

6

Fuel processing and chemicals

Fuel processing activities (NACE Subsection DF) is the collective term used in this publication for the manufacture of coke oven products, refined petroleum products and the processing of nuclear fuels. These activities essentially involve the processing of energy producing minerals such as coal and crude oil. The manufacture of chemicals is covered by NACE Subsection DG, which also includes the manufacture of man-made fibres.

The mixture of volatile liquid hydrocarbons (such as naphtha and kerosene) that comprises crude oil is one of the key raw materials for chemicals manufacturing, along with natural gas. A number of enterprises that are involved in fuel processing, and particularly the manufacture of refined petroleum products, are also involved in the manufacture of chemicals: for this reason these two types of manufacturing have been put together in this chapter. Indeed, Royal Dutch/Shell and Total were amongst both the largest global fuel processors and chemical enterprises in the world. As many as ten of the world's twenty-five largest chemical manufacturing enterprise groups, in terms of chemical sales, were from the EU-27. This helps explain how EU-27 chemical manufacturers accounted for about 30 % of world sales in 2007⁽¹⁾.

Enterprises in this sector operate within a highly regulated framework that extends from the supply of the raw materials, through their processing to the treatment of waste. The Registration,

Evaluation and Authorisation of Chemical substances (the so-called REACH Regulation) came into force on 1 July 2007, with the main aims of improving the protection of human health and the environment from risks posed by chemicals. The first list of 15 chemicals to undergo scrutiny was published by the European Chemicals Agency in October 2008. A new European Parliament and Council Regulation⁽²⁾ on the classification, labelling and packaging of chemical substances and mixtures (CLP) was adopted in December 2008, in order to align the labelling and description of hazards around the world. The CLP Regulation entered into force on 20 January 2009, with the deadline for substance classification according to the new rules by 1 December 2010 and for mixtures by 1 June 2015.

The fuel processing and chemicals sector faces a number of key challenges; these are energy and raw materials supply, climate change and barriers to market entry in emerging countries. Against this background, the High Level Group on the Competitiveness of the European Chemicals Industry, which was first proposed by the European Commission in June 2007⁽³⁾, released its final strategy report in February 2009. The strategies focus on more innovation and research (see the importance of this in Subchapter 6.4), the responsible use of resources and a level playing field for sourcing energy and raw materials, and a drive to open world markets.

(1) See www.cefic.org.

(2) Regulation (EC) No 1272/2008.

(3) 2007/418/EC.

Table 6.1: Manufacture of coke, refined petroleum products and nuclear fuel; manufacture of chemicals, chemical products and man-made fibres
Top ten chemical enterprise (groups), EU-27, 2007

| | | World ranking | Chemical sales (EUR million) (1) | Chemical sales as a proportion of total sales (%) |
|----------------------------|---------|---------------|----------------------------------|---|
| BASF | DE | 1 | 47 455 | 82 |
| Royal Dutch / Shell | UK / NL | 3 | 33 499 | 13 |
| Ineos Group | UK | 4 | 27 498 | 100 |
| Total | FR | 9 | 21 004 | 13 |
| Bayer | DE | 11 | 16 522 | 51 |
| Basell | NL | 13 | 12 123 | 97 |
| Evonik | DE | 15 | 11 654 | 81 |
| Akzo Nobel | NL | 17 | 10 222 | 100 |
| Air Liquide | FR | 18 | 10 004 | 85 |
| Linde | DE | 22 | 9 213 | 75 |

(1) Data in US dollars converted to EUR, using the average exchange rate of EUR 1 = 1.3705 USD for 2007.

Source: Chemical & engineering news, 28 July 2008, 86(30), p19-25, <http://pubs.acs.org/cen>

Structural profile

Fuel processing and the manufacture of chemicals (NACE Subsections DF and DG) were the main activities of 34.9 thousand enterprises across the EU-27 in 2006. These enterprises had a turnover of EUR 1 098.7 billion in 2005, from which EUR 217.0 billion of value added was generated, which was the equivalent of 4.0 % of the value added generated across the non-financial business economy in 2005. These enterprises employed just over 2 million persons in 2006, the equivalent of 1.6 % of the total workforce of the EU-27's non-financial business economy. Almost all of these workers were paid employees (98.8 %, 2005), indicating a very low incidence of self-employed persons in this sector.

The manufacture of chemicals (NACE Subsection DG) generated an estimated EUR 190.0 billion of value added in 2006, over four fifths of sectoral value added. Within chemicals manufacturing, the manufacture of pharmaceuticals subsector (NACE Group 24.4) was the largest in terms of the EUR 70.5 billion of value added generated, followed by the manufacture of basic chemicals (NACE Group 24.1) which generated a further EUR 65.0 billion of value added. The manufacture of miscellaneous chemical products (NACE Groups 24.2, 24.3, 24.5, 24.6 and 24.7) was the smallest of the three chemicals subsectors in terms of value added (EUR 51.4 billion); more details concerning the composition of this varied range of activities is provided in Subchapter 6.3. However, this subsector was the largest in terms of its workforce; the 708.0 thousand persons employed in the manufacture of miscellaneous chemical

products accounted for a little over one third of all those working across the EU-27 in the fuel processing and chemicals manufacturing sector. The three chemicals subsectors dwarfed the fuel processing subsector in terms of enterprise numbers, value added and persons employed. However, fuel processing enterprises generated more turnover (40 % of the sectoral total in 2005) than any of the three chemicals subsectors. Although fuel processing enterprises represented only 3.7 % of all enterprises within the sector in 2006, they employed 8.1 % of its workforce and generated a little more than double this proportion (17.8 %, 2005) in terms of value added.

The fuel processing and chemicals manufacturing sector in Germany was by far the largest among the Member States, generating a little over one fifth (22.7 %) of total value added across the EU-27 in 2006 and accounting for a similar share of employment. Ireland was the Member State most specialised in fuel processing and the manufacture of chemicals in value added terms, as the value added generated in this sector accounted for 12.8 % of the value added of its non-financial business economy in 2006. Other Member States in which there was also strong specialisation in these activities included Belgium, Poland (2005) and Hungary.

There was a high share of regional employment in the fuel processing and chemicals manufacturing sector in Köln (Germany), where about one in every eight (12.4 %) persons employed in the non-financial business economy were engaged in these activities. Although this was by far the strongest regional concentration of fuel processing and

Table 6.2: Manufacture of coke, refined petroleum products and nuclear fuel; manufacture of chemicals, chemical products and man-made fibres (NACE Subsections DF and DG)
Structural profile, EU-27, 2006 (1)

| | Enterprises | | Turnover | | Value added | | Persons employed | |
|--|-------------|--------------|---------------|--------------|---------------|--------------|------------------|--------------|
| | (thousand) | (% of total) | (EUR million) | (% of total) | (EUR million) | (% of total) | (thousand) | (% of total) |
| Fuel processing & chemicals (2) | 34.9 | - | 1 098 652 | - | 216 974 | - | 2 068.4 | - |
| Fuel processing (2) | 1.3 | 3.7 | 439 831 | 40.0 | 38 515 | 17.8 | 168.4 | 8.1 |
| Chemicals | 33.6 | 96.3 | 700 000 | 59.9 | 190 000 | 82.2 | 1 900.0 | 91.9 |
| Basic chemicals | 8.5 | 24.4 | 322 863 | 26.2 | 65 006 | 29.6 | 562.2 | 27.2 |
| Misc. chemical products (3) | 20.5 | 59.0 | 197 284 | 17.0 | 51 371 | 22.6 | 708.8 | 34.3 |
| Pharmaceuticals, medicinal chemicals & botanical products | 4.5 | 12.8 | 196 000 | 16.4 | 70 500 | 30.0 | 610.0 | 29.5 |

(1) Rounded estimates based on non-confidential data.

(2) Turnover and value added, 2005.

(3) Number of enterprises, 2005.

Source: Eurostat (SBS)

Table 6.3: Manufacture of coke, refined petroleum products and nuclear fuel; manufacture of chemicals, chemical products and man-made fibres (NACE Subsections DF and DG)
Structural profile: ranking of top five Member States, 2006

| | Highest value added (1) | | | Largest number of persons employed (2) | | | Most specialised: share in the non-financial business economy (%) | |
|---|-------------------------|---------------|--------------|--|------------|--------------|---|----------------------|
| | Country | (EUR million) | (% of EU-27) | Country | (thousand) | (% of EU-27) | Value added (3) | Persons employed (4) |
| 1 | Germany | 51 587 | 22.7 | Germany | 472.8 | 22.9 | Ireland (12.8) | Belgium (3.1) |
| 2 | France | 32 213 | 14.8 | France | 298.8 | 14.4 | Belgium (8.9) | Slovenia (2.3) |
| 3 | United Kingdom | 31 635 | 12.4 | United Kingdom | 235.6 | 11.4 | Poland (7.1) | Germany (2.2) |
| 4 | Spain | 18 356 | 8.6 | Italy | 214.1 | 10.4 | Hungary (7.1) | France (2.0) |
| 5 | Italy | 17 919 | 8.2 | Spain | 146.5 | 7.1 | Slovenia (5.7) | Sweden (1.7) |

(1) Bulgaria, Denmark, Cyprus, Latvia, Lithuania, Malta, Portugal and Slovakia, not available; value added: the Netherlands, Austria, Poland and Slovenia, 2005; share of EU-27: all 2005.

(2) Denmark, Ireland, Cyprus, Lithuania, Malta, Portugal and Slovakia, not available; the Netherlands, Austria, Poland and Slovenia, 2005.

(3) Bulgaria, Denmark, Cyprus, Latvia, Lithuania, Malta, the Netherlands, Portugal and Slovakia, not available; Austria, Poland, Romania and Slovenia, 2005.

(4) Bulgaria, Denmark, Ireland, Cyprus, Lithuania, Malta, Portugal and Slovakia, not available; the Netherlands, Austria, Poland, Romania and Slovenia, 2005.

Source: Eurostat (SBS)

chemicals manufacturing workers, there were a number of other regions across Germany as well as France, as well as other hotspots including Antwerp in Belgium and Cheshire in the United Kingdom, where there was also high employment specialisation.

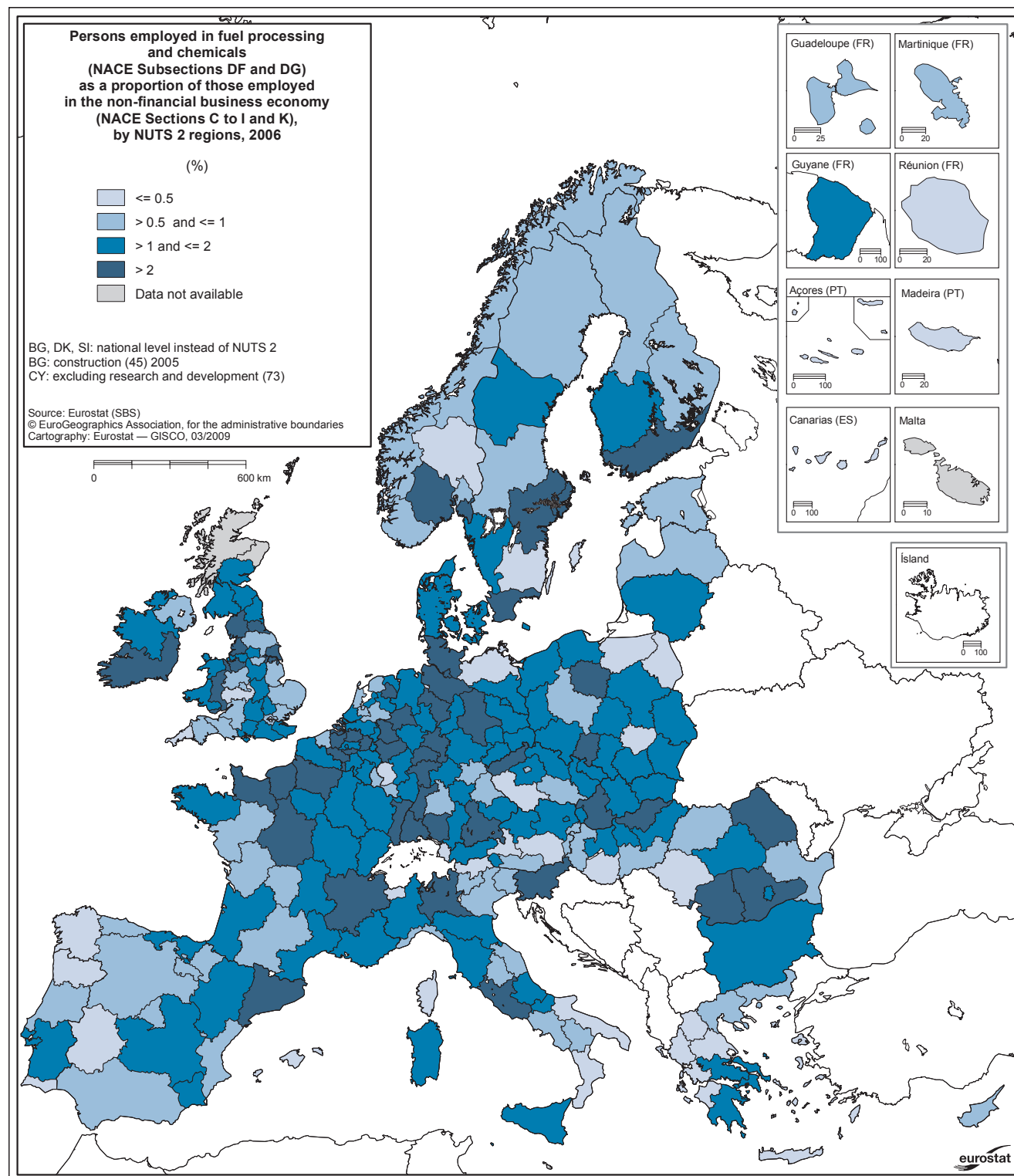
The production index for chemicals manufacturing across the EU-27 rose continuously and strongly (an average of 3.4 % per annum) during the period between 1997 and 2007, far outpacing the growth recorded across industry (NACE Sections C to E), particularly when industrial output as a whole went through a period of stagnation between 2001 and 2003. In contrast to chemicals manufacturing, the output of fuel processing across the EU-27 was relatively unchanged during much of the period considered. There was relatively strong output growth in 2004, however, after which output levels were maintained; this growth spurt was enough to raise the average rate of output growth to 0.5 % per annum for the ten years through to 2007.

In addition to output growth, there were some strong price rises during the same period. The EU-27 price index for fuel processing almost doubled between 1997 and 2007 (an average rise of 6.9 % per annum), while that for chemicals manufacturing rose more moderately (an average increase of 1.9 % per annum). For both activities, there were strong rises in 2000 and from 2004 onwards.

Although output and prices for both fuel processing and chemicals manufacturing increased over the period between 1997 and 2007, there was a different development in terms of employment. EU-27 employment within chemicals manufacturing enterprises and fuel processing enterprises declined continuously and relatively steadily in the period between 1997 and 2006, before levelling off in 2007. The rate of loss of employment within fuel processing (an annual average -2.7 % per annum) during the ten year period was almost twice the rate recorded in chemicals manufacturing (an average -1.4 % per annum), both being faster than the average rate of employment losses across industry as a whole (-1.2 % per annum).

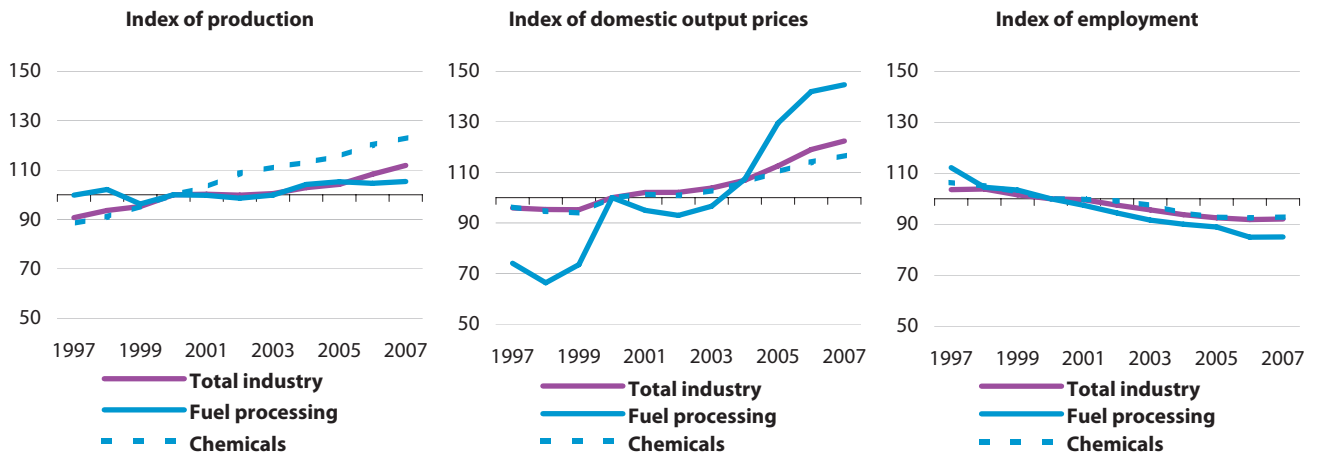
Fuel processing and the manufacture of chemicals within the EU-27 was not only concentrated in the larger Member States but it was also focused within large enterprises (those employing 250 or more persons); they accounted for a little over three quarters (77.7 %) of the total value added generated in 2005 and two thirds of employment within the sector. The shares of value added and employment accounted for by SMEs (employing less than 250 persons) within this sector were both the third lowest among the sectoral aggregates of the chapters used within this publication (only higher than for the network supply of electricity, gas and steam, and for transport equipment manufacturing).

Map 6.1: Manufacture of coke, refined petroleum products and nuclear fuel; manufacture of chemicals, chemical products and man-made fibres (NACE Subsections DF and DG)
 Persons employed in fuel processing and chemicals (NACE Subsections DF and DG) as a proportion of those employed in the non-financial business economy (NACE Sections C to I and K)



Source: Eurostat (SBS)

Figure 6.1: Manufacture of coke, refined petroleum products and nuclear fuel; manufacture of chemicals, chemical products and man-made fibres (NACE Subsections DF and DG)
Evolution of main indicators, EU-27 (2000=100)



Source: Eurostat (STS)

Table 6.4: Manufacture of coke, refined petroleum products and nuclear fuel; manufacture of chemicals, chemical products and man-made fibres (NACE Subsections DF and DG)
Share of value added and persons employed by enterprise size class, EU-27, 2006 (%)

| | Value added | | Persons employed | |
|------------------------------|------------------------------------|---------------------------------|--------------------------------|-----------------------------|
| | Non-financial business economy (1) | Fuel processing & chemicals (2) | Non-financial business economy | Fuel processing & chemicals |
| 1 to 9 persons employed | 21.0 | 1.2 | 29.7 | 3.2 |
| 10 to 49 persons employed | 18.9 | 5.0 | 20.7 | 8.7 |
| 50 to 249 persons employed | 17.8 | 16.1 | 17.0 | 21.6 |
| 250 or more persons employed | 42.1 | 77.7 | 32.6 | 65.5 |

(1) 1 to 9 persons employed and 50 to 249 persons employed, 2005.
(2) 2005.

Source: Eurostat (SBS)

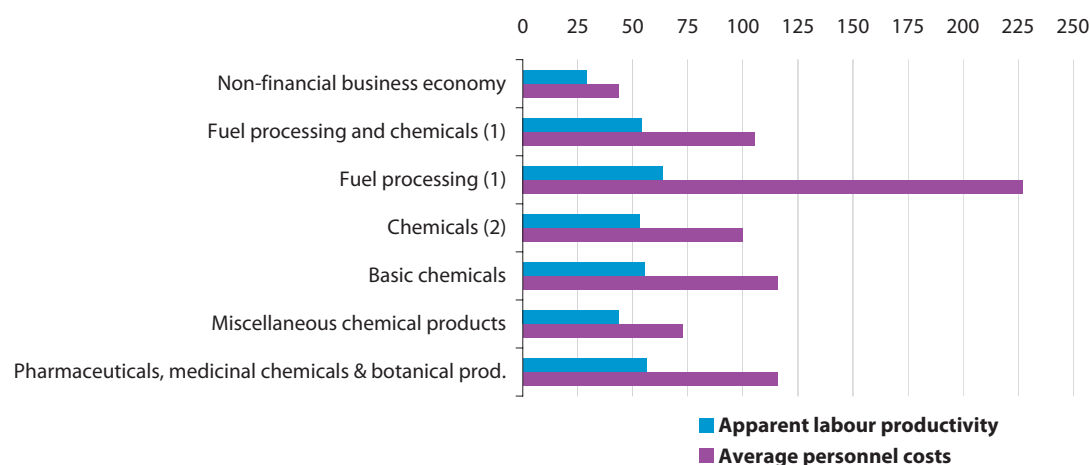
Table 6.5: Manufacture of coke, refined petroleum products and nuclear fuel; manufacture of chemicals, chemical products and man-made fibres (NACE Subsections DF and DG)
Expenditure, productivity and profitability, EU-27, 2006

| | (EUR million) | | | (EUR thousand per person) | | (%) | |
|---|-----------------|-------------------------------|------------------------------|------------------------------|-------------------------|-----------------------------------|----------------------|
| | Personnel costs | Purchases of goods & services | Investment in tangible goods | Apparent labour productivity | Average personnel costs | Wage adjusted labour productivity | Gross operating rate |
| Fuel processing & chemicals (1) | 109 960 | 830 504 | 33 396 | 105.5 | 54.1 | 194.9 | 9.7 |
| Fuel processing (1) | 10 725 | 342 254 | 6 396 | 227.2 | 63.7 | 356.6 | 6.3 |
| Chemicals (2) | 98 000 | 540 000 | 27 000 | 100.0 | 53.2 | 177.5 | 13.1 |
| Basic chemicals | 30 644 | 261 156 | 12 128 | 115.6 | 55.1 | 209.7 | 10.6 |
| Misc. chemical products (3) | 30 285 | 146 710 | 5 748 | 72.5 | 43.7 | 166.0 | 10.7 |
| Pharmaceuticals, medicinal chemicals & botanical products | 33 900 | 132 000 | 8 439 | 115.6 | 56.1 | 205.9 | 18.7 |

(1) All data, except for investment in tangible goods, 2005. (2) Average personnel costs and wage adjusted labour productivity, 2005. (3) Investment in tangible goods, 2005.

Source: Eurostat (SBS)

Figure 6.2: Manufacture of coke, refined petroleum products and nuclear fuel; manufacture of chemicals, chemical products and man-made fibres (NACE Subsections DF and DG) Labour output and costs, EU-27, 2006 (EUR thousand per capita)



(1) Apparent labour productivity and average personnel costs, 2005.

(2) Average personnel costs, 2005.

Source: Eurostat (SBS)

Employment characteristics

The gender breakdown of the fuel processing and chemicals manufacturing workforce was almost identical to that across the non-financial business economy of the EU-27 in 2007; as a little under two thirds (65.0 %) of the sectoral workforce were male. However, there was a much clearer distinction between the two regarding the proportion of workers in part-time employment. Only about one in every 15 (6.8 %) workers within the fuel processing and chemicals manufacturing sector worked on a part-time basis in 2007, about half the share (14.3 %) across the EU-27's non-financial business economy. There was also a notable difference in age profile, as the proportion of young workers under the age of 30 was much smaller in the fuel processing and chemicals manufacturing sector (17.9 %) than was the case across the non-financial business economy (24.3 %).

This characteristic of a relatively low presence of young workers in the sectoral workforce was common among all of the Member States for which data are available⁽⁴⁾, but notably so in Romania, Sweden, Denmark and the Netherlands where the share of this age group was between 12 and 17 percentage points lower than their average share across their respective non-financial business economies in 2007.

There were stark contrasts in the gender breakdown of the fuel processing and chemicals manufacturing workforce among Member States. In France, Latvia, Denmark and Cyprus, the share of women in the sectoral workforce was high relative to the breakdown across their respective non-financial business economies, and in the case of Latvia and Cyprus there were almost as many women as men employed in this sector.

Expenditure, productivity and profitability

There was tangible investment to the value of EUR 33.4 billion across the EU-27's fuel processing and chemicals manufacturing sector in 2006. This level of investment corresponded to 3.2 % of investment within the non-financial business economy, a slightly lower proportion than the relative contribution of the sector's value added. In this respect, the investment rate of the fuel processing and chemicals manufacturing sector was relatively low (14.4 %) in comparison to the rate across the EU-27's non-financial business economy (18.0 %). This lower rate of sectoral investment was common to a majority of Member States (particularly Greece, Sweden, Belgium and Estonia) although there were others (including the Czech Republic, Germany, Italy Finland and, in particular, Luxembourg) where it was somewhat higher.

(4) Estonia, Cyprus, Latvia, Lithuania, Luxembourg and Malta, not available.

Average personnel costs across the fuel processing and chemicals manufacturing sector (EUR 54.1 thousand per employee) in 2005 approached double the average across the EU-27's non-financial business economy (EUR 28.9 thousand per employee) and were higher than those of any of the other sectoral aggregates of the chapters within this publication. Despite the fact that average personnel costs in the fuel processing subsector were particularly high (an average EUR 63.7 thousand per employee), they only accounted for 3.0 % of operating expenditure in 2005, underlining the perception of a highly capital-intensive activity with a relatively small but well remunerated workforce. To a lesser extent, this characterisation also appears to apply to the EU-27's chemicals manufacturing activities; average personnel costs were also high (an average EUR 53.2 thousand per employee) in 2005 but accounted for a slightly lower proportion (15.4 % in 2006) of operating expenditure than the average (16.1 %) across the non-financial business economy.

The value added generated by each member of the EU-27's fuel processing and chemicals manufacturing workforce was EUR 105.5 thousand in 2005, more than double the non-financial business economy average, and the third highest level among the sectoral chapter aggregates in this publication (only less than mining and quarrying, and the network supply of electricity, gas and steam). The apparent labour productivity of the fuel processing subsector was particularly high (an average EUR 227.2 thousand per person employed).

Even when taking into account the relatively high average personnel costs, the resulting wage adjusted labour productivity of the fuel processing and chemicals manufacturing sector remained relatively high (194.9 % in 2005 compared with 146.5 % for the non-financial business economy in the same year). This characteristic was common among all the Member States for which data are available⁽⁵⁾ but particularly in Poland (579.7 % compared with 210.7 % in 2005), the only exception being in Luxembourg where the wage adjusted labour productivity ratio of the sector was much lower than the ratio across its non-financial business economy.

The gross operating rate of the EU-27's fuel processing and chemicals manufacturing sector was 9.7 % in 2005, moderately less than the non-financial business economy average (10.0 %). The gross operating rate of the chemicals manufacturing activity (13.1 % in 2006) was almost double that, however, of the fuel processing subsector (6.3 % in 2005), with the rate for pharmaceuticals subsector (18.7 %) particularly high.

External trade

Almost two thirds (65.1 %) of the total exports by EU-27 Member States in coke, refined petroleum products, nuclear fuel, chemicals, chemical products and man-made fibres (CPA Subsections DF and DG, hereafter referred to as processed fuels and chemicals) was to other Member States, a slightly smaller share than for industrial goods (CPA Sections C to E) as a whole. The remaining one third of exports to non-member countries (extra-EU-27 trade) generated a surplus of EUR 57.8 billion in 2007, the third highest surplus among the industrial chapters of this publication (Chapters 2 to 15).

(5) Austria, Poland, Romania and Slovenia, 2005; Bulgaria, Denmark, Ireland, Cyprus, Latvia, Lithuania, Malta, the Netherlands, Portugal and Slovakia, not available.

Table 6.6: Coke, refined petroleum products and nuclear fuel; chemicals, chemical products and man-made fibres (CPA Subsections DF and DG)
External trade, EU-27, 2007

| | Value (EUR million) | | | Share of industrial exports (%) | Share of industrial imports (%) |
|--|---------------------|------------------|---------------|---------------------------------|---------------------------------|
| | Extra-EU exports | Extra-EU imports | Trade balance | | |
| Fuel processing and chemical products | 235 104 | 177 278 | 57 827 | 20.2 | 13.3 |
| Fuel processing products | 55 152 | 56 467 | -1 315 | 4.7 | 4.2 |
| Chemical products | 179 953 | 120 811 | 59 142 | 15.5 | 9.1 |
| Basic chemicals | 58 393 | 55 883 | 2 509 | 5.0 | 4.2 |
| Miscellaneous chemical products | 45 452 | 23 547 | 21 904 | 3.9 | 1.8 |
| Pharmaceuticals, medicinal chemicals & botanical products | 76 108 | 41 380 | 34 728 | 6.5 | 3.1 |

Source: Eurostat (Comext)

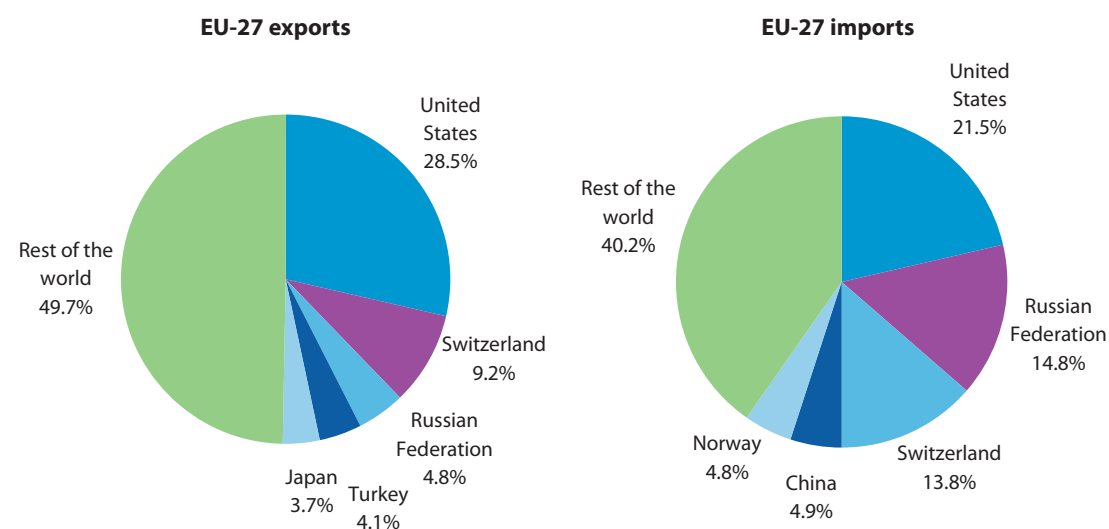
The trade surplus in 2007 was slightly less than that in 2006, although it was still more than one quarter (27.4 %) higher than the surplus five years earlier (2002). The general widening of the trade surplus over this period reflected the faster rate of export value growth than import value growth. The value of processed fuels and chemicals exports from the EU-27 rose continuously between 2002 and 2007, to a value of EUR 235.1 billion, which represented about one fifth (20.2 %) of the total value of EU-27 industrial exports. There was a continual increase in the value of imports over the same period, to reach a level of EUR 177.3 billion by 2007.

Within this broad range of products, there was a trade deficit of EUR 1.3 billion in coke, refined petroleum products and nuclear fuel. The bulk of the overall trade surplus recorded for 2007 came from the EUR 34.7 billion surplus recorded for pharmaceutical products (CPA Group 24.4) and the surplus of EUR 21.9 billion recorded for the group of miscellaneous chemical products (CPA Groups 24.2, 24.3, 24.5, 24.6 and 24.7), which covers pesticides and agro-chemicals, paints and varnishes, and soaps and detergents among many other products.

Germany was the largest exporter of processed fuels and chemicals as a whole; the value of German exports (intra- and extra-EU) was EUR 126.9 billion in 2007, a little under one fifth (18.8 %) of all trade by the EU Member States. Belgium was the next largest exporter of these products and had a slightly higher trade surplus (EUR 18.8 billion) than Germany (17.8 billion). However, Ireland had the highest trade surplus (EUR 32.9 billion) in these products. Exports of processed fuels and chemicals as a whole accounted for a little over one half (51.8 %) of all industrial exports from Ireland in 2007, by far the highest proportion among the Member States. By far the largest trade deficits in these products were recorded in Spain (EUR 12.2 billion) and Poland (EUR 9.4 billion).

A little more than one third (37.4 %) of imports of coke, refined petroleum products and nuclear fuel came from Russia in 2007. Almost one half of the imports of chemicals, chemical products and man-made fibres came from the United States (28.7 %) and Switzerland (20.1 %). The United States and Switzerland were also the main destination for EU-27 exports of both coke, refined petroleum products and nuclear fuel on the one hand and chemicals, chemical products and man-made fibres on the other.

Figure 6.3: Coke, refined petroleum products and nuclear fuel; chemicals, chemical products and man-made fibres (CPA Subsections DF and DG)
Main trading partners, EU-27, 2007 (% share of exports/imports in value terms)



Source: Eurostat (Comext)

6.1: Fuel processing

This subchapter covers the manufacture of coke oven products (NACE Group 23.1), the manufacture of refined petroleum products (NACE Group 23.2) and the processing of nuclear fuels (NACE Group 23.3). Hereafter these are collectively referred to as fuel processing activities (NACE Subsection DF). Note that these activities essentially involve the processing of products whose extraction (for example, coal, crude oil, and ores) is covered in Subchapter 2.1.

Crude oil and semi-finished petroleum feedstocks are key inputs into the fuel processing process. The net transformation output of all petroleum products from refineries across the EU-27 was 720.1 million tonnes in 2006. The three main final products of the fuel processing sector were diesel oil, which accounted for a little over one third (36.9 %) of net transformation output in 2006, motor spirits (a further 21.0 %) and residual fuel oils (another 15.5 %). Refinery gas, liquid petroleum gas (LPG), jet fuel kerosenes and naphtha together accounted for a combined 17.2 % of total net transformation output.

Structural profile

There were 1.3 thousand enterprises across the EU-27 for which fuel processing (NACE Subsection DF) was their main activity in 2006 and they employed 168.4 thousand persons, the equivalent of 8.1 % of the fuel processing and chemicals manufacturing (NACE Subsections DF and DG) workforce. From a turnover of EUR 439.8 billion in 2005, the EU-27's fuel processing sector generated EUR 38.5 billion of value added, which represented a 17.8 % share of the value added generated across fuel processing and chemicals manufacturing, double the employment share.

Activities concerning the refinement of petroleum products (NACE Group 23.2) were by far the

largest within the fuel processing sector; they accounted for about three quarters (76.2 %) of those employed in 2006 and an overwhelming majority (92.8 %) of value added in 2005. A little less than one fifth (17.8 %) of the sector's workforce was employed in the processing of nuclear fuel (NACE Group 23.3) and they contributed 5.8 % of value added. The remainder, 5.9 % of the workforce and 1.5 % of value added, was recorded in the manufacture of coke oven products (NACE Group 23.1).

Among the Member States, Spain had the largest fuel processing sector in terms of value added generated (EUR 7.2 billion in 2006), accounting for a little less than one fifth (18.4 % in 2005) of the EU-27 total. Behind Spain, the next largest Member States in these terms were Poland (13.5 % of the EU-27 total) and Germany (12.9 %). Indeed, the EUR 5.2 billion of value added that the fuel processing sector generated in Poland in 2005 represented 4.3 % of the total value added of its non-financial business economy, about six times the average contribution across the EU-27. There was also strong specialisation in Hungary, the relative value added contribution being about four times the EU-27 average.

The level of the production index for fuel processing was almost the same in 2003 as in 1997, despite alternating growth and decline in output in the intervening years. However, in 2004 the output of fuel processing rose relatively strongly and output was then maintained at this higher level through to 2007. This pattern of output development largely reflected the production index for refined petroleum products, for which average growth over the ten year period through until 2007 was 0.8 % per annum. During the same period, the production index of coke oven products appeared to follow a four year cycle of rising production and then declines, with growth in 2006 and 2007 confirming an overall upward development in output (at an average growth rate of 2.0 % per annum).

Table 6.7: Manufacture of coke, refined petroleum products and nuclear fuel (NACE Division 23)
Structural profile, EU-27, 2006 (1)

| | Enterprises (thousand) | Turnover (EUR million) | Value added (EUR million) | Persons employed (thousand) | Share in total (%) | |
|---------------------------------------|---------------------------|------------------------------|------------------------------------|-----------------------------------|--------------------|---------------------|
| | | | | | Value added | Persons employed |
| Fuel processing (2) | 1.3 | 439 831 | 38 515 | 168.4 | 100.0 | 100.0 |
| Coke oven products (2) | 0.1 | 2 826 | 559 | 10.0 | 1.5 | 5.9 |
| Refined petroleum products | 1.1 | 476 213 | 30 232 | 128.4 | 92.8 | 76.2 |
| Processing of nuclear fuel (3) | 0.1 | 8 679 | 3 232 | 30.0 | 5.8 | 17.8 |

(1) Rounded estimates based on non-confidential data. (2) Turnover and value added, 2005. (3) Number of enterprises, 2005.

Source: Eurostat (SBS)

Table 6.8: Manufacture of coke, refined petroleum products and nuclear fuel (NACE Division 23)
Structural profile: ranking of top five Member States in terms of value added and persons employed, 2006

| | Highest value added (1) | | | Largest number of persons employed (2) | | | Most specialised: share in non-financial business economy (%) (3) | |
|---|-------------------------|---------------|--------------|--|------------|--------------|---|-------------|
| | Country | (EUR million) | (% of EU-27) | Country | (thousand) | (% of EU-27) | Country | Value added |
| 1 | Spain | 7 167 | 18.4 | France | 27.2 | 16.2 | Poland | 4.3 |
| 2 | Germany | 5 728 | 15.9 | United Kingdom | 23.9 | 14.2 | Hungary | 2.8 |
| 3 | Poland | 5 200 | 13.5 | Germany | 20.7 | 12.3 | Greece | 1.5 |
| 4 | United Kingdom | 4 150 | 12.9 | Italy | 16.9 | 10.0 | Belgium | 1.3 |
| 5 | France | 3 876 | 7.8 | Poland | 15.2 | 9.0 | Spain | 1.3 |

(1) Bulgaria, Denmark, Ireland, Cyprus, Latvia, Lithuania, Malta, Austria, Portugal and Slovakia, not available; value added: the Netherlands, Poland and Slovenia, 2005; share of EU-27: all 2005.

(2) Denmark, Ireland, Cyprus, Lithuania, Malta, Austria, Portugal and Slovakia, not available; the Netherlands, Poland and Slovenia, 2005.

(3) Bulgaria, Denmark, Ireland, Cyprus, Latvia, Lithuania, Malta, the Netherlands, Austria, Portugal and Slovakia, not available; Poland, Romania and Slovenia, 2005.

Source: Eurostat (SBS)

Table 6.9: Manufacture of coke, refined petroleum products and nuclear fuel (NACE Division 23)
Expenditure, productivity and profitability, EU-27, 2006

| | (EUR million) | | | (EUR thousand per person) | |
|-----------------------------------|-----------------|-------------------------------|------------------------------|------------------------------|-------------------------|
| | Personnel costs | Purchases of goods & services | Investment in tangible goods | Apparent labour productivity | Average personnel costs |
| Fuel processing (1) | 10 725 | 342 254 | 6 396 | 227.2 | 63.7 |
| Coke oven products (1) | 199 | 2 394 | 177 | 56.5 | 20.4 |
| Refined petroleum products | 8 102 | 378 543 | 5 495 | 235.4 | 63.5 |
| Processing of nuclear fuel | 2 108 | 5 297 | 724 | 107.7 | 70.5 |

(1) Personnel costs, purchases of goods and services and apparent labour productivity, 2005.

Source: Eurostat (SBS)

Expenditure and productivity

Tangible investment in the EU-27's fuel processing sector was EUR 6.4 billion in 2006. This corresponded to about one fifth (19.2 %) of all tangible investment across fuel processing and chemicals manufacturing, a slightly higher share than this sector's share of value added.

A very high share (97.0 % in 2005) of operating expenditure in the EU-27's fuel processing sector was committed to purchases of goods and services (including, in particular, the purchase of energy products to be processed); this was the highest share of expenditure on goods and services among all NACE divisions in the non-financial business economy with data available for 2005 or 2006.

Although a relatively small share of operating expenditure went on personnel costs (3.0 % in 2005), average personnel costs in the sector were particularly high, an average EUR 63.7 thousand per employee in 2005 for the EU-27. Within the sector, however, there were large differences in average personnel costs; those for the manufacture of coke oven products subsector were as low as EUR 20.4 thousand per employee (in 2005), while

those for the manufacture of refined petroleum products subsector averaged EUR 63.5 thousand per employee in 2006 and the nuclear fuels subsector EUR 70.5 thousand per employee in 2006. The low average costs in coke oven products manufacturing can, in large part, be attributed to average personnel costs in Poland (EUR 14.4 thousand per employee in 2005), as this Member State dominated the subsector, accounting for about two thirds (61.6 %) of EU-27 value added.

The average amount of value added generated by each person employed within the EU-27's fuel processing sector was EUR 227.2 thousand in 2005, the second highest amount among industrial NACE divisions after the extraction of crude petroleum and gas (NACE Division 11). Despite relatively high average personnel costs, the wage adjusted labour productivity ratio of the sector remained high (356.6 % in 2005), again the second highest of the industrial NACE divisions. Among the individual Member States, Poland recorded a wage adjusted labour productivity ratio of 1 955.5% in 2005, Spain also recorded a remarkably high level for this indicator (1 252.2 % in 2006).

6.2: Basic industrial chemicals (including petrochemicals)

The manufacture of basic chemicals (NACE Group 24.1) covers the manufacture of petrochemicals, industrial gases, dyes, pigments and fertilizers, as well as primary forms of plastics and synthetic rubber.

Petroleum and natural gas are used by petrochemical enterprises to produce a range of products; these concern basic petrochemicals such as aromatics (for example, naphthalene and xlyenes), methanol, and olefins (for example, butadiene and acetylene), intermediate products (for example, ethyl benzene and phenol) and petrochemical products (for example, plastics, solvents, additives and agro-chemicals). Petrochemicals are then used by many other downstream sectors of the economy as a raw material for use in a myriad of products (for example, healthcare products, plastics packaging and synthetic rubber tyres).

The sector is touched by legislation at various levels, with environmental protection and health and safety prominent. The REACH and CLP legislations previously mentioned at the start of this chapter concern forms of classifying, packaging and labelling chemicals. Other new legislation has looked at implications of the global chemicals trade. For example, the European Parliament and the Council adopted legislation⁽⁶⁾ on the export and import of dangerous chemicals in June 2008, thereby implementing the Rotterdam Convention on the Prior Informed Consent Procedure (PIC) with a number of further provisions. The focus of this legislation is to protect human health and the environment from potential harm. As such, it complemented the 2007 Community Implementation Plan for the Stockholm Convention on Persistent Organic Pollutants (POPs)⁽⁷⁾, which dealt with assessing measures to tackle the accumulation of adverse chemical substances in various ecosystems, across international boundaries. Civil protection legislation was also developed further in 2007, in part looking at the impact of potential chemical accidents and responses to that; Council Decisions on the civil protection mechanism⁽⁸⁾ set the framework for a co-ordinated response by Member States and the Community in the event of major emergencies⁽⁹⁾.

⁽⁶⁾ Regulation (EC) 698/2008.

⁽⁷⁾ SEC(2007) 341.

⁽⁸⁾ Regulation (EC) 779/2007.

⁽⁹⁾ Regulation (EC) 162/2007.

Structural profile

The manufacture of basic chemicals (NACE Group 24.1) was the principal activity of about 8.5 thousand enterprises across the EU-27 in 2006. These enterprises employed an estimated 562 thousand people in 2006, a little over one quarter (27.2 %) of the fuel processing and chemicals workforce. The basic chemicals manufacturing sector generated a turnover of EUR 322.9 billion in 2006, about one fifth (EUR 65.0 billion) of which was left as value added.

The manufacture of other organic basic chemicals (NACE Class 24.14) such as hydrocarbons, organic compounds with nitrogen functions and organo-sulphur compounds generated EUR 28.3 billion of value added in 2006 in the EU-27, accounting for a little more than two fifths (43.5 %) of the value added across basic chemicals manufacturing. The second largest activity within the sector was the manufacture of plastics in primary forms (NACE Class 24.16), the EUR 20.3 billion of value added generated corresponding to a little less than one third (31.2 %) of sectoral value added in 2006. Of the remaining activities, the manufacture of other inorganic basic chemicals (NACE Class 24.13) such as carbonates, metallic halogenates and inorganic acids and compounds generated EUR 5.8 billion of value added and that of industrial gases (NACE Class 24.11) a further EUR 4.2 billion of value added. The combined value added of the manufacture of dyes and pigments (NACE Class 24.12), fertilizers and nitrogen compounds (NACE Class 24.15) and the manufacture of synthetic rubber in primary forms (NACE Class 24.17) accounted for about one tenth (9.8 %) of the value added generated across the EU-27's basic chemicals manufacturing sector in 2006.

The basic chemicals manufacturing sector in Germany was by far the largest among the Member States, alone generating 29.0 % of the value added generated by this sector across the EU-27. However, Ireland was the Member State by far the most specialised in the manufacture of basic chemicals, the EUR 8.6 billion of value added generated in 2006 contributing 9.4 % of the value added generated across its non-financial business economy, which was a little more than eight times

Table 6.10: Manufacture of basic chemicals (NACE Group 24.1)
Structural profile, EU-27, 2006

| | Enterprises (thousand) | Turnover (EUR million) | Value added (EUR million) | Persons employed (thousand) | Share in total (%) | |
|------------------------------------|---------------------------|------------------------------|------------------------------------|-----------------------------------|--------------------|---------------------|
| | | | | | Value added | Persons employed |
| Basic chemicals | 8.5 | 322 863 | 65 006 | 562.2 | 100.0 | 100.0 |
| Industrial gases | 1.0 | 12 678 | 4 238 | 37.8 | 6.5 | 6.7 |
| Dyes and pigments | 0.6 | 11 209 | 2 839 | 35.4 | 4.4 | 6.3 |
| Other inorganic basic chemicals | 1.2 | 23 750 | 5 844 | 76.5 | 9.0 | 13.6 |
| Other organic basic chemicals | 1.9 | 145 935 | 28 277 | 159.8 | 43.5 | 28.4 |
| Fertilizers and nitrogen compounds | 1.1 | 17 185 | 2 800 | 56.8 | 4.3 | 10.1 |
| Plastics in primary forms | 2.7 | 106 898 | 20 283 | 189.3 | 31.2 | 33.7 |
| Synthetic rubber in primary forms | 0.1 | 5 209 | 725 | 6.7 | 1.1 | 1.2 |

Source: Eurostat (SBS)

Table 6.11: Manufacture of basic chemicals (NACE Group 24.1)
Structural profile: ranking of top five Member States in terms of value added and persons employed, 2006

| | Highest value added (1) | | | Largest number of persons employed (1) | | | Most specialised: share in non-financial business economy (%) (2) | |
|---|-------------------------|---------------|--------------|--|------------|--------------|---|-------------|
| | Country | (EUR million) | (% of EU-27) | Country | (thousand) | (% of EU-27) | Country | Value added |
| 1 | Germany | 18 873 | 29.0 | Germany | 166.9 | 29.7 | Ireland | 9.4 |
| 2 | United Kingdom | 8 719 | 13.4 | France | 63.5 | 11.3 | Belgium | 2.7 |
| 3 | Ireland | 8 574 | 13.2 | United Kingdom | 55.9 | 9.9 | Germany | 1.6 |
| 4 | Netherlands | 6 633 | 10.3 | Italy | 46.0 | 8.2 | Hungary | 1.3 |
| 5 | France | 5 838 | 9.0 | Spain | 33.5 | 6.0 | Finland | 1.2 |

(1) Luxembourg, Malta and Portugal, not available; the Netherlands and Poland, 2005.

(2) Cyprus, Luxembourg, Malta, the Netherlands and Portugal, not available; Bulgaria, Poland and Romania, 2005.

Source: Eurostat (SBS)

the average contribution among Member States. The only other Member State⁽¹⁰⁾ that showed relatively strong specialisation in this activity in 2006 was Belgium.

The production index for basic chemicals manufacturing in the EU-27 rose continuously during the ten year period through until 2007, at an average 3.3 % per year. Output growth was strongest in the period before 2002, after which it slowed considerably before picking up again in 2005. Growth was particularly strong in Ireland (an average 12.6 % per annum), where output almost quadrupled in the period between 1997 and 2003 before falling back to a more sustained level.

There were relatively steady rises in the output of both other organic basic chemicals and industrial gases during the ten years through until 2007 across the EU-27. In contrast, there was

relatively little difference in the output levels of fertilizers and nitrogen compounds, nor dyes and pigments in 2007 (when compared with levels in 1997), although there were regular fluctuations in the intervening years. However, a fluctuating but downward trend was observed for the output of synthetic rubber in primary forms, particularly in the period after 2003.

Expenditure and productivity

Tangible investment across the EU-27 in the basic chemicals manufacturing sector was EUR 12.1 billion in 2006, a little over one third (36.3 %) of all tangible investment across fuel processing and chemicals manufacturing. The resulting investment rate was 18.7 %, slightly higher than the non-financial business economy average (18.4 %).

⁽¹⁰⁾ Data for the Netherlands are unavailable for 2005 and 2006, although figures for earlier years also point to a similar level of specialisation in this activity as in Belgium.

Table 6.12: Basic industrial chemicals (including petrochemicals) (CPA Group 24.1)
Production of selected products, EU-27, 2007 (1)

| | Prodcom code | Production value (EUR million) | Rounding base (EUR million) | Volume of sold production (million) | Unit of volume | Rounding base (million) |
|--|--------------|--------------------------------|-----------------------------|-------------------------------------|----------------|-------------------------|
| Polypropylene; in primary forms | 24.16.51.30 | 10 341 | - | 10 185 | kg | - |
| Unsaturated acyclic hydrocarbons; ethylene | 24.14.11.30 | 10 262 | - | 13 982 | kg | - |
| Polyurethanes; in primary forms | 24.16.56.70 | 7 915 | - | 4 189 | kg | - |
| Unsaturated acyclic hydrocarbons; propene (propylene) | 24.14.11.40 | 7 699 | - | 11 166 | kg | - |
| Nucleic acids and other heterocyclic compounds - thiazole, benzothiazole, other cycles | 24.14.52.90 | 7 208 | - | 153 | kg | - |
| Polyethylene having a specific gravity of ≥ 0.94 ; in primary forms | 24.16.10.50 | 6 250 | - | 6 821 | kg | - |

(1) Excluding products of a generic nature (other), sales of services such as repair, maintenance and installation; estimates; threshold of production value set at EUR 6 billion.

Source: Eurostat (PRODCOM)

Table 6.13: Manufacture of basic chemicals (NACE Group 24.1)
Expenditure, productivity and profitability, EU-27, 2006 (1)

| | (EUR million) | | | (EUR thousand per person) | |
|------------------------------------|-----------------|-------------------------------|------------------------------|------------------------------|-------------------------|
| | Personnel costs | Purchases of goods & services | Investment in tangible goods | Apparent labour productivity | Average personnel costs |
| Basic chemicals | 30 644 | 261 156 | 12 128 | 115.6 | 55.1 |
| Industrial gases | 1 910 | 8 589 | 969 | 112.1 | 52.9 |
| Dyes and pigments | 1 871 | 8 437 | 430 | 80.2 | 53.3 |
| Other inorganic basic chemicals | 3 544 | : | : | 76.4 | 46.8 |
| Other organic basic chemicals | 10 000 | 120 000 | 4 100 | 176.9 | 63.0 |
| Fertilizers and nitrogen compounds | 1 928 | 14 519 | 767 | 49.3 | 34.3 |
| Plastics in primary forms | 10 818 | 87 764 | 4 177 | 107.1 | 57.7 |
| Synthetic rubber in primary forms | 418 | 4 449 | 94 | 108.2 | 63.3 |

(1) Rounded estimates based on non-confidential data.

Source: Eurostat (SBS)

The operating expenditure structure of the basic chemicals manufacturing sector in the EU-27 was similar to the average across the whole of fuel processing and chemicals manufacturing in 2005. Personnel costs accounted for a little more than one tenth (10.5 %) of operating expenditure in the sector in 2006.

The average amount of value added generated by each person employed across the EU-27 in basic chemicals manufacturing was EUR 115.6 thousand in 2006, about a tenth higher than the average (in 2005) across fuel processing and chemicals manufacturing. This relative productivity advantage was maintained, even when adjusting productivity for wages, as average personnel costs in the sector (EUR 55.1 thousand per person

employed in 2006) were very similar to the average for the whole of fuel processing and chemicals manufacturing. The wage adjusted labour productivity ratio of the basic chemicals manufacturing sector within the EU-27 was 209.7 % in 2006, which was bolstered by the high ratio (281.0 %) recorded for the other organic basic chemicals subsector (NACE Class 24.14), the largest activity in terms of value added. Of the other activities, the wage adjusted labour productivity ratio (211.9 %) of the industrial gases subsector (NACE Class 24.11) was the only other to equal or surpass the ratio for the sector as a whole. All the other five subsectors at the NACE class level recorded wage adjusted labour productivity ratios in the range of 150 % to 185 %.

6.3: Miscellaneous chemical products

This subchapter covers a number of activities that are presented separately but have been grouped together under miscellaneous chemical products. The manufacture of pesticides and other agro-chemical products (NACE Group 24.2) is the first activity covered. This is followed by the manufacture of paints, varnishes, enamels, lacquers, solvents, thinners, varnish removers, as well as printing inks (NACE Group 24.3), which is hereafter referred to as paints and printing inks. The manufacture of washing and cleaning products, as well as perfumes, toiletries, cosmetics and related products (NACE Group 24.5) forms the next group; hereafter, referred to as soaps, detergents and toiletries. The manufacture of other chemical products (NACE Group 24.6), a residual grouping that includes the manufacture of photographic materials, explosives, glues and essential oils, as well as intermediate inputs for other manufacturing processes is the penultimate group. The manufacture of man-made fibres (NACE Group 24.7) is the final group covered.

The miscellaneous chemical products manufacturing sector (NACE Groups 24.2, 24.3, 24.5, 24.6 and 24.7) comprised a total of a little over 20.5 thousand enterprises across the EU-27 in 2005 that employed 708.8 thousand persons in 2006. These enterprises generated EUR 197.3 billion of turnover of which EUR 51.4 billion was left as

value added in 2006, a little less than a quarter (22.6 % in 2005) of the total value added generated across fuel processing and chemicals manufacturing in the EU-27.

Manufacture of pesticides and other agro-chemical products

There were just over 600 enterprises across the EU-27 for which the manufacture of pesticides and other agro-chemical products was their main activity in 2005. These enterprises employed 29.1 thousand people, accounting for 1.4 % of the workforce across fuel processing and chemicals manufacturing in 2006. The sector generated value added of EUR 2.7 billion in 2006, representing a slightly lower share (1.2 % in 2005) of the value added generated within fuel processing and chemicals manufacturing activities.

Among the Member States, the main producer of pesticides and other agro-chemical products was Germany, accounting for over one third (37.6 %) of the value added generated in the EU-27 and employing a little less than one quarter (23.5 %) of the total workforce. In value added terms, Germany was also the Member State most specialised in this activity.

After a period of annual fluctuations, there was a clear downward trend in the production index of pesticides and other agro-chemical products across the EU-27 between 2001 and 2007 (an average decline of 2.5 % per annum). In large part,

Table 6.14: Manufacture of miscellaneous chemical products (NACE Groups 24.2, 24.3, 24.5 to 24.7) Structural profile, EU-27, 2006

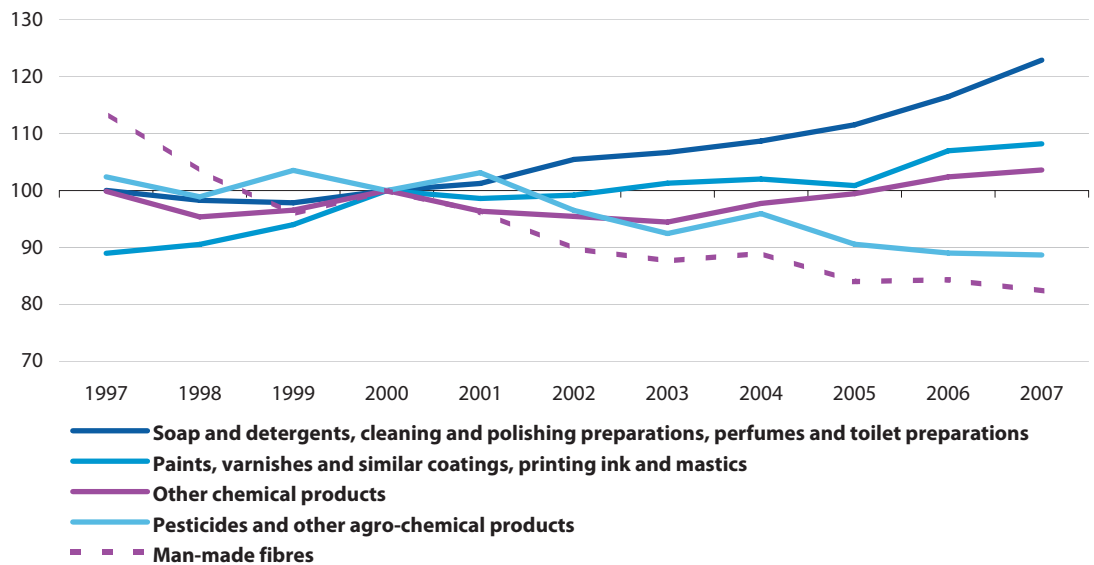
| | Enterprises (thousand) | Turnover (EUR million) | Value added (EUR million) | Persons employed (thousand) | Share in total (%) | |
|--|---------------------------|------------------------------|------------------------------------|-----------------------------------|--------------------|---------------------|
| | | | | | Value added | Persons employed |
| Miscellaneous chemical products (1) | 20.5 | 197 284 | 51 371 | 708.8 | 100.0 | 100.0 |
| Pesticides & other agro-chemical products (1) | 0.6 | 12 012 | 2 715 | 29.1 | 5.3 | 4.1 |
| Paints, varnishes & similar coatings, printing ink and mastics (2) | 4.5 | 44 208 | 12 022 | 174.0 | 23.4 | 24.5 |
| Soap & detergents, cleaning & polishing preparations, perfumes & toilet preparations (2) | 8.3 | 71 443 | 17 800 | 266.4 | 34.6 | 37.6 |
| Other chemical products | 6.8 | 57 338 | 16 194 | 195.6 | 31.5 | 27.6 |
| Man-made fibres | 0.4 | 12 283 | 2 641 | 43.7 | 5.1 | 6.2 |

(1) Number of enterprises, 2005.

(2) Rounded estimates based on non-confidential data.

Source: Eurostat (SBS)

Figure 6.4: Manufacture of miscellaneous chemical products (NACE Groups 24.2, 24.3, 24.5 to 24.7) Index of production, EU-27 (2000=100)



Source: Eurostat (STS)

this decline may be linked to improved incentives to farm in an environmentally sensitive way since the so-called Agenda 2000 reform of the Common Agricultural Policy (CAP).

EU-27 tangible investment in the pesticides and other agro-chemical products manufacturing sector was EUR 0.3 billion in 2006, a relatively small 0.9 % share of total tangible investment within fuel processing and chemical manufacturing. Relative to value added generated across the sector, this was the equivalent of an investment rate of 10.5 %, which was notably less than the rate of 14.4 % for the whole of fuel processing and chemicals manufacturing in 2005.

Personnel costs accounted for 14.6 % of operating expenditure in this sector in 2006, a little more than the average across fuel processing and chemicals manufacturing (11.7 % in 2005). There was almost no difference in average personnel costs, however, which were EUR 55.0 thousand per employee for the EU-27's pesticides and other agro-chemical products manufacturing sector. The apparent labour productivity of those working in this sector was EUR 93.3 thousand per person employed, slightly more than 10 % below the average for fuel processing and chemicals manufacturing in 2005. The wage adjusted labour productivity ratio of the pesticides and other agro-chemical products manufacturing sector was 169.6 % in 2006.

Manufacture of paints and printing inks

Paint and printing inks manufacturing was the principal activity of 4.5 thousand enterprises across the EU-27 in 2006, providing employment for an estimated 174.0 thousand people, the equivalent of 8.4 % of the fuel processing and chemicals manufacturing workforce. The paint and printing inks manufacturing sector generated EUR 12.0 billion of value added in the EU-27 in 2006, of which three tenths (29.9 %) came from these activities in Germany and a similar, combined, proportion from the United Kingdom (15.4 %) and Italy (13.8 %). Although there was moderate specialisation in this activity in Germany, specialisation was stronger in both Estonia and Slovenia, where the value added generated by their respective paints and printing inks manufacturing sectors made about twice the contribution to their national non-financial business economies as was the average across the EU-27.

During the period between 1997 and 2007, there were three relatively distinct developments in the production index of paints and printing inks; in the period between 2000 and 2005, there was little change in EU-27 output, either side of which there was relatively strong growth. Over the ten year period as a whole, growth in output averaged 2.0 % per annum.

Table 6.15: Miscellaneous chemical products (CPA Groups 24.2, 24.3 and 24.5 to 24.7)
Production of selected products, EU-27, 2007 (1)

| | Prodcom code | Production value (EUR million) | Rounding base (EUR million) | Volume of sold production (million) | Unit of volume | Rounding base (million) |
|---|--------------|--------------------------------|-----------------------------|-------------------------------------|----------------|-------------------------|
| Beauty, make-up & skin care preparations including suntan excluding medicaments, lip & eye make-up, manicure & pedicure preparations, powders for cosmetic use & talcum powder | 24.52.15.00 | 7 880 | 40 | - | - | - |
| Paints & varnishes; based on acrylic or vinyl polymers dispersed or dissolved in an aqueous medium (including enamels & lacquers) | 24.30.11.50 | 6 192 | 0.05 | 3 990 | kg | 0.07 |
| Washing preparations & cleaning preparations, with or without soap, p.r.s. including auxiliary washing preparations excluding those for use as soap, surface-active preparations | 24.51.32.50 | 6 000 | 2 000 | 6 000 | kg | 1 000 |
| Toilet waters | 24.52.11.70 | 4 136 | - | 97 | litres | - |
| Printing inks (excluding black) | 24.30.24.70 | 3 839 | - | 1 155 | kg | - |
| Hair preparations (excluding shampoos, permanent waving & hair straightening preparations, lacquers) | 24.52.17.00 | 2 654 | - | - | - | - |
| Paints & varnishes, based on polyesters dispersed/dissolved in a non-aqueous medium including enamels & lacquers excluding weight of the solvent >50% of the weight of the solution | 24.30.12.29 | 2 465 | - | 722 | kg | - |
| Washing preparations & cleaning preparations, with or without soap, n.p.r.s. including auxiliary washing preparations excluding those for use as soap, surface-active preparations | 24.51.32.70 | 2 000 | 400 | 1 240 | kg | 40 |

(1) Excluding products of a generic nature (other), sales of services such as repair, maintenance and installation; estimates; threshold of production value set at EUR 2 billion; the rounding base indicates the magnitude of the rounding employed to protect confidential cells (in the case of PRODCOM code 24.52.15.00, the value lies within the range +/- EUR 40 million of the reported value).

Source: Eurostat (PRODCOM)

EU-27 tangible investment in the paint and printing inks manufacturing sector was EUR 1.1 billion in 2006. Compared with the value added generated by this sector, this represented a relatively low investment rate of 9.0 % even when compared with the average rate across fuel processing and chemicals manufacturing (14.4 % in 2005). In contrast, personnel costs represented a relatively high proportion of operating expenditure (18.6 % compared with 11.7 % in 2005 for fuel processing and chemicals manufacturing), despite average personnel costs in the paints and printing inks sector (EUR 43 400 per employee) being relatively low.

The apparent labour productivity of those working in the EU-27's paints and printing inks manufacturing sector was EUR 69.1 thousand per person employed in 2006, about EUR 36.0 thousand less per person than the average level across fuel processing and chemicals manufacturing in 2005. Even after taking into account relatively lower average personnel costs, the wage adjusted labour productivity ratio of the paints and printing inks sector (159.3 %) remained some way beneath the average ratio for fuel processing and chemicals manufacturing (194.9 % in 2005), although it was still just above the average ratio across the non-financial business economy.

Table 6.16: Manufacture of miscellaneous chemical products (NACE Groups 24.2, 24.3, 24.5 to 24.7) Expenditure, productivity and profitability, EU-27, 2006

| | (EUR million) | | | (EUR thousand per person) | |
|---|-----------------|-------------------------------|------------------------------|------------------------------|-------------------------|
| | Personnel costs | Purchases of goods & services | Investment in tangible goods | Apparent labour productivity | Average personnel costs |
| Miscellaneous chemical products (1) | 30 285 | 146 710 | 5 748 | 72.5 | 43.7 |
| Pesticides & other agro-chemical products | 1 584 | 9 262 | 285 | 93.3 | 55.0 |
| Paints, varnishes & similar coatings, printing ink and mastics | 7 401 | 32 381 | 1 083 | 69.1 | 43.4 |
| Soap & detergents, cleaning & polishing preparations, perfumes & toilet preparations | 10 617 | 53 718 | 2 148 | 66.8 | 40.8 |
| Other chemical products | 8 905 | 41 580 | 2 059 | 82.8 | 46.6 |
| Man-made fibres (1) | 1 778 | 9 769 | 467 | 60.4 | 40.9 |

(1) Investment in tangible goods, 2005.

Source: Eurostat (SBS)

Manufacture of soaps, detergents and toiletries

There were 8.3 thousand enterprises across the EU-27 for which the manufacture of soaps, detergents and toiletries was their main activity in 2006. These enterprises employed 266.4 thousand persons, accounting for 12.9 % of the total workforce in fuel processing and chemicals manufacturing. In relative terms, the sector was rather larger in terms of employment than in terms of the value added generated (EUR 17.8 billion).

The manufacture of perfumes and toilet preparations (NACE Class 24.52) in the EU-27 was slightly larger than the manufacture of soap and detergents (NACE Class 24.51), generating EUR 1.2 billion more value added in 2006. Among almost all of the Member States, however, the soap and detergents subsector was much the larger of the two. The overall picture for the EU-27 was shaped largely by the size of the perfumes and toiletries manufacturing sector in France; it accounted for 40.9 % of EU-27 value added compared with a share of only 10.9 % within the soap and detergents manufacturing subsector. Poland and France were the only two Member States that were significantly relatively specialised in soaps, detergent and toiletries manufacturing in the EU-27, the contribution of value added to their respective non-financial business economies being about twice the average across the EU-27.

There was relatively little change in the EU-27 production index of the soaps, detergents and toiletries manufacturing sector between 1997 and 2001. However, there then followed a period of accelerated growth through to 2007 (at

an average rate of 3.3 % per annum). These two distinct periods reflected a relative balance between the output growth of perfumes and toilet preparations manufacturing and output declines for soap and detergent manufacturing up to 2001, followed by relatively strong growth in the output of both subsectors through to 2007.

Tangible investment in the soaps, detergents and toiletries sector of the EU-27 was EUR 2.1 billion in 2006, accounting for 6.4 % of total tangible investment across fuel processing and chemicals manufacturing, rather less than its relative share of value added (8.2 % in 2005). This explains the relatively low investment rate of 12.1 % in 2006. In contrast, personnel costs represented a relatively high proportion of operating expenditure (16.5 % compared with 11.7 % in 2005 across fuel processing and chemicals manufacturing), despite average personnel costs for the soaps, detergents and toiletries sector (EUR 40 800 per employee) being about one quarter (24.5 %) lower.

The apparent labour productivity of those working in the soaps, detergents and toiletries sector in the EU-27 was EUR 66.8 thousand per person employed in 2006, about a third less than the average productivity of those working across fuel processing and chemicals manufacturing in 2005. This relative difference was narrowed somewhat when adjusting productivity for wage differences; the wage adjusted labour productivity ratio was 163.6 % in 2006, compared with an average of 194.9 % for fuel processing and chemicals manufacturing in 2005.

Manufacture of other chemical products

The manufacture of other chemical products, such as photographic materials, explosives, glues and essential oils was the principal activity of about 6.8 thousand enterprises across the EU-27 in 2006. This grouping of activities provided employment for 195.6 thousand people across the EU-27, a little less than one tenth (9.5 %) of the total fuel processing and chemical manufacturing workforce. The sector generated turnover of EUR 57.3 billion in 2006, of which a little over one quarter was left as value added (EUR 16.2 billion).

A clear majority of both the value added generated in the sector (62.1 %) and the number of persons employed (59.8 %) came from the manufacturing subsector of other chemical products not elsewhere classified (NACE Class 24.66), such as the manufacture of writing inks, lubricating preparations, additives and anti-freezing preparations.

The other chemical products manufacturing sector in Germany generated about one quarter (25.5 %) of the value added generated by this sector across the EU-27 in 2006, more than any other Member State. However, the only Member State that was highly specialised in this group of manufacturing activities was Belgium, the contribution of value added from this sector to its non-financial business economy being almost four times the EU-27 average.

The overall rise in the EU-27 production index of other chemicals manufacturing during the period between 1997 and 2007 was largely determined by the strong growth in the output of other chemical products not elsewhere classified (NACE Class 24.66) in the four years after 2003 (an overall increase of 21.4 %).

Tangible investment in the other chemicals manufacturing sector was EUR 2.1 billion in 2006, representing 6.2 % of total tangible investment across fuel processing and chemicals manufacturing in the EU-27. This represented a slightly lower proportion than that of the sector's contribution to value added, which was reflected in a lower investment rate (12.7 %) in 2006 than across fuel processing and chemicals manufacturing as a whole in 2005. Personnel costs represented a relatively high proportion (17.6 %) of operating expenditure in the EU-27's other chemicals manufacturing sector in 2006 when compared with fuel processing and chemicals manufacturing (11.7 % in 2005), despite average personnel costs being about 15 % lower.

The apparent labour productivity of those working across the EU-27 in the other chemical products manufacturing sector was EUR 82.8 thousand per person employed in 2006, about a fifth lower than the average for fuel processing and chemical manufacturing in 2005. The difference in productivity was narrowed when taking the lower average personnel costs of the sector into account; the average wage adjusted labour productivity ratio for the other chemical products manufacturing sector of the EU-27 was 177.6 % in 2006.

Manufacture of man-made fibres

The man-made fibres manufacturing sector in the EU-27 only comprised 355 enterprises in 2006. This relatively small sector employed 43.7 thousand persons, representing 2.1 % of all those working throughout fuel processing and chemicals manufacturing in the EU-27. This sector's value added was EUR 2.6 billion in 2006, and its contribution to the total for fuel processing and chemicals manufacturing in value added terms was about half its contribution in employment terms.

Among the Member States, by far the largest man-made fibres manufacturing sector was in Germany; it contributed almost one third (33.1 %) of the EU-27's total value added. However, Austria was clearly the Member State most specialised in this manufacturing activity, the contribution of the value added of the man-made fibres manufacturing sector to its non-financial business economy being about four and a half times the EU-27 average.

There was a distinct downward trend in the EU-27 production index for man-made fibres in the ten year period through until 2007, although there were some temporary upturns (such as in 2000 and 2004). Between 1997 and 2007, the average rate of decline in the output of man-made fibres manufacturing across the EU-27 was 3.2 % per annum, with notably faster rates of decline in Italy (an average -6.1 % per annum), the United Kingdom (-7.3 %) and Spain (-8.7 %). This downward trend contrasted sharply with the increasing trend of output observed for the EU-27's production index for fuel processing and chemicals manufacturing over the same period.

Tangible investment in the EU-27's man-made fibres manufacturing sector was EUR 0.5 billion in 2005, the equivalent of 1.5 % of the total tangible investment across fuel processing and chemicals manufacturing. Although small, this

share represented slightly more than the equivalent share in terms of value added, resulting in an investment rate (17.4 %) for man-made fibres manufacturing sector that was higher than the average (14.4 %) for the whole of fuel processing and chemicals manufacturing in 2005.

Although average personnel costs (EUR 40.9 thousand per employee in 2006) in the EU-27's man-made fibres manufacturing sector were low, about a quarter less than the average for fuel processing and chemicals manufacturing, the share of personnel costs in operating expenditure was notably higher (15.4 % in 2006 – down from 19.0 % in 2005 – compared with 11.7 % in 2005 for fuel processing and chemicals manufacturing as a whole).

6.4: Pharmaceuticals

The manufacture of pharmaceuticals includes the manufacture of basic pharmaceutical products (NACE Class 24.41) and pharmaceutical preparations (NACE Class 24.42), such as medicaments, vaccines, homeopathic preparations, dental fillings, bandages and dressings.

Community action within the pharmaceuticals sector has had the dual objective of safeguarding public health by providing safe and effective medicines, while creating a business environment that stimulates research, boosts innovation and supports competitiveness.

Legislation for medicinal products for human use and veterinary use continues to be updated to reflect new developments. These include the November 2007 Regulation of the European Parliament and of the Council updating rules governing the production, distribution and use of advanced therapy medicinal products⁽¹⁾ for processes such as gene therapy, somatic cell therapy and tissue engineering, by bringing them into a single, integrated framework. The European Commission also produced a Communication clarifying for the pharmaceutical sector the information to be provided in applications of medicinal products under paediatric investigation plans⁽²⁾.

However, the European Commission issued a Communication in December 2008 recognising that more needs to be done to address inequalities of availability of information about medicines,

The apparent labour productivity of those working in the man-made fibres manufacturing sector was EUR 60.4 thousand per person employed in 2006, about two fifths (42.7 %) less than the average value added generated per person employed across fuel processing and chemicals manufacturing in the EU-27 in 2005. The value added generated per person employed in the sector was a little less than 50 % higher than average personnel costs in 2006, which can be seen from a wage adjusted labour productivity ratio of (147.9 %, considerably less than the ratio for the whole of fuel processing and chemicals manufacturing (194.9 % in 2005).

the growth in counterfeit medicines and the slow down in innovation. It laid out three legislative proposals: to tackle the growing issues of counterfeiting and illegal distribution of medicines⁽³⁾; to enable citizens to have access to high-quality information on prescription-only medicines⁽⁴⁾; and to improve patient protection by strengthening the EU system for the safety monitoring ('pharmacovigilance') of medicines⁽⁵⁾.

Against the background of innovation concerns, it is interesting to note the research and development expenditure within the pharmaceuticals manufacturing sector. Among the 20 Member States for which data are available⁽⁶⁾ for either 2005 or 2006, intra-mural expenditure was EUR 8.7 billion, 90 % of which was spent in Germany, Sweden, Denmark, France, the United Kingdom and Spain. In Denmark, as well as Slovenia, R&D expenditure in pharmaceutical manufacturing accounted for a little over two fifths of all R&D expenditure in manufacturing. This proportion was highest in Hungary, where it was nearly three fifths in 2006. In contrast, this share was well below 10 % in Germany, France and the United Kingdom, among a number of Member States.

Structural profile

There were around 4.5 thousand enterprises throughout the EU-27 for which pharmaceuticals manufacturing was their principal activity in 2006. These enterprises employed an estimated 610.0 thousand persons in the Member States,

⁽¹⁾ Regulation (EC) 1394/2007.

⁽²⁾ 2008/C 243/01.

⁽³⁾ COM(2008) 668 final.

⁽⁴⁾ COM(2008) 662 final.

⁽⁵⁾ COM(2008) 664 final.

⁽⁶⁾ Belgium, Ireland, Italy, Luxembourg, Malta, the Netherlands and Finland, not available.

Table 6.17: Manufacture of pharmaceuticals (NACE Group 24.4)

Intra-mural research and development expenditure: selected Member States, 2006

| | R&D expenditure (EUR million) | Share of manufacturing R&D expenditure (%) |
|----|-------------------------------|--|
| DK | 1 050.7 | 44.3 |
| DE | 3 343.7 | 7.3 |
| ES | 605.8 | 18.0 |
| FR | 960.9 | 6.5 |
| SE | 1 475.9 | 22.8 |
| UK | 648.3 | 8.6 |

Source: Eurostat (SBS)

about three in every ten of the workers within all fuel processing and chemicals manufacturing activities. The value added generated by pharmaceutical activities in the EU-27 was EUR 70.5 billion in 2006, a little more than one third (36.0 %) of the turnover generated. The sector also contributed three tenths of the value added generated across all fuel processing and chemicals manufacturing in 2005.

The vast majority (89.3 %) of the value added generated by the pharmaceuticals sector of the EU-27 came from the pharmaceutical preparations manufacturing subsector (NACE Class 24.42), the remainder coming from the manufacture of basic pharmaceutical products (NACE Class 24.41).

The pharmaceuticals manufacturing sectors in Germany and France were larger than in other Member States and similar in size in terms of their value added generated in 2006; each contributed about one fifth of EU-27 value added. Although both of these countries showed moderate specialisation in these activities, specialisation was much stronger in Hungary, Ireland, Sweden,

Belgium and particularly in Slovenia, where the pharmaceuticals sector contributed around 4.1 % of non-financial business economy value added in 2006, over three times the equivalent share for the EU-27.

In the ten year period through until 2007, there was a consistent and steep rise in the production index for EU-27 pharmaceuticals manufacturing. Indeed, among the nine NACE groups within fuel processing and chemicals manufacturing for which data are available⁽¹⁷⁾, the growth in the output of pharmaceuticals manufacturing (an average 6.1 % per annum) was the highest and about twice the rate of growth of the next highest that was recorded for basic chemicals manufacturing. Among the Member States, output growth was particularly strong in Greece (an average 14.1 % per annum) and Ireland (an average 18.0 %), whereas there were moderate declines in Portugal and Finland.

EU-27 tangible investment in the pharmaceuticals manufacturing sector was EUR 8.4 billion in 2006, which was about one quarter of tangible investment across all fuel processing and chemicals manufacturing activities. Nevertheless, this represented a slightly lower share than the equivalent share in terms of value added, resulting in an investment rate for the pharmaceuticals sector (12.0 %) that was beneath the average rate (14.4 % in 2005) for fuel processing and chemicals manufacturing.

Personnel costs accounted for about one fifth (20.4 %) of the pharmaceutical sector's operating expenditure in 2006, approaching twice the average share (11.7 % in 2005) of all fuel processing and chemical manufacturing activities. This notably higher share was not, however, the result of a particularly higher average personnel costs. Indeed, average personnel costs of EUR 56.1 thousand per pharmaceutical employee in 2006 were almost identical to those across the whole of fuel processing and chemicals manufacturing in the EU-27 in 2005.

⁽¹⁷⁾ NACE Group 23.3 for the processing of nuclear fuels, not available.

Table 6.18: Manufacture of pharmaceuticals, medicinal chemicals and botanical products (NACE Group 24.4) Structural profile, EU-27, 2006

| | Enterprises (thousand) | Turnover (EUR million) | Value added (EUR million) | Persons employed (thousand) | Share in total (%) | |
|---|------------------------|------------------------|---------------------------|-----------------------------|--------------------|------------------|
| | | | | | Value added | Persons employed |
| Pharmaceuticals, medicinal chemicals & botanical products (1) | 4.5 | 196 000 | 70 500 | 610.0 | 100.0 | 100.0 |
| Basic pharmaceutical products (2) | 0.8 | : | : | : | : | : |
| Pharmaceutical preparations | 3.6 | 177 255 | 62 979 | 539.5 | 89.3 | 88.4 |

(1) Rounded estimates based on non-confidential data.

(2) Number of enterprises, 2005.

Source: Eurostat (SBS)

The apparent labour productivity of those working in the EU-27's pharmaceutical sector in 2006 was about EUR 10.0 thousand higher than the average across fuel processing and chemicals manufacturing in 2005; each person employed in pharmaceuticals manufacturing in the EU-27

generated an average of EUR 115.6 thousand of value added in 2006. The value added generated per person employed in the pharmaceuticals manufacturing sector covered average personnel costs about twice over. In these terms, the EU-27 wage adjusted labour productivity ratio for the

Table 6.19: Manufacture of pharmaceuticals, medicinal chemicals and botanical products (NACE Group 24.4) Structural profile: ranking of top five Member States in terms of value added and persons employed, 2006

| | Highest value added (1) | | | Largest number of persons employed (1) | | | Most specialised: share in non-financial business economy (%) (2) | |
|---|-------------------------|---------------|--------------|--|------------|--------------|---|-------------|
| | Country | (EUR million) | (% of EU-27) | Country | (thousand) | (% of EU-27) | Country | Value added |
| 1 | Germany | 14 244 | 20.2 | Germany | 127.8 | 21.0 | Slovenia | 4.1 |
| 2 | France | 13 714 | 19.5 | France | 105.0 | 17.2 | Belgium | 3.0 |
| 3 | United Kingdom | 10 977 | 15.6 | United Kingdom | 70.8 | 11.6 | Sweden | 2.9 |
| 4 | Italy | 6 472 | 9.2 | Italy | 69.8 | 11.4 | Ireland | 2.7 |
| 5 | Sweden | 4 616 | 6.5 | Spain | 38.9 | 6.4 | Hungary | 2.5 |

(1) Luxembourg and Malta, not available; Estonia, the Netherlands and Poland, 2005.

(2) Cyprus, Luxembourg, Malta and the Netherlands, not available; Bulgaria, Estonia, Poland and Romania, 2005.

Source: Eurostat (SBS)

Table 6.20: Pharmaceuticals (CPA Group 24.4) Production of selected products, EU-27, 2007 (1)

| | Prodcom code | Production value (EUR million) | Rounding base (EUR million) | Volume of sold production (million) | Unit of volume | Rounding base (million) |
|--|--------------|--------------------------------|-----------------------------|-------------------------------------|----------------|-------------------------|
| Medicaments containing corticosteroid hormones, their derivatives & structural analogues, put up in measured doses or for retail sale | 24.42.12.65 | 8 394 | - | - | - | - |
| Vaccines for human medicine | 24.42.21.40 | 4 799 | - | - | - | - |
| Medicaments containing vitamins; provitamins; derivatives & intermixtures thereof; for therapeutic or prophylactic uses; put up in measured doses or for retail sale | 24.42.13.60 | 2 938 | - | - | - | - |
| Opacifying preparations for X-ray examinations; diagnostic reagents designed to be administered to the patient | 24.42.23.40 | 2 648 | - | - | - | - |
| Antisera & other blood fractions | 24.42.21.20 | 2 623 | - | - | - | - |
| Medicaments of penicillins, streptomycins or deriv. thereof, in doses or p.r.s. | 24.42.11.60 | 2 400 | 800 | - | - | - |
| Medicaments containing insulin but not antibiotics; for therapeutic or prophylactic uses; put up in measured doses or for retail sale | 24.42.12.60 | 2 400 | 300 | - | - | - |
| Medicaments of alkaloids or derivatives thereof, p.r.s. | 24.42.13.40 | 2 163 | - | - | - | - |

(1) Excluding products of a generic nature (other), sales of services such as repair, maintenance and installation; estimates; threshold of production value set at EUR 2 billion; the rounding base indicates the magnitude of the rounding employed to protect confidential cells (in the case of PRODCOM code 24.42.11.60, the value lies within the range +/- EUR 800 million of the reported value).

Source: Eurostat (PRODCOM)

pharmaceuticals sector of 205.9 % in 2006 was slightly higher than that (194.9 % in 2005) for the whole of fuel processing and chemicals manufacturing. Among the Member States, wage adjusted labour productivity ratios for the pharmaceuticals

sector were much higher than average (for fuel processing and chemicals manufacturing) in Belgium, Romania, Finland and Sweden, but much lower in Greece, Spain, Estonia (2005) and Poland (2005).

Table 6.21: Manufacture of pharmaceuticals, medicinal chemicals and botanical products (NACE Group 24.4) Expenditure, productivity and profitability, EU-27, 2006

| | (EUR million) | | | (EUR thousand per person) | |
|--|-----------------|-------------------------------|------------------------------|------------------------------|-------------------------|
| | Personnel costs | Purchases of goods & services | Investment in tangible goods | Apparent labour productivity | Average personnel costs |
| Pharmaceuticals, medicinal chemicals and botanical products (1) | 33 900 | 132 000 | 8 439 | 115.6 | 56.1 |
| Basic pharmaceutical products (2) | 3 300 | : | 879 | 87.0 | : |
| Pharmaceutical preparations | 30 508 | 118 378 | 7 560 | 116.7 | 56.9 |

(1) Rounded estimates based on non-confidential data.

(2) Rounded estimates based on non-confidential data; apparent labour productivity, 2005.

Source: Eurostat (SBS)

Table 6.22: Manufacture of coke, refined petroleum products and nuclear fuel (NACE Division 23) Main indicators, 2006 (1)

| | BE | BG | CZ | DK | DE | EE | IE | EL | ES | FR | IT | CY | LV | LT |
|------------------------------------|--------|-------|-------|--------|---------|---------|-----|--------|---------|--------|--------|-------|--------|----------|
| Enterprises | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | : | 0.1 | 0.0 | 0.1 | 0.4 | : | 0.0 | 0.0 |
| Persons employed | 5.8 | 4.7 | 3.0 | : | 20.7 | 1.1 | : | 4.1 | 8.8 | 27.2 | 16.9 | : | 0.0 | : |
| Turnover | 46 167 | : | 5 113 | : | 124 709 | 90 | : | 10 900 | 39 908 | 64 773 | 41 466 | : | : | : |
| Production | 42 360 | : | 4 548 | : | 97 476 | 91 | : | 9 003 | 34 279 | 64 758 | 37 485 | : | : | : |
| Purch. of goods & serv. | 43 807 | : | 5 031 | : | 84 572 | 55 | : | 10 393 | 33 399 | 51 540 | 35 589 | : | : | : |
| Value added | 2 073 | : | 150 | : | 5 728 | 36 | : | 1 050 | 7 167 | 3 876 | 2 445 | : | : | : |
| Personnel costs | 698 | : | 52 | : | 1 764 | 8 | : | 271 | 572 | 2 305 | 924 | : | : | : |
| Average personnel costs | 119.6 | : | 17.7 | : | 85.4 | 7.7 | : | 69.1 | 65.2 | 84.7 | 56.4 | : | : | : |
| Gross operating surplus | 1 376 | 30 | 98 | : | 3 964 | 28 | : | 779 | 6 595 | 1 571 | 1 520 | : | : | : |
| Gross investment | 136 | : | 71 | : | 1 162 | 16 | : | 44 | 533 | 1 205 | 811 | 0 | : | : |
| Apparent labour prod. | 354.5 | : | 50.3 | : | 277.2 | 34.0 | : | 257.6 | 816.5 | 142.4 | 144.9 | : | : | : |
| Wage adj. labour prod. | 296.5 | : | 283.5 | : | 324.4 | 440.5 | : | 373.0 | 1 252.2 | 168.1 | 257.0 | : | : | : |
| Gross operating rate | 3.0 | : | 1.9 | : | 3.2 | 31.3 | : | 7.1 | 16.5 | 2.4 | 3.7 | : | : | : |
| Investment rate | 6.6 | : | 46.9 | : | 20.3 | 43.7 | : | 4.2 | 7.4 | 31.1 | 33.2 | : | : | : |
| | LU | HU | MT | NL | AT | PL | PT | RO | SI | SK | FI | SE | UK | NO |
| Enterprises | 0.0 | 0.0 | : | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | : | 0.0 | 0.1 | 0.2 | 0.0 |
| Persons employed | 0.0 | 6.4 | : | 6.2 | : | 15.2 | : | 6.9 | 0.1 | : | 2.8 | 3.3 | 23.9 | 0.0 |
| Turnover | 0 | 7 434 | : | 30 074 | : | 13 418 | : | 3 291 | 8 | : | 8 637 | 1 495 | 45 392 | 521 |
| Production | 0 | 6 624 | : | 24 386 | : | 12 887 | : | 3 277 | 6 | : | 6 914 | 1 471 | 45 918 | 543 |
| Purch. of goods & serv. | 0 | 5 278 | : | 29 163 | : | 9 439 | : | 2 945 | 7 | : | 7 935 | 956 | 27 660 | 188 |
| Value added | 0 | 1 173 | : | 421 | : | 5 200 | : | 100 | 1 | : | 768 | 539 | 4 150 | 355 |
| Personnel costs | 0 | 217 | : | 496 | : | 264 | : | 69 | 2 | : | 159 | 185 | 1 761 | 1 |
| Average personnel costs | : | 34.3 | : | 80.6 | : | 17.5 | : | 9.9 | 19.3 | : | 56.4 | 62.0 | 73.9 | 42.5 |
| Gross operating surplus | 0 | 956 | : | -76 | : | 4 936 | : | 31 | 0 | : | 609 | 346 | 2 390 | 355 |
| Gross investment | 0 | 181 | : | 434 | : | 400 | : | 163 | 1 | : | 258 | 39 | 476 | 48 |
| Apparent labour prod. | : | 184.5 | : | 68.4 | : | 341.7 | : | 14.4 | 15.3 | : | 273.0 | 165.7 | 173.3 | 23 694.1 |
| Wage adj. labour prod. | : | 538.4 | : | 84.8 | : | 1 955.5 | : | 144.6 | 79.4 | : | 483.8 | 267.1 | 234.4 | 55 766.7 |
| Gross operating rate | : | 12.9 | : | -0.3 | : | 36.8 | : | 0.9 | -4.1 | : | 7.1 | 23.2 | 5.3 | 68.2 |
| Investment rate | : | 15.4 | : | 103.3 | : | 7.7 | : | 163.6 | 40.7 | : | 33.6 | 7.1 | 11.5 | 13.5 |

(1) Cyprus, Netherlands and Poland, 2005; Slovenia, 2005 except for enterprises; unless otherwise stated, values refer to EUR million; number of enterprises and number of persons employed are given in thousands; average personnel costs and apparent labour productivity are given in EUR thousand per person; wage adjusted labour productivity, gross operating rate and investment are ratios expressed as percentages.

Source: Eurostat (SBS)

Table 6.23: Manufacture of chemicals and chemical products (NACE Division 24)
Main indicators, 2006 (1)

| | BE | BG | CZ | DK | DE | EE | IE | EL | ES | FR | IT | CY | LV | LT |
|------------------------------------|--------|-------|-------|--------|---------|--------|--------|-------|--------|---------|--------|--------|--------|-------|
| Enterprises | 0.8 | 0.6 | 1.5 | 0.3 | 3.5 | 0.1 | 0.2 | 0.4 | 4.2 | 3.8 | 5.8 | 0.1 | 0.1 | 0.1 |
| Persons employed | 69.1 | 25.7 | 40.9 | 29.5 | 452.1 | 2.9 | 24.5 | 17.9 | 137.7 | 271.5 | 197.3 | 1.9 | 4.3 | 6.1 |
| Turnover | 39 139 | 1 093 | 6 109 | 9 216 | 165 251 | 423 | 29 110 | 3 140 | 47 718 | 125 041 | 80 190 | 199 | 170 | 819 |
| Production | 38 925 | 1 036 | 5 932 | 9 375 | 143 218 | 367 | 28 852 | 2 970 | 43 147 | 108 270 | 72 814 | 180 | 169 | 841 |
| Purch. of goods & serv. | 29 902 | 864 | 4 947 | 6 314 | 119 409 | 343 | 18 087 | 2 365 | 38 274 | 98 377 | 64 602 | 129 | 103 | 734 |
| Value added | 11 533 | 261 | 1 457 | 3 471 | 45 859 | 81 | 11 602 | 949 | 11 188 | 28 337 | 15 475 | 74 | 77 | 149 |
| Personnel costs | 5 010 | 101 | 539 | 1 962 | 28 079 | 32 | 1 467 | 569 | 6 221 | 16 472 | 9 794 | 38 | 33 | 68 |
| Average personnel costs | 73.2 | 4.0 | 13.7 | 66.6 | 62.3 | 11.1 | 60.1 | 33.1 | 45.7 | 60.7 | 51.7 | 20.4 | 7.7 | 11.2 |
| Gross operating surplus | 6 523 | 160 | 918 | 1 509 | 17 780 | 48 | 10 135 | 381 | 4 967 | 11 865 | 5 681 | 35 | 44 | 82 |
| Gross investment | 1 212 | 137 | 298 | 565 | 6 222 | 13 | 989 | 130 | 1 947 | 3 690 | 2 772 | 9 | 31 | 79 |
| Apparent labour prod. | 166.9 | 10.2 | 35.6 | 117.7 | 101.4 | 27.4 | 474.4 | 53.0 | 81.2 | 104.4 | 78.5 | 39.3 | 17.8 | 24.7 |
| Wage adj. labour prod. | 228.1 | 254.1 | 260.7 | 176.6 | 162.9 | 246.2 | 789.8 | 159.9 | 177.7 | 171.9 | 151.7 | 192.8 | 230.5 | 219.3 |
| Gross operating rate | 16.7 | 14.6 | 15.0 | 16.4 | 10.8 | 11.4 | 34.8 | 12.1 | 10.4 | 9.5 | 7.1 | 17.8 | 25.6 | 10.0 |
| Investment rate | 10.5 | 52.5 | 20.4 | 16.3 | 13.6 | 16.1 | 8.5 | 13.7 | 17.4 | 13.0 | 17.9 | 12.1 | 40.7 | 53.2 |
| | LU | HU | MT | NL | AT | PL | PT | RO | SI | SK | FI | SE | UK | NO |
| Enterprises | 0.0 | 0.7 | : | 0.7 | 0.4 | 2.2 | 1.0 | 1.2 | 0.2 | 0.2 | 0.3 | 1.0 | 3.8 | 0.3 |
| Persons employed | 1.0 | 31.6 | : | 65.1 | 26.6 | 102.1 | 21.2 | 48.1 | 13.8 | 12.7 | 17.6 | 43.0 | 211.6 | 13.5 |
| Turnover | 326 | 6 160 | : | 49 860 | 9 103 | 12 427 | 4 207 | 2 814 | 2 670 | 1 697 | 6 979 | 15 787 | 90 975 | 6 543 |
| Production | 206 | 5 342 | : | 45 052 | 8 511 | 11 240 | 3 874 | 2 681 | 2 433 | 1 611 | 6 434 | 16 149 | 85 450 | 6 334 |
| Purch. of goods & serv. | 255 | 4 486 | : | 39 485 | 6 454 | 9 237 | 3 265 | 2 333 | 1 730 | 1 433 | 5 190 | 10 464 | 63 845 | 4 655 |
| Value added | 47 | 1 789 | : | 10 534 | 3 137 | 3 507 | 1 100 | 596 | 945 | 284 | 1 945 | 6 733 | 27 484 | 2 244 |
| Personnel costs | 43 | 609 | : | 3 958 | 1 453 | 1 207 | 567 | 312 | 428 | 134 | 894 | 2 449 | 11 942 | 957 |
| Average personnel costs | 41.4 | 19.4 | : | 61.0 | 55.1 | 12.1 | 27.0 | 6.5 | 31.1 | 10.5 | 50.9 | 62.1 | 57.0 | 71.2 |
| Gross operating surplus | 4 | 1 179 | : | 6 577 | 1 684 | 2 300 | 532 | 284 | 517 | 151 | 1 051 | 4 160 | 15 542 | 1 286 |
| Gross investment | 11 | 487 | : | 1 273 | 421 | 698 | 176 | 452 | 190 | 264 | 255 | 759 | 3 146 | 429 |
| Apparent labour prod. | 45.0 | 56.6 | : | 161.9 | 118.1 | 34.3 | 51.8 | 12.4 | 68.3 | 22.4 | 110.5 | 156.7 | 129.9 | 166.4 |
| Wage adj. labour prod. | 108.8 | 292.0 | : | 265.4 | 214.3 | 284.0 | 191.9 | 190.1 | 219.9 | 212.7 | 217.1 | 252.4 | 228.0 | 233.6 |
| Gross operating rate | 1.2 | 19.1 | : | 13.2 | 18.5 | 18.5 | 12.7 | 10.1 | 19.4 | 8.9 | 15.1 | 26.3 | 17.1 | 19.7 |
| Investment rate | 22.4 | 27.2 | : | 12.1 | 13.4 | 19.9 | 16.0 | 75.8 | 20.1 | 92.8 | 13.1 | 11.3 | 11.4 | 19.1 |

(1) Netherlands and Poland, 2005; Portugal, 2005 except for enterprises; unless otherwise stated, values refer to EUR million; number of enterprises and number of persons employed are given in thousands; average personnel costs and apparent labour productivity are given in EUR thousand per person; wage adjusted labour productivity, gross operating rate and investment are ratios expressed as percentages.

Source: Eurostat (SBS)