 671.4	46.4
Radio, TV & communication equipment	28.5	14.5	201 024	31.8	51 057	26.9	812.4	22.6

(1) Rounded estimates based on non-confidential data.
Source: Eurostat (SBS)

Table 9.2

Manufacture of electrical and optical equipment (NACE Subsection DL)
Structural profile: ranking of top five Member States, 2004

			Share of non-financial business economy			
Rank	Value added (EUR million) (1)	Employment (thousands) (2)	No. of enterprises (3)	Turnover (3)	Value added (3)	Employment (4)
1	Germany (63 173)	Germany (1 012.1)	Czech Republic (2.5 %)	Finland (11.1 %)	Hungary (10.2 %)	Slovakia (6.8 %)
2	France (24 970)	France (432.5)	Slovakia (2.1 %)	Hungary (9.7 %)	Finland (9.8 %)	Hungary (6.0 %)
3	United Kingdom (23 353)	Italy (422.5)	Slovenia (1.9 %)	Czech Republic (5.5 %)	Germany (5.9 %)	Finland (5.4 %)
4	Italy (19 373)	United Kingdom (363.8)	Germany (1.5 %)	Germany (5.2 %)	Slovenia (5.3 %)	Czech Republic (5.2 %)
5	Sweden (7 279)	Czech Republic (186.9)	Hungary (1.3 %)	Slovakia (4.6 %)	Czech Republic (5.1 %)	Slovenia (5.1 %)

(1) Greece and Malta, not available; Luxembourg, 2003.
(2) Greece and Malta, not available; Luxembourg and Slovenia, 2003.
(3) Ireland, Greece, Cyprus and Malta, not available; Luxembourg, 2003.
(4) Ireland, Greece, Cyprus and Malta, not available; Luxembourg and Slovenia, 2003.
Source: Eurostat (SBS)

STRUCTURAL PROFILE

Among the NACE subsections, electrical and optical equipment manufacturing (NACE Subsection DL) in the EU-27 was the third largest industrial activity in 2004 in terms of the value added generated, only behind the manufacture of food, beverages and tobacco (NACE Subsection DA, see Chapter 2) and the manufacture of basic metals and fabricated metal products (NACE Subsection DJ, see Chapter 7). The electrical and optical equipment manufacturing sector generated EUR 189.7 billion value added in 2004, contributing 3.7 % of the value added created across the EU-27's non-financial business economy (NACE Sections C to I and K). The 196 400 enterprises active in the sector employed 3.6 million persons across the EU-27, accounting for 2.9 % of the non-financial business economy workforce.

Among the four NACE divisions that comprise the electrical machinery and optical equipment manufacturing sector, the largest was the electrical machinery and equipment manufacturing (NACE Division 31) subsector, which accounted for two fifths (40.1 %) of sectoral value added in 2004. Instrument engineering (NACE Division 33) and the manufacture of radio, television and telecommunication equipment and apparatus (NACE Division 32) were similarly sized, both contributing a little over one quarter (27.1 % and 26.9 % respectively) of the value added generated across electrical machinery and optical equipment manufacturing as a whole. By far the smallest subsector of the four was manufacture of office machinery and computers (NACE Division 30), which contributed just 6.1 % of sectoral value added – see Table 9.1.

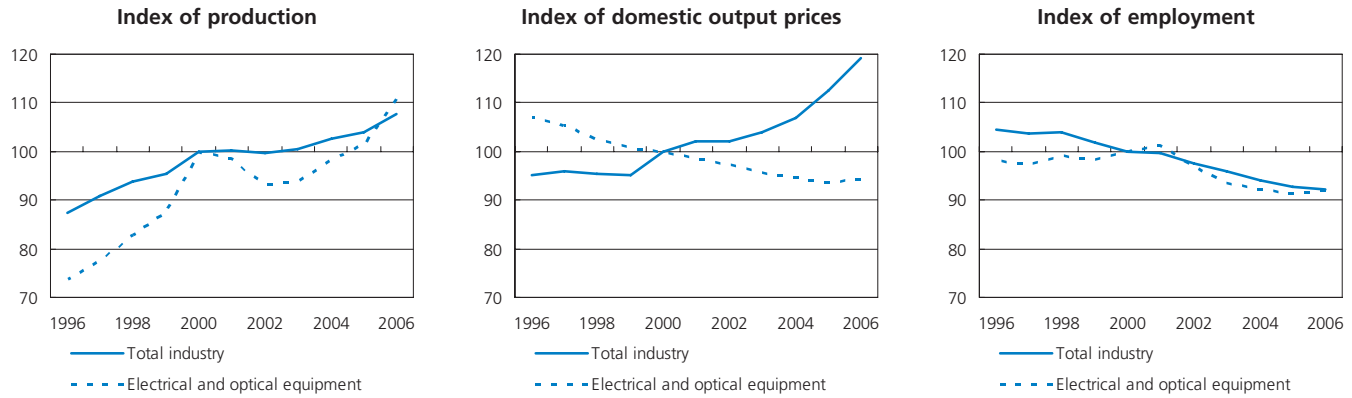
The electrical and optical equipment manufacturing sector in Germany contributed one third (33.3 %) of the value added generated by the sector across the EU-27, by far the largest contribution and much greater than the next highest (13.2 %) from France. Among the Member States [5] the contribution made by the electrical machinery and optical equipment sector to the value added generated across national non-financial business economies in 2004 was highest, however, in Hungary (10.2 %) and Finland (9.8 %), where it was a little over two-and-a-half times the EU 27 average (3.7 %). In these two Member States, the electrical and optical equipment manufacturing sector was the largest sector within the industrial economy (at the level of NACE subsections) on the basis of value added data. Germany, Slovenia and the Czech Republic were also relatively specialised in the manufacture of electrical machinery and optical equipment sector (see Table 9.2).

The map on page 176 shows the regional specialisation of the electrical machinery and optical equipment manufacturing sector (NACE Subsection DL) in terms of the proportion of the non-financial business economy workforce employed in this sector. The most specialised regions (at the level of detail shown in the map) were Zapadne Slovensko in Slovakia and Oberpfalz and Mittelfranken in Germany, where at least one in every nine people (11 %) within the non-financial business economy workforce was employed in electrical and optical equipment manufacturing. There were many other regions in Germany that were also specialised in this sector and many regions in the Czech Republic and Hungary, as well as Slovenia (which is considered as a single region at the level of detail in the map).

[5] Luxembourg, 2003; Ireland, Greece, Cyprus and Malta, not available.

Figure 9.1

Manufacture of electrical and optical equipment (NACE Subsection DL)
Evolution of main indicators, EU-27 (2000=100)



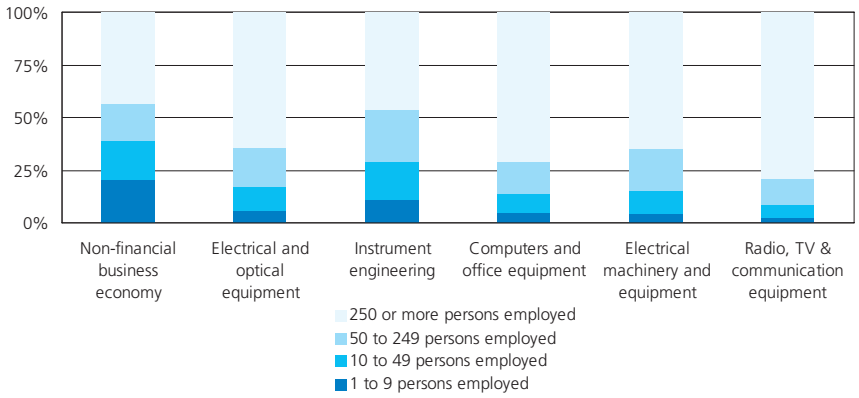
Source: Eurostat (STS)

The development of the production index for EU-27 electrical machinery and optical equipment manufacturing followed, but magnified, the economic cycle for industrial (NACE Sections C to E) output as a whole in the period between 1996 and 2006; the average rate of growth in the production index (4.2 % per annum) for electrical machinery and optical equipment manufacturing in the ten years through to 2006 was double that for industry as a whole (NACE Sections C to E) but there was a more significant downturn in production in the period between 2000 and 2002 than for industry as a whole (see Figure 9.1). The growth in the production index for electrical machinery and optical equipment manufacturing during these ten years was driven by the growth (an average 5.8 % per annum) in the output of radio, television and communication equipment manufacturing (NACE Division 32), which is described in more detail in Subchapter 9.4.

Marking a break from the steady downward trend in the domestic output price index for electrical machinery and optical equipment manufacturing, there was a small price increase in 2006. Nevertheless, the general downward trend in output prices (an average 1.2 % per annum over the ten years from 1996) for electrical machinery and optical equipment contrasted starkly with the relatively steady rise (an average 2.3 % per annum) in the output price index for industry as a whole, and the overall price increases in all the other manufacturing (NACE Section D) NACE subsections. The downward trend in the output price index was particularly apparent (an average decline of 8.3 % per annum) for the manufacture of computers and office machinery (NACE Division 30), which is described in more detail in Subchapter 9.2.

Figure 9.2

Manufacture of electrical and optical equipment (NACE Subsection DL)
Share of value added by enterprise size class, EU-27, 2004



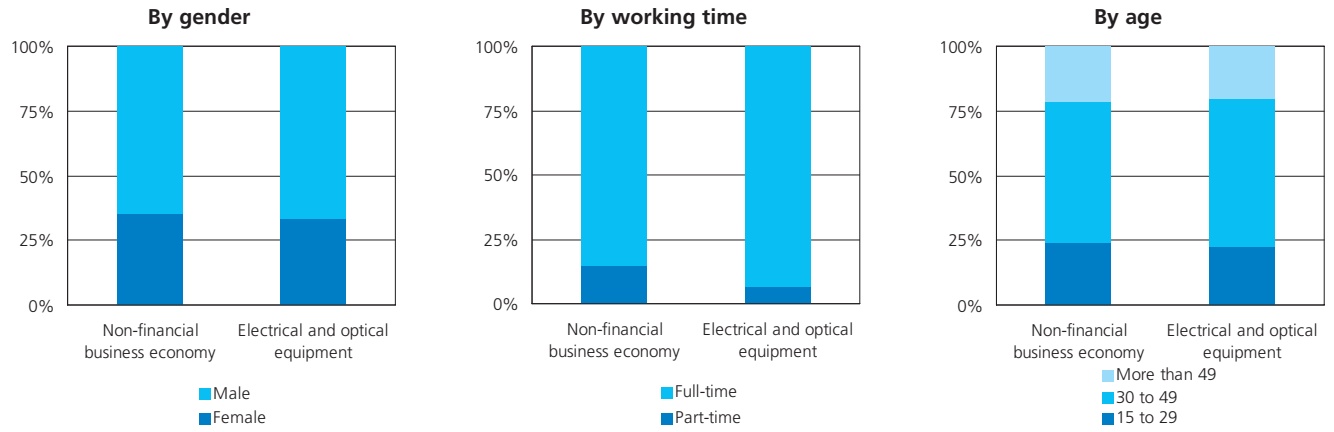
Source: Eurostat (SBS)

There were two distinct developments in the employment index for the manufacture of electrical and optical equipment in the EU-27 during the period between 1996 and 2006; between 1996 and 2001 there was stability and then some growth in employment, which contrasted with the broader decline across industry as a whole, followed by a relatively steady decline in keeping with the developments for industry as a whole, until 2006 when there was a small increase.

Large enterprises (employing more than 250 persons) generated a little under two thirds (64.0 %) of the value added within the EU-27's electrical machinery and optical equipment manufacturing sector in 2004, in stark contrast to their minority contribution (43.0 %) across the non-financial business economy as a whole. This relative importance of large enterprises in the sector was also clear in three of the four electrical machinery and optical equipment manufacturing subsectors, the exception being instrument engineering for which the contribution of large enterprises was more in keeping with that for non-financial business economy –see Figure 9.2. The share of value added coming from large enterprises was particularly high (79.2 %) in the computers and office equipment manufacturing subsector.

Figure 9.3

Manufacture of electrical and optical equipment (NACE Subsection DL)
Labour force characteristics, EU-27, 2006



Source: Eurostat (LFS)

EMPLOYMENT CHARACTERISTICS

The general profile of the workforce in the EU-27's electrical machinery and optical equipment manufacturing sector was similar to that of the workforce across the non-financial business economy in terms of both gender and age composition in 2006 (see Figure 9.3). About two thirds (66.8 %) of the EU-27 workforce in the sector were male, slightly above the non-financial business economy average(65.0 %) but below the industrial average (70.1 %) and this was broadly reflected across the four subsectors that comprise the electrical machinery and optical equipment manufacturing sector. Among the Member States, however, there were many notable differences; in Cyprus the proportion of men in the workforce of this sector was particularly high (79.1 %) compared to the non-financial business economy average (64.8 %), whereas in Slovakia men were in the minority (46.3 %) in this sector, in contrast to the situation (63.7 %) across the non-financial business economy.

The proportion of workers engaged in part-time work (6.8 %) in the electrical machinery and optical equipment manufacturing sector was much lower than the proportion (14.4 %) across the non-financial business economy as a whole, although much more in line with the industrial average (7.6 %), and this pattern was replicated across the four subsectors that make up the electrical machinery and optical equipment manufacturing sector.

According to structural business statistics, there was relatively little self-employment within the electrical machinery and optical equipment manufacturing sector; employees accounted for 95.4 % of the number of persons employed in 2004, a much higher share than that (86.2 %) for the non-financial business economy as a whole.

COSTS, PRODUCTIVITY AND PROFITABILITY

As a proportion of total expenditure, investment within the EU-27's electrical machinery and optical equipment manufacturing sector (NACE Subsection DL) in 2004 was relatively low (3.3 %) compared to the average proportion (4.9 %) across the non-financial business economy (NACE Sections C to I and K). Personnel costs within the sector, however, accounted for a relatively high share (21.5 %) of total expenditure compared with the average share (16.4 %) across the non-financial business economy, in large part reflecting the fact that average personnel costs of EUR 37 000 per employee in the sector were about a third higher (34.1 %) than the non-financial business economy average. Ireland, Hungary and Finland stood out from the other Member States, as the proportion of total expenditure in the sector accounted for by personnel costs was relatively low (between 8.4 % and 10.8 %), whereas the proportion accounted for by the purchase of goods and services was relatively high (between 86.0 % and 88.0 %, compared to an EU-27 average of 75.1 %).

Table 9.3

Manufacture of electrical and optical equipment (NACE Subsection DL)
Productivity and profitability, EU-27, 2004 (1)

	Apparent labour productivity (EUR thousand)	Average personnel costs (EUR thousand)	Wage adjusted labour productivity (%)	Gross operating rate (%)
Electrical and optical equipment	52.0	37.0	141.0	9.7
Instrument engineering	50.0	35.0	138.0	13.4
Computers and office equipment	70.0	40.0	179.0	9.0
Electrical machinery and equipment	46.0	35.0	132.0	8.4
Radio, TV & communication equipment	62.9	41.5	151.4	9.2

(1) Rounded estimates based on non-confidential data.
Source: Eurostat (SBS)

Table 9.4

Electrical and optical equipment (CPA Subsection DL)
External trade, EU-27, 2006

	Extra-EU exports		Extra-EU imports			
	(EUR million)	(% share of industrial exports)	(EUR million)	(% share of industrial imports)	Trade balance (EUR million)	Cover ratio (%)
Electrical and optical equipment	197 586	18.3	267 029	21.3	-69 443	74.0
Medical, precision and optical instruments; watches and clocks	54 106	5.0	47 174	3.8	6 932	114.7
Office machinery and computers	28 937	2.7	80 121	6.4	-51 185	36.1
Electrical machinery and equipment	51 061	4.7	40 224	3.2	10 837	126.9
Radio, TV & communication equipment	63 482	5.9	99 510	7.9	-36 028	63.8

Source: Eurostat (Comext)

Although the average apparent labour productivity (EUR 52 000 per person employed) of those working within the EU-27's electrical machinery and optical equipment manufacturing sector was over a quarter (27.1 %) higher than that across the non-financial business economy as a whole in 2004, the wage adjusted labour productivity level of 141.0 % was lower than the non-financial business economy average (148.0 %) due to the sector's relatively high average personnel costs. Among the subsectors, however, the wage adjusted labour productivity level of those working in manufacture of computers and office machinery was particularly high (179.0 %).

The gross operating rate for the EU-27's electrical machinery and optical equipment manufacturing sector was 9.7 %, which was lower than the average rate (11.0 %) for the non-financial business economy. There were a number of Member States, however, for whom the profitability of the sector in 2004 was above the non-financial business average; by way of examples, in Lithuania the gross operating rate of the sector was 13.7 % compared to a non-financial business economy rate of 10.5 %, in Bulgaria it was 11.3 % compared to 8.8 % and in Sweden 12.3 % compared to 9.6 %.

EXTERNAL TRADE

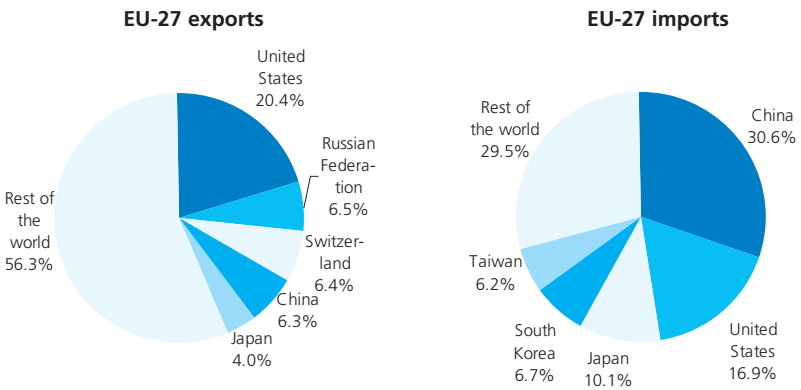
The EU-27 imported electrical and optical equipment (CPA Subsection DL) to the value of EUR 267.0 billion in 2006, which represented a little more than one fifth (21.3 %) of the value of all industrial imports (CPA Sections C to E), mainly from China (30.6 %), the United States (16.9 %) and Japan (10.1 %) – see Table 9.4 and Figure 9.4. The EU-27 exported electrical and optical equipment to non-member countries to the value of EUR 197.6 billion in 2006, representing 18.3 % of all industrial exports, with the single largest export market being the United States (20.4 %). It should be noted, however, that exports to non-member countries represented only one third (33.2 %) of the total trade (intra and extra-EU) of the EU-27 Member States in electrical and optical equipment, underlining the importance of the internal market. Exports (intra and extra-EU) of electrical and optical equipment were particularly important in Malta, where they represented almost two thirds (63.8 %) of the value of national industrial exports, as well as in Luxembourg (44.9 %) and Hungary (38.3 %).

The EU-27 had a trade deficit in electrical and optical equipment of EUR 69.4 billion in 2006. At a more detailed level, however, the EU-27 recorded a trade surplus of EUR 10.8 billion for electrical machinery and apparatus (CPA Division 31) and a surplus of EUR 6.9 billion for medical, precision and optical instruments, watches and clocks (CPA Division 33). These surpluses contrasted starkly with the trade deficit of EUR 36.0 billion for radio, television and communication equipment and apparatus (CPA Division 32) and the deficit of EUR 51.2 billion for computer and office equipment (CPA Division 30).

Among the Member States, Germany recorded the largest trade surplus (EUR 15.9 billion) in electrical and optical equipment in 2006, followed by Ireland (EUR 10.1 billion). In contrast, the largest deficit for these goods was recorded by Spain (EUR 18.5 billion), with other large deficits being posted in France (EUR 10.9 billion) and Italy (EUR 10.3 billion).

Figure 9.4

Electrical and optical equipment (CPA Subsection DL)
Main destination of EU-27 exports and main origin of EU-27 imports, 2006



Source: Eurostat (Comext)

9.1: INSTRUMENT ENGINEERING

The manufacture of medical, precision and optical instruments, watches and clocks (NACE Division 33) includes activities related to the manufacture of instruments, industrial process control equipment, watches, clocks and photographic equipment (while photo-chemical products, flashbulbs or television cameras are not included). Together these activities are referred to here as instrument engineering.

STRUCTURAL PROFILE

A little more than one quarter (27.1 %) of the value added generated by all of the electrical machinery and optical equipment manufacturing activities (NACE Subsection DL) in the EU-27 in 2004, came from instrument engineering (NACE Division 33), in value terms some EUR 51.4 billion. There were 1.0 million persons employed in the instrument engineering sector in 2004 spread across 92 700 enterprises, which together accounted for 28.3 % of the electrical machinery and optical equipment manufacturing workforce.

The two largest subsectors in value added terms were the manufacture of instruments and appliances for measuring, checking, testing, navigating and other purposes, except industrial process control equipment (NACE Group 33.2) and the manufacture of medical and surgical equipment and orthopaedic appliances (NACE Group 33.1), which each accounted for around two fifths of the sector's value added – see Table 9.5. The manufacture of optical instruments and photographic equipment (NACE Group 33.4) and the manufacture of industrial process control equipment (NACE Group 33.3) contributed respectively just over and just under 10 % of instrument engineering value added in 2004, leaving the manufacture of watches and clocks (NACE Group 33.5) as by far the smallest instrument engineering subsector. This pattern was closely mirrored in terms of the breakdown of employment within the sector.

The instrument engineering sector in Germany contributed one third (33.6 %) of the value added generated by the sector across the EU-27, slightly more than the combined contribution from the United Kingdom (16.3 %) and France (15.3 %), who had the next largest sectors (see Table 9.6). The value added generated by the instrument engineering sector accounted for 1.6 % of the value added generated across Germany's non-financial business economy, the highest share among the Member States and notably more than the average across the EU-27 (1.0 %). By this measure, Sweden and Slovenia were the Member States that were the next most specialised in instrument engineering.

Table 9.5

Instrument engineering (NACE Division 33)
Structural profile, EU-27, 2004

	No. of enterprises (thousands)	Turnover (EUR million)	Value added (EUR million)	Employment (thousands)
Instrument engineering (1)	92.7	127 680	51 376	1 020.0
Medical and surgical equipment and orthopaedic appliances	59.3	46 821	19 614	434.2
Instr. and appl. for measuring, checking, testing, navigating and other purp. (1)	16.9	52 963	21 062	360.0
Industrial process control equipment	7.4	11 560	4 175	91.9
Optical instruments and photographic equipment (1)	8.0	15 000	6 000	120.0
Watches and clocks (1)	1.2	1 500	540	13.0

(1) Rounded estimates based on non-confidential data.
Source: Eurostat (SBS)

Table 9.6

Instrument engineering (NACE Division 33)
Structural profile: ranking of top five Member States, 2004

Rank	Share of EU-27 value added (%) (1)	Share of EU-27 employment (%) (2)	Value added specialisation ratio (EU-27=100) (3)	Employment specialisation ratio (EU-27=100) (4)
1	Germany (33.6)	Germany (31.8)	Germany (160.6)	Germany (192.1)
2	United Kingdom (16.3)	France (13.1)	Sweden (130.6)	Slovenia (167.9)
3	France (15.3)	Italy (12.2)	Slovenia (124.1)	Sweden (125.4)
4	Italy (10.8)	United Kingdom (11.7)	Denmark (109.9)	Finland (117.8)
5	Ireland (4.4)	Poland (5.0)	France (108.9)	Czech Republic (115.6)

(1) Greece, Malta and Netherlands, not available; Luxembourg, 2003.
(2) Greece and Malta, not available; Luxembourg, 2003.
(3) Ireland, Greece, Cyprus, Malta and Netherlands, not available; Luxembourg, 2003.
(4) Ireland, Greece, Cyprus and Malta, not available; Luxembourg, 2003.
Source: Eurostat (SBS)

Table 9.7

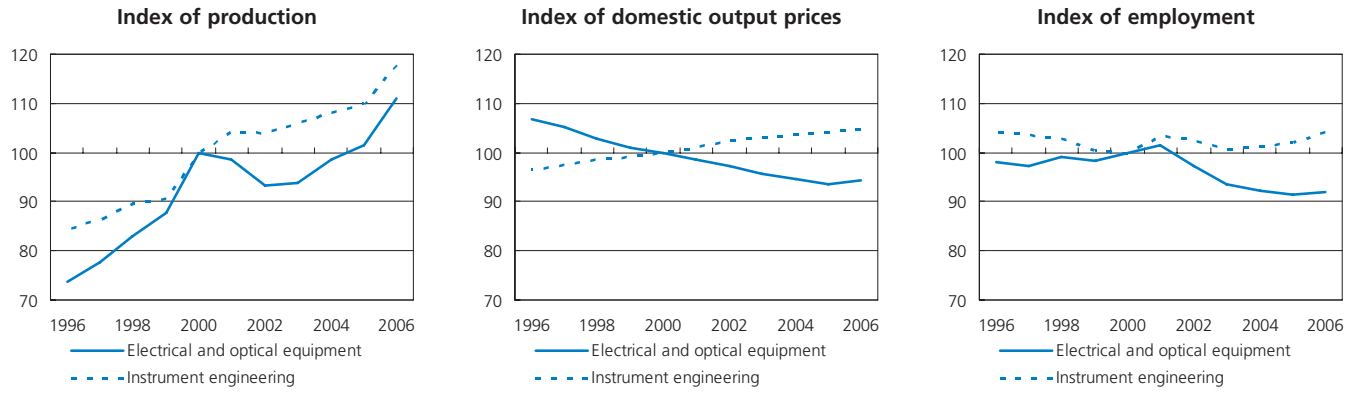
Production of selected products - medical, precision and optical instruments; watches and clocks (CPA Division 33), EU-27, 2006 (1)

	Prodcom code	Production value (EUR million)	Volume of sold production (thousands)	Unit of volume
Radar apparatus	33.20.20.30	4 044	2 013	units
Instruments and apparatus, regulating or controlling, n.e.c.	33.20.70.90	3 387	111 310	units
Apparatus based on the use of X-rays, for medical, surgical, dental or veterinary uses (including radiography and radiotherapy apparatus)	33.10.11.15	3 291	160	units
Instruments and appliances for aeronautical or space navigation (excluding compasses)	33.20.11.55	2 984	193	units
Needles, catheters, cannulae and the like used in medical, surgical, dental or veterinary sciences (excluding tubular metal needles and needles for sutures)	33.10.15.17	2 552	10 025 297	units
Repair and maintenance of instruments and apparatus for measuring, checking, testing, navigating and other purposes (excluding industrial process control equipment)	33.20.92.00	2 301	-	-
Dental fittings (including dentures and part dentures, metal crowns, cast tin bars, stainless steel bars) (excluding individual artificial teeth)	33.10.17.59	2 272	-	-
Instruments and apparatus using optical radiations, n.e.c.	33.20.53.50	817	273	units
Ozone therapy, oxygen therapy, aerosol therapy, respiration apparatus	33.10.16.55	675	222 975	units

(1) Estimated.
Source: Eurostat (PRODCOM)

Figure 9.5

Instrument engineering (NACE Division 33)
Evolution of main indicators, EU-27 (2000=100)



Source: Eurostat (STS)

The production index for instrument engineering in the EU 27 during the period between 1996 and 2006 developed in a way that was similar to the production index for industry as a whole (NACE Sections C to E), avoiding the relatively sharp fall in output in 2001 and 2002 that was recorded for electrical machinery and optical equipment manufacturing as a whole. The average rate of growth (3.4 % per annum) in the output of instrument engineering over the ten years through to 2006 was slower, however, than the rate of growth (an average 4.2 % per annum) in the output for electrical machinery and optical equipment manufacturing.

The domestic output price index for instrument engineering rose steadily year-on-year (an average 0.8 % per annum) throughout the ten-year period to 2006, in contrast to the downward trend in prices already noted for electrical machinery and optical equipment as a whole (see Figure 9.5).

COSTS, PRODUCTIVITY AND PROFITABILITY

The structure of costs for the EU-27's instrument engineering sector was quite different to that of electrical machinery and optical equipment manufacturing as a whole in 2004; personnel costs accounted for a much higher share (29.7 % compared to 21.5 %) of total expenditure, and purchases of goods and services for a much lower share (67.2 % compared to 75.1 %). This cost structure for instrument engineering in the EU-27 was mirrored across its five subsectors.

Although personnel costs in this sector accounted for a high proportion of total expenditure, average personnel costs of EUR 35 000 per employee in the instrument engineering sector across the EU-27 were a

Table 9.8

Instrument engineering (NACE Division 33)
Productivity and profitability, EU-27, 2004

	Apparent labour productivity (EUR thousand)	Average personnel costs (EUR thousand)	Wage adjusted labour productivity (%)	Gross operating rate (%)
Instrument engineering (1)	50.0	35.0	138.0	13.4
Medical and surgical equipment and orthopaedic appliances	45.2	31.4	143.9	16.4
Instr. and appl. for measuring, checking, testing, navigating and other purp. (1)	58.0	43.0	137.0	11.6
Industrial process control equipment	45.4	37.1	122.5	8.5
Optical instruments and photographic equipment (1)	50.0	35.0	140.0	15.0
Watches and clocks (1)	40.0	:	:	8.3

(1) Rounded estimates based on non-confidential data.
Source: Eurostat (SBS)

little beneath the average for electrical machinery and optical equipment manufacturing (EUR 37 000 per employee), which suggests that the sector was relatively labour intensive. The apparent labour productivity (EUR 50 000 per person employed) of those working in the sector was also a little lower than the level across electrical machinery and optical equipment manufacturing, as was the wage adjusted labour productivity level (138.0 % compared to 141.0 %).

The gross operating rate of the instrument engineering sector was 13.4 % in 2004, much higher than the rate (9.7 %) for electrical machinery and optical equipment manufacturing as a whole and also above the average rate for the non-financial business economy (11.0 %). Within the instrument engineering sector, however, the profitability of the five subsectors varied considerably according to this measure (see Table 9.8), from 8.3 % for the manufacture of watches and clocks (NACE Group 33.5) to 16.4 % for the manufacture of medical and surgical equipment and orthopaedic appliances (NACE Group 33.1).

EXTERNAL TRADE

The EU-27 recorded a trade surplus of EUR 6.9 billion in medical, precision and optical instruments, watches and clocks (CPA Division 33) with non-member countries in 2006, resulting from exports valued at EUR 54.1 billion (a little over a quarter of the value of electrical machinery and optical equipment exports) and imports valued at EUR 47.2 billion – see Table 9.9. Exports of medical, precision and optical instruments, watches and clocks as a whole to non-member countries were almost as valuable as trade in these goods between Member States, accounting for 47.9 % of all exports (intra- and extra-EU) by EU-27 Member States.

Among the Member States, Germany recorded the largest trade surplus (EUR 16.6 billion) in these goods (intra- and extra-EU trade), with the next highest being for Ireland (EUR 4.1 billion) and the Netherlands (EUR 2.0 billion). In contrast, the largest trade deficits in these goods were recorded for Slovakia (EUR 2.0 billion) and Spain (EUR 4.1 billion).

Table 9.9

Medical, precision and optical instruments; watches and clocks (CPA Division 33)
External trade, EU-27, 2006

	Extra-EU exports		Extra-EU imports			
	(EUR million)	(% share of chapter)	(EUR million)	(% share of chapter)	Trade balance (EUR million)	Cover ratio (%)
Medical, precision and optical instruments; watches and clocks	54 106	27.4	47 174	17.7	6 932	114.7
Medical and surgical equipment and orthopaedic appliances	22 003	11.1	18 528	6.9	3 475	118.8
Instruments and appliances for measuring, checking, testing, navigating and other purposes	22 619	11.4	17 102	6.4	5 517	132.3
Industrial process control equipment	:	:	:	:	:	:
Optical instruments and photographic equipment	7 768	3.9	6 994	2.6	775	111.1
Watches and clocks	1 717	0.9	4 551	1.7	-2 834	37.7

Source: Eurostat (Comext)

9.2: COMPUTERS AND OFFICE EQUIPMENT

This subchapter covers the manufacture of office machinery, computers and peripherals, such as printers and terminals (NACE Division 30). Note that the manufacture of electronic games is classified under toys and is covered within Subchapter 11.2.

STRUCTURAL PROFILE

The computers and office equipment manufacturing sector (NACE Division 30) was the smallest activity among the four NACE divisions that comprise electrical machinery and optical equipment manufacturing as a whole (NACE Subsection DL), both in terms of the value added generated and in terms of employment; the EUR 11.5 billion of value added generated within the EU-27 in 2004 accounted for 6.1 % of the value added generated by all of the activities covered by this chapter and the 161 400 persons employed across the 9 700 enterprises active in computer and office equipment manufacturing represented less than one person in every twenty (4.5 %) within the electrical machinery and optical equipment manufacturing workforce.

The manufacture of computers and other information processing equipment (NACE Class 30.02) accounted for about four fifths of both the value added (84.4 %) generated in the sector and its workforce (81.4 %), the remaining share being accounted for by the manufacture of office machinery (NACE Class 30.01).

The computers and office equipment manufacturing sector in Germany generated a little over one third (35.3 %) of the value added created by the sector across the EU-27 in 2004, with the sector in the United Kingdom (28.2 %) and Ireland (13.2 %) also contributing significant proportions (see Table 9.11). Among the Member States [6], the contribution made by the sector to the value added of the non-financial business economy was highest (1.1 %) in Hungary, almost five times the average contribution across the EU-27. Nonetheless, based on the limited data available; the computers and office equipment manufacturing sector accounted for 4.2 % of the value added in Irish manufacturing (NACE Section D) in 2004, considerably more than the share for Hungary (2.7 %) and the average share across the EU-27 (0.7 %). This relatively high share for Ireland is at least in part explained by Ireland acting as an entrance point into the EU-27 for some large international manufacturers.

[6] Ireland, Greece, Cyprus, Luxembourg and Malta, not available.

Annual short-term statistics show that the index of production for the computer and office equipment manufacturing in the EU-27 rose at a particularly fast pace (an average 11.1 % per annum) between 1996 and its relative peak in 2000 when compared to the otherwise strong rate (an average 7.9 % per annum) for electrical and optical equipment manufacturing – see Figure 9.6. As with many technology related activities, however, the output of computer and office equipment manufacturing then fell; there was a decline in the production index in consecutive years from 2001 to 2004, with a particularly pronounced reduction (down 16.8 %) in 2002. In 2005 and 2006 there were signs of a sustained recovery, with an overall rise of 9.2 % from the relative low in 2004.

Price comparisons over time in this area are particularly difficult because computer specifications are constantly increasing. Nevertheless, in contrast to the large majority of industrial NACE divisions, the domestic output price index for the manufacture of computers and office equipment in the EU-27 fell year-on-year between 1996 and 2006 at an average rate of decline of 8.3 % per annum.

Table 9.10

Manufacture of computers and office equipment (NACE Division 30)
Structural profile, EU-27, 2004 (1)

	No. of enterprises (thousands)	Turnover (EUR million)	Value added (EUR million)	Employment (thousands)
Computers and office equipment	9.7	59 500	11 500	161.4
Office machinery	1.0	5 500	1 800	31.8
Computers and other information processing equipment	8.7	54 000	9 710	130.0

(1) Rounded estimate based on non-confidential data.
Source: Eurostat (SBS)

Table 9.11

Manufacture of computers and office equipment (NACE Division 30)
Structural profile: ranking of top five Member States, 2004

Rank	Share of EU-27 value added (%) (1)	Share of EU-27 employment (%) (2)	Value added specialisation ratio (EU-27=100) (3)	Employment specialisation ratio (EU-27=100) (4)
1	Germany (35.3)	Germany (26.0)	Hungary (489.7)	Hungary (250.6)
2	United Kingdom (28.2)	United Kingdom (18.7)	Germany (168.6)	Slovakia (249.9)
3	Ireland (13.2)	Italy (9.4)	United Kingdom (149.0)	Czech Republic (192.3)
4	Italy (5.8)	Ireland (8.8)	Czech Republic (104.8)	Germany (157.0)
5	France (4.2)	Czech Republic (5.5)	Slovenia (85.3)	United Kingdom (129.9)

(1) Greece, Luxembourg and Malta, not available.
(2) Greece, Luxembourg, Malta and Netherlands, not available.
(3) Ireland, Greece, Cyprus, Luxembourg and Malta, not available.
(4) Ireland, Greece, Cyprus, Luxembourg, Malta and Netherlands, not available.
Source: Eurostat (SBS)

Table 9.12

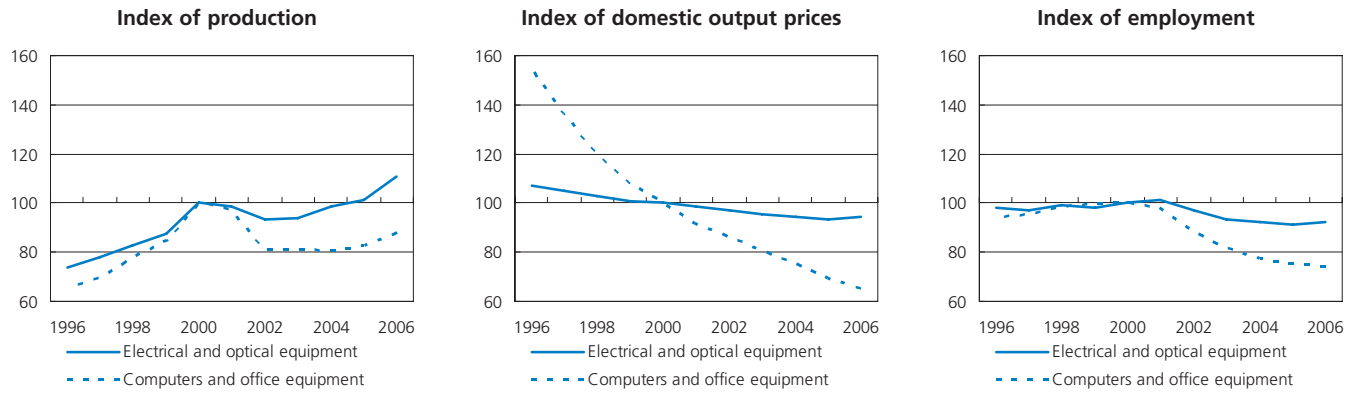
Production of selected products - office machinery and computers (CPA Division 30), EU-27, 2006 (1)

	Prodcom code	Production value (EUR million)	Volume of sold production (thousands)	Unit of volume
Digital data processing machines: presented in the form of systems	30.02.14.00	c	14 772	units
Parts and accessories for computers and other data processing machines	30.02.19.00	9 601	-	-
Installation of computers and other information processing equipment	30.02.90.00	3 434	-	-
Central storage units	30.02.17.30	3 066	c	units
Input or output units whether or not containing storage units in the same housing (including mouses) (excluding printers and keyboards)	30.02.16.70	1 754	14 317	units
Desktop PCs	30.02.13.00	1 628	2 214	units
Printers	30.02.16.30	745	4 375	units
Parts and accessories for photocopiers incorporating an optical system, contact type photocopiers and thermocopiers	30.01.25.00	554	-	-
Storage units (excluding central storage units, disk storage units and magnetic tape storage units)	30.02.17.90	495	17 557	units
Parts and accessories of the machines of HS 8472	30.01.24.00	228	-	-

(1) Estimated.
Source: Eurostat (PRODCOM)

Figure 9.6

Manufacture of computers and office equipment (NACE Division 30)
Evolution of main indicators, EU-27 (2000=100)



Source: Eurostat (STS)

Table 9.13

Manufacture of computers and office equipment (NACE Division 30)
Productivity and profitability, EU-27, 2004 (1)

	Apparent labour productivity (EUR thousand)	Average personnel costs (EUR thousand)	Wage adjusted labour productivity (%)	Gross operating rate (%)
Computers and office equipment	70.0	40.0	179.0	9.0
Office machinery	56.0	41.0	140.0	9.2
Computers and other information processing equipment	74.9	39.3	191.0	9.0

(1) Rounded estimates based on non-confidential data.
Source: Eurostat (SBS)

Table 9.14

Office machinery and computers (CPA Division 30)
External trade, EU-27, 2006

	Extra-EU exports		Extra-EU imports			
	(EUR million)	(% share of chapter)	(EUR million)	(% share of chapter)	Trade balance (EUR million)	Cover ratio (%)
Office machinery and computers	28 937	14.6	80 121	30.0	-51 185	36.1
Office machinery and parts thereof	2 951	1.5	6 010	2.3	-3 059	49.1
Computers and other information processing equipment	25 986	13.2	74 112	27.8	-48 126	35.1

Source: Eurostat (Comext)

COSTS, PRODUCTIVITY AND PROFITABILITY

As a proportion of total expenditure, gross investment in tangible goods in the EU-27's computers and office equipment manufacturing sector in 2004 was particularly low (1.3 %), both in comparison to the average across electrical machinery and optical equipment manufacturing (3.3 %) and, more particularly, the non-financial business economy (4.9 %). Similarly, personnel costs in the sector in 2004 accounted for the lowest share (11.2 %) of total expenditure among the four NACE divisions that make-up electrical machinery and optical equipment manufacturing (for which the average share was 21.5 %). This was despite the fact that average personnel costs in the sector (an average EUR 40 000 per employee) were a little higher than the average across electrical machinery and optical equipment manufacturing as a whole (EUR 37 000 per employee).

Apparent labour productivity in the sector was EUR 70 000 per person employed across the EU-27, the highest level among the NACE divisions that cover electrical and optical equipment manufacturing and EUR 18 000 per person employed more than the average for electrical machinery and optical equipment manufacturing. The apparent labour productivity level in the sector more than covered average personnel costs, with the wage adjusted labour productivity ratio of 179.0 % being substantially more than the average ratio across electrical and optical equipment manufacturing (141.0 %) as well as the average ratio for the EU-27's non-financial business economy (148.0 %). The high value of the wage adjusted labour productivity ratio for the whole of the computers and office equipment sector was strongly influenced by the ratio for computers and other information processing equipment (191.0 %), while the ratio for office machinery (140.0 %) was more in line with the electrical and optical equipment manufacturing average (see Table 9.13).

The gross operating rate for the EU-27's computer and office equipment manufacturing sector was 9.0 % in 2004, below both the rate for electrical and optical equipment manufacturing as a whole (9.7 %) and, more clearly, the rate for the non-financial business economy (11.0 %). This pattern was reflected in a majority of Member States, although among the exceptions the most notable concerned Hungary and the United Kingdom for whom the gross operating rates of the sector (14.8 % and 21.0 % respectively) were much higher than those of their non-financial business economies (8.8 % and 14.4 % respectively).

EXTERNAL TRADE

The EU-27 had a trade deficit of EUR 51.2 billion for office machinery and computers (CPA Division 30) in 2006, which represented a substantial widening of the deficit recorded in 2005 (EUR 42.3 billion) and an acceleration of the trend noted since 2001. The trade deficit in 2006 was a result of EU-27 imports valued at EUR 80.1 billion (almost two fifths of which came from China) and exports of EUR 28.9 billion (see Table 9.14). Computers and other information processing equipment (CPA Class 30.02) represented 89.8 % of total exports, while accounting for 92.5 % of total imports in 2006.

Among the Member States, the Netherlands was the largest trader, exporting (intra- and extra-EU trade combined) EUR 39.2 billion worth of office machinery and computers and importing EUR 39.5 billion worth of these products. Only four Member States (Ireland, Hungary, the Czech Republic and Luxembourg) recorded a trade surplus for office machinery and computers in 2006 with that for Ireland (EUR 4.7 billion) being by far the largest. In contrast, the largest trade deficits for office machinery and computers in 2006 were recorded for France (EUR 8.4 billion) and Germany (EUR 7.6 billion).

9.3: ELECTRICAL MACHINERY AND EQUIPMENT

This subchapter covers NACE Division 31 which includes the manufacture of electric motors, generators, transformers, electricity distribution equipment, insulated wires and cables, optical fibres for coded data transmission, batteries, lighting equipment, and other electrical equipment. The manufacture of metal cables, which are not used as a conductor of electricity, is not included.

STRUCTURAL PROFILE

In 2004 the electrical machinery and equipment manufacturing sector (NACE Division 31) was the largest of the four NACE divisions covered within this chapter, accounting for two fifths (40.1 %) of the value added for electrical machinery and optical equipment manufacturing (NACE Subsection DL) and a little under half (46.4 %) of its employment. The electrical machinery and equipment manufacturing sector generated EUR 76.0 billion of value added in 2004, of which the manufacture of electricity distribution and control apparatus (NACE Group 31.2) contributed EUR 31.0 billion, the manufacture of the miscellaneous category of electrical equipment not elsewhere classified (NACE Group 31.6) contributed EUR 18.3 billion and the manufacture of electric motors, generators and transformers (NACE Group 31.1) contributed a further EUR 13.0 billion – see Table 9.15. These three activities also accounted for almost three quarters (72.7 %) of the 1.7 million persons employed in the electrical machinery and equipment manufacturing sector, the workforce being spread across 65 500 enterprises.

The electrical machinery and equipment manufacturing sector in Germany contributed a little over two fifths (40.4 %) of the value added generated in the sector across the EU-27, by far the largest share among Member States and considerably more than the next largest contributions that came from France and Italy (both 11.5 %). However, in relation to the value added of each Member States' non-financial business economy in 2004, the electrical machinery and equipment manufacturing sector in Hungary contributed the highest share (4.6 %), which was about three times more than the EU-27 average (1.5 %). In these terms, Slovakia and Germany were the next most specialised Member States in electrical machinery and equipment manufacturing.

Table 9.15

Manufacture of electrical machinery and equipment (NACE Division 31)
Structural profile, EU-27, 2004

	No. of enterprises (thousands)	Turnover (EUR million)	Value added (EUR million)	Employment (thousands)
Electrical machinery and equipment (1)	65.5	243 000	76 000	1 671.4
Electric motors, generators and transformers (1)	19.5	44 952	13 000	292.4
Electricity distribution and control apparatus (1)	11.4	92 000	31 000	557.3
Insulated wire and cable (1)	2.3	21 344	4 724	126.4
Accumulators, primary cells and primary batteries (1)	0.7	6 000	1 700	40.0
Lighting equipment and electric lamps (1)	8.0	20 000	7 000	170.0
Electrical equipment n.e.c.	23.4	58 548	18 321	487.3
Electrical equipment for engines and vehicles n.e.c. (1)	3.3	27 600	7 500	250.0
Other electrical equipment n.e.c. (1)	20.1	30 900	10 800	241.0

(1) Rounded estimates based on non-confidential data.
Source: Eurostat (SBS)

Table 9.16

Manufacture of electrical machinery and equipment (NACE Division 31)
Structural profile: ranking of top five Member States, 2004

Rank	Share of EU-27 value added (%) (1)	Share of EU-27 employment (%) (2)	Value added specialisation ratio (EU-27=100) (3)	Employment specialisation ratio (EU-27=100) (4)
1	Germany (40.4)	Germany (29.8)	Hungary (308.9)	Slovakia (342.1)
2	Italy (11.5)	Italy (11.7)	Slovakia (193.2)	Czech Republic (230.3)
3	France (11.5)	France (9.6)	Germany (192.9)	Hungary (204.9)
4	United Kingdom (9.1)	United Kingdom (8.0)	Czech Republic (186.4)	Slovenia (186.9)
5	Spain (5.9)	Czech Republic (6.6)	Slovenia (175.6)	Germany (180.4)

(1) Greece, Luxembourg and Malta, not available.
(2) Greece, Luxembourg and Malta, not available; Slovenia, 2003.
(3) Ireland, Greece, Cyprus, Luxembourg and Malta, not available.
(4) Ireland, Greece, Cyprus, Luxembourg and Malta, not available; Slovenia, 2003.
Source: Eurostat (SBS)

Table 9.17

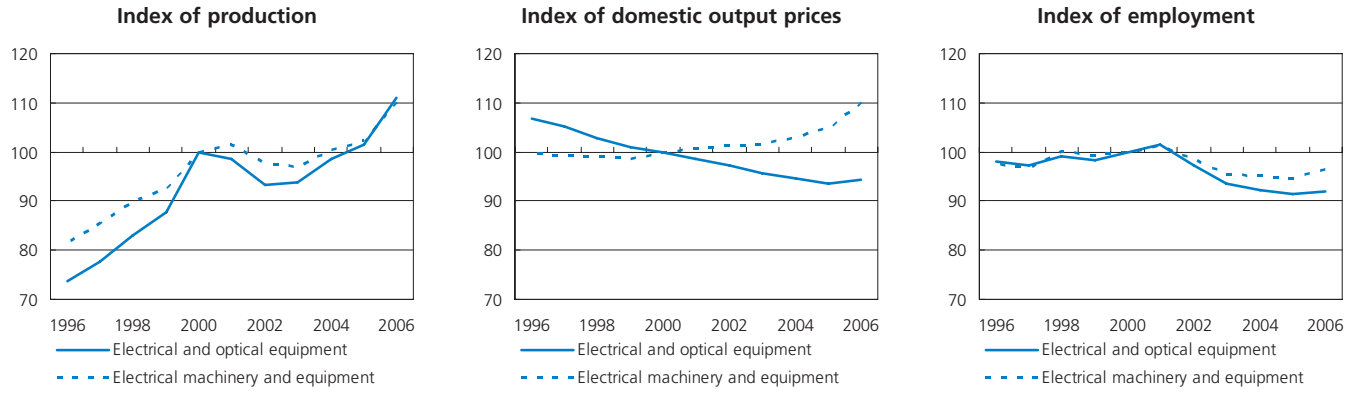
Production of selected products - electrical machinery and apparatus n.e.c. (CPA Division 31), EU-27, 2006 (1)

	Prodcom code	Production value (EUR million)	Volume of sold production (thousands)	Unit of volume
Insulated electric conductors whether or not fitted with connectors, for a voltage > 80 V but <= 1 000 V	31.30.13.70	11 160	5 013 935	kg
Insulated ignition wiring sets and other wiring sets of a kind used in vehicles, aircraft or ships	31.61.10.00	8 396	858 686	kg
Chandeliers and other electric ceiling or wall lighting fittings (excluding those used for lighting public open spaces or thoroughfares)	31.50.25.30	4 922	325 689	units
Generating sets including turbo-generators, generating sets for welding equipt. without heads/appliances excluding with compression, internal and spark-ignition combustion piston engines	31.10.32.50	4 711	24	units
Insulated electric conductors for voltage >1 000 V excluding winding wire, coaxial cable and other coaxial electric conductors, ignition and other wiring sets used in vehicles, aircraft, ships	31.30.14.00	3 927	968 424	kg
Relays and contactors for a voltage > 60 V but <= 1 kV	31.20.24.50	3 853	654 878	units
Parts suitable for machines of 8501 or 8502	31.10.61.00	3 579	-	-
Programmable memory controllers for a voltage <= 1 kV	31.20.31.50	3 498	c	-
Insulated winding wire lacquered or enamelled	31.30.11.30	2 382	547 066	kg

(1) Estimated.
Source: Eurostat (PRODCOM)

Figure 9.7

Manufacture of electrical machinery and equipment (NACE Division 31)
Evolution of main indicators, EU-27 (2000=100)



Source: Eurostat (STS)

The development of the index of production for the manufacture of electrical machinery and equipment in the EU 27 during the ten years between 1996 and 2006 was very similar to that observed for electrical machinery and optical equipment manufacturing (NACE Subsection DL) as a whole. Nevertheless, the downturn in electrical machinery and equipment manufacturing output in 2001 and subsequent upturn in 2004 (see Figure 9.7) lagged by one year a similar but stronger development for electrical machinery and optical equipment manufacturing as a whole. Over the ten years through to 2006, the index of production for the manufacture of electrical machinery and equipment grew at an average 3.0 % per annum, a lower rate of growth than that for electrical machinery and optical equipment manufacturing (an average 4.2 % per annum).

The development of the domestic output price index for electrical machinery and equipment manufacturing was similar to the development for industry as a whole (NACE Sections C to E) rather than that for electrical machinery and optical equipment manufacturing. The domestic output price index remained relatively stable in the period between 1996 and 2000, after which there was a gradual acceleration in price rises. Over the ten years between 1996 and 2006, the domestic output price index for electrical machinery and equipment manufacturing increased by an average 1.0 % per annum.

Table 9.18

Manufacture of electrical machinery and equipment (NACE Division 31)
Productivity and profitability, EU-27, 2004

	Apparent labour productivity (EUR thousand)	Average personnel costs (EUR thousand)	Wage adjusted labour productivity (%)	Gross operating rate (%)
Electrical machinery and equipment (1)	46.0	35.0	132.0	8.4
Electric motors, generators and transformers (1)	45.0	31.9	140.0	10.0
Electricity distribution and control apparatus (1)	55.0	45.0	123.0	6.6
Insulated wire and cable	37.4	28.3	132.0	5.6
Accumulators, primary cells and primary batteries (1)	42.5	32.0	140.0	7.4
Lighting equipment and electric lamps (1)	41.0	26.9	150.0	13.0
Electrical equipment n.e.c.	37.6	27.8	135.4	9.3

(1) Rounded estimates based on non-confidential data.
Source: Eurostat (SBS)

COSTS, PRODUCTIVITY AND PROFITABILITY

The cost structure of the EU-27's electrical machinery and equipment manufacturing sector was similar to that for electrical machinery and optical equipment manufacturing as a whole in 2004: tangible investment accounted for 3.2 % of total expenditure, personnel costs 23.7 % and purchases of goods and services the remaining 73.1 %. Average personnel costs in the electrical machinery and equipment manufacturing sector were EUR 35 000 per employee in 2004, only EUR 2 000 per person less than the average across electrical machinery and optical equipment manufacturing activities. There was a greater difference, however, in apparent labour productivity, the level of EUR 46 000 per person employed across the sector being EUR 6 000 per person less than for electrical machinery and optical equipment manufacturing. As a result, the wage adjusted labour productivity ratio for the EU-27's electrical machinery and equipment manufacturing sector was 132.0 % in 2004, below the ratio for machinery and optical equipment manufacturing as a whole (141.0 %) and, therefore below the non-financial business economy average (148.0 %).

The gross operating rate (calculated as the gross operating surplus in relation to turnover) for the EU-27's electrical machinery and equipment manufacturing sector was 8.4 % in 2004, below both the average rate for the whole of electrical machinery and optical equipment manufacturing (9.7 %) and that for the non-financial business economy (11.0 %). Within the sector, however, there was a wide variation in profitability according to this measure, the lowest gross operating rate being 5.6 % for the manufacture of insulated wire and cable (NACE Group 31.3) and the highest rate of 13.0 % being for the manufacture of lighting equipment and electric lamps (NACE Group 31.5) – see Table 9.18.

EXTERNAL TRADE

The EU-27 recorded a trade surplus with non-member countries of EUR 10.8 billion for electrical machinery and apparatus (CPA Division 31) in 2006. This represented a further widening of the trade surplus since a level of EUR 4.1 billion was recorded in 2004 and EUR 6.8 billion in 2005.

EU-27 exports of electrical machinery and apparatus were valued at EUR 51.1 billion in 2006, of which one third (33.4 %) came from electricity distribution and control apparatus (CPA Group 31.2) and a little less than one third (30.5 %) from electric motors, generators and transformers (CPA Group 31.1). EU-27 imports of electrical machinery and apparatus were valued at EUR 40.2 billion in 2006, of which electrical equipment not elsewhere classified (CPA Group 31.6) represented the largest share (29.5 %).

Germany was by far the largest trader of electrical machinery and apparatus in 2006; it exported (intra- and extra-EU trade combined) such goods to the value of EUR 43.1 billion and imported EUR 24.7 billion's worth of them. These values were more than twice those registered by France, the second largest trader. Germany also recorded by far the largest trade surplus (EUR 14.4 billion) for electrical machinery and apparatus in 2006, dwarfing the surpluses for Italy (EUR 3.3 billion) and France (EUR 1.6 billion) which were the next highest.

Table 9.19

Electrical machinery and apparatus n.e.c. (CPA Division 31)
External trade, EU-27, 2006

	Extra-EU exports		Extra-EU imports			
	(EUR million)	(% share of chapter)	(EUR million)	(% share of chapter)	Trade balance (EUR million)	Cover ratio (%)
Electrical machinery and equipment	51 061	25.8	40 224	15.1	10 837	126.9
Electric motors, generators and transformers	15 554	7.9	8 754	3.3	6 801	177.7
Electricity distribution and control apparatus	17 062	8.6	8 648	3.2	8 414	197.3
Insulated wire and cable	4 358	2.2	4 115	1.5	242	105.9
Accumulators, primary cells and primary batteries	1 374	0.7	2 569	1.0	-1 195	53.5
Lighting equipment and electric lamps	3 660	1.9	4 252	1.6	-592	86.1
Electrical equipment n.e.c.	9 053	4.6	11 886	4.5	-2 833	76.2

Source: Eurostat (Comext)

9.4: RADIO, TELEVISION AND COMMUNICATION EQUIPMENT

This subchapter covers the manufacture of radio, television and communication equipment, as covered by NACE Division 32. Electronic components, including active, passive and printed circuit boards (PCBs), are all included within NACE Group 32.1; the manufacture of television cameras, transmission apparatus for radio and television, telephonic switching apparatus (including LANs and modems), telephones and fax machines are found under NACE Group 32.2 (note that Chapters 21 and 22 deal with information, communication and media content that makes use of this equipment); while NACE Group 32.3 covers the manufacture of audio-visual equipment and related appliances, such as loudspeakers, headphones and aerials, as well as other electronic consumer appliances, such as telephone answering machines.

Technological innovation of radio, television and communication equipment has lead to miniaturization, digitalisation and convergence into multifunctional products (such as third generation phones that incorporate high-speed internet access and video telephony).

Intense competition from the Far East, underlines the need for European manufacturers to innovate. In this context the 7th Framework Programme on research and development may provide the platform to share ideas and innovate. Among the technology platforms established for this purpose are the Networked and electronic media platform which will look to focus on generalized broadband access, increased mobility, the availability of richer media formats and contents, as well as new home networks and communications platforms, and the Mobile and wireless communications technology platform that will look to build on GSM and DECT [7] technologies. One area of change concerns the energy efficiency of products: the EU's Energy Star label [8] differentiates between efficient and less efficient IT products and this voluntary standard could be extended to other products and countries (building on commitments made at an EU-US summit in April 2007).

The key legislative tool in the sector remains the 1999 radio and telecommunications terminal equipment directive [9], which ensures that equipment is safe and does not disturb radio services or other equipment. At the time of writing, the second progress report on this directive is expected at the end of September 2007.

STRUCTURAL PROFILE

A little more than one quarter (26.9 %) of the value added generated across the electrical machinery and optical equipment manufacturing activities (NACE Subsection DL) in 2004 came from the value added generated (EUR 51.1 billion) by the EU-27's manufacture of radio, television and communication equipment sector (NACE Division 32). The 812 400 persons employed across 28 500 enterprises that reported this as their main activity in 2004 represented over one fifth (22.6 %) of the EU-27's electrical machinery and optical equipment manufacturing workforce. The manufacture of electronic valves and tubes and other electric components (NACE Group 32.1) and television and radio transmitters and apparatus for line telephony and line telegraphy manufacturing (NACE Group 32.2) each employed about 300 000 people across the EU-27 in 2004, with the remainder of the sectoral workforce (22.8 %) employed in the manufacture of television and radio receivers, sound or video recording and reproducing apparatus (NACE Group 32.3) – see Table 9.20.

A little more than one fifth (21.8 %) of the value added generated by the EU-27's radio, television and communication equipment sector came from Germany, the largest contribution from any Member State. A further one quarter of sectoral value added came from France (15.5 %) and Finland (10.3 %) in 2004, the next highest contributions –see Table 9.21. Finland was by far the most specialised Member State [10] in the manufacture of radio, television and communication equipment, the sector accounting for 7.2 % of the value added of Finland's national non-financial business economy, which was over seven times the average contribution in the EU-27 (1.0 %). In these terms, Hungary was the next most specialised Member State in the manufacture of radio, television and communication equipment and then Sweden.

The development of the production index for the manufacture of radio, television and communication equipment in the ten years between 1996 and 2006 was similar but much more exaggerated than the development already described for electrical machinery and optical equipment manufacturing as a whole (see Figure 9.8). In periods of expansion, such as between 1996 and 2000 (an average 12.6 % per annum) and then 2003 to 2006 (an average 10.6 % per annum), the growth in the output of radio, television and communication equipment outstripped all other manufacturing (NACE Section D) divisions [11]. In contrast, output contracted sharply in the period between 2000 and 2003 (an average 6.6 % per annum).

The domestic output price index for the EU-27's manufacture of radio, television and communication equipment followed a steady downward trend that was even sharper than that for electrical machinery and optical equipment manufacturing as a whole, an average fall of 3.5 % per annum for radio, television and communication equipment manufacturing compared to 1.2 % per annum.

[7] Global system for mobile communication; digital enhanced cordless telecommunications.
[8] Regulation (EC) No 2422/2001.
[9] Directive 1999/5/EC of the European Parliament and Council.

[10] Ireland, Greece, Cyprus, Luxembourg, Malta and Netherlands, not available.
[11] Recycling (NACE Division 37), not available for 1996 to 2000; Mining of uranium and thorium ores, not available for 2003 to 2006.

Table 9.20

Manufacture of radio, television and communication equipment (NACE Division 32) Structural profile, EU-27, 2004

	No. of enterprises (thousands)	Turnover (EUR million)	Value added (EUR million)	Employment (thousands)
Radio, TV & communication equipment	28.5	201 024	51 057	812.4
Electronic valves and tubes and other electronic components (1)	9.0	60 000	16 554	310.0
Television and radio transmitters and apparatus for line telephony and line telegraphy (2)	14.2	92 000	:	300.0
Television and radio receivers, sound or video recording or reproducing apparatus and associated goods (2)	5.7	48 809	9 197	185.2

(1) Rounded estimates based on non-confidential data; value added, 2003.
(2) Rounded estimates based on non-confidential data.
Source: Eurostat (SBS)

Table 9.21

Manufacture of radio, television and communication equipment (NACE Division 32)
Structural profile: ranking of top five Member States, 2004

Rank	Share of EU-27 value added (%) (1)	Share of EU-27 employment (%) (1)	Value added specialisation ratio (EU-27=100) (2)	Employment specialisation ratio (EU-27=100) (2)
1	Germany (21.8)	Germany (18.1)	Finland (724.0)	Finland (455.3)
2	France (15.5)	France (15.9)	Hungary (369.8)	Hungary (327.3)
3	Finland (10.3)	Italy (10.8)	Sweden (247.3)	Estonia (235.0)
4	United Kingdom (9.4)	United Kingdom (9.8)	Austria (183.6)	Sweden (180.9)
5	Italy (8.6)	Hungary (6.7)	Lithuania (135.9)	Lithuania (178.6)

(1) Greece, Luxembourg, Malta and Netherlands, not available.
(2) Ireland, Greece, Cyprus, Luxembourg, Malta and Netherlands, not available.
Source: Eurostat (SBS)

Table 9.22

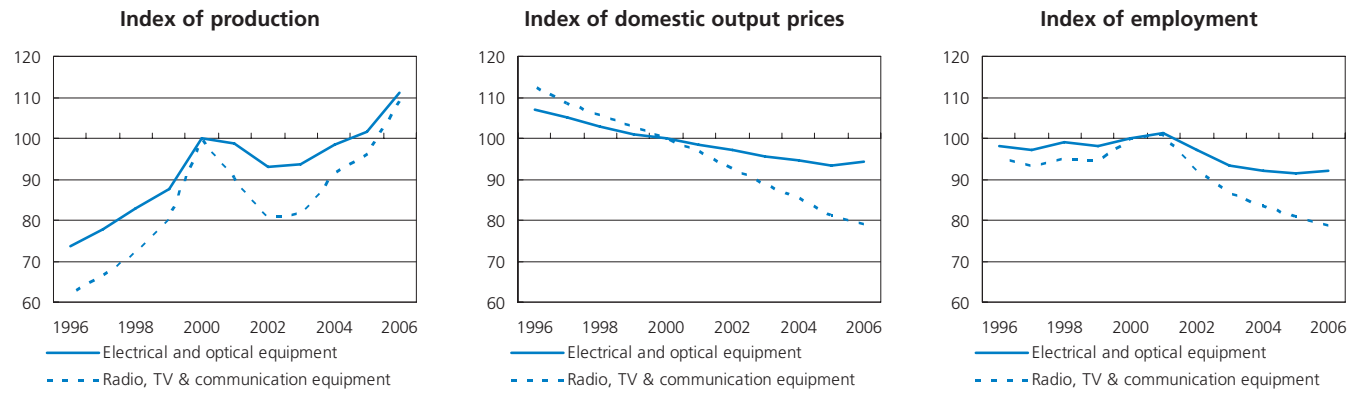
Production of selected products - radio, television and communication equipment and apparatus (CPA Division 32), EU-27, 2006 (1)

	Prodcom code	Production value (EUR million)	Volume of sold production (thousands)	Unit of volume
Radio transmission apparatus with reception apparatus	32.20.11.70	32 230	277 415	units
Flat panel colour TV receivers, lcd/plasma, etc. excluding television projection equipment, apparatus with video recorder/player, video monitors, television receivers with integral tube	32.30.20.60	8 178	13 304	units
Telephonic or telegraphic switching apparatus (excluding relays and switching equipment such as selectors for automatic telephone exchangers)	32.20.20.40	7 477	63 965	units
Digital MOS integrated circuits (ICs): wafers not yet cut into chips	32.10.62.15	7 111	4 205 662	units
Photosensitive semiconductor devices; solar cells, photo-diodes, photo-transistors, etc.	32.10.52.37	3 554	1 137 164	units
Linear (analogue) integrated circuits (ICs)	32.10.62.95	2 720	7 710 022	units
Electronic assemblies, parts, for line telephony or line telegraphy, including for line telephones with cordless receivers, and for videophones (excluding for telephonic or telegraphic carrier-current line systems)	32.20.30.60	2 718	-	-
Radio receivers motor vehicles with sound recording or reproducing apparatus	32.30.12.70	2 567	19 091	units
Telephonic/telegraphic apparatus for carrier-current line systems, n.e.c.	32.20.20.50	2 373	12 415	units
Bare multilayer printed circuit boards	32.10.30.50	2 124	c	units

(1) Estimated.
Source: Eurostat (PRODCOM)

Figure 9.8

Manufacture of radio, television and communication equipment (NACE Division 32)
Evolution of main indicators, EU-27 (2000=100)



Source: Eurostat (STS)

Table 9.23

Manufacture of radio, television and communication equipment (NACE Division 32)
Productivity and profitability, EU-27, 2004

	Apparent labour productivity (EUR thousand)	Average personnel costs (EUR thousand)	Wage adjusted labour productivity (%)	Gross operating rate (%)
Radio, TV & communication equipment	62.9	41.5	151.4	9.2
Electronic valves and tubes and other electronic components (1)	60.0	36.0	160.0	9.4
Television and radio transmitters and apparatus for line telephony and line telegraphy (2)	:	51.7	:	:
Television and radio receivers, sound or video recording or reproducing apparatus and associated goods (2)	49.7	33.9	146.4	6.3

(1) Rounded estimates based on non-confidential data; gross operating rate, 2003.
(2) Rounded estimates based on non-confidential data.
Source: Eurostat (SBS)

Table 9.24

Radio, television and communication equipment and apparatus (CPA Division 32)
External trade, EU-27, 2006

	Extra-EU exports		Extra-EU imports			
	(EUR million)	(% share of chapter)	(EUR million)	(% share of chapter)	Trade balance (EUR million)	Cover ratio (%)
Radio, TV & communication equipment	63 482	32.1	99 510	37.3	-36 028	63.8
Electronic valves and tubes and other electronic components	23 790	12.0	31 573	11.8	-7 783	75.3
Television and radio transmitters; apparatus for line telephony and telegraphy	27 348	13.8	31 685	11.9	-4 337	86.3
Television and radio receivers; sound or video recording or reproducing apparatus and associated goods	12 343	6.2	36 252	13.6	-23 909	34.0

Source: Eurostat (Comext)

COSTS, PRODUCTIVITY AND PROFITABILITY

The cost structure of the radio, television and communication equipment manufacturing sector was more akin to the structure across the non-financial business economy as a whole than to electrical machinery and optical equipment manufacturing. A much lower proportion of total expenditure went on personnel costs (16.9 %) in the sector than was generally the case across electrical machinery and optical equipment manufacturing (21.5 %), despite the fact that average personnel costs in the sector were EUR 4 500 per employee higher at EUR 41 500 per employee in 2004 – see Table 9.23. However, the wage adjusted productivity ratio of the EU-27's radio, television and communication equipment manufacturing sector remained higher than the ratio across electrical machinery and optical equipment manufacturing as a whole in 2004 (151.4 % compared to 141.0 %), as the apparent labour productivity of the sector (EUR 62 900 per person employed) was EUR 10 900 per person employed higher than for electrical machinery and optical equipment manufacturing.

However, profitability, as measured by the gross operating rate (which is the ratio of gross operating surplus to turnover) was a little lower for the EU-27's radio, television and telecommunication equipment sector (9.2 %) than the average for electrical machinery and optical equipment manufacturing as a whole (9.7 %) and more clearly beneath the average rate for the non-financial business economy (11.0 %).

EXTERNAL TRADE

The EU-27 had a trade deficit for radio, television and communication equipment (CPA Division 32) of EUR 36.0 billion in 2006 – see Table 9.24. Imports of radio, television and communication equipment from non-member countries into the EU-27 were valued at EUR 99.5 billion in 2006, the majority of this coming from Far East countries like China (32.6 %), South Korea (12.6 %) and Japan (10.8 %).

Overall, intra-EU imports accounted for a small majority (54.4 %) of the value of radio, television and communication equipment imports (intra- and extra-EU) by EU-27 Member States, underlining the importance of the internal market for these goods. The United Kingdom and Germany were the main traders in radio, television and communication equipment accounting for a combined share of 41.6 % of the value of EU-27 Member States exports (intra-and extra-EU) and 37.6 % of their imports. However, whereas the United Kingdom recorded the highest trade surplus for these goods (EUR 12.3 billion) among the Member States in 2006, Germany recorded the largest trade deficit (EUR 7.5 billion).

Table 9.25

Manufacture of computers and office equipment (NACE Division 30)
Main indicators, 2004

	EU-27	BE	BG	CZ	DK	DE	EE	IE	EL	ES	FR	IT	CY	LV	LT
No. of enterprises (thousands) (1)	9.7	0.1	0.1	0.4	0.1	1.1	0.0	0.1	:	1.1	0.5	1.9	0.0	0.0	0.0
Turnover (EUR million) (1)	59 500	217	76	2 634	229	16 579	60	15 971	:	781	2 752	4 188	0	14	15
Production (EUR million) (1)	53 300	204	60	2 648	227	13 252	35	15 719	:	732	2 471	3 865	0	10	9
Value added (EUR million) (1)	11 500	53	12	124	90	4 061	5	1 514	:	139	488	666	0	3	4
Gross operating surplus (EUR million) (1)	5 400	21	6	52	34	1 662	1	912	:	1	120	201	0	2	2
Purchases of goods & services (EUR million) (1)	48 000	167	72	2 535	141	12 509	58	14 423	:	660	2 226	3 665	0	12	12
Personnel costs (EUR million) (1)	6 100	33	5	73	56	2 399	3	602	:	138	368	465	0	1	2
Investment in tangible goods (EUR million)	697	5	4	18	3	173	0	125	:	9	36	46	0	0	1
Employment (thousands)	161	1	2	9	1	42	0	14	:	5	9	15	0	0	1
Apparent labour prod. (EUR thousand) (1)	70.0	59.9	6.2	14.0	75.0	96.9	13.0	107.2	:	28.2	56.6	43.8	:	12.0	7.6
Average personnel costs (EUR thousand) (1)	40.0	43.8	3.0	8.6	47.7	58.2	9.3	42.6	:	32.9	42.9	36.4	:	5.1	3.9
Wage adjusted labour productivity (%) (1)	179.0	136.8	207.7	162.2	157.3	166.5	140.4	251.3	:	85.9	131.8	120.3	:	237.7	194.4
Gross operating rate (%) (1)	9.0	9.5	8.3	2.0	14.7	10.0	2.2	5.7	:	0.2	4.3	4.8	:	12.1	12.6
Investment / employment (EUR thousand)	4.3	5.5	2.2	2.0	2.4	4.1	1.2	8.8	:	1.9	4.1	3.0	:	0.7	1.5

	LU (2)	HU	MT	NL	AT	PL	PT	RO	SI	SK	FI	SE	UK	NO
No. of enterprises (thousands)	0.0	0.3	:	0.2	0.1	0.9	0.0	0.5	0.1	0.0	0.1	0.4	1.7	0.0
Turnover (EUR million)	:	2 106	:	1 568	615	406	109	191	128	684	88	703	9 341	49
Production (EUR million)	:	1 966	:	1 439	576	282	90	79	79	676	70	598	8 172	47
Value added (EUR million)	:	399	:	306	42	79	24	12	26	-26	17	221	3 242	15
Gross operating surplus (EUR million)	:	311	:	20	-4	44	6	6	10	-48	4	33	1 961	3
Purchases of goods & services (EUR million)	:	1 734	:	1 305	549	336	86	182	105	727	72	426	6 113	35
Personnel costs (EUR million)	:	88	:	285	46	36	18	6	16	22	13	188	1 281	12
Investment in tangible goods (EUR million)	:	27	:	:	3	8	3	4	3	32	1	14	152	1
Employment (thousands)	:	8	:	:	1	5	1	3	1	3	0	4	30	0
Apparent labour prod. (EUR thousand)	:	47.9	:	:	33.6	15.8	31.1	4.3	31.0	-9.1	44.7	53.0	107.4	80.9
Average personnel costs (EUR thousand)	:	10.6	:	:	38.3	8.9	24.0	2.1	19.8	7.7	36.4	48.3	43.0	68.3
Wage adjusted labour productivity (%)	:	450.3	:	:	87.7	177.7	129.4	199.4	157.0	-118.1	123.0	109.7	250.0	118.3
Gross operating rate (%)	:	14.8	:	1.3	-0.7	10.8	5.3	3.2	7.8	-7.1	4.2	4.7	21.0	6.3
Investment / employment (EUR thousand)	:	3.3	:	:	2.1	1.6	3.5	1.5	3.7	11.2	3.5	3.3	5.0	3.2

(1) EU-27, rounded estimate based on non-confidential data. (2) 2003.
Source: Eurostat (SBS)

Table 9.26

Manufacture of electrical machinery and equipment (NACE Division 31)
Main indicators, 2004

	EU-27	BE	BG	CZ	DK	DE	EE	IE	EL	ES	FR	IT	CY	LV	LT
No. of enterprises (thousands)	65.5	0.7	0.6	13.8	0.9	5.9	0.1	0.2	:	3.1	4.3	17.7	0.1	0.1	0.1
Turnover (EUR million) (1)	243 000	3 510	332	5 303	4 549	95 322	208	3 336	:	16 120	28 873	31 772	29	123	252
Production (EUR million) (1)	227 000	3 401	314	5 078	4 375	86 426	177	3 310	:	15 578	27 534	30 970	25	100	251
Value added (EUR million) (1)	76 000	1 190	76	1 458	1 091	30 713	58	1 687	:	4 478	8 705	8 735	10	32	72
Gross operating surplus (EUR million) (1)	20 300	276	33	627	184	4 717	21	1 363	:	1 717	1 659	3 305	3	15	38
Purchases of goods & services (EUR million) (1)	171 000	2 378	262	4 018	3 368	64 776	164	1 722	:	12 321	20 466	23 839	19	97	183
Personnel costs (EUR million) (1)	55 400	914	43	843	907	25 995	37	325	:	2 761	7 046	5 430	7	17	34
Investment in tangible goods (EUR million)	7 378	52	18	304	130	2 426	21	83	:	442	843	1 215	1	4	5
Employment (thousands)	1 671	20	18	110	21	499	4	9	:	85	161	195	1	3	7
Apparent labour prod. (EUR thousand) (1)	46.0	61.0	4.2	13.2	51.6	61.6	13.4	183.9	:	53.0	54.1	44.9	19.4	9.5	10.3
Average personnel costs (EUR thousand) (1)	35.0	48.3	2.5	8.6	43.7	52.4	8.6	35.6	:	33.2	43.9	32.1	15.1	5.1	4.9
Wage adjusted labour productivity (%) (1)	132.0	126.3	169.8	153.5	118.1	117.5	155.6	516.8	:	159.5	123.0	139.7	128.2	187.7	210.7
Gross operating rate (%) (1)	8.4	7.9	9.8	11.8	4.0	4.9	10.0	40.8	:	10.6	5.7	10.4	9.0	12.0	15.1
Investment / employment (EUR thousand)	4.4	2.6	1.0	2.8	6.2	4.9	4.7	9.0	:	5.2	5.2	6.2	1.3	1.1	0.6

	LU (2)	HU	MT	NL	AT	PL	PT	RO	SI	SK	FI	SE	UK	NO
No. of enterprises (thousands)	0.0	1.7	:	0.9	0.6	4.8	0.9	0.8	0.8	0.4	0.5	1.3	5.2	0.5
Turnover (EUR million)	:	5 110	:	3 737	5 093	5 046	2 272	1 074	1 072	1 435	3 321	4 706	19 813	1 323
Production (EUR million)	:	4 613	:	3 325	4 929	4 673	2 143	1 055	999	1 374	3 259	4 330	18 179	1 198
Value added (EUR million)	:	1 662	:	1 145	1 803	1 450	595	335	354	380	1 073	1 445	6 920	433
Gross operating surplus (EUR million)	:	966	:	345	621	828	141	132	121	136	316	302	2 358	111
Purchases of goods & services (EUR million)	:	3 452	:	2 636	3 652	3 707	1 707	769	748	1 068	2 326	3 282	12 924	914
Personnel costs (EUR million)	:	696	:	800	1 182	622	454	203	233	244	757	1 143	4 562	322
Investment in tangible goods (EUR million) (3)	:	256	:	75	144	200	82	137	67	102	62	72	583	27
Employment (thousands) (3)	:	70	:	17	27	92	27	66	15	41	18	26	134	6
Apparent labour prod. (EUR thousand) (3)	:	23.6	:	66.5	66.3	15.8	22.2	5.1	23.4	9.3	60.7	55.4	51.5	69.9
Average personnel costs (EUR thousand)	:	10.0	:	47.6	43.9	7.2	17.1	3.1	15.5	6.0	43.1	47.8	34.7	52.8
Wage adjusted labour productivity (%) (3)	:	236.4	:	139.6	150.8	220.4	130.0	164.3	151.0	155.8	141.0	115.9	148.5	132.3
Gross operating rate (%)	:	18.9	:	9.2	12.2	16.4	6.2	12.3	11.3	9.5	9.5	6.4	11.9	8.4
Investment / employment (EUR thousand) (3)	:	3.6	:	4.4	5.3	2.2	3.1	2.1	4.6	2.5	3.5	2.8	4.3	4.3

(1) EU-27, rounded estimate based on non-confidential data. (2) 2003. (3) Slovenia, 2003.
Source: Eurostat (SBS)

Table 9.27

Manufacture of radio, television and communication equipment (NACE Division 32)
Main indicators, 2004

	EU-27	BE	BG	CZ	DK	DE	EE	IE	EL	ES	FR	IT	CY	LV	LT
No. of enterprises (thousands)	28.5	0.2	0.2	3.9	0.2	2.5	0.1	0.0	:	1.0	2.6	7.9	0.0	0.0	0.1
Turnover (EUR million)	201 024	5 063	112	3 894	1 117	45 241	202	2 824	:	5 012	31 393	13 709	7	38	325
Production (EUR million)	166 189	5 209	104	3 701	1 066	32 969	202	2 868	:	4 307	27 821	14 190	7	38	337
Value added (EUR million)	51 057	1 799	38	630	383	11 112	60	1 585	:	1 006	7 900	4 402	1	19	95
Gross operating surplus (EUR million)	18 414	596	21	336	81	3 369	20	1 260	:	228	1 070	1 327	0	13	40
Purchases of goods & services (EUR million)	153 140	3 561	73	3 472	746	34 276	128	1 348	:	4 111	23 617	9 740	6	21	251
Personnel costs (EUR million)	32 644	1 203	17	295	301	7 743	40	326	:	779	6 830	3 075	0	6	55
Investment in tangible goods (EUR million)	8 135	80	7	126	41	2 214	28	909	:	144	1 182	970	0	3	46
Employment (thousands)	812	17	6	34	7	147	6	8	:	25	129	88	0	1	9
Apparent labour prod. (EUR thousand)	62.9	102.8	6.4	18.4	54.1	75.6	10.2	203.0	:	40.6	61.2	49.9	23.4	14.5	10.3
Average personnel costs (EUR thousand)	41.5	69.6	3.0	9.7	43.0	53.2	6.8	41.7	:	32.1	53.1	39.4	11.7	4.6	6.0
Wage adjusted labour productivity (%)	151.4	147.7	214.8	190.5	126.0	142.3	149.1	486.7	:	126.4	115.3	126.8	199.5	314.0	172.7
Gross operating rate (%)	9.2	11.8	18.7	8.6	7.3	7.4	9.9	44.6	:	4.5	3.4	9.7	4.7	34.6	12.3
Investment / employment (EUR thousand)	10.0	4.5	1.2	3.7	5.7	15.1	4.8	116.4	:	5.8	9.2	11.0	13.0	2.2	4.9

	LU (1)	HU	MT	NL	AT	PL	PT	RO	SI	SK	FI	SE	UK	NO
No. of enterprises (thousands)	0.0	1.8	:	0.3	0.2	2.6	0.3	0.2	0.3	0.1	0.3	0.8	2.8	0.2
Turnover (EUR million)	:	11 207	:	:	6 240	3 152	3 328	292	524	555	26 619	10 605	16 481	963
Production (EUR million)	:	10 491	:	:	5 509	3 053	3 305	293	443	501	14 864	11 234	14 537	977
Value added (EUR million)	:	1 337	:	:	2 257	539	635	105	163	93	5 274	3 666	4 806	316
Gross operating surplus (EUR million)	:	767	:	:	709	298	322	53	50	28	3 374	1 659	1 592	72
Purchases of goods & services (EUR million)	:	9 976	:	:	4 239	2 745	2 754	202	369	464	22 036	7 604	11 586	666
Personnel costs (EUR million)	:	570	:	:	1 547	241	313	52	113	65	1 900	2 007	3 214	244
Investment in tangible goods (EUR million) (2)	:	552	:	:	292	146	168	34	18	32	261	151	396	35
Employment (thousands)	:	55	:	:	26	31	13	10	6	10	36	30	80	4
Apparent labour prod. (EUR thousand)	:	24.4	:	:	88.4	17.5	50.4	10.8	26.3	9.4	146.9	120.9	60.4	78.3
Average personnel costs (EUR thousand)	:	10.6	:	:	60.9	8.6	25.0	5.4	18.8	6.6	53.0	73.3	41.4	61.0
Wage adjusted labour productivity (%)	:	230.0	:	:	145.1	203.4	202.0	200.7	139.5	142.2	277.1	164.9	146.0	128.3
Gross operating rate (%)	:	6.8	:	:	11.4	9.4	9.7	18.2	9.6	5.0	12.7	15.6	9.7	7.4
Investment / employment (EUR thousand) (2)	:	10.1	:	:	11.4	4.7	13.4	3.5	3.0	3.2	7.3	5.0	5.0	8.7

(1) 2003. (2) Slovenia, 2003.
Source: Eurostat (SBS)

Table 9.28

Instrument engineering (NACE Division 33)
Main indicators, 2004

	EU-27	BE	BG	CZ	DK	DE	EE	IE	EL	ES	FR	IT	CY	LV	LT
No. of enterprises (thousands) (1)	92.7	1.4	0.9	4.2	0.7	15.6	0.1	0.1	:	5.3	12.3	21.5	0.1	0.1	0.2
Turnover (EUR million)	127 680	1 543	101	1 390	2 432	40 352	90	5 509	:	3 428	22 167	15 485	13	34	98
Production (EUR million)	118 793	1 444	91	1 342	2 325	37 662	88	5 066	:	3 319	20 700	14 823	10	32	97
Value added (EUR million)	51 376	468	24	441	1 131	17 288	26	2 266	:	1 296	7 877	5 571	6	12	35
Gross operating surplus (EUR million)	17 064	141	11	179	457	4 479	11	1 486	:	433	1 756	2 288	2	4	15
Purchases of goods & services (EUR million)	76 671	1 071	79	968	1 307	22 950	67	3 324	:	2 221	14 237	10 157	8	21	69
Personnel costs (EUR million)	34 311	327	14	263	675	12 808	15	780	:	863	6 121	3 283	4	7	21
Investment in tangible goods (EUR million)	3 679	50	7	87	107	1 022	3	249	:	112	508	445	0	3	7
Employment (thousands) (1)	1 020	9	7	34	15	324	2	22	:	34	134	124	0	2	4
Apparent labour prod. (EUR thousand) (1)	50.0	53.4	3.6	13.1	77.4	53.3	15.1	104.1	:	38.0	58.9	44.8	20.4	6.6	9.3
Average personnel costs (EUR thousand) (1)	35.0	44.8	2.4	9.1	46.9	40.8	8.8	35.9	:	28.6	47.4	34.6	16.5	4.2	5.7
Wage adjusted labour productivity (%) (1)	138.0	119.2	152.7	143.8	165.1	130.8	171.7	290.3	:	132.9	124.2	129.3	123.5	156.9	162.3
Gross operating rate (%)	13.4	9.1	10.4	12.9	18.8	11.1	12.1	27.0	:	12.6	7.9	14.8	13.2	12.9	14.8
Investment / employment (EUR thousand) (1)	3.6	5.7	1.0	2.6	7.3	3.2	1.9	11.4	:	3.3	3.8	3.6	1.0	1.4	1.9

	LU (2)	HU	MT	NL	AT	PL	PT	RO	SI	SK	FI	SE	UK	NO
No. of enterprises (thousands)	0.1	3.7	:	2.3	1.4	11.1	0.9	0.9	0.5	0.2	0.8	2.2	5.9	0.5
Turnover (EUR million)	165	794	:	:	1 932	1 407	459	225	439	247	1 932	4 867	18 196	1 603
Production (EUR million)	167	630	:	:	1 807	1 302	425	219	403	232	1 969	4 560	16 435	1 538
Value added (EUR million)	81	282	:	:	947	554	155	80	169	73	733	1 947	8 384	584
Gross operating surplus (EUR million)	22	121	:	:	383	273	47	41	53	24	246	564	3 565	98
Purchases of goods & services (EUR million)	90	514	:	:	1 018	821	308	168	286	181	1 261	2 955	9 758	1 050
Personnel costs (EUR million)	60	160	:	:	564	281	108	39	116	49	487	1 383	4 820	486
Investment in tangible goods (EUR million) (3)	8	44	:	76	58	51	29	20	27	9	37	127	582	33
Employment (thousands)	2	20	:	26	16	52	7	13	8	7	12	26	120	8
Apparent labour prod. (EUR thousand)	43.0	13.8	:	:	59.1	10.7	23.3	6.4	21.7	10.8	62.8	73.8	70.0	73.2
Average personnel costs (EUR thousand)	32.0	8.8	:	:	37.5	7.2	16.9	3.2	15.3	7.3	42.7	56.4	41.5	62.1
Wage adjusted labour productivity (%)	134.2	156.2	:	:	157.5	149.8	137.9	201.7	142.1	148.1	147.0	130.8	168.9	117.9
Gross operating rate (%)	13.0	15.3	:	:	19.8	19.4	10.3	18.2	12.2	9.6	12.8	11.6	19.6	6.1
Investment / employment (EUR thousand) (3)	4.1	2.2	:	2.9	3.6	1.0	4.4	1.6	3.6	1.3	3.1	4.8	4.9	4.1

(1) EU-27, rounded estimate based on non-confidential data. (2) 2003. (3) Slovenia, 2003.
Source: Eurostat (SBS)