

Globalisation and Employment in the OECD

by

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Introduction

In the long run, enhanced international engagement can normally be expected to be welfare-improving for each country involved, with greater specialisation and competition and the ability to access foreign knowledge all helping to raise productivity levels and per capita incomes. But such improvements in income levels need not be experienced by all factors of production, especially comparatively unskilled workers in developed countries. The process of labour market adjustment following changes in international investment and trade patterns can also be prolonged.

This paper reviews some of the possible changes that may occur in the national labour markets of many OECD countries as a result of the internationalisation of production by multinational companies, with a particular focus on the impact of outward foreign direct investment (FDI) from OECD countries on employment in the home country of the investing firms. Although this provides only a partial picture of the overall effects of globalisation on labour market outcomes, it is an aspect about which comparatively little has been known until recently. The paper complements other analytical studies at the OECD on the labour market impact of international trade (Baldwin, 1995; OECD, 2005; OECD, 2007).

In the economy as a whole, relative factor prices will reflect the full impact of globalisation if they are sufficiently flexible, with the price of factors of production that were comparatively scarce prior to enhanced global engagement falling relative to the price of more abundant factors. For most OECD countries the wages of more skilled workers and the returns to capital might thus be expected to rise relative to the wages of less skilled workers. But if there are significant labour market rigidities, or institutional features such as binding floors for the wages of less skilled workers, then it becomes more likely that there will be a greater quantitative effect on aggregate employment and a smaller adjustment in the relative wages of different types of workers (Davis, 1998; Moore and Ranjan, 2005; OECD, 2005).

The issues examined in this paper have potentially important macroeconomic consequences. The integration and expansion of cross-border production networks increases the ability of companies to change the location of production of both finished and intermediate goods and services. Such changes affect both the sensitivity of national factor demands to changes in factor prices and the speed and the extent to which economic shocks are transmitted across national borders. Recent research has also begun to suggest that international trade in labour tasks, which is one consequence of the international fragmentation of production, might also have positive effects on productivity growth in firms that use intermediate inputs produced offshore (Grossman and Rossi-Hansberg, 2006; Amiti and Wei, 2005). Empirical investigation of this latter point is limited, but the results in this paper are suggestive that it might matter.

The existing theoretical and empirical literature is large, with a wide variety of approaches being used to study the effects of enhanced global engagement on the labour markets of developed countries. Most studies suggest that the overall impact of the

internationalisation of production on aggregate labour market developments is comparatively small. As with international trade, different occupational and skill groups have been found to be affected in different ways. In particular, international investment (and trade) account for a non-negligible proportion of the rising returns to skilled labour relative to those of unskilled labour.

Existing studies also provide evidence of considerable heterogeneity in the impact of the increased internationalisation of production, with the effects on home-country labour markets depending on whether domestic and foreign components of production are complements or substitutes, the location in which investment takes place and also the activities of the foreign affiliates of domestic parent companies. In general, the labour market effects of the internationalisation of production should be strongest for cost-saving investments (one component of vertical FDI), and also the smaller the home country relative to the location of affiliates.

The substitution of employment between parent companies and foreign affiliates is typically found to be stronger for affiliates located in Asia and Central and Eastern Europe than with affiliates located in other emerging countries. However, perhaps surprisingly, several have reported that in-company employment substitution is on average higher with affiliates located in industrialised countries than with affiliates located in developing countries.

The absence of empirical evidence of large effects in most of the studies conducted to date does not provide an indication that this will be the case in future periods. The internationalisation of production is continuing rapidly and shifting towards organisational forms that can be expected to have larger labour market effects on home countries.

This paper contains two new empirical analyses using industry-level data on the outward stocks of foreign direct investment (FDI) and employment in the foreign affiliates of the G3 economies to investigate the impact of the greater internationalisation of production on employment in home countries in the OECD. In general, these results suggest that the findings from studies of individual countries or particular industry groupings should be regarded with a degree of caution until they have been investigated more widely on other data sets, with the effects of outward investment in different industries and also in different countries found to be very heterogeneous.

The remainder of this paper is as follows. First, the next section provides a short overview of recent trends in foreign direct investment, international sourcing and the activities of multinational companies. The terms offshoring, outsourcing and foreign production by multinationals are often used interchangeably, but in fact they are distinct concepts that overlap only partially (Box 1). The next two sections review the theory of multinational companies, and some of the associated implications for the ways in which FDI will affect labour markets, and provide an overview of existing empirical studies of the activities of the affiliate companies of multinational companies. New empirical work on the impact of the internationalisation of production on the demand for labour is then reported in the following section, with the final section summarising the main findings and discussing the implications for policymakers.

Box 1. Outsourcing, offshoring and the internationalisation of production

The terms outsourcing and offshoring are frequently used interchangeably to describe the process whereby intermediate goods and services are purchased from foreign suppliers, usually with slightly different definitions. In fact there is only a partial overlap between outsourcing and offshoring, and between both terms and the internationalisation of production by multinational companies.

Outsourcing refers to the purchase of goods and services that were previously produced inside the purchasing company. The company providing the intermediate inputs can be located inside (domestic outsourcing) or outside (international outsourcing) the country of the sourcing company. All firms outsource particular activities, but relatively few do so across national boundaries (Tomiura, 2005). Trade-based measures of outsourcing are discussed further in Molnar *et al.* 2007, Annex A.

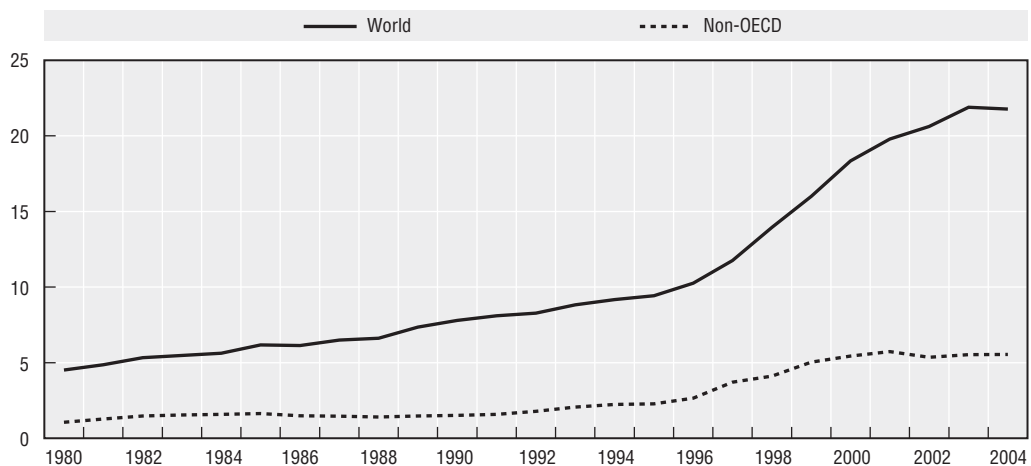
Offshoring refers to the purchase from companies in locations outside the country of goods and services previously produced inside the purchasing company. Thus it includes not only international outsourcing, but also international insourcing, with the foreign affiliates of domestic parent companies exporting to their parents.

The internationalisation of production refers to the establishment of affiliates abroad by parent companies in the home country. These affiliates may export back to the parent company (international insourcing), or provide goods and services to home and foreign markets. The goods and services produced by affiliates need not have been previously produced inside the parent company.

Recent trends in international investment

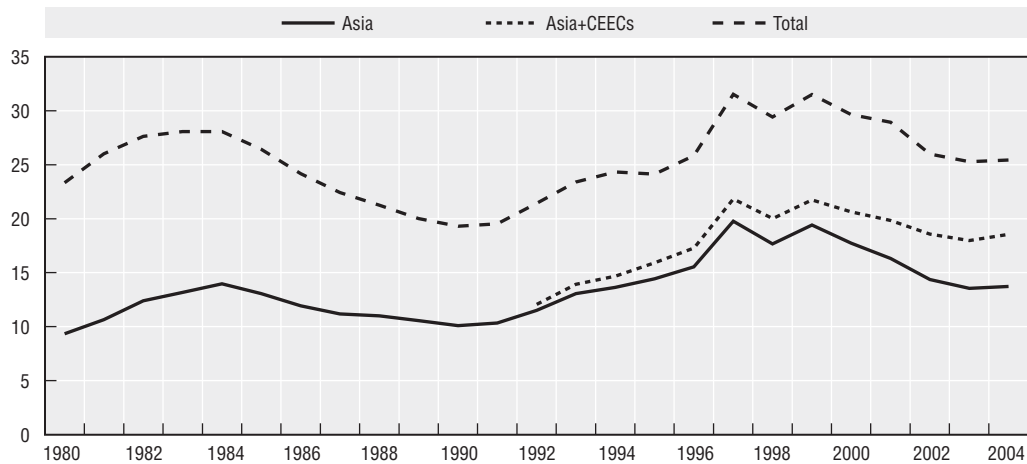
This section provides an overview of some of the major recent trends in international integration.¹ The creation and expansion of international production networks is a longstanding and ongoing process which has accelerated over the past decade. This is readily apparent from Figures 1 and 2. The global stock of foreign direct investment relative to global GDP has accelerated noticeably since the early 1990s, as has the stock of inward

Figure 1. The global stock of inward foreign direct investment
Per cent of world GDP at current prices



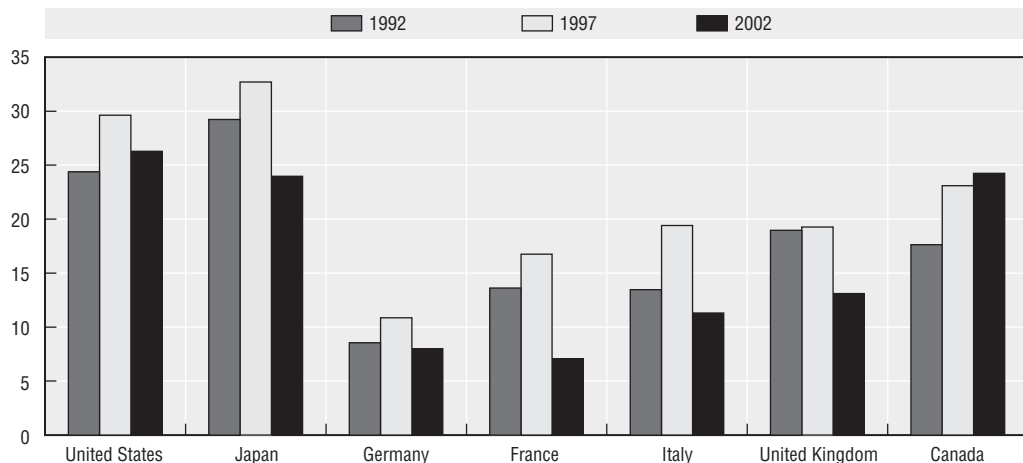
Source: UNCTAD World Investment Report Database and IMF Economic Outlook Database.

Figure 2. **The inward investment stock in the non-OECD economies**
Per cent of global stock



Source: UNCTAD World Investment Report Database.

Figure 3. **The G7 outward FDI stock in the non-OECD economies**
Per cent of total



Source: Adapted from OECD (2005b).

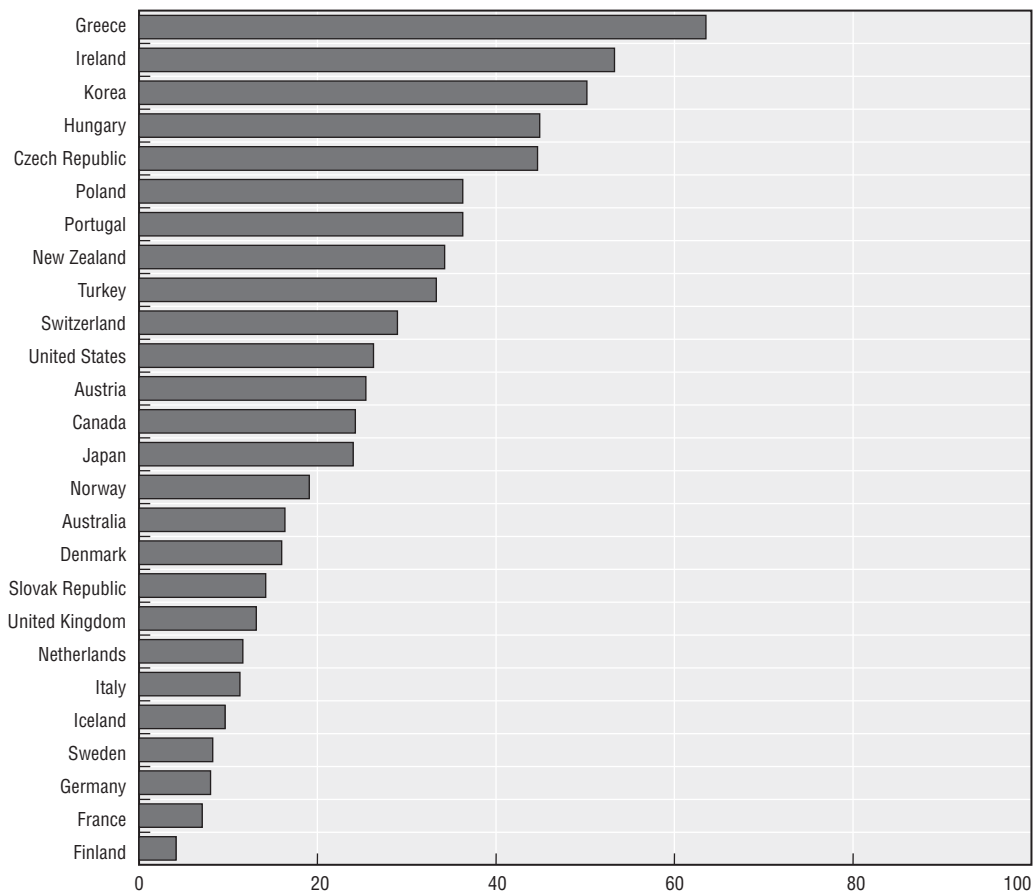
FDI in the non-OECD economies. Coinciding with this change, imports from non-OECD countries into the OECD have also risen markedly since the early 1990s (Molnar et al. 2007, Figure 2).

The acceleration in the global stock of FDI is unlikely to be due only to increasing investments in production facilities in lower-wage economies, although that is clearly a powerful motivation for some investors. The majority of global FDI remains located in the OECD economies, with the proportion held in the non-OECD economies fluctuating between 25-30%, changing little in recent years (Figure 2). A similar pattern is apparent from the geographical distribution of the outward FDI stocks of the G7 economies (Figure 3). However, the destination for investment within the non-OECD is changing, with a rising share of investments being located in Central and Eastern Europe and, to a lesser extent, the Asian economies.

The available data suggest that outward FDI stocks are typically larger in proportion to domestic output in smaller, open economies with comparatively higher labour costs, especially in Europe (Figure 4). Amongst the G7 economies the United Kingdom has the highest outward stock relative to the size of the domestic economy. As of the end of 2002, the size dispersion of FDI stocks was very wide, although this partly reflects the high level of stocks in three European economies that have a significant proportion of multinational holding companies – Switzerland, the Netherlands and Belgium. All three countries have high flows of both inward and outward FDI.

Figure 4. **FDI in non-OECD countries by OECD countries**

Per cent of total outward FDI stock in 2002

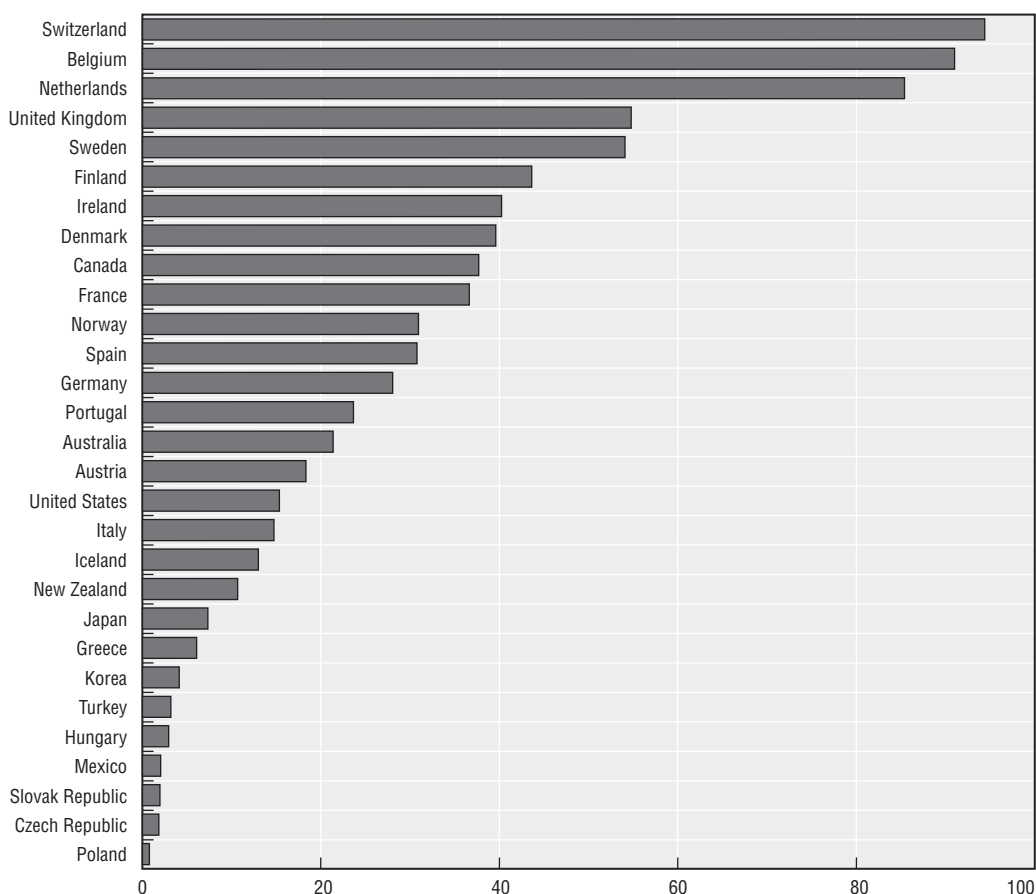


Source: Adapted from OECD (2005b).

Perhaps surprisingly, the available data suggest that many of the lower income OECD economies are amongst those with the highest proportions of their outward FDI stock invested in non-OECD countries (Figure 5). One possible explanation is that many of these countries have a higher proportion of longstanding commercial ties through trade with the non-OECD economies, especially those in close geographical proximity. However, the aggregate level of outward FDI from many lower income OECD economies is comparatively small, so that their investment in non-OECD economies is low in relation to their domestic GDP.

A further feature of direct investment is that in most countries it is dominated by investments in primary and service sectors rather than manufacturing ones (Figure 6). Of

Figure 5. **The outward FDI stocks of OECD countries in 2002**
Per cent of GDP



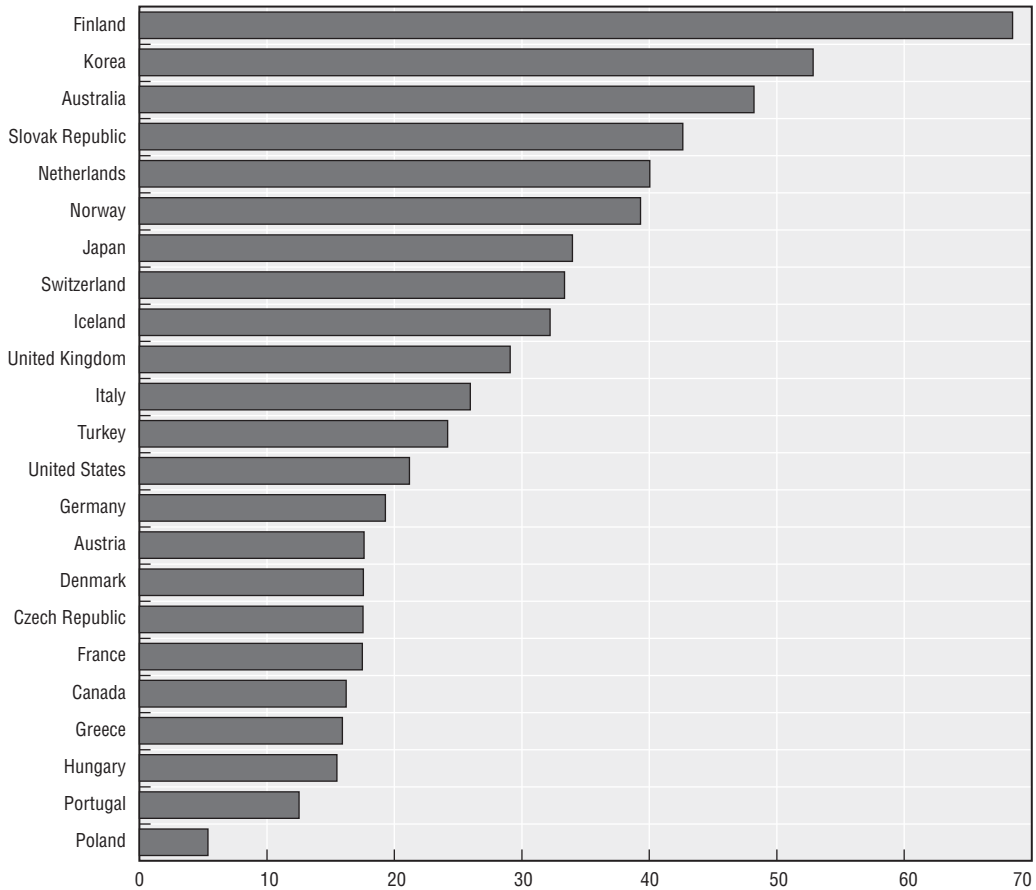
Source: Adapted from OECD 2005(b).

the countries shown, only Finland and Korea have more than half their total outward stock in manufacturing activities. Despite the smaller scale of manufacturing investments compared with services investments, cross-border linkages appear to be a lot deeper in manufacturing. For instance, employment in foreign affiliates in the manufacturing sector is generally much larger as a share of domestic employment than employment in foreign affiliates in the primary and tertiary sectors (Figure 7). There is considerable potential for cost savings by locating some activities in non-OECD economies, although this is offset to some extent by likely average differences in labour productivity.

A part of the production of many foreign affiliates will be used as intermediate inputs by parent companies. The extent of this, and indeed the extent of other forms of international sourcing, is difficult to measure, and a number of different concepts have been used, as discussed further in Molnar *et al.* (2007, Annex A). Despite common perceptions that international sourcing has risen significantly, at least one commonly used measure suggests that imports of intermediate goods have not risen much faster than imports of final goods (Figure 8).² Imports of parts and components have indeed risen as a proportion of domestic output, but this seems to have as much to do with the general rise in import penetration over time as with the fragmentation of production by multinational companies. Indeed, the share of OECD manufacturing imports accounted for by intermediate goods, parts

Figure 6. Outward FDI in manufacturing industries

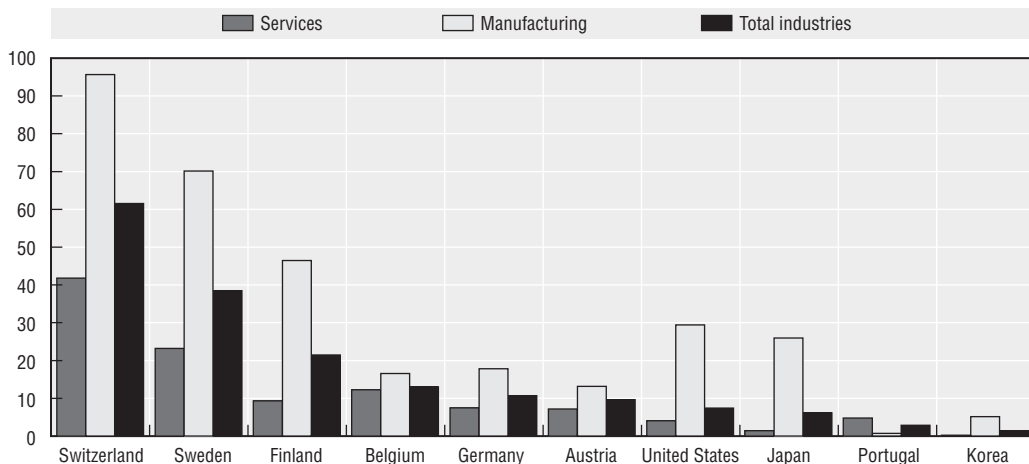
Per cent of total outward FDI stock in 2002



Source: Adapted from OECD (2005b).

Figure 7. Employment in outward foreign affiliates

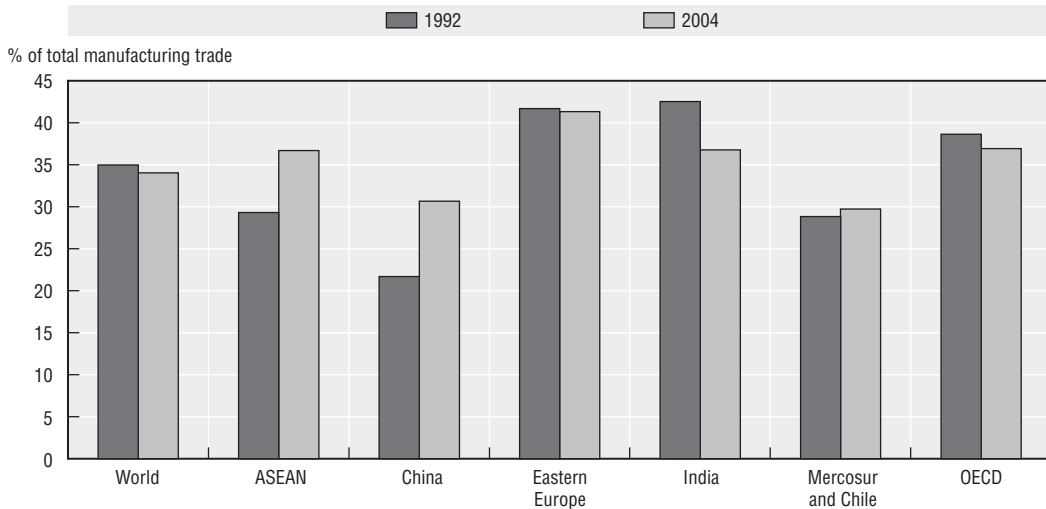
As a percentage of total national employment



Source: Adapted from OECD (2005b); data for Japan and Korea from the Ministry of Economy, Trade and Industry and the Korea Development Institute.

Figure 8. OECD imports of intermediate goods, parts and components 1992 and 2004

Per cent of total manufacturing imports from selected countries/regions. % of total manufacturing imports



Sources: Authors' calculations using data from the United Nations COMTRADE database.

and components has hardly changed at all between 1992 and 2004. Whilst intermediate imports into the OECD as a whole from China and the ASEAN have risen sharply (as a share of total manufacturing imports), this has been offset by reductions in intermediate imports from other countries. The share of imports from non-OECD economies has risen a little over time in most OECD countries, but has reached a similar level to imports from other OECD countries only in Japan and Korea (Figure 9). It is clear that regional integration in East Asia is well advanced (Ng and Yeats, 2003).

There appears to be little direct correlation between the general trend towards greater international openness in all OECD economies, as measured by the sum of exports and imports relative to GDP, and differences across countries in evolution of employment rates (OECD, 2005 and 2007).³ Greater international openness has however coincided with a widening of wage dispersions in almost all OECD countries over the past two decades (OECD, 2007), as well a modest downward adjustment in the labour share of national income (IMF, 2007). This is much more apparent in some economies than in others, possibly reflecting differences in specific institutional features in the labour market.

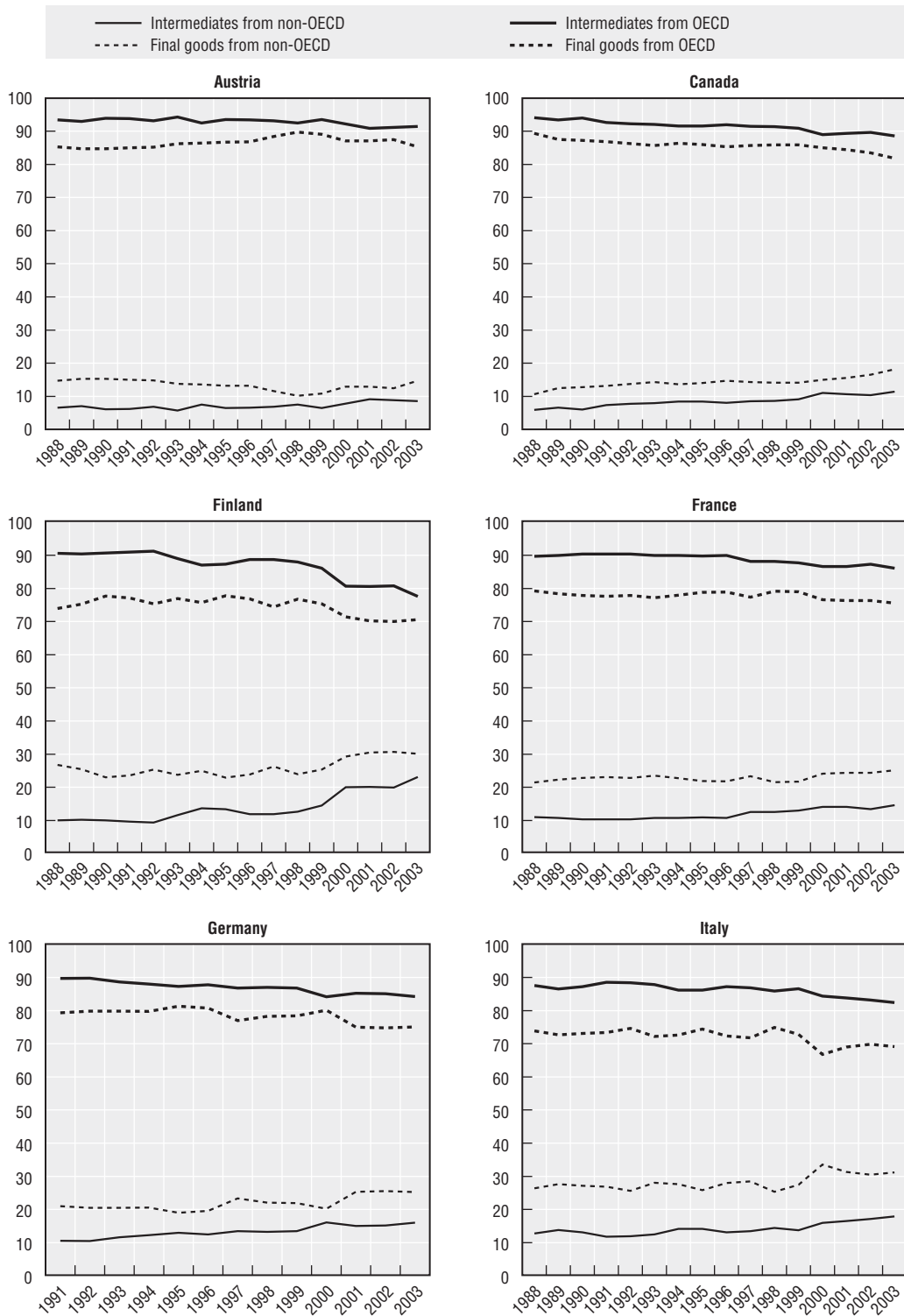
Multinationals and labour markets in home countries

Vertical and horizontal multinationals

This section summarises some of the effects that the operations of multinational firms and foreign direct investment (FDI hereafter) might have on the labour markets in source economies. As apparent from the definitions in Box 1, there are likely to be some similarities between the effects of international investment by multinational enterprises (MNEs) on home country labour markets and those from international trade. But the overlap is only partial – imports of finished and intermediate goods and services do not have to be purchased from the foreign affiliates of parent companies. Equally, parent companies may establish their foreign affiliates in order to enhance foreign market access

Figure 9. **The sources of imports of finished goods and parts and components**

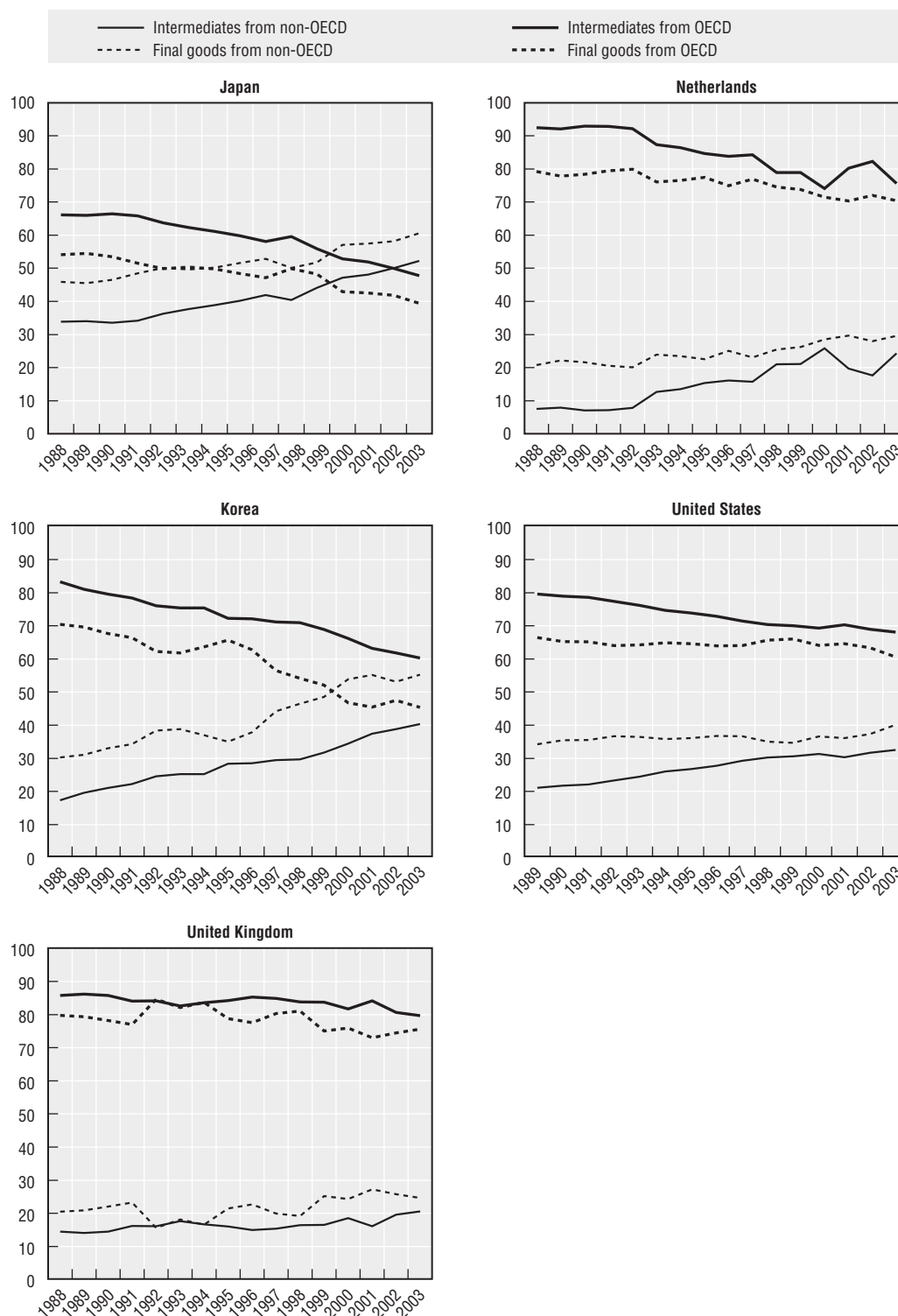
Per cent of total finished goods and total parts and components



Source: Authors' calculations using data from the United Nations COMTRADE Database. See Molnar et al. (2007) for further details.

Figure 9. **The sources of imports of finished goods and parts and components**
(cont.)

Per cent of total finished goods and total parts and components



Source: Authors' calculations using data from the United Nations COMTRADE Database. See Molnar et al. (2007) for further details.

beyond what could otherwise have been achieved through exporting, including access to third countries (Ekholm *et al.*, 2007).

One basic distinction is between “vertical” and “horizontal” multinationals. Vertical MNEs are ones that fragment different stages of the production process across different countries, with the location of stages depending on the relative cost of the factor of production they use intensively. Each activity, including final production, occurs in only a few, or even a single, location, depending on endowments and factor prices. Horizontal MNEs are multi-plant firms that produce similar outputs in both home and host countries, thus economising on any costs of exporting. Such firms are more likely to occur when the host countries are of similar size (to avoid the costs of having costly capacity in small markets), have similar factor endowments, and there are positive costs to international trade (Brainard, 1997). Both forms of multinational are particular examples of the knowledge capital model set out by Carr *et al.* (2001) and Markusen (2002). The knowledge capital model exploits the insight that multinational firms must possess some kind of knowledge-based firm-specific asset to allow them to take advantage of profitable opportunities in foreign markets that other national companies in those markets cannot exploit.

Knowledge capital has three principal characteristics – it can be easily transferred between parent companies and their affiliates, it can be used simultaneously in a number of different production activities and locations and it has a high skill intensity. The ability to use knowledge capital in multiple locations at the same time implies that multinational firms will have firm-level scale economies, providing a motive for horizontal MNEs. The transportability of knowledge capital and its high skill intensity facilitate the vertical fragmentation of production. Such fragmentation is more likely to occur between countries with comparatively dissimilar factor endowments, and also as trading costs, or more generally the costs of market access, come down. Knowledge capital also becomes more easily exploitable as international communications costs decline. All these factors suggest that vertical multinationals should be becoming more prevalent over time, with different parts of the production of goods and services being produced increasingly in different locations.

In practice, the distinction between horizontal and vertical multinationals is rarely clear cut. Many firms have “complex” integration strategies, involving a mixture of both kinds of outward investment (Yeaple, 2003). It is also rarely the case that firms within an industry have identical levels of productivity, not least because of the existence of firm-specific knowledge based assets. The existence of non-zero transport costs, and differences in the fixed costs of establishing foreign affiliates in different locations offer firms a rich variety of possible production strategies (Grossman *et al.*, 2006). Choosing between them will depend on the costs of outsourcing, the costs of trade in finished goods, the costs of establishing foreign affiliates and the intra-industry dispersion of productivity.⁴

The labour market effects of foreign direct investment

The importance of distinguishing between different models of FDI is that each offers different predictions about the possible effects of investment on home country labour markets, and in particular the relationship between employment in the parent company and its foreign affiliates.

For vertical-type foreign investments, the effect on home countries will vary on the stages of production moved offshore and, more generally, with the relative factor abundance of home and host countries. If investment takes place from countries with a high relative endowment of skilled labour, other stages of the production chain will produce comparatively lower-skill labour intensive activities, with parent companies producing higher-skill outputs such as “headquarter services” (Helpman and Krugman, 1985).

Assuming perfect factor markets, the initial effects at the level of the parent company (the home country) are likely to involve a reduction in employment and a rise in the relative demand for skilled labour. Subsequently, employment is likely to rise, both because of additional production of skill-intensive inputs for foreign affiliates, and because the cost savings from production fragmentation may be reflected in price reductions, expanding market share and the scale of output.⁵ In the economy as a whole, the cost of skilled labour is likely to rise relative to the cost of unskilled labour. If factor markets clear, then eventually there should be a negligible effect on total employment, but a change in the relative price of skilled-unskilled labour. So the overall outcome is likely to depend in part on the structural features of national labour markets. If there are significant labour market rigidities, or institutional features such as binding wage floors for less skilled workers, then it becomes more likely that there will a greater quantitative effect on (un)employment and a smaller adjustment in the relative wages of different types of workers (Moore and Ranjan, 2005; OECD, 2005).

For horizontal-type foreign investments, the effect on the labour market in the home country will depend in part on the exact scope of the production processes being replicated by the parent company and its affiliates (Head and Ries, 2002). At one extreme, with affiliates located abroad replicating all activities of the parent using identical factor proportions, employment and output growth in the home country after the investment takes place could be weaker than might otherwise have been the case. Foreign market growth is met by production in foreign affiliates rather than by the parent company.⁶ A second possibility is that horizontal affiliates replicate only the final goods part of production in the parent company. In this case demand for intermediate goods and services produced by the parent company could rise if the overall scale of production by the multinational firm increases. The knowledge capital model implies that at least some of these additional activities in the parent will be high-skill intensive.

The examples discussed so far assume that the activities undertaken by foreign affiliates are either less or as skill-intensive as those that continue to be undertaken by parent companies. It is also possible that high skill-intensive activities are undertaken in affiliates; a recent example of this is provided by the increasing globalisation of many R&D activities (UNCTAD, 2005). The effect of this on the home country depends on the motivating factors for such investments. One possibility is that the short-run demand for highly-skilled activities at home is decreased. But if high-skill intensive investments are being made to access and exploit knowledge in the host countries, then the eventual result could be faster technical change and productivity growth in the home country (Grossman and Helpman, 1991; Amiti and Wei, 2005a) and a higher level of economic activity and employment.

Empirical studies of multinationals and home country labour markets

Foreign direct investment and employment

The full impact of the internationalisation of production on employment in home countries depends on many factors, including those that affect labour demand directly and others that have an indirect effect, such as induced changes in exports and fixed investment (Andersen and Hainaut, 1998). This section contains an overview of the findings from a series of recent studies that have sought to test directly the substitutability of aggregate employment in parent companies and their affiliates, using firm or industry level data on multinationals. Many of the studies test whether the effects on employment in the home country of establishing or expanding foreign affiliates differ according to the location of the affiliates. The most commonly used empirical approach is to augment otherwise standard labour demand models for the parent companies with measures of labour employed in, or the wage costs of affiliate companies.⁷

The findings from studies of the transfer of production within multinational companies fail to provide a clear picture across countries and industries of the relationship between the expansion of activities abroad and total employment at home. One example is provided by a series of studies using data for the United States. Desai *et al.* (2005) and Hanson *et al.* (2003) both find that over a period spanning 1982-99, an expansion in the scale of activities in US-owned foreign affiliates has a significant positive association with employment growth in the parent companies of United States multinationals in the manufacturing sector.⁸ In contrast, using a related data set over a sub-sample of 1983-92, Brainard and Riker (1997) obtain evidence of substitution between labour in the parent companies of United States manufacturing MNEs and labour in their affiliates, although the effects are generally small.⁹ The evidence of employment substitution between affiliates in different countries is found to be markedly higher than between the parent company and the affiliates. This is especially so for affiliates in low value-added sectors and comparatively low income locations. Harrison and McMillan (2006) also find that employment in US-owned foreign affiliates in high-income economies is complementary with employment in parent companies, whereas employment in US-owned foreign affiliates in low-income economies substitutes for employment in parent companies.

Using a related data set for Sweden, Hatzius (1998) reports that employment in the parent companies (affiliates) of Swedish multinational companies is positively associated with foreign (Swedish) labour costs. This also suggests that foreign and domestic employment may be substitutable at the margin. However, in contrast to the results for the United States, Braconier and Ekholm (2000) report that the labour substitution between Swedish parent companies and their affiliates is more likely to occur with affiliates in higher-income countries than with affiliates in lower-income countries, suggesting that FDI in low cost locations was not at the expense of employment in Sweden.

Ahn *et al.* (2005) include measures of both FDI and imports in an econometric model of plant-level employment growth in Korea over the period 1990-2002. This is one of the few studies to allow directly for possible effects on domestic employment from both forms of global engagement. The results across a range of different empirical specifications show that employment changes in Korea are more closely related to outward FDI than to the growth of imports. In general, industry-level outward FDI is found to have a significant positive relationship with domestic employment growth. The sole exception is for FDI in

China, which is found to have a significant negative effect on domestic employment growth, possibly reflecting the direct substitution of labour intensive activities.

A number of studies using data on European multinationals have sought to test whether employment in parent companies and employment in affiliates located in Central and Eastern Europe (CEE) are substitutes. Recent examples include Konings and Murphy (2003), Becker *et al.* (2005), Cuyvers *et al.* (2005) and European Commission (2005). On balance, the studies suggest that there is evidence of employment substitution, though for some countries the effects are small. A 10% reduction in labour costs in CEE affiliates is found to be associated with a 0.3% reduction in parent employment in Belgium and a 0.2% reduction in France (European Commission, 2005). Larger effects for German and Swedish multinationals are obtained by Becker *et al.* (2005), who find that a 10% reduction in wage costs in CEE host countries is associated with a decline of 0.5% in parent company employment in Germany and a decline of 0.9% in parent company employment in Sweden.

The studies by Konings and Murphy (2003) and Becker *et al.* (2005) both find that substitution between parent company and affiliate employment is significantly higher for affiliates located in the EU15 than it is for affiliates located in Central and Eastern Europe. In contrast, the results in European Commission (2005) suggest that employment in parent companies in Belgium is not affected by that in EU15 affiliates, while employment in French parent companies and EU15 affiliates is complementary. It is difficult to know what lies behind these different results, but it may suggest that firms from each of these countries have followed different integration strategies within Europe.

The question of whether the impact of outward FDI on employment in parent companies might differ with their size as well as the location of affiliates is examined by Falzoni and Grasseni (2005), using a sample of Italian multinationals over the period 1994-98.¹⁰ Their findings suggest that foreign operations in both developed and developing countries have a negative effect on domestic employment only for small firms (those in the lower half of the size distribution). For larger firms, it is only employment in Asian affiliates that has a significant negative effect on employment in parent companies. It is not clear whether these results reflect only the comparatively unusual size distribution of firms in Italy, or whether they are more generally applicable.

An important issue when evaluating the impact of outward FDI is the possible counterfactual if investment had not taken place.¹¹ For this to be evaluated properly, firms making outward investment need to be compared with other, purely domestic, firms who had similar characteristics immediately before the outward investment took place. One of the few studies of this type is that of Barba Navaretti and Castellani (2004). Using a matched sample of Italian multinationals and purely national companies, they report that there are no significant differences between the growth rate of domestic employment in either set of companies after foreign investment took place. For these firms at least, expansion abroad appears not to have affected directly employment in the parent company. Becker and Müндler (2007), using linked employee-employee data for Germany also report that there is a significant reduction in the probability of job separation in multinationals who expand abroad relative to other German companies.

Another issue to consider, as suggested by the differing results discussed above using data on United States MNEs, is that the relationship between outward investment and the activities of the parent company may change over time (Hanson *et al.*, 2003). Higuchi and Matsuura (2003), using firm-level data for Japan, find that job losses in firms with overseas

production plants can persist for up to five years after the establishment of the overseas plant. Thereafter, employment growth is stronger in firms with overseas production plants than in purely domestic firms.

Several empirical studies also find that outward investment has differential effects on different skill groups in the home country, with skilled workers more likely to benefit than unskilled workers, as might be expected in many skill-abundant OECD economies.¹² For example, Head and Ries (2002) find that changes in the ratio of foreign affiliate employment to domestic employment can explain about one-tenth of the rise in the share of non-production workers in the labour costs of Japanese manufacturing sectors during the 1970s and 1980s. Sasaki and Sakura (2004) find that overseas production shifted labour demand toward high-skilled workers (university graduates) and so did the increasing share of imports from East Asia. The widening wage gap between the skilled and the unskilled, however, is attributable to skill-biased technological change as much as to globalisation.

Related results are reported by Hanson *et al.* (2003) who find that the relationship between employment in United States parent companies and their foreign affiliates varies by skill. For a given level of output, employment in the parent is found to be a price complement with high-skilled foreign labour and a price substitute with low-skilled foreign labour.

Overall, it is clear from the empirical literature that there is considerable heterogeneity in the effects of outward investment on employment in the home country. In part this may reflect the different motives underlying different forms of foreign investment. Some studies have found evidence of substitution between employment in foreign affiliates and parent companies, but others have found that the two are complements. In either case the reported effects are generally small and may vary over time.

Internationalisation and the price elasticity of labour demand

The studies discussed above all consider whether enhanced internationalisation results in the substitution of employment between the home country and foreign countries. One general implication of the finding of (weak) substitutability between parent and affiliate employment, as well as the increasing use made of international sourcing by non-multinational companies, is that labour demand curves may have become more elastic, both in home and host countries (Rodrik, 1999; Hatzius, 1998), because of greater opportunities to move production to lower cost locations following a rise in domestic costs.¹³ Other things being equal, a more elastic demand curve implies that national factor demands may become more sensitive to changes in factor prices over time as FDI and international sourcing increase, although there is no theoretical reason why this will always be the case (Panagariya, 1999). It also implies that the relative bargaining power of workers and employers could change.¹⁴ This is discussed further in Molnar *et al.* (2007, Box 2).

Indirect evidence in favour of the proposition that factor demands have become more sensitive to factor prices over time is provided by Hatzius (2000), who shows that the elasticity of manufacturing fixed investment with respect to labour costs has risen over time in the United Kingdom and Germany, especially in industries with comparatively high FDI levels. Related evidence for the United States is provided by Slaughter (2001), who finds that the price elasticity of demand for unskilled workers has risen over time in a number of manufacturing industries. In contrast, few changes are found over time in the elasticity of demand for skilled workers. The proportion of the assets of multinational companies held by foreign affiliates, the

international sourcing of intermediate inputs and net exports and are each found to explain part of the different outcomes found for the different skill groups.

Other studies that have tested for the impact of greater openness on the price elasticity of labour demand have focused largely on the impact of international trade, see, for example, Jean (2000), Bruno *et al.* (2004), Riihimäki (2005), Senses (2006) and OECD (2007). Overall, these studies provide some support for the proposition that in at least some industries in some countries, the demand for labour has become more elastic over time as a result of enhanced international openness. However, this is not a universal finding and uncertainty remains about the possible magnitude of such shifts and the factors responsible for them. This suggests that it would be worthwhile to undertake an equivalent analysis using measures of outward direct investment. It is possible that two offsetting forces are at work – the availability of foreign labour can increase domestic labour demand elasticities, but this might also reduce the share of unskilled workers in employment, pushing down the overall labour demand elasticity (Senses, 2006). Ultimately the balance of these forces is an empirical matter.¹⁵

A related question is whether multinationals are also able to adjust their labour demand more quickly than purely domestic firms, especially if they have a low-cost option to move particular tasks to their affiliates. There are also comparatively few empirical tests of this issue, despite the importance of adjustment speeds for determining the pace at which labour markets adjust to economic “shocks”.

The most comprehensive study is that of Barba Navaretti *et al.* (2003), using firm-level data for a number of European countries. Their results suggest that the speed of employment adjustment in foreign-owned firms is significantly faster than in purely national companies. They also report evidence that the wage elasticities of labour demand in the affiliates of multinational firms vary little across countries when interacted with country-level indicators of labour market regulation. In contrast, wage elasticities in purely domestic firms are lower in countries with more heavily regulated labour markets. One explanation of this finding is that multinational firms may be less affected by some labour market regulations than are purely domestic companies, although the extent to which this occurs in practice is far from clear.

The industry-level effects of foreign direct investment on labour demand

The implication of both the theoretical literature and existing empirical studies is that the effects of the internationalisation of production are likely to be heterogeneous, both across countries and across industries. This section reports new estimates from a series of models that examine the effects of the internationalisation of production on employment in the home country of the investing companies. Two sets of models are estimated, one using industry data on employment in the foreign affiliates of parent companies from the G3 countries, and one using industry data on the stock of outward foreign direct investment (as a percentage of domestic industry output) for 11 OECD economies.¹⁶ Foreign direct investment may be an imperfect measure of the scale of activities carried out in foreign affiliates,¹⁷ but for many countries it is the only data available.

The industries covered consist of (up to) eight manufacturing sectors and five service sectors, with the availability of data on internationalisation normally determining those included in the sample for each country. A summary of the sectors included is given in Table 1. All domestic industry data are taken from the OECD STAN database over the period 1980-2003. The industries chosen each cover a wide variety of different types of

Table 1. **Industries included in the empirical analysis**

	Industry	ISIC Rev. 3 Group
Manufacturing	Food, beverages and tobacco	15, 16
	Textiles	17, 18
	Wood, paper, printing and publishing	20, 21, 22
	Chemicals, rubber and plastics	24, 25
	Basic metals and fabricated metal products	27, 28
	Machinery	29
	Electrical and optical equipment	30, 31, 32, 33
	Transport equipment	34, 35
Services	Wholesale and retail trade	50, 51, 52
	Transport and storage	60, 61, 62, 63
	Post and telecommunications	64
	Financial services	65, 66, 67
	Business services	71, 72, 73, 74

activity and products, and it is likely that there is considerable within-industry specialisation (Schott, 2004). The data for the G3 countries come directly from the providers of the data in the respective countries.¹⁸ Data on outward direct investment stocks are from the OECD International Direct Investment Statistics database, and adjusted for breaks in definitions and coverage as far as possible, with additional data being obtained from national sources for seven of the 11 countries for which figures are available in sufficient detail.¹⁹ In general, the level of industrial and country detail available in the direct investment data is more limited than that available in the STAN database, placing a constraint on the degree of disaggregation possible in the empirical work.

In both estimated models the indicators of internationalisation in each sector are used to augment otherwise conventional conditional labour demand relationships in which domestic employment in that sector is related to the volume of domestic output and real producer wages in the sector and a sector-specific time trend to allow for labour-augmenting technical progress. Two sets of relationships are estimated for each model. The first simply tests whether there is an association between internationalisation and domestic employment after controlling for the scale of production and labour costs. The second enables tests to be undertaken of two propositions in the literature – whether internationalisation changes the domestic price elasticity of demand for labour in the sector in which internationalisation takes place, and whether internationalisation changes the speed at which domestic employment in that sector is adjusted following changes in output or wages. The underlying specifications of the separate models are set out in Box 2.

The specifications of the equations set out in Box 2 are more likely to identify the effects of vertical-type outward investments designed to move parts of the production process from the domestic company to foreign affiliates. The direction of such effects will depend in part on the stages of production that are moved. Pure horizontal-type investments, in which the factor proportions and activities of the foreign affiliate are identical to those of the parent company, are less likely to be identified, as the model controls for any substitution of production away from the parent by including domestic output as a scale measure. The scale effect from horizontal investments can be controlled for fully only by either conditioning on the (unobserved) total volume of output produced at home and in foreign affiliates, or by estimating a further equation relating the share of OECD output produced in the home country to (net) outward FDI.²⁰

Box 2. The empirical framework

The empirical work undertaken for the two sets of studies uses different baseline models, reflecting the nature of the data available. For the analyses of the G3 countries using data on employment in foreign affiliates, only a short time span of data is available. Thus while it is possible to look at the factors affecting employment growth, it is not practicable to examine those affecting the long-run level of employment. The equations used take the basic form set out in [1] and [2] (augmented by additional lags of output and wage growth where possible):

$$\Delta \ln L_{i,t} = \alpha_0 + \alpha_1 \Delta \ln Y_{i,t} + \alpha_2 \Delta \ln RW_{i,t} + \alpha_3 \Delta \ln LF_{i,t} + \varepsilon_{i,t} \quad [1]$$

$$\Delta \ln L_{i,t} = \alpha_0 + \alpha_1 \Delta \ln Y_{i,t} + [\alpha_2 + \gamma(LF_{i,t-1}/L_{i,t-1})] \Delta \ln RW_{i,t} + \alpha_3 \Delta \ln LF_{i,t} + \varepsilon_{i,t} \quad [2]$$

Here, L_i denotes domestic employment in industry i , Y and RW denote output and real wages respectively, and LF denotes employment in the foreign affiliates of home country parent companies. Industry fixed effects are included to pick-up any otherwise excluded industry specific factors. The specification shown in [2] enables a test to be undertaken of whether a rising share of employment in foreign affiliates has any short-run effect on the response of employment to a change in wages ($\gamma = 0$).

For the analysis of the impact of outward FDI stocks on domestic employment two related specifications were used, shown as [3] and [4], where FDI denotes the (log) ratio of the outward stock of foreign direct investment to the nominal value of domestic output in the sector concerned. The span of the data is considerably greater, with detailed industry level stocks on foreign direct investment being available back to the early 1980s for some countries, making it possible to look for long-run effects on employment.

$$\Delta \ln L_{i,t} = \alpha_0 + \alpha_1 \Delta \ln Y_{i,t} + \alpha_2 \Delta \ln RW_{i,t} + \alpha_4 (\ln L_{i,t-1} + \lambda_1 \ln Y_{i,t-1} + \lambda_2 \ln RW_{i,t-1} + \lambda_3 FDI_{i,t-1}) + \beta T_i + \varepsilon_{i,t} \quad [3]$$

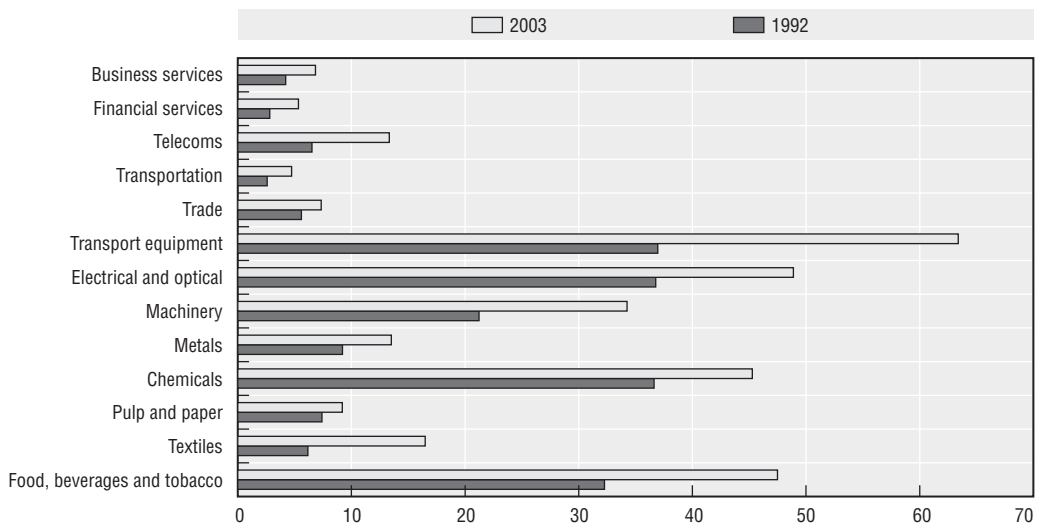
$$\Delta \ln L_{i,t} = \alpha_0 + \alpha_1 \Delta \ln Y_{i,t} + \alpha_2 \Delta \ln RW_{i,t} + [\alpha_4 + \gamma_1 FDI_{i,t-1}] (\ln L_{i,t-1} + \{\lambda_1 + \gamma_2 FDI_{i,t-1}\} \ln Y_{i,t-1} + \{\lambda_2 + \gamma_3 FDI_{i,t-1}\} \ln RW_{i,t-1} + \lambda_3 FDI_{i,t-1}) + \beta T_i + \varepsilon_{i,t} \quad [4]$$

The specification shown in [4] permits a direct test of whether higher levels of foreign direct investment raise the speed of adjustment of employment towards its long-run sustainable level ($\gamma_1 > 0$). It also provides a test of whether higher levels of foreign direct investment change the price elasticity of the demand for labour ($\gamma_3 = 0$).

Employment in foreign affiliates and domestic employment

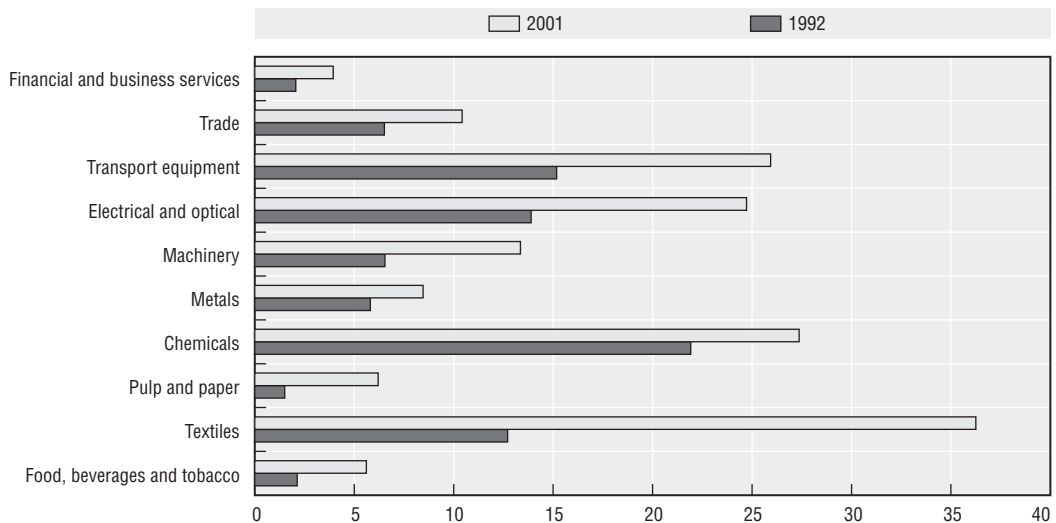
Data for each of the G3 economies provide an indication of the extent to which employment in foreign affiliates has risen over time relative to employment in the same domestic sectors (Figures 10, and 11 and 12).²¹ As might be expected, in all three countries the ratio of foreign to domestic employment is typically higher in manufacturing industries than in service sectors (see also Figure 7). The transport equipment, the electrical and optical equipment and the chemical industries are amongst the industries with the highest foreign-domestic employment ratio in all three countries. Although the data used do not cover every industry in which outward investment has occurred, the omitted industries have a comparatively low share of total employment in foreign affiliates.

Figure 10. **Employment in United States foreign affiliates relative to domestic employment (%)**



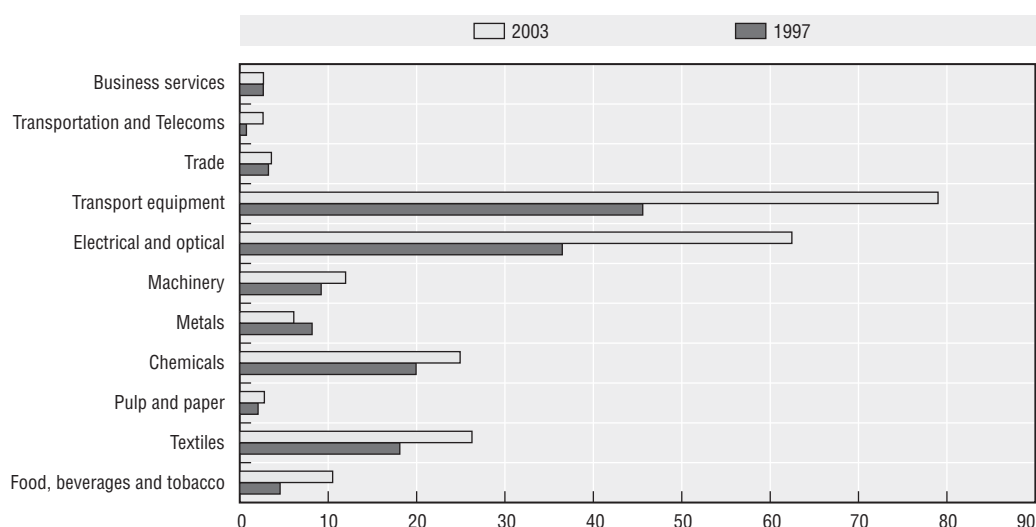
Source: Bureau of Economic Analysis and OECD STAN Database.

Figure 11. **Employment in German States foreign affiliates relative to domestic employment (%)**



Source: Deutsche Bundesbank and OECD STAN Database.

The estimation period differs for each country. The full sample of data is truncated for estimation purposes in order to retain some lagged observations for use in the instrumental variable estimates of [1] and [2]. The largest sample used is for the United States, with data for all 13 of the sectors identified in Table 1. For Germany, the estimation sample spans 1994-2001. Japan has the shortest sample, covering only six years from 1998 to 2003. Both the German and Japanese samples have one sector missing, reflecting the unavailability of data for some service industries. Common slope parameters are imposed across all industries in each country model, with the short sample period making it unfeasible to test for differing parameters across industries by estimating separate

Figure 12. **Employment in Japanese foreign affiliates relative to domestic employment (%)**

Source: METI Survey on Activities of Foreign Affiliates and OECD STAN Database.

equations for particular industries or industry groups. However, this question is addressed in the subsequent regressions that use the outward FDI stock.

The sign and significance of the coefficients on the foreign employment terms are summarised in Table 2. After controlling for domestic output and wage effects, significant coefficients on the growth of employment in foreign affiliates are found for both the United States and, to a lesser extent, Japan. No significant effects were found in Germany. In most cases the differences between the OLS results and the IV results are small.

Table 2. **Summary of impact of foreign affiliate employment on domestic employment growth**

	United States		Japan		Germany	
	OLS	IV	OLS	IV	OLS	IV
MODEL 1						
Foreign employment growth	+++	++	-**	-	+	+
MODEL 2						
Foreign employment growth	+++	++	-**	-	+	+
Wage interaction term	-	-	+	+	+	+

Note: +/- de notes the sign of the estimated coefficient in Table 4 and ** denotes a coefficient significant at the 5% level. For definitions of Model 1 and Model 2, see Box 5 of Molnar et al. (2007). For the wage interaction term, a negative (positive) sign means that foreign employment has raised (reduced) the responsiveness of domestic employment to a change in domestic wages.

The complete set of regression results from estimating relationships [1] and [2] in Box 2 is reported in Table 3.²² In all three countries stronger output growth and slower growth of real wages are found to be significantly positively related to domestic employment growth, as might be expected, although the magnitude of the estimated effects differs considerably across countries and across different estimation techniques. The first year effects on employment of changes in output and wages are typically found to be larger in the United

States than in the other two countries. Japan has the smallest first year effects from changes in output and wages.

For the United States, stronger employment growth in affiliates is found to have a significant positive association with domestic employment growth for given levels of domestic value-added output and real wages. However, the magnitude of the estimated effect is relatively small. A 1% rise in foreign employment is associated with a rise of between 0.1-0.2% in domestic employment after two years if output and real wages are unchanged.

In contrast, for Japan there is evidence of a negative coefficient on foreign employment growth, implying that foreign and domestic employment may have been substitutes, all else equal, over this period.²³ The coefficient is statistically significant using conventional fixed effects estimation, but not when using instrumental variable techniques. The magnitude of the effect from the first of these results is smaller in absolute terms than for the United States, with a 1% rise in foreign employment growth found to be associated with a reduction in domestic employment growth of 0.02% after one year.

To further investigate the negative effect of foreign affiliate employment on domestic employment in Japan, affiliate employment was disaggregated by geographical area. The resulting estimates show that the increase in affiliate employment in China has a significant negative effect on domestic employment in Japan and its size is much larger than that of worldwide affiliate employment. Rising employment in Asian affiliates is also found to have had a negative impact on domestic employment, though this effect is only marginally significant (at the 10% level). Employment growth in affiliates in other country groups such as the ASEAN or the NIES (Newly Industrialised Economies, including Korea; Hong Kong, China; Singapore and Chinese Taipei) are not found to have a significant negative association with employment in Japan.

The findings from estimating model [2] in Box 2 are summarised in the lower line of the respective country panels in Table 3. In all three countries there is no statistically significant evidence that changes in the ratio of foreign to domestic employment have any impact on the short-run price elasticity of labour demand.

For the United States there are also sufficient observations available to estimate the labour demand equation using gross output rather than value added as the scale variable in [1]. Gross output includes any intermediate inputs that are produced by the foreign affiliates of parent companies. Thus if there are important scale effects on the overall level of domestic employment, with some formerly domestic activities being moved offshore, they are more likely to appear in the regressions with gross output.

The resulting estimates show that foreign employment growth continues to be positively associated with domestic employment growth, but the short-run effects are weaker than found when using value-added output. This suggests that some of the effects of outward investment are reflected in gross output, and that at least some imported intermediates are complements to domestic employment. A further feature of the results using gross output is that the short-run effects of higher wage growth on domestic employment are lower than found when using value-added output as the scale variable.

The question arises as to why different results are found for the United States and Japan. A possible explanation relates to the time period covered and the maturity of foreign investments from the different countries. American multinationals have typically been established for longer than Japanese multinationals. As suggested by other empirical

Table 3. **Foreign affiliate employment and domestic employment**Dependent variable = $\Delta \ln(\text{domestic employment})_t$

	[1]	[2]	[3]	[4]	[5]	[6]
United States						
$\Delta \ln(\text{output growth})_t$	0.406 (10.1)	0.376 (8.4)	0.406 (10.0)	0.606 (5.8)	0.594 (4.9)	0.606 (6.5)
$\Delta \ln(\text{output growth})_{t-1}$	0.357 (8.0)	0.372 (8.5)	0.366 (8.0)	0.272 (4.3)	0.259 (3.5)	0.302 (4.8)
$\Delta \ln(\text{real wage inflation})_t$	-0.344 (8.3)	-0.120 (3.9)	-0.266 (4.2)	-0.608 (4.6)	-0.362 (3.4)	-0.349 (2.3)
$\Delta \ln(\text{real wage inflation})_{t-1}$	-0.242 (5.3)	0.010 (0.3)	-0.229 (3.2)	-0.075 (0.9)	0.173 (2.3)	-0.215 (1.0)
$\Delta \ln(\text{foreign employment growth})_t$	0.056 (3.1)	0.028 (1.4)	0.054 (3.0)	0.189 (2.7)	0.072 (1.0)	0.136 (2.2)
$\Delta \ln(\text{foreign employment growth})_{t-1}$	0.033 (1.6)	0.046 (3.0)	0.034 (1.7)	0.036 (1.3)	0.064 (2.9)	0.032 (1.4)
FRAT* $\Delta \ln(\text{real wage inflation})_t$			-0.200 (1.2)			-0.521 (0.8)
FRAT* $\Delta \ln(\text{real wage inflation})_{t-1}$			-0.037 (0.2)			0.249 (0.4)
R ² adj.	0.765	0.787	0.764	0.676	0.702	0.709
Log-likelihood	370.2	377.2	370.9			
Serial correlation [p-value]	0.11	0.001	0.106	0.259	0.801	0.744
Over-identifying restrictions [p-value]				0.11	0.30	0.05
No. of observations	143	143	143	143	143	143
Output measure	Value added	Gross output	Value added	Value added	Gross output	Value added
Estimation method	OLS	OLS	OLS	IV	IV	IV
Germany						
$\Delta \ln(\text{output growth})_t$	0.139 (2.6)		0.127 (2.4)	0.561 (2.8)		0.245 (1.0)
$\Delta \ln(\text{output growth})_{t-1}$	0.366 (10.2)		0.364 (9.9)	0.407 (4.9)		0.388 (4.2)
$\Delta \ln(\text{real wage inflation})_t$	-0.074 (0.6)		-0.112 (0.8)	-0.239 (1.1)		-0.785 (1.8)
$\Delta \ln(\text{real wage inflation})_{t-1}$	-0.342 (5.2)		-0.378 (4.6)	-0.268 (2.2)		-0.526 (1.0)
$\Delta \ln(\text{foreign employment growth})_t$	0.020 (1.3)		0.021 (1.4)	0.032 (0.4)		0.035 (0.6)
$\Delta \ln(\text{foreign employment growth})_{t-1}$	0.005 (0.3)		0.006 (0.3)	0.003 (0.1)		0.012 (0.4)
FRAT* $\Delta \ln(\text{real wage inflation})_t$			0.463 (0.5)			0.542 (1.6)
FRAT* $\Delta \ln(\text{real wage inflation})_{t-1}$			0.350 (0.7)			0.185 (0.8)
R ² adj.	0.714		0.707	0.531		0.525
Log-likelihood	207.5		207.8			
Serial correlation [p-value]	0.49		0.36	0.61		0.86
Over-identifying restrictions [p-value]				0.11		0.59
No. of observations	80		80	80		80
Output measure	Value added		Value added	Value added		Value added
Estimation method	OLS		OLS	IV		IV
Japan I						
$\Delta \ln(\text{output growth})_t$	0.150 (2.96)		0.155 (3.00)	0.123 (1.91)		0.154 (2.38)
$\Delta \ln(\text{real wage inflation})_t$	-0.034 (1.68)		-0.024 (0.91)	-0.039 (1.58)		-0.024 (0.68)
$\Delta \ln(\text{foreign employment growth})_t$	-0.019 (1.73)		-0.019 (1.71)	-0.020 (0.98)		-0.024 (1.14)
FRAT* $\Delta \ln(\text{real wage inflation})_t$			-0.102 (0.66)			-0.157 (0.85)
R ² adj.	0.614		0.608	0.609		0.605
Log-likelihood	175.4		175.816			
Serial correlation [p-value]	0.5886		0.5387	0.4474		0.4257
Over-identifying restrictions [p-value]				0.2208		0.1493
No. of observations	62		62	62		62
Output measure	Value added		Value added	Value added		Value added
Estimation method	OLS		OLS	IV		IV
Japan II						
$\Delta \ln(\text{output growth})_t$	0.123 (2.60)		0.127 (2.64)	0.090 (1.53)		0.087 (1.42)
$\Delta \ln(\text{real wage inflation})_t$	-0.029 (1.50)		-0.021 (0.98)	-0.034 (1.48)		-0.037 (1.31)
$\Delta \ln(\text{Chinese affiliate employment growth})_t$	-0.026 (3.02)		-0.027 (3.04)	-0.006 (0.29)		-0.007 (0.32)
FRAT* $\Delta \ln(\text{real wage inflation})_t$			0.027 (0.72)			-0.424 (0.50)
R ² adj.	0.665		0.661	0.665		0.6375
Log-likelihood	179.86		180.3054			
Serial correlation [p-value]	0.2312		0.1448	0.851		0.9026
Over-identifying restrictions [p-value]				0.22		0.06

Table 3. **Foreign affiliate employment and domestic employment (cont.)**Dependent variable = $\Delta \ln(\text{domestic employment})_t$

	[1]	[2]	[3]	[4]	[5]	[6]
No. of observations	62		62	51		51
Output measure	Value added		Value added	Value added		Value added
Estimation method	OLS		OLS	IV		IV
Japan III						
$\Delta \ln(\text{output growth})_t$	0.155 (3.04)		0.158 (3.05)	0.130 (2.10)		0.098 (1.57)
$\Delta \ln(\text{real wage inflation})_t$	-0.034 (1.66)		-0.028 (1.18)	-0.042 (1.78)		-0.035 (1.28)
$\Delta \ln(\text{Asian affiliate employment growth})_t$	-0.029 (1.83)		-0.029 (1.82)	-0.031 (0.94)		-0.028 (1.00)
FRAT* $\Delta \ln(\text{real wage inflation})_t$			-0.116 (0.48)			-0.018 (0.07)
R ² adj.	0.618		0.610	0.594		0.6025
Log-likelihood	175.73		175.92			
Serial correlation [p-value]	0.5682		0.0222	0.2621		0.236
Over-identifying restrictions [p-value]				0.303		0.509
No. of observations	62		62	62		62
Output measure	Value added		Value added	Value added		Value added
Estimation method	OLS		OLS	IV		IV

Variable definitions: FRAT = one year lag of ratio of foreign employment to domestic employment.

Note: The panels for Germany and Japan have the same format as for the United States; however, some regressions are not possible given the available data. These are denoted with a ? symbol. All regressions use industry-specific data. Industry fixed effects are also included in the regressions. All t-statistics are heteroscedastic-consistent. Sample period is 1993-2003 for the United States and 1998-2003 for Germany and Japan. The IV regressions treat current dated terms in output, wages and foreign employment as endogenous. The Panel Japan I uses data on employment in all Japanese-owned foreign affiliates. Panels Japan II and Japan III use data on affiliate employment in China and all Asian affiliates respectively.

studies, it is possible that after having initially been substitutes during the initial process of changing the location of production, employment at home and in foreign affiliates become complementary over time (Andersen and Hainaut, 1998). If so, it could be argued that job losses at home are more likely to coincide with job creation abroad in Japan than the United States.

Outward direct investment and domestic employment

The second model estimated uses stocks of outward foreign investment (as a proportion of domestic output) as the indicator of internationalisation. The available data set is much richer, with over 2000 observations in total, compared with that for the initial analysis using the foreign affiliate employment data for the G3 economies. The principal focus of the analysis using outward FDI stocks has been on potential differences in the effect of internationalisation on employment across industries.²⁴ A variety of different specifications are estimated using both value added output and gross output as alternate scale variables.

For the purposes of testing whether the effects of internationalisation differ across industries, the thirteen sectors in the dataset were separated into three groups. One of these groups comprises the five service sectors. The manufacturing sectors were separated into two groups using information from the G7 economies on the share of imports in these sectors coming from non-OECD countries and the proportion of outward investment in these sectors located in non-OECD economies. A high share of imports from the non-OECD and a high proportion of FDI in non-OECD economies are suggestive of sectors in which production may have been, or is able to be, moved offshore to comparatively lower cost locations. The four sectors that were found to have the highest commercial ties with the non-OECD were textiles, transport equipment, electrical and optical equipment, and food,

beverages and tobacco. These four sectors were thus included in a second group, with the remaining four manufacturing sectors forming a third group.

The complete set of regression results from estimating relationships [3] and [4] in Box 2 are summarised in Table 4 and reported in detail in Tables 5 and 6.²⁵ The models are estimated both for the full panel and separately for each of the three groups of different sectors.²⁶ The results provide strong evidence of clear, statistically significant, differences in the factors affecting labour demand across the three groups of different sectors. Likelihood ratio tests of imposing common coefficients and a common error variance across all three groups, as would be required for the full panel model to be valid, are heavily rejected by the data. This does not only reflect differences between manufacturing and services sectors – common parameters are also rejected across the two manufacturing groups.

Table 4. **Summary of impact of outward direct investment on domestic employment growth**

	All industries		Manufacturing industries with strong links to non-OECD		Other manufacturing industries		Services	
A. Value-added output								
	OLS	IV	OLS	IV	OLS	IV	OLS	IV
MODEL 3								
Outward FDI	+++	-**	-**	-**	-*	+	+	+
MODEL 4								
Outward FDI	-	-*	-**	-**	+	+	+++	+++
Wage interaction term	-	-**	-**	-**	+	-	+	+
Adjustment speed to long-run	+++	-	-**	-*	+++	+	+++	+++
B. Gross output								
	OLS	IV	OLS	IV	OLS	IV	OLS	IV
MODEL 3								
Outward FDI	-**	-**	-**	-**	+	+	-	-

Note: +/- denotes the sign of the estimated coefficient in Tables 5 and 6 and ** denotes a coefficient significant at the 5% level. A negative (positive) sign for the wage interaction term means that the labour demand curve has become more (less) elastic. A negative (positive) sign for the adjustment coefficient means that the adjustment of employment has risen (slowed).

In all three industry groupings, as well as the single combined panel, there is evidence that higher output and lower real wages are significantly positively related to domestic employment, both in the short term and in the long run. In almost all the regressions the long-run output elasticity is less than two standard deviations away from unity, and the long-run real wage elasticity is less than two standard deviations away from -1. The point estimates of the long-run output and wage elasticities in the group of service sectors (labelled Group 3 in Table 5 and Table 6) are generally above those found for the two manufacturing groups.

As shown in Table 4, there are marked differences across groups in the impact of outward direct investment, especially in the coefficients found on the separate outward FDI stock term (λ_3 in [3] in Box 2). For all specifications shown it is the case that significant negative effects are found for the group of manufacturing sectors with the strongest commercial ties with the non-OECD countries. Other things being equal, a rise in the

Table 5. **Outward foreign direct investment and labour demand in the home country: OLS estimates**

	All sectors		Group 1		Group 2		Group 3	
	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value
<i>Long-run coefficients</i>								
Output	0.845	35.5	0.851	21.5	0.707	17.0	1.088	13.1
Wage	-0.917	-30.9	-0.871	-17.9	-0.871	-15.1	-1.197	-11.9
FDI	0.022	4.9	-0.058	-5.5	-0.015	-1.9	0.006	0.9
<i>Short-run coefficients</i>								
Dynamic coefficient	-0.281	-26.3	-0.260	-13.0	-0.341	-14.9	-0.229	-12.6
Output	0.420	26.9	0.390	15.4	0.460	18.6	0.377	10.8
Wage	-0.263	-16.4	-0.268	-9.0	-0.297	-11.8	-0.180	-6.2
No. of observations	2 131		709		741		681	
R ²	0.541		0.510		0.618		0.593	
Log likelihood	4 066.52		1 284.68		1 487.95		1 314.51	
Output measure	Value added		Value added		Value added		Value added	
<i>Long-run coefficients</i>								
Output	0.838	35.0	0.844	23.7	0.767	15.0	1.111	14.6
Wage	-0.943	-31.0	-0.928	-19.9	-0.886	-13.9	-1.170	-12.5
FDI	-0.011	-0.1	-0.564	-4.3	0.170	0.9	0.659	3.0
<i>Short-run coefficients</i>								
Dynamic coefficient	-0.265	-18.4	-0.315	-10.3	-0.285	-9.3	-0.218	-10.2
Output	0.401	26.2	0.370	14.9	0.467	18.9	0.383	11.6
Wage	-0.270	-17.3	-0.266	-9.2	-0.301	-12.0	-0.193	-6.9
<i>Interaction term coefficients</i>								
FDI-VA	-0.003	-1.0	0.021	3.3	-0.010	-1.9	-0.018	-4.2
FDI-W	-0.002	-0.6	-0.027	-3.9	0.009	1.4	0.007	1.7
FDI-employment	0.006	2.0	-0.019	-2.8	0.013	2.3	0.020	4.6
No. of observations	2 131		709		741		681	
R ²	0.564		0.541		0.624		0.638	
Log likelihood	4 121.07		1 327.69		1 497.16		1 397.60	
Output measure	Value added		Value added		Value added		Value added	
<i>Long-run coefficients</i>								
Output	0.826	16.2	1.137	6.8	0.613	8.4	0.853	11.2
Wage	-0.561	-11.2	-0.569	-4.6	-0.882	-8.2	-0.870	-9.7
FDI	-0.044	-4.4	-0.130	-3.1	0.013	0.8	-0.002	-0.3
<i>Short-run coefficients</i>								
Dynamic coefficient	-0.182	-13.6	-0.110	-5.3	-0.268	-8.9	-0.238	-12.0
Output	0.432	19.1	0.450	11.4	0.415	12.2	0.403	10.6
Wage	-0.088	-4.6	-0.055	-1.7	-0.143	-4.2	-0.173	-5.8
No. of observations	1 357		512		419		426	
R ²	0.498		0.478		0.548		0.715	
Log likelihood	2 477.66		873.06		813.68		841.07	
Output measure	Gross output		Gross output		Gross output		Gross output	

Note: The table reports the coefficients obtained when estimating equations [3] and [4] in Box 2. Group 1 comprises four manufacturing industries – food/beverages/tobacco, textiles, transport equipment and electrical and optical equipment with strong commercial links with the non-OECD. Group 2 consists of wood/paper/printing, chemicals, basic metals and machinery. Group 3 comprises five service sectors. Further details of the industries are reported in Table 1.

outward investment-output ratio in this group will be associated with some reductions in domestic employment.

There are two possible explanations for this finding. The first is that labour at home may be directly substitutable with foreign labour in this group of manufacturing sectors.

Table 6. **Outward foreign direct investment and labour demand in the home country: IV estimates**

	All sectors		Group 1		Group 2		Group 3	
	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value
<i>Long-run coefficients</i>								
Output	0.818	15.0	0.915	12.1	0.743	8.9	1.377	7.2
Wage	-0.906	15.8	-0.952	-12.7	-1.054	-7.2	-1.100	-5.2
FDI	-0.025	-3.6	-0.050	-3.1	0.005	0.5	-0.005	-0.6
<i>Short-run coefficients</i>								
Dynamic coefficient	-0.271	-11.6	-0.273	-6.1	-0.385	-9.1	-0.229	-9.6
Output	0.730	6.9	0.764	4.3	0.380	2.3	0.784	0.2
Wage	0.052	0.3	-0.463	-1.6	-0.807	-3.5	0.002	0.0
No. of observations	2031		701		737		657	
R ²	0.223		0.346		0.368		0.376	
Output measure	Value added		Value added		Value added		Value added	
<i>Long-run coefficients</i>								
Output	0.857	20.2	0.941	13.0	0.824	6.9	1.284	7.3
Wage	-0.966	-22.1	-0.975	-15.3	-1.165	-6.4	-1.078	-4.9
FDI	-0.394	-3.6	-0.546	-3.0	0.015	0.1	0.678	2.3
<i>Short-run coefficients</i>								
Dynamic coefficient	-0.326	-11.9	-0.378	-7.6	-0.345	-5.2	-0.220	-8.2
Output	0.712	7.2	0.855	4.9	0.449	2.5	0.684	3.2
Wage	-0.066	-0.4	-0.739	-2.4	-0.873	-3.8	-0.070	-0.3
<i>Interaction term coefficients</i>								
FDI-VA	0.014	2.8	0.024	2.1	0.000	-0.1	-0.019	-3.7
FDI-W	-0.017	-3.4	-0.030	-2.4	-0.002	-0.3	0.010	1.9
FDI-employment	-0.012	-2.4	-0.023	-1.8	0.001	0.1	0.021	4.1
No. of observations	2031		701		737		657	
R ²	0.333		0.226		0.330		0.517	
Output measure	Value added		Value added		Value added		Value added	
<i>Long-run coefficients</i>								
Output	0.710	13.3	0.877	7.1	0.546	5.2	0.999	10.0
Wage	-0.422	-8.6	-0.520	-3.4	-0.915	-5.3	-0.791	-7.3
FDI	-0.038	-3.6	-0.114	-3.0	0.027	1.3	-0.014	-1.6
<i>Short-run coefficients</i>								
Dynamic coefficient	-0.236	-10.6	-0.154	-4.4	-0.358	-6.4	-0.233	-10.2
Output	0.290	4.9	0.271	2.5	0.169	0.8	0.616	5.5
Wage	0.469	2.1	0.358	1.3	-0.579	-2.5	-0.078	-0.6
No. of observations	1 303		497		403		408	
R ²	0.136		0.287		0.286		0.681	
Output measure	Gross output		Gross output		Gross output		Gross output	

Note: The table reports the coefficients obtained from instrumental variables estimation of the relationships in Table 5. Group 1 comprises four manufacturing industries – food/beverages/tobacco, textiles, transport equipment and electrical and optical equipment with strong commercial links with the non-OECD. Group 2 consists of wood/paper/printing, chemicals, basic metals and machinery. Group 3 comprises five service sectors. Further details of the industries are reported in Table 1.

An alternative is that outward investment helps to raise productivity at home, reducing the level of employment required to achieve a given level of output in the short term, but raising output and employment in the longer term (Grossman and Rossi-Hansberg, 2006). It is not possible to distinguish fully between these two hypotheses in the model.²⁷

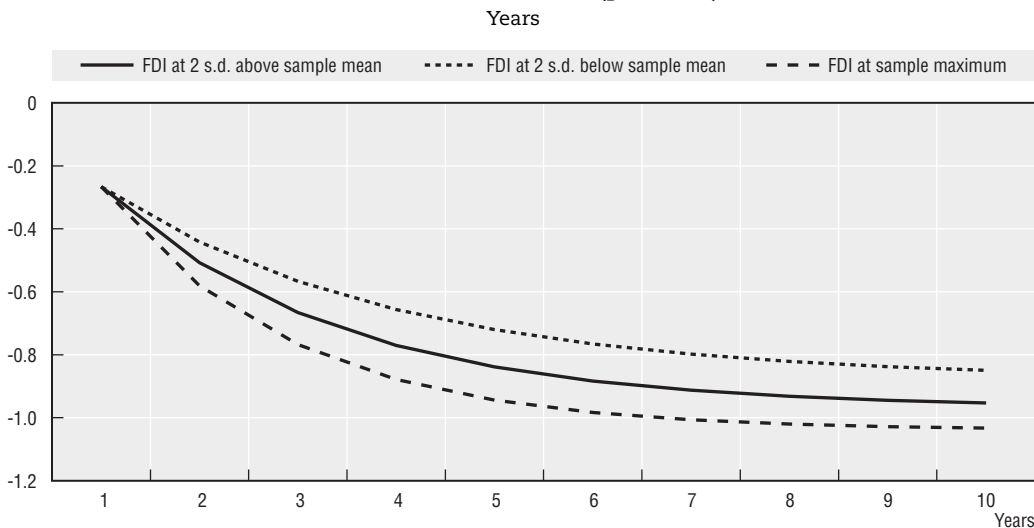
In the remaining two groups the long-run coefficients found on the separate outward investment-output ratio are generally insignificant, although there are two occasions in

which a significant positive coefficient is found for the group of service sectors when estimating model [4] in Box 2.²⁸

There are also noticeable differences in the findings obtained for each group when testing whether outward investment has a significant effect on either the long-run wage elasticity of demand or the speed at which employment adjusts towards its long-run sustainable level. For the group of manufacturing sectors that have strong commercial links with the non-OECD countries, there is statistically significant evidence that increases in outward investment raise the long-run wage elasticity and also the speed of adjustment of domestic employment. In contrast, for the group of service sectors, an increase in outward investment is found to be associated with significant reductions in the speed of adjustment of employment, other things being equal. Thus whilst there is evidence that domestic and foreign employment are substitutable to some extent in industries with strong linkages with the non-OECD, they are more likely to be possible complements in services sectors.

The estimated coefficients imply that the strong growth of outward investment seen over the sample period is having noticeable effects on the price elasticity of demand for labour in at least some industries. For example, for the group of manufacturing industries with strong commercial links with the non-OECD, a sustained rise of 1% in real wages is found to reduce domestic employment by between 0.8-0.9% when evaluated at two standard deviations below the sample mean for the FDI ratio. But evaluated at two standard deviations above the sample mean for the FDI ratio, the elasticity rises to between 0.9-1.0%. If the sample maximum is used,²⁹ the elasticity rises to above 1%, although not significantly so. The changes in FDI are also reflected in differing speeds of employment adjustment towards the long run, as can be seen from Figure 13. The impact on the average economy wide price elasticity of demand for labour is much smaller, with the increases found for manufacturing sectors being offset by the reduction found for non-manufacturing sectors.

Figure 13. The direct effect on domestic employment of a 1% increase in real wages in manufacturing industries with strong commercial links with non-OECD economies (per cent)



Source: Calculated using the coefficients reported for the industries in Group 1 in Table 5.

Conclusions and policy implications

The empirical evidence obtained at both the country and the industry level supports several of the propositions advanced in the literature about the possible effects of the internationalisation of production. However, there are significant differences in the effects of outward investment across countries and industries, making it difficult to draw strong conclusions. But there is evidence for at least some countries and industries that outward investment has a significant negative association with the domestic demand for labour after controlling for domestic output and real wages. One possible explanation for this is that enhanced offshoring may reduce the level of employment required to achieve a given level of output in the short-term, but raise productivity, output and employment in the longer term (Grossman and Rossi-Hansberg, 2006).

There is evidence that in manufacturing industries in which there are comparatively strong commercial links between OECD and non-OECD countries there is significant evidence that outward investment makes the labour demand curve more elastic in the home country. There is also evidence that outward investment raises the speed at which employment adjusts in these industries following changes in demand and wages. However, there is also evidence that the opposite may have occurred in some services sectors. At the country level, the expansion of employment in the foreign affiliates of domestically owned companies appears to have a significant positive association with the level of domestic employment in the United States, but not in Germany or Japan. In the later there appears to be a negative association, particularly from outward investment in China.

Overall, the findings from existing studies and from the additional empirical work in this paper provide few reasons for suggesting that the aggregate employment effects of outward investment differ greatly from the general effects of international trade, with overall gains and individual winners and losers. Neither of these factors necessarily changes the appropriate policies to encourage job creation and facilitate the reallocation of labour across sectors. But the increasing speed and scope of global integration does increase the need to have such policies in place, and also raises the potential costs of labour market distortions.

In particular, labour market adjustment is likely to be facilitated by carefully designed policies that help to compensate displaced workers for their foregone earnings, at least for a while, and also, in at least some instance, by the prompt use of active labour market policies (OECD, 2005 and 2007). New forms of globalisation could however require the changes in the design of some of these policies. In particular, the increasing tradability and relocation of many service sector activities is likely to result in the displacement of workers that typically have a higher average skill level than those displaced in manufacturing (Jensen and Kletzer, 2006). Such workers may have relatively less need of proactive labour market schemes to acquire the general skills necessary to move to new activities.

More broadly, the restated *OECD Jobs Strategy* (OECD, 2006) suggests that new job creation is also likely to be aided by stability-orientated macroeconomic policy, the removal of impediments to labour market participation and measures to enhance the flexibility of labour and product markets and labour skills and competencies.

There are a number of additional ways in which the issues explored in this paper might be studied. One approach would be to further extend the new databases in order to incorporate additional country data on employment in foreign affiliates and an enhanced

degree of industrial disaggregation, although this is almost certainly likely to reveal even greater heterogeneity. A second approach might be to seek to allow for other factors that can affect labour demand, such as anti-competitive product market regulations and other aspects of globalisation, to see whether the effects of outward investment can be estimated more precisely. A third approach would be to either estimate an equation in which the share of OECD value-added output produced in different member states is related to (net) outward FDI stocks or, equivalently, use OECD-wide output in the national labour demand equations (Barrell *et al.*, 1995). Finally, it would be of interest to gain a more complete picture of labour market developments by also exploring the impact of the internationalisation of production on real wages in the home country.

Notes

1. See also OECD (2005b).
2. Information for tradeable services is not available on the same basis.
3. Over the period 1994-2004, there is a small negative correlation of -0.19 in OECD economies between greater openness and changes in employment rates. This is not significant, and becomes almost zero if the four OECD Central European economies are excluded.
4. For example, empirical evidence suggests that foreign direct investment becomes more prevalent relative to trade when the intra-industry dispersion of productivity is higher, as more (higher productivity) firms are able to bear the fixed costs of establishing foreign affiliates (Helpman *et al.*, 2004). Related models consider the choice between international sourcing and undertaking production abroad in foreign affiliates (Grossman and Helpman, 2005).
5. These are referred to as the substitution, scope and scale effects by Hanson *et al.* (2003).
6. This assumes that the parent company would be otherwise be able to export to foreign markets. Evidence for services sectors in the United States, suggests that outward investment does weaken the growth of services exports for given market size (Pain and van Welsum, 2004).
7. The majority of studies reviewed in this section provide direct evidence about the impact of the internationalisation of production by using firm level data for parent companies and their foreign affiliates. Such data include the full range of activities produced by foreign affiliates. Other studies have focused more closely on one particular aspect related to the activities of foreign affiliates – the production of intermediate goods and services for parent companies. Often this can be observed only indirectly, using international trade data on imports of intermediates. Using such data it is difficult to separate out the effects of the international insourcing of production of intermediates within multinational companies and international outsourcing between otherwise unrelated companies. Whilst both are important for understanding the effects of enhanced international openness, the particular focus in this paper is on the impact of the transfer of production within multinational companies. For more detailed overviews of third-party trade and the general offshoring of services activities see OECD (2005) and van Welsum and Vickery (2005).
8. Desai *et al.* (2005) use the growth of employment in foreign affiliates, Hanson *et al.* (2003) use the growth of sales by foreign affiliates.
9. For example, a 10% fall in wages in affiliates in Mexico is found to be associated with a reduction of 0.17% in employment in parent companies in the United States.
10. The basic data show that small and medium-sized companies have a higher share of affiliate employment in developing countries rather than developed countries. The share of affiliate employment in total employment is also found to be decreasing by size of company.
11. For example, relocating particular stages of production to lower cost locations might be necessary to ensure survival of the firm. In such cases, even if employment in the parent company did decline, the job losses would be smaller than if the firm had not survived.
12. Theoretically there is no necessary reason why this should always be the case. Depending on the range of commodities produced and traded, and the endowments of the factors required as inputs for each, the fragmentation of production across national borders and the transfer of unskilled labour fragment to foreign countries could even result in a higher local return to unskilled workers (Jones, 2003).

13. Purely domestic firms may also be able to switch if they are able to outsource production.
14. FDI, in particular, may increase workers' insecurity in some countries (Scheve and Slaughter, 2004; OECD 2007).
15. Gorg et al. (2006) also find for Ireland that the price elasticity of labour demand for multinational firms is greater than that of purely domestic firms. This difference is found to be reduced, although not eliminated, as multinationals develop "backward" linkages with domestic firms.
16. The G7 economies plus Austria, Finland, the Netherlands and Korea.
17. This is because foreign direct investment is a financial flow rather than a measure of the fixed capital investment undertaken by foreign affiliates. Fixed capital investment by affiliates that is financed by borrowing in the host country will not be reflected in the outward FDI data.
18. These are the Bureau of Economic Analysis in the United States, the Ministry of Economy, Trade and Industry in Japan and the Deutsche Bundesbank.
19. The International Direct Investment Statistics database contains separate information on the industrial composition of direct investment and on the geographical location of total direct investment. It does not contain combined information on the geographical location of investment in each industry. This information is available from national sources in some countries, but has not been collected for the current paper.
20. Either of these approaches is complicated because all countries are also hosts to the affiliates of multinationals in other countries. So inward FDI and the output of the foreign parent companies would also have to be taken into account.
21. The data for Germany stop in 2001 because of a change in the definition of foreign employment after then.
22. The panel relationships are estimated using a standard industry fixed effect estimator. This is found to be statistically preferable to a random effects model.
23. The specification used in Table 4 does not provide an indication of whether the estimated negative short-run effect persists into the longer term.
24. It is not feasible to estimate a separate model for each industry in each country, because sufficient data are not always available in all cases. So standard fixed effects panel data estimators and estimators robust to the presence of heterogeneity have been used to estimate models across industry groups, with every country within each of the industries implicitly having a common coefficient.
25. The panel relationships are again estimated using a fixed effects estimator. Separate fixed effects are included for each industry-country pair. Common slope parameters are imposed across countries within each industrial sector.
26. The models were also estimated with a common variance for the three industry groups, which did not produce significantly different results.
27. In the latter case, the higher level of productivity may help to reduce costs and expand output, offsetting any subsequent decline in employment levels.
28. The effect of FDI does not change substantially when controlling for employment protection practices for regular workers. In the manufacturing sectors with close ties with non-OECD countries, its impact is still negative and significant, albeit the size of the impact is reduced to one-half. In services, the employment-creating impact of outward FDI is larger and more significant when controlling for employment protection of regular workers.
29. This is approximately three standard deviations away from the sample mean.

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