

EMU's potential long-term effects are, by definition, not yet evident. This does not, however, preclude informed judgement as to the direction they might take, based on evidence to date.

Economic theory, the Single Market Programme (SMP) and US experience highlight increased competition as the primary long-term consequence of EMU. There are some indications of price convergence in the EU through the 1990s and evidence from the US suggests that mature currency unions exhibit lower price divergence. Exchange rate movements, however, make it difficult to discern an EMU effect to date. If EMU furthers the implementation of the SMP and the integration of EU labour, product and capital markets, it should promote competition and greater economic efficiency.

Evidence suggests that EMU will augment existing tendencies towards greater specialisation. The EU appears less specialised than the US, making it relatively less vulnerable to asymmetric sectoral shocks stemming from industry structure. A slow increase in EU specialisation has, however, been apparent over recent decades and appears to have been encouraged at a national level by EU entry.

Geographical concentration in manufacturing presents a mixed picture, with strong sectoral variations. At the level of the overall economy, however, the expansion of the generally more dispersed service sector exercises a dampening influence on geographical concentration.

5.1 The short to medium-term effects of EMU, described in Section 4, will have longer-term consequences for the industrial structure of the euro area.

5.2 These longer-term effects are, by definition, not yet evident. It is, however, possible to set the theoretical long-run implications identified in Section 3 in the context of current euro area, EU and global developments. Prices data, anecdotal evidence and the experience of the Single Market Programme (SMP) can cast light on the impact of EMU entry on **competition**. While it is more difficult to isolate early indications of the impact of the euro on **specialisation** and **concentration**, an analysis of established trends, past periods of EU integration, Member States' experience post-EU entry and US experience can all contribute to an informed judgement.

TRENDS IN COMPETITION

5.3 This sub-section considers evidence on trends in competition; first, by reference to contemporary euro area price data; second, by comparisons of the EU and the US; and third, by drawing on the experience of the SMP, the consequences of which may cast some light on the longer-term effects expected from EMU.

EMU's impact on prices **5.4** A single currency would, as outlined in Section 3, be expected in theory to reduce trade barriers, increase price transparency and boost trade and competition, thereby increasing pressure for price convergence. One approach to assessing the impact of EMU on competition is therefore to examine trends in prices. The EMU study by HM Treasury *Prices and EMU* addresses this issue in detail.

5.5 The study finds some indications of price convergence in EMU. Among the large countries that entered EMU in 1999, France and Germany have seen a fall in their relative price levels¹ (RPLs) towards the EU average. Italy's RPL has remained below the EU average since the introduction of the euro and shown no upward movement during this time. Since 1997, the level of price convergence in the euro area has increased relative to that of the EU as a whole. Data for the geographical core of the euro area (France, Germany, Belgium, Luxembourg and the Netherlands) show both a consistently higher level of price convergence and a more marked increase in convergence in recent years. Comparison with the EU may have been affected by movements in the nominal exchange rate between the euro and the non-euro area EU currencies.

5.6 Table 5.1 shows production-weighted coefficients of variation for price dispersion by sector in 1995 and 2002. In all euro area sectors except communications, fuel and power, and alcohol and tobacco, price divergence in 2002 was lower than it was in 1995.

Table 5.1: Price convergence by sector
Production-weighted coefficients of variation for disaggregated data

| Description | EU | | Euro area | |
|----------------------------------|------|------|-----------|------|
| | 1995 | 2002 | 1995 | 2002 |
| Transport goods | 13.2 | 11.8 | 10.6 | 7.2 |
| Clothing and footwear | 15.0 | 11.1 | 14.0 | 7.0 |
| Food and non-alcoholics | 12.4 | 7.6 | 10.9 | 7.1 |
| Restaurants and hotels | 13.8 | 18.8 | 14.2 | 8.0 |
| Furnishings and equipment | 13.3 | 10.5 | 13.5 | 8.9 |
| Recreation and cultural services | 16.9 | 13.3 | 13.6 | 8.9 |
| Recreation and cultural goods | 11.7 | 7.3 | 9.1 | 6.2 |
| Miscellaneous goods and services | 21.7 | 10.9 | 22.9 | 11.0 |
| Health | 22.2 | 13.4 | 19.5 | 11.7 |
| Fuel and power | 15.9 | 18.1 | 12.9 | 15.2 |
| Alcohol and tobacco | 22.8 | 36.9 | 20.6 | 23.1 |
| Rent and maintenance | 28.7 | 19.5 | 28.2 | 21.4 |
| Communications | 14.8 | 26.9 | 15.8 | 23.2 |
| Transport services | 23.4 | 27.9 | 25.3 | 24.3 |
| Tradeable goods | 11.7 | 8.4 | 11.0 | 5.8 |
| Non-tradeables | 19.4 | 12.7 | 19.7 | 11.3 |
| All items | 15.8 | 10.7 | 15.7 | 8.7 |

Source: Eurostat and HM Treasury calculations.

Price divergence in the EU and US

5.7 Comparison of the EU with the US using European Commission data suggests that price dispersion in the EU is higher across all categories, and particularly in health care (though US price dispersion is notable in housing and utilities). According to these data, discussed in more detail in the EMU study *Prices and EMU*, average price dispersion in the US is one fifth less than in the EU. It is difficult to know how far this reflects the US being a mature monetary union and how far it reflects other factors such as the lack of significant internal political borders, a more generally competitive trading environment and relatively low transport costs.

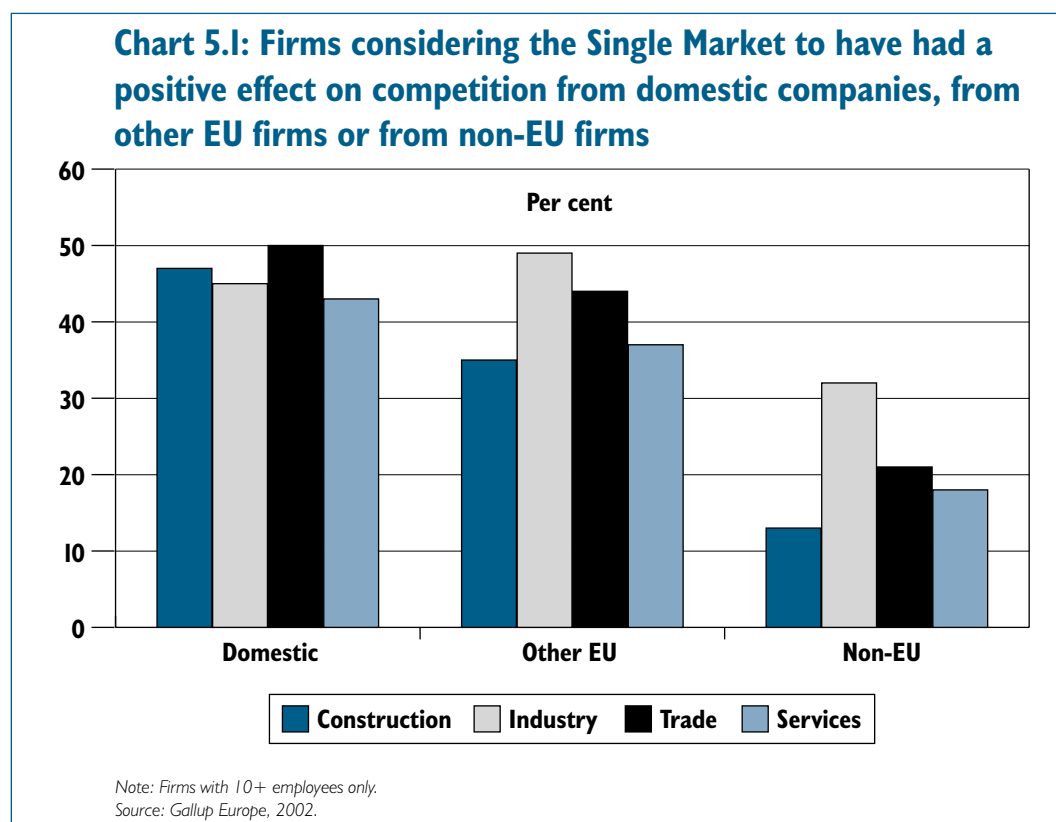
Impact of SMP on competition

5.8 Analysis of the impact of EMU on competition can be informed not only by current data but also by past experience; in particular, the impact of the SMP in the EU. From the perspective of promoting competition, the most important measures within the SMP included steps to institute common rules on regulation, takeovers, state assistance to

¹ The RPL is the ratio of domestic to foreign prices adjusted for the exchange rate between domestic and foreign currency. A full definition is included in the EMU study by HM Treasury *Prices and EMU*.

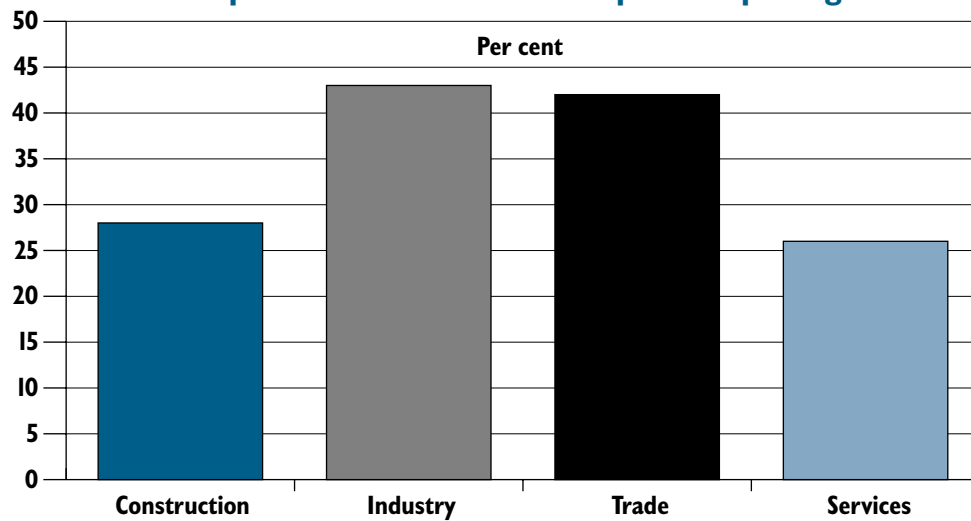
industry, patents and copyrights, company accounting and disclosure of information; the opening of public procurement to competitive tender; and reduced intervention in agriculture. Such a broad range of measures inevitably affected different sectors in very different ways. Chart 5.1 describes EU business perceptions of the extent to which the SMP has boosted competition. Overall some 48 per cent of companies considered that the SMP had increased competition from domestic firms; 42 per cent considered that the SMP had increased competition from firms elsewhere in the EU; and 22 per cent considered that the SMP had increased competition from non-EU firms. The SMP's impact on competition appears to have been more widespread than its impact on, for example, exports. The same survey found 25 per cent of firms reporting that the SMP had helped boost sales to other Member States and 17 per cent reporting that the SMP had helped boost sales to non-EU countries.

5.9 UK firms had the lowest positive responses with respect to the SMP's impact on domestic competition and on competition from other EU firms, and the second lowest positive response regarding non-EU competition. This may be a function of the UK having already been relatively open and competitive at the time of the SMP's launch and the effect of the SMP therefore being perceived as having been less dramatic in the UK than in some other EU countries.



5.10 Service sector companies in all EU countries tend to report less of a boost to competitive pressure from the SMP than their trade or industry sector counterparts. This is consistent with the services sector finding the SMP less influential than other sectors on pricing strategies (see Chart 5.2). Here again, UK companies appear to have been less affected by the SMP than companies in other Member States, with only 29 per cent of UK companies considering it to have been an important influence on product pricing (compared with 36 per cent of EU companies overall).

Chart 5.2: Companies considering the Single Market to have been an important influence on their product pricing



Note: Firms with 10+ employees only.
Source: Gallup Europe, 2002.

SMP gains from scale and competition

5.11 The SMP was intended to bring substantial gains through increased efficiency, with lower costs and prices and increased product variety. This was forecast to occur via two main channels: the exploitation of scale economies, and increased competition prompting the elimination of inefficient firms and industry restructuring. Allen *et al.* (1998) estimate that the reduced price-cost margins brought about by the SMP raised UK GDP by 1.1 per cent (though this assumes integrated product markets in the EU). European Commission DG Economic and Financial Affairs (1996a) analysis suggests that the cost reductions achieved over the period 1985-1993, during which time the SMP was being implemented, were primarily a result of the exploitation of scale advantages linked to fixed investment in marketing, brand development, R&D and the development of new products and production processes.

5.12 Focusing on the effect of the SMP on the UK, Griffith (2001) used panel data of manufacturing establishments in 1980-1996 to investigate the relationship between product market competition and productivity levels and growth. Following the approach of the Cecchini report, Griffith divided industries into three categories: those where non-tariff barriers to trade were already low pre-SMP; those with intermediate levels of non-tariff barriers which might be susceptible to measures undertaken as part of the SMP; and those with high non-tariff barriers which, again, might be reduced by SMP measures. The first category was assumed to be relatively insensitive to the SMP; in the second and third categories, however, there was the potential for a significant reduction in non-tariff barriers. *Ex ante*, industries in these latter two categories (described in Table 5.2) could be expected to be 'sensitive' to the SMP; an expectation which Griffith found to be borne out in the empirical evidence. She found increased efficiency and growth in 'SMP-sensitive' sectors but not in sectors where barriers had been low to begin with (or where non-tariff barriers would not have been expected to be affected by SMP measures). Mark-ups fell by more in the *ex ante* 'SMP-sensitive' sectors than in the 'non-sensitive' sectors.

Table 5.2: Industries affected by the Single Market Programme

| High non-tariff barriers | Moderate non-tariff barriers |
|---------------------------------|--------------------------------|
| Specialised chemicals | Glass |
| Pharmaceutical products | Refractory and ceramics |
| Mining and construction | Basic industrial chemicals |
| Power transmission equipment | Agricultural machinery |
| Other machinery | Metal-worked machinery |
| Manufacture of office equipment | Textile machinery |
| Insulated wires | Processing machinery |
| Basic electrical equipment | Machinery for wood |
| Telecomms equipment | Domestic electrical appliances |
| Other electronic equipment | Electric lamps |
| Shipbuilding | Motor vehicles and parts |
| Railway and tramway | Brewing and malting |
| Precision instruments | Soft drinks |
| Medical equipment | Woollens |
| Optical instruments | Cotton and silk |
| Ice cream, chocolate | Carpets |
| Jewellery | Footwear |
| Toys and games | Clothing |
| | Household textiles |
| | Rubber |

Source: Griffith, 2001.

TRENDS IN SPECIALISATION

5.13 Specialisation describes the extent to which the activity of a given region occurs in a small number of industries. EMU entry might, as Section 3 described, encourage specialisation, thereby facilitating the exploitation of comparative advantage and economies of scale. Increased specialisation may also carry costs. Not only the one-off adjustment costs related to restructuring, but also increased vulnerability to asymmetric shocks (Krugman 1993). The EMU study *Analysis of European and UK business cycles and shocks* by Professor Michael Artis looks at whether there is a 'UK idiosyncrasy' in terms of the incidence of shocks in the UK relative to other EU countries, and at whether EMU itself will prompt greater synchronicity of shocks.

5.14 Similar industrial structures do not mean that countries will react to similar shocks in similar ways. If, for example, UK products in a particular sector are less sophisticated than German products, UK exports are likely to be sold in markets where price is a more important factor. Carlin *et al.* (2001) found that UK and Swedish exports tend to be more price sensitive than German or French across all sectors (see Section 6). UK export performance is discussed further in Professor Wendy Carlin and Dr Andrew Glyn's contribution to the EMU study *Submissions on EMU from leading academics*.

5.15 As specialisation is a gradual, long-term process, it is not yet possible to examine the extent to which it has been influenced by EMU. Instead, this section assesses the probable impact of the single currency on specialisation by taking into account evidence on:

- trends in EU specialisation;
- specialisation in currency unions;

- specialisation in the EU compared with the US; and
- specialisation in the UK compared with the EU.

Alternative sources of evidence **5.16** Much of the evidence on specialisation involves comparison of US and EU industrial structures. Comparability is complicated by the reliability and availability of the data, and by the fact that specialisation can be based on different aggregates. It may be estimated on the basis of output or value added, trade, or employment. The specialisation indices constructed from these alternative sources do not always tell mutually consistent stories.

5.17 Despite these difficulties, some common themes can be identified. EU specialisation appears to have increased over recent years, but only to a limited extent. As Hallet (2000) notes, this may be partly because problems of data availability constrain studies to periods too short to observe changes in trend.

Trends in EU specialisation

Specialisation patterns based on output data **5.18** Midelfart-Knarvik *et al.* (2000) is one of the most comprehensive recent surveys of industrial specialisation in the EU. Their results, reproduced in Table 5.3, indicate that during the 1970s – a period of large exchange rate fluctuations, and of increased tariff and non-tariff barriers following the collapse of the Bretton Woods system – the industrial structures of most EU countries became more convergent due to a common decline in the share of the manufacturing sector noted in Section 2. In the 1980s, as European integration increased in the run-up to the launch of the SMP, manufacturing specialisation began to increase. Midelfart-Knarvik *et al.* (2000) attribute most of the growing divergence of EU structures in the 1980s to changes in the industry mix at a national level. The UK and France were the least specialised countries in the early 1970s, and this remained the case over the following twenty years.

Table 5.3: Specialisation in EU manufacturing¹

| Krugman specialisation index | 1970-73 | 1980-83 | 1988-91 | 1994-97 |
|-------------------------------|-------------|-------------|-------------|-------------|
| Austria | 0.31 | 0.28 | 0.28 | 0.35 |
| Belgium | 0.33 | 0.35 | 0.38 | 0.45 |
| Denmark | 0.56 | 0.55 | 0.58 | 0.59 |
| Finland | 0.60 | 0.51 | 0.53 | 0.59 |
| France | 0.20 | 0.19 | 0.21 | 0.20 |
| Germany | 0.33 | 0.31 | 0.35 | 0.37 |
| Greece | 0.53 | 0.58 | 0.66 | 0.70 |
| Italy | 0.35 | 0.35 | 0.36 | 0.44 |
| Ireland | 0.70 | 0.62 | 0.66 | 0.78 |
| Netherlands | 0.51 | 0.57 | 0.55 | 0.52 |
| Portugal | 0.54 | 0.48 | 0.59 | 0.57 |
| Spain | 0.44 | 0.29 | 0.33 | 0.34 |
| Sweden | 0.42 | 0.39 | 0.40 | 0.50 |
| UK | 0.23 | 0.19 | 0.22 | 0.21 |
| EU average² | 0.33 | 0.30 | 0.33 | 0.35 |

¹ Krugman specialisation indices, relative to the rest of the EU and based on gross output data (four year averages). The index can range from zero, implying the country has an identical structure to the rest of the EU, to a maximum value of two, implying that it has no industries in common with the rest of the EU (see Annex B for further detail).

² Weighted average.

Source: Midelfart-Knarvik *et al.*, 2000.

5.19 Table 5.3 suggests that EU entry promotes specialisation. While the picture for first wave EU entrants² is somewhat mixed, specialisation increased for those countries which joined in the 1970s and 1980s, in part as the rigours of the Single Market shaped their economies. For the entrants of the 1990s, specialisation rose in the latter part of the decade. These results are consistent with the expectation of economic theory, outlined in Section 3, that lower trade barriers lead to more specialisation.

Specialisation patterns based on trade data

5.20 Trade data, for practical reasons of reliability and availability, are often used to measure trends in specialisation. Disaggregated trade data allow a distinction between intra and inter-industry trade. As Table 5.4 shows, in 1996 most trade within the EU was intra-industry. The import and export of goods belonging to the same industry sector accounted for almost 60 per cent of intra-EU trade, compared to just over half in the early 1980s. Almost three-quarters of EU trade with non-EU countries was, in contrast, inter-industry; between, rather than within, industries. Inter-industry trade might suggest a greater degree of specialisation, in that countries are producing and exchanging dissimilar products. But it is difficult at this level of aggregation to determine what a high and rising level of intra-industry trade implies for specialisation. Intra-industry trade could reflect trade in similar finished products (horizontal trade), or trade at different stages of production (vertical trade). If the latter, then an increasing proportion of intra-industry trade might be consistent with increasing, not declining, specialisation.

Table 5.4: Inter and intra-industry EU trade, 1996

| Per cent | Inter-industry | Intra-industry |
|----------|----------------|----------------|
| World | 52.7 | 47.3 |
| Intra-EU | 40.9 | 59.1 |
| Extra-EU | 73.4 | 26.6 |

Source: Fouquin et al., 2001.

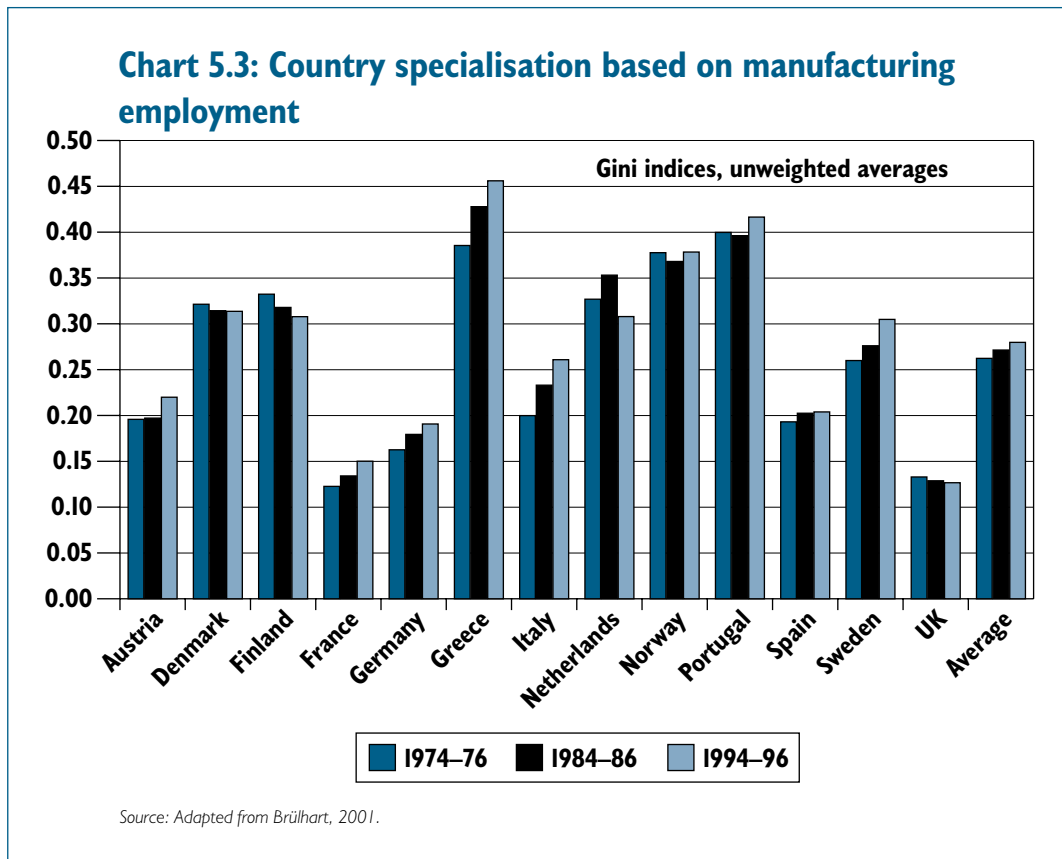
5.21 Brülhart (2001) computes locational Gini indices (see Annex B for detailed definitions) based on global manufacturing exports for 14 European countries from 1972-1996. He finds that measured in terms of exports, specialisation has declined. Larger countries (the UK, France and Germany) are less specialised than their smaller counterparts (Greece, Portugal and Norway).

Specialisation patterns based on employment data

5.22 Brülhart (2001) also addresses manufacturing specialisation patterns based on employment and finds that larger economies are less specialised and smaller countries more specialised (using data for 1972-1996). Specialisation levels on this basis are considerably lower than those computed from export data. The overall average Gini coefficient of employment was 0.27 compared to 0.39 for exports. Brülhart attributes the discrepancy to the presence of non-traded goods in highly aggregated employment data. As Chart 5.3 shows, the long-term specialisation trend in employment is upwards, with a decline in specialisation evident in only a small number of countries, including the UK.

² Entry into the EU occurred in a number of waves:

- Belgium, France, Germany, Italy, Luxembourg, Netherlands (1957);
- Denmark, Ireland, UK (1973);
- Greece (1981), Portugal, Spain (1986); and
- Austria, Finland, Sweden (1995).



Bringing the EU data together

5.23 Specialisation estimates based on trade, output and employment data seem to tell different stories. Some studies of export data suggest declining specialisation in the EU; output and employment measures point to an increase. Countries appear to have become more specialised in manufacturing output and employment, but to have seen a diversification of manufacturing exports.

5.24 This apparent contradiction could reflect two factors. First, many studies focus only on manufacturing, which may not be representative of the overall economy. While manufacturing specialisation appears to have increased in the EU during the 1980s and 1990s, Hallett (2000), for example, suggests that the structural shift from manufacturing to services has led to greater similarity in overall specialisation indices. Even where studies focus solely on manufacturing, the extent to which traded and non-traded goods sectors feature in the datasets used may produce inconsistent results.

5.25 Brülhart (2001) suggests a second explanation related to the differing speeds of two processes triggered by falling trade barriers and falling transaction costs:

- rising export propensities; and
- sector specialisation in employment.

5.26 If the first process occurs more rapidly than the second, contradictory messages may be sent out regarding specialisation trends from trade and employment. The latter may be a more reliable indicator of the long-term trend; in which case Europe appears to be specialising, but at a very slow pace and with numerous country and sector exceptions. Not every industry enjoys scale economies, especially in the service sector. Where they do exist, they may diminish as the scale of operation increases, or even give way to diseconomies of scale. Where they are sustained, they may at some stage be interrupted by the competition authorities. A Europe specialising into an array of national champions does not appear likely.

However, a less extreme scenario of a more modest increase in specialisation, facilitated by the euro, is consistent with EU experience since the establishment of the Single Market.

Specialisation evidence from existing currency unions

5.27 Lessons on the possible impact of EMU on specialisation may be taken from the experience of other countries sharing a common currency.³ Based on trade data, Engel and Rose (2000) calculate national measures of specialisation using a Herfindahl index (see Annex B for detailed definitions), and consider whether common currency areas are more specialised. Their database contains over 3000 observations, of which about 13 per cent relate to countries which are members of currency unions.

5.28 Their findings show that currency union members are systematically more specialised, indicated by a higher Herfindahl index (Table 5.5). These conclusions are insensitive to controlling for real GDP per capita, and to measures of country size, and supplement work showing that countries sharing a common currency are more open to trade.

Table 5.5: Specialisation in currency unions

| | Observations | Herfindahl Index | | Number of exports | |
|----------------------------|--------------|------------------|----------|-------------------|----------|
| | | Mean | St. dev. | Mean | St. dev. |
| Non-currency union members | 2,657 | 0.23 | 0.24 | 254 | 132 |
| Currency union members | 388 | 0.31 | 0.19 | 132 | 89 |

Source: Engel and Rose, 2000.

Comparing EU and US levels of specialisation

5.29 Another indication of the implications of EMU for specialisation may come from the US (discussed in more detail in the EMU study by HM Treasury *The US as a monetary union*). Krugman and Venables (1996) argue, on the basis of broad employment shares, that the US is more specialised than the EU. Table 5.6 shows that in steel, cars and textiles, employment is more evenly distributed across the four large EU countries, than it is across four US regions. The single currency and the Single Market might, therefore, be expected to draw the euro area in a more specialised direction. This is not necessarily the case, because initial starting points themselves influence destinations. Patterns of output, employment and trade may, once established, be extremely robust to change; a euro area subject to US-style competitive pressures will not necessarily converge to a US-style structure.

Table 5.6: Employment shares in the US and EU

| | Steel | Cars | Textiles |
|------------------|-------|------|----------|
| US (1990) | | | |
| North East | 13.4 | 7.9 | 14.2 |
| Mid-West | 51.8 | 65.6 | 3.2 |
| South | 24.5 | 23.4 | 79.6 |
| West | 10.4 | 7.0 | 3.9 |
| EU (1989) | | | |
| France | 18.9 | 25.3 | 15.8 |
| Germany | 20.2 | 34.7 | 13.2 |
| Italy | 18.7 | 9.5 | 17.4 |
| UK | 15.8 | 13.0 | 18.6 |

Source: Krugman and Venables, 1996.

³ This is defined as countries sharing the same currency and is not as tightly defined as a single currency.

5.30 In line with the Krugman and Venables (1996) work on employment, most studies based on production data point to the EU being considerably less specialised than the US, though agreement is by no means universal. Clark and van Wincoop (1999), for example, draw on data from ten broad sectors⁴ to conclude that US regions are, on most measures, less specialised than the EU. They also note that while EU and US specialisation indices were at a similar level in the mid-1970s, the US index fell during the 1980s while the EU index remained relatively constant. One explanation of these different results might relate to the level of industrial aggregation used. The US seems to be more specialised at a high level of industrial disaggregation while at more aggregate levels it is less specialised than the EU. For further discussion, see the EMU study by HM Treasury *The US as a monetary union*.

Changes in US specialisation

5.31 Midelfart-Knarvik *et al.* (2000), while corroborating the finding of greater specialisation in the US, discern a steady decline in US specialisation as measured in relative terms by the Gini coefficient (see Table C14 in Annex C). This decline contrasts with the dip and then revival in EU manufacturing specialisation (as shown in Table 5.3).

Comparing UK and EU levels of specialisation

5.32 How different, or similar, are the UK and EU industrial structures, and does the development of the latter give any guide to the direction of change in the former, were the UK to join EMU?

Relatively low UK specialisation

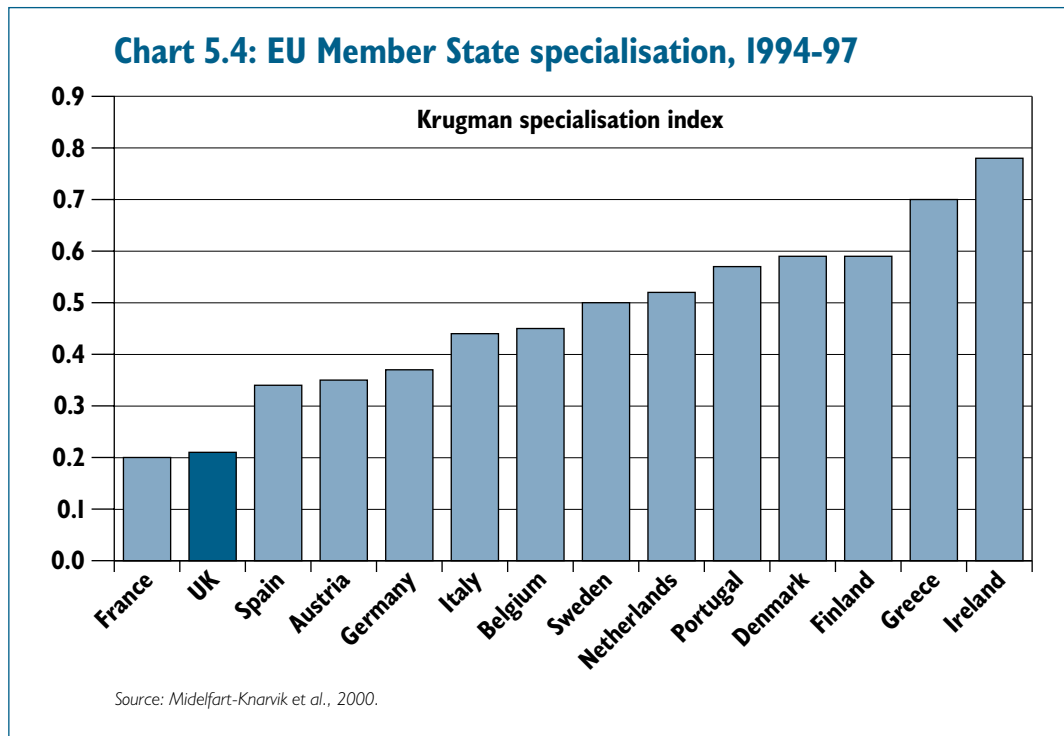
5.33 As discussed above, most studies find the EU industrial structure to be less specialised than the US. The same studies also tend to find that the UK is less specialised than most of its EU counterparts (see Chart 5.4, which presents the 1994-97 data from Table 5.3), though comparable to France (with both countries experiencing a slight decline in specialisation between the early and late 1990s).⁵

5.34 Brülhart (2001), as noted earlier (Chart 5.3), also identified declining UK specialisation in the 1980s and 1990s. There was no indication that this reflected simply long-term convergence, i.e. reversion towards a long-term average. The UK, with declining specialisation, was characterised by a very low level of specialisation; highly specialised Greece, meanwhile, saw further sharp increases.

5.35 The UK's relatively low specialisation is in part a function of its size. Smaller countries will tend to be more specialised than large countries, especially within manufacturing, for the reason that some industries may not exist in smaller countries (the gap being filled by imports). In this context, the greater degree of specialisation of Germany and Italy, and the increase in specialisation in these countries over time, is significant.

⁴ Agriculture, forestry and fishing; mining; construction; manufacturing of durable goods; manufacture of non-durable goods; transport, storage and communications; utilities; wholesales and retail trade, and restaurants and hotels; finance, insurance, real estate, business services; and community, personal and other services.

⁵ Comparisons are based on two-digit industry-level data. However, gains from clustering frequently arise at the level of three to four digit industries or below (Henriksen *et al.*, 2001). Hence these figures are only one guide to the actual levels of specialisation in each country. They also do not take account of specialisation in the service sector.



EU and UK manufacturing specialisation

5.36 Table 5.7 shows the three manufacturing sectors each Member State is most specialised in (in terms of value added at factor cost). Relative specialisation, as here, does not necessarily indicate that an industry makes a large contribution to national value added. A country may be specialised in a relatively small sector, though Table 5.7 is filtered to include only industries accounting for at least 0.5 per cent of manufacturing value added. On this basis, France, Germany, Ireland, the Netherlands, Finland, Sweden and the UK are all specialised in at least one technology-driven sector, while the southern Member States tend to specialise in labour-intensive sectors.

Table 5.7: Manufacturing specialisation by Member State, 1999

| | | | |
|--------------------------|--|---------------------------------------|---------------------------------|
| Austria | Railway rolling stock | Sawmilling, planing of wood | Sports goods |
| Belgium | Made-up textile articles | Other first processing of iron, steel | Other textiles |
| Denmark ¹ | Ship building and repair | Fish | Games and toys |
| Finland | Pulp, paper and paperboard | Sawmilling, planing of wood | Telecommunications equipment |
| France | Aircraft and spacecraft | Processing of nuclear fuel | Steam generators |
| Germany | Electricity distribution and control apparatus | Machine tools | Motor vehicles |
| Greece ¹ | Cement, lime and plaster | Textile fibres | Fruit and vegetables |
| Ireland | Electronic components | Medical and surgical equipment | Office machinery and computers |
| Italy ¹ | Ceramic tiles and flags | Motorcycles and bicycles | Tanning and dressing of leather |
| Luxembourg ² | Basic iron and steel | Other textiles | Rubber products |
| Netherlands ¹ | Audio-visual household goods | Prepared animal feeds | Oils and fats |
| Portugal | Footwear | Knitted and crocheted fabrics | Other wood products |
| Spain | Ceramic tiles and flags | Stone | Oils and fats |
| Sweden | Pulp, paper and paperboard | Sawmilling, planing of wood | Telecommunications equipment |
| UK ² | Aircraft and spacecraft | Office machinery and computers | Refined petroleum products |

¹ 1998

² 1997

Source: European Commission, Eurostat, 2002.

Bilateral comparisons **5.37** Industry shares in a country's activity can be compared not only with the corresponding shares for the rest of the EU as a whole, but also with the shares for other individual countries. This second comparison produces a matrix of bilateral differences between the industrial structures of pairs of countries. Midelfart-Knarvik *et al.* (2000) explored both approaches. The results of the first – specialisation relative to the rest of the EU – were shown in Table 5.3 and Chart 5.4. Table 5.8 shows bilateral comparisons, illustrating the six countries which most closely resemble the UK during the period under consideration. The lower the number, the greater the similarity of the industrial structure of two countries. The final two rows indicate the EU countries with which the six featured countries are most like and unlike, from the full range of EU countries included in the Midelfart-Knarvik *et al.* analysis.

Table 5.8: Bilateral differences, 1994-1997

| | UK | France | Germany | Italy | Spain | Neths |
|---------------------|----------------|----------------|---------------|-----------------|----------------|----------------|
| UK | 0 | | | | | |
| France | 0.19 | 0 | | | | |
| Germany | 0.36 | 0.35 | 0 | | | |
| Italy | 0.47 | 0.51 | 0.49 | 0 | | |
| Spain | 0.38 | 0.33 | 0.43 | 0.53 | 0 | |
| Netherlands | 0.46 | 0.46 | 0.61 | 0.77 | 0.58 | 0 |
| <i>Most like:</i> | <i>France</i> | <i>UK</i> | <i>France</i> | <i>Austria</i> | <i>France</i> | <i>Belgium</i> |
| <i>Most unlike:</i> | <i>Ireland</i> | <i>Ireland</i> | <i>Greece</i> | <i>Portugal</i> | <i>Ireland</i> | <i>Italy</i> |

Source: Midelfart-Knarvik et al., 2000.

5.38 This analysis confirms that in 1994-1997 the UK was closest in terms of its industrial structure to France, and the second most similar country to Germany and to Italy. Comparison with 1980-1983 suggests that the differences between most pairs of countries (71 pairs out of 91) had grown more distinct over time. The UK and France, however, had become increasingly similar.⁶

5.39 The industrial structure which the UK resembles least in the above analysis, is that of Ireland, its geographically closest neighbour and the one Member State with which it shares a land border. This may reflect a tradition of specialisation between the UK and Ireland, two countries with close geographical and historical associations, including a period with a common currency. It may also reflect the fact that Ireland is a relatively small country compared with the UK.

UK and euro area comparisons **5.40** Analysis by the Department of Trade and Industry (DTI) for this study, extends the work of Midelfart-Knarvik *et al.* (2000) to look at the specialisation of the UK relative to the euro area aggregate.⁷ It constructs Krugman indices (see Annex B for definitions) in terms not only of gross output, but also of value-added and exports. Table 5.9 summarises the results, which show rising specialisation in terms of production and value added, but declining UK specialisation in terms of exports.

⁶ For 1980-1983, the UK-France bilateral difference stood at 0.22. See Midelfart-Knarvik *et al.* (2000).

⁷ Luxembourg and Ireland are excluded.

Table 5.9: Krugman specialisation indices¹ relative to the euro area plus the UK

| | Production | | Value added | | Exports | |
|-------------|------------|---------|-------------|---------|---------|---------|
| | 1984-87 | 1991-94 | 1984-87 | 1991-94 | 1984-87 | 1991-94 |
| Austria | 0.22 | 0.26 | 0.23 | 0.25 | 0.47 | 0.40 |
| Belgium | 0.26 | 0.29 | 0.29 | 0.26 | 0.38 | 0.42 |
| Finland | 0.44 | 0.46 | 0.44 | 0.44 | 0.83 | 0.82 |
| France | 0.10 | 0.11 | 0.12 | 0.13 | 0.21 | 0.23 |
| Germany | 0.29 | 0.31 | 0.31 | 0.34 | 0.39 | 0.35 |
| Greece | 0.55 | 0.59 | 0.57 | 0.57 | 1.10 | 1.09 |
| Italy | 0.30 | 0.35 | 0.38 | 0.38 | 0.50 | 0.52 |
| Netherlands | 0.46 | 0.43 | 0.37 | 0.35 | 0.65 | 0.56 |
| Portugal | 0.51 | 0.58 | 0.54 | 0.68 | 0.83 | 0.86 |
| Spain | 0.26 | 0.28 | 0.31 | 0.36 | 0.40 | 0.40 |
| UK | 0.14 | 0.16 | 0.20 | 0.26 | 0.34 | 0.32 |

¹ The Krugman specialisation index is zero if the two regions have the same structure, and is two if they have no industries in common (see Annex B for further detail).

Note: Ireland and Luxembourg are excluded.

Source: DTI.

5.41 Using a different data set and revised classifications⁸ (see Table 5.10), the DTI work finds that France is the economy most similar to the overall of the four largest EU economies (EU4) in aggregate, followed by the UK and Germany, with Italy the outlier. Extrapolating the results from the old STAN database to this table implies declining relative specialisation in France, the UK and Italy, but an increase in Germany. The UK, in other words, appears more similar in terms of its degree of specialisation to that of the euro area as a whole, than does Germany.

Table 5.10: Krugman specialisation indices¹ relative to the four major EU economies, whole economy

| | Production | | Value added | | Exports | |
|---------|------------|---------|-------------|---------|---------|---------|
| | 1992-95 | 1996-98 | 1992-95 | 1996-98 | 1992-95 | 1996-98 |
| France | 0.19 | 0.18 | 0.18 | 0.18 | 0.32 | 0.31 |
| Germany | 0.20 | 0.21 | 0.23 | 0.22 | 0.36 | 0.36 |
| Italy | 0.25 | 0.26 | 0.25 | 0.24 | 0.56 | 0.60 |
| UK | 0.21 | 0.22 | 0.18 | 0.19 | 0.40 | 0.40 |

¹ The Krugman specialisation index is zero if the two regions have the same structure, and is two if they have no industries in common (see Annex B for further detail).

Source: DTI.

⁸ The DTI used the OECD's new STAN database which uses revised industrial classifications and covers the whole economy. As data were available only for the G7 countries, specialisation could be measured relative only to the major EU economies rather than to the EU or euro area as a whole. Furthermore, given both the new industrial classification and German reunification, full sector breakdowns were available only from 1992.

UK interest rate and cost sensitivity **5.42** The DTI work also asks whether the UK is more or less specialised than its major EU neighbours in sectors which are either particularly interest rate-sensitive, or in which exports are sensitive to relative costs and hence to the exchange rate (characteristics which will determine the openness of firms and the exposure of firms to the economic cycle, and which are discussed further in Section 6). Germany appears to have by far the biggest exposure to interest rate sensitive sectors; a reflection, perhaps, of its capital goods orientation. Italy has the highest exposure to cost-sensitive sectors, which may be a function of its large textiles and clothing industries. The UK, in terms of production and value-added is close to the EU4 average. In terms of export composition, it appears to be less interest rate sensitive than its large EU counterparts, though more cost sensitive than either France or Germany (data are included in Tables C15 and C16 in Annex C).

Implications for the UK of differences in specialisation **5.43** This analysis suggests that the UK is less specialised than most euro area countries, and that the EU is less specialised than the mature US currency union. The UK's lower level of specialisation may reflect its larger services sector, though the difference with many other EU countries is marked also within manufacturing. Lower UK specialisation could suggest scope for greater potential gains in terms of productivity from more cross-border trade and investment within EMU, with increased specialisation associated with a reallocation of resources in line with comparative advantage and economies of scale.

5.44 As noted above, and set out in the EMU study *Analysis of European and UK business cycles and shocks* by Professor Michael Artis, there is an argument that monetary union, by leading to greater specialisation, could increase the likelihood of asymmetric shocks (see also Krugman, 1993). An alternative view put forward in, for example, Barry Eichengreen's contribution to the EMU study *Submissions on EMU from leading academics*, is that increased intra-industry trade in a monetary union could lead to asymmetric shocks becoming less likely. Eichengreen suggests that there has been little significant change in either direction as a result of the ongoing integration of the European economy (see also Bayoumi and Eichengreen, 1999). On balance, the relatively low level of specialisation in the EU, and in particular in the UK, compared with the US, suggests that the vulnerability to asymmetric shocks stemming from industry structure is limited.

TRENDS IN EU CONCENTRATION

5.45 Specialisation describes the extent to which the activities of a country or region are in a small number of industries or sectors. There are two forms of concentration:

- industry concentration describes the extent to which activity in a given industry or sector takes place in a small number of firms (Section 6 includes a discussion of the potential impact of EMU on ownership patterns and firm size); and
- geographical concentration – the focus of the analysis in this section – describes the extent to which activity in a given industry or sector takes place in a small number of countries or regions, rather than being more dispersed.

5.46 Levels of industrial and geographical concentration do not always correspond; agglomeration can be thought of as the extent to which geographical concentration exceeds what the ‘normal’ industry concentration would imply. As with specialisation, patterns of concentration may be affected by EMU-related changes in the competitive climate, and many of the themes outlined above feature again here. One of the consequences of increased concentration could be that higher value-added firms and sectors locate together, leading to higher wages in these ‘core’ regions and increased income disparity overall. This section looks at whether ‘core’ areas are attracting higher value added and higher wage industries at the expense of poorer ‘periphery’ areas, using evidence on income trends across the EU. It then reviews developments in concentration within Member States and, finally, reviews the argument that the expansion of the service sector is halting the trend towards concentration.

Core versus periphery

5.47 One concern highlighted in the theoretical discussion of Section 3 was whether EMU might promote the location of higher value-added activity in ‘core’ countries. Identifying what constitutes the ‘core’ and what the ‘periphery’ is far from straightforward and often politically sensitive. These are also terms which can cover different issues. In the EMU study *Analysis of European and UK business cycles and shocks* by Professor Michael Artis they are used to discuss the idea of a ‘core’ of countries centered around Germany, which share similar economic cycles and shocks, with other countries forming the periphery.

5.48 In terms of economic geography, a peripheral region is essentially defined as one with low accessibility, but other criteria are frequently added.⁹ New economic geography models suggest that economic integration can widen regional gaps by encouraging agglomeration and, therefore, raising labour demand in core regions, based on the assumptions of increasing returns, local externalities, low transport costs and labour immobility. The determinants of agglomeration are discussed further in the EMU study by HM Treasury *The location of financial activity and the euro*. Padoa Schioppa and Basile (2002) identify three different types of EU peripheral area:

- the cohesion countries (Greece, Spain, Portugal, Ireland);
- the northern Scandinavians (Finland, Sweden); and
- the peripheral regions of large countries (e.g. the former east Germany and southern Italy).

5.49 They also point to two types of core area: small countries which belong fully to the core (Austria, Belgium, the Netherlands, Denmark and Luxembourg), and core regions of large countries. A hybrid group of larger countries, including both core and peripheral regions, comprises Italy, Germany, France and the UK. Some peripheral regions have, due to catch-up, become increasingly less peripheral in recent years, Ireland being an obvious example. This picture may be complicated further by the next EU enlargement of up to ten new Member States.

5.50 The European Commission, DG Internal Market (2000) notes that between 1988 and 1998, the geographic concentration of manufacturing activities across countries declined, contradicting predictions that the internal market would increase the gap between the core and the periphery. The Commission also argues that the internal market has allowed firms to exploit economies of scale and increase productivity. This process has been “...underpinned by progressive reduction in the relative disparities across Member States in the availability of technology, capital and labour” (page 12).

⁹For further discussions of the difficulty of gauging peripherality, see Schürmann and Talaat (2000).

5.51 Overall, the evidence on income convergence within the EU is encouraging (Table 5.11), with peripheral countries such as Ireland, Spain and Portugal growing relatively quickly. As the table also shows, the standard deviation of per capita income in different countries fell sharply over 1960 to 1980 and continued to fall significantly thereafter. These crude results are consistent with the general literature on convergence, which finds convergence in GDP per capita between OECD countries. Barro and Sala-i-Martin (1991) calculate that both European and US regions' GDP per capita has converged by about 2 per cent a year (over the period 1880 to 1988 for the US, and 1950 to 1985 for the EU).

Table 5.11: Per capita income in the EU periphery and income divergence in the EU

| EU15=100 | Greece | Spain | Ireland | Portugal | Italy | St. dev. of EU15 ¹ |
|----------|-------------|-------------|--------------|-------------|--------------|-------------------------------|
| 1960 | 43.6 | 59.1 | 62.6 | 40.1 | 87.3 | 29.6 |
| 1970 | 62.9 | 72.9 | 61.2 | 50.4 | 95.6 | 23.2 |
| 1980 | 70.0 | 72.7 | 65.5 | 55.4 | 101.1 | 20.2 |
| 1990 | 58.3 | 76.5 | 73.3 | 61.0 | 101.9 | 18.9 |
| 2000 | 67.1 | 82.1 | 114.3 | 75.7 | 98.9 | 15.1 |

¹ Standard deviation based on the current 15 Member States throughout, excluding Luxembourg.

Note: Figures in **bold** for individual countries indicate periods of EU membership. Figures use a purchasing power standard.

Source: European Commission, DG Economic and Financial Affairs, 2000.

The experience of the US

5.52 Brühlhart (2001) finds that the distribution of EU manufacturing employment has become more concentrated over the past three decades. This contrasts with the US experience of increasing dispersion over recent decades. Anderson and Bram (2001) note that in the early 1900s, US manufacturing was highly concentrated in a few major port cities in the North East. Gradually the migration of the population to the South and the West, the construction of transport links, technological advances, and increasing labour, land and energy costs eroded the North East's advantages. The period from the 1970s to the 1990s saw a steady dispersion of employment and a convergence of 'manufacturing density' – manufacturing jobs per square mile – as jobs shifted from states with the highest manufacturing densities, to those with the lowest. The US experience is discussed further in the EMU study by HM Treasury *The US as a monetary union*.

5.53 Devereux *et al.* (2002) also note a contrast between UK and US experience with respect to agglomeration and new entry. In the US firm entry tends to reduce geographical concentration as new plants locate away from established industry centres (Dumais *et al.* 2002). Devereux *et al.*, however, find that new entry in the UK tends to reinforce agglomeration with entrants favouring the already congested areas. Between 1985-1991, for example, 67 per cent of UK entrants to the highly agglomerated lace sector chose to locate in the most crowded postcode area in Nottingham (see Table C17 in Annex C for further detail).

Concentration effects within Member States

5.54 Evidence for regional convergence within, rather than between, EU Member States is mixed:

- Dignan (1995) estimates that, within the euro area and over the 1984-1990 period, GDP per capita converged steadily between countries but diverged within them (though this appears to have shifted more recently to slow convergence);

- the European Commission, DG Regional Policy (1996, 2001, 2003) find convergence between countries in GDP per capita levels over the decade 1990-2000, largely due to catch-up by the cohesion countries (Spain, Portugal, Greece and Ireland). Regional income disparities, however, rose in all countries except Germany, France and Austria; and
- Braunerhjelm *et al.* (2000) bring the US into the analytical framework. They examine US data for 1960-1995 and EU data for 1977-1995, finding qualitatively similar results in each case. In the US, economic growth was higher in countries that were poor relative to the US as a whole but rich relative to the states in which they were located; in the EU, growth was higher in regions that were poor relative to the EU as whole but rich relative to their own Member States. Convergence at an EU or US level, therefore, appeared to have occurred alongside local polarisation.

5.55 Brülhart and Traeger (2002) examine the impact of EU entry on sectoral concentration. They find that EU accession significantly increases within-country concentration in three sectors: manufacturing, market services and non-market services. Agriculture and construction, however, do not appear to be affected. As to whether EU accession changes the centre-periphery profile of location, Brülhart and Traeger conclude that this is the case for two sectors, manufacturing and market services, but in opposite directions. Accession appears to encourage manufacturing industry to locate in the periphery, but market services to locate in central regions.

Explaining trends in concentration

5.56 Midelfart-Knarvik *et al.* (2000) find that the EU has, since the 1970s, experienced a light but erratic decline in manufacturing concentration. Brülhart (2001) finds, as noted above, increased concentration of manufacturing employment over the same period. The contrast illustrates the difficulties inherent in identifying a clear trend in EU manufacturing concentration. Midelfart-Knarvik *et al.* suggest that relatively high tech, highly skilled and fast growing industries have tended to become more dispersed, while the less skilled labour intensive and slower growing industries have become more geographically concentrated.

5.57 At this level of the overall economy, the relative shift from manufacturing to services tends to dampen geographical concentration measures. Services in general tend to be more dispersed than manufacturing. Midelfart-Knarvik *et al.* (2000) note the wide and increasing variation in the share of the service sector in employment across the EU, and focus on five broad sectors,¹⁰ all of which are less concentrated than manufacturing. Of these five, 'financial services, insurance, real estate and business services' is the most concentrated, reflecting the high degree of clustering in financial centres such as London (although the degree of concentration has declined over time). Not surprisingly, transport services are the least concentrated.

¹⁰ These are 1) financial, insurance, real estate and business services; 2) wholesaling and retailing; 3) restaurants and hotels; 4) transport; and 5) communications. For Ireland and Greece data are only available for financial, insurance, real estate and business services.

5.58 The dampening influence of the growth of the service sector on geographical concentration is furthered by several factors, including:

- catch-up on the part of poorer Member States with initially smaller service sectors, and in which converging income levels imply strong demand for services;
- out-sourcing by manufacturers, facilitated by technological change. Many manufacturing sectors have become more intensive users of services, and manufacturing industries with high service inputs have tended to be among those growing most quickly. Technological change means that some services no longer need to be near to the production base, and allows ‘front’ and ‘back’ office activity to be undertaken in often very different locations; and
- increasing trade, especially in the ‘financial services, insurance, real estate and business services’ sector, where a decline in concentration has reflected in particular a reduction in Germany’s share, with the UK and Italy maintaining dominant positions.

Implications of concentration for the UK

5.59 The possible impact of EMU entry on geographical concentration in the UK is therefore ambiguous. Greater competition and broader access to funding in EMU might encourage geographical concentration within the euro area by giving firms a greater incentive to locate in areas which were cost-competitive or offered indirect benefits such as supplier networks, reputation, proximity to research centres or supportive institutional and cultural frameworks. The UK, as its large FDI stock demonstrates, enjoys considerable advantages as an industry location. While the consequences of EMU entry for geographical concentration are uncertain, what is clear is that the importance of offering a flexible, supportive business environment would only increase.

CONCLUSIONS ON LONGER-TERM EFFECTS

5.60 This section examines evidence from the SMP, past periods of EU integration, more recent EU developments, as well as US experience, in order to draw conclusions about the potential long-term impacts of EMU membership. The evidence from these sources suggests that EMU, by furthering the implementation of the Single Market, will promote greater competition. Greater competition may also be a driver of a reallocation of resources leading to greater specialisation, through not necessarily greater geographical concentration. How these long-term trends, as well as the short to medium-term effects discussed in Section 4, affect different sectors with different characteristics, is the subject of Section 6.

The consequences of the EMU membership decision for UK businesses, both in the short and medium term (in terms of trade, investment and adjustment costs) and in the longer term (in terms of competition, specialisation and concentration) will be felt in different ways and to different degrees by different industries.

Evidence-based analysis, being rooted in the (primarily pre-EMU) past, has its limitations as a guide to the potential impact of EMU membership for UK industry. Its application in the context of a range of different sector characteristics can, however, help to inform a more forward-looking judgement. The most important of these characteristics include: openness and exchange rate sensitivity, pricing behaviour, market structure, firm size, financing and ownership, and cyclicity. Taking each in turn, the EMU decision would have a more direct impact on UK sectors in which:

- export or import ratios are high, firms trade or compete primarily with euro area countries or historically low trade or cross-border investment ratios reflect a particular sensitivity to exchange rate barriers;
- firms have little scope to choose the pricing currency or dictate prices, or there is potential for price convergence across markets and along the supply chain;
- competitive pressure is weak, merger and acquisition potential is high, consumers are willing and able to arbitrage or sunk costs are similar for all new entrants, rather than determined in part by firms;
- small firms play an important role or multinationals could play a larger role;
- firms are accustomed to raising finance nationally, operate in new or specialised fields, have the capacity to absorb FDI or have separate managerial control and ownership; or
- product demand is highly cyclical or cyclicity is highly damaging.

6.1 To what extent might EMU membership help, hinder or reshape the UK's industrial performance? Section 3 identified the three main potential short to medium-term forces associated with EMU membership: reduced barriers to trade, increased investment and adjustment costs. It also noted the euro's potential to promote and shape competition, specialisation and concentration. The evidence for such developments in the euro area to date was examined in Sections 4 and 5.

6.2 EMU will have consequences for UK business, irrespective of whether or not the UK decides to join:

- for the UK outside EMU, increased competition within the euro area and greater cross-border trade and investment imply both new challenges and new opportunities for UK firms which sell to euro customers, buy from euro area suppliers or compete with euro area firms; and
- were the UK to join EMU, the challenge and the adjustment costs would be qualitatively and quantitatively different; so too would be the opportunities and the benefits, both for UK firms and UK consumers.

6.3 In either case, UK industry needs to be sufficiently flexible to adapt to a new environment. What this entails in practice will vary between different firms and different sectors.

6.4 This section examines at how the potential impact of EMU may vary between industries according to the key characteristics identified earlier in the study:

- openness and exchange rate sensitivity;
- pricing behaviour;
- market structure;
- firm size;
- financing and ownership; and
- cyclicalities.

6.5 The section draws together the threads from those which precede it to explore the relevance of these characteristics, illustrating each with a variety of industry examples in order to give a more forward-looking focus to the analysis.

Openness and exchange rate sensitivity

6.6 EMU membership might be expected to have its greatest impact on sectors characterised by trade openness and exchange rate sensitivity. Both describe an industry's exposure to non-domestic activity, though the two do not always go together. A highly traded sector may, for example, be relatively unaffected by exchange rate fluctuations if demand for its product is relatively insensitive to price changes or if it is protected by regulation or procurement practices. The removal of intra-euro area exchange rate volatility will have a more immediate direct impact on sectors which:

- derive a high proportion of their turnover from export markets or import a high proportion of their inputs;
- trade or compete primarily with other euro area countries; and/or
- have historically had low trade or cross-border investment ratios reflecting a particular sensitivity to exchange rate barriers.

6.7 UK firms in relatively open sectors and which trade or compete primarily in euro area markets would derive immediate benefit from the reduction in transaction costs and elimination of intra-euro area exchange rate volatility accompanying EMU entry (Box 6.1 provides examples of such sectors). Were the UK not to join EMU, and if the retention of exchange rate volatility and transaction costs proved a relative disadvantage for UK firms in euro area markets, firms in these sectors would be among the most exposed. For UK companies competing primarily in non-euro area markets or with non-euro area firms, the direct impact of the EMU decision might be more muted, though any longer-term change in the euro area's competitive environment and trading patterns could have substantial implications. UK firms which have concentrated on the domestic market due to exchange rate-related concerns and costs, meanwhile, would benefit considerably from the opportunities opened up by a larger market and increased competition.

6.8 The sectoral impact of EMU would be felt not only by individual firms but also through the entry and exit of firms. Méltz (2002), for example, argues that exposure to trade produces an overall welfare gain not because it necessarily improves the productivity of an individual firm, but because it encourages the more productive firms to enter the export market and benefit via increased market share and profits.

6.9 Given that the UK has traditionally been a relatively open economy, the potential impact of EMU entry on the overall UK trade propensity might not be as large as in those euro area countries which start from a more 'closed' position. This does not, however, mean that UK businesses would therefore feel little EMU effect in absolute terms. Increased openness elsewhere in the euro area would mean new opportunities for UK industry. It would also imply increased competition for UK firms at home and in euro area and third country export markets.

6.10 National export and import propensities conceal large sectoral differences. EMU entry would, by altering competitive conditions, affect the inter-sectoral balance of UK investment, FDI, trade and profits. Increased openness to trade is also, over the long term, an important influence on location and concentration. Hallet (2000) finds traded goods sectors to be the most spatially concentrated. The scope for non-traded goods such as construction and transport and communication services to concentrate is constrained because their location tends to follow the distribution of purchasing power.

6.11 When sectors are insulated from competition by regulation, state ownership or procurement practices, the impact of the euro will be dampened. Some analysis suggests that the influence of discriminatory government procurement on specialisation can generate countervailing pressure to other agglomeration forces. Brülhart and Trionfetti (1998) argue that in industries which are sensitive to public procurement, other influences on location lose their significance. More liberalised procurement leads to stronger geographical concentration in these industries.

Box 6.1: Potential impact of EMU: openness and exchange rate sensitivity

The **hotel and restaurant** sector is, in many cities and regions, exchange rate sensitive. Bookings and reservations in internationally popular destinations may rise or fall with currency movements, and currency volatility between booking and actually travelling can leave the customer or provider exposed. Exchange rate exposure is similarly problematic for industries which have a considerable lag between production costs and payment, either because the production process is lengthy (e.g. **shipbuilding**) or because output is stockpiled to meet seasonal demand. The removal of intra-euro area exchange rate volatility could be of substantial benefit to UK firms and consumers in these sectors, facilitating long-term planning, investment, purchasing and marketing decisions.

Sectors which are protected (e.g. some **agricultural sectors**) or have a strong element of state provision (e.g. **education**) tend to be relatively insulated from currency fluctuations. While open to trade, sectors dominated by multinational enterprises (MNEs) such as **petrochemicals** may have their currency sensitivity reduced by the ability of MNEs to absorb currency risk within the group, dampening the direct impact of EMU on such firms.

The **retail trade** derives little of its turnover from export markets (though much of its input is imported at some point in the supply chain, meaning that some exchange rate volatility may be reflected in prices or margins). Retail sales to consumers are typically localised; hence the existence of a very large number of small enterprises – there were 1.8 million non-food retail enterprises across the EU in 1999.^a **Residential real estate and letting services** are, with the exception of the very top end of the market (which, especially in London, has a significant non-domestic customer component), also relatively protected from direct export and currency considerations. So, too, are **retail financial and insurance services**. It is unlikely that UK retail services would be exposed to greater direct competition as a result of EMU entry. However, greater competition along the supply chain, as well as the implications for restructuring of capital market integration, would still imply new opportunities and challenges for firms even in these apparently insulated sectors.

EMU membership eradicates some but not all exchange rate volatility. The extent to which it does so depends on how much trade is with the euro area. Sectors in which the main competition to UK firms resides outside the euro area would be affected by EMU entry differently to those which compete primarily with euro area firms.

EU manufacturing sectors which are sensitive to exchange rate volatility, but compete mainly with US dollar-based firms, include **machinery and equipment, electrical and optical products, and transport equipment**.^b Within the UK, sectors for which exchange rate volatility against the US dollar could be of particular concern include **ceramics, computers, professional goods and non-ferrous metals**. **Wood, rubber and plastics, non-metallic minerals and basic and fabricated metals** are, by contrast, much less exchange rate sensitive and US dollar exposed.

^a Fouquin *et al.* (2001).

^b European Commission, Eurostat (2002).

Pricing behaviour

6.12 EMU entry and a subsequent increase in competitive pressure might affect pricing behaviour in some sectors. The magnitude of this would vary with:

- the pace and degree of price convergence in different markets and at different stages of the supply chain;
- the currency of pricing;
- the scope for producers to dictate prices; and/or
- the extent to which euro area customers exhibit an increasing preference for domestic currency pricing.

Price convergence **6.13** The EMU study by HM Treasury *Prices and EMU* looks in detail at the theory of price convergence. It shows that prices are determined by costs, the level of competition and demand. Exchange rates, differences in costs and differences in the degree of competition can maintain price differentials between countries; the ability to conduct trade and arbitrage across borders should increase competition and put downward pressure on prices.

6.14 The EMU study *Prices and EMU* suggests that UK entry to EMU might have variable impacts on sectoral prices. Where UK prices currently lie within the price range of the large Member States (France, Germany, Spain and Italy), price pressure would be limited. Tradeable goods would be subject to greater price pressure than non-tradeables, though the expansion of the Internet as a search and purchase tool means that the proportion of goods and services which are 'non-tradeable' is diminishing.

6.15 Different sectors may experience different rates of convergence of both consumer and producer prices and from different starting points, since initial producer and consumer price levels in a sector might differ between countries. As Box 6.2 illustrates, with reference to specific examples, branding might inhibit price convergence as might strong national preferences. EMU entry might imply only limited pressure on market share, and hence on prices, for UK firms in these sectors (though it could also prompt increased advertising and branding expenditure by some, as a precautionary measure). Overall, the pressure on companies' profit margins from EMU-generated price convergence – and hence the impetus for restructuring – will be very different between sectors and countries (Andr n and Oxelheim, 2002).

Currency of pricing **6.16** Some sectors produce commodity goods for which prices are determined on world markets in a particular currency (often the US dollar). Increased trade and competition stemming from EMU entry would have little impact on such firms as they are already exposed to global competition. They could, however, benefit from increased exchange rate certainty to the degree that they trade within the euro area. If firms' costs are fixed in their domestic currency and they cannot adjust prices when exchange rates fluctuate (as will almost certainly be the case in the short run), exchange rate changes can have a substantial effect on profitability.

Pricing strategies **6.17** Exporters that price their goods in the customer's (foreign) currency will experience changes in their own mark-up from exchange rate movements, but demand for their goods abroad should remain stable. Firms which choose to price their exports in their own domestic currency maintain stability of mark-up, but risk shifts in demand as the foreign price of their goods alters with the exchange rate. In both cases, exchange rate volatility potentially affects profits, but via different means. Pricing in the exporter's currency is positively related to the market share of the exporting country, 'country' size and shared currency-origin of competitors. A UK firm which trades primarily with non-euro area markets, such as the US, might over the long term find its pricing power enhanced by UK EMU entry.

Consumer pricing preferences

6.18 One interesting question concerns the extent to which retail or business customers might become accustomed to intra-euro area ease of price comparison and the absence of exchange rate risk, and therefore begin to confine their product searches to euro area companies (or, more accurately, to companies prepared to price their products in euros) or oblige non-euro area suppliers to price in euros.

6.19 A shift of exchange rate risk onto non-euro area firms would affect industries accustomed to pricing and invoicing in their (non-euro area) domestic currency. Were the UK to remain outside EMU, adjusting to the change in circumstances could be particularly onerous for smaller companies, giving them a further disincentive to export. Multinationals based outside the euro area might, given their ability to offset exchange rate risk within the group, enjoy an increased advantage relative to their single location counterparts.

Box 6.2: Potential impact of EMU: pricing behaviour

EMU may have little impact on sectors which produce goods that are priced on world markets in a particular currency. **Chemicals** prices in Europe have historically been Deutschmark-based and are now euro-related. **Petrochemicals** and **oil and gas**, by contrast, are based in US dollars; so, too is the **aerospace** industry (in which euro-denominated contracts tend to be converted into US dollars to facilitate comparison with Boeing). The UK has the largest aerospace industry in the EU. It also has a more direct involvement than other Member States in the US market. As the European market becomes more open and integrated, however, competition from euro area firms is increasing. Of interest over the longer term will be the extent to which large US customers involved in consortia activity begin to demand euro contracting from their suppliers.^a

Sectors in which EMU entry would be unlikely to facilitate major price convergence include: commodity products, such as **steel**^b, sectors in which prices are already within the range of other large EMU members, such as **food** and **non-alcoholic beverages**; industries where markets are segmented by strong national preferences, such as **domestic electrical appliances**; and industries where branding is a major influence on customer choice, such as **watches, shoes and sports clothing**^c (though customer preferences are not set in stone and revealed price differentials may encourage shifts).

Car pricing has come under both European Commission and national spotlights in recent years. Nevertheless, price differentials remain substantial. Empirical evidence suggests that taxes, exchange rates, dealer margins, specifications and right-hand drive surcharges account for only part of the differentials; the marketing power generated by the old cars block exemption has allowed manufacturers effectively to segment the Single Market. New rules from October 2003 will, however, allow dealers to market their services freely across the Single Market and open up the service and repair markets to greater competition.

^a Society of British Aerospace Companies (2002).

^b European Commission, DG Internal Market (1996b).

^c See Cordell (1992), Burse (2002) and the Wall Street Journal (2002).

Market structure

6.20 The potential impact of EMU membership will depend in part on a sector's market structure; the existing degree of contestability in the sector, by the ability of existing producers to defend their market share and the ability of existing and potential producers to exploit the change in circumstances. EMU's impact is likely to be greater on industries in which:

- product differentiation is weak;
- acquisition opportunity (or potential) is high;
- the cost to customers of arbitrage, relative to the reward, is low; and/or
- sunk costs are similar for all new entrants, rather than determined in part at firm level.

Product differentiation **6.21** Firms in some sectors will be better placed than in others to retain market power in a more competitive euro area environment. Branding, for example, gives firms a degree of market power. Where products are differentiated, customer preference may be shaped by a range of factors besides price and quality, such as image, reputation, social or political consciousness and product origin. Examples of sectors where national preferences are important are included in Box 6.3. Where technology and advertising afford UK producers or retailers a degree of market power, trade in these differentiated products will tend to react differently to trade in homogeneous products as transaction costs fall.

Acquisition potential **6.22** This does not mean that producers of branded goods or services are insulated from EMU's effects. If EMU promotes capital market integration, and hence merger and acquisition activity, this will also affect differentiated sectors. Furthermore, non-differentiated product sectors are often already relatively specialised, limiting the scope for further change in this direction. Brülhart (2001), for example, finds that the most specialised sectors tend to be the traditional low-tech, labour-intensive and resource-intensive industries – precisely those which tend to display low product differentiation.

6.23 Producer power is bolstered not only by brand loyalty but also by the inconvenience to customers of switching suppliers. Shifting word processing systems, for example, may be prohibitively expensive in terms of both time and money, however attractive the alternative appears on paper.

Costs of arbitrage **6.24** High arbitrage costs, in terms of search, delivery and uncertainty, constitute an effective barrier against entry. The willingness of consumers to take advantage of increased price transparency will depend in part on the costs of arbitrage, both in absolute terms and relative to the product price. Consumers may be prepared to spend several hours researching the possibility of saving 5 per cent on the purchase price of, for example, a computer, but are unlikely to consider the same time well spent to purchase a cheaper box of breakfast cereal.

6.25 Arbitrage in branded goods is facilitated by the presence of large retail chains. Pan-European retail chains have not yet generally developed to the same extent as US-wide counterparts such as Wal-Mart. Retail formats do not, with some exceptions (e.g. IKEA), appear to travel easily across European borders. While retailing is quite concentrated in some Member States such as the UK and France, the leading retailers tend to be different in each country.

6.26 By improving information flows and levels, shortening distribution channels, encouraging out-sourcing and specialisation, and reducing barriers to entry (Cigan, 2002), the Internet and the euro may, in some sectors, have mutually reinforcing effects on competition and search costs, tilting the balance of advantage still further in the consumer's direction. The growth of Internet bookings in the travel and tourism sector illustrates the extent to which consumer behaviour may change as search costs fall. It also, however, reveals the limits of consumers' willingness to shop around, even when delivery costs and risks are low. Comparing flight prices is one thing; constructing complicated travel packages from a variety of sources is quite another.

Sunk costs 6.27 Market and cost structure are an important determinant of what happens to industry concentration as trade barriers fall and the market expands. Most manufacturing industries entail investment in sunk costs. In some industries, and as described in particular by Sutton (1991), these costs (building an assembly plant, for example) are similar for all new entrants, and 'exogenous' (see Box 6.3 for some specific examples). In others, a large proportion of sunk costs may comprise R&D or advertising and hence be determined by the firm itself or 'endogenous'.¹

6.28 Industry concentration tends to decline as markets expand because the size of the minimum efficient plant falls in relation to the market. Where sunk costs are mainly exogenous, concentration may fall substantially as new firms enter the market. Where sunk costs are firm-determined, however, there will tend to be a lower limit to concentration. In sectors such as pharmaceuticals and confectionery, EMU entry might, for example, prompt increased advertising expenditure in order to maintain market share. The competitive escalation of endogenous sunk costs makes market entry more difficult; EMU is unlikely, of itself, to eradicate the prime-mover advantage often characteristic of such industries. As Sutton notes, the US and UK own-label tinned soup markets – quite mature and similar – are dominated by Campbell and Heinz respectively. Each of these US companies retains the leadership in the market it entered first and is a weak second in the other.

¹ See also Robinson and Chiang, 1996.

Box 6.3: Potential impact of EMU: market structure

If consumers are willing and able to compare products and prices, the potential effects of EMU on a sector may be large; not least, in industries where the increasing exploitation of the Internet is simultaneously reducing search costs and helping to improve both business-to-consumer and business-to-business relations. **Tourism and travel** is one such sector where the enhanced ability of consumers to compare and take advantage of price differentials has increased the pressure on existing firms and facilitated the emergence of new entrants and the exit of some incumbents. The extra convenience and transparency provided by the single currency could tip the balance of market power still further towards the purchaser, thereby adding to the pressure for restructuring and creating both opportunities and challenges for UK firms.

In contrast, sectors in which strong national tastes constrain the development of pan-European brands may feel only a limited direct impact on supplier and consumer behaviour from EMU (though will still be open to the effects of capital market integration on funding and ownership). The 'white goods' or **domestic electrical appliances** industry is one such sector,^a characterised by a high degree of integration in production but only limited integration of markets. Strong brands rarely cross national borders and consumers are dissuaded from shopping for bulky white goods too far from home by the expense of shipping, concern over after-sales service and a preference for familiar brands or national safety certificates.

UK producers of relatively undifferentiated products may also be insulated to some extent from the direct effects of the euro. Such industries tend already to be globalised, leaving individual producers with little market power. The **steel** industry, for example, produces commodity products to specific standards and it is an intensive user of R&D, though not of advertising. The largest producer in 2000 – Nippon Steel – had a global market share of only 3.4 per cent.^b UK steel producers already operate in a global environment in which intra-EU trade is sensitive to changes in relative unit costs.^c The impact of the EMU decision on such firms' market structure would be limited.

The impact of EMU entry on industrial concentration will depend, in part, on firms' cost structures. Where sunk costs are similar for all firms (as in, for example, **cement** or **iron** and **steel**), the expanded market engendered by EMU would suggest decreasing industrial concentration.

In contrast, industrial concentration among UK firms might be expected to prove more resilient in sectors where sunk costs are, in part, firm-determined: in, for example, R&D-intensive sectors (e.g. **industrial and agricultural chemicals** and **aerospace**); in advertising-intensive sectors (**confectionery** and **soft drinks**); and in sectors with high expenditure on both R&D and advertising (**pharmaceuticals**, **soaps** and **detergents**). EMU entry might encourage increased expenditure by UK firms in such sectors in order to maintain market share.

^a Baden-Fuller and Stopford (1991).

^b European Commission, Eurostat (2002).

^c Humphry (2000).

Firm size

6.29 As has already been noted in this section and throughout the study, the size distribution of firms within a sector is a potentially important influence on the impact which EMU membership would have on that sector:

- the abolition of intra-euro area exchange rate volatility and exchange rate transaction costs is likely to be of disproportionate benefit to small firms;
- absolute cost savings will be greater for large companies;
- the importance of multinational enterprises may increase; and/or
- agglomeration may be encouraged.

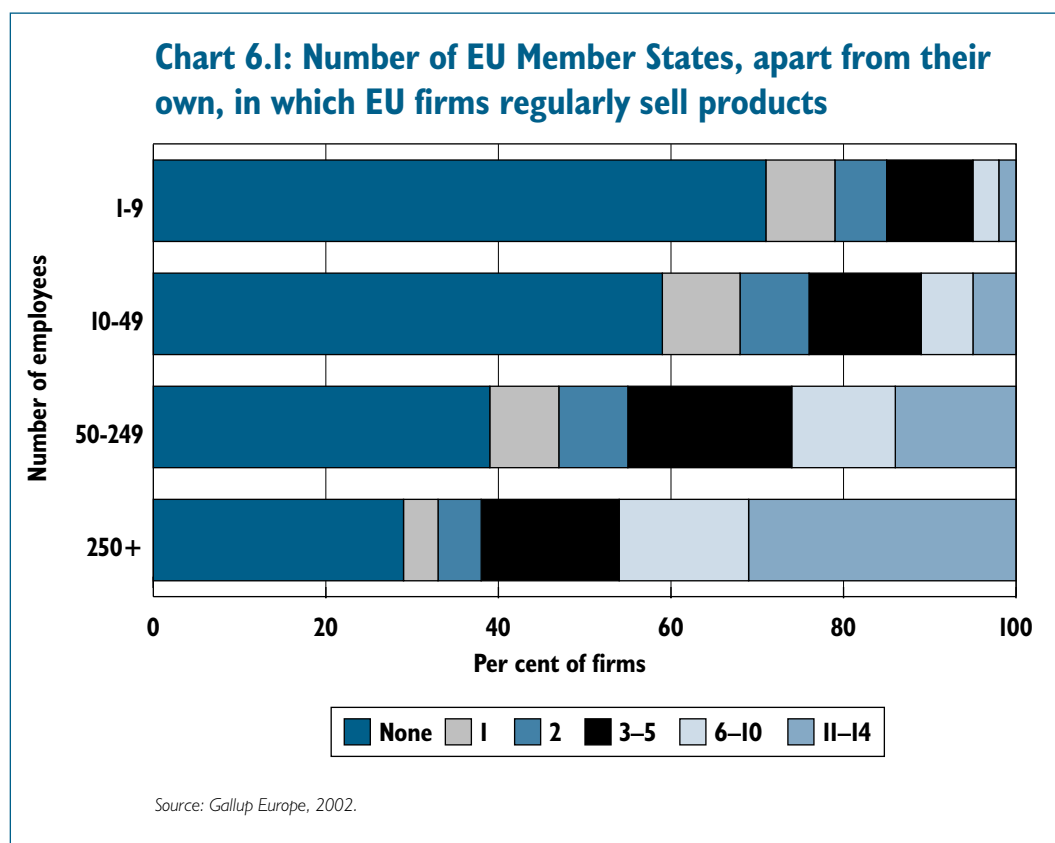
Lower transaction costs **6.30** In *absolute* terms, exchange transaction savings will be greater for larger firms, which have a higher propensity to trade (Bannock Consulting, 2001). Firm size and export activity are generally positively related,² as Chart 6.1 which is drawn from the European Commission's 2002 *Internal Market Scoreboard*, illustrates.³

6.31 Small and medium-sized enterprises (SMEs) are, however, likely to benefit disproportionately in *relative* terms from reduced conversion costs and exchange rate volatility. Large companies can spread costs, both of money and time, over higher volumes and because of greater transaction sizes may be better able to hedge currency risk. For smaller firms, the cost (or perceived cost) of hedging may be so high as to preclude overseas trade.

6.32 SME export sales also tend to be confined to a more limited number of product and geographical markets than those larger firms. Of the almost 6,000 companies surveyed in the European Commission's *Internal Market Scoreboard* (Gallup Europe, 2002), firms with less than 10 employees exported, on average, to just over one other Member State while those with over 250 employees exported to over six other Member States. Being less diversified than their larger counterparts SME exporters enjoy far less 'natural' hedging against exchange rate risk. This provides a further reason to expect reduced real exchange rate volatility to be to their particular benefit, and to look for an increased propensity to trade as a consequence. More detailed examples of the firm size characteristics of particular sectors are provided in Box 6.4.

² The major exception to this is wholesale trade, where small firms have a higher propensity to export than large. This reflects large and small companies filling different roles as wholesalers; small firms are generally involved in trade activities, and larger enterprises in distribution – still primarily a domestic activity. See European Commission, DG Enterprise (2002a).

³ Gallup Europe (2002).



6.33 The impact on investment of EMU entry might similarly be particularly marked among small UK firms if lower trade barriers and more integrated capital markets provided access to international capital markets for a wider number of companies, as the analysis of Section 3 suggests.

Implications for MNEs

6.34 At the opposite end of the size spectrum from SMEs, multinational enterprises (MNEs) are also well-placed to exploit the opportunities of scale and scope offered by a more integrated euro area (see Box 6.4 for examples of sectors characterised by MNEs). As is discussed further below, MNEs appear to enjoy inherent productivity advantages relative to single-location firms. The removal of national exchange rate barriers within the euro area might allow UK MNEs to exploit this advantage to an even greater extent via increased market, buying or branding power.

6.35 Given EMU's potential consequences for capital market integration and hence for greater merger and acquisition activity, the euro area might, in time, be characterised by a greater number of MNEs than would otherwise have been the case. This could benefit aggregate euro area productivity and employment, while entailing varying adjustment costs.

Agglomeration

6.36 If EMU promotes openness and trade, it may also promote industrial agglomeration – geographic concentration over and above that which would be suggested by the 'normal' industry concentration. Contrary to common perceptions, clusters are not composed solely of small firms. A survey of 34 regional clusters over the decade to 2001 found that the number of MNEs rose in 17 clusters and declined in only one, while only five clusters had no MNEs among their major firms.⁴

⁴ European Commission, DG Enterprise (2002b).

6.37 Amiti and Pissarides (2002) argue that a key motivation behind clustering is the improvement in the quality of job matches when firms are able to recruit from a larger pool of labour. High trade costs, however, make it more profitable for firms to locate in the market they supply rather than where productivity is highest.

6.38 If EMU were to reduce trade costs, it might – in a labour market characterised by heterogeneous skills – boost agglomeration. Where this reflects firms relocating (as opposed to influencing the start-up location), it would affect primarily medium and large sized firms. Small businesses tend to have much stronger ties to their local communities in terms of both customers and finance and to be considerably less mobile than their larger counterparts.

6.39 In some sectors, EMU entry might encourage agglomeration in centres outside the UK. In others, agglomeration might occur within the UK, building on UK sector-specific advantages in terms of skills or resources, or the overall business environment. EMU entry increases the need for flexibility and adaptability on the part of national economies, sectors and firms.

Box 6.4: Potential impact of EMU: firm size

Sectors dominated by very large companies may be characterised by high returns to scale and high entry costs; they may be very globalised (such that a firm which appears dominant in a national context has in fact very little market power, being in strong competition with firms based overseas); or – at an opposite extreme – they may be highly protected (e.g. a state monopoly). The direct impact of EMU is reduced in each case by its only limited implications for firm entry and exit, and competitive pressure. The barriers to entry either remain high and unaffected by EMU or were low to begin with. Sectors such as **cars, pharmaceuticals, mineral oil or aerospace**, which already operate in a global environment characterised by high entry costs, are unlikely to come under significant additional pressure to restructure from EMU.

The smaller-sized suppliers to such sectors may, however, be affected to a much greater extent. The margins of **car component manufacturers** are, for example, already being squeezed globally by consolidation and cost-cutting on the part of the car manufacturers they supply. Concentration and globalisation of demand increases pressure for globalisation of supply. EMU may exacerbate this pressure for restructuring in the euro area car component sector by enhancing the ability of car manufacturers to compare and shift between suppliers.

Industries characterised by small businesses serving primarily localised markets are unlikely to be strongly affected by EMU (though they will not be entirely insulated since improved access to markets and funding for the larger firms in these sectors will lead to increased competitive pressure and, perhaps, industry consolidation). **Construction** is dominated by micro-enterprises of less than 10 people (in the UK, 98 per cent of construction enterprises and 62 per cent of employment^a), as is **motor distribution** (though **retailing** in general is more complex, with both very small and very large firms accounting for a high proportion of turnover and employment).

Some industries (though not in all countries) are characterised less by a preponderance of small companies *per se*, than by clusters of small companies: **textiles** in Italy, for example; **leather goods** in Spain; and **lace, ceramics, cutlery and hosiery** in the UK. Industries prone to clustering tend to be older-established, less high-tech and less skilled than their less agglomerated counterparts. This does not, however, mean that they are therefore uncompetitive or prone to inertia. The advantages of a network of suppliers, local specialist skills, knowledge spillovers, investor familiarity with the industry, and a reputation which is generally established in export as well as domestic markets may mean that clusters are well-placed to benefit from the reduction in trade and investment barriers brought about by EMU.

In **software** and other 'new' industries, a few dominant large companies may face continuous strong competition from niche players or entrants in a fast changing marketplace. Competition in such sectors stems less from a product being improved or made more efficiently than from entirely new products rendering their predecessors redundant. EMU works both to reinforce and undermine the position of the dominant players. Smaller, newer enterprises benefit from enhanced funding opportunities and larger marketplaces. Larger enterprises may, however, be better able to exploit stronger brand names and pursue innovation via acquisition, facilitating the development of multinationals.

^a Small Business Service.

Financing and ownership

6.40 The impact of EMU on the cost and availability of finance is detailed in the EMU study by HM Treasury *EMU and the cost of capital* and is summarised in Section 3. The impact of EMU on financing and ownership may be greater in sectors in which firms:

- are highly reliant on external funding;
- have experience of raising funds on national capital markets but not on international markets;
- operate in relatively specialised or new fields;
- have the capacity to absorb FDI or form alliances; and/or
- have separation of managerial control and ownership.

The use of external funding

6.41 By opening up broader access for UK firms to international capital markets, EMU would entail obvious benefits for sectors which make extensive use of external financing. It carries particular benefits, however, for those in which a significant number of firms have experience of raising funds in domestic capital markets but have not yet (for reasons of cost, lack of information or risk) done the same on international markets. UK firms may be more accustomed than their counterparts in some euro area countries to raising market finance and hence well-placed to take quick advantage of the new opportunities opened up by EMU entry. Firms with experience of advising companies looking to raise market finance, a traditional UK strength, should be similarly well-placed.

6.42 If this were to result in a shift from bank borrowing to capital market borrowing, it might render some sectors more vulnerable to financial market volatility. At the same time, however, by broadening the range of funding alternatives open to businesses, EMU also potentially offers an offsetting measure of stability.

6.43 It seems unlikely that EMU entry would lead to an immediate and significant increase in competition to lend to UK SMEs. SMEs, particularly at the smaller end of the size bracket, are often reluctant to switch from traditional lenders. In the longer term, however, EMU has the potential to increase competition among bank lenders and so reduce the cost of borrowing for SMEs.

Ownership and restructuring

6.44 What matters for growth and productivity is not simply the amount of funding available, but the way in which it is monitored and used (sometimes identified as a traditional weakness of UK industry).⁵ Merger and acquisition, especially of the hostile variety, is much more common in the UK than in the euro area. EMU will not, of itself, transform this picture; national ownership structures are a product of social, legal, historical and financial structures, and not simply of national currencies. Nevertheless, by reducing trade barriers and furthering capital market integration, EMU is likely to encourage restructuring not only, as has traditionally been the case in much of the euro area, through a change of management, but also through a change of ownership. This opens up new opportunities for UK firms looking to expand. It also implies, over the longer term, increased competition for UK firms from euro area firms looking to expand.

⁵ Owen (1999).

6.45 By facilitating cross-border investment activity, EMU may lend an increasingly international dimension to industrial restructuring. This has important consequences for corporate ownership, organisation and hence performance. Many studies find a performance gap between domestic and foreign-owned companies (for example, see Pain and van Welsum, 2002). Other work suggests that the performance gap is between domestic firms and multinationals, rather than between domestic and foreign-owned firms (for example, see Pfaffermayr and Bellak 2000, Doms and Jensen 1998, and Criscuolo and Martin 2002).

6.46 Haskel *et al.* (2002) identify productivity gains not simply for the firms taken into foreign ownership, but also for the sector as a whole. They find that a 10 per cent increase in foreign presence in a UK industry typically raises total factor productivity of that industry's domestic plants by 0.5 per cent. Such findings are, however, not undisputed. Griffith and Simpson (2001) argue that domestic UK establishments which become foreign-owned do not enjoy higher labour productivity, though their productivity does improve faster than that of establishments which shift from foreign to domestic ownership. Box 6.5 provides examples of UK sectors where foreign ownership is important.

6.47 If a single currency encourages FDI flows, it will not do so to the same extent across all sectors. EMU entry would be expected to affect not only the level of FDI, but also its composition. The removal of currency risk would not, for example, do much to enhance the appeal to manufacturers of a location which lacked an adequate freight infrastructure; it might, however, persuade some service providers to view the region in a different light. As noted by one executive interviewed by the Financial Times *"All you need for an IT helpdesk to function is a secure connection. But if you want to manufacture semiconductor chips, your infrastructure has to be world-class"*.⁶

Management and ownership

6.48 Griffith (2001) found that the efficiency improvements stemming from the SMP occurred only in firms with a 'principal agent' structure (group or managerial establishment, plants with subsidiary or sibling plants, or foreign ownership), and not in single owner or entrepreneurial firms. Managerial control and ownership are assumed to be much more separate in the former group than in the latter, suggesting that increased product market competition stemming from the SMP was particularly effective in reducing agency costs. Given the traditional openness of the UK economy to FDI, and the principal agent structure of many of its firms, UK industry should be relatively well placed to benefit from any similar such effect delivered by EMU entry.

⁶ Financial Times (2002b).

Box 6.5: Potential impact of EMU: financing and ownership

Most enterprises in most sectors derive the bulk of their finance from internally-generated funds. Nevertheless, EMU's impact on the cost and availability of finance is an important consideration. By removing intra-euro area exchange rate risk, EMU potentially facilitates cross-border investment within the euro area by institutional and retail investors. This could be of particular benefit to UK firms in sectors which are highly reliant on capital market finance (whether equities or bonds), such as research-intensive and 'new' industries, e.g. **biotechnology**. The biotechnology industry raised record sums in 1999 and 2000, but the market downturn of 2001 and 2002 resulted in a cash crisis for some companies and expectations among investors of consolidation within the sector.

Sectors characterised by small, 'traditional' businesses, in contrast, tend to turn to banks rather than to capital markets for funding. The majority of **household service** or **construction** companies, for example, are small enterprises which rely primarily on bank lending for external finance. It is unlikely that EMU entry would have a substantive impact on the local banking relationships of UK SMEs.

The primary sources of external funding in any sector may change if the structure and ownership of that sector change. Such a shift may occur with, for example, privatisation; with the opening up of a protected sector to competition; or with a change in sector circumstances reflecting, for example, technological advances. The **telecommunications** sector has been subject to all three influences and its restructuring over the past decade has been both accompanied and facilitated by major borrowing on the part of both telephone services operators and telecommunications equipment producers. Consolidation and a sharp rise in external funding has also been a feature of the **media** industry.

The investment banking industry benefited from this increased demand for funding during the late 1990s and has suffered during the subsequent downturn (which has also affected its own demand for acquisition-related funding). The restructuring and expansion of the financial services sector, both in the UK and globally, has shaped the pace and direction of industrial restructuring in general, just as the process of industrial restructuring in non-financial sectors has shaped the responses of investors and financial intermediaries. The implications of EMU entry for the UK financial services sector are explored in more detail in the EMU study *The location of financial activity and the euro*.

Foreign ownership of UK firms is particularly marked in the **car**, **oil** and **machinery and equipment** sectors. Foreign-owned affiliates accounted in 1998 for almost 84 per cent of UK auto sector turnover and gross operating surplus and almost 89 per cent of investment.^a

Strategic alliances, both horizontal and vertical, have grown larger and more complex, and are characteristic of a broad range of sectors including **chemicals and pharmaceuticals**, and **computers**. If EMU entry were to result in a more competitive environment, this might encourage UK firms to explore further such opportunities with an increasing number of potential partners, to their benefit and that of their customers.

^a Per cent of total enterprises with over 250 employees (OECD, 2002b).

Cyclicalities

6.49 Sectors and markets are continually subjected to change, both cyclical and structural. At an aggregate level, the impact on industry of product market fluctuations may have increased in recent years as more sectors have become exposed to international trade and as the number of protected, highly regulated or state-owned industries has declined. Were the loss of an independent monetary policy to lead to more pronounced economic cycles, EMU entry would have a greater impact on sectors which:

- face highly cyclical demand for their output; or
- find cyclicalities to be particularly damaging.

6.50 If the EMU environment is one of more volatile demand – and the transition phase may be even if the long-term context is not – different industries will be affected in different ways. Industries which produce investment goods or consumer durables tend to face more cyclical demand patterns than those which produce non-durables, since purchase decisions can be more easily postponed during economic downturns. UK firms which operate in cyclical industries, but which have diversified into other activities or have pursued product differentiation (or are in a better position to do so), might find it easier to adjust to the new environment than their equally cyclical but less diversified competitors. Box 6.6 provides examples of sectors which tend to be particularly sensitive to the cycle.

6.51 A change in the volatility of short-term interest rates – set within EMU for the euro area as a whole rather than for any individual member – would have a particular impact on sectors in which demand is especially sensitive to short-term interest rates, such as estate agents. Any longer-term impact of the change in the monetary policy environment on borrowing patterns, such as the proportion of borrowing undertaken at variable or short-term interest rates, would also affect these sectors.

6.52 Some sectors which produce goods that are not themselves highly cyclical may nevertheless find increased cyclicalities to be particularly damaging. Such industries might include, for example, those producing commodity-type products such as steel, cement or commodity chemicals. Prices in such sectors tend, during downturns, to be pushed down towards marginal cost levels, making it difficult for firms to recover fixed costs over the economic cycle.

6.53 The form which industrial restructuring takes is itself cyclical. Merger and acquisition activity rises with financial markets and buoyant economic data; declining confidence and rising interest rates tend to be accompanied instead by downsizing, cost-cutting and consolidation. A potentially more volatile UK economic cycle within EMU could have consequences not only for the extent of restructuring undertaken by UK firms but also for the way in which that restructuring occurred.

Box 6.6: Potential impact of EMU: cyclical

Sectors producing investment goods (such as **machinery and equipment** or **consumer durables**) tend to be especially sensitive to the economic cycle. Others are less inherently cyclical in terms of their product line but find increased cyclical damage. UK firms in capital-intensive industries such as **steel, cement** and **commodity chemicals** might find it more difficult to recover their fixed costs in an even more cyclical environment. Rationalisation in many such sectors is fuelled by excess capacity, as well as by an ongoing reappraisal of production, delivery and marketing systems in the face of rapid technological change.

Demand in some sectors, such as **estate agents**, is particularly sensitive to the short-term interest rate cycle. The shift in the monetary policy environment accompanying EMU entry could be of obvious consequence for UK firms in such industries, the magnitude of the effect being a function of both the step adjustment in the level of interest rates and the impact on expectations of future interest rates. A change in the volatility of short-term interest rates or, over the longer term, in borrowing patterns (such as the proportion of borrowing undertaken at variable or short-term interest rates) would also affect these sectors.

Industries which are relatively insensitive to economic or interest rate cycles (and which in terms of relative performance, may indeed be counter-cyclical), include **health care, food, consumer non-durables** and **tobacco**. Demand for tobacco products, for example, is highly price and income inelastic. Substantive changes in demand tend instead to reflect fashion, social change or health concerns (in response to which, manufacturers have diversified into, for example, accessories or clothing or sought out new markets).

Within the **car** industry, many of the major players have diversified into less cyclical sectors or into areas which can alleviate the impact of downturns on their primary activities. General Motors, for example, operates a large **financial services** company offering mortgage, business and auto financing; Ford Motor owns an auto financing company, as well as a large car rental firm; while Toyota runs a consumer finance company as well as producing vehicles.

6.54 EMU entry implies a shift in the operating environment and hence entails a range of sometimes offsetting, sometimes exacerbating, consequences for industrial demand and supply. The introduction of greater competition in some sectors as barriers to trade and investment fall will affect patterns of demand (and hence employment, incomes, investment and location decisions) in other sectors. Furthermore, some UK firms and industries will respond more rapidly or efficiently to these changes than others, and more (or less) rapidly or efficiently than their counterparts in other euro area countries. Differences in the transition process to the new environment – in investment, training, marketing and location decisions – will themselves shape the eventual composition and distribution of the industrial base of the euro area and, whether the UK joins EMU or not, of the UK.

7.1 This study set out to address the implications of possible UK entry to EMU from a microeconomic perspective, investigating the potential impact of EMU membership on UK business sectors. The consequences of EMU entry for the UK economy as a whole would not be distributed uniformly across all industries. However beneficial or costly the effect on the UK in aggregate, different business sectors could be presented with very different opportunities and challenges. The responses and reaction times of each industry would themselves affect the dynamics of industrial change and hence the long-term resilience and competitiveness of the UK in a European and global context.

7.2 While UK industry shares many of the structural characteristics of its large euro area counterparts, there are nevertheless important differences which might imply a different UK response to a euro area wide shock. These include the UK's relatively large service sector, its large stock of foreign direct investment (in particular, from outside the EU) and its high level and proportion of service sector trade with non-EU countries.

7.3 Economic theory suggests that EMU should have different effects over different time periods. This study therefore employs a dynamic framework which identifies the immediate effects of EMU entry, the short to medium-term impact and the longer-term implications.

7.4 Both theory and a wide range of current and historical UK, EU and US evidence suggest that EMU will potentially foster increased trade, investment and cross-border investment. The evidence to date from the euro area is consistent with (or at least does not contradict) this expectation. By furthering the implementation of the Single Market Programme (in particular within service sectors), EMU is likely to lead, over the long term, to increased competition and augment an existing tendency of gradually increasing specialisation.

7.5 The intensity and nature of EMU's effect on individual sectors, and therefore on UK business, if the UK were to join would vary with a number of different sector characteristics. In particular, six key characteristics are important: openness or exchange rate sensitivity, pricing behaviour, market structures, firm size, finance and ownership, and the volatility of demand.

7.6 A fully quantified cost-benefit analysis of the potential impact of EMU entry on individual UK business sectors is not feasible, for reasons of data availability, reliability and complexity. Nevertheless, a combination of theory, evidence, history and comparison allows an informed judgement to be reached as to the potential dynamic consequences of EMU membership for the UK industrial base, and the possible implications for different industry sectors. The effect of membership of EMU would have to be gauged relative to a changing and evolving EU industrial landscape. The push to complete the Single Market in goods and services and the further integration of capital markets are key elements of this change. Against this backdrop, several conclusions can be drawn:

- the potential increase in competitive pressure generated by membership of EMU could occur through both product and capital markets. While open and exchange rate sensitive industries would feel the impact of EMU most directly, all sectors and firms – however domestic their focus – would be affected by improved access to capital which facilitated expansion and restructuring;

- increased competition would be of particular benefit in many service sectors which have, to date, been less exposed to the effects of the Single Market than the goods sector. Greater competition and openness would help to raise productivity (especially important in services which affect business competitiveness such as distribution or business services) and deliver substantial benefits to consumers;
- by removing a currency barrier to trade, and potentially improving access to funding, EMU membership should be of disproportionate benefit to small and medium-sized enterprises (albeit less so to micro-enterprises); and
- at the opposite end of the size spectrum, EMU could also facilitate the development of multinational enterprises. This could help to raise aggregate productivity.

7.7 The potential increase in competition, trade and cross-border investment facilitated by EMU will help shape the euro area's industrial base and influence in the process the industrial structures of euro area trading partners and competitors. Irrespective of the UK's EMU decision, UK industries cannot avoid being affected by the euro, though the quantitative and qualitative effects and the adjustment costs will clearly differ. Inside or outside of EMU, its existence places an increased premium on the flexibility and resilience of UK firms, sectors and the economy as a whole.

7.8 Whether or not the UK joins EMU, the Government is committed to creating the best possible environment for private enterprise and investment across all UK regions, sectors and industries. This is important for the Government's long-term economic goal of closing the productivity gap which exists between the UK and its major competitors. In the EU context, the Government is committed to the economic reform strategy agreed by EU Heads of Government or State at Lisbon in March 2000. The Government's vision is of a dynamic, job-creating EU characterised by full employment, high living standards and social cohesion. Challenging reforms of labour, product and capital markets are needed to achieve this goal.¹

7.9 The conclusions of this study are based on the assumption that, if the UK were to join EMU, it would do so on the basis of sustainable and durable convergence. If this were not the case, UK business sectors would be faced with an environment of greater macroeconomic instability and, over the longer term, potentially lower output and employment than would otherwise be the case. These issues are considered further in the Government's assessment of the five economic tests for EMU entry.

¹ See *Meeting the Challenge: Economic Reform in Europe* (HM Treasury, 2003) for full details.

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A1 This Annex sets out economic theory on the determinants of domestic investment and foreign direct investment.

The determinants of domestic investment

A2 Box A1 provides an overview of theoretical accounts of the determinants of investment. The neo-classical and dynamic models suggest that firms will invest if the returns from investment exceed the cost of capital. In general however, these theories perform poorly when tested against the data. The relationship between Tobin's Q and investment is, for example, usually found to be weak at an aggregate level. Similarly, empirical studies often show a weak link between investment and the cost of capital, but a stronger relationship with output (as would be predicted by the simple accelerator models) and profitability.

A3 Recent economic research has attempted to address these weaknesses. Factors such as the level of innovation and the availability of skilled labour have been identified as important drivers of investment (see Nickell and Nicolitsas, 2000). The importance of capital market imperfections has also been emphasised, and is considered in detail in the EMU study by HM Treasury *EMU and the cost of capital*. One of the most important avenues of work has focused on the impact of uncertainty on investment. This is particularly relevant to this analysis, as EMU may have a significant impact on uncertainty through its impact on macroeconomic stability and the exchange rate. This issue is therefore the focus of the remainder of this annex.

Box A1: Theories of investment

Simple accelerator models of investment assume there is an optimal capital stock for a given level of output and interest rates. In these models, investment shifts in response to a change in output or interest rates to keep the capital stock at the optimal level.

The **neoclassical theory of investment** suggests that a firm will invest until the marginal return from investment equals the marginal cost of capital (see, for example, Jorgensen, 1963). Two central factors drive investment in the simple neoclassical model: the return from investment, which is governed by the price and volume of output; and the cost of capital, which is determined by factors such as the interest rate, depreciation and tax.

A shortcoming of the simple neoclassical model is that it assumes that firms can instantaneously and costlessly adjust investment levels to reach the optimal capital stock, having equated the current marginal product of capital to the marginal cost of capital. There is also no explicit forward-looking element; no direct consideration of expectations of future profits. This is addressed in dynamic models of investment, of which **Tobin's Q** is an example (Tobin 1969). Tobin's Q is the ratio of the forward-looking stock market valuation of the firm (which approximates to the market's estimate of the present value of new investment) to the price of new equipment (which approximates to the marginal cost of capital). This relationship can be viewed as the ratio of the present value of marginal investment to the marginal cost of the investment. If Tobin's Q is greater than one, i.e. if the marginal value of investment exceeds marginal cost, then it makes sense for firms to invest more. The optimal level of investment, which corresponds to the neoclassical optimal capital stock, is where Tobin's Q equals one.

Work by Hayashi (1982) introduces **dynamic adjustment costs** into the neoclassical model, e.g., the cost of lost business due to installation of new equipment or the cost of retraining workers. These costs may increase with the size of the investment, with the result that a too rapid accumulation of capital may be inefficient. The optimal capital stock predicted under the neoclassical model may not be reached immediately, but represents a longer-run equilibrium which firms attempt to move towards.

The impact of uncertainty on investment

A4 One of the most important developments in the literature on the economic drivers of investment has been the increased importance attached to uncertainty. Dixit and Pindyck (1994) formulate a model where investment is irreversible and firms have the option to delay capital spending until some future point in time. In this case there is an ‘option value’ to delaying investment, as in the future a firm may obtain information which increases its certainty about the return from its prospective investment. This option value effectively increases the rate of return which a firm requires to invest. The option will have a higher value when economic variability is higher.

A5 However, the theory on the impact of uncertainty on investment is not unambiguous. Early models suggested that uncertainty would raise investment levels. Assuming that returns are convex, a higher than expected price will increase returns by more than a lower than expected price (of comparable magnitude) would reduce returns. Therefore the possibility of receiving the higher or lower than expected price is preferable to the certainty of receiving the price midway between the two. More recent work, for example Abel and Eberly (1999) introduces costs to delaying investment into the Dixit and Pindyck (1994) option value model. This also makes the relationship between uncertainty and investment ambiguous. Others have argued that uncertainty may impact on the short-run dynamics of investment but should not affect the long-run rate of investment.¹

Empirical evidence on uncertainty and investment

A6 However, empirical evidence has largely supported the conclusion that uncertainty has a negative impact on investment. Carruth *et al.* (2000a) survey this literature and find: “A general conclusion is that increased uncertainty, at both aggregate and disaggregate levels, leads to lower investment levels”.²

A7 Carruth *et al.* (2002a) cite several examples of empirical analysis of aggregate UK investment which find a negative impact from uncertainty. For example, Price (1996) finds that uncertainty of output has a large and significant effect on long-run manufacturing investment levels in the UK. Driver and Moreton (1992) find that both output and inflation variance terms have negative effects on UK investment. Carruth *et al.* (2000b) use UK company panel data with uncertainty proxied as the producer price index, and find that sectoral uncertainty reduces investment. This effect is not confined to the UK, with several other studies finding similar results in the US and elsewhere.³ Studies that have looked at disaggregated data are less conclusive, though still generally point to a negative relationship.

Exchange rate volatility and investment

A8 Empirical studies also show a link between exchange rate volatility and a reduction in aggregate investment. Darby *et al.* (1999) test for the impact on investment of both exchange rate volatility and misalignment in the UK, US, France and Germany. They find that, on average, exchange rate volatility reduces investment, though they do not find a long-run relationship between exchange rate volatility and investment in the UK. They also find that a long-run exchange rate misalignment from an equilibrium level has a negative impact on UK investment levels. Byrne and Davis (2002) analyse the impact of exchange rate volatility on aggregate investment across the G7, and find that both nominal and real exchange rate volatility reduce investment.

¹ See Bloom *et al.* (2001).

² Another review of this literature which reaches similar conclusions is Ashworth *et al.* (2001).

³ See Carruth, *et al.* (2000a) for a complete review of this literature, and Deutsche Bundesbank (2001) which finds a strong negative relationship between investment and uncertainty.

A9 Other studies find that the impact of exchange rate movements on investment varies across sectors. Investment is most likely to be affected by exchange rate volatility in low margin firms which find it difficult to adjust prices or in firms exposed to exchange rate volatility, i.e. exporters and importers. For example, Campa and Goldberg (1995) find that exchange rate appreciations reduce investment in low margin industries in the US, though the strength of the effect has been decreasing over time, which the authors attribute to increased exposure to imported inputs. Campa and Goldberg (1999) find that investment in low margin sectors in the US, UK and Japan is strongly responsive to persistent exchange rate movements. Nucci and Pozzolo (2001) find that investment is sensitive to exchange rates for low margin and small Italian manufacturing firms.

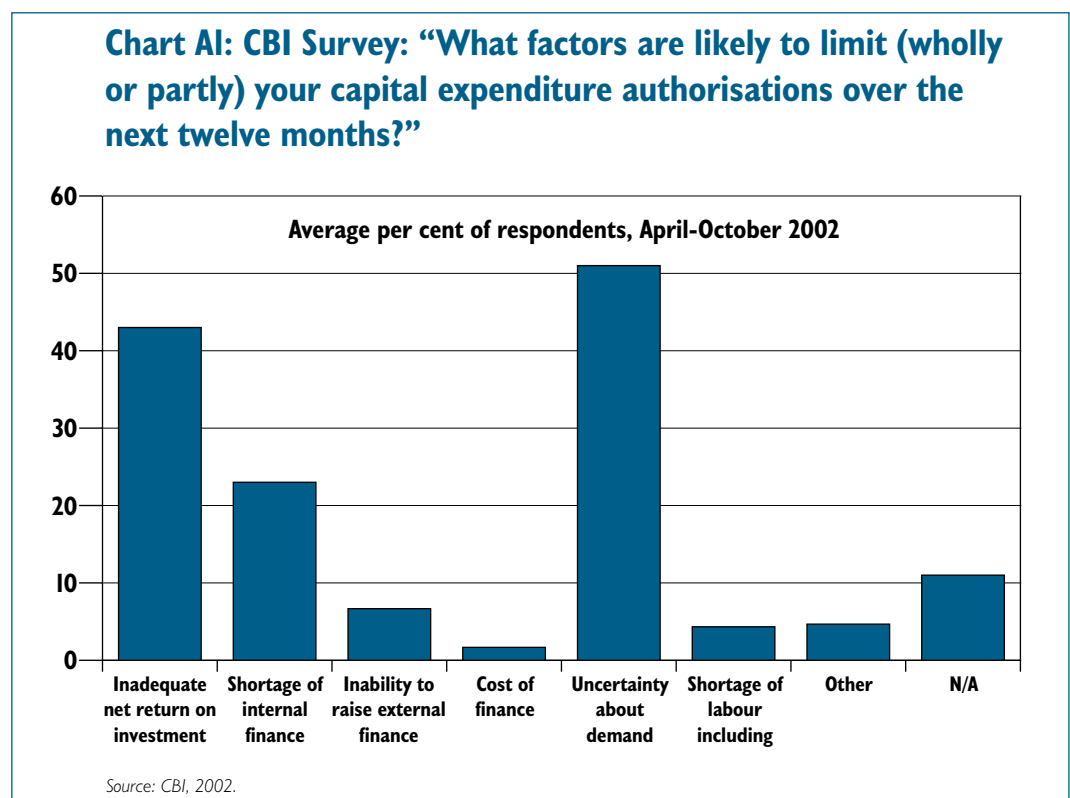
Interaction with competition

A10 Analysis highlights the impact of market structure on investment. Caballero (1991) argues that the existence of imperfect competition is a necessary condition for any irreversibility-driven negative relationship between investment and uncertainty. An explanation is that where firms have a degree of market power there is less risk of competitors stepping in and investing earlier, thus foreclosing market opportunities. This means that the presence of a competitive market will generally tend to increase investment, as it will reduce the option value of delaying investment.⁴

A11 By contrast, in a study of US manufacturing industries, Ghosal and Loungani (1995) find that, for industries with a high degree of product market competition, the effect of uncertainty on investment is negative and reasonably large. For relatively non-competitive industries, the impact is always small and not significantly different from zero. In a non-competitive industry, fear of pre-emption by a rival and the consequent need to act quickly, which play a more important role in oligopolistic industries, may counteract the desire to wait.

Business surveys highlight the role of uncertainty and expected returns

A12 Business surveys such as the *CBI Industrial Trends Survey* (CBI, 2002) summarised in Chart A1, provide additional information on the determinants of investment. The most important factors identified by business in the CBI survey as limiting capital expenditure are inadequate net returns on proposed investment and uncertainty about demand. The net cost of capital is captured by responses on inadequate return and the cost of finance.



⁴For example see Guiso and Paragi (1999) and Carruth *et al.* (2000a).

What are the key determinants of investment?

AI3 The key message of both economic theory and the evidence from economic studies and business surveys is that investment is determined by the relationship between the expected returns of investment and the expected cost of financing the investment. Firms will only invest if they believe the returns from investment will be greater than the costs. This will depend on a number of factors:

- the **returns from investment**, determined by the demand for and the price level of the output generated by the investment and by the costs of production. Expectations of demand, price and costs over the lifetime of the investment are therefore key determinants of expected returns. The degree of uncertainty attached to these expectations is crucial; and
- the **cost and availability of internal and external finance**, as higher costs of finance require greater returns to ensure that the investment is profitable.

The determinants of foreign direct investment

AI4 Economic theory concerning the location decisions of multinational firms is less developed than are many other areas of international economics. Existing theory is designed to answer the question of why firms decide to locate in more than one country, and centres on the ownership, location and internalisation framework:

- **ownership advantages** are those which a multinational firm possesses in terms of specific knowledge and organisational skills which allow the firm to compete effectively with domestic firms;
- **location** is determined by factors such as resources, trade barriers, transport costs and labour costs; and
- **internalisation** is the idea that it is more profitable to carry out certain transactions within firms (i.e. between parent and subsidiary companies) than between firms, and assumes firm-specific, knowledge-based assets that cannot easily or profitably be sold or transferred to other firms.

AI5 While these characteristics explain why a firm may decide to locate outside its home country, they do not explain why multinational firms choose to locate in any particular country. Firms choose particular countries for a number of reasons including:

- **market-seeking** firms may choose to locate in a particular country to serve either the domestic market or to export to other countries, e.g. locating in one euro area country in order to export to others;
- **resource-seeking** firms seek specific resources which are unavailable in the home country; and
- **efficiency-seeking** firms choose to locate in a country that allows them to produce more efficiently, perhaps because of the availability of, for example, more productive labour.

A16 Having established the motives for locating abroad and choosing a particular destination country, foreign direct investment (FDI) can be broadly categorised into two forms, vertical and horizontal, with differing implications for intra-industry trade:

- **vertical**, where different stages of production are located in different countries and the location choice is more likely to reflect factor endowment differences. For example, capital abundant countries export higher quality, capital intensive goods (finished computer products from the US), while labour abundant countries export lower quality, labour intensive goods used in the supply chain (semi-conductors from Malaysia); and
- **horizontal**, where the same final production activities are undertaken in different countries, e.g. European car manufacture. Trade is driven by product differentiation and internal scale economies. As countries become more similar in their economic characteristics (the availability and cost of labour for example), the flow of horizontal intra-industry trade would be expected to increase.

A17 Overall, this analysis shows that the decision to invest overseas is affected by many factors. The UK's strong historical FDI performance is based on its attractive regulatory and tax regime; a stable macroeconomic environment; flexible labour and product markets; innovative capital markets; and a skilled labour force. Many of these factors will not be affected directly by EMU, and EMU entry should not necessarily detract from the UK's excellent record in attracting FDI.

FDI and the exchange rate

A18 Among these many influences, however, one of obvious relevance to the decision of whether or not to join the single currency, is the exchange rate. The actual and expected levels of the exchange rate are important determinants of the decision to invest overseas. If firms are investing overseas in order to service export markets, the exchange rate will affect the profitability of that trade. Exchange rate movements also have potential implications for overseas investments which do not involve trade, as earnings from foreign subsidiaries have to be converted back into domestic currency.

A19 As outlined in Box A2, there are two ways in which the exchange rate can affect FDI:

- exchange rate volatility, where a currency moves with high frequency around its short-run mean value; and
- persistent exchange rate deviation from some level of its medium or long-term equilibrium.

A20 Box A2 suggests that a persistent exchange rate depreciation will increase FDI inflows, while a persistent appreciation will decrease them. It also suggests that exchange rate volatility has ambiguous effects on FDI flows. This is not a surprising result. FDI is heterogeneous and subject to a number of different influences, so is unlikely to behave uniformly in the face of exchange rate movements. Exchange rate volatility may dissuade some overseas investors from investing, but persuade others to invest in order to insure against risk through diversification.

A21 Also important is the origin of the FDI, and the target market. Exchange rate risk will be very different for an investment which aims to service the domestic economy, and for an investment which aims to establish a base for exporting to EU countries or to non-EU countries. A third-country firm looking to export from an EU base will face currency volatility on exports to the euro area if it locates in the UK. However, if the firm services only the UK market, currency movements against the euro will not be as important.

Box A2: Two exchange rate issues – volatility and deviation from trend

Economic theory is ambiguous on the implications of **exchange rate volatility** on FDI. In the models of investment under uncertainty discussed in the section on domestic business investment (such as Dixit and Pindyck, 1994), uncertainty about future returns reduces FDI. The firm trades off the gains from entering a foreign market in one period with the opportunity cost of waiting until more information on risks and returns may have become available. The value of the ‘option to wait’ increases with the volatility of the underlying asset price. The greater the exchange rate volatility, the more likely the firm is to wait and see before entering the market.

Exchange rate volatility might, however, increase FDI. If volatility acts as a barrier to trade then firms may choose to invest as an alternative means of accessing markets, locating production in several different countries specifically to diversify risk. The ability to switch production between plants will also give a firm the flexibility to manage its costs in the presence of exchange rate risk (Pain, 2002). One reason for undertaking horizontal FDI may be to provide insurance against risk through diversification.

Empirical studies of the relationship between exchange rate volatility and FDI come to different conclusions. Hubert and Pain (2002) find that exchange rate volatility has a weak negative effect on FDI. Aizenman and Marion (2001) find a negative effect, but only for vertical FDI, suggesting that horizontal FDI is encouraged by volatility. Görg and Wakelin (2001) find no effect, while some earlier studies find that volatility has a positive impact on FDI (Goldberg and Kohlstad, 1994, Cushman, 1988).

The theory is less ambiguous as to the impact on FDI of a persistent **exchange rate deviation** from some measure of its long-run or medium run equilibrium, suggesting that a persistent depreciation will increase FDI, and a persistent appreciation will decrease it. With sticky asset prices, a lower currency can make a country’s assets (including its labour force) relatively cheap to overseas firms. Froot and Stein (1991) argue that FDI has an advantage in the presence of capital market imperfections: domestic currency depreciation raises the relative net worth of an overseas investor, making borrowing cheaper. FDI may also be used as a substitute for exports. Since depreciation makes overseas goods more expensive, foreign suppliers may instead produce directly in a country with a weak exchange rate.

Academic studies tend to confirm that depreciation raises incoming FDI, while an appreciation has the opposite effect.^a Pain (1996), for example, finds that the location of UK FDI in Europe is sensitive to unit labour costs in the host country, suggesting that the relative exchange rate influences FDI flows. Pain and Hubert (2002) find similar results for German FDI in the EU, and Barrell and Pain (1999) likewise for FDI flows into the EU from the US. There are, however, outliers in the literature. Froot and Stein (1991), for example, draw the opposite conclusion.

^aSee Görg and Wakelin (2001), Kohlhagen (1977) and Campa (1994).

Impact of EMU on UK FDI **A22** This discussion suggests that although economic research does not pin-point an unambiguous effect on FDI from the removal of exchange rate volatility, this may mask important effects at the disaggregated and sectoral level. FDI into the UK which seeks to use the UK as an export base to the rest of the EU may be particularly affected by exchange rate risk. It should also be noted that economic research on the impact of exchange rate volatility on FDI has primarily considered past trends in bilateral FDI flows, and bilateral exchange rate volatility. This is a very different issue from the impact of UK entry into EMU on FDI, which represents an irreversible commitment to intra-euro area exchange rate stability. If some firms have been put off investing in the UK due to long-term currency risk, EMU entry might prompt them to reconsider.

Impact on quality of FDI **A23** As well as affecting the quantity of investment, the removal of exchange rate uncertainty and a reduction in transactions costs could also raise the quality of inward investment. An increase in trade and competition, induced by a reduction in uncertainty and transactions costs, might result in an increase in allocative efficiency. Pain (2002) suggests that such improvements in allocative efficiency can be explained by standard trade theories, which predict that trade will encourage a transfer of resources from import-substituting activities into activities in which countries have comparative advantage. This should result in more efficient, better quality FDI due to a shift in the pattern of inward investment towards activities characterised by comparative advantage.

Indices of specialisation B1

The main indices of **specialisation** are:

- the **Herfindahl index of regional specialisation**; an absolute measure which sums the squares of industry shares in total regional activity. It takes values of between zero and one, with higher readings indicating greater specialisation;
- the **Krugman specialisation index**; a relative measure which sums the absolute difference of the structures of two regions. If both regions have the same structure, the reading is zero; if they have no industries in common, the reading is two;
- the **dissimilarity index of regional specialisation**; a relative measure which compares the industrial structure of a region with an average distribution across regions. It sums absolute differences between shares of industries in economic activity in a region, and their average value across regions by sector. A reading of zero indicates maximum diversity, and a reading of two, maximum specialisation; and
- the **Gini coefficient of regional specialisation**; a relative measure which assesses the equality of the distribution of industries in a given region, compared with that of, for example, the country as a whole. Readings range from zero (equal distribution) to one.

Indices of concentration B2

The main indices of **concentration** are:

- the **Herfindahl index of geographical concentration**; an absolute measure which sums the squares of regions' shares in national employment in a particular industry. It takes values of between zero and one (a pure monopoly based in one region);
- the **dissimilarity index of geographical concentration**; a relative measure which sums the absolute differences between the shares of regional employment in a given industry and the share of national employment in that industry. A value of zero indicates equal distribution of a sector across regions;
- the **locational Gini coefficient**; a relative measure of concentration which assesses the equality of distribution of an industry across regions. Readings range from zero (equal distribution) to one; and
- indices of **spatial separation**. The previous concentration indices do not take into account the spatial dimension, i.e. whether the locations in which industry is concentrated are clustered together or widely dispersed. Midelfart-Knarvik *et al.* (2000) develop an index which has a value of zero if production occurs in a single place, and higher values as spatial separation increases.

B3 Box B1 formally sets out the main indicators of specialisation and concentration.

Box BI: Indicators of specialisation and concentration

i = industry

j, k, l = regions

S_{ij}^s = share of industry i in total employment of region j (specialisation)

S_{ij}^c = share of region j in total employment of industry i (concentration)

S_i = share of total employment in industry i in total employment

S_j = share of total employment in industry j in total employment

n = number of industries

m = number of regions

Herfindahl Index

Regional specialisation measure

$$H_j^s = \sum_i (S_{ij}^s)^2$$

Geographical concentration measure

$$H_i^c = \sum_j (S_{ij}^c)^2$$

Dissimilarity Index

Specialisation measure

$$DSR_j = \sum_i |S_{ij}^s - S_i|$$

Concentration measure

$$DCR_i = \sum_j |S_{ij}^c - S_j|$$

Krugman specialisation index

$$K_{kl} = \sum_i |S_{ik}^s - S_{il}^s|$$

Spatial separation measure

$$SP^i = C \sum_{k=1}^n \sum_{l=1}^n (S_{ik}^c S_{il}^c \delta_{kl})$$

δ_{kl} is the distance between k and l . C is a constant

Gini coefficients

Gini coefficient for regional specialisation

$$GINI_j^s = \frac{2}{n^2 \bar{R}} \left[\sum_{i=1}^n \lambda_i |R_i - \bar{R}| \right] \text{ where } R_i = \frac{S_{ij}^s}{S_i}, \bar{R} = \frac{1}{n} \sum_{i=1}^n R_i$$

λ_i indicates the position of industry i in the ranking of R_i in descending order

Gini coefficient for concentration of industries

$$GINI_i^c = \frac{2}{m^2 \bar{C}} \left[\sum_{j=1}^m \lambda_j |C_j - \bar{C}| \right] \text{ where } C_j = \frac{S_{ij}^c}{S_j}, \bar{C} = \frac{1}{m} \sum_{j=1}^m C_j$$

λ_j indicates the position of region j in the ranking of C_j in descending order

Source: Adapted from Traistaru and Iara, 2002.

Table CI: Historical sector shares in GDP

| Per cent | Agriculture | Manufacturing | Other production ¹ | Business services ² | Other services ³ | Government/ other |
|-----------------------|-------------|---------------|-------------------------------|--------------------------------|-----------------------------|-------------------|
| UK | | | | | | |
| 1975 | 2.58 | 28.21 | 11.33 | 15.71 | 24.73 | 17.44 |
| 1985 | 1.90 | 23.92 | 15.36 | 18.80 | 24.24 | 15.78 |
| 1993 | 1.88 | 19.94 | 9.76 | 24.54 | 28.69 | 15.19 |
| France | | | | | | |
| 1975 | 5.60 | 27.22 | 10.36 | 15.95 | 25.55 | 15.32 |
| 1985 | 4.07 | 23.07 | 8.95 | 19.23 | 26.92 | 17.76 |
| 1992 | 2.93 | 20.80 | 8.33 | 22.83 | 28.11 | 17.00 |
| (West) Germany | | | | | | |
| 1975 | 2.88 | 35.40 | 10.10 | 4.64 ⁴ | 26.28 | 14.32 |
| 1985 | 1.80 | 32.62 | 9.09 | 5.66 ⁴ | 29.33 | 14.09 |
| 1993 | 1.09 | 27.16 | 8.32 | 6.04 ⁴ | 35.67 | 13.68 |
| Italy | | | | | | |
| 1975 | 7.14 | 27.43 | 13.59 | 5.11 ⁵ | 35.48 | 11.25 |
| 1985 | 4.55 | 24.61 | 11.08 | 4.79 ⁵ | 41.68 | 13.11 |
| 1994 | 2.94 | 20.52 | 11.16 | 4.99 ⁵ | 46.82 | 13.57 |
| US | | | | | | |
| 1975 | 3.46 | 22.28 | 10.07 | 18.21 | 31.68 | 14.30 |
| 1985 | 2.07 | 19.47 | 10.78 | 23.08 | 31.85 | 12.75 |
| 1993 | 1.65 | 17.39 | 8.08 | 26.74 | 33.05 | 13.09 |
| Japan | | | | | | |
| 1975 | 5.28 | 29.05 | 11.74 | 12.93 | 16.73 ⁶ | 10.05 |
| 1985 | 3.06 | 28.37 | 10.98 | 14.78 | 20.22 ⁶ | 9.74 |
| 1994 | 2.05 | 23.49 | 13.25 | 17.17 | 22.21 ⁶ | 9.64 |

¹ Mining and quarrying; electricity, gas and water; construction.

² Financial institutions and insurance; real estate and business services.

³ Wholesale and retail trade, restaurants and hotels; transport, storage, communications; community, social and personal services.

⁴ Financial institutions and insurance only; numbers sum to less than 100 per cent.

⁵ Financial institutions and insurance only.

⁶ Excludes wholesale and retail trade, restaurants and hotels; numbers sum to less than 100 per cent.

Source: Nickell et al., 2001.

Table C2: Leading manufacturing sectors by value added, 1999¹

| | First sector | Second sector | Third sector |
|----------------------|--|--------------------------------|---------------------------------------|
| Austria | Machinery and equipment | Metal products | Coke, refined petroleum and equipment |
| Belgium | Chemicals | Food and beverages | Motor vehicles |
| Denmark ² | Food and beverages | Machinery and equipment | Chemicals |
| Finland | Radio, TV and communications equipment | Pulp, paper and paper products | Machinery and equipment |
| France | Chemicals | Food and beverages | Motor vehicles |
| Germany | Machinery and equipment | Motor vehicles | Chemicals |
| Greece ² | Food and beverages | Chemicals | Non-metallic mineral products |
| Ireland ² | Chemicals | Food and beverages | Publishing and printing |
| Italy | Machinery and equipment | Chemicals | Metal products |
| Luxembourg | Metals | Rubber and plastics | Non-metallic mineral products |
| Netherlands | Food and beverages | Chemicals | Publishing and printing |
| Portugal | Food and beverages | Non-metallic mineral products | Textiles |
| Spain | Food and beverages | Metal products | Chemicals |
| Sweden | Motor vehicles | Machinery and equipment | Chemicals |
| UK | Food and beverages | Chemicals | Machinery and equipment |
| EU | Chemicals | Machinery and equipment | Food and beverages |

¹ 2000 for EU; 1998 for Italy, Austria's third sector and Netherlands second and third sectors; 1997 for Luxembourg and Netherlands first sector.

² Classification based on value added for NACE Divisions, net of VAT but not of other taxes on products; these are important in chemicals and food and beverage sectors, and are likely to have inflated the importance of these sectors.

Source: European Commission, Eurostat, 2002.

Table C3: UK micro-enterprises (less than 10 employees) share in UK private sector, 2002

| Per cent | Enterprises | Employment | Turnover |
|----------------------------------|-------------|------------|-----------|
| All industries | 95 | 30 | 23 |
| Agriculture, forestry, fishing | 99 | 85 | 81 |
| Mining, quarrying, utilities | 86 | 3 | 7 |
| Manufacturing | 88 | 15 | 8 |
| Construction | 98 | 62 | 43 |
| Wholesale, retail, repairs | 93 | 28 | 23 |
| Hotels, restaurants | 89 | 29 | 31 |
| Transport, storage, comms. | 9 | 22 | 16 |
| Financial intermediation | 94 | 9 | n/a |
| Real estate, business activities | 96 | 43 | 40 |
| Education | 98 | 54 | 48 |
| Health, social work | 91 | 17 | 13 |
| Other services | 98 | 53 | 40 |

Source: Small Business Service.

Table C4: Share of small enterprises (1-49 employees) in sector value added, 1999¹

| Per cent | Aut | Bel | Den | Fin | Fra | Ire | Ita | Nld | Por | Spa | Swe | UK |
|---------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Electricity, water, gas supply | 5.5 | – | – | 16.5 | 2.5 | – | 4.1 | 3.2 | 10.9 | 5.4 | 27.4 | 3.9 |
| Total manufacturing | 19.9 | 20.7 | 24.2 | 16.0 | 23.9 | 8.7 | 42.3 | 25.5 | 32.6 | 33.7 | 17.6 | 20.0 |
| Food, beverages, tobacco | – | 27.8 | 12.7 | 18.3 | 33.8 | 8.2 | 45.7 | 17.2 | 29.5 | 32.8 | 15.4 | 7.7 |
| Textiles, leather, clothing, footwear | 23.8 | 30.5 | 41.7 | 35.5 | 36.3 | – | 54.7 | 42.5 | 35.0 | 56.2 | – | 28.7 |
| Wood, paper, publishing, printing | 27.6 | 40.6 | 40.6 | 12.2 | 39.0 | – | 49.8 | 34.0 | 40.3 | 48.6 | 23.4 | 30.1 |
| Chemicals, rubber, plastics | 12.3 | 9.1 | 12.8 | 16.8 | 12.1 | 3.4 | 26.5 | 12.4 | 23.8 | 20.1 | 12.4 | 12.6 |
| Elect. machinery, electronics | 9.7 | 12.2 | 20.8 | 5.1 | 15.6 | 3.9 | 35.4 | 16.2 | 12.2 | 21.2 | 10.8 | 16.7 |
| Transport equipment | 3.7 | 5.8 | 18.8 | 16.1 | 8.4 | 14.1 | 10.8 | 18.9 | 9.2 | 6.8 | 4.6 | 6.9 |

¹ Germany, Greece, Luxembourg not available. Some data are for 1998; see source for details.

Source: European Commission, Eurostat, 2002.

Table C5: Comparison of rates of growth of euro area imports before (1996-1998) and after (1999-2001) EMU

| NACE | Industry ¹ | Share of euro area imports (per cent) | Change relative to: | | Annual rates of growth in euro area imports from | | | | | | | | |
|------|---|---------------------------------------|---|---|--|----------------------|----------------------------|----------------------|----------------------|----------------------------|----------------------|----------------------|----------------------------|
| | | | Imports from non-euro area ² (percentage points) | Imports from non-euro area W. Europe ³ (percentage points) | Euro area | | | | Non-euro area | | | | |
| | | | | | 1996-1998 (per cent) | 1999-2001 (per cent) | Change (percentage points) | 1996-1998 (per cent) | 1999-2001 (per cent) | Change (percentage points) | 1996-1998 (per cent) | 1999-2001 (per cent) | Change (percentage points) |
| 341 | Manufacture of motor vehicles | 8.8 | 0.11 | 0.08 | 0.10 | 0.08 | -0.02 | 0.19 | 0.07 | -0.13 | 0.12 | 0.02 | -0.10 |
| 343 | Parts and accessories for motor vehicles and their engines | 3.3 | 0.06 | 0.22 | 0.11 | 0.08 | -0.03 | 0.18 | 0.09 | -0.09 | 0.22 | -0.02 | -0.24 |
| 323 | Television and radio, sound or video recording apparatus | 1.9 | 0.05 | 0.22 | 0.05 | 0.07 | 0.03 | 0.14 | 0.11 | -0.03 | 0.11 | -0.08 | -0.19 |
| 271 | Manufacture of basic iron and steel and of ferro-alloys (ECSC) | 2.1 | 0.05 | 0.03 | 0.03 | 0.02 | -0.01 | 0.06 | 0.01 | -0.06 | 0.01 | -0.04 | -0.04 |
| 353 | Manufacture of aircraft and spacecraft | 4.5 | 0.04 | -0.05 | 0.22 | 0.17 | -0.05 | 0.23 | 0.13 | -0.09 | 0.19 | 0.19 | -0.01 |
| 241 | Manufacture of basic chemicals | 6.4 | 0.04 | 0.05 | 0.05 | 0.08 | 0.04 | 0.06 | 0.07 | 0.00 | 0.06 | 0.05 | -0.01 |
| 300 | Office machinery and computers | 6.4 | 0.01 | 0.05 | 0.16 | 0.07 | -0.09 | 0.17 | 0.06 | -0.11 | 0.18 | 0.05 | -0.14 |
| 312 | Manufacture of electricity distribution and control apparatus | 1.1 | 0.01 | 0.04 | 0.08 | 0.07 | -0.01 | 0.13 | 0.11 | -0.02 | 0.08 | 0.02 | -0.06 |
| 251 | Manufacture of rubber products | 1.0 | 0.01 | 0.08 | 0.07 | 0.02 | -0.05 | 0.11 | 0.06 | -0.06 | 0.08 | -0.04 | -0.13 |
| 152 | Processing and preserving of fish and fish products | 0.8 | 0.01 | -0.01 | 0.11 | 0.07 | -0.05 | 0.11 | 0.05 | -0.06 | 0.06 | 0.02 | -0.04 |
| 252 | Manufacture of plastic products | 1.9 | 0.01 | 0.04 | 0.06 | 0.04 | -0.02 | 0.10 | 0.07 | -0.03 | 0.08 | 0.02 | -0.06 |
| 287 | Manufacture of other fabricated metal products | 1.3 | 0.00 | 0.03 | 0.07 | 0.04 | -0.03 | 0.11 | 0.07 | -0.03 | 0.08 | 0.01 | -0.06 |
| 273 | Other first processing of iron and steel; non-ECSC ferro-alloys | 0.5 | 0.00 | 0.04 | -0.05 | 0.01 | 0.06 | -0.01 | 0.04 | 0.05 | -0.01 | 0.00 | 0.01 |
| 153 | Processing and preserving of fruit and vegetables | 0.7 | 0.00 | 0.01 | 0.04 | 0.03 | -0.01 | 0.04 | 0.03 | -0.01 | 0.06 | 0.04 | -0.02 |
| 365 | Manufacture of games and toys | 0.5 | 0.00 | 0.06 | 0.10 | 0.08 | -0.02 | 0.09 | 0.08 | -0.02 | 0.05 | -0.03 | -0.08 |
| 332 | Instruments for measuring, checking, testing navigating | 1.4 | -0.01 | 0.01 | 0.09 | 0.08 | -0.02 | 0.11 | 0.11 | -0.01 | 0.07 | 0.04 | -0.02 |
| 177 | Manufacture of knitted and crocheted articles | 0.6 | -0.01 | 0.10 | 0.05 | 0.02 | -0.03 | 0.13 | 0.10 | -0.02 | 0.07 | -0.07 | -0.13 |
| 246 | Manufacture of other chemical products | 1.7 | -0.01 | -0.05 | 0.05 | 0.05 | 0.01 | 0.07 | 0.09 | 0.02 | 0.04 | 0.10 | 0.05 |
| 245 | Soap and detergents, cleaning and polishes, perfumes and toiletries | 0.8 | -0.01 | -0.02 | 0.06 | 0.07 | 0.01 | 0.09 | 0.11 | 0.02 | 0.07 | 0.10 | 0.03 |
| 274 | Manufacture of basic precious and non-ferrous metals | 3.2 | -0.02 | 0.02 | 0.03 | 0.06 | 0.03 | 0.02 | 0.07 | 0.05 | 0.05 | 0.06 | 0.01 |

Table C5: Comparison of rates of growth of euro area imports before (1996-1998) and after (1999-2001) EMU (continued)

| NACE | Industry ¹ | Share of euro area imports (per cent) | Change relative to: | | Annual rates of growth in euro area imports from | | | | | | | | | |
|------|---|---------------------------------------|---|--|--|----------------------|--------------------------------------|----------------------|--------------------------------------|----------------------|--------------------------------------|----------------------|--------------------------------------|----------------------|
| | | | Imports from non-euro area ² (percentage points) | Imports from Europe ³ (percentage points) | Euro area | | | | Non-euro area | | | | Non-euro area Western Europe | |
| | | | | | 1996-1998 (per cent) | 1999-2001 (per cent) | Change 1996-1998 (percentage points) | 1999-2001 (per cent) | Change 1996-1998 (percentage points) | 1999-2001 (per cent) | Change 1996-1998 (percentage points) | 1999-2001 (per cent) | Change 1996-1998 (percentage points) | 1999-2001 (per cent) |
| 297 | Manufacture of domestic appliances not elsewhere classified | 0.9 | -0.02 | 0.05 | 0.05 | 0.03 | -0.02 | 0.09 | -0.01 | 0.05 | -0.02 | 0.05 | -0.02 | -0.07 |
| 291 | Machinery for mechanical power, except vehicles | 2.2 | -0.02 | 0.01 | 0.08 | 0.04 | -0.04 | 0.11 | -0.02 | 0.07 | 0.02 | -0.05 | -0.05 | |
| 182 | Manufacture of other wearing apparel and accessories | 3.0 | -0.02 | 0.05 | 0.06 | 0.02 | -0.04 | 0.08 | 0.06 | 0.05 | -0.04 | -0.08 | | |
| 159 | Manufacture of beverages | 0.7 | -0.02 | 0.01 | 0.08 | 0.04 | -0.04 | 0.09 | 0.07 | 0.08 | 0.03 | -0.04 | | |
| 294 | Manufacture of machine tools | 1.0 | -0.02 | -0.01 | 0.11 | 0.05 | -0.06 | 0.12 | 0.07 | 0.07 | 0.02 | -0.05 | | |
| 295 | Manufacture of other special purpose machinery | 2.1 | -0.02 | 0.00 | 0.09 | 0.03 | -0.06 | 0.10 | 0.07 | 0.08 | 0.02 | -0.07 | | |
| 155 | Manufacture of dairy products | 0.9 | -0.03 | 0.01 | 0.00 | 0.02 | 0.02 | 0.00 | 0.05 | -0.01 | -0.01 | 0.01 | | |
| 158 | Manufacture of other food products | 1.2 | -0.03 | 0.00 | 0.06 | 0.02 | -0.04 | 0.06 | 0.05 | 0.07 | 0.03 | -0.04 | | |
| 361 | Manufacture of furniture | 1.2 | -0.03 | 0.03 | 0.07 | 0.03 | -0.05 | 0.13 | 0.11 | 0.08 | 0.00 | -0.08 | | |
| 175 | Manufacture of other textiles | 0.5 | -0.03 | 0.00 | 0.04 | 0.00 | -0.04 | 0.04 | 0.03 | 0.04 | 0.01 | -0.04 | | |
| 211 | Manufacture of pulp, paper and paper board | 2.0 | -0.03 | 0.00 | 0.00 | 0.05 | 0.05 | -0.02 | 0.06 | 0.00 | 0.04 | 0.04 | | |
| 311 | Manufacture of electric motors, generators and transformers | 0.9 | -0.03 | -0.13 | 0.11 | 0.03 | -0.08 | 0.16 | 0.12 | -0.05 | 0.09 | 0.15 | 0.05 | |
| 212 | Manufacture of articles of paper and paper board | 0.7 | -0.03 | 0.01 | 0.03 | 0.06 | 0.02 | 0.06 | 0.12 | 0.05 | 0.05 | 0.06 | 0.01 | |
| 244 | Pharmaceuticals, medicinal chemicals and botanical products | 3.8 | -0.03 | -0.05 | 0.17 | 0.16 | -0.01 | 0.14 | 0.17 | 0.03 | 0.11 | 0.15 | 0.04 | |
| 172 | Textile weaving | 0.7 | -0.04 | 0.00 | 0.02 | -0.04 | -0.06 | 0.05 | 0.03 | -0.02 | -0.01 | -0.07 | -0.07 | |
| 292 | Manufacture of other general purpose machinery | 2.1 | -0.04 | 0.02 | 0.10 | 0.05 | -0.05 | 0.12 | 0.12 | -0.01 | 0.10 | 0.03 | -0.07 | |
| 193 | Manufacture of footwear | 1.0 | -0.05 | -0.05 | 0.07 | 0.05 | -0.02 | 0.09 | 0.12 | 0.03 | -0.02 | 0.01 | 0.03 | |
| 286 | Manufacture of cutlery, tools and general hardware | 0.8 | -0.06 | -0.06 | 0.08 | 0.04 | -0.04 | 0.09 | 0.11 | 0.02 | 0.07 | 0.09 | 0.01 | |
| 321 | Electronic valves and tubes and other electronic components | 2.9 | -0.07 | -0.23 | 0.12 | 0.10 | -0.02 | 0.10 | 0.16 | 0.06 | -0.01 | 0.20 | 0.21 | |
| 261 | Manufacture of glass and glass products | 0.6 | -0.08 | -0.05 | 0.04 | 0.02 | -0.03 | 0.08 | 0.13 | 0.05 | 0.02 | 0.04 | 0.02 | |
| 331 | Medical and surgical equipment and orthopaedic appliances | 1.2 | -0.08 | -0.05 | 0.11 | 0.08 | -0.03 | 0.12 | 0.17 | 0.05 | 0.10 | 0.11 | 0.02 | |
| 362 | Manufacture of jewellery and related articles | 0.6 | -0.08 | -0.20 | 0.09 | 0.07 | -0.02 | 0.06 | 0.13 | 0.06 | 0.02 | 0.20 | 0.18 | |

Table C5: Comparison of rates of growth of euro area imports before (1996-1998) and after (1999-2001) EMU (continued)

| NACE | Industry ¹ | Share of euro area imports (per cent) | Change relative to: | | Annual rates of growth in euro area imports from | | | | | | | | | |
|------|--|---------------------------------------|---|---|--|----------------------|--------------------------------------|--------------------------------------|----------------------|----------------------|--------------------------------------|--------------------------------------|------------------------------|----------------------|
| | | | Imports from non-euro area ² (percentage points) | Imports from non-euro area W. Europe ³ (percentage points) | Euro area | | | | Non-euro area | | | | Non-euro area Western Europe | |
| | | | | | 1996-1998 (per cent) | 1999-2001 (per cent) | Change 1996-1998 (percentage points) | Change 1999-2001 (percentage points) | 1996-1998 (per cent) | 1999-2001 (per cent) | Change 1996-1998 (percentage points) | Change 1999-2001 (percentage points) | 1996-1998 (per cent) | 1999-2001 (per cent) |
| 151 | Production, processing and preserving of meat and meat products | 1.2 | -0.08 | -0.02 | 0.04 | 0.02 | -0.02 | -0.03 | 0.03 | 0.06 | -0.07 | -0.07 | 0.00 | |
| 154 | Manufacture of vegetable and animal oils and fats | 0.6 | -0.09 | 0.10 | 0.08 | 0.01 | -0.07 | 0.05 | 0.07 | 0.02 | 0.11 | -0.07 | -0.18 | |
| 334 | Manufacture of optical instruments and photographic equipment | 0.6 | -0.10 | -0.08 | 0.14 | 0.09 | -0.05 | 0.10 | 0.15 | 0.05 | 0.09 | 0.12 | 0.03 | |
| 316 | Manufacture of electrical equipment not elsewhere classified | 1.1 | -0.11 | 0.09 | 0.07 | 0.02 | -0.05 | 0.07 | 0.13 | 0.06 | 0.15 | 0.00 | -0.14 | |
| 232 | Manufacture of refined petroleum products | 2.4 | -0.14 | -0.05 | 0.04 | 0.22 | 0.18 | -0.03 | 0.30 | 0.32 | -0.03 | 0.20 | 0.23 | |
| 322 | Television and radio transmitters and apparatus for line telephony | 2.4 | -0.17 | 0.09 | 0.29 | 0.19 | -0.10 | 0.21 | 0.28 | 0.07 | 0.31 | 0.12 | -0.19 | |

¹Industries which account for more than 0.5% of 2001 EU imports (combined share of 2001 imports: 88%).

²Basis of ranking.

³Denmark, Norway, Sweden, Switzerland and the United Kingdom.

Source: Data provided by the Strategy Unit, DTI from the Comext database.

Table C6: Sector characteristics potentially influencing EMU sensitivity

| NACE | Industry | Stocks & work in progress/turnover ¹ (per cent) | Advertising expenditure/turnover ² (per cent) | Small firms' share of turnover ³ (per cent) |
|------|---|---|---|---|
| 151 | Meat and meat products | 11 | 0.8 | 12 |
| 152 | Fish and fish products | 17 | 0.4 | * |
| 153 | Fruit and vegetables | 17 | 1.7 | 10 |
| 154 | Vegetable and animal oils and fats | 13 | 0.1 | * |
| 155 | Dairy products | 12 | 1 | 10 |
| 156 | Grain mill products, starches and starch products | 14 | 7.5 | 5 |
| 157 | Prepared animal feeds | 10 | 3 | 19 |
| 158 | Other food products | 16 | 4.1 | 11 |
| 159 | Beverages | 52 | 4.3 | 4 |
| 160 | Tobacco products | 11 | 3.5 | * |
| 171 | Preparation and spinning of textile fibres | 39 | 0.2 | 28 |
| 172 | Textile weaving | 39 | 0.5 | 36 |
| 174 | Made-up textile articles, except apparel | 30 | 1.3 | 53 |
| 175 | Other textiles | 32 | 1.5 | 34 |
| 176 | Knitted and crocheted fabrics | 30 | 0.2 | * |
| 177 | Knitted and crocheted articles | 40 | 1.2 | * |
| 181 | Leather clothes | 23 | 0 | * |
| 182 | Other wearing apparel and accessories | 27 | 1.3 | 50 |
| 183 | Furs | 19 | 0 | * |
| 191 | Tanning and dressing of leather | 23 | 0.5 | * |
| 192 | Luggage, handbags and the like, saddlery and harness | 33 | 2 | * |
| 193 | Footwear | 51 | 1 | * |
| 201 | Sawmilling and planing of wood | 26 | 0.2 | 53 |
| 202 | Veneer, plywood, fibre board and other panels and board | 21 | 0.5 | * |
| 203 | Builders' carpentry and joinery | 17 | 1.7 | 75 |
| 204 | Wooden containers | 15 | 0.2 | * |
| 205 | Other products of wood; articles of cork and straw | 21 | 0.3 | * |
| 211 | Pulp, paper and paperboard | 21 | 0.5 | * |
| 212 | Articles of paper and paperboard | 16 | 0.9 | * |
| 221 | Publishing | 11 | 4 | 21 |
| 222 | Printing and service activities related to printing | 8 | 0.3 | * |
| 233 | Processing of nuclear fuel | 16 | 0.2 | * |
| 241 | Basic chemicals | 21 | 0.2 | 6 |
| 242 | Pesticides and other agro-chemical products | 34 | 1.5 | * |
| 243 | Paints, varnishes, printing ink and mastics | 24 | 2.1 | 17 |
| 244 | Pharmaceuticals | 37 | 3.1 | 3 |
| 245 | Soap and detergents, cleaning and polishes, perfumes and toiletries | 20 | 9.6 | 11 |
| 246 | Other chemical products | 24 | 1.3 | 10 |
| 247 | Man-made fibres | 16 | 0.7 | * |
| 251 | Rubber products | 22 | 1.1 | 22 |
| 252 | Plastic products | 17 | 0.9 | 40 |
| 261 | Glass and glass products | 25 | 0.4 | 28 |
| 262 | Non-refractory ceramic goods | 33 | 0.9 | 27 |
| 263 | Ceramic tiles and flags | 33 | 1 | * |
| 264 | Bricks, tiles and construction products, in baked clay | 45 | 1.1 | * |
| 265 | Cement, lime and plaster | 20 | 0.2 | * |
| 266 | Articles of concrete, plaster and cement | 15 | 0.6 | 26 |
| 267 | Cutting, shaping and finishing of stone | 34 | 1.7 | * |
| 268 | Other non-metallic mineral products | 23 | 0.7 | 37 |
| 271 | Basic iron and steel and ferro-alloys | 25 | 0.1 | 2 |
| 272 | Tubes | 27 | 0.4 | 46 |
| 273 | Other first processing of iron and steel | 26 | 0.3 | 37 |
| 274 | Basic precious and non-ferrous metals | 22 | 0.2 | 9 |
| 281 | Structural metal products | 17 | 0.6 | 45 |
| 282 | Tanks, reservoirs and central heating | 23 | 1.1 | * |

Table C6: Sector characteristics potentially influencing EMU sensitivity (continued)

| NACE | Industry | Stocks & work in progress/turnover ¹ (per cent) | Advertising expenditure/turnover ² (per cent) | Small firms' share of turnover ³ (per cent) |
|------------------------|--|---|---|---|
| 283 | Steam generators | 16 | 0.1 | * |
| 286 | Cutlery, tools and general hardware | 28 | 0.9 | 60 |
| 287 | Other fabricated metal products | 21 | 0.5 | 52 |
| 291 | Machinery for mechanical power, except vehicles | 36 | 0.5 | 18 |
| 292 | General purpose machinery | 21 | 0.5 | 40 |
| 293 | Agricultural and forestry machinery | 31 | 0.7 | * |
| 294 | Machine tools | 32 | 0.7 | 37 |
| 295 | Other special purpose machinery | 27 | 0.6 | 35 |
| 296 | Weapons and ammunition | 62 | 0.5 | * |
| 297 | Domestic appliances not elsewhere classified | 22 | 2.2 | 16 |
| 300 | Office machinery and computers | 13 | 0.5 | 6 |
| 311 | Electric motors, generators and transformers | 33 | 0.4 | 27 |
| 312 | Electricity distribution and control apparatus | 27 | 0.8 | 19 |
| 313 | Insulated wire and cable | 24 | 0.2 | 20 |
| 314 | Accumulators, primary cells and primary batteries | 29 | 0.6 | * |
| 315 | Lighting equipment and electric lamps | 22 | 0.8 | * |
| 316 | Electrical equipment not elsewhere classified | 28 | 0.6 | 35 |
| 321 | Electronic components | 20 | 0.3 | 13 |
| 322 | TV and radio transmitters and apparatus for line telephony | 24 | 1 | 3 |
| 323 | TV and radio, sound or video recording apparatus | 21 | 1.1 | 7 |
| 331 | Medical and surgical equipment and orthopaedic appliances | 31 | 0.8 | 36 |
| 332 | Instruments for measuring, checking, testing, navigating | 34 | 0.7 | 23 |
| 334 | Optical instruments and photographic equipment | 36 | 1.5 | 36 |
| 335 | Watches and clocks | 26 | 0.8 | * |
| 341 | Motor vehicles | 23 | 2 | 1 |
| 342 | Bodies for motor vehicles; trailers | 23 | 0.4 | 32 |
| 343 | Parts and accessories for motor vehicles and their engines | 17 | 0.2 | 15 |
| 351 | Building and repairing of ships and boats | 43 | 0.6 | 27 |
| 352 | Railway and tramway locomotives and rolling stock | 30 | 0.1 | * |
| 353 | Aircraft and spacecraft | 58 | 0.2 | 4 |
| 354 | Motorcycles and bicycles | 32 | 1.5 | * |
| 355 | Other transport equipment nec | 17 | 0 | * |
| 361 | Furniture | 17 | 1.5 | 46 |
| 362 | Jewellery and related articles | 54 | 2.8 | * |
| 363 | Musical instruments | 34 | 1.2 | * |
| 364 | Sports goods | 29 | 5.5 | * |
| 365 | Games and toys | 25 | 1.9 | * |
| 366 | Miscellaneous manufacturing not elsewhere classified | 20 | 0.7 | 71 |
| Unweighted Mean | | 26 | 1.2 | 32 |

* Figures not specified for reasons of data confidentiality.

¹ Measured as the average of the beginning of the year and end of the year ratios, 2000, for UK industries, derived from the Annual Business Enquiry database.

² UK industries, 2000, Annual Business Enquiry database.

³ UK industries, March 2002, Inter-Departmental Business Register (IDBR). Annual turnover of less than £10 million.

Source: ONS and DTI calculations.

Table C7: Stock of FDI in the EU, 1999

| € billion (Per cent of total national stock) | EU | Aut | Den | Fin | Fra | Ger | Gre | Ire | Ita | Nld | Por | Spa | Swe | UK |
|---|------------------|----------------|-----------------|----------------|-----------------|------------------|----------------|-----------------|-----------------|-----------------|----------------|-----------------|-----------------|-----------------|
| Mining, quarrying | 21.29 (3.1) | 0.26 (1.1) | 0.82 (2.3) | – | 0.31 (0.2) | 0.54 (0.2) | 0.94 (6.4) | – | – | 3.00 (1.6) | 0.09 (0.4) | 0.48 (0.4) | – | 34.84 (9.7) |
| Manufacturing | 257.44 (37.8) | 7.10 (30.5) | 3.53 (10.1) | 8.25 (49.1) | 41.84 (28.3) | 45.04 (15.9) | 6.95 (47.4) | 85.74 (96.0) | 41.84 (45.8) | 65.55 (35.9) | 5.76 (26.2) | 49.83 (44.0) | 47.18 (64.3) | 93.14 (26.0) |
| Electricity, gas water | 11.26 (1.7) | 0.03 (0.1) | – | – | -0.23 (-0.2) | 0.52 (0.2) | 0.00 (0.0) | – | 2.19 (2.4) | 1.41 (0.8) | 0.29 (1.3) | 1.18 (1.0) | 5.62 (7.8) | 15.79 (4.4) |
| Construction | 2.66 (0.4) | 0.08 (0.3) | 0.33 (0.9) | – | 0.19 (0.1) | 0.47 (0.2) | 0.65 (4.4) | – | – | 0.81 (0.4) | 0.40 (1.8) | 2.34 (2.1) | 1.40 (1.9) | 0.91 (0.3) |
| Distributive trades | 77.89 (11.4) | 5.29 (22.7) | 6.73 (19.2) | 3.16 (18.8) | 12.71 (8.6) | 24.95 (8.8) | 1.43 (9.8) | – | 8.45 (9.3) | 31.37 (17.2) | 4.45 (20.2) | 11.15 (9.9) | 8.53 (11.6) | 37.55 (10.5) |
| Hotels, restaurants | 8.15 (1.2) | 0.20 (0.9) | 0.36 (1.0) | – | 0.36 (0.2) | 0.64 (0.2) | 1.26 (8.6) | – | – | 1.66 (0.9) | 0.49 (2.2) | 1.88 (1.7) | – | 6.38 (1.8) |
| Transport, storage communications | 24.18 (3.5) | 1.44 (6.2) | 8.69 (24.8) | 0.46 (2.7) | 1.35 (0.9) | 1.56 (0.5) | 3.22 (22.0) | – | 3.08 (3.4) | 10.13 (5.5) | 0.62 (2.8) | 2.56 (2.3) | – | 75.77 (21.1) |
| Financial intermediation | 147.27 (21.6) | 2.23 (9.6) | 4.34 (12.4) | 4.39 (26.2) | 25.73 (17.4) | 26.90 (9.5) | 0.22 (1.5) | 3.61 (4.0) | 35.71 (39.1) | 47.87 (26.2) | 4.33 (19.7) | 14.39 (12.7) | 3.15 (4.3) | 76.72 (21.4) |
| Real estate, renting, business activities | 131.47 (19.3) | 6.66 (28.6) | 10.20 (29.1) | 0.53 (3.2) | 65.57 (44.4) | 182.22 (64.4) | – | – | – | 20.91 (11.4) | 5.57 (25.3) | 29.33 (25.9) | 7.36 (10.0) | 17.26 (4.8) |

Source: European Commission, Eurostat, 2002.

Table C8: Top 20 cross-border M&As, 1998-2000

| | Deal value (US\$ billion) | Acquired company | Host country | Acquiring company | Home country |
|------|---------------------------|---|--------------|---|--------------|
| 2000 | 202.8 | Mannesmann AG <i>Telecommunications</i> | Germany | Vodafone AirTouch PLC <i>Telecommunications</i> | UK |
| 1999 | 60.3 | AirTouch Communications Inc. <i>Telecommunications</i> | US | Vodafone Group PLC <i>Telecommunications</i> | UK |
| 1998 | 48.2 | Amoco Corp. <i>Petroleum</i> | US | British Petroleum Co. PLC <i>Petroleum</i> | UK |
| 2000 | 46.0 | Orange PLC-Mannesmann AG <i>Telecommunications</i> | UK | France Télécom SA <i>Telecommunications</i> | France |
| 1998 | 40.5 | Chrysler Corp. <i>Automobile</i> | US | Daimler-Benz AG <i>Automobile</i> | Germany |
| 1999 | 34.6 | Astra AB <i>Pharmaceuticals</i> | Sweden | ZENECA Group PLC <i>Pharmaceuticals</i> | UK |
| 2000 | 32.6 | Orange PLC <i>Telecommunications</i> | UK | Mannesmann AG <i>Telecommunications</i> | Germany |
| 2000 | 27.2 | ARCO <i>Petroleum</i> | US | BP Amoco PLC <i>Petroleum</i> | UK |
| 2000 | 25.1 | Bestfoods <i>Food and kindred products</i> | US | Unilever PLC <i>Food and kindred products</i> | UK |
| 1999 | 21.9 | Hoechst AG <i>Chemicals</i> | Germany | Rhône-Poulenc SA <i>Chemicals</i> | France |
| 2000 | 19.4 | Allied Zurich PLC <i>Insurance</i> | UK | Zurich Allied AG <i>Insurance</i> | Switzerland |
| 1998 | 18.4 | BAT Industries PLC-Financial <i>Insurance</i> | UK | Zurich Versicherungs GmbH <i>Insurance</i> | Switzerland |
| 2000 | 14.8 | Airtel SA <i>Telecommunications</i> | Spain | Vodafone AirTouch PLC <i>Telecommunication</i> | UK |
| 1999 | 13.6 | One 2 One <i>Telecommunications</i> | UK | Deutsche Telekom AG <i>Telecommunications</i> | Germany |
| 1999 | 13.2 | YPF SA <i>Petroleum</i> | Argentina | Repsol SA <i>Petroleum</i> | Spain |
| 1999 | 12.6 | PacifiCorp <i>Electric and gas utility</i> | US | Scottish Power PLC <i>Electric and gas utility</i> | UK |
| 2000 | 11.8 | Ernst and Young Consulting <i>Consulting service</i> | US | Cap Gemini SA <i>Consulting service</i> | France |
| 2000 | 11.1 | Crédit Commercial de France <i>Banks</i> | France | HSBC Holding PLC <i>Banks</i> | UK |
| 2000 | 11.0 | CWC Consumer Co. <i>Telecommunications</i> | UK | NTL Inc. <i>Media (radio and TV)</i> | US |
| 1998 | 10.9 | Energy Group PLC <i>Electric and gas distribution</i> | UK | Texas Utilities Co. <i>Electric and gas distribution</i> | US |

Source: Thomson Financial and OECD, 2001a.

Table C9: European inward M&A by region/country of investor

| US\$ billion | Europe | North America | Asia/Pacific | Total | France | UK | Germany |
|--------------|--------------|---------------|--------------|---------------|--------------|--------------|--------------|
| 1990 | 45.2 | 11.7 | 8.6 | 68.5 | 11.7 | 5.9 | 5.6 |
| 1991 | 24.4 | 11.3 | 4.0 | 40.7 | 7.2 | 4.8 | 2.0 |
| 1992 | 36.3 | 8.1 | 1.1 | 49.9 | 8.9 | 8.6 | 2.7 |
| 1993 | 25.1 | 13.2 | 1.5 | 41.3 | 5.8 | 8.7 | 3.9 |
| 1994 | 39.0 | 17.8 | 1.6 | 59.8 | 4.8 | 10.2 | 6.1 |
| 1995 | 53.0 | 27.2 | 2.7 | 85.9 | 10.0 | 9.2 | 12.1 |
| 1996 | 48.0 | 37.3 | 8.7 | 96.5 | 8.6 | 6.3 | 5.6 |
| 1997 | 83.9 | 44.1 | 6.3 | 139.4 | 14.1 | 24.8 | 9.8 |
| 1998 | 137.4 | 77.6 | 9.8 | 229.5 | 25.9 | 19.8 | 16.0 |
| 1999 | 282.2 | 83.9 | 14.7 | 390.1 | 70.3 | 62.5 | 69.7 |
| Total | 777.5 | 332.1 | 39.0 | 1201.6 | 167.2 | 160.9 | 133.4 |

Source: OECD, 2001a.

Table C10: European outward M&A by region of destination

| US\$ billion | Europe | North America | Asia/Pacific | Latin America | Total |
|--------------|--------------|---------------|--------------|---------------|---------------|
| 1990 | 45.3 | 41.9 | 2.6 | 6.8 | 93.3 |
| 1991 | 24.4 | 16.9 | 1.3 | 0.6 | 43.9 |
| 1992 | 36.3 | 10.8 | 2.2 | 1.3 | 51.0 |
| 1993 | 25.1 | 14.5 | 3.0 | 1.0 | 42.6 |
| 1994 | 39.0 | 38.7 | 1.7 | 2.8 | 76.9 |
| 1995 | 53.9 | 38.1 | 12.4 | 2.1 | 93.4 |
| 1996 | 48.0 | 53.4 | 12.6 | 6.1 | 112.0 |
| 1997 | 83.9 | 55.4 | 5.7 | 18.0 | 158.1 |
| 1998 | 137.4 | 171.9 | 12.4 | 32.6 | 352.1 |
| 1999 | 282.2 | 203.5 | 24.0 | 34.0 | 553.0 |
| Total | 777.5 | 645.1 | 77.7 | 105.5 | 1576.2 |

Source: OECD, 2001a.

Table CI I: US FDI positions (historic-cost basis)

| US\$ billion | 1997 | 1998 | 1999 | 2000 | 2001 |
|------------------------------------|----------------|------------------|------------------|------------------|------------------|
| Austria | 2,646 | 3,856 | 3,669 | 2,686 | 3,374 |
| Belgium | 17,337 | 17,899 | 20,111 | 19,527 | 20,392 |
| Finland | 1,311 | 1,628 | 1,269 | 1,110 | 1,143 |
| France | 36,630 | 42,328 | 39,960 | 38,752 | 38,457 |
| Germany | 40,726 | 47,685 | 48,445 | 50,963 | 61,437 |
| Greece | 634 | 648 | 587 | 637 | 648 |
| Ireland | 11,339 | 21,825 | 25,946 | 33,816 | 34,499 |
| Italy | 15,547 | 15,548 | 17,321 | 22,392 | 23,893 |
| Luxembourg | 10,258 | 14,571 | 19,776 | 25,571 | 30,039 |
| Netherlands | 68,619 | 89,978 | 110,321 | 117,557 | 131,884 |
| Portugal | 1,399 | 1,360 | 1,915 | 1,888 | 1,924 |
| Spain | 11,541 | 14,221 | 18,632 | 19,846 | 19,421 |
| Euro area total¹ | 217,987 | 271,547 | 307,952 | 334,745 | 367,111 |
| Denmark | 2,385 | 2,764 | 3,413 | 5,363 | 6,537 |
| Sweden | 3,542 | 5,237 | 9,855 | 22,676 | 17,968 |
| UK | 154,462 | 183,035 | 228,574 | 241,663 | 249,201 |
| EU total | 378,376 | 462,583 | 549,794 | 604,447 | 640,817 |
| Rest of Europe | 46,763 | 55,850 | 62,164 | 75,010 | 84,976 |
| Canada | 96,626 | 98,200 | 111,747 | 128,814 | 139,031 |
| Latin America | 180,818 | 196,755 | 237,748 | 251,863 | 269,556 |
| Asia/Pacific | 144,815 | 159,678 | 184,313 | 205,317 | 216,501 |
| Other | 23,918 | 27,637 | 27,356 | 27,980 | 30,793 |
| World total | 871,316 | 1,000,703 | 1,173,122 | 1,293,431 | 1,381,674 |

¹ Including Greece for all years.

Source: Bureau of Economic Analysis, 2002

Table C12: US FDI stock by sector in the world, the EU and the UK (historic-cost basis)

| US\$ billion | Total Industry | Petroleum | Total Manuf'g | Food | Chemical | Primary fabricated metals | Mach'y and equip. | Elect. equip. | Transp't equip. | Other manuf'g | Wholesale Trade | Deposit'y Inst'ns | Finance Ins, real estate | Other services | Other industry |
|--------------|----------------|-----------|---------------|------|----------|---------------------------|-------------------|---------------|-----------------|---------------|-----------------|-------------------|--------------------------|----------------|----------------|
| Total | | | | | | | | | | | | | | | |
| 2001 | 1381.7 | 102.1 | 376.3 | 35.5 | 108.7 | 21.5 | 52.4 | 48.4 | 39.1 | 70.7 | 92.8 | 49.3 | 572.5 | 86.5 | 102.2 |
| 2000 | 1293.4 | 95.8 | 353.6 | 35.9 | 100.9 | 18.8 | 41.2 | 49.1 | 40.1 | 67.7 | 83.7 | 38.1 | 542.6 | 80.1 | 99.5 |
| 1999 | 1173.1 | 90.5 | 306.2 | 34.2 | 81.7 | 18.3 | 35.3 | 37.0 | 36.1 | 63.6 | 74.2 | 38.4 | 498.5 | 72.1 | 93.4 |
| 1998 | 1000.7 | 91.3 | 290.1 | 35.3 | 79.5 | 18.4 | 30.9 | 32.1 | 33.9 | 60.1 | 68.7 | 40.0 | 375.4 | 59.2 | 76.1 |
| EU | | | | | | | | | | | | | | | |
| 2001 | 640.8 | 22.7 | 195.6 | 17.6 | 72.6 | 10.5 | 30.9 | 20.0 | 10.6 | 33.4 | 35.1 | 20.9 | 274.8 | 48.0 | 43.8 |
| 2000 | 604.5 | 24.5 | 176.7 | 16.3 | 66.1 | 9.0 | 22.2 | 29.8 | 12.9 | 30.5 | 33.2 | 20.2 | 261.6 | 44.4 | 43.9 |
| 1999 | 549.8 | 26.3 | 147.9 | 15.3 | 48.1 | 9.9 | 18.4 | 13.8 | 13.5 | 28.9 | 32.4 | 20.5 | 244.7 | 39.0 | 39.0 |
| 1998 | 462.6 | 28.0 | 141.3 | 15.0 | 47.5 | 10.7 | 16.8 | 11.5 | 13.1 | 26.8 | 30.9 | 19.3 | 181.6 | 34.3 | 27.2 |
| UK | | | | | | | | | | | | | | | |
| 2001 | 249.2 | 11.9 | 55.4 | 6.2 | 16.4 | 2.5 | 12.0 | 3.0 | 3.0 | 12.3 | 8.0 | 13.3 | 110.2 | 17.8 | 33.7 |
| 2000 | 241.7 | 15.6 | 49.8 | 6.3 | 15.0 | 2.3 | 8.8 | 3.8 | 3.4 | 10.3 | 8.3 | 12.3 | 105.2 | 16.1 | 34.2 |
| 1999 | 228.6 | 17.5 | 49.1 | 5.8 | 15.5 | 2.4 | 9.0 | 3.6 | 3.4 | 9.4 | 7.5 | 11.1 | 98.8 | 14.8 | 29.8 |
| 1998 | 183.0 | 18.4 | 42.4 | 4.9 | 16.2 | 1.9 | 7.3 | 3.6 | 1.1 | 7.3 | 7.2 | 10.7 | 72.4 | 12.2 | 19.7 |

Source: Bureau of Economic Analysis.

Table C13: US FDI stock by sector and EU Member State (historic-cost basis)

| US\$ billion | Total Industry | Petroleum | Total Manuf'g | Food | Chemical | Primary/fabricated metals | Mach'y and equip. | Elect. equip. | Transp't equip. | Other manuf'g | Wholesale Trade | Deposit'y Inst'ns | Finance | | | Other industry |
|----------------|----------------|-----------|---------------|------|----------|---------------------------|-------------------|---------------|-----------------|---------------|-----------------|-------------------|------------------|----------------|----------------|----------------|
| | | | | | | | | | | | | | Ins, real estate | Other services | Other industry | |
| Austria | | | | | | | | | | | | | | | | |
| 2001 | 3.4 | * | 1.7 | 0.0 | 0.1 | * | 0.1 | 0.5 | 0.3 | * | 0.7 | 0.3 | 0.4 | 0.3 | * | |
| 2000 | 2.7 | * | 1.2 | 0.0 | 0.1 | * | 0.1 | 0.4 | 0.3 | * | 0.6 | 0.3 | 0.3 | 0.2 | * | |
| 1999 | 3.7 | 0.1 | 0.9 | 0.0 | 0.1 | 0.0 | 0.1 | 0.4 | 0.1 | 0.2 | 0.6 | * | 0.1 | * | -0.1 | |
| 1998 | 3.9 | 0.2 | 1.1 | 0.0 | 0.0 | 0.0 | 0.1 | 0.4 | 0.3 | 0.2 | 0.5 | * | * | 0.2 | 0.0 | |
| Belgium | | | | | | | | | | | | | | | | |
| 2001 | 20.4 | 0.0 | 7.1 | 1.2 | 4.5 | 0.2 | 0.1 | 0.1 | 0.3 | 0.8 | 2.1 | 0.6 | 7.8 | 3.0 | -0.1 | |
| 2000 | 19.5 | 0.0 | 7.5 | 1.0 | 4.8 | 0.1 | 0.1 | 0.3 | 0.3 | 1.0 | 1.8 | 0.5 | 7.3 | 2.5 | -0.2 | |
| 1999 | 20.1 | 0.1 | 7.7 | 1.0 | 4.5 | 0.1 | 0.2 | 0.3 | 0.3 | 1.3 | 3.0 | 0.4 | 6.8 | 2.3 | -0.2 | |
| 1998 | 17.9 | 0.1 | 8.6 | 1.2 | 5.4 | 0.1 | 0.3 | 0.3 | 0.5 | 0.9 | 2.5 | 0.3 | 4.7 | 1.6 | 0.0 | |
| Denmark | | | | | | | | | | | | | | | | |
| 2001 | 6.5 | 0.9 | 2.1 | 0.1 | 0.1 | 0.0 | * | 0.5 | * | 0.3 | 1.9 | 0.0 | * | 0.1 | * | |
| 2000 | 5.4 | 1.1 | 2.0 | 0.1 | 0.1 | 0.0 | * | 0.3 | 0.0 | * | 0.7 | 0.0 | * | 0.1 | * | |
| 1999 | 3.4 | 0.9 | 0.8 | 0.0 | * | * | * | 0.3 | 0.0 | 0.3 | * | 0.0 | 0.7 | 0.1 | * | |
| 1998 | 2.8 | 0.6 | 0.5 | 0.0 | 0.1 | 0.1 | * | 0.2 | 0.0 | * | * | 0.0 | 0.9 | 0.2 | * | |
| Finland | | | | | | | | | | | | | | | | |
| 2001 | 1.1 | 0.0 | 0.7 | 0.0 | 0.4 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | 0.3 | 0.0 | * | 0.1 | * | |
| 2000 | 1.1 | 0.0 | 0.7 | 0.0 | 0.3 | * | 0.1 | 0.1 | 0.1 | * | 0.7 | 0.0 | * | 0.1 | * | |
| 1999 | 1.3 | * | 0.5 | 0.0 | 0.4 | * | 0.0 | 0.0 | 0.0 | * | 0.4 | 0.0 | * | 0.1 | 0.1 | |
| 1998 | 1.6 | 0.0 | 1.0 | 0.0 | 0.3 | * | 0.0 | * | * | 0.1 | 0.3 | 0.0 | * | 0.1 | * | |
| France | | | | | | | | | | | | | | | | |
| 2001 | 38.5 | * | 16.2 | 3.4 | 2.6 | 3.8 | 1.2 | 2.5 | 0.7 | 2.0 | 2.6 | 2.7 | 8.4 | 5.2 | * | |
| 2000 | 38.8 | * | 16.1 | 3.1 | 2.9 | 3.7 | 1.0 | 2.3 | 0.7 | 2.3 | 2.6 | 3.0 | 9.4 | 5.0 | * | |
| 1999 | 40.0 | * | 16.3 | 2.9 | 4.0 | 4.0 | 1.0 | 1.0 | 0.8 | 2.5 | 2.8 | 2.9 | 9.4 | 5.2 | * | |
| 1998 | 42.3 | 1.1 | 19.7 | 3.5 | 4.2 | 4.4 | 2.6 | 1.0 | 1.0 | 3.1 | 2.7 | 1.7 | 9.8 | 5.2 | 2.2 | |
| Germany | | | | | | | | | | | | | | | | |
| 2001 | 61.4 | 2.4 | 34.5 | 0.6 | 10.0 | 2.6 | 10.1 | 2.4 | 4.8 | 4.0 | 2.6 | 0.2 | 14.4 | 4.1 | 3.2 | |
| 2000 | 51.0 | 1.5 | 24.1 | 0.6 | 3.5 | 1.2 | 5.9 | 2.5 | 6.1 | 4.2 | 3.5 | 0.3 | 14.8 | 3.6 | 3.2 | |
| 1999 | 48.5 | 1.4 | 22.5 | 0.5 | 3.5 | 1.5 | 4.5 | 1.8 | 6.8 | 3.9 | 3.3 | 0.7 | 14.8 | 2.2 | 3.7 | |
| 1998 | 47.7 | 3.2 | 22.8 | 1.0 | 3.0 | 2.0 | 4.1 | 1.3 | 7.2 | 4.1 | 3.1 | 1.1 | 12.4 | 2.0 | 3.1 | |
| Greece | | | | | | | | | | | | | | | | |
| 2001 | 0.7 | 0.0 | 0.1 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.1 | 0.2 | 0.1 | 0.0 | |
| 2000 | 0.6 | * | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | * | 0.0 | 0.0 | |
| 1999 | 0.6 | * | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | * | * | 0.0 | |
| 1998 | 0.7 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.2 | * | 0.1 | * | |

Table C13: US FDI stock by sector and EU Member State (historic-cost basis) (continued)

| US\$ billion | Total Industry | Petroleum | Total Manuf'g | Food | Chemical | Primary/fabricated metals | Mach'y and equip. | Elect. equip. | Transp't equip. | Other manuf'g | Wholesale Trade | Depository Inst'ns | Finance Ins, real estate | Other services | Other industry |
|--------------------|----------------|-----------|---------------|------|----------|---------------------------|-------------------|---------------|-----------------|---------------|-----------------|--------------------|--------------------------|----------------|----------------|
| | | | | | | | | | | | | | | | |
| Ireland | | | | | | | | | | | | | | | |
| 2001 | 34.5 | * | 10.5 | 0.5 | 3.8 | 0.1 | 1.0 | 0.9 | 0.0 | 4.1 | 0.9 | 0.0 | 12.7 | 9.9 | * |
| 2000 | 33.8 | * | 8.8 | 0.4 | 3.4 | 0.1 | 0.7 | 0.7 | 0.0 | 3.4 | 0.8 | -0.1 | 14.3 | 8.8 | * |
| 1999 | 26.0 | * | 7.5 | 0.6 | 2.8 | 0.1 | 0.4 | 0.7 | 0.0 | 2.8 | 0.5 | 0.0 | 10.0 | 7.3 | * |
| 1998 | 21.8 | * | 8.0 | 0.6 | 3.1 | 0.2 | 0.2 | 1.2 | 0.0 | 2.7 | 0.3 | 0.0 | 7.6 | 5.4 | * |
| Italy | | | | | | | | | | | | | | | |
| 2001 | 23.9 | * | 13.1 | 1.2 | 2.8 | 0.2 | 1.3 | 4.7 | 0.7 | 2.2 | 2.2 | 0.4 | 3.3 | 2.5 | * |
| 2000 | 22.4 | * | 12.3 | 1.1 | 2.5 | 0.1 | 1.1 | 4.7 | 0.8 | 2.1 | 2.4 | 0.3 | 2.8 | 2.5 | * |
| 1999 | 17.3 | * | 8.1 | 1.0 | 2.3 | 0.1 | 0.9 | 1.2 | 0.7 | 1.9 | 2.6 | 0.2 | 2.3 | 2.4 | * |
| 1998 | 15.6 | * | 8.1 | 0.8 | 3.0 | 0.1 | 1.0 | 0.7 | 0.6 | 1.9 | 2.6 | 0.3 | 0.9 | 2.3 | * |
| Luxembourg | | | | | | | | | | | | | | | |
| 2001 | 30.0 | 0.1 | 2.6 | 0.0 | * | * | 0.0 | 0.0 | 0.0 | * | 1.3 | 0.4 | 24.5 | 0.2 | 0.0 |
| 2000 | 25.6 | 0.1 | 3.4 | 0.0 | * | * | 0.0 | 0.0 | 0.0 | * | 1.1 | 0.3 | 20.6 | 0.1 | 0.0 |
| 1999 | 19.8 | * | 3.6 | 0.0 | * | * | 0.0 | 0.0 | 0.0 | * | * | 0.3 | 15.1 | 0.0 | 0.0 |
| 1998 | 14.6 | * | 2.6 | 0.0 | 0.0 | * | 0.0 | 0.0 | 0.0 | * | * | 0.3 | 11.2 | 0.0 | 0.0 |
| Netherlands | | | | | | | | | | | | | | | |
| 2001 | 131.9 | 4.3 | 34.7 | 3.1 | 22.5 | -0.1 | 3.8 | 3.2 | 0.0 | 2.3 | 10.4 | * | 76.3 | 3.7 | * |
| 2000 | 117.6 | 3.1 | 29.5 | 2.7 | 19.1 | 0.0 | 2.9 | 2.6 | 0.0 | 2.2 | 8.7 | * | 71.3 | 3.0 | * |
| 1999 | 110.3 | 3.2 | 21.7 | 2.3 | 12.1 | 0.3 | 1.9 | 3.2 | 0.1 | 1.8 | 8.4 | * | 73.1 | 2.5 | * |
| 1998 | 90.0 | 2.7 | 15.9 | 1.1 | 10.5 | 0.4 | 0.9 | 1.0 | 0.3 | 1.7 | 6.9 | * | 59.4 | 3.3 | * |
| Portugal | | | | | | | | | | | | | | | |
| 2001 | 1.9 | * | 0.6 | 0.1 | 0.1 | 0.0 | * | 0.3 | 0.1 | * | 0.4 | 0.1 | 0.3 | 0.4 | * |
| 2000 | 1.9 | * | 0.5 | 0.1 | 0.1 | 0.0 | * | 0.3 | 0.1 | * | 0.3 | 0.1 | 0.3 | 0.5 | * |
| 1999 | 1.9 | * | 0.5 | 0.1 | 0.1 | 0.0 | * | 0.2 | 0.1 | * | 0.3 | * | 0.2 | 0.5 | 0.2 |
| 1998 | 1.4 | * | 0.3 | 0.1 | 0.1 | 0.0 | * | * | 0.0 | 0.0 | 0.4 | * | 0.3 | 0.1 | * |
| Spain | | | | | | | | | | | | | | | |
| 2001 | 19.4 | * | 6.6 | 1.0 | 1.6 | 1.3 | -0.1 | 1.0 | 0.9 | 1.0 | 1.2 | 2.3 | 8.5 | 0.6 | * |
| 2000 | 19.9 | * | 0.5 | 0.1 | 0.1 | 0.0 | * | 0.3 | 0.1 | * | 0.3 | 0.1 | 0.3 | 0.5 | * |
| 1999 | 18.6 | 0.1 | 7.1 | 1.1 | 1.5 | 1.3 | 0.1 | 1.0 | 1.2 | 1.0 | 1.3 | 2.2 | 7.1 | 0.5 | 0.4 |
| 1998 | 14.2 | 0.2 | 8.7 | 1.7 | 1.4 | 1.4 | 0.2 | 1.0 | 2.2 | 1.0 | 1.8 | 2.1 | 0.5 | 0.6 | 0.4 |
| Sweden | | | | | | | | | | | | | | | |
| 2001 | 18.0 | 0.1 | 8.7 | 0.2 | * | 0.2 | 0.2 | 1.0 | * | * | 0.4 | * | 6.6 | 1.3 | * |
| 2000 | 22.7 | 0.1 | 14.0 | 0.0 | * | 0.0 | 0.3 | 0.9 | 0.1 | * | 0.4 | * | 6.0 | 1.3 | * |
| 1999 | 9.9 | 0.1 | 1.6 | 0.0 | 0.3 | 0.0 | 0.2 | 0.1 | 0.1 | 0.9 | 0.6 | * | 5.9 | 0.9 | * |
| 1998 | 5.2 | * | 1.7 | 0.0 | 0.2 | 0.0 | 0.2 | 0.1 | * | * | 0.4 | * | 1.3 | 1.1 | 0.3 |

Table CI3: US FDI stock by sector and EU Member State (historic-cost basis) (continued)

| US\$ billion | Total Industry | Petroleum | Total Manuf'g | Food | Chemical | Primary/fabricated metals | Mach'y and equip. | Elect. equip. | Transp't equip. | Other manuf'g | Wholesale Trade | Deposit'y Inst'ns | Finance | | Other industry | |
|--------------|----------------|-----------|---------------|------|----------|---------------------------|-------------------|---------------|-----------------|---------------|-----------------|-------------------|------------------|----------------|----------------|--|
| | | | | | | | | | | | | | Ins, real estate | Other services | | |
| UK | | | | | | | | | | | | | | | | |
| 2001 | 249.2 | 11.9 | 55.4 | 6.2 | 16.4 | 2.5 | 12.0 | 3.0 | 3.0 | 12.3 | 8.0 | 13.3 | 110.2 | 16.8 | 33.7 | |
| 2000 | 241.7 | 15.6 | 49.8 | 6.3 | 15.0 | 2.3 | 8.8 | 3.8 | 3.4 | 10.3 | 8.3 | 12.3 | 105.2 | 16.1 | 34.2 | |
| 1999 | 228.6 | 17.5 | 49.1 | 5.8 | 15.5 | 2.4 | 9.0 | 3.6 | 3.4 | 9.4 | 7.5 | 11.1 | 98.8 | 14.8 | 29.8 | |
| 1998 | 183.0 | 18.4 | 42.4 | 4.9 | 16.2 | 1.9 | 7.3 | 3.6 | 1.1 | 7.3 | 7.2 | 10.7 | 72.4 | 12.2 | 19.7 | |

* Figures not specified for reasons of data confidentiality.
Source: Bureau of Economic Analysis.

Table CI4: Gini coefficients of specialisation, US and EU

| | 1970-1973 | 1980-1983 | 1988-1991 | 1994-1997 |
|------------|-----------|-----------|-----------|-----------|
| US average | 0.450 | 0.413 | 0.391 | 0.372 |
| EU average | 0.248 | 0.234 | 0.249 | 0.261 |

Source: Midelfart-Knarvik et al., 2000.

Table CI5: Sector structure implications: sensitivity to interest rate changes

| 1 = least sensitive, 3 = most sensitive | Production | | Value added | | Exports | |
|--|------------|---------|-------------|---------|---------|---------|
| | 1992-95 | 1996-98 | 1992-95 | 1996-98 | 1992-95 | 1996-98 |
| France | 1.81 | 1.82 | 1.81 | 1.82 | 1.92 | 1.93 |
| Germany | 1.96 | 2.01 | 1.98 | 2.02 | 2.10 | 2.12 |
| Italy | 1.79 | 1.82 | 1.80 | 1.83 | 1.94 | 1.96 |
| UK | 1.80 | 1.82 | 1.81 | 1.83 | 1.86 | 1.86 |
| 'EU4' | 1.86 | 1.89 | 1.88 | 1.90 | 1.98 | 2.00 |

Source: DTI, new version of OECD STAN.

Table CI6: Sector structure implications: sensitivity to cost changes

| 1 = least sensitive 3 = most sensitive | Production | | Value added | | Exports | |
|---|------------|---------|-------------|---------|---------|---------|
| | 1992-95 | 1996-98 | 1992-95 | 1996-98 | 1992-95 | 1996-98 |
| France | 1.67 | 1.65 | 1.70 | 1.68 | 1.75 | 1.75 |
| Germany | 1.69 | 1.66 | 1.69 | 1.66 | 1.70 | 1.68 |
| Italy | 1.86 | 1.85 | 1.86 | 1.85 | 1.97 | 1.94 |
| UK | 1.64 | 1.65 | 1.61 | 1.61 | 1.79 | 1.82 |
| 'EU4' | 1.71 | 1.70 | 1.71 | 1.69 | 1.77 | 1.77 |

Source: DTI, new version of OECD STAN.

Table C17: Most agglomerated UK regions, by postcode, 1992

| 4-digit industry | 1st postcode area | 2nd postcode area | Total number of firms | Per cent of firms in 1st (2nd) postcode | Per cent of emp. in 1st (2nd) postcode | Average firm emp. in 1st (other) postcode |
|----------------------|-------------------|-------------------|-----------------------|---|--|---|
| Spinning, weaving | N. Ireland | * | 26 | 57.7 (*) | 86.3 (*) | 134 (29) |
| Jute, polypropylene | Dundee | * | 31 | 32.3 (*) | 67.6 (*) | 204 (47) |
| Ceramic goods | Stoke-on-Trent | Derby | 744 | 31.3 (3.0) | 66.0 (4.1) | 120 (28) |
| Lace | Nottingham | Derby | 86 | 60.5 (11.6) | 63.8 (14.2) | 36 (31) |
| Cutlery | Sheffield | * | 75 | 68.0 (*) | 58.2 (*) | 39 (60) |
| Pedal cycles | * | Birmingham | 73 | * (19.2) | * (17.7) | * (21) |
| Hosiery | Leicester | Nottingham | 1341 | 39.7 (6.0) | 38.2 (17.9) | 40 (43) |
| Jewellery | Birmingham | London | 1916 | 18.4 (25.5) | 33.7 (21.3) | 11 (5) |
| Handtools | Sheffield | Walsall | 324 | 18.8 (2.8) | 40.7 (7.7) | 51 (17) |
| Periodicals | London | Tunbridge Wells | 2079 | 29.7 (3.0) | 38.4 (3.1) | 26 (18) |
| Woollens and worsted | Bradford | Huddersfield | 508 | 17.7 (16.3) | 28.8 (17.3) | 95 (50) |
| Caravans | Hull | Bournemouth | 85 | 18.8 (5.9) | 37.1 (9.3) | 148 (54) |
| Wall coverings | Blackburn | * | 33 | 27.3 (*) | 40.1 (*) | 166 (93) |
| Weaving cotton, silk | Blackburn | Oldham | 267 | 14.6 (6.0) | 32.8 (13.0) | 111 (39) |
| Other steel forming | Birmingham | Sheffield | 58 | 22.4 (10.3) | 21.6 (19.2) | 74 (78) |
| Spirit distilling | Glasgow | Edinburgh | 95 | 13.7 (8.4) | 30.8 (12.3) | 290 (103) |
| Hats | Luton | * | 126 | 23.8 (*) | 29.2 (*) | 26 (20) |
| Fish processing | Doncaster | Aberdeen | 290 | 4.5 (14.8) | 29.3 (14.8) | 502 (57) |

* Figures not specified for reasons of data confidentiality.
Source: Devereux et al., 2002.