

# **THE CONTRIBUTION OF FOREIGN AFFILIATES TO PRODUCTIVITY GROWTH: EVIDENCE FROM OECD COUNTRIES**

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## **ABSTRACT**

This study uses new information to determine the role of foreign affiliates for productivity growth. The study has three aims. Firstly, the study quantifies the contribution of foreign affiliates to productivity growth in OECD countries using a growth accounting approach. Secondly, the analysis shows how much of this contribution derives from an increase in the employment share of foreign affiliates in the host country relative to an increase in productivity of existing foreign affiliates. Thirdly, the study compares the presence of foreign affiliates across OECD countries. The information is derived by matching three OECD data sources: the STAN database for industrial analysis, the AFA (Activities of Foreign Affiliates) and FATS (Foreign Affiliates in Trade and Services) databases. Despite its limitations, this database provides longitudinal industry level information on both the presence and the productivity of foreign affiliates in OECD countries. The analysis confirms that foreign affiliates can make an important contribution to productivity growth. The contribution is larger in the manufacturing sector. In the services sector and in low-tech manufacturing sectors, the largest component of the contribution of foreign affiliates is mainly the increased employment share of foreign affiliates. In medium and high tech sectors, the contribution is mainly driven by the larger growth of existing foreign affiliates.

## **INTRODUCTION**

In recent decades foreign direct investment (FDI) has steadily increased so that foreign owned multinational enterprises (MNEs) now play an important role in the economy of many developed and developing countries.

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What is the impact of foreign affiliates on the host country economy?

Countries have competed with each other in attracting FDI because affiliates of foreign MNEs are expected to contribute to the welfare of the host economy through multiple channels.

Economic models of international trade assume that MNEs must have inherent advantages that allow them to compete with domestic firms despite the higher costs of operating in a foreign country with a different culture and legal environment, where they have also less knowledge of demand conditions and of local business networks with suppliers and customers (see for example Hymer, 1976; Helpman 1984; Dunning, 1991 and Markusen, 1995).

The inherent advantages derive from firm specific assets, such as better management techniques and better production technology and employees' technical knowledge which they can share with their affiliates as well as brand names and product innovations that the affiliates benefit from.

Thus, firms that are affiliates of Multinational enterprises benefit both from being part of a global group, and from the advantages of vertical (and/or horizontal) integration. They can gain from factor price differentials, global economies of scale, outsourcing and the knowledge transfers from parent companies and flows among subsidiaries. This makes them more productive than firms which are not part of an MNE (see for example Doms and Jensen, 1998 for evidence on the United States; Griffith, 1999 and Criscuolo and Martin, 2004 for evidence on the UK). Since there is a paucity of data identifying firms which are part of domestic MNEs, and since only a small fraction of domestic firms are part of domestic multinationals, this MNE advantage is reflected in a foreign affiliates' advantage.

Empirical evidence has shown that foreign affiliates are larger, more capital and skill intensive; they invest more in both physical and knowledge capital and pay higher wages<sup>1</sup> than domestic firms within the same industry. Also, as shown by previous OECD work, they are often concentrated in more capital and skill intensive sectors. Foreign affiliates are also more R&D intensive and more innovative. Therefore, they are likely to grow more rapidly than domestic firms and thus contribute *directly* to the productivity growth of the host economy more than the average domestic firm.

Foreign affiliates may contribute *indirectly* to the productivity growth of the host economy, by raising the productivity of domestic firms. Host countries hope to benefit from the presence of foreign affiliates by appropriating some of the productivity and knowledge advantages that foreign affiliates cannot fully internalize. These externalities take place through "knowledge spillovers" such as international technology transfers and diffusion of best practices and demonstration effects (see Keller, 2004 for a survey)<sup>2</sup>. The presence of foreign affiliates increases the competitive pressure on domestic firms in the same industry, thus forcing them to introduce new technology and improve efficiency (see Blomström and Kokko, 1997); however, the entry of foreign firms can result in lower productivity or exit of domestic firms because of lower market share, through a market stealing effect (Aitken and Harrison, 1999).

This is the first study to quantify the *direct* contribution of foreign affiliates to productivity growth across OECD countries using a growth accounting approach. It investigates how much of the contribution is derived from an increase in the size of foreign affiliates' presence in the host country and how much is derived from their more rapid growth. The data on which the analysis is based comes from matching three sources: the OECD STAN database for industrial analysis, the AFA (Activities of Foreign Affiliates) and

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1. See Lipsey, 2003 for a survey of empirical evidence.

2. Domestic firms can imitate foreign affiliates; workers trained in foreign firms might leave foreign firms and move to domestic firms. In the case of backward and forward linkages, Foreign firms are also likely to improve the knowledge of domestic suppliers and/or distributors (see evidence in Smarzynska, 2004).

FATS (Foreign Affiliates' Trade in Services) databases. Despite its limitation, this data provides longitudinal information at sector level on the productivity of the host country and the presence and the productivity of foreign affiliates. Thus, this study does not attempt to assess and quantify spillovers (i.e. the *indirect* contribution) from foreign affiliates to domestic firms. This will be the subject of future research.

Only the study by Corrado, Lengermann and Slifman (2003) has used a growth accounting approach to quantify the contribution of the (foreign and domestic) multinational sector to labour productivity growth of the United States for the period from 1977 to 2000 using industry level data. Relative to their work, this study assesses the contribution of the foreign multinational sector across several OECD countries. Moreover, it extends their analysis, by decomposing the foreign affiliates' contribution in two effects: the *within* effect, i.e. the contribution from productivity growth of existing foreign affiliates, and the *between* effect, i.e. the contribution from the growth in the share of foreign affiliates' employment in the host economy.

The rest of the paper is organised as follows. The next section describes the data, section three outlines the methodology used and section four describes the results. Finally section 5 concludes. The Annex and the Appendices include more details regarding the data and some additional results.

## THE DATA

The data used for the analysis contains information from three OECD databases: the STAN productivity database; the AFA (Activity of Foreign Affiliates) database, which contains information on activity of foreign affiliates in the manufacturing sector and the FATS (Foreign Affiliates' Trade in Services) database, which contains information on the activity of foreign affiliates in the service sector. A description of each dataset follows.

### The STAN database

The Structural Analysis (STAN) database is provided and maintained by the Economic Analysis and Statistics Division of the OECD. STAN has been widely used and comprehensively documented.<sup>3</sup> Thus, this section only briefly describes the variables used and the main issues of interest.

STAN contains information on annual measures of output, measured as gross output and/or value added, labour input, investment, import and exports at the industry level<sup>4</sup> both in the manufacturing and the services sector for 28 OECD countries. The analysis conducted in the paper only uses measures of output and labour input to construct measures of labour productivity growth.

STAN is mostly based on member countries' annual National Accounts, mainly collected at the establishment level, but also uses other sources (e.g. national industrial surveys/censuses; short term indicators of industrial activity; labour force surveys; business registers; income surveys and input-output tables) to estimate missing information. In general, the STAN definitions of variables follow SNA93 definitions.

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3. See Webb (2005) for a thorough user guide and [www.oecd.org/sti/stan](http://www.oecd.org/sti/stan) for an overview of the sources.

4. STAN list of industries is based on ISIC Rev. 3

The output measures available in STAN are value added and gross output, they are measured as nominal, i.e. at current prices, and real, i.e. as volumes. The latter are expressed as index numbers with national reference year equal to 100. It is, therefore, possible to calculate the implicit deflators for gross output and for value added.<sup>5</sup>

Gross Output is defined as the value of goods and/or services produced in a year whether sold or stocked.

The definition of Value Added in STAN is at the valuation most commonly presented in national publications; however this definition differs across countries. Indeed, value added is not measured directly, but calculated as the difference between production and intermediate inputs, or as the sum of labour costs, consumption of fixed capital, taxes less subsidies and net operating surplus and mixed income. Table 1 (from Webb, 2005) describes the different definitions. Table 2 describes the difference in definitions across countries used in the current analysis; as the table shows, most countries present value added at basic prices, in line with SNA93 (or in Europe, ESA95) recommendations. Japan and the United States use valuations at producer's prices.

**Table 1. Valuation of Value added<sup>1</sup>**

Value added at <b>Factor costs</b>	1. This table draws on concepts outlined in both the 1968 and 1993 version of a <i>System of National Accounts</i> (SNA68 and SNA93). Until the late 1990s, most countries adhered to recommendations in SNA68 (where the notions of Factor Costs, Producer's Prices and Market Prices were predominant). However, many OECD Member countries have now implemented SNA93 (or the EU equivalent, ESA95) which recommends the use of Basic Prices and Producer's prices (as well as Purchaser's Prices for Input-Output tables).
+ <i>other taxes, less subsidies, on production</i> <sup>2</sup>	
= Value added at <b>Basic prices</b>	2. These consist mostly of current taxes (and subsidies) on the labour or capital employed, such as payroll taxes or current taxes on vehicles and buildings.
+ <i>taxes less subsidies, on products</i> <sup>3</sup> <i>(not including imports and VAT)</i>	
= Value added at <b>Producer's prices</b>	
+ <i>taxes, less subsidies, on imports</i>	
+ Trade and transport costs	3. These consist of taxes (and subsidies) payable per unit of some good or service produced, such as turnover taxes and excise duties.
+ Non-deductible VAT	
= Value added at <b>Market prices</b> <sup>4</sup>	4. Market prices are those which purchasers pay for the goods and services they acquire or use, excluding deductible VAT. The term is usually used in the context of aggregates such as GDP, whereas Purchaser Prices refer to the individual transactions.

Source: Colin Webb, 2005

**Table 2. Differences in Valuation of Value added across countries<sup>1</sup>**

Definition	Country
Value added at <b>Basic prices</b>	Austria; Belgium; Czech Republic; Germany; Finland; France; Hungary; Italy; Netherlands; Norway; Poland; Portugal; Spain; Sweden
Value added at <b>Producer's prices</b>	Japan; United States

Source: OECD, STAN country notes, 2005

5. The calculation is the following: (output at current prices \* 100) / index of output volumes \* output at current prices in the reference year); where output can refer to value added and/or gross output.

STAN has information on total employment and on the number of employees. The preferred measure of labour input in this study is employment. For many countries the measure of employment provided is headcounts, i.e. the actual number engaged full- and part-time. However, some countries such as Austria; Japan and the United Kingdom provide the number of jobs, as recommended in SNA93, so that those with more than one job are counted more than once. For measuring productivity, a measure of hours worked or of full-time equivalent employment would be preferable<sup>6</sup>. However, there are concerns related to the measurement of hours actually worked and their degree of international comparability (see Chapter 4 of the OECD's Manual "Measuring Productivity"), consequently this study prefers the headcounts measure.

### **AFA and FATS databases**

Both the Activity of Foreign Affiliates (AFA) and the Foreign Affiliates' Trade in Services (FATS) are survey based data. OECD member countries report on the basis of their own surveys or their own business registers information concerning the outputs, inputs and importing/exporting activity of foreign affiliates at the sectoral level. The data contains 18 variables that described the activity of foreign affiliates in the host country.

The data reports information at the enterprise level, rather than at the establishment level. This means that the statistics on foreign affiliates' activity reported might incorporate secondary activity. This point is particularly relevant because measures of foreign affiliates' activity are calculated relative to national totals using data from STAN which is primarily based on establishment level data. Since the two aggregates are not expressed in the same statistical unit, this might cause some measurement error problem (see also the OECD Manual on Globalisation section 3.3.7).

The AFA and FATS databases do not contain information on the enterprises' capital stocks. Thus, the only measure of productivity that can be calculated from AFA/FATS is labour productivity, defined as the ratio of output (value added or turnover) to the number of persons employed.

In using these data various issues arise.

Firstly, the definition of "Foreign Affiliate" in both databases on the activity of foreign affiliates in manufacturing and service sector is based on the concept of controlling interest. The definition of "controlling interest" might differ across countries (as detailed in Figure 1 and 2). For most countries, controlling interest is defined as direct majority ownership (i.e. over 50% of shares held directly by foreign owners). However, for some countries such as Hungary and the United States data on foreign affiliates include also firms under minority control (between 10% and 50%), based on the assumption that foreign owners can still influence management decisions. Moreover some countries (e.g. Germany) include indirectly foreign-owned establishments, i.e. owned by foreigners through foreign majority-owned resident enterprises. When making cross-country comparisons these differences need to be outlined.

Secondly, the definition of foreign owned firms within countries might have changed over time. In Germany the data available up to 2001 comprises enterprises directly owned by foreigners, but after 2002 the figures provided also include enterprises indirectly owned by foreigners through foreign majority-owned resident enterprises. In Norway and Finland, data from 1995 include indirectly foreign-owned

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6. A related issue concerns also the quality of labour, which is much more difficult to compare across countries. While some efforts have been made, the statistical basis remains rather limited. The OECD has, therefore, not yet estimated quality-adjusted levels of labour input for international comparisons of productivity levels.

establishments and are not comparable with those for previous years which only include enterprises directly owned by foreigners.

**Box 1. Activity of Foreign Affiliates (AFA) and Foreign Affiliates' Trade in Services (FATS) databases**

As outlined in Chapter 3 of the OECD “Handbook on Economic Globalisation Indicators” data covering the operations of affiliates and parent companies should be compiled, if possible, “for affiliates in which the direct investor has an unambiguous control and should be attributed to the country of the investor of ultimate control”.

The criterion recommended for a firm to be classified as under unambiguous control of a foreign owner is whether a majority (more than 50% of the capital) of ordinary shares or voting power is held by a single foreign investor (or a group of foreign investors acting in concert). Some countries, however, define foreign controlled affiliates as those firms where a foreign owner holds more than 10% of the capital. As outlined in tables 3 and 4 this is the case of Hungary and the United States in both AFA and FATS.

To identify the “investor of ultimate control”, i.e. the parent firm at the end of a chain of domestic and/or foreign directly and indirectly controlled companies, it is necessary to have information not only on the foreign firms that directly control the firm but also on the indirect owners of the firm. However, this information is not available for all countries, as shown in table 3 and table 4.

**Table 3. Definition of Foreign owned companies in AFA**

		<i>Ownership</i>	
		<b>Majority (&gt;50%)</b>	<b>Minority (&gt;10%)</b>
<b>CONTROL</b>	<b>Direct</b>	Czech republic; Finland (until 1995); Germany (until 2001); Ireland; Japan; Netherlands; Poland; Canada; Norway (until 1995); Turkey	Hungary (>10%)
	<b>Indirect</b>	Finland (from 1996); Norway (from 1996); France; Germany (from 2001); Italy; United States (from 1997); Luxembourg	United States (until 1997)

**Table 4. Definition of Foreign owned companies in FATS**

		<i>Ownership</i>	
		<b>Majority (&gt;50%)</b>	<b>Minority (&gt;10%)</b>
<b>CONTROL</b>	<b>Direct</b>	Austria ; Belgium; Poland; France; Japan; Luxembourg; Germany (until 2001); Portugal; Greece (?); Netherlands	Hungary (>10%)
	<b>Indirect</b>	Finland; Sweden; Ireland; Italy; Norway; Germany (from 2002); United States from 1997 partially indirect	United States until 1996 (partially indirect)

Thirdly, statistics on foreign presence in some sectors are only available for more recent years (e.g. for France data for the food and beverages and energy sectors were added in 1999) or are missing in the database for some years due to confidentiality issues.

Finally, the coverage of the sources used has sometimes changed over time (e.g. in the Czech Republic the Business Register used as source by the Czech Statistical Office covered units employing at

least 20 employees in 1997 and 1998; and all units from 1999; in Norway the data sources used by Statistics Norway covered all establishments with five or more persons up to 1991; those employing more than ten persons for the period 1992-95 and all manufacturing establishments from 1996.).

In analysing the longitudinal dimension of the data, we need to take these factors into account to identify spurious changes in the data.

## **Issues in creating a joint AFA –STAN and FATS-STAN database**

### ***Level of consolidation***

The first issue when combining the AFA/FATS databases with STAN is that the data are not collected at the same level. While the main source for the STAN database is annual National Accounts which are primarily based on establishment level data, AFA and FATS are both based on enterprise level information. Thus, in STAN the industry allocation is mostly based on the main activity of each plant that is part of an enterprise. In AFA/FATS, the industry classification is based on the primary activities of the consolidated group. This might cause the relative presence of foreign affiliates in certain sectors to be under- or overestimated, depending on whether the industry concerned is the secondary or primary activity of the foreign enterprise.<sup>7</sup> Contrary to the study of Corrado, Lengermann and Slifman, the data underlying this analysis do not provide a straight forward solution to this problem.

### ***Deflators***

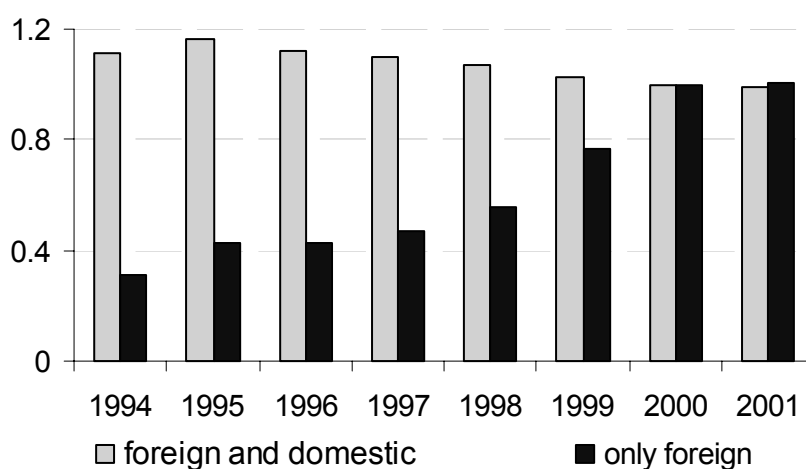
To measure productivity growth, both value added and turnover need to be deflated. AFA/FATS only contain nominal values, but the STAN database contains measures of output at current and constant prices, so that value added and output deflators can be derived. When comparing productivity growth of foreign owned and domestic firms at the aggregate manufacturing and/or services sector level, the same deflators are used for both groups. However, the sectoral distribution of foreign affiliates likely differs from the national average.

For the countries for which the complete sectoral distribution of foreign affiliates across different industries is available, separate deflators for foreign affiliates can be derived. Annex 1 contains the details of this issue. Figure 1 shows the different deflators for Sweden. The limitations of this approach are related to the fact that sudden and/or spurious changes in the presence of foreign affiliates within a particular sector of the economy might affect the deflators for that particular sector, for reasons unrelated to inflation.

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7. In 14 cases, the ratio of foreign presence relative to the national total is greater than one. This happens at the 2-digit level for France in sector 30 (Manufacture of office, accounting and computing machinery) from 1994 to 1997 and from 1999 to 2001 (average value for these periods 1.17 (standard deviation 0.07)); for Great Britain in sector 30 (Manufacture of office, accounting and computing machinery) in 1993 (1.16); for Hungary in sector 23 (Manufacture of coke, refined petroleum products and nuclear fuel) from 1998 to 2002 (average value for these periods 2.81 (standard deviation 1.07)); and for the USA (Majority and Minority ownership) in sector 16 (Manufacture of Tobacco products) in 2000 and 2001 (average value for these periods 1.09 (standard deviation 0.002)). In the service sector, the employment share is always within the 0-1 range; but for turnover the ratio is greater than 1 in 30 cases, 27 of which are in the wholesale and retail trade sector. The high turnover ratio for these sectors is easily explained by the difference in definition of output in FATS (sales) and STAN (margins), as discussed in more detail in the paper.

**Figure 1. Deflators for the manufacturing sector total and foreign firms only: Sweden**



Source: AFA and STAN databases, OECD.

### *Differences across surveys in terms of variable definition*

A third set of issues arises in merging together production data from AFA/FATS and STAN. Some of the main variables used are defined differently in the two surveys. Firstly, STAN contains information on total employment, which is generally recognised as the most suitable measure of labour input for productivity calculations. AFA and FATS only contain information on the total number of employees. However, the difference between total number of employees and total employment, which corresponds mostly to the “self-employed”, is likely to be negligible for foreign affiliates. Therefore, the statistics reported, should reflect very closely the foreign affiliates’ share of total employment in the host economy.

Secondly, STAN contains gross output information, while AFA and FATS use turnover. Since turnover equals the value of goods and/or services sold in a year, while production is defined as the value of goods or services produced in a year whether sold or stocked, the direction of the biases that may arise from this difference is not always clear. However, in the services sector, sizeable biases, especially in the wholesale and retail sectors, might derive from differences in the definition of output. As noted by Triplett and Bosworth (2004) and Timmer and Inklaar (2005) the system of national accounts, which constitute the basis for STAN, measures trade output as margins rather than sales, where margins are defined as sales minus the value of the goods that would need to be purchased to replace the ones sold.

### *Issues related to international comparability*

To summarise, caution must be taken when comparing foreign affiliates’ presence and contribution to growth across countries and across manufacturing and service sectors, if the latter are provided by different national sources.

There might be discrepancies related to whether countries use direct or indirect control in their definition of foreign controlled affiliates, or whether the countries classify only majority owned firms as foreign controlled affiliates or whether they include also minority controlled firms.

A second source of distortion is the difference in the sources of information on the Foreign Affiliates presence. Some countries use Business Register information, others use specific surveys. In the latter case

a related concern relates to sampling issues: e.g. if the stratification on size excludes smaller firms below different thresholds, the samples might not be comparable across countries.

A third concern arises because of conversion of national industrial classification to international classification. This issue occurs when the conversion to an international classification is based on aggregated published data. This concern affects particularly data from the United States and Canada.

Finally, differences in the definition of the main variables of interest, e.g. employment; gross output and value added must be kept in mind in cross country comparisons, as discussed in the sections describing the STAN database.

### ***Other data issues***

In the following section the study shows that on the whole the performance of foreign affiliates is better than average. However, one might question whether “the average firm” in the host country constitutes a useful reference for comparison.

The group most suitable for comparison with affiliates of foreign MNEs is likely to be the affiliates of domestic MNEs. Domestic MNEs are similar in size; enjoy economies of scale and the benefits of being part of global groups to the same level as foreign affiliates. When such comparisons have been made at the microlevel (e.g. Doms and Jensen 1998 for the United States and Criscuolo and Martin 2004 for the United Kingdom) the results show that in general the nationality of the owner<sup>8</sup> does not bear any weight on the productivity outcome. However, the data on domestic MNEs are currently available only for very few countries and contain only information on the domestic activity of the consolidated group rather than at the enterprise level, thus hampering the comparison between foreign controlled affiliates and affiliates of domestic multinationals.

### **The presence of foreign affiliates in OECD countries**

Previous OECD work has shown the presence in several OECD countries of foreign affiliates (OECD, 2001 and Hatzichronoglou, 2004). One of the aims of this work is to show the trends of this presence over time, wherever possible.

### ***Employment***

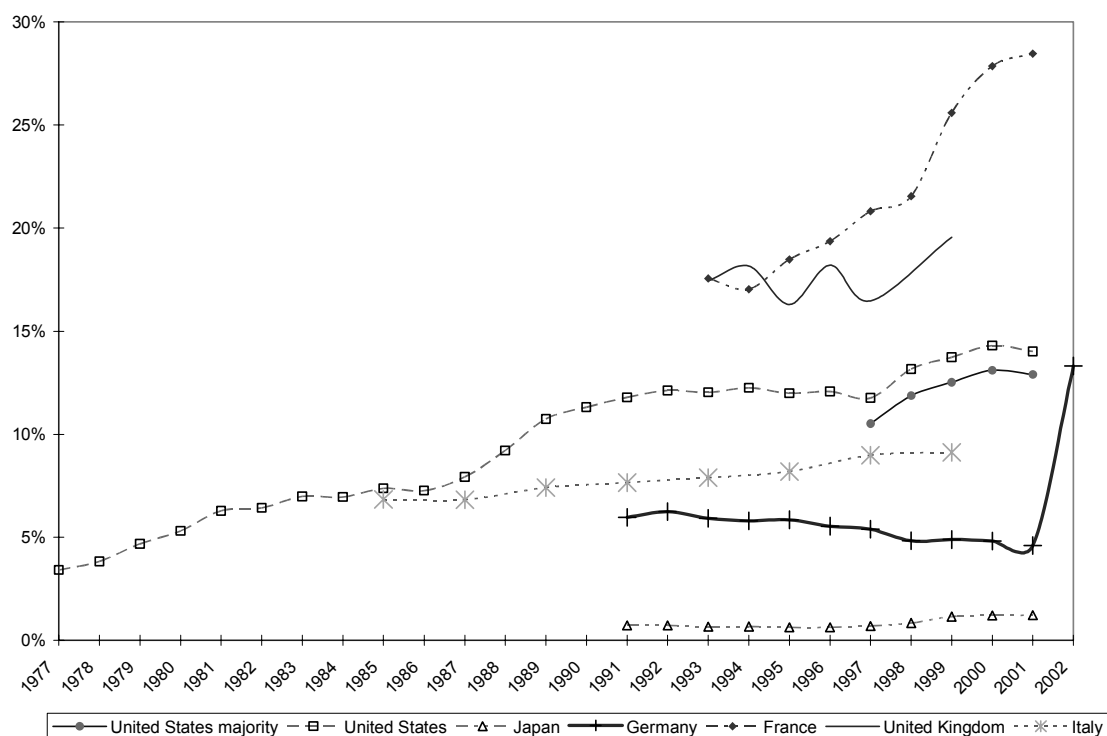
Figure 2 reports the employment share of foreign affiliates in the manufacturing sector in 6 of the G7 countries.<sup>9</sup> The employment share of foreign affiliates is the lowest in Japan (going from 0.72% in 1991 to 1.22% in 2001) and is highest in France and the United Kingdom. For all countries the share of employment of foreign affiliates has increased over time. For Germany this share had decreased prior to 2001 then sharply increased between 2001 and 2002. However, as explained below, this is likely to be the consequence of a change in the definition of “foreign-controlled” firms.

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8. The exceptions seem to be the United States, in both studies affiliates of American MNEs are consistently the most productive.

9. Excluding Canada for which data on employment in foreign affiliates is not available in the AFA/FATS databases

**Figure 2. Employment share of Foreign Affiliates in the Manufacturing Sector of G7 countries**



Source: OECD

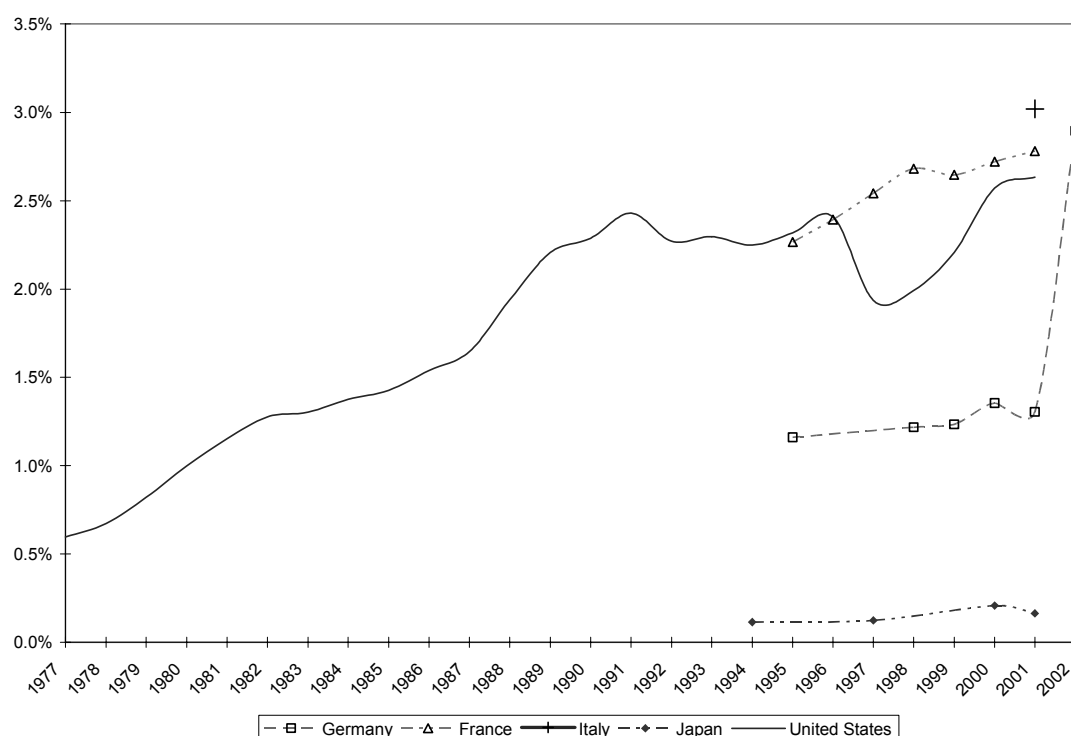
The steep increase in the share of employment of foreign affiliates in Germany between 2001 and 2002 is due to a change in the definition of foreign controlled enterprises. Since 2002 Germany includes both direct and indirect foreign direct investment in the number reported. This means that from 2002 the figures provided also include enterprises indirectly owned by foreigners through foreign majority-owned resident enterprises.

Figure 2 also demonstrates a steep increase in the foreign employment share in France for 1999. This is primarily because in 1999 the food and energy industry sector was included in the survey.

Two series are shown for the United States. The difference between the two series lies once again in the way the group of foreign affiliates is defined. The series (United States) that covers the period 1977 to 2001 covers both majority and minority foreign owned enterprises. The series (United States majority) defines as foreign affiliates only majority owned enterprises and covers only a more recent time period (1997-2001). As expected and as evident from the figure, this second group is a subset of the first one and follows very closely the trend outlined in the first series.

Figure 3 looks at the services sector. In services we have longitudinal data for four G7 countries and only data for 2001 for Italy. As in the manufacturing sector, the data shows a general trend towards the increasing presence of foreign affiliates. The presence of foreign affiliates is lowest in Japan and highest in France. However in the interpretation of the graph, some caveats apply.

**Figure 3. Employment share of Foreign Affiliates in the Service Sector (50 to 99) of G7 countries**



Source: OECD

Firstly, these graphs report the service sector defined as 50 to 99, since some of the sectors are public services, the figures are likely to be a lower bound estimate of the presence of foreign affiliates in market services. Annex 3 reports figures for the private business sector.<sup>10</sup>

Data for the G7 countries in the service sector present a very similar trend to the one in the manufacturing sector; with Japan having the lowest presence of foreign affiliates, Germany has a break in the series in 2001 as in manufacturing, because indirectly controlled foreign affiliates are included. Data for the United States also presents a break in the series, because from 1997 the definition of foreign ownership only includes majority owned foreign affiliates, while up to 1997, all firms where foreigners had an interest of at least 10% were defined as foreign affiliates. Data for Italy are only available in 2001.

Figure 5 and 6 present the share of employment of foreign affiliates in the non-G7 OECD countries in manufacturing and services, respectively.

10. Private Business sectors is defined as sectors 50 to 74 and for those countries for which data on foreign affiliates for the financial services is not available, we report data on 50 to 64 and 70 to 74, as described in the notes to the figures.

**Figure 4. Employment share of Foreign Affiliates in the Manufacturing Sector of non-G7 countries**

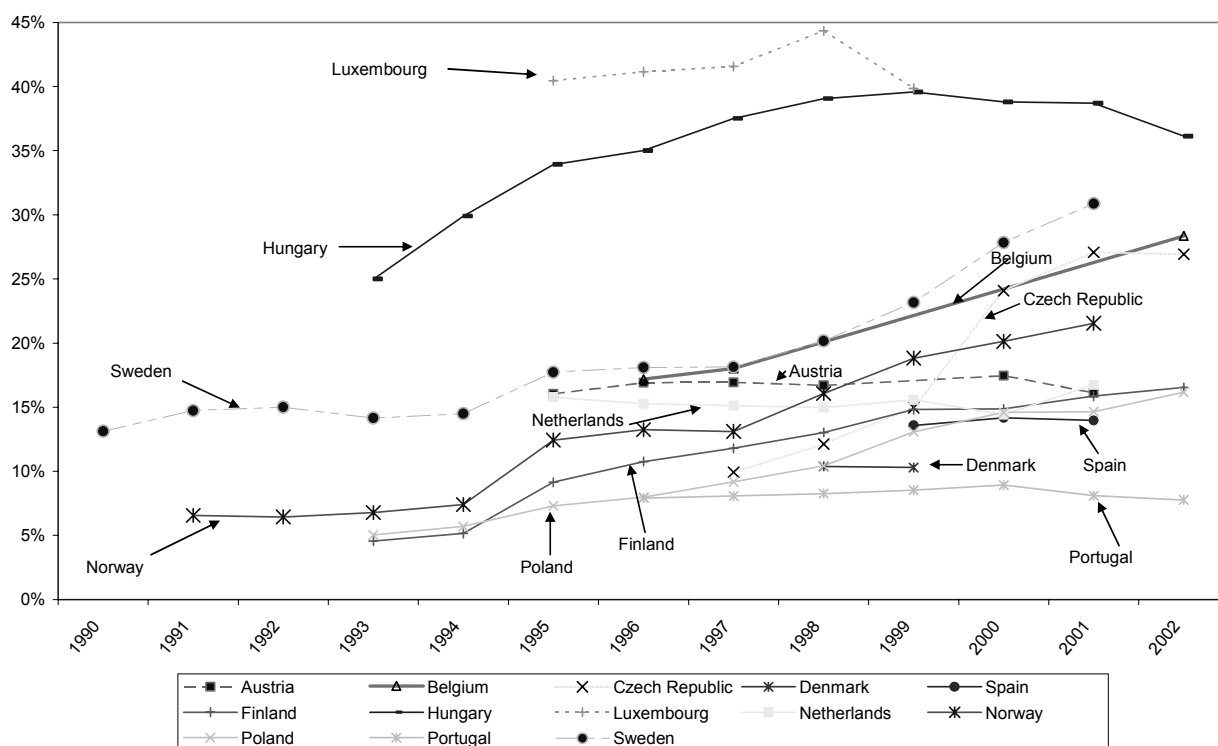


Figure 5 shows that in most of the 14 countries for which we have data, there is an increase in the employment share of foreign affiliates. This reflects a general trend also found in previous studies.

However, some of this observed increase might partly be “spurious”, i.e due to changes in definition of the foreign affiliates’ group or in the coverage of the data. Explanations are provided where possible.

For Sweden, the coverage of the data on foreign affiliates has improved over time, and indeed the increase in the number of employees between 1995 and 1996 can be related to this improvement. However, the steep increase in the following year that we observe in the manufacturing sectors reflects sharp changes in the paper, printing and publishing, pharmaceutical and motor vehicles industries.<sup>11</sup>

In Norway, data from 1995 has included indirectly foreign-owned establishments and are not comparable with those for previous years which only include enterprises directly owned by foreigners.

Similarly for Finland data from 1995 has included indirectly foreign-owned establishments and are not comparable with those for previous years which only include enterprises directly owned by foreigners.

11. In the 90s, Some major mergers with and acquisitions of foreign firms took place: for example, General Motor's 50% ownership of Saab Automobile (1990); the merger between Asea and Swiss Brown Boveri (1988)(ABB); the merger between Pharmacia and Upjohn (1996); Tetra Pak's acquisition of Alfa Laval (1991) and Dutch Akzo's acquisition of Nobel Industries (1994). In 1999, a year that corresponds to a big increase in foreign presence in the data, Ford acquired the automobile operations of Swedish Volvo.

Figure 5. : Employment share of Foreign Affiliates in the Service Sector of non-G7 countries

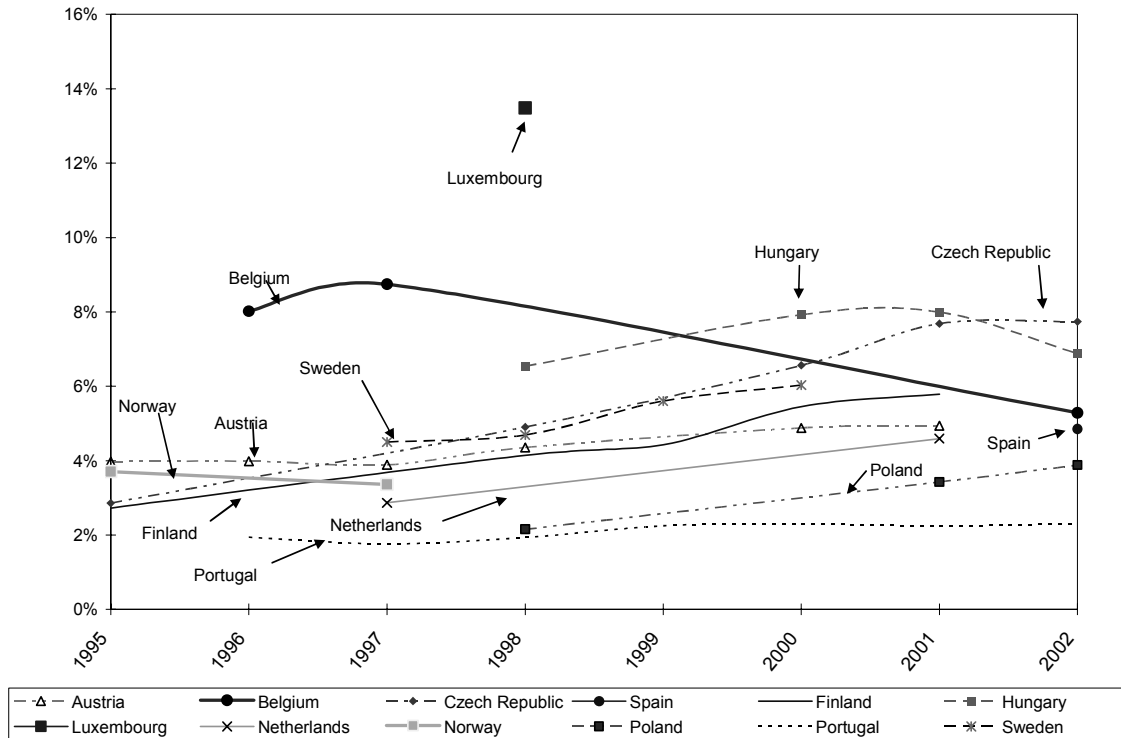


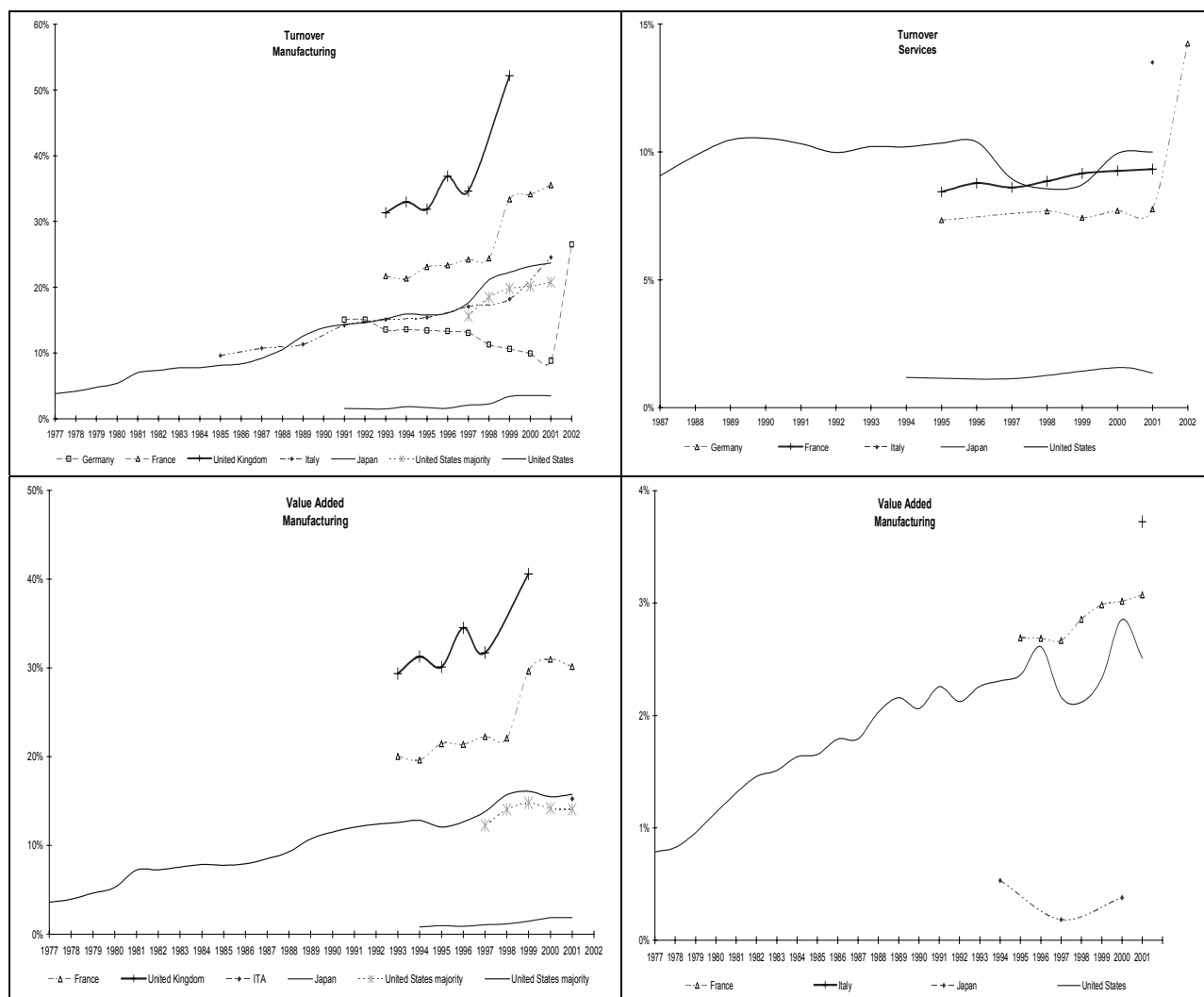
Figure 6 shows the penetration rate of foreign affiliates in services. For services, data for Austria and Belgium are also available. Data for Luxembourg and Spain are only available for one year. Relative to the manufacturing sector data, the time period covered is much shorter and the data is much more sparse over time (e.g for the Netherlands we only have two data points in 1997 and 2001).

As suggested by these first figures, further work is needed to fill in any gaps in the data and to extend the coverage to more OECD countries.

**Output: turnover and value added**

In the manufacturing sector the share of foreign affiliates' value added relative to the total is almost always larger than the share of turnover (see table 1). The difference is larger in Japan. A possible explanation of this feature of the data is that affiliates might import finished or semi-finished products from their parent company and resell them on the host country market. That would also have the consequence of higher turnover productivity relative to value added productivity.

Figure 6. Output share of foreign affiliates: G7 countries



For the manufacturing sector in the G7 countries the output trends for both value added and turnover are very similar and also reflect the trend in employment shares (e.g. a break in the series for France in 1999 and for Germany in 2001). One thing to note from comparing these two figures is that for Germany and Italy we only have data on turnover, but not on value added.

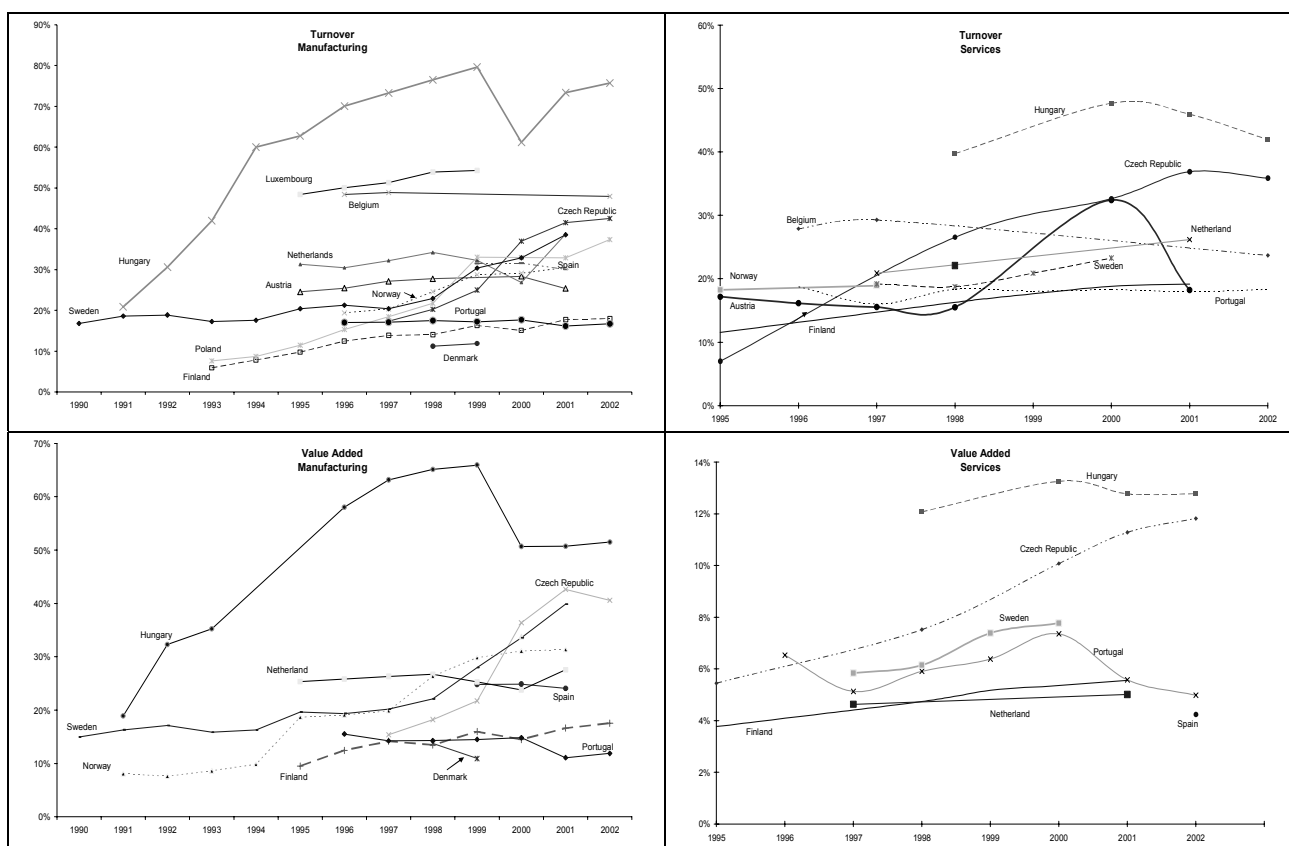
For the non G7 countries data on foreign affiliates in the manufacturing reflects again a general increase in the presence of foreign affiliates. The data show a high foreign presence in eastern European countries, Hungary and Czech Republic. However, caution is needed when comparing Hungary with other countries because data for Hungary includes in the foreign affiliates' group minority owned foreign enterprises. This might partly explained the larger presence of foreign affiliates in terms of employment, turnover and value added.

In the service sector, the data is only available for more recent years and is sparser than in the manufacturing sector. Caution is needed when interpreting the figures: the turnover share of foreign affiliates might be biased for three reasons. Firstly, the service sector, defined as sectors 50 to 99, include public services where there are no foreign affiliates, so this might lead to a downward bias. Secondly, in the retail and wholesale trade sectors, the measure of output used in STAN, i.e. margins, is by definition smaller than the measure of output used in FATS, i.e. sales; this might lead to an upward bias. Thirdly,

FATS is based on enterprise level information, while STAN is primarily based on establishment level data. If foreign enterprises are active in the manufacturing and service sectors, but report manufacturing as their primary activity, FATS will not record their activity in the service sector. This might lead to a downward bias in the estimate of the foreign affiliates' presence in the service sector.

The Annex reports the share of turnover of foreign affiliates in sectors 50 to 74 using the totals from STAN and, for the countries and where the data is available, the share of turnover using the total from FATS. The figures show that the ratio of foreign affiliates' turnover to the national total from STAN for the sectors 50 to 74 is larger than the turnover share in sectors 50 to 99. This ratio is however larger than the one obtained as the ratio of foreign affiliates turnover to the total turnover for sectors 50 to 74 from FATS.

**Figure 7. Output share of foreign affiliates: non G7 countries**



**Table 5. Ratio of turnover share to value added share in the manufacturing sector**

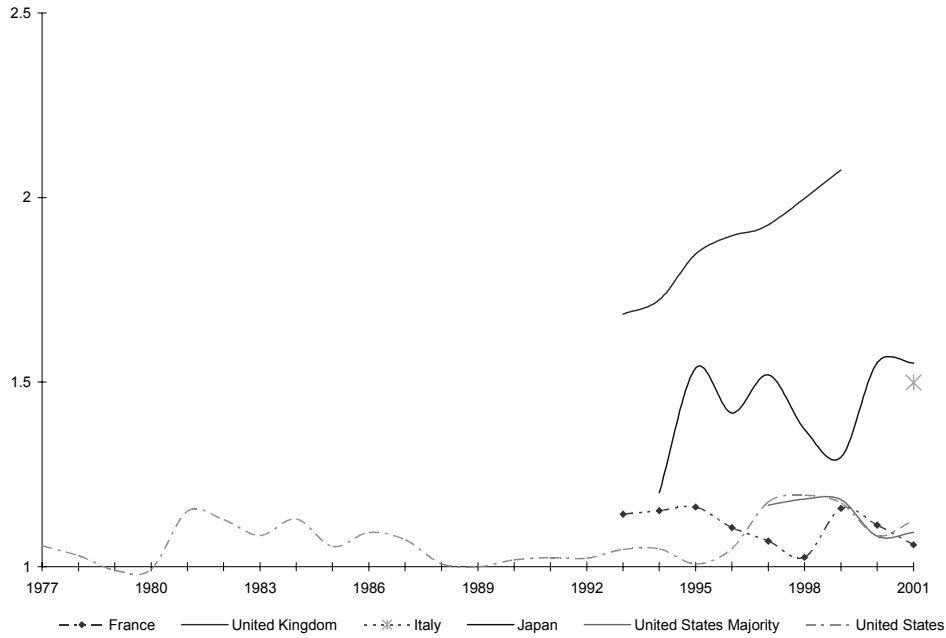
Country	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	
<b>France</b>				1.08	1.09	1.08	1.09	1.09	1.10	1.12	1.10	1.18		
<b>United Kingdom</b>				1.07	1.05	1.06	1.07	1.09		1.29				
<b>Japan</b>					2.24	1.73	1.76	1.95	1.93	2.26	1.88	1.83		
<b>United States (majority)</b>								1.27	1.31	1.34	1.42	1.47		
<b>United States</b>	1.20	1.19	1.18	1.21	1.24	1.31	1.27	1.28	1.34	1.38	1.49	1.50		
<b>Czech Republic</b>								1.13	1.11	1.15	1.02	0.97	1.05	
<b>Denmark</b>									0.82	1.09				
<b>Spain</b>										1.27	1.27	1.25		
<b>Finland</b>						1.03	1.00	0.98	1.04	1.02	1.04	1.07	1.03	
<b>Hungary</b>		1.10	0.95	1.19				1.21	1.16	1.17	1.21	1.21	1.45	1.47
<b>Netherlands</b>						1.24	1.18	1.22	1.28	1.28	1.13	1.40		
<b>Norway</b>							1.02	1.02	0.93	0.96	0.94	0.97		
<b>Portugal</b>							1.10	1.20	1.23	1.19	1.20	1.46	1.41	
<b>Sweden</b>	1.12	1.14	1.10	1.09	1.08	1.04	1.10	1.01	1.04	1.09	0.98	0.97		

Source : OECD calculations using AFA/STAN database

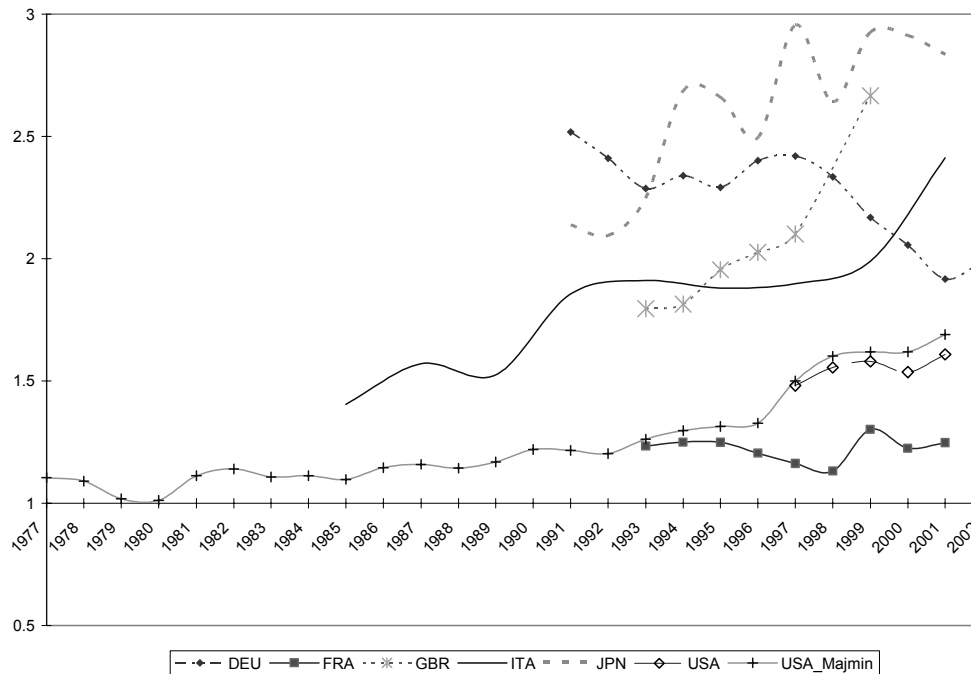
### *The relative Labour Productivity of foreign affiliates*

Figures 8 to 16 report the relative labour productivity of foreign affiliates in the manufacturing and services sectors of OECD countries. The figures show that on average foreign affiliates are more productive than the national average. When labour productivity is measured as turnover per employee the advantage is larger than when labour productivity is measured as value added per employee. A possible explanation for this pattern might be that affiliates are more likely to import finished or semi-finished products from their parent company and resell them within the host country market.

**Figure 8. Relative Labour Productivity (Value Added over Employment) of Foreign Affiliates in the Manufacturing Sector of G7 countries**



**Figure 9. Relative Labour Productivity (Turnover over Employment) of Foreign Affiliates in the Manufacturing Sector of G7 countries**

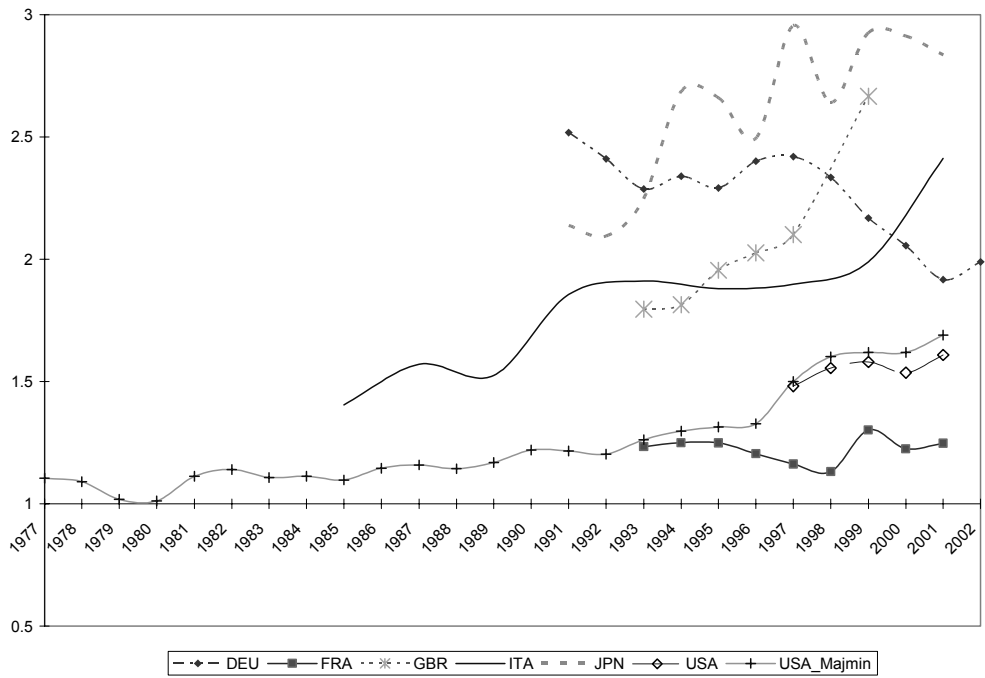


In the United States the labour productivity advantage of foreign affiliates (when we measure labour productivity as value added per employee) is very small and in some years it becomes negative. The

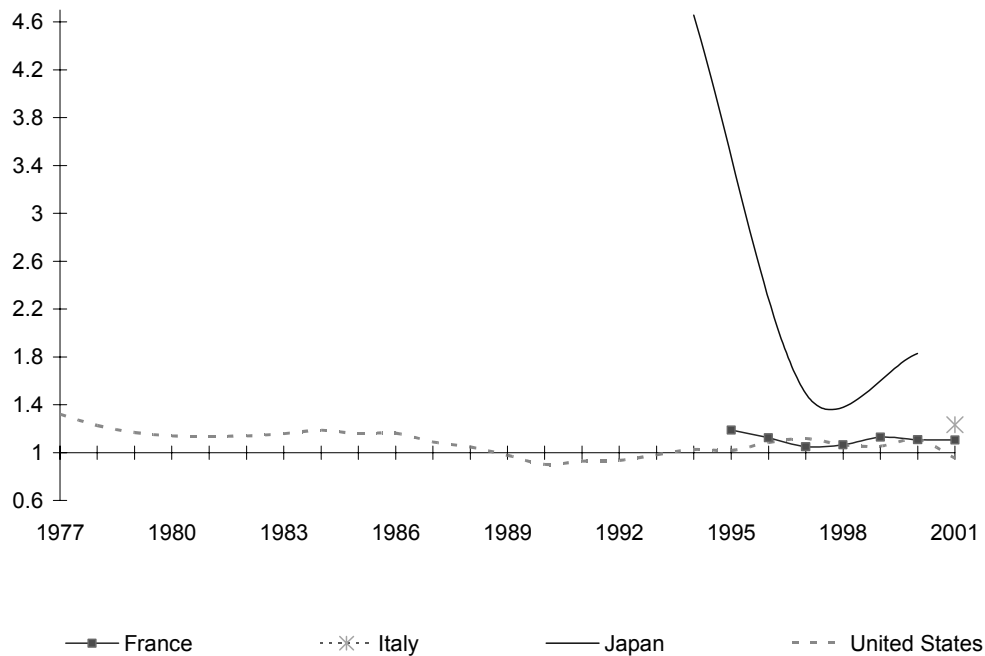
advantage in labour productivity for foreign firms is also quite small for France, Finland and Sweden and is largest in Portugal, Spain, Hungary and Great Britain.

Caution is needed in the interpretation of the labour productivity advantage of foreign affiliates in the service sector, when labour productivity is measured as turnover per employee for foreign affiliates and as gross output per employee in the national sector. The advantages from foreign affiliates appear to be very large: this is mainly due to the output measurement issues discussed above, since for foreign affiliates we measure labour productivity as sales per employee and for the total national we measure labour productivity as margins per employee. Thus, where possible we compare the foreign affiliates turnover with the total turnover from FATS. Annex 3 shows that foreign affiliates remain more productive and that the ranking across countries also remain largely confirmed with France, Finland and Sweden being the countries where foreign affiliates have less of a productivity advantage relative to the national average.

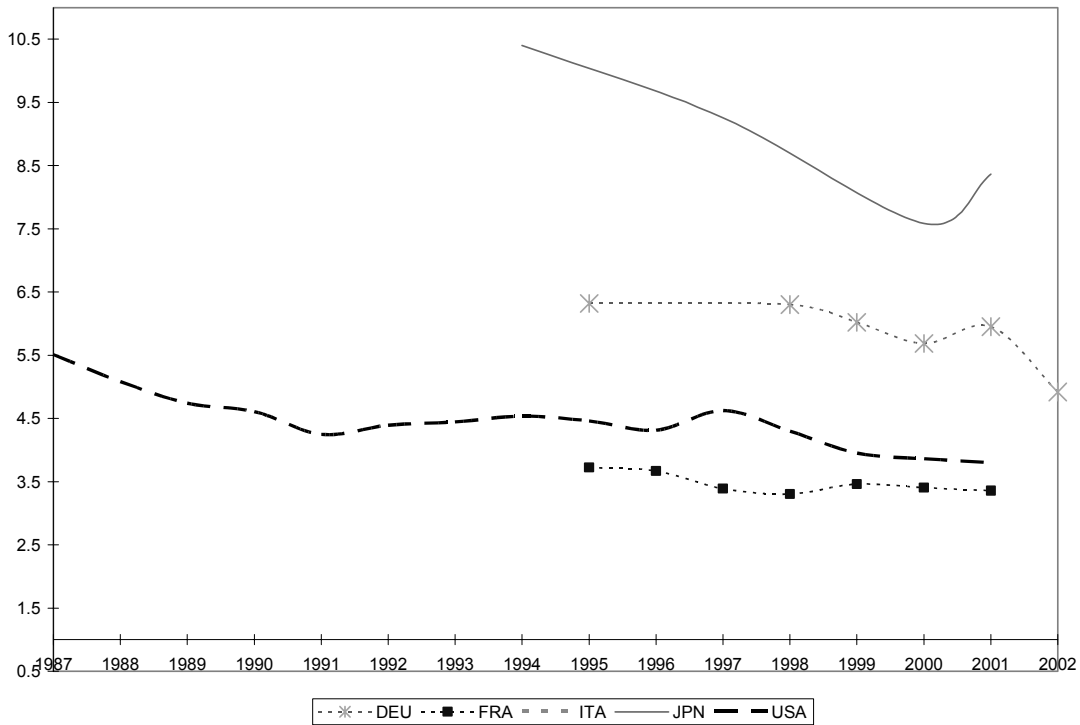
**Figure 10. Relative Labour Productivity (Turnover over Employment) of Foreign Affiliates in the Manufacturing Sector of G7 countries**



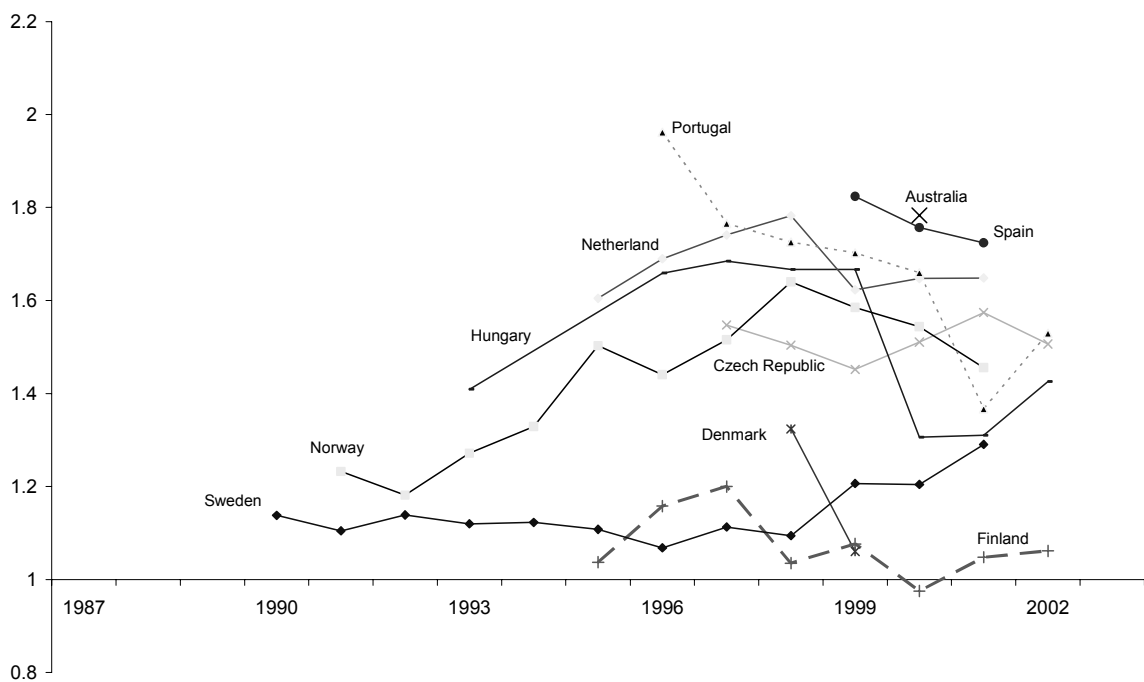
**Figure 11. Relative Labour Productivity (Value Added over Employment) of Foreign Affiliates in the Service Sector of G7 countries**



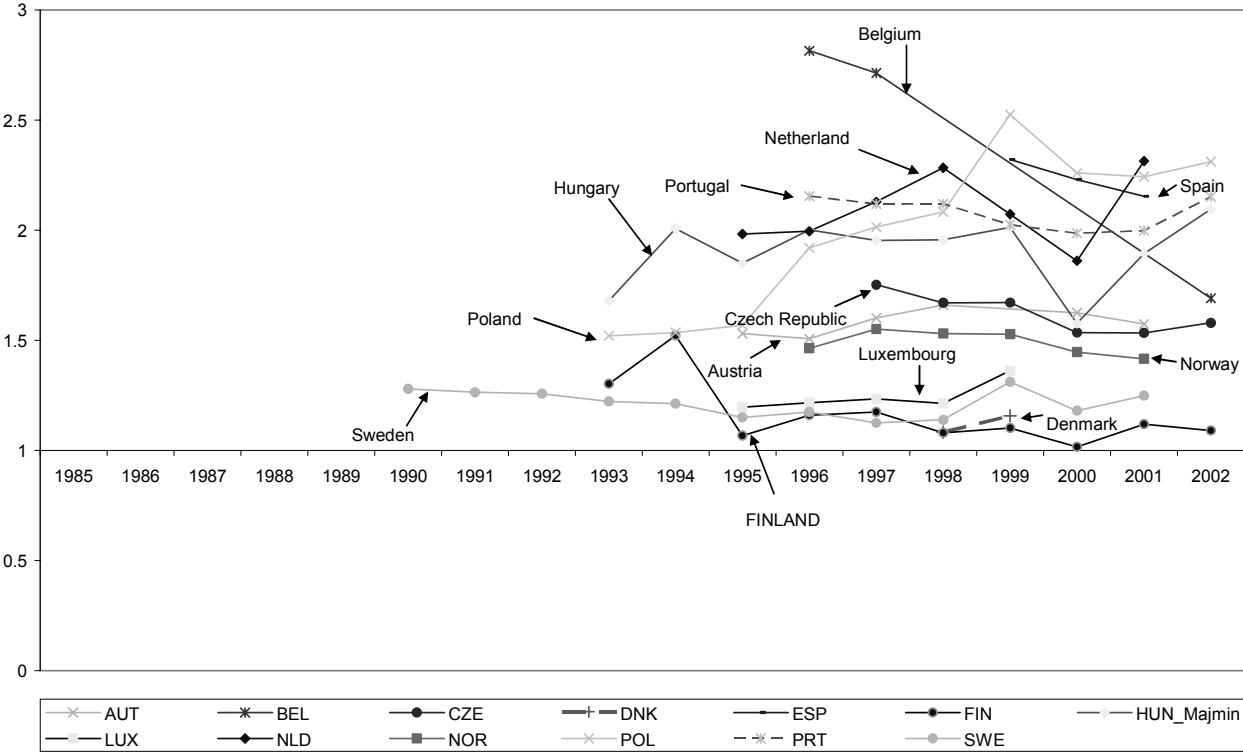
**Figure 12. Relative Labour Productivity (Turnover over Employment) of Foreign Affiliates in the Service Sector of G7 countries**



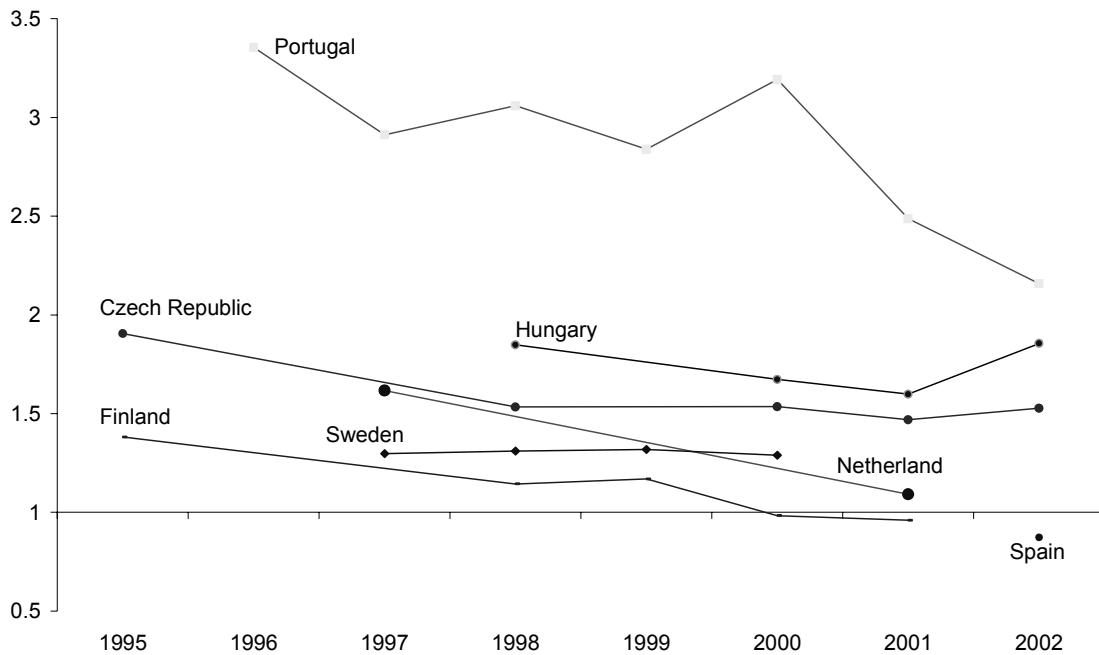
**Figure 13. Relative Labour Productivity (Value Added over Employment) of Foreign Affiliates in the Manufacturing Sector of non G7 countries**



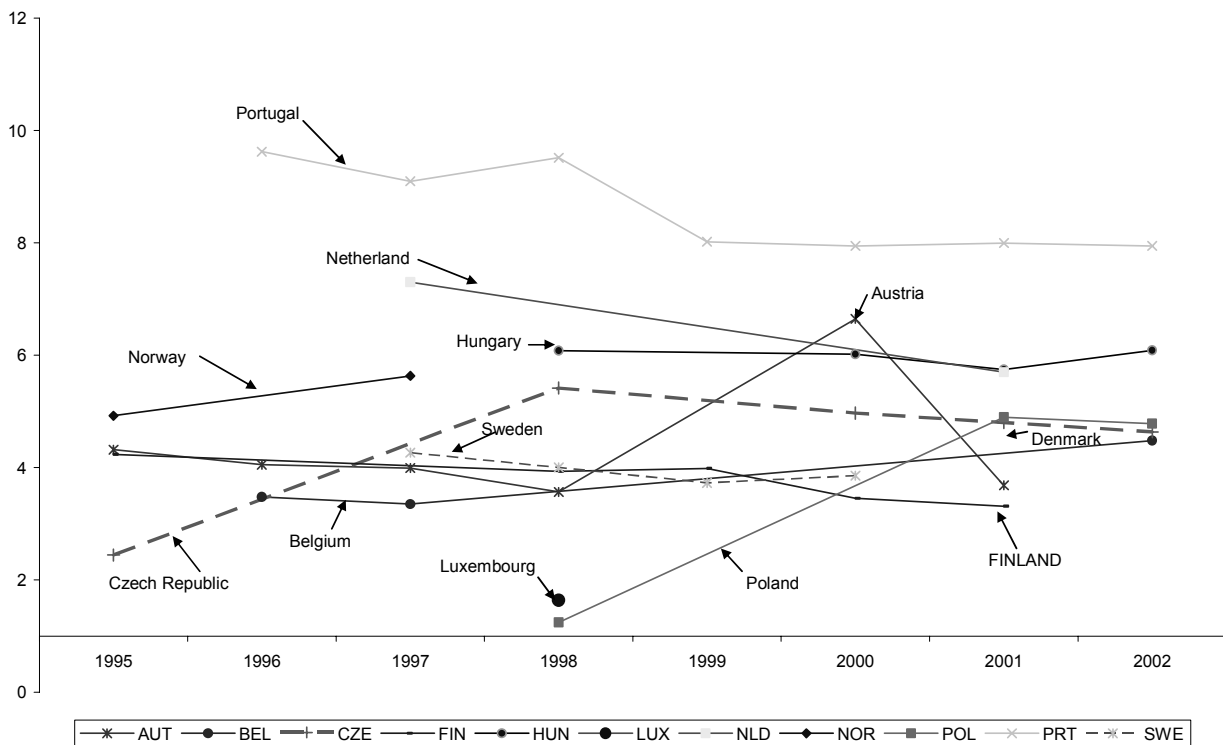
**Figure 14. Relative Labour Productivity (Turnover over Employment) of Foreign Affiliates in the Manufacturing Sector of non G7 countries**



**Figure 15. Relative LP (Value Added/Employment) of Foreign Affiliates in the Service Sector of non G7 countries**



**Figure 16. Relative Labour Productivity (Turnover over Employment) of Foreign Affiliates in the Service Sector of non G7 countries**



Annex 2 reports the relative productivity of foreign affiliates at a more disaggregated level for both manufacturing and service sector. The Annex reports the relative labour productivity of foreign affiliates at the sectoral level in the 1990s. In the manufacturing sectors foreign affiliates are in general more productive than domestic firms. The United States, France and Sweden are countries where this advantage is less marked, while in Spain, Portugal and the United Kingdom this advantage is more pronounced. In high tech sectors (such as chemicals and pharmaceuticals and machinery and equipment) the productivity advantage of foreign affiliates is smaller. This might be due to the tougher competition present in these sectors which have already been opened to global competition through imports. In the service sectors, a similar ranking holds. In the retail and wholesale sector the relative labour productivity of foreign affiliates is always very high. This might be partly due to the difference in definition of output between FATS and STAN (and deserve further investigation). In the business services sector foreign affiliates are less productive overall than the national average. The sector for which foreign affiliates are more productive than the national total (except within the United States) is financial intermediation. For hotels and restaurants, transport, storage, communication and business activities, foreign firms are relatively less productive than the national average in France. In the United States the foreign affiliates have a small productivity advantage only in the wholesale and retail trade sectors, while in all other services domestic firms are more productive.

## METHODOLOGY

Total annualised labour productivity growth is defined as the weighted sum of the domestic firms' productivity growth and the foreign affiliates' productivity growth, where the weights used are the shares of domestic and foreign affiliates' total employment, as shown in the formula below:

$$\frac{1}{k} * \frac{\Delta LP_t}{LP_{t-k}} = \sum_{i=DOM, FOR} \frac{w_{it} LP_{it} - w_{it-k} LP_{it-k}}{LP_{t-k}} * \frac{1}{k}$$

Where LP is labour productivity calculated as the ratio of output<sup>12</sup> at constant prices to labour input (EMP),  $\Delta$  indicates change; k indicates the number of years between observations, so that the left hand side is the aggregate annualised labour productivity growth and  $w_{it} = \frac{EMP_{it}}{EMP_t}$ , is the employment share.

For each sector therefore the contribution to labour Productivity growth of foreign affiliates can be calculated as:  $1/k * \left( \left( \frac{EMP_{FOR,t}}{EMP_t} * LP_{FOR,t} - \frac{EMP_{FOR,t-k}}{EMP_t} * LP_{FOR,t-k} \right) / LP_{t-k} \right)$ . This contribution is calculated for the total manufacturing and service sectors, but also at a more detailed sectoral level.

The paper also shows how much of the contribution to productivity growth by foreign affiliates derives from switches in labour resources between domestic and the more productive foreign affiliates, ("between effect") and how much is due to the labour productivity growth within the group of foreign affiliates.

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12. Output can be turnover or value added. The empirical analysis focuses on value added.

$$\frac{1}{k} * \left( \left( \frac{EMP_{FOR,t}}{EMP_t} * LP_{FOR,t} - \frac{EMP_{FOR,t-k}}{EMP_{t-k}} * LP_{FOR,t-k} \right) / LP_{t-k} \right) = \underbrace{\frac{1}{k} * \frac{\Delta LP_{FOR,t}}{LP_{t-k}} * \bar{w}_{FOR}}_{within} + \underbrace{\Delta w_{FOR,t} * \frac{1}{k} * \frac{\bar{LP}_{FOR}}{LP_{t-k}}}_{between}$$

The first term on the right hand side is the “within” or “productivity growth” effect and the second is the “between” or “share” effect term. Thus for example, the contribution of foreign affiliates to labour productivity growth might increase if there is an increase in its productivity growth or its average employment share is higher (from the first term) or if its employment share increase or if its labour productivity level is higher relative to the domestic average. The next section will report the results of such decomposition at the manufacturing and service sector level. Decompositions at a more detailed industry level are reported in Annex 2.

### **Labour Productivity Growth and the contribution of foreign affiliates to labour productivity growth**

The study has shown that foreign affiliates are on average more productive than domestic firms, but are they also growing faster? What is their contribution to the growth of the host economy? Figure 17 starts by describing annualised labour productivity growth over the period 1995-2001 for the national average, the foreign affiliates and for the domestic firms in the manufacturing sectors of 12 OECD countries. The figures show (sizeable) variation in growth rates across countries and across domestic and foreign firms, and additionally contribution across countries. In Sweden, Finland, Czech Republic, United States, Netherlands, Japan, United Kingdom and Norway foreign affiliates have demonstrated a superior growth rate when compared with domestic firms. In France and Hungary, domestic firms have grown more than foreign affiliates and in Spain and Portugal foreign affiliates have experienced negative labour productivity growth.

The sectoral analysis shows that these results hide a great sectoral heterogeneity. For example, in Sweden, domestic firms grew much more than domestic firms in the basic metal and fabricated mineral products and in the machinery and equipment sectors. Finland’s domestic firms outperform foreign affiliates in the machinery and equipment sectors. Norway in the chemical, rubber and fuel products and in the basic metals and fabricated mineral products, and in recycling and other manufacturing not elsewhere classified. In the Czech Republic and Netherlands domestic firms have grown more than foreign in the textile, leather, footwear and wood, paper and publishing sectors. Additionally the Czech domestic firms grew more in the transport and equipment sectors. The Dutch domestic firms grew more in chemicals, non-metallic mineral products and in recycling and other manufacturing not elsewhere classified. Japanese domestic firms outperformed in the machinery and equipments sectors (29 to 33); the British firms in the chemicals sectors and in the transport and equipment sectors; as did the US, which also grow faster in the recycling and not elsewhere classified sectors.

The only sector in which foreign firms have demonstrated superior growth when compared with domestic firms in France is the machinery and equipment sector with a difference of 15.1 percentage points.

The data for Hungary show that the domestic advantage is actually driven by the very strong growth of domestic firms in the chemicals sector (23 to 25), but more significantly to the sizeable growth in the machinery and equipment sector; electrical and optical and transport equipment (29 to 35).

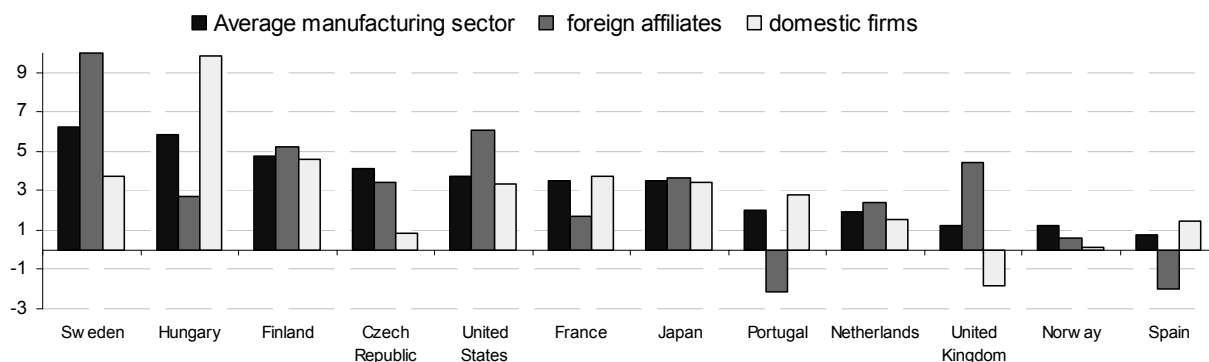
In Spain the foreign affiliates have had a positive growth in the sectors of food, beverages and tobacco products and the sectors of non metallic mineral products, where the growth of foreign affiliates is more than double the national average, and in the sector of basic metals and fabricated mineral products where the growth of foreign affiliates is positive but quantitatively small.

In Portugal, the only sectors where foreign affiliates experience strong positive growth are the medium-high and high-tech sectors: chemical, rubber, plastic and fuel products, where they grow less than domestic firms; and the sector of machinery and equipment; electrical and optical equipment and transport equipment, where foreign affiliates have grown much more than domestic.

**Box 2. Labour Productivity vs Total Factor Productivity (TFP) (Growth)**

This paper uses as a measure of productivity growth the rate of growth of output (ideally value added) per employee. Relative to TFP growth, LP growth is less data intensive, imposes very few theoretical restrictions and does not rely on measures of capital stock that are likely to be affected by measurement error problems. However, labour productivity measures only the efficiency of one of the inputs to production, labour, and thus cannot distinguish whether an increase in productivity is due to an improvement in efficiency or an increase in capital stock. This could be interesting in this case, since it would be interesting to know where the foreign affiliates' advantage lies: how much is due to better technical efficiency and how much can be attributed to more capital intensity, ICT?

**Figure 17. Average annual productivity growth in the manufacturing sector, 1995-2001, percentage points<sup>1</sup>**



Note: Labour productivity is measured as value added in constant prices over employment.

1. Or nearest available year: Czech Republic 1996-2002; United Kingdom 1995-1999; Finland 1995-2002; Hungary 1996-2002; Spain 1999-2001 and Portugal 1996-2002.

**Figure 18. Average annual productivity growth in the services sector, 1995-2001, percentage points**

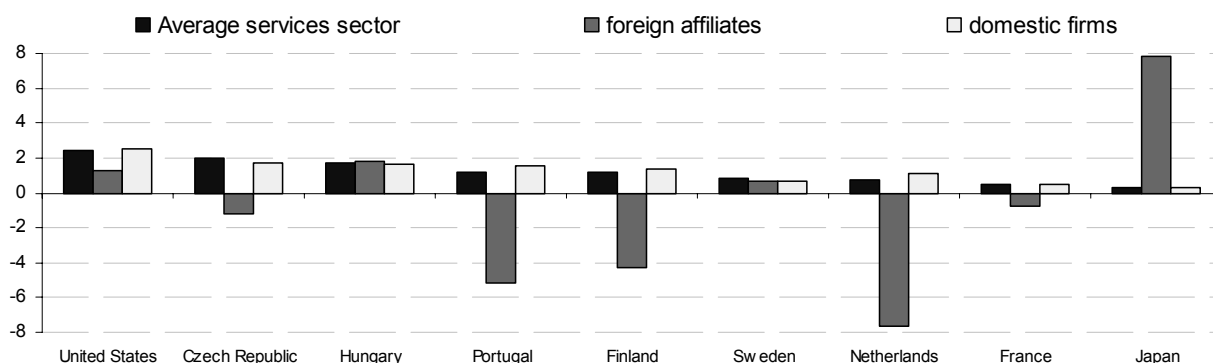


Figure 18 illustrates the labour productivity growth of the total service sector, the labour productivity growth of foreign affiliates, and growth of domestic firms in the service sector for 9 OECD countries. The picture here differs from the manufacturing sector: except for Japan and Hungary foreign firms have grown

less than domestic firms and in 5 countries (Czech Republic; Portugal; Finland, France and the Netherlands), they have experienced negative growth. An analysis of the sectoral productivity growth shows that in the United States, foreign affiliates have grown more than domestic only in the retail and wholesale sector. French domestic firms have grown more than foreign in hotels and restaurants and in real estates and business activities, where foreign affiliates experience negative growth.

The tables also demonstrate the share of foreign affiliates' employment in the sector at the beginning of the period and over the period in question, how this has changed. These figure help explain why, for example, a large growth of foreign affiliates' productivity translates into a small contribution and gives additional evidence to support the breakdown of the foreign affiliates contribution in within and between effects.

Figure 19 shows the contribution of foreign affiliates and the break-down in within and between effects.

The contribution is negative in Spain and Portugal, where the growth of foreign affiliates was negative and, in line with this result, the negative results are driven by a negative "within" effects.

The contribution is very small and positive in Japan (where it only accounts for 5% of the aggregate productivity growth), this is in line with the small share of employment of foreign affiliates; although two thirds of the contributions reflect a "between effect", i.e. by the increase in the share of foreign employment.

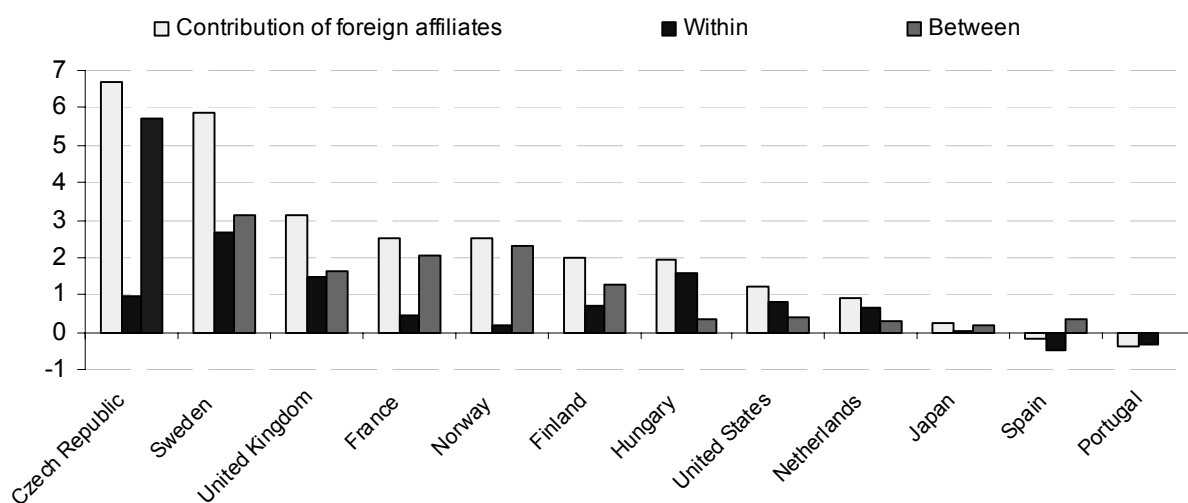
In the USA the contribution accounts for about 32% of total growth. Across European countries, there is wide variation in the contribution of foreign affiliates to growth, which lies between 42 and 99%: Hungary (33%); Finland (42%), France (72%), Netherlands (47%) and Sweden (94%).

In the Czech Republic (164%), Great Britain (158%) and Norway (251%), the foreign contribution is larger than the national productivity growth. Box 3 explains how this happens by mean of an example.

Only in few cases, the contribution is driven by the "within" effects (Hungary, United States and Netherlands; and in the negative contributions in Spain and Portugal). In all other cases, as shown in figure 19, the between effects is the main component of the foreign contribution.

At the sectoral level, this is also the case, except for the medium-high and high tech sectors, such as machinery and equipment and chemical, rubber, plastics and fuel products. In these sectors the within effect is as important as the between effect and in some cases, is much more sizeable than the between effect. This seems to suggest that foreign affiliates grow more rapidly than domestic firms in high-tech sectors. This result is in concordance with previous evidence. In particular, the results for the United States agree with evidence found by Corrado, Lengermann and Slifman. This study finds that foreign affiliates accounted for 14% of the employment in the machinery and equipment sector and contributed 3.2 percentage points to the total productivity growth in the sector (i.e. 21%). 2.5 percentage points (i.e. 78%) of this contribution is derived from the "within effect", i.e. from the increased productivity growth.

**Figure 19. Contribution of foreign affiliates to average annual productivity growth and break down in “within” and “between effect” in the manufacturing sector, 1995-2001, percentage points**



**Figure 20. Contribution of foreign affiliates to average annual productivity growth and break down in “within” and “between effect” in the services sector, 1995-2001, percentage points**

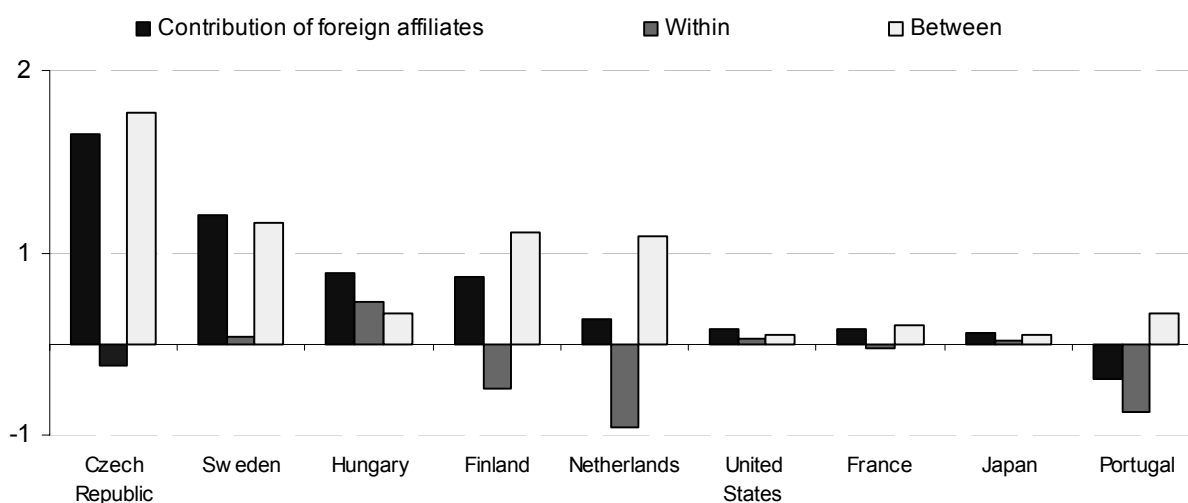


Figure 20 presents the contribution of foreign affiliates and its breakdown for the service sector.

For the services sector, except for Hungary and Portugal, the between effect accounts for most of the foreign affiliates’ contribution to productivity growth. For the Czech Republic, Finland, Netherlands and France, the “within effect” actually represents a negative component of the contribution, in line with the negative productivity growth of foreign affiliates shown in figure 18. At the sectoral level, the data shows great heterogeneity. In particular, in the wholesale and retail sectors, the within contribution constitutes the largest component of the contribution for France, United States, Hungary and Portugal. In the transport, storage and communications sectors, the within effect is the largest component of the contribution of foreign affiliates for United States and Hungary.

**Box 3. When is the contribution of foreign affiliates likely to be larger than the average host country's growth?**

For each sector therefore the contribution to labour productivity growth of foreign affiliates can be calculated as:

$$1/k * \left( \left( \frac{EMP_{FOR,t} * LP_{FOR,t}}{EMP_t} - \frac{EMP_{FOR,t-k} * LP_{FOR,t-k}}{EMP_{t-k}} \right) / LP_{t-k} \right) = \underbrace{\frac{1}{k} * \frac{\Delta LP_{FOR,t}}{LP_{t-k}} * \bar{w}_{FOR}}_{within} + \underbrace{\Delta w_{FOR,t} * \frac{1}{k} * \frac{\bar{LP}_{FOR}}{LP_{t-k}}}_{between}$$

The contribution to productivity growth by foreign affiliates derives from switches in labour resources between domestic and more productive foreign affiliates - the “between effect” - and how much is due to the labour productivity growth within the group of foreign affiliates - the “within effect”. The contribution can be negative if either both terms are negative, or if either of the terms of the right hand side is negative and larger in absolute value than the positive terms. The first term on the right hand side can be negative if the productivity growth is negative; the second term can be negative if either there is a negative change in the employment shares of foreign affiliates or if foreign affiliates have on average during the period negative productivity levels.

A similar expression can be derived for domestic firms.

For example, the following elements that determine the sign of the contribution can be derived for the contribution of domestic firms to the manufacturing sector of the Czech Republic, Norway and United Kingdom in the period considered:

	$\Delta LP$	$\bar{w}$	$\Delta w$	$\bar{LP}$	Sign of contribution
Czech Republic	0.01	0.82	-0.17	0.32	Negative
Norway	0.03	0.82	-0.09	0.35	Negative
United Kingdom	-0.002	0.83	-0.03	0.026	Negative

where  $\Delta LP$  is the change in labour productivity between periods (negative for the United Kingdom),  $\bar{w}$  is the average share of employment,  $\Delta w$  is the change in the employment share (which is negative in all three cases) and  $\bar{LP}$  is the average labour productivity level across the time periods considered.

## CONCLUSIONS

This paper represents a first attempt to investigate the contribution of foreign affiliates to labour productivity growth in OECD countries using a growth accounting approach.

The study describes the general trend of increased activity of foreign affiliates in OECD countries. Japan has still a small presence of foreign affiliates in both the manufacturing and services sectors. Most countries in the study have experienced an increase in the aggregate presence of foreign affiliates. Foreign affiliates are found to be on average more labour productive than the national average.

The analysis confirms that foreign affiliates can make important contribution to productivity growth.

In the manufacturing sector, the average contribution of foreign affiliates to annual productivity growth ranges from 6.7% in the Czech Republic to -0.4% in Portugal. For three countries, Czech Republic, United Kingdom and Norway, the contribution of foreign affiliates is larger than the labour productivity growth in the total manufacturing sector. This is due to a sharp growth in the foreign affiliates' share of employment in the Czech Republic and Norway and to the negative productivity growth of domestic firms in the United Kingdom. In the majority of cases, the contribution of foreign affiliates arises from the "between" effect, i.e. the sharp growth of the share of foreign affiliates' employment. However, there is great heterogeneity across sectors and countries. In the medium-high and high technology manufacturing sectors, the contribution reflects mainly within effects.

In the service sector, the contribution of foreign affiliates is much smaller than in the manufacturing sector ranging from 1.2% in the Czech Republic to -0.2% in Portugal. As in the manufacturing sector, the between effect, with the exception of Hungary, accounts for most of the contribution of foreign affiliates to productivity growth in the service sector. At the sectoral level, in retail and wholesale, the within effect is largest for the United States, France, Hungary and Portugal. In the sectors of transport, storage and telecommunications the within effect is the most important component of the contribution of foreign affiliates for the United States.

In both the manufacturing and services sectors the contribution is largest in the Czech Republic and Sweden and smallest in Japan and Portugal. For France and the United States the foreign affiliates' contribution to labour productivity is much smaller in the service sector than in the manufacturing sector.

The results for the United States are in line with previous evidence from Corrado, Lengermann and Slifman that foreign affiliates make a significant contribution to productivity growth and that part of this contribution derives from the larger productivity growth of foreign affiliates, especially in high technology sectors.

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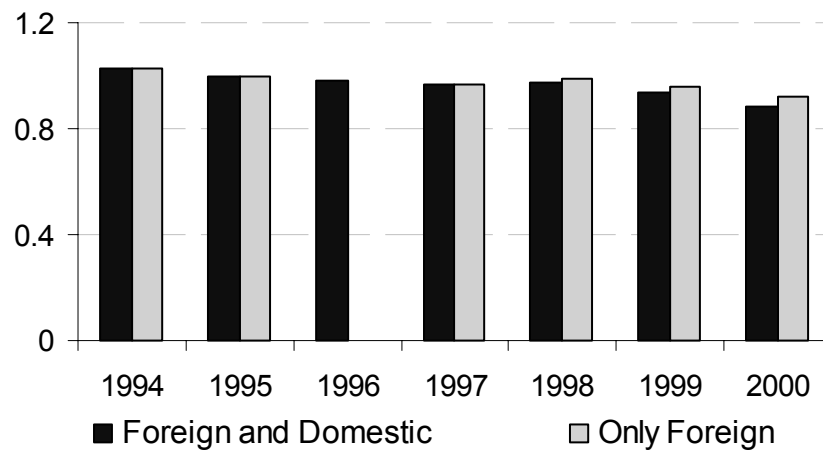
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## **ANNEX 1: DEFLATION OF FOREIGN AFFILIATES OUTPUT AT THE AGGREGATE LEVEL**

For countries for which we have the complete sectoral distribution of foreign affiliates I can construct a deflator which accounts for the sectoral distribution of foreign affiliates. I first derive weights that reflect the presence of foreign affiliates in each sectors relative to the total manufacturing level, calculated as the share of foreign value added in the sector relative to foreign value added in total manufacturing, and use these weights to aggregate up sectoral level deflators to the whole manufacturing level. I then compare the figure of real labour productivity and its trend over time using this deflator with the one deflated using the same manufacturing level deflator for both domestic and foreign firms. This is possible for only some countries and for few years.

The formula of the new deflators will differ across countries according to whether the deflators are fixed weight or Annually re-weighted chained Laspeyres.

**Figure 21. Deflators for the manufacturing sector total and foreign firms only: Japan**



Note: In 1996 it was not possible to calculate the deflator for the foreign firms because information for the sectors 17 to 19 (textiles, textile products, leather and footwear) is missing in AFA.

## ANNEX 2: ANALYSIS AT THE SECTORAL LEVEL

**Table 6. Relative labour productivity (value added over employment) in the manufacturing sector**

<i>Sectors 15 and 16: Food Products, Beverages and Tobacco</i>													
country	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Czech Republic								2.23	2.89	1.83	1.84	2.32	2.46
Spain										1.84	1.96	2.06	
Finland						1.08	1.21	1.37	1.31	1.44	1.08	1.15	
France										1.56	1.36	1.27	
United Kingdom				1.70	1.78	1.89	2.34	2.72		2.06			
Hungary							1.59	1.68	1.56	1.68			
Japan					7.68	7.16	7.30	6.59	6.82	7.77	8.59		
Netherlands							1.58	1.62	1.88	2.01	1.85	2.31	1.81
Norway		1.33	1.52	1.54	1.49	2.58	2.60	2.55	3.95	3.68	3.82	3.50	
Portugal							3.25	2.10	1.95	1.94	2.18	0.98	1.32
Sweden	1.06	1.10	1.10	1.24	1.17	0.98	1.02	1.31	1.13	1.13	1.14	1.07	
United States	0.73	0.76	0.73	0.84	0.74	0.66	0.77	1.12	0.97	0.94	1.04	1.10	
<i>Sectors 17 to 19: Textiles, Textile Product, Leather and Footwear</i>													
country	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Czech Republic								1.35	1.00	1.06	1.26	1.24	1.14
Spain											2.05	1.81	
Finland						1.97	1.89	1.53	1.52	1.52	1.64	1.84	
France				1.09	1.06	1.02	0.99	1.04	1.05	1.04	1.03	0.98	
United Kingdom				1.91	2.11	2.09	1.99	1.97		1.81			
Hungary							1.29	1.46	1.50	1.47			
Japan					1.79	1.62		1.57	1.66	1.90	1.88		
Netherlands						1.82	1.83	1.80	1.76	1.44	1.31	1.54	
Norway		1.61	1.52	1.44	0.96	1.30	0.88	1.24	1.34	1.12	1.02	1.32	
Portugal							1.22	0.89	0.88	0.88	0.80	1.00	0.99
Sweden	1.45	1.42	1.53	1.59	1.64	1.46	1.62	1.60	1.69	1.53	1.51	1.46	
United States	1.19	1.20	1.22	1.22	1.19	1.24	1.28	1.18	1.23	1.05	1.12	1.26	
<i>Sectors 20 to 22: Wood and Products of Wood and Cork; Pulp, Paper, Paper Products, Printing and Publishing</i>													
country	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Czech Republic								1.54	1.19	1.48	1.78	1.84	1.50
Spain											1.82	1.76	
Finland						0.95	1.15	1.14	0.81	0.91	0.76	0.84	
France				1.32	1.38	1.44	1.33	1.32	1.29	1.22	1.18	1.22	
United Kingdom				1.91	1.95	1.98	2.09	2.09		3.12			
Hungary							1.82	1.81	1.99	2.04			
Japan					0.56	1.23	1.17	1.94	1.47	1.15	1.41		
Netherlands						1.97	1.90	1.89	1.87	1.74	1.65	1.80	
Norway		1.21	1.46	1.26	1.20	1.40	1.40	1.39	1.37	1.35	1.46	1.52	
Portugal							3.64	2.45	1.75	2.46			1.63
Sweden	1.04	1.11	1.17	1.11	1.09	0.93	1.01	0.97	1.16	1.13	1.17	1.14	
United States	1.10	1.06	1.10	1.14	1.19	1.17	1.25	1.19	1.28	1.18	1.20	1.20	
<i>Sectors 23 to 25: Chemical, Rubber, Plastics and Fuel Products</i>													
country	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
France					1.05	1.04	0.96	0.95	0.92	1.23	1.07	1.01	
United Kingdom				1.60	1.61	1.70	1.74	1.80		1.67			
Hungary							1.53	1.38	1.43	1.44			
Japan					0.54	0.54	0.42	0.55	0.53	0.53	0.63		
Netherlands						1.28	1.30	1.30	1.33	1.23	1.16	1.13	
Norway		1.12	0.89	1.09	1.16	1.16	1.06	1.10	1.15	1.22	1.05	0.97	0.91
Portugal							2.59	3.03	3.20	2.48	2.05	2.12	2.37
Sweden	0.94	0.76	0.84	0.88	0.95	1.06	0.96	1.05	1.03	1.16	1.06	1.25	
United States	0.83	0.84	0.87	0.90	0.91	0.85	0.87	1.12	1.12	1.17	0.99	1.03	
<i>Sectors 24 and 25: Chemical, Rubber and Plastics</i>													
country	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Czech Republic								1.38	1.22	1.41	1.27	1.31	1.36
Spain										1.44	1.43	1.39	
Finland						1.26	1.23	1.35	1.16	1.29	1.44	1.36	
France					1.10	1.10	1.03	1.03	0.99	0.96	0.93	0.91	
United Kingdom				1.53	1.60	1.70	1.72	1.81		1.57			
Hungary									1.66	1.64			
Japan					0.72	0.76	0.61	0.82	0.83	0.78	0.96		
Netherlands						1.31	1.30	1.26	1.35	1.21	1.17	1.16	
Norway													
Portugal							2.56	3.07	3.30	2.57	2.22	2.32	2.70
Sweden	1.00	0.82	0.85	0.92	0.95	1.06	0.96	1.08	1.07	1.16	1.11	1.32	
United States	0.94	0.93	0.95	1.00	0.98	0.92	0.94	0.89	0.93	0.93	0.91	0.89	

<b>Sector 26: Other non-metallic mineral products</b>													
country	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Czech Republic								1.65	1.69	1.63	1.86	2.20	1.79
Spain										2.22	2.22	2.29	
Finland						1.13	1.26	1.37	1.29	1.34	1.31	1.32	
France					1.06	1.15	1.02	0.99	1.02	1.04	1.02	1.03	
United Kingdom				1.39	1.44	1.40	1.43	1.54		1.39			
Hungary							1.23	1.16	1.06	1.28			
Japan					0.70	1.78		0.93	1.12	1.41	1.43		
Netherlands						1.29	1.31	1.38	1.43	1.30	1.20	1.10	
Norway		1.13	1.27	1.33	1.33	1.11	1.30	1.22	1.09	1.01	1.12	1.08	
Portugal							1.37	1.24	1.15	2.00	1.80		1.26
Sweden	1.03	1.02	0.94	0.97	0.97	0.94	1.01	0.98	0.98	1.02	0.96	0.97	
United States	1.06	1.15	1.10	1.20	1.17	1.25	1.35	1.38	1.30	1.24	1.36	1.48	
<b>Sectors 27 and 28: basic metals and fabricated mineral products</b>													
country	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Czech Republic								1.06	1.32	1.53	1.43	1.46	1.24
Spain										2.23	2.37	2.13	
Finland						0.89	0.94	1.09	1.05	1.17	1.25	1.09	
France					0.98	0.92	0.93	0.93	0.84	0.86	0.84	0.87	
United Kingdom				1.79	1.91	1.96	1.79	1.74		2.17			
Hungary							1.06	1.29	1.23	1.37			
Japan					1.02	0.94	1.09	0.67	0.21	0.66	1.10		
Netherlands						1.21	1.26	1.27	1.31	1.26	1.45	1.36	
Norway		1.09	1.00	1.23	1.17	1.02	1.02	1.25	1.17	1.12	1.06	1.00	
Portugal							2.54	1.58	1.84	1.31	2.04		
Sweden	1.01	1.00	1.03	1.10	1.11	1.26	1.01	1.08	1.01	1.19	1.15	1.16	
United States	1.12	1.08	1.06	1.06	1.01	1.09	1.12	1.10	1.14	1.04	1.11	1.22	
<b>Sectors 29 to 33: machinery and equipment</b>													
country	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Czech Republic											1.24	1.23	1.22
Spain										1.47			
Finland										0.89	0.83	0.94	0.77
France					1.08	1.09	1.00	0.95	0.91	0.94	0.97	0.97	
United Kingdom				1.39	1.39	1.59	1.62	1.59		2.11			
Hungary									1.46	1.26			
Japan					0.86	1.48	1.47	1.44	1.36	1.48	1.47		
Netherlands						1.22	1.20	1.24	1.35	1.16	1.24	1.34	
Norway		1.10	1.12	1.08	1.02	1.39	1.21	1.26	1.44	1.31	1.21	1.19	
Portugal								1.23	0.87			1.33	1.53
Sweden	1.16	1.15	1.16	1.09	1.08	1.08	0.98	0.93	0.90	0.89	1.00	1.20	
United States			0.85	0.86	0.89	0.82	0.85	0.85	0.86	0.87	0.88	0.93	
<b>Sectors 30 to 33: Electrical and Optical Equipment</b>													
country	1977	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Czech Republic											1.23	1.28	1.31
Spain										1.40			
Finland										0.71	0.66	0.79	0.57
France					1.12	1.12	1.03	0.95	0.91	0.98	0.98	0.95	
United Kingdom				1.32	1.35	1.65	1.67	1.60		2.01			
Hungary									1.44	1.17			
Japan					0.85	1.54	1.49	1.15	1.13	1.32	0.99		
Netherlands						1.35	1.36	1.40	1.49	1.24	1.27	1.52	
Portugal								1.13	0.75			1.31	1.53
Sweden	1.38	1.34	1.45	1.12	1.08	1.08	0.98	0.90	0.86	0.83	0.98	1.50	
<b>Sectors 34 and 35: Transport Equipment</b>													
country	1977	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Czech Republic								2.41	1.69	1.43	1.24	1.37	1.23
Spain										1.32	1.31	1.30	
Finland											0.89	1.17	1.23
France					0.92	0.89	0.99	0.80	0.76	0.68	0.83	0.74	
United Kingdom				1.29	1.32	1.55	1.65	1.65		1.53			
Hungary									1.45	1.75			
Japan					0.97	0.58	0.91	1.04	0.68	0.64	1.10		
Netherlands						0.72	1.34	1.23	1.47	1.30	1.38	1.99	
Norway			1.11	1.11	1.14	1.10	1.03	1.18	1.12	1.11	1.25	1.20	
Portugal								1.40	1.99				
Sweden	0.83	0.80	0.92	0.81	0.87	0.79	0.75	0.81	0.91	1.21	1.18	1.22	
United States	0.82	0.88	0.75	0.73	0.76	0.81	0.75	0.83	1.09	1.07	0.81	0.76	
<b>Sectors 36 and 37: Manufacturing NEC; Recycling</b>													
country	1977	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Czech Republic								1.50	1.58	1.31	1.50	1.69	1.65
Spain											1.92	1.84	
Finland						1.06	1.28	1.19	1.04	1.25	1.31	1.27	
France					0.97	0.89	0.90	0.90	0.91	0.95	0.88	0.80	
United Kingdom				1.54	1.58	1.92	1.71	1.74		2.85			
Hungary							0.98	1.31	1.17	1.38			
Japan					1.87	2.74	1.81	1.49	0.55	0.75	1.63		
Netherlands						2.35	2.49	2.73	2.64	2.33	2.32	2.29	
Norway		0.80	0.92	1.00	1.31	1.35	1.43	1.33	1.32	1.38	1.12	0.93	
Portugal							2.27	1.51	2.89		1.37		
Sweden	2.29	2.53	2.62	2.39	1.49	1.88	2.23	2.14	1.61	2.21	2.11	2.30	
United States	2.45	2.30	2.52	1.94	2.19	2.86	2.77	1.12	1.02	1.00	1.10	1.01	

**Table 7. Contribution to LP (VA/EMP) productivity growth in the manufacturing sectors**

<i>Total Manufacturing sector (Sectors 15 to 37)</i>								
<b>country</b>	<b>Average Sector LP growth</b>	<b>LP growth Domestic firms</b>	<b>LP growth foreign affiliates</b>	<b>foreign employment share</b>	<b>change in foreign employment share</b>	<b>Foreign contribution</b>	<b>within effect</b>	<b>between effect</b>
Czech Republic	0.041	0.009	0.035	0.099	0.170	0.067	0.010	0.057
Spain	0.008	0.015	-0.020	0.136	0.004	-0.002	-0.005	0.003
Finland	0.048	0.046	0.052	0.092	0.074	0.020	0.007	0.013
France	0.035	0.038	0.017	0.185	0.100	0.025	0.005	0.020
United Kingdom	0.012	-0.018	0.044	0.163	0.033	0.031	0.015	0.016
Hungary	0.059	0.098	0.027	0.350	0.011	0.019	0.016	0.003
Japan	0.035	0.034	0.036	0.006	0.006	0.002	0.001	0.002
Netherlands	0.019	0.015	0.024	0.158	0.009	0.009	0.006	0.003
Norway	0.012	0.002	0.006	0.124	0.091	0.025	0.002	0.023
Portugal	0.020	0.028	-0.021	0.079	-0.001	-0.004	-0.003	0.000
Sweden	0.062	0.037	0.100	0.177	0.131	0.058	0.027	0.032
United States	0.037	0.033	0.061	0.120	0.020	0.012	0.008	0.004
<i>Sectors 15 and 16: Food Products, Beverages and Tobacco</i>								
<b>country</b>	<b>Average Sector LP growth</b>	<b>LP growth Domestic firms</b>	<b>LP growth foreign affiliates</b>	<b>foreign employment share</b>	<b>change in foreign employment share</b>	<b>Foreign contribution</b>	<b>within effect</b>	<b>between effect</b>
Czech Republic	-0.040	-0.083	-0.024	0.062	0.122	0.045	-0.006	0.051
Spain	0.008	-0.001	0.069	0.106	-0.008	0.005	0.013	-0.008
Finland	0.035	0.031	0.049	0.061	0.089	0.024	0.006	0.018
France	-0.010	0.010	-0.101	0.131	0.016	-0.011	-0.022	0.011
United Kingdom	-0.010	-0.061	0.013	0.133	0.099	0.052	0.004	0.048
Hungary	-0.044	-0.082	-0.028	0.316	0.034	0.003	-0.015	0.017
Japan	-0.015	-0.016	0.021	0.001	0.000	0.000	0.000	0.000
Netherlands	0.017	0.006	0.042	0.179	0.000	0.012	0.012	0.000
Norway	0.020	-0.021	0.087	0.126	0.012	0.036	0.030	0.006
Portugal	0.012	0.026	-0.094	0.035	-0.002	-0.011	-0.010	-0.001
Sweden	0.014	0.007	0.032	0.204	0.104	0.026	0.008	0.018
United States	-0.049	-0.057	0.028	0.135	-0.024	-0.001	0.002	-0.003
<i>Sectors 17 to 19: Textiles, Textile Product, Leather and Footwear</i>								
<b>country</b>	<b>Average Sector LP growth</b>	<b>LP growth Domestic firms</b>	<b>LP growth foreign affiliates</b>	<b>foreign employment share</b>	<b>change in foreign employment share</b>	<b>Foreign contribution</b>	<b>within effect</b>	<b>between effect</b>
Czech Republic	0.078	0.079	0.035	0.082	0.095	0.034	0.006	0.028
Spain	0.004	0.014	-0.115	0.027	-0.003	-0.012	-0.006	-0.006
Finland	0.013	0.009	0.001	0.016	0.028	0.009	0.000	0.009
France	0.049	0.050	0.039	0.107	0.023	0.009	0.005	0.004
United Kingdom	0.010	0.001	-0.025	0.044	0.047	0.020	-0.003	0.023
Hungary	-0.035	-0.073	0.007	0.282	0.041	0.021	0.003	0.018
Japan	-0.001	-0.001	0.032	0.001	0.001	0.000	0.000	0.000
Netherlands	0.050	0.061	0.017	0.110	-0.020	-0.003	0.003	-0.006
Norway	0.041	0.038	0.044	0.029	0.039	0.012	0.003	0.010
Portugal	0.004	0.006	-0.028	0.054	-0.022	-0.006	-0.001	-0.004
Sweden	0.013	0.008	0.013	0.140	0.035	0.012	0.003	0.009
United States	0.035	0.035	0.038	0.051	-0.010	0.000	0.002	-0.002
<i>Sectors 20 to 22: Wood and Products of Wood and Cork; Pulp, Paper, Paper Products, Printing and Publishing</i>								
<b>country</b>	<b>Average Sector LP growth</b>	<b>LP growth Domestic firms</b>	<b>LP growth foreign affiliates</b>	<b>foreign employment share</b>	<b>change in foreign employment share</b>	<b>Foreign contribution</b>	<b>within effect</b>	<b>between effect</b>
Czech Republic	0.063	0.050	0.046	0.082	0.091	0.041	0.009	0.032
Spain	-0.025	-0.023	-0.060	0.054	0.002	-0.002	-0.006	0.004
Finland	0.004	0.004	0.020	0.026	0.011	0.004	0.001	0.003
France	0.019	0.021	-0.001	0.169	0.033	0.011	0.000	0.011
United Kingdom	-0.006	-0.039	0.138	0.094	0.001	0.027	0.026	0.001
Hungary	0.034	0.027	0.079	0.227	-0.030	0.010	0.030	-0.021
Japan	-0.005	-0.005	0.023	0.000	0.000	0.000	0.000	0.000
Netherlands	0.021	0.022	0.012	0.089	0.004	0.004	0.002	0.002
Norway	0.029	0.021	0.046	0.054	0.061	0.022	0.005	0.016
Portugal	0.021	0.032	-0.090	0.024	0.001	-0.007	-0.008	0.001
Sweden	0.032	0.024	0.073	0.063	0.134	0.034	0.009	0.025
United States	-0.004	-0.004	0.008	0.072	-0.021	-0.004	0.001	-0.004

**Sectors 23 to 25: Chemical, Rubber, Plastics and fuel Products**

country	Average Sector LP growth	LP growth Domestic firms	LP growth foreign affiliates	foreign employment share	change in foreign employment share	Foreign contribution	within effect	between effect
France	0.039	0.043	0.033	0.378	0.098	0.034	0.015	0.019
United Kingdom	0.006	0.008	0.002	0.241	0.002	0.002	0.001	0.001
Hungary	-0.020	0.524	-0.038	0.624	-0.022	-0.046	-0.036	-0.010
Japan	0.026	0.027	0.062	0.043	0.016	0.004	0.002	0.002
Netherlands	0.024	0.040	0.002	0.327	0.006	0.002	0.001	0.001
Norway	-0.010	0.004	-0.039	0.207	0.208	0.016	-0.014	0.030
Portugal	0.041	0.051	0.023	0.123	-0.004	0.006	0.007	-0.002
Sweden	0.064	-0.008	0.106	0.387	0.186	0.097	0.054	0.043
United States	0.017	0.007	0.055	0.248	0.015	0.015	0.012	0.003

**Sectors 24 and 25: Chemical, Rubber and Plastics**

country	Average Sector LP growth	LP growth Domestic firms	LP growth foreign affiliates	foreign employment share	change in foreign employment share	Foreign contribution	within effect	between effect
Czech Republic	0.026	-0.013	0.025	0.121	0.283	0.088	0.009	0.079
Spain	-0.003	0.009	-0.021	0.319	0.007	-0.005	-0.010	0.005
Finland	0.018	0.001	0.035	0.105	0.155	0.043	0.008	0.035
France	0.048	0.085	0.011	0.418	0.077	0.020	0.006	0.015
United Kingdom	0.013	0.022	0.0001	0.243	0.001	0.0004	0.00004	0.0003
Hungary	-0.211	-0.131	-0.235	0.469	0.005	-0.185	-0.192	0.007
Japan	0.019	0.017	0.080	0.045	0.016	0.006	0.003	0.003
Netherlands	0.036	0.051	0.013	0.313	0.004	0.006	0.005	0.001
Sweden	0.065	-0.025	0.124	0.375	0.190	0.106	0.061	0.045
United States	0.021	0.023	0.017	0.265	0.001	0.004	0.004	0.0002

**Sector 26: Other non-metallic mineral products**

country	Average Sector LP growth	LP growth Domestic firms	LP growth foreign affiliates	foreign employment share	change in foreign employment share	Foreign contribution	within effect	between effect
Czech Republic	0.027	-0.031	0.046	0.078	0.194	0.085	0.013	0.072
Spain	0.015	0.017	0.029	0.080	-0.006	-0.002	0.005	-0.007
Finland	0.017	0.001	0.048	0.252	0.029	0.021	0.014	0.006
France	0.023	0.029	0.002	0.202	0.042	0.009	0.001	0.008
United Kingdom	0.004	-0.001	0.002	0.097	0.037	0.013	0.0003	0.013
Hungary	0.064	0.007	0.077	0.483	0.062	0.078	0.049	0.029
Japan	0.010	0.010	-0.032	0.000	0.001	0.0003	-0.00005	0.0004
Netherlands	0.031	0.053	0.002	0.344	0.030	0.008	0.001	0.006
Norway	-0.024	-0.025	-0.027	0.301	0.086	0.004	-0.010	0.015
Portugal	0.013	0.014	-0.001	0.049	-0.009	-0.002	-0.0001	-0.002
Sweden	0.021	0.022	0.028	0.335	0.209	0.047	0.012	0.035
United States	-0.003	-0.022	0.028	0.217	0.057	0.021	0.008	0.013

**Sectors 27 and 28: basic metals and fabricated mineral products**

country	Average Sector LP growth	LP growth Domestic firms	LP growth foreign affiliates	foreign employment share	change in foreign employment share	Foreign contribution	within effect	between effect
Czech Republic	0.009	-0.001	0.045	0.064	0.104	0.030	0.006	0.024
Spain	0.025	0.025	0.001	0.055	0.005	0.006	0.0001	0.006
Finland	-0.003	-0.007	0.033	0.079	0.052	0.012	0.003	0.008
France	0.013	0.020	0.002	0.096	0.159	0.025	0.0003	0.025
United Kingdom	0.013	-0.003	0.040	0.090	0.024	0.021	0.008	0.013
Hungary	-0.006	-0.042	0.091	0.240	0.010	0.028	0.024	0.004
Japan	0.013	0.013	0.048	0.003	-0.002	-0.0003	0.0001	-0.0004
Netherlands	0.011	-0.002	0.033	0.131	0.081	0.025	0.007	0.018
Norway	0.043	0.044	0.038	0.143	0.074	0.021	0.007	0.014
Portugal	0.018	0.030	-0.034	0.051	-0.012	-0.011	-0.004	-0.007
Sweden	0.005	0.007	-0.009	0.136	0.035	0.005	-0.002	0.007
United States	0.010	0.008	0.032	0.111	-0.020	-0.0004	0.004	-0.004

**Sectors 29 to 33: machinery and equipment**

country	Average Sector LP growth	LP growth Domestic firms	LP growth foreign affiliates	foreign employment share	change in foreign employment share	Foreign contribution	within effect	between effect
Czech Republic	0.021	0.004	0.026	0.295	0.043	0.038	0.010	0.027
Finland	0.110	0.128	0.048	0.218	0.018	0.015	0.010	0.006
France	0.082	0.012	0.163	0.329	0.083	0.088	0.066	0.022
United Kingdom	0.027	-0.059	0.118	0.224	0.054	0.074	0.047	0.027
Hungary	0.428	1.036	0.127	0.459	0.078	0.237	0.102	0.135
Japan	0.102	0.103	0.059	0.011	0.004	0.002	0.001	0.001
Netherlands	0.012	0.009	0.031	0.177	-0.022	0.001	0.006	-0.005
Norway	0.006	-0.001	-0.018	0.076	0.184	0.036	-0.004	0.040
Portugal	0.044	-0.018	0.112	0.316	0.053	0.064	0.047	0.017
Sweden	0.198	0.366	0.021	0.269	0.030	0.022	0.011	0.011
United States	0.153	0.149	0.192	0.142	0.034	0.032	0.025	0.007

**Sectors 30 to 33: Electrical and Optical Equipment**

country	Average Sector LP growth	LP growth Domestic firms	LP growth foreign affiliates	foreign employment share	change in foreign employment share	Foreign contribution	within effect	between effect
Czech Republic	0.020	-0.029	0.056	0.403	0.023	0.043	0.029	0.015
Finland	0.176	0.214	0.075	0.256	0.040	0.025	0.015	0.011
France	0.126	0.018	0.249	0.321	0.083	0.129	0.101	0.027
United Kingdom	0.051	-0.048	0.117	0.247	0.072	0.091	0.055	0.037
Hungary	0.568	2.667	0.120	0.523	0.135	0.356	0.117	0.238
Japan	0.164	0.167	0.035	0.015	-0.006	-0.001	0.001	-0.002
Netherlands	0.010	0.007	0.033	0.169	-0.025	0.001	0.007	-0.006
Portugal	0.048	-0.026	0.134	0.356	0.042	0.070	0.057	0.013
Sweden	0.451	0.917	0.045	0.205	0.057	0.061	0.028	0.033

**Sectors 34 and 35: Transport Equipment**

country	Average Sector LP growth	LP growth Domestic firms	LP growth foreign affiliates	foreign employment share	change in foreign employment share	Foreign contribution	within effect	between effect
Czech Republic	0.201	0.442	0.004	0.285	0.287	0.144	0.004	0.140
Spain	-0.040	-0.035	-0.047	0.389	0.004	-0.022	-0.024	0.003
Finland	-0.010	-0.087	0.176	0.333	-0.006	0.048	0.052	-0.003
France	0.059	0.080	0.021	0.208	0.122	0.025	0.005	0.019
United Kingdom	0.029	0.059	0.025	0.368	-0.048	-0.006	0.013	-0.020
Hungary	-0.017	-0.168	0.185	0.625	-0.111	-0.024	0.153	-0.177
Japan	0.034	0.032	0.244	0.001	0.044	0.012	0.003	0.008
Netherlands	0.044	-0.031	0.411	0.231	0.004	0.071	0.070	0.001
Norway	0.005	-0.013	0.021	0.123	0.241	0.053	0.006	0.047
Portugal	0.032	-0.183	0.460	0.156	0.058	0.219	0.119	0.100
Sweden	0.065	0.023	0.187	0.085	0.349	0.111	0.039	0.072
United States	0.023	0.032	0.012	0.079	0.144	0.021	0.001	0.020

**Sectors 36 and 37: Manufacturing NEC; Recycling**

country	Average Sector LP growth	LP growth Domestic firms	LP growth foreign affiliates	foreign employment share	change in foreign employment share	Foreign contribution	within effect	between effect
Czech Republic	0.050	0.029	0.076	0.078	0.079	0.041	0.013	0.028
Spain	0.025	0.022	-0.018	0.032	0.007	0.012	-0.001	0.013
Finland	0.022	0.018	0.060	0.043	0.025	0.009	0.004	0.005
France	0.021	0.026	0.002	0.092	0.074	0.011	0.0002	0.011
United Kingdom	0.000	-0.036	0.121	0.044	0.044	0.042	0.015	0.026
Hungary	-0.041	-0.068	0.078	0.211	-0.022	0.007	0.015	-0.008
Japan	0.039	0.040	-0.058	0.002	-0.002	-0.001	-0.0002	-0.001
Netherlands	0.006	0.004	0.002	0.013	0.009	0.004	0.0001	0.003
Norway	0.022	0.025	-0.036	0.035	0.061	0.009	-0.003	0.012
Portugal	0.045	0.046	-0.072	0.025	0.050	0.016	-0.008	0.024
Sweden	0.047	0.042	0.094	0.071	-0.009	0.008	0.012	-0.003
United States	0.025	0.037	-0.099	0.031	0.010	-0.007	-0.010	0.003

Note: Czech Republic: 1997 to 2002. Sectors 29 to 33: 2000 to 2002. Spain: 1999 to 2001. Sectors 17 to 19; 20 to 22 and 36 and 37: 2000 to 2001. Finland: Sectors 20 to 22: 1998 to 2001; Sectors 29 to 33: 1999 to 2002; Sectors 34 and 35: 2000 to 2002; total manufacturing (15 to 37): 1995 to 2002. France: Sectors 15 and 16: 1999 to 2001; Sectors 20 to 22: 1997 to 2001. United Kingdom: 1995 to 1999. Hungary: 1996 to 1999; Sectors 24 to 25; 29 to 33; 34 and 35: 1998-99; total manufacturing (15 to 37): 1996 to 2002. Japan: 1995-2000. Netherlands: Sectors 20 to 22: 1997-2001. Norway: Sectors 23 to 25: 1995-2002. Portugal: 1996 to 2002. Sectors 20 to 22: 1996-1999; Sectors 27 and 28 and 36 and 37: 1996-2000; Sectors 29 to 33: 1997-2002; Sectors 34 and 35: 1997-98. Sweden: Sectors 29 to 33: 1995-2000.

Source: STAN and AFA databases, OECD.

Table 8. Relative labour productivity (value added over employment) in the service sector

<b>Sectors 50 to 52: Wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods</b>								
<b>country</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>
Czech Republic	2.32			1.69	1.65	1.76	1.84	1.80
Finland	1.92			1.64	1.69	1.72	1.66	
France	1.58	1.66	1.59	1.64	1.85	1.82	1.85	
Hungary				1.71		2.02	1.89	1.96
Italy							1.79	
Netherlands			2.11			1.66	1.90	
Portugal		6.34	6.02	6.40	6.01	6.97	3.24	3.06
Sweden			1.71	1.75	1.86	1.84		
United States	1.33	1.28	1.52	1.54	1.60	1.86	1.81	
<b>Sectors 55: Hotels and restaurants</b>								
<b>country</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>
Czech Republic	0.77			0.83	0.77	1.68	1.54	1.35
Finland				1.17	1.17	1.25	1.15	
France	0.73	0.79	0.71	0.93	0.79	0.80	0.77	
Hungary				1.52		1.75	1.72	1.90
Italy							0.85	
Netherlands			1.84			1.27	1.30	
Portugal		2.86	1.46	1.63	1.17	1.26	1.29	1.33
Sweden			1.56	1.30	1.24	1.26		
United States	0.99	1.16	0.88	0.87	0.83	0.78	0.72	
<b>Sectors 60 to 64: Transport, storage and communications</b>								
<b>country</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>
Czech Republic	2.62			1.00	0.78	1.23	1.41	1.59
Finland	0.90			0.68	0.72	0.53	0.55	
France	0.76	0.77	0.80	0.77	0.62	0.60	0.74	
Hungary				3.19		3.49	3.46	3.34
Italy							1.72	
Japan			1.44			1.61		
Netherlands			0.94			0.68	0.65	
Portugal		2.87	3.61	3.71	2.94	2.73	2.49	2.53
Sweden			0.83	0.87	0.87	0.93		
United States	0.99	1.19	0.59	0.66		0.59	0.24	
<b>Sectors 65 to 67: Financial intermediation</b>								
<b>country</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>
Czech Republic	3.16			1.94		6.30	1.99	2.14
France	1.49	1.23	1.46	1.72	1.66	1.68	1.51	
Hungary				2.71				
Portugal		1.04	1.21	1.20	1.39	1.22	1.31	1.29
United States	0.59	0.91	1.12	0.86	0.79	1.01	0.46	
<b>Sectors 70 to 74: Real estate, renting and business activities</b>								
<b>country</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>
Czech Republic	0.74			0.99	0.93	1.05	0.91	1.26
Finland	0.59			0.47	0.48	0.53	0.50	
France	0.55	0.48	0.41	0.42	0.45	0.45	0.45	
Hungary				0.59		0.79	0.78	0.89
Italy							0.50	
Japan			0.45			0.36		
Netherlands			1.13			0.63	0.59	
Portugal		0.85	0.48	0.57	0.45	0.56	1.54	0.74
Sweden			0.52	0.55	0.59	0.59		
United States	0.48	0.50	0.59	0.53		0.39	0.45	

**Table 9. Contribution to LP (VA/EMP) productivity growth in the service sectors**

**Sectors 50 to 52: Wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods**

country	Average Sector LP growth	LP growth Domestic firms	LP growth foreign affiliates	foreign employment share	change in foreign employment share	Foreign contribution	within effect	between effect
Czech Republic	0.077	0.059	0.028	0.059	0.105	0.045	0.007	0.038
Finland	0.020	0.017	-0.006	0.078	0.043	0.013	-0.001	0.014
France	0.005	0.002	0.034	0.051	0.001	0.003	0.003	0.0002
Hungary	0.002	-0.014	0.039	0.147	0.009	0.014	0.010	0.004
Netherlands	0.017	0.021	-0.010	0.069	0.003	0.0001	-0.002	0.002
Portugal	0.000	0.017	-0.086	0.031	0.007	-0.013	-0.019	0.005
Sweden	0.035	0.020	0.063	0.102	0.022	0.026	0.012	0.014
United States	0.063	0.060	0.146	0.038	-0.004	0.006	0.007	-0.001

**Sectors 55: Hotels and restaurants**

country	Average Sector LP growth	LP growth Domestic firms	LP growth foreign affiliates	foreign employment share	change in foreign employment share	Foreign contribution	within effect	between effect
Czech Republic	-0.063	-0.067	-0.004	0.045	0.037	0.004	0.000	0.004
Finland	-0.004	-0.001	-0.011	0.097	-0.035	-0.014	-0.001	-0.013
France	0.001	0.0003	0.011	0.026	-0.010	-0.001	0.0002	-0.001
Hungary	-0.023	-0.027	0.034	0.094	-0.021	-0.004	0.004	-0.008
Netherlands	-0.010	-0.008	-0.081	0.046	0.051	0.009	-0.011	0.020
Portugal	-0.011	-0.009	-0.095	0.013	0.019	0.0004	-0.006	0.006
Sweden	0.023	0.030	-0.046	0.073	0.017	0.003	-0.006	0.008
United States	-0.008	-0.0001	-0.051	0.070	0.087	0.006	-0.006	0.012

**Sectors 60 to 64: Transport, storage and communications**

country	Average Sector LP growth	LP growth Domestic firms	LP growth foreign affiliates	foreign employment share	change in foreign employment share	Foreign contribution	within effect	between effect
Czech Republic	0.021	0.016	-0.044	0.005	0.056	0.014	-0.004	0.018
Finland	0.052	0.059	-0.034	0.026	0.049	0.005	-0.002	0.007
France	0.041	0.042	0.035	0.016	0.009	0.002	0.001	0.001
Hungary	0.0001	-0.007	0.012	0.081	0.003	0.006	0.003	0.003
Netherlands	0.037	0.047	-0.052	0.046	0.053	0.008	-0.004	0.011
Portugal	0.043	0.039	0.018	0.016	0.013	0.008	0.001	0.007
Sweden	0.013	0.012	0.052	0.065	0.062	0.023	0.004	0.019
United States	0.027	0.033	-0.120	0.054	-0.015	-0.007	-0.006	-0.002

**Sectors 65 to 67: Financial intermediation**

country	Average Sector LP growth	LP growth Domestic firms	LP growth foreign affiliates	foreign employment share	change in foreign employment share	Foreign contribution	within effect	between effect
Czech Republic	0.154	-0.649	0.058	0.063	0.621	0.406	0.068	0.337
France	-0.010	-0.010	-0.008	0.023	0.003	0.001	-0.0003	0.001
Portugal	0.202	0.192	0.289	0.051	0.043	0.036	0.022	0.014
United States	0.059	0.061	0.006	0.034	0.008	0.001	0.0001	0.001

**Sectors 70 to 74: Real estate, renting and business activities**

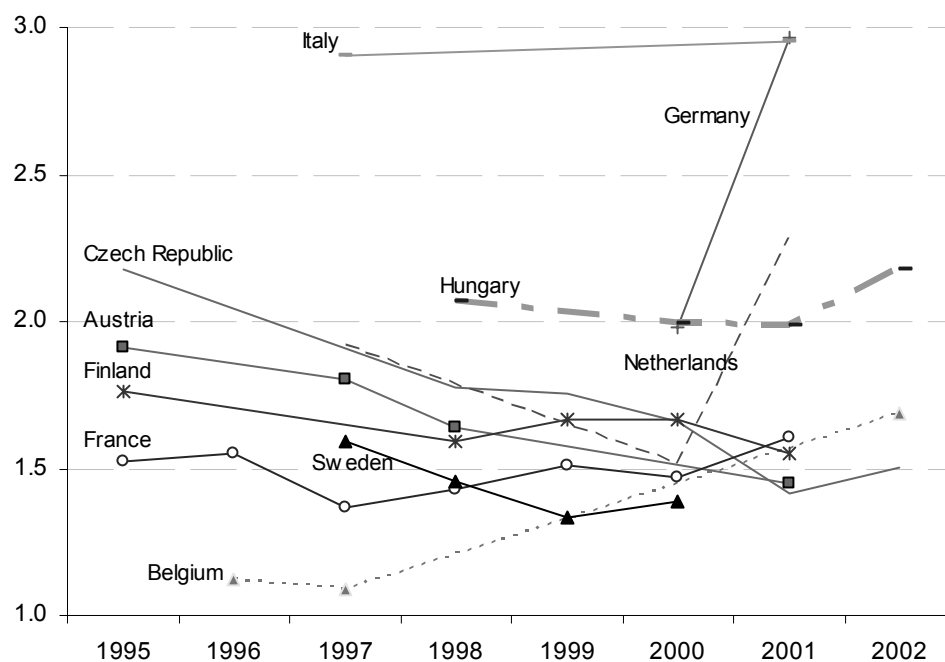
country	Average Sector LP growth	LP growth Domestic firms	LP growth foreign affiliates	foreign employment share	change in foreign employment share	Foreign contribution	within effect	between effect
Czech Republic	-0.015	-0.020	0.074	0.045	0.062	0.012	0.004	0.008
Finland	-0.019	-0.013	-0.041	0.048	0.061	0.003	-0.002	0.005
France	-0.018	-0.016	-0.044	0.059	0.017	-0.0003	-0.002	0.001
Hungary	-0.034	-0.048	0.076	0.173	-0.040	0.00003	0.007	-0.007
Netherlands	0.006	0.017	-0.116	0.036	0.047	0.002	-0.008	0.010
Portugal	-0.009	-0.009	-0.030	0.067	-0.022	-0.004	-0.001	-0.003
Sweden	-0.040	-0.041	-0.002	0.125	0.012	0.002	-0.0001	0.002
United States	-0.001	0.0001	-0.009	0.029	0.013	0.001	-0.0002	0.001

Note: Czech Republic: 1995-2002. Finland: Sector 55: 1998-2001. Hungary: 1998-2002. Netherlands: 1997-2001. Portugal: 1996-2002. Sweden: 1997-2000.

Source: STAN and FATS databases, OECD.

### ANNEX 3: FURTHER ANALYSIS OF LABOUR PRODUCTIVITY IN THE SERVICES SECTOR

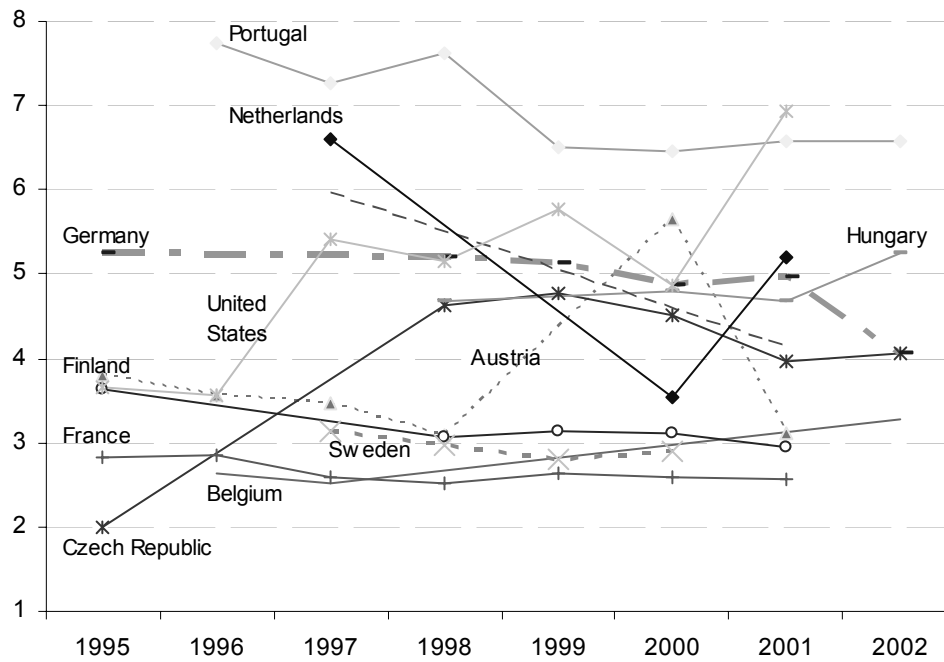
**Figure 22. Relative Labour Productivity of foreign affiliates in the services sector (50 to 74) using FATS database for total national figures**



Note: Austria: sectors 65 to 67 only included in 2001; Belgium: sectors 65 to 67 only included in 2002; Czech Republic: sectors 65 to 67 not included in 1999; Finland: sector 55 not included in 1995; Germany: sectors 50 to 52 not included in 2000; Hungary: sectors 65 to 67 not included in 1998 and 2002.

Source: FATS database, OECD

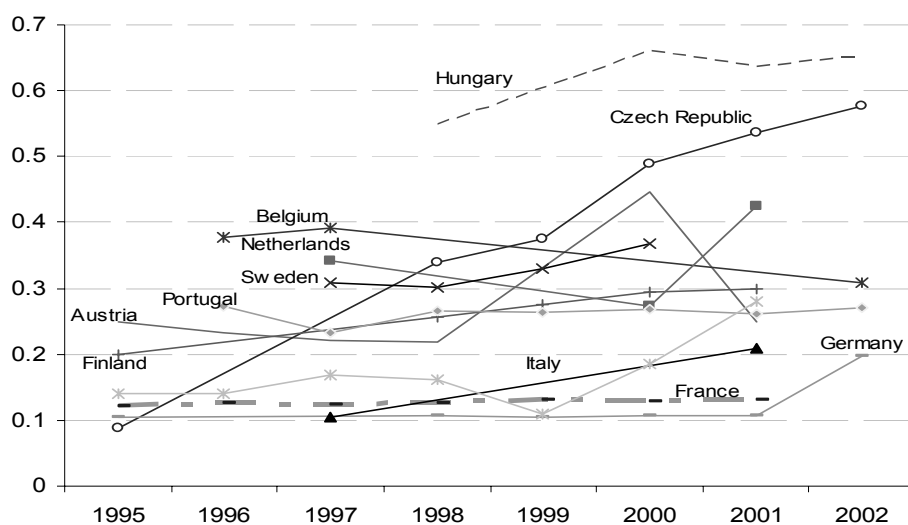
**Figure 23. Relative Labour Productivity of foreign affiliates in the services sector (50 to 74) using the STAN database for total national figures**



Note Czech Republic: sectors 65 to 67 not included in 1999; Finland: sector 55 not included in 1995; Hungary: sectors 65 to 67 not included in 2002. United States: sectors 70 to 74 not included between 1997 and 2002 and sectors 60 to 64 and 65 to 67 not included in 2002.

Source: STAN and FATS database, OECD

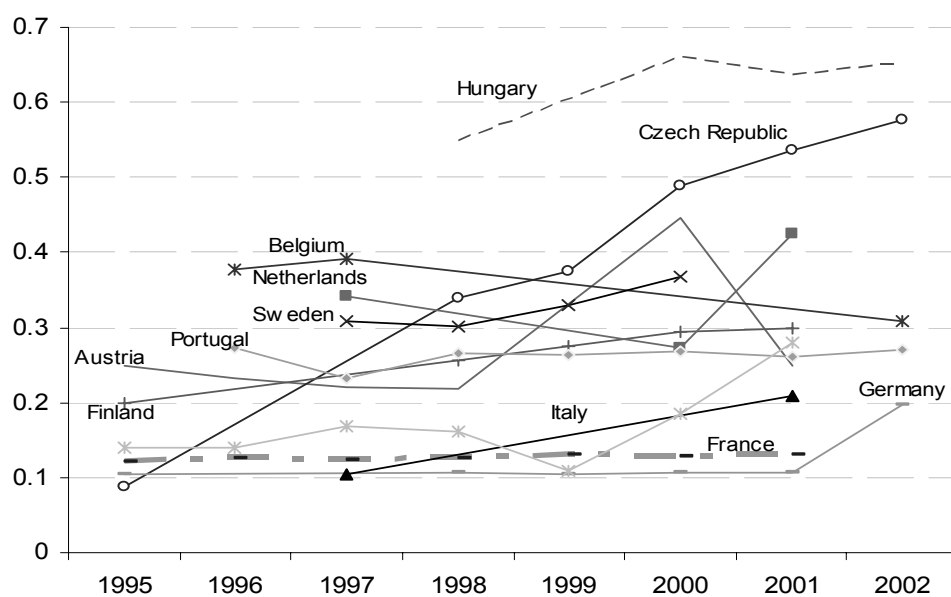
**Figure 24. Share of turnover foreign affiliates as from ratio of FATS to STAN**



Note Czech Republic: sectors 65 to 67 not included in 1999; Finland: sector 55 not included in 1995; Hungary: sectors 65 to 67 not included in 2002. United States: sectors 70 to 74 not included between 1997 and 2002 and sectors 60 to 64 and 65 to 67 not included in 2002.

Source: STAN and FATS databases, OECD

**Figure 25. Share of turnover foreign affiliates as from ratio of FATS to FATS**



Note: Austria: sectors 65 to 67 only included in 2001; Belgium: sectors 65 to 67 only included in 2002; Czech Republic: sectors 65 to 67 not included in 1999; Finland: sector 55 not included in 1995; Germany: sectors 50 to 52 not included in 2000; Hungary: sectors 65 to 67 not included in 1998 and 2002.

Source: FATS database, OECD