



Leverhulme Centre  
for Research on Globalisation and Economic Policy

## **GEP Research Report, June 2008**

# **The Economic Impact of Offshoring**

**Holger Görg\*, David Greenaway\*\*  
and Richard Kneller\*\***

\* **Kiel Institute for the World Economy, University of Kiel and GEP**

\*\* **Leverhulme Centre for Research on Globalisation and  
Economic Policy (GEP), University of Nottingham**

© Leverhulme Centre for Research on Globalisation and Economic Policy, University of Nottingham

*Corresponding author:* Professor David Greenaway, Professor of Economics, University of Nottingham,  
Nottingham. NG7 2RD; [david.greenaway@nottingham.ac.uk](mailto:david.greenaway@nottingham.ac.uk)

The authors acknowledge financial support from The Leverhulme Trust under Programme Grant F/00 114/AM.

## **Contents**

- 0. Executive Summary**
  - 1. Globalisation and Offshoring**
  - 2. Patterns of Offshoring**
  - 3. Key Drivers of Offshoring**
  - 4. The Economic Effects of Offshoring**
  - 5. Evidence on the Economic Effects of Offshoring**
  - 6. UK Multinationals and Enterprise Performance**
  - 7. Offshoring and Enterprise Performance in the UK**
  - 8. Conclusions**
- References**

## 0. Executive Summary

### *Globalisation and Offshoring*

- Globalisation, or international economic integration, is not a new phenomenon. In fact, extensive and sophisticated global trade networks existed two thousand years ago. We are, however, living through an era of very rapid globalisation which is also more extensive in its reach than any prior episode. Offshoring is just the newest form of the globalisation of economic activity.
- As well as manifesting itself in offshoring, economic globalisation takes a number of other forms: international trade (increasingly in services as well as merchandise); foreign direct investment; international portfolio investment; and international migration of labour. All have grown significantly in recent decades.
- A number of factors have interacted in driving the current wave of globalisation. Of greatest significance has been the interaction of technological development which has facilitated new ways of organising production, distribution and marketing and falling costs of doing business internationally. The latter is partly a product of declining man-made barriers, such as tariffs and regulatory hurdles, and partly a consequence of plummeting communication and transportation costs.
- It is widely acknowledged that globalisation brings with it many benefits. These include a more efficient use of scarce resources, lower prices to consumers and access to a wider range of products and services. In addition, because enterprises can operate in larger and more competitive markets, there are gains from exploiting scale economies and more efficient corporate performance. And, because globalisation can stimulate productivity improvement, it tends to go hand in hand with economic growth, which is fundamental to wealth creation and poverty reduction.

- Although there are unambiguously long term gains from globalisation, there can be short run adjustment costs as enterprises move from one activity to another and workers transfer from one job to another. Evidence suggests that these transitional costs are relatively small when compared to aggregate gains. However, from the perspective of individual workers or groups of workers, they can be substantial and need to be managed to ensure that support for globalisation is not undermined.

### *Patterns of Offshoring*

- Outsourcing and offshoring are related phenomena and are often confused. Outsourcing refers to a process whereby activity which was previously undertaken in-house is contracted to another supplier. This could be supply of intermediate inputs or services. This is very prevalent within an economy. When the process occurs across national frontiers, we have offshore outsourcing or, in short, offshoring. As offshoring and cross-border investment are linked, offshoring has grown alongside the increasing proliferation of multinational enterprises.
- Although offshoring has grown impressively over the last decade, especially in some of the larger OECD countries, it still represents a relatively small share of overall economic activity. Thus, although in the United Kingdom imported material inputs increased by 54 per cent and imported services inputs by 35 per cent over the last decade, in 2004 imported material inputs still only accounted for five per cent of industry output and for services 3.9 per cent of output.
- Media headlines tend to focus on activities perceived as offshored to 'low wage' economies and it is the case that a number of high profile such 'relocations' have been completed in recent years. However, it is still the case that most UK offshoring occurs in OECD countries in general and other EU countries in particular, rather than low wage / low income economies.
- It is important to remember that offshore outsourcing is not recurring in isolation. Domestic outsourcing (and indeed insourcing) continues to grow. Thus, for

### *Key Drivers of Offshoring*

- Offshoring, as with other internationalisation strategies like direct exporting or setting up an overseas affiliate, incurs start-up costs. These will include market research, training, setting up robust telecommunication bridges and so on. Efficient firms will be able to overcome these costs to offshore and of course some aspects of costs have fallen dramatically in recent years. Technological developments have driven down communication and co-ordination costs while liberalisation and deregulation have also facilitated the process.
- Globalisation means that markets are increasingly competitive, which drives successful enterprises to search for greater efficiency and reducing costs is an oft-cited motive for offshoring. Not surprisingly, therefore, there is evidence linking offshoring activity with relative wage rates.
- However, lower wages are not the only driver. They interact with skills in general and language, literacy and IT skills in particular. This is why offshoring activity is not clustered in the world's lowest wage economies but rather in those relatively low wage countries which also have some depth to their supply of relatively high skill labour, such as India or Eastern Europe.
- Infrastructure is also important to the offshore decision. This is self-evidently so in the case of the communications and transportation infrastructure: people, services and information have to go back and forth continuously. It is also true of the socio-political infrastructure: enterprises have to be confident that chosen locations protect intellectual property, guarantee the security of assets, minimise bureaucratic interference and so on.
- Offshoring opportunities exist for all enterprises in a given sector but not all enterprises actually offshore. The fact that up-front sunk costs are involved would lead us to believe that it is the most productive firms in a given domestic context that offshore. This is what economic theory suggests and there is

growing evidence across a range of countries which supports this supposition. That evidence points not only to enterprises with higher productivity growth (which is good for economic growth) but higher survival rates (which is good for employment).

### ***The Economic Impact of Offshoring***

- When assessing the economic impact of offshoring, the natural place to begin is with its impact on production and production structure. Economists assess this in the context of a production function; in other words the relationship between amounts of factor inputs like labour, capital and skills which are used and the way they are used, to produce final outputs, be they goods or services.
- At its simplest level, offshoring represents a change in the mix of inputs used. If work is offshored, there may be a decline in the amounts of inputs used also. In popular discussion it is this direct effect on which the media can focus, which is equated with job destruction. But because the mix of inputs changes, offshoring can result in productivity within the enterprise improving.
- Productivity gains within the enterprise (or across enterprises) stimulated by offshoring can lead to job creation as activities which are complementary to the offshored activity expand in scale. Any empirical assessment of the implications of offshoring on employment should therefore account for all of these effects.
- Economic theory also suggests that offshoring might be linked to aggregate productivity growth, a key driver of economic growth in the economy as a whole. The dynamics of aggregate productivity growth are complicated depending as they do not only on changes that occur within an enterprise but also on changes in the relative importance of firms in a sector and of sectors across the economy as a whole. These change through time as new firms and markets emerge and others decline or die. If it turns out to be the case that enterprises that offshore are generally more productive and in expanding areas of economic activity, this will impact positively on aggregate productivity growth.

## *Economic Effects of Offshoring: The Evidence*

- When assessing employment effects, it is important to account for direct and indirect effects but also to ensure that changes are appropriately contextualised. With regard to the latter, it is important to remember just how significant ‘normal’ turnover in the labour market is. Recent evidence for the UK suggests that on average every week 51,000 jobs are destroyed and 53,000 are created. In other words, 15 to 16 per cent of the private sector workforce churns in this way, every year. To put offshoring in context, recent evidence also suggests that it was responsible for around 3.5 per cent of job losses in the UK in 2005.
- A growing number of studies focus specifically on the employment effects of offshoring, mainly covering OECD countries. Much of this work captures both the relocation and scale effects. Although some studies have identified small negative employment effects, the consensus that seems to be emerging is that employment effects are either broadly neutral or result in a small net gain.
- Two important studies of employment effects in the UK have recently been completed, using somewhat different approaches: the focus of one is at the sector level, for both manufactures and services; the other uses information on individual enterprises for 39 different kinds of services transacted. Neither can find evidence of negative employment effects, whilst the firm level analysis of the services sector reports that enterprises that outsourced over the 1997-2004 period actually grew faster than comparable non-outsourcing enterprises and created rather than destroyed jobs.
- Recent work has also focused on a range of non-employment effects including productivity, price level changes and consumer welfare. With regard to the first, the most common finding is of a positive association between offshoring and productivity. For price level effects, the evidence is more limited and indirect in the sense that it tends to be based on the effects of imports in general, which have tended to put downward pressure on price levels. Finally, as consumers generally benefit from lower prices and greater choice, there is a very strong presumption of positive benefits and some evidence to support that.

## *UK Multinationals and Enterprise Performance*

- To provide completely new, original and up-to-date evidence on the impact of offshoring on the UK economy, we assemble a specially prepared database from published information and use advanced econometric techniques to investigate a range of aspects of firm performance. Since multinationals are heavily involved in offshoring, we investigate which kinds of enterprises are multinational and have affiliates abroad, where they choose to locate and why they select particular locations.
- Multinational enterprises (MNEs) are a small minority in the population of firms under scrutiny, accounting for just over 8 per cent of those in manufacturing and just over 5 per cent in services. These enterprises are located in up to 139 different countries (with slightly more in manufacturing than services) with the average number of locations being around 2.5.
- Most UK multinationals have their presence in other OECD countries, with around 20 per cent of manufacturing firms and 18 per cent of services firms having a location in a non-OECD country. Looking specifically at China and India, only 8 per cent and 4.5 per cent of manufacturing and services firms respectively have a presence in these locations. These findings are echoed for multinationals from the Euro area more broadly.
- When MNEs are compared with non-multinationals, a number of distinctive markers stand out. First, MNEs are significantly larger and the larger they are the more subsidiaries they tend to have and the more locations they tend to operate in. Compared to firms that are not multinationals but do export, they tend to employ more workers, have larger turnover and export a greater share of total output. Thus, although MNEs account for under 6 per cent of the number of firms in our sample, they account for over 16 per cent of employment, 19 per cent of turnover and 35 per cent of exports.

## *Offshoring and Enterprise Performance*

- Economic theory and industry engagement point to a number of factors likely to influence the decision on where to locate once an offshoring decision has been made. Our empirical analysis suggests that distance is important. Other things being equal, nearer destinations are preferred to farther ones. The quality of human capital is also important, as is proficiency in the English language, as well as other aspects of historical ties with the UK. All of these receive strong statistical support, with particularly strong support for the interaction of skills and the English language.
- Characteristics of the environment are also influential. As we would expect, having a good ICT infrastructure, especially when combined with a skilled workforce, makes a location particularly attractive for offshoring. Whether the environment is investor friendly/market friendly also matters, as indicated by the statistical importance of widely used measures of corruption, red tape and protection of intellectual property.
- Turning to performance, for manufacturing firms we find that offshoring is positively associated with all aspects of business performance, except wages. Thus employment unambiguously increases in the industry as a whole and does so for the average firm. Offshoring also results in increased turnover, higher labour productivity and more exports.
- Findings are similar in the services sector, with clear employment gains, improved productivity and increased exports. The only difference with manufacturing is a small decline in average wages is observed, possibly a consequence of a changing skill mix in the enterprise.
- These effects are quantitatively substantial and on conservative assumptions add up to 100,000 additional jobs and £10 billion additional turnover in the UK economy, with employment gains in manufacturing around twice those in services and turnover gains about three times as great.

# 1. Globalisation and Offshoring

## 1.1 Introduction

Globalisation and offshoring can be emotive terms. They stimulate enormous public interest and can generate strong reactions. A crude, but revealing, indicator of public interest in these issues is a straightforward Google search: key in ‘globalisation’ and you get a menu of 15,600,000 sites in 0.05 seconds; the American ‘globalization’ generates 28,000,000 sites in a slightly longer time (0.06 seconds); whilst offshoring results in 4,900,000 in 0.15 seconds.

Aside from demonstrating the power of modern information technology (itself one of the key drivers of offshoring and globalisation), what this simple experiment tells us is that we live in a world which is highly globalised and, like it or not, will become even more so, if only because most of the world’s most populous countries are not yet very globalised: Brazil, China, India, Indonesia, Pakistan and Russia account for 50 per cent of the world’s population but none of them feature in the top 50 most globalised countries in the A. T. Kearney classification. It also tells us that ‘offshoring’ seems to be, in some sense, less prevalent than globalisation. As a matter of fact, that is the case. After all, offshoring is just one of a number of forms through which the globalisation process manifests itself. The fact that it is the ‘newest’ form, and is affecting domains of economic activity (like business services) which in the past were less affected by globalisation, is what makes the phenomenon controversial.

## 1.2 Globalisation and its Drivers

The term ‘globalisation’ is of fairly recent vintage, essentially becoming common currency from the late 1980s/early 1990s. But the phenomenon is (quite literally) an ancient one. There were well established and well documented trade networks functioning two thousand years ago which stretched all the way from the extremities of the Roman Empire in the West to the Han Empire in the East. Trade networks associated with ancient civilisations, for example Egypt and China, if less extensive, are also known about.

*Economic globalisation* refers to the process whereby economies become more joined up and therefore more interdependent: international economic integration is just as good a descriptor. As we will see below, the process brings benefits but increased interdependence between economies also brings greater uncertainty: our wellbeing is more intertwined with economic activity in domains beyond our shores and events outwith our direct control.

Economic globalisation can take many forms:

- *international trade*: is the default for most when thinking about globalisation. This is obviously the exchange of goods and services across national frontiers, which has been taking place since the beginning of recorded history. As can be seen from Table 1.1, global merchandise trade was almost \$12 trillion and trade in services almost \$3 trillion in 2006. Both have been growing strongly in recent years with the growth in services trade outstripping that of merchandise trade. In fact, over the period since 2000, services trade has grown almost twice as fast as merchandise trade (in part because of the growth in offshoring);
- *foreign direct investment (FDI)*: involves the establishment (greenfield or by acquisition) of overseas affiliates, for some combination of production, distribution and marketing. In the current wave of globalisation this has grown dramatically. As Table 1.1 shows, annual flows of FDI exceed \$900 billion and the book value of stocks is over \$10 trillion. The table also illustrates the importance of multinationals to global commerce, by reference to their affiliate sales and assets;
- *overseas portfolio investment*: takes the form of holding assets denominated in foreign currency. Currently the most commented upon example of this is China's portfolio of over \$1 trillion in US dollar denominated assets. Estimating total asset holdings here is tricky but one revealing proxy is the daily turnover of foreign exchange markets which, according to the Bank for International Settlements, exceeds \$2 trillion;
- *international migration*: is the human capital equivalent of FDI and, because it involves people movement, is inevitably more controversial. Although the UK is currently party to significant immigration from Eastern Europe in

particular and its highest emigration levels since the 1960's, more generally migration has not played as prominent a role in the current wave of globalisation as it did in the final quarter of the nineteenth century;

- *offshoring*: refers to the process whereby components or services are sourced from foreign suppliers. Although in manufactures it has been a relatively common phenomenon for a long time, its increasing presence in services has raised its profile dramatically since the turn of the new century.

*Table 1.1: Globalisation in Numbers*

<b>Globalisation in numbers</b>	
<b>2005/06</b>	
Merchandise trade	\$11.8 trillion
Services trade	\$2.7 trillion
Foreign investment flows	\$916 billion
Foreign investment stocks	\$10.1 trillion
Foreign affiliate sales	\$22.7 trillion
Foreign affiliate assets	\$45.6 trillion
Global GDP	\$44.7 trillion
Daily turnover in foreign exchange markets	\$2.0 trillion

*Sources: World Trade Report (WTO); World Investment Report (UNCTC); Bank for International Settlements.*

There have been waves of globalisation throughout recorded history. We are currently living through a wave which, although it has similarities with earlier periods, is different in scale and intensity, driven in large measure by the interaction of rapid technological progress and plunging costs of doing business.

Trade costs have been driven down by a combination of falls in both man-made and natural barriers. Over the last fifty years the GATT and WTO have promoted significant multilateral trade liberalisation, a consequence of which has been plummeting tariffs on manufactures. Thus, whilst at the end of the Second World War average tariffs on manufactures in most major industrialised economies exceeded 40 per cent, by the time the Uruguay Round tariff cuts were fully implemented in 1999, average tariffs in the US, EU and Japan were 4.8, 5.6 and 6.6 per cent respectively. For a long time trade liberalisation primarily impacted on business between OECD countries. However, the last twenty years has seen unilateral trade liberalisation in scores of developing countries, often accompanied by deregulation and average tariffs in developing countries are now around 12 per cent.

The fall in natural barriers has been even more impressive, so much so that the leading commentator, Frances Cairncross (1997), was moved to declare ‘the death of distance’ in her well known book of the same title. Freight, travel and telecommunications costs have all fallen dramatically, especially the latter. The ICT revolution in general, ubiquitous broadband access and convergence of technologies, have resulted in some communication costs essentially falling to zero.

Falling trade costs result in expanded opportunities for cross border business, whether this is in the form of trade in goods and services or cross-border investment. They also facilitate changes in the way in which business is organised and conducted. More specifically, it facilitates what is sometimes referred to as the ‘slicing up of the value chain’. In other words, taking advantage of opportunities afforded by lower labour costs to break up the production process and outsource parts of it to reduce unit costs and improve competitiveness. As we shall see later, offshoring is just another manifestation of this phenomenon, increasingly being applied to business services.

### **1.3 Benefits of Globalisation**

It is easy to take for granted the benefits resulting from globalisation, in part because they are not always transparent, in part because potential costs associated with the process often generate more public interest. But they are considerable and come in a range of different forms.

First, trade, cross-border investment and portfolio investment all result in us using scarce resources more efficiently by driving productive factors to the parts of the world where they can earn the highest return. Second, following from the resource reallocation just described, consumers benefit by lower prices for the goods and services they consume. In addition, however, they generally get access to greater variety, something which we seem to value more highly as we become better off.

The benefits of these so-called gains from specialisation and exchange are well known to economists and boosted significantly when there are opportunities for scale economies and exposing domestic enterprises to more competition. But the

real long term prize from globalisation results from its interaction with economic growth. Fundamentally, economic growth is driven by the quantity and quality of available productive factors and the way in which these assets are combined. Globalisation helps growth prospects by increasing the quantum of these factors (through, for instance, cross-border investment and migration); and often increases their quality (because it is the most enterprising workers who move and the most productive firms that invest overseas). Moreover, globalisation can affect the way in which they are combined, through the transfer of new technology and knowledge spilling across borders. In other words, enterprises discover new, more efficient ways of doing things.

Why is economic growth so important? Because it is the only guaranteed basis for improving living standards and reducing poverty. Although the evidence on causal links between globalisation and growth is not always conclusive over relatively short periods of time, the long run links are clear and the benefits well worth having.<sup>1</sup>

## **1.4 Adjusting to Globalisation**

If globalisation, in its various guises, is such a good thing, why is it at times so controversial? Controversy is generally sparked by one of two things: adjustment costs and distribution of gains. Many of the benefits from globalisation flow from resources being reallocated from one sector of economic activity to another: extraction of natural resources or agriculture to manufacturing, manufacturing to services at the broadest level; or more narrowly from standard manufacturing to higher value niche market activity, for instance from mass produced garments to designer label clothing. It is this process which unlocks productivity gains and drives down prices to consumers. But the process of resource reallocation will not necessarily be frictionless or costless: capital assets have to be written off, workers have to move jobs. It is the latter in particular that can result in stresses and strains.

For example, if because of import competition a coal mine closes and a call centre opens, workers who are displaced from the former may not be instantly suited to employment in the latter, either because they do not have the appropriate mix of

skills or because the call centre is in a different part of the country. As a consequence, a period of unemployment might follow, or re-employment might only be possible at a lower wage. Either way, the individual worker bears a cost. It may be a small cost relative to the overall gains from trade expansion. Thus, for example, Magee estimates that the long run gains from trade liberalisation exceed short run adjustment costs by a factor of sixteen to one. But research on Canadian workers shows that, for the *individual* the lifetime cost may be substantial, of the order of \$70,000 (Jacobson et al 1993).

Of course this needs to be put into perspective. Job turnover in a dynamic economy is surprisingly high. Recent work by Hijzen, Upward and Wright on the UK, for example, calculated that 51,000 jobs are lost in the UK and 53,000 created, every week. Moreover, most of the churn is not due directly to globalisation but to the proliferation of new technology. In addition, re-employment and re-engagement tend to occur relatively quickly in a dynamic economy like the UK. (See Hijzen, Upward and Wright 2007).

Although it is clear that, through time, adjustment occurs relatively quickly (look at the transformation of the UK economy over the past twenty years), it is easy to see why a specific plant closure or decision to offshore grabs the headlines: ‘3,000 jobs lost in the garments industry’ captures more attention than ‘price of shirts falling for the benefit of consumers’. Moreover, when restructuring takes place and jobs are lost, it is not possible to state with certainty where new jobs will be created. As Alan Greenspan, former Chair of the US Federal Reserve Board put it:

*“Jobs in the United States have been perceived as moving abroad over the years, to low wage Japan in the 1950s and 1960s, to low wage Mexico in the 1990s and most recently to low wage China. We can usually identify somewhat in advance which jobs will be displaced by foreign or domestic competition. But in economies at the forefront of technology, most new jobs are the consequence of innovation which by its nature is not easily predictable. We can thus be confident that new jobs will replace old ones as they always have but*

---

<sup>1</sup> For an evaluation of the links between globalisation and growth, see Crafts (2004).

*not without a high degree of pain for those caught in the job-losing segment of America's massive job-turnover process."*

There is both a political economy issue here and an issue of how adjustment can be facilitated with judicious policy intervention, both of which we will return to in the Conclusions in the specific context of offshoring.

## **2. Patterns of Offshoring**

### **2.1 Defining Offshoring and Outsourcing**

Offshoring is a widespread phenomenon in the UK and frequently makes the headlines in national newspapers. Still, while 'offshoring' or 'international outsourcing' are terms frequently used in the media and public debate, they are often applied in imprecise and sometimes even misleading ways. The *Oxford Dictionary* defines the two as follows:<sup>2</sup>

*Offshoring*: "the practice of a company in one country arranging for people in another country to do work for it"

*Outsourcing*: "to arrange for an outside a company to do work or provide goods for that company"

The two definitions are somewhat similar and indicate that it is the fact that a company gets some outside agent to 'do work for it' that constitutes offshoring or outsourcing. It also implies that the work was previously done, or could potentially have been done, by the business itself. This work can be done outside of the company by hiring an independent subcontractor abroad, or within the company structure by relocating some part of the production activities to affiliates based in other countries. Whether it is performed within or outside the company does not matter, strictly speaking, for the definition of outsourcing: in both cases, part of the production that was previously carried out in the firm, or could be carried out by it,

is located abroad. The relationship between offshoring and outsourcing is set out schematically in Figure 2.1.

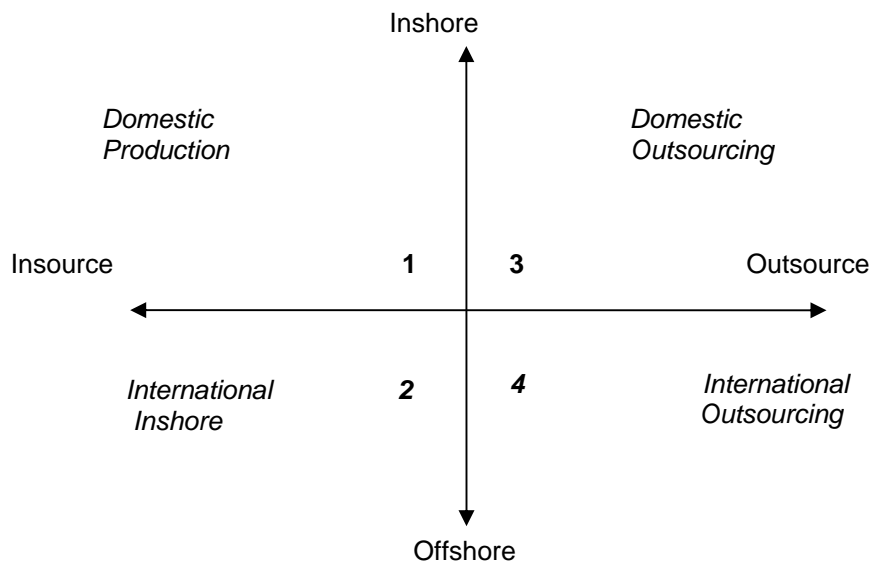
Offshoring usually refers to the location of the production of an intermediate input, independent of whether management of the activity is internal or external to the firms, whereas outsourcing refers to the management of the activity, independent of whether its production is abroad or not. This relationship is usually described using a variation of Figure 2.1 below (see for example Abramovsky, Griffith and Sato 2004).

The vertical axis describes the boundary of the firm and the horizontal axis the boundary between domestic and overseas production. All goods and services traded in the bottom two quadrants are measured using statistics on intermediate imported inputs.

- *Quadrant 1*: the firm produces intermediate inputs that it requires ‘in-house’ where this production is located within the domestic economy.
- *Quadrant 2*: the firm produces its own intermediate inputs but in a foreign location.
- *Quadrant 3*: production of the intermediate input is outside the firm but within the domestic economy
- *Quadrant 4*: management of production is external to the firm and its location is overseas. This is often referred to as offshore outsourcing.

---

<sup>2</sup> Definitions from the online version of the *Oxford Dictionary* available at <http://www.oup.com/elt/catalogue/teachersites/oald7/lookup?cc=global>, accessed on 8 July 2007



*Figure 2.1: Outsourcing and Offshoring*

It is clear from this that what is typically referred to in the media as offshoring is international outsourcing or offshore outsourcing. This label is further muddled however when terms such as ‘nearshoring’ (the location of outsourced production in countries that are geographically close by) are added: a descriptor which has gained currency in Europe with the integration of the transition economies of central and eastern Europe.

Economists have argued that much of the offshoring literature is familiar territory to them and represents a continuation of well established trends in the internationalisation of business. For example much of international outsourcing describes international trade and can be understood from a standard international trade perspective, while international inshoring has some tradition in the literature on multinational activity (vertical FDI). Indeed in both cases the fundamental principle being studied is the relocation of activity on the basis of cost. This appears to match the anecdotal evidence on offshoring where there is also an absence of sourcing technologies developed abroad.

In some sense, this is a rather intuitive definition that is quite uncontroversial. There is also an abundance of anecdotal evidence from case studies of individual companies which indicate how important (or not) offshoring can be for some

businesses. Table 2.1 lists some high-profile cases that have occurred over the last few years.

However, it is difficult to generalise from such case studies. Where it gets complicated in measurement is when one attempts to quantify the economy-wide magnitude of offshoring. In the absence of being able to survey all companies in an economy about their offshoring activity to quantify how much work they have outsourced to businesses abroad, it is difficult to measure this phenomenon precisely.

*Table 2.1: Selected offshoring cases in the UK*

<i>Service</i>	<i>Company</i>	<i>Function</i>	<i>Country and number of jobs or value involved</i>
Financial services (banking, insurance)	HSBC	Back-off processing jobs	4,000 by the end of 2003 in India, China and Malaysia. Another 3,500 were announced in June 2004.
	Norwich Union/Aviva	Administrative insurance jobs, 350 in call centres, 2000 in back-office and administration.	2,350 in India by end of 2004.
	Lloyds TSB	Call centre jobs	1,500 jobs in India by end 2004.
	Barclays Axa Abbey National	Back-office staff Back-and-front office work	500 to India 700, some to India 400 jobs to Bangalore
Distribution services Telecommunication services	Tesco	Business support centre	350 to India
	BT	Call centre	2,200 by 2004 to India
	BT	Global customer support	3,000-4,000 jobs in Tech Mahindra, India 2006-2011
Tax compliance	Ernst and Young	Checking corporate tax returns	200 to India
Transport services	British Rail	National Rail inquiries	600 to India
Health services	NHS	Fast-track centres offering surgery to NHS patients. Foreign providers run mobile operating units. Netcare plans to bring over surgical teams from South Africa on rotation once every 11 weeks.	Non-UK health care providers, including Netcare of South Africa, amounting to a total of £2 billion.
	NHS	£896-mn IT contract to modernise NHS	Tata Consultancy Services (India) part of a consortium
Other government	Greater London	Software for toll charging	A \$10 million contract to

---

*Source: UNCTAD World Investment Report 2004, p. 168, and business press sources..*

One particular feature of offshoring is helpful in this context: it leads to the *re-import* of intermediate goods by the parent company. Hence, measuring imports into the UK (or other economies), particularly if one is able to distinguish imports of final goods and intermediates, may be a useful measure of offshoring. However, it should be kept in mind that this measure is far from perfect. Leaving aside the issue of how precisely to measure intermediate inputs, such import data will capture not only work that the firm could have done itself, but also other inputs.

To make this point clear, consider an (admittedly extreme) example. A computer manufacturer may import micro-processors from abroad rather than producing them themselves. This would show up in trade statistics as an import and would probably be rightly classified as offshoring under the above measurement, especially if the firm used to produce micro-processors itself. The same manufacturer may also import cardboard boxes for shipping the finished product. This, again, would show up as an import. But would we think of this as offshoring?

Be that as it may, in recent years attention in terms of offshoring has shifted towards outsourcing of services. While the process of services offshoring is similar to that of outsourcing manufacturing activities, this leads to imports of services, rather than manufacturing (tangible) intermediates. Hence, the debate around services offshoring is intrinsically linked to that on the increasing volume of trade in services, which we noted in Chapter 1.

Another feature of offshoring has also been exploited in an attempt at measurement. If a company offshores part of its production to an affiliate it owns abroad, this is a form of outward investment and may be associated with outward foreign direct investment (FDI) flows. Again, however, there are caveats. Firstly, while some outward investment clearly relates to offshoring, much is investment with an intention to open up new markets, rather than relocate production there. For example, Vodafone's takeover of German telecommunications group Mannesmann in 2000 led to substantial outward investment flows from Britain to Germany.

However, it is difficult to attribute this to offshoring, as Vodafone's motive was clearly related to market seeking aims.

Using data on outward FDI flows comes with another limitation. Data on capital flows are only poorly related to actual economic activity by multinationals (Lipsey, 2001). For example, in November 2006 HSBC announced it was to expand its outsourcing operations in India by opening up new facilities in Kalkotta and Hyderabad. Does this mean that this comes with an increase in outward investment flows from Britain to India? Not necessarily. If the affiliates in India are able to (partly or fully) finance their operations using sources other than equity or loans from their parent company, this will not lead to such outward investment, or to reduced investment flows not reflecting the actual scale of activity in India.

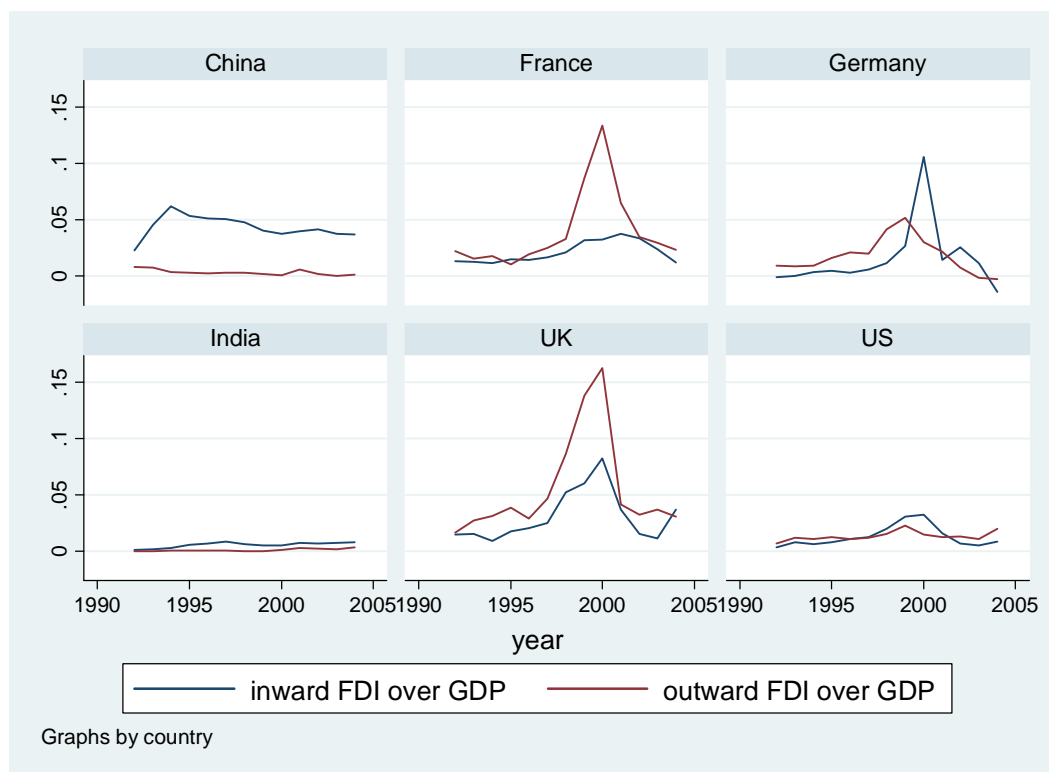
## **2.2 Global trends in FDI, services trade and offshoring**

Figure 2.2 shows the importance of outward FDI flows for the UK, with the US, Germany and France as comparators. We also present equivalent data for China and India, which are widely regarded as being the most important countries to which activities are offshored. To provide another angle of comparison we not only report data on outward, but also on inward FDI.

A look at the graphs shows that, for the developed countries, FDI flows are quite volatile and it is difficult to identify a common trend. These fluctuations may be driven by a number of small projects, e.g., in the UK outward data and the German inward data the respective peaks in 2000 – 2001 are likely to be at least partly due to the Vodafone – Mannesmann takeover.

Still, for the UK we find that over the period 1992 to 2003 it has been a net outward investor, i.e. outward flows consistently exceeded inward flows. In 2004, both flows were roughly equal, however. Another noteworthy feature is that both China and India are net recipients of direct investment, as would be expected given that they are important hosts for offshoring activities. At least in India inward FDI flows are still at a very low level.

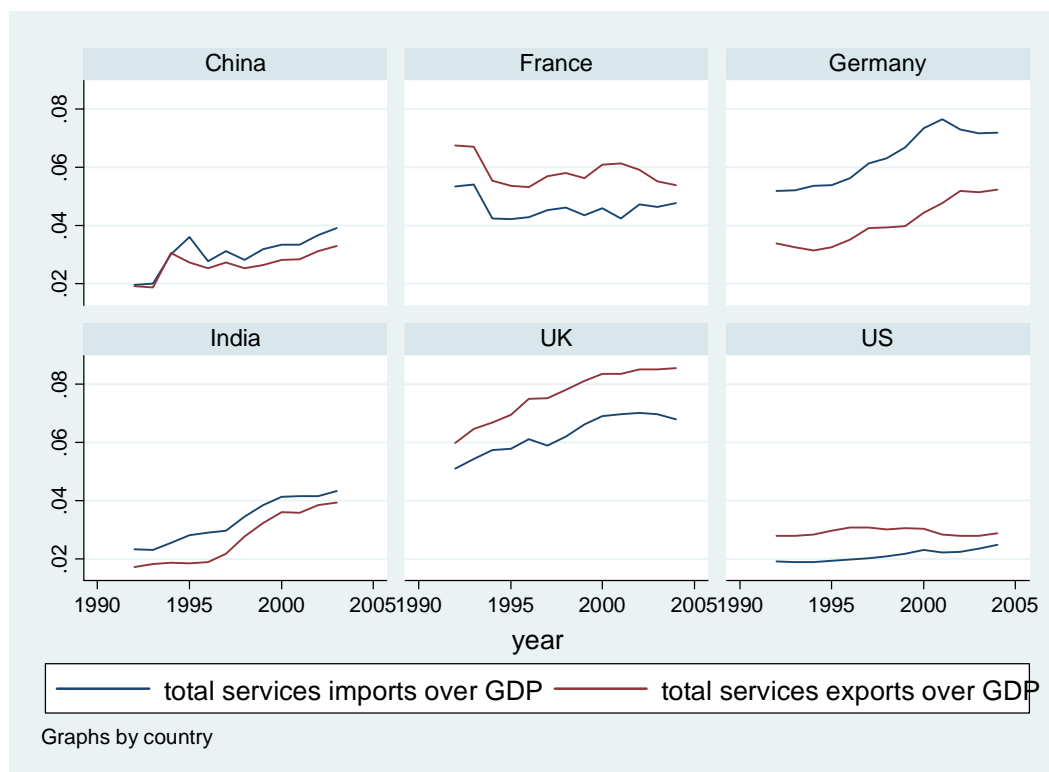
Figure 2.2: Foreign direct investment flows



Source: own calculations using data from UNCTAD Handbook of Statistics

Given the shortcomings of using FDI data as proxies for offshoring we now turn to measuring services trade. Figure 2.3 shows the importance of services trade for the UK and the same comparison countries as above. Also, to provide another angle of comparison we not only report data on services imports, but also on exports of services for these countries.

Figure 2.3: Trade in services



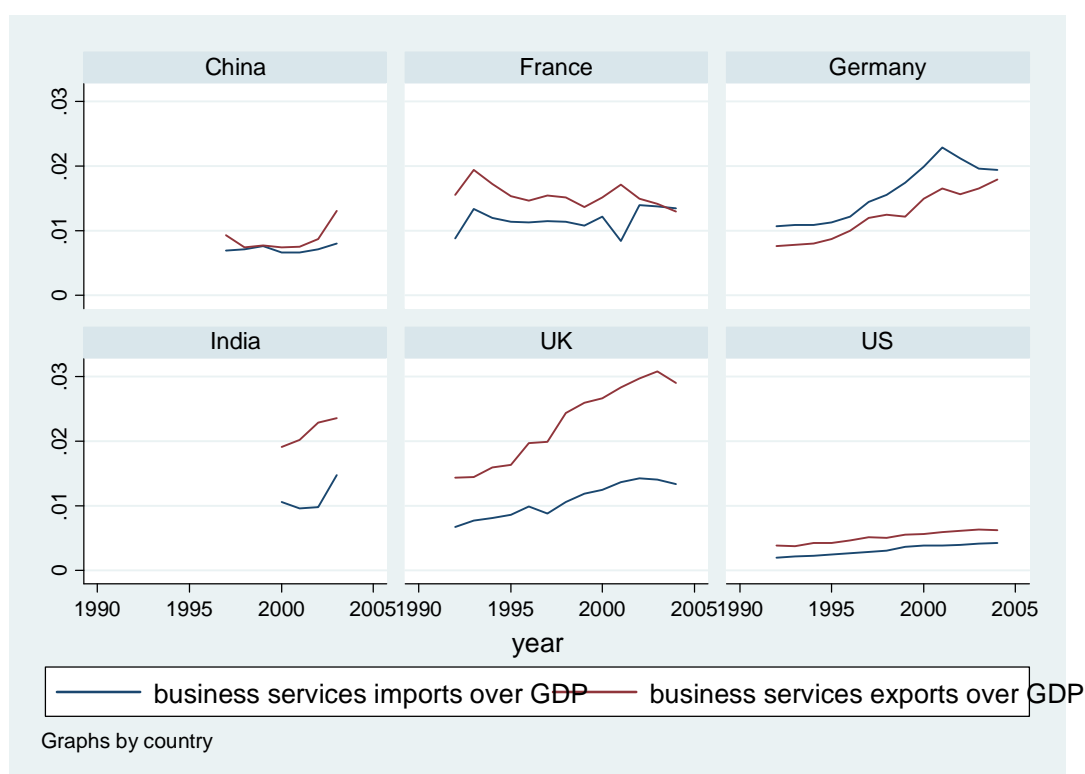
Source: own calculations using data from UNCTAD Handbook of Statistics

A number of features stand out. Firstly, imports of services are still relatively low: in the UK, services imports amount to about 7 per cent of GDP in 2004 compared to only about 2.5 per cent in the US. Second, although starting from a low base, the growth of services offshoring is rapid in all countries except France: in the UK, services imports grew by about 34 per cent between 1992 and 2004, compared with 31 per cent growth for the US. Third, exports of services are significantly higher than imports for the UK, the US and France. By contrast, China and India which are generally thought of as destinations for offshoring, and therefore should be net-exporters of services, have significantly higher imports than exports. Only Germany shows the picture that one may “normally” expect for a country that engages significantly in offshoring: its imports of services substantially outweigh its exports. Fourth, imports and exports of services show largely the same trends over the 13 year period analysed (1992 to 2004).

The data presented above relate to total services, which includes items such as transport and tourism, retail and wholesale trade which are unlikely to relate to

companies' offshoring activities. What arguably captures this notion better is a subset of services usually labelled "Business Services". In particular, the latter are defined as consisting of communication and information services; merchanting and other trade-related services; operational leasing services; and miscellaneous business, professional and technical services, (for example in Abramovsky, Griffith and Sato 2004). These types of services have in the literature largely been equated with offshoring of services activities.

Figure 2.4: Trade in business services



Source: own calculations using data from UNCTAD Handbook of Statistics

Figure 2.4 shows a pattern which, although at a lower level, is quite similar to the one found when considering total services. Focussing on the UK we find that imports of business services, while still at a low level, have been increasing considerably since 1992. In 2004, business service imports were equivalent to roughly 1.3 per cent of GDP. This represents a doubling since 1992, when the corresponding value was 0.6 per cent. It is also notable again that the UK has a positive export balance in business services and, if anything, the growth in exports seems to have outstripped that of imports since the late 1990s.

One important point emerges from the graph which is a striking contrast to the earlier table. In terms of business services we find that both China and India (although data availability is somewhat limited for these two countries) are net exporters of business services, in line with what one would expect from these two countries.

The final point to note is that for all countries we again find that imports and exports of business services show similar trends over time. In other words, increases in imports go hand-in-hand with increases in exports of business services, a trend that is important to keep in mind when considering the impact of offshoring (i.e., services imports) on the economy.

### **2.3 A Closer Look at Offshoring in the UK**

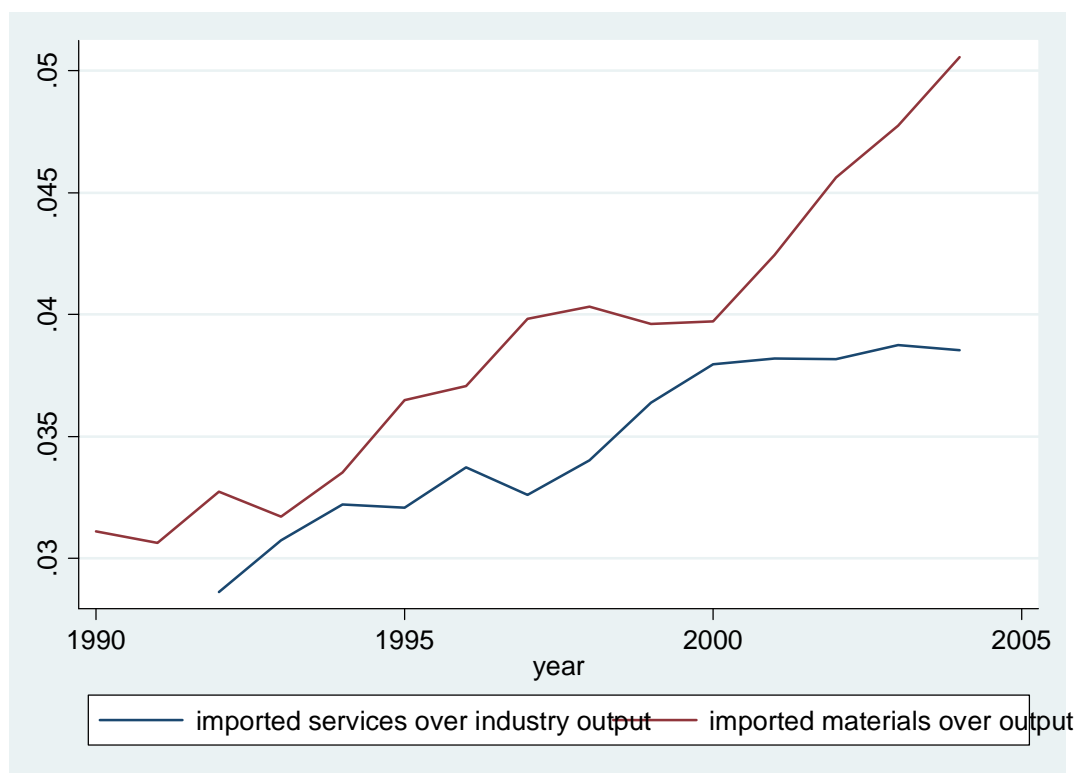
In the analysis thus far we have made use of widely available aggregate country level data. These, by their nature, are limited in the amount of information they convey. For the UK we are able to dig deeper into measuring imports of *intermediate inputs* for different industries; a concept that is at the heart of offshoring.

Such measures can be constructed using trade statistics and input-output tables. The first data source provides us with imports of materials and service goods, as used in the previous section. The challenge is, however, to measure an industry's imports of *intermediate* rather than final goods. To do so we use the UK Input-Output tables to allocate imports according to their use as inputs across industries.<sup>3</sup> Based on this procedure we are able to calculate imports of material in services intermediates for broadly defined manufacturing and services industries in the UK. These are then scaled by industry level output in order to facilitate comparison across industries.

Figure 2.5 shows the averages of these measures for the British economy over the 1990 to 2004 period. A number of points are noteworthy. First, materials outsourcing is more important relative to industry output than is services offshoring: In 2004, imported material inputs accounted on average for roughly five per cent of

industry output, while imported services inputs stood at around 3.9 per cent. Second, both materials and services offshoring have increased immensely since the early 1990s. The former increased by 54 per cent, compared with 35 per cent for the latter type of offshoring.

Figure 2.5: Imports of intermediates in the UK economy

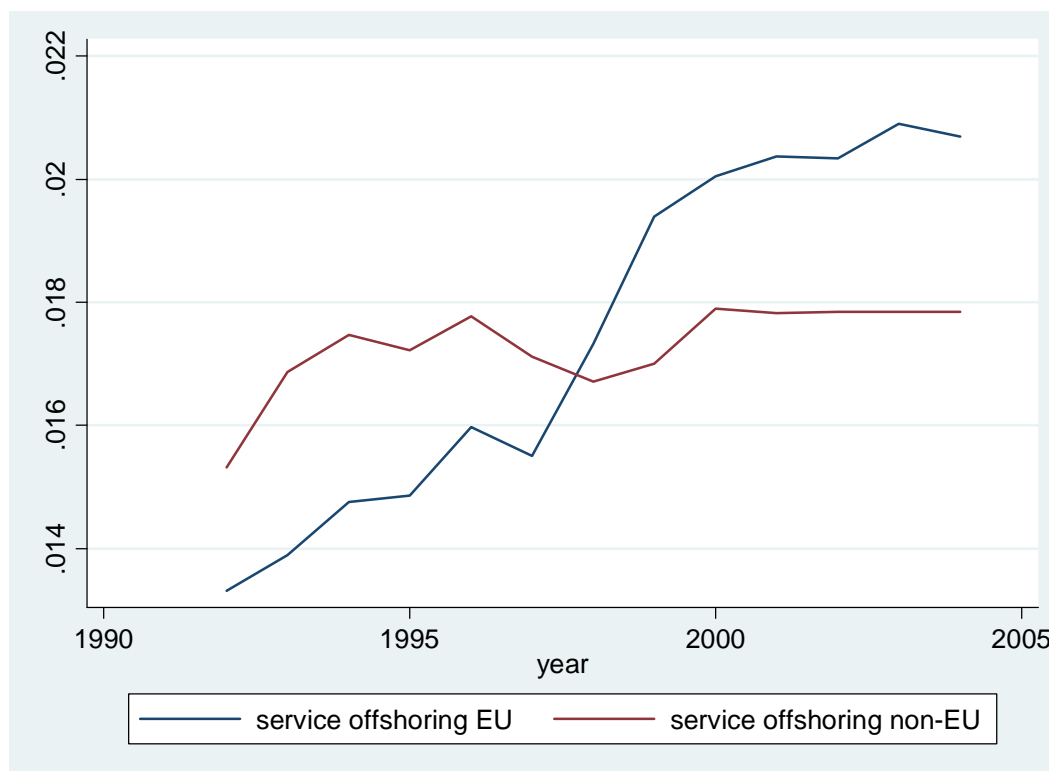


Source: own calculations using data as described in the appendix

Figures 2.6 and 2.7 look further at the origin of imports of intermediate goods. Up to 1997 most services inputs were sourced from non-EU countries. However, this balance has shifted towards EU countries since 1998. In 2004, imported services from EU countries are equivalent to roughly 2.1 per cent of industry output, while services imports from non-EU countries account for 1.7 per cent.

<sup>3</sup> The details of this procedure are described in the Appendix to Chapter 2.

Figure 2.6: Offshoring of services by region



Source: own calculations using data as described in the appendix

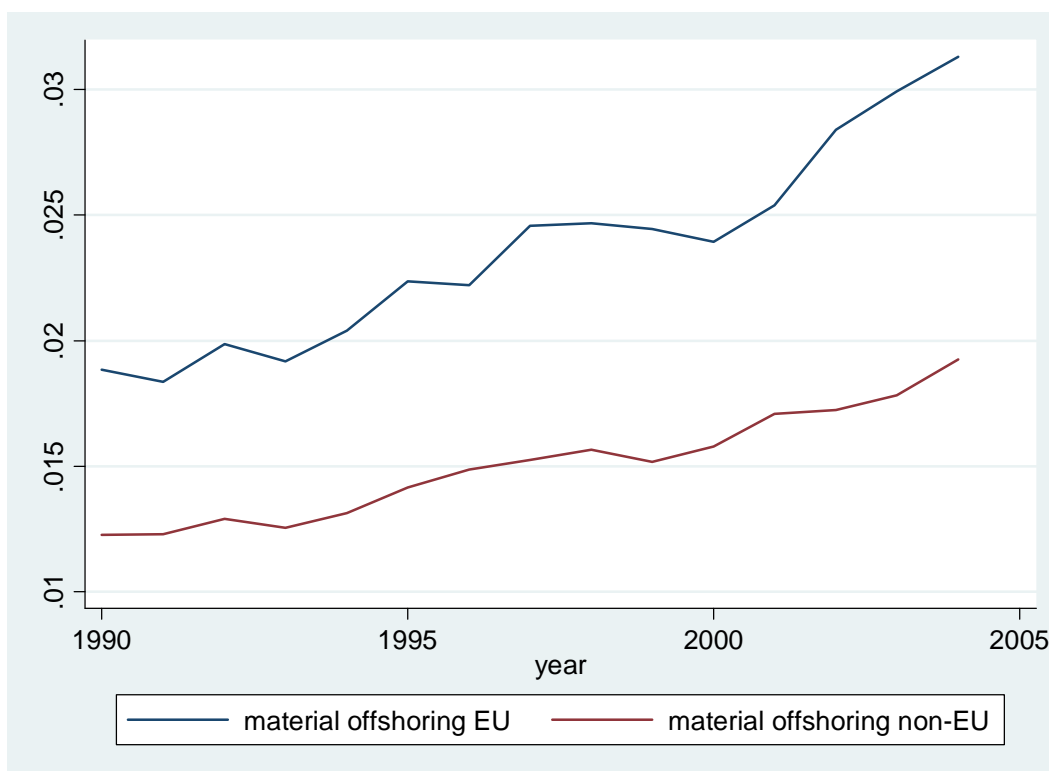
The picture for materials offshoring looks somewhat different. Over the period under consideration the main origin of imports has been the European Union. In 2004, the share of imported material inputs from other EU countries relative to industry output was 3.1 per cent, compared with 1.9 per cent for imported materials from non-EU countries. Also, imports from both broad origin regions have increased considerably over the period analysed.

For material imports we can look at one further geographic breakdown which is illuminating, namely whether the origin of imports is a high income OECD country or not.<sup>4</sup> Figure 2.8 shows that the overwhelming part of imported intermediate

<sup>4</sup> Unfortunately, such a distinction is not possible for services imports due to data limitations. High income countries are: Belgium, Luxembourg, Germany, France, Finland, Austria, Ireland, Netherlands, Spain, Portugal, Greece, Italy, USA, Canada, New Zealand, Australia, Japan, Sweden, Denmark, Norway, Switzerland, Island.

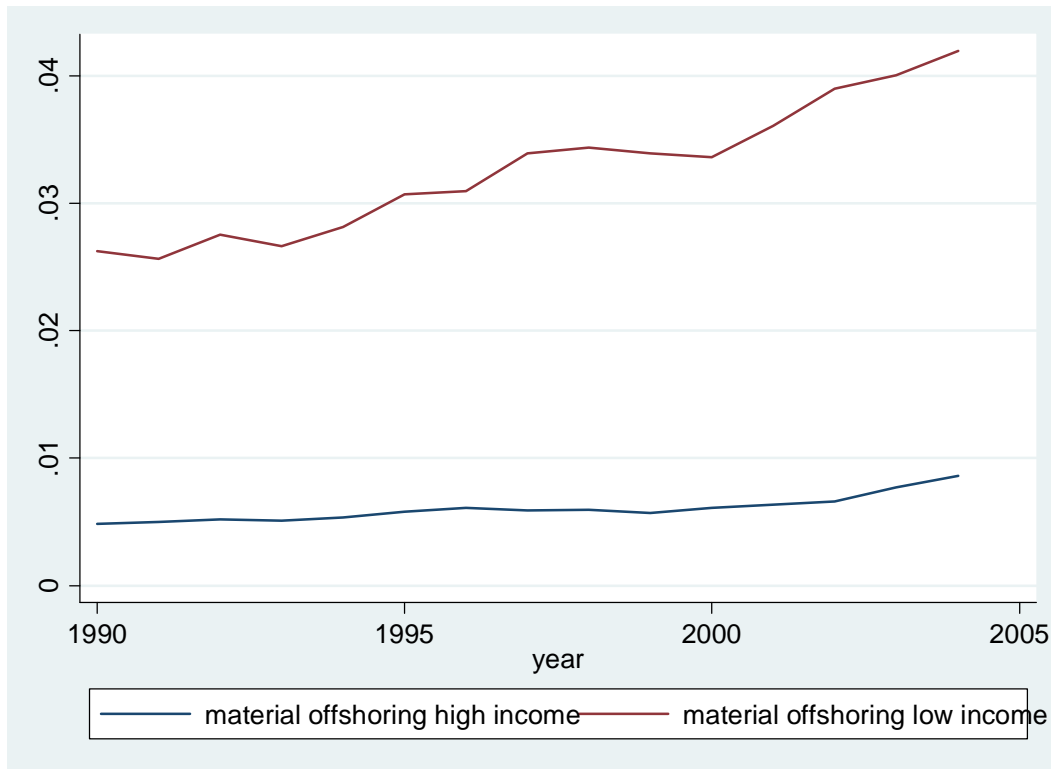
inputs are sourced from high income countries. In 2004, the ratio of imported intermediate materials over output was only 0.8 per cent, compared with 4.2 per cent for imported materials from high income countries. However, imports from low income countries grew by 77 per cent over the period analysed, compared with growth of 60 per cent in imported materials from high income countries. This suggests that offshoring from low income countries – the cases generally highlighted in the media – are still at quite low levels.

*Table 2.7: Offshoring of materials by region*



*Source: own calculations using data as described in the appendix*

Table 2.8: Offshoring materials from high and low income countries



Source: own calculations using data as described in the appendix

## 2.4 Summary

Overall, two important lessons can be drawn from the analysis in this chapter. First, while the extent and depth of offshoring is generally highlighted in the media, a look at official statistics shows that its actual magnitude, in particular concerning offshoring of services, is still relatively low. Second, while the levels may still be low, the growth of offshoring activities over the last decade has been impressive and with ongoing developments in new technology there is no reason to presume this growth will slow down. Moreover, it needs to be remembered that against this backdrop there has been very healthy growth in ‘domestic offshoring’ within the UK. In 2006 for example the call centre industry grew by 6 per cent. It now employs almost one million people directly and has a total turnover of over £20 billion.

## **3. Key Drivers of Offshoring**

### **3.1 Introduction**

In chapter 1 we discussed the key drivers behind the globalisation process, emphasising in particular the role of new technology and the falling costs of doing business internationally. We noted there that similar drivers were behind the increase in offshoring. In this chapter, we narrow our focus and address three core questions:

- Why do firms offshore activities they previously carried out themselves?
- Where do firms offshore their inputs?
- What types of firms offshore?

We will discuss these questions from the perspective of both economic theory and empirical analysis, and will also, where appropriate, highlight possible policy dimensions.

### **3.2 Why do firms offshore activities that they previously carried out themselves?**

As we have seen in Chapter 2, offshoring has increased in both industrialised and developing countries over the last decade, particularly the former. Indeed, it is the prevalence of offshoring that, according to some observers, is one differentiator of the current wave of globalisation from previous ones.

First of all, it is important to point out that offshoring is not costless. The production process (be it manufacturing or services) needs to be split up into its constituent components, some of which can then be located in different countries. Doing this incurs substantial costs of coordination between the headquarters of the enterprise and its foreign affiliates, or independent suppliers. As an example, some combination of the following costs may be incurred:

- telecommunication between different parts of the enterprise
- increased management coordination
- mechanisms to ensure effective quality control
- transportation costs for intermediate inputs
- travel costs for staff
- search cost for finding independent suppliers or new staff abroad

This is not an exhaustive list, of course, but gives some idea of what is involved in offshoring. Moreover, the enterprise may not be fully aware of all costs in advance, which is one reason why offshoring is often a two-stage process, using a pilot start-up, prior to committing to a full scale operation. It is widely recognised, however, that these costs of ‘co-ordination’ have fallen significantly in the last decade or so (e.g. Arndt and Kierzkowski, 2001). There are two important explanations for this: first, technological progress, which has reduced natural barriers (i.e. distance) and, second, liberalisation in the world trading system, which has reduced man-made barriers.

Technological progress has dramatically changed the way business is transacted around the globe. Due to the rise of the internet people can now order products from suppliers all over the world. This implies that costs of searching for independent suppliers are now much lower, as are costs of looking for appropriately qualified staff abroad. The related drop in the costs of telecommunications means that communication between an HQ and its foreign affiliate is now possible at a fraction of what it cost previously, and this also aids management planning and co-ordination as well as quality control.

Another aspect of technical progress is that many services that were previously non-tradable have become tradable. This is true of financial services, back-office functions and a range of other business services. This implies that in principle their production can be located anywhere around the globe.

In line with technical progress costs of travel and transportation have also dropped significantly recently, making it now possible for managers or workers to travel easily between HQ and foreign affiliates in many parts of the world, if need be.

Furthermore, trading intermediate inputs (the cornerstone of offshoring) is now less costly than it used to be.

Technological advances have gone hand in hand with policy moves to liberalise further the world trading system, making it easier for trade and cross-border investment to take place. Negotiations starting under the GATT (General Agreement on Tariffs and Trade) and GATS (General Agreement on Trade in Services) culminated in the founding of the World Trade Organisation, liberalising many aspects of international trade in goods and services (albeit with some significant exceptions). China's accession to the WTO in 2001 was an important step in facilitating offshoring in that country.

Furthermore, many governments around the world have successively liberalised restrictions on inward and outward FDI flows, allowing firms to enter countries and set up affiliates. For example, the *UNCTAD World Investment Report 2006* shows that, in 2005, 93 countries introduced changes to their regulatory regime towards foreign investment. In total, 205 changes were implemented and 164 of those related to making regulations more favourable towards inward investment.

Baier and Bergstrand (2000) develop a theoretical model which attempts to explain the growth of offshoring, focussing on the importance of trade costs. Calibrating their model they find that reductions in tariff rates and transport costs can explain a large amount of the increase in what they call vertical specialisation in the world economy.

### **3.3 Where do firms offshore their inputs?**

Having established that offshoring increased primarily because it is now "easier" to do it, the next question is: where do firms offshore their inputs? The short, yet somewhat simplistic answer is, of course, where it is cheapest to do so, taking all the potential costs of offshoring into account. A large economic literature has developed investigating this issue, and we summarise the findings here.

At the most basic level, offshoring takes place because enterprises want to minimise production costs. In a survey of enterprises that had engaged in offshoring, A.T.

Kearney (2003) reported that the most frequent response was to reduce costs (36 per cent of respondents) with some other common responses being cost related (for example, increased sales, 14 per cent and improving productivity 13 per cent). They, therefore, choose locations with the lowest costs for inputs, subject of course to other pre-requisites being in place, such as the right working language and a robust communications network. Frequently highlighted is the role of labour costs in this context. As an example, hourly wage rates for programmers differ widely across the world.

	<i>Euros</i>
Russia	9
China	14
India	7
US	44
Germany	54

*Source: Deutsche Bank Research, 2004*

This goes a long way towards explaining why offshoring of many computer services take place to India and China, and no longer in developed countries.

At a more formal level, a number of empirical studies by economists have also confirmed the importance of factor costs for the decision on where to offshore. Swenson (2000) investigates econometrically the outsourcing decisions of firms operating in U.S. foreign trade zones, paying particular attention to the relative costs of inputs. She finds that firms reduce their reliance on foreign offshored inputs when the relative price of these inputs rises vis-à-vis the price in the US. More specifically, she finds that if a dollar depreciation leads to foreign inputs being (temporarily) more expensive, firms tend to source less abroad.

Focussing more explicitly on the role of wages, Baldone et al. (2001) study the decision by EU companies to offshore manufacturing production to Central and Eastern Europe during the mid 1980s to late 1990s. They find strong and robust evidence that locations with low wage rates attract more offshoring activity.

Furthermore, Hanson et al. (2003) examine the vertical fragmentation of activities around the globe by US multinational firms. They find that US headquarters' demand for intermediate inputs imported from their affiliates abroad is higher when affiliates face lower wages for less skilled workers. This is in line with the hypothesis that production is offshored to affiliates in low cost locations and their output is then imported back by HQ in the US.

There have, to the best of our knowledge, not been any formal econometric studies of the determinants of services offshoring and the relative importance of labour costs for this. However, anecdotal evidence strongly suggests that labour costs play an important role for where to offshore services inputs.

It is important to emphasise, however, that wages are only one aspect of labour costs. What matters to a firm is not only the hourly wage a worker receives but the labour cost per unit of production. Hence, the productivity of workers is an essential consideration. This goes a long way to explain why some programming services are still carried out in the US and Germany (or the UK for that matter) to relate back to the above example. In line with this argument, Yeats (2001) shows that the combined effect of low wages and high skills have helped Central and Eastern European countries to attract offshoring activity from other EU countries like Ireland. Of course, both low wages and high skilled labour are available in parts of China and India, explaining their dominance as destinations for offshoring of some activities.

Labour and other production costs are important components of total costs of a product. However, they are not the only ones. Especially when fragmenting production internationally, trade costs (widely defined as costs of transportation and tariffs/non-tariff barriers) also contribute substantially to overall costs.

Notwithstanding the fact that trade costs in general have fallen, thus enabling more offshoring to take place, research has found that these costs can be important in determining to which countries firms offshore activities.

Hanson et al (2003) in their analysis of fragmentation of production by US multinationals find that the level of costs of trading between the foreign affiliate and US parent is an important determinant of offshoring activity. Baier and Bergstrand

(2000) also show in their analysis that tariff rates and transport costs are important determinants of outsourcing. Specifically, in model simulations they find that a 7.5 percentage point decline in tariff rates combined with a five percentage point decrease in transport costs can lead to an increase in vertical specialisation (offshoring) by around one-third.

The importance of tariff barriers for offshoring is also highlighted by government policies which provide tariff reductions or exemptions for trade in intermediate goods which are processed abroad and then shipped back to the home country for final production. In the European Union, this is known as outward processing trade, which is the customs arrangement allowing goods to be temporarily exported from EU territories for processing, and the resultant products to be released for free circulation in the EU with total or partial relief from import duties (e.g., Görg, 2000). In the US a similar programme is known as overseas assembly provision (e.g., Swenson, 2004).

Finally, risk is an important determinant of where offshoring activity takes place. This includes issues such as exchange rate risk (Swenson, 2000) but also more broadly defined risks such as political disruptions, corruption, patent protection and so on. Yeats (2001) provides an empirical analysis of how country risk played an important role in determining the location of offshoring activities in the Caribbean region.

### **3.4 What types of enterprises offshore?**

The last issue to consider is whether, among a random sample of firms we would expect all to engage in offshoring or whether it is only a certain group of firms that do so. The short answer to this is: only a certain group – and we would expect this to comprise the “better” firms in any sample.

Recent developments in international trade theory have argued it is reasonable to assume that offshoring (as with any other type of international engagement, such as exporting or foreign direct investment) involves substantial sunk costs. These are costs that are incurred when searching for a foreign partner and include market research, contractual arrangements, translations and so on. Given this, only very

efficient firms and high performing enterprises will be able to overcome these sunk cost barriers and successfully start to offshore (Antras and Helpman, 2004). This is not a peculiarity of offshoring. Rather, it applies to a greater or lesser degree to any form of foreign market entry, be that exporting, direct investment or offshoring (see Greenaway and Kneller 2007 and 2008).

Empirical evidence has been produced which is in line with this theoretical prediction. A number of studies look at large samples of firm level data for a number of countries. For example, Tomiura (2005) and Kurz (2006) using data for Japan and the US, respectively, model a firm's decision to outsource and find that more productive firms are more likely to outsource. In particular, Kurz (2006) concludes that outsourcers are "outstanding" in that they are larger, more capital intensive and more productive.

Görg et al. (2007) and Criscuolo and Leaver (2005) use firm level data for Ireland and the UK respectively to look at differences in productivity between firms that outsource (i.e., import services inputs from abroad) and those that do not. They also find that outsourcers are more productive than firms that do not engage in offshoring.

In a somewhat different exercise, Geishecker et al. (2007) use a large European firm level dataset and investigate the decisions of firms to set up affiliates abroad. They find that firms which locate abroad account for over-proportionally large shares of output, employment and profits in their home countries. They also have higher survival rates and productivity growth than firms that do not locate abroad.

Thus, theory and evidence strongly suggests that it is indeed the "better" firms, i.e., those that are more productive and larger, that offshore activities abroad. This of course has implications for aggregate productivity growth and, ultimately, wealth creation in the economy. If firms have to improve productivity in order to be able to reap the benefits from offshoring then more offshoring will be associated with higher aggregate productivity in the economy. Indeed, as we will see later, empirical evidence by Amiti and Wei (2005a) for the US and evidence for other countries shows that increased offshoring is associated with higher aggregate productivity in an industry.

### **3.5 Summary**

This chapter has discussed the key contributors that help explain why activities are offshored. We identified several key drivers. Firstly, technical progress and government policies towards liberalising trade and investment have made international outsourcing activities more feasible. Secondly, enterprises find it beneficial to offshore to countries where labour and other production costs are low, where trade costs (transport costs and tariffs) are low, and where most risks are known and manageable. Thirdly, offshoring is mainly undertaken by firms that are “better” compared to others in terms of efficiency or productivity. This has implications for aggregate productivity growth and wealth creation.

## **4. The Economic Impact of Offshoring**

### **4.1 Introduction**

Having evaluated the extent of offshoring and its key drivers, we turn now to its economic effects. We begin with some reference points from economic theory, which guides us on where we should look for real economic effects. That is the subject of this chapter, which provides a foundation for what follows, namely a review of the evidence on its economic effects (Chapter 5) and a new analysis of the economic impact of offshoring on the UK economy (Chapters 6 and 7).

### **4.2 Outsourcing and the Production Function**

As explained in Chapter 2 offshoring and outsourcing describe conceptually different, but related, phenomena. It is noteworthy, however, that recent theoretical developments on the economics of offshoring have at their heart the decision about whether to outsource or not. Outsourcing allows firms to split up their production process into various stages and place these in different locations. Outsourcing overseas, i.e. offshoring, allows firms to benefit from lower factor cost by changing costs between locations.

The standard economic toolkit for understanding the supply-side of the economy is the production function. Here output (goods and services) is produced by combining inputs – raw materials, labour, machines, intermediate inputs, skills and so on – and productivity. The latter includes the accumulated stock of knowledge within the firm and efficiency with which it uses this and other inputs, in particular combinations. The choice an enterprise makes about how to combine these inputs, for example whether to produce some within the firm, or to buy them from elsewhere, is dependent upon their price and the other inputs and the extent of any interrelationships between the inputs – whether any two inputs are complements or substitutes for example.

The production function is a useful basis also for discussing the implications of offshoring. Offshoring in the simplest sense reflects a change in the mix of inputs. If for example work previously conducted within the firm is now outsourced offshore, there is a resulting decline in the amount of labour, machines and equipment, human capital and so on that were previously employed in constructing that input and an increase in the quantity of the particular intermediate input. This change in the mix of inputs has an obvious effect on the quantity of inputs (the literature has naturally focused on employment) but also on enterprise productivity. We might describe these as the direct effects of offshoring.

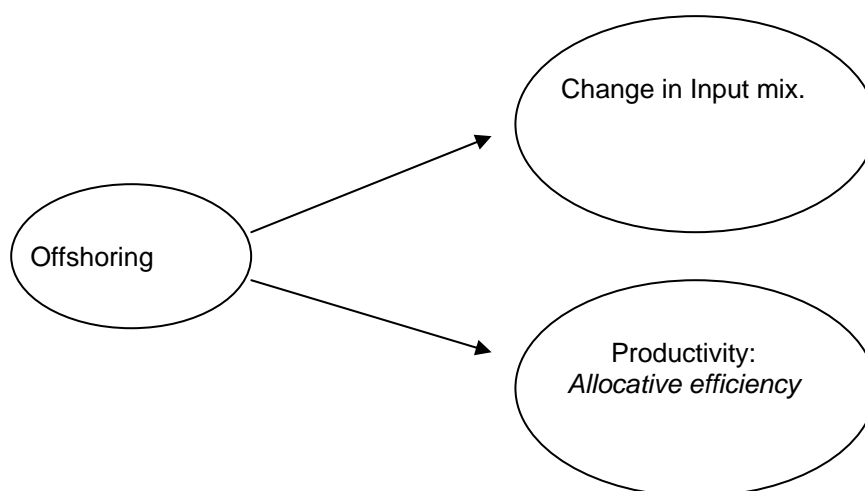
It is worth describing in more detail the changes that occur as a result of outsourcing. Offshoring, firstly, leads to a change in the quantity of inputs demanded by the firm. Here the main concern in public debate (and the academic literature) has been on possible job losses related to offshored activities. While it is obvious that focusing on a *single* input is likely to conclude that locating part of production abroad destroys jobs, what is frequently neglected is the resulting change in input mix. It is reasonable to assume that the reduction in one input is accompanied by an increase in some other input, due to a reshuffling of activities. Hence, while some jobs may be lost, others may be created at the same time in other areas within the firm.

Any change in the quality of the intermediate input produced (if properly measured) will be accounted for by a change in the amount of the intermediate input; it would be captured as a productivity improvement for the firm producing the new technically advanced input. If not properly measured it will be reflected in an improvement in the productivity of the firm using the input - there is an improvement in the quality of the intermediate input that is not fully captured in the price index for the product that allows comparisons to be made across time (and between firms if they use different vintages of capital).

Changing the input mix may also have a true effect on productivity by affecting the (allocative) efficiency of the firm, it allows the firm to reallocate its choice of inputs

to activities that it is ‘better at’. This would occur for example if the outsourced good or service is available cheaper from elsewhere.<sup>5</sup>

Figure 4.1 illustrates the possible effects of offshoring:



*Figure 4.1: Effects of offshoring on the production function*

Productivity is typically measured in the literature using either labour productivity (value added per employee) or total factor productivity, TFP, (productivity once all other inputs have been controlled for). The use of labour productivity has the advantage of being relatively simple to construct. TFP is significantly more difficult and has been famously described as ‘a measure of our ignorance’ as it includes all of the errors made in the measurement of output and inputs as well as the assumptions made by the researcher about the production function, what the appropriate way to combine inputs are and so on. For this reason it is more often considered more attractive to use a measure of labour productivity to capture the effect of offshoring.

---

<sup>5</sup> This effect is distinct from any indirect productivity ‘spillover’ effects. Offshoring, if for example it reflects the use of new inputs with more advanced technology, may help to raise the returns to other inputs, such as skilled labour.

### 4.3 Offshoring and Aggregate Productivity

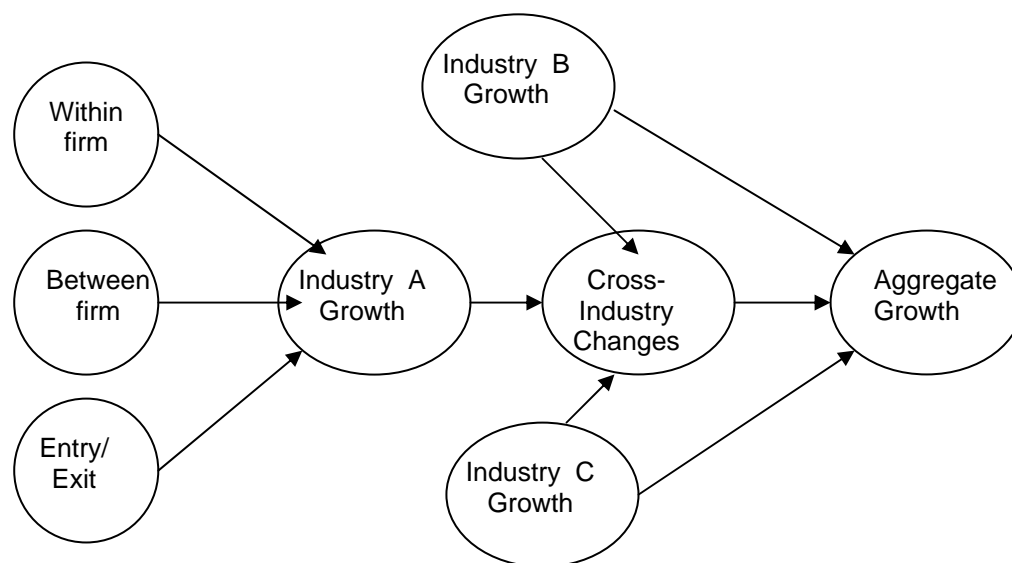
If offshoring has implications for the productivity of a firm, then it will also have implications for aggregate levels of productivity in the economy. At the simplest level impacts on individual firms can be aggregated to give the impact on the firm for the industry as a whole. There are reasons to expect that aggregate impacts are likely to be larger however, as the reallocation of resources that is occurring in the individual firm works more broadly. Here the impacts are likely to be on aggregate productivity.

Aggregate productivity is simple to describe: it is the sum of the individual productivity of all firms within the economy, where the contribution of any one firm is weighted by its relative size. The dynamics of productivity growth is more complicated and depends not only on how productivity changes over time within the firm (within-firm changes) but also on how the relative weight of firms changes within and across industries in the overall index (between-firm changes) as well as the dynamic process of firms entering and leaving the industry (net-entry). There is similarly further reallocation effects as particular sectors of the economy expand and contract.

The process of aggregate productivity growth is summarised in Figure 4.2. Within-firm productivity changes combine with the changing relative size of firms (between firm effects) and their entry and exit to give the rate of productivity growth within an industry. Within firm productivity growth depends on improvements in efficiency and intensity with which inputs are used. Shifts in market shares (the between effect) and net entry will reflect resource reallocation and aggregate productivity trends and therefore competitive pressures within the market (both from domestic and overseas firms) as well as technological progress in the industry. This same process occurs in other industries and in addition there is reallocation of resources across industries (some industries grow while others decline) to give an economy wide rate of productivity growth.

If for example the extent of outsourcing behaviour differs across firms within the industry and there is some cost or technological advantage from doing so then the

resulting change in productivity will over time lead to a greater proportion of industry output concentrated in those firms.



*Figure 4.2: Aggregate Productivity and its Components*

As discussed above, offshoring leads to a change in the input mix at the level of the firm. However, to get a fuller picture of the implications of offshoring it is important to consider that it may in fact also lead to a reallocation of resources in the whole economy. This has implications for other firms not actively engaged in offshoring and their workforce. These general equilibrium effects, of outsourcing/offshoring are more complicated than the direct and indirect firm effects and as a result more difficult to predict.

At the economy wide level the direct loss of employment for workers whose jobs were offshored, would be expected to have an effect on the price of labour (wages). This change in the price of labour will in turn affect the mix of inputs that the firm chooses, according to the extent of complementarity or substitutability between inputs. These price changes, however, will also affect the demand for labour by other firms in the economy. If offshoring impacts differently on workers with different skills, this will further complicate the changes that occur, and similarly as these price and demand changes filter across other sectors of the economy. Or if offshoring varies across firms within the same industry this will impact on the productivity of that industry and so on.

To get a handle on the possible effects of such offshoring for a developed economy, Markusen (2007) develops a theoretical model of offshoring of business services. He assumes a model framework where the world consists of one developed and one developing economy, where the former is rich in skilled labour and the latter abundant in unskilled labour. Services are used as inputs into manufacturing activities (e.g., think of consulting services or backoffice services) and offshoring is possible because they can be split into a headquarter and an office (i.e., actual service production) activity.

Without going into too much detail, some of the results are quite noteworthy and illuminating. In the model analysis, making some reasonable assumptions about factor abundance and income of countries, Markusen finds that increased services offshoring can in general have strong positive effects for the developed country. Not only is it shown to be able to lead to higher wages for skilled workers in the economy, but also low skilled workers in developed countries are able to gain from increased wages as demand for them increases due to reshuffling of activities between services and manufacturing. Overall, the analysis shows that services offshoring can bring substantial welfare gains to the developed economy. Interestingly, this does not come at the expense of the developing country, which can also expect to gain in terms of overall welfare.

#### **4.4 Summary**

Offshoring has direct effects on employment and if the focus of investigation is sufficiently narrow these are easy to see. Its overall effects will depend upon how it impacts on relative factor prices and productivity. If it has a strong effect on the latter, then it may have a neutral or positive rather than negative effect on jobs. We now turn to the evidence on these.

## **5. Evidence on the Economic Effects of Offshoring**

### **5.1 Introduction**

The empirical literature evaluating the impact of offshoring is limited, though growing. This is partly because it is a comparatively recent phenomenon and partly because there are significant practical and methodological challenges to identifying and quantifying its consequences.

In chapter 2 we explained why measuring the extent of offshoring across activities and through time was not straightforward and there is no need to reiterate that discussion here. Even when one has identified a meaningful and robust measure however, one faces the difficulty of relating changes in that measure to changes in economic activity or economic welfare. This is particularly true of disentangling the effects of offshoring from other drivers of change. This, of course, is not peculiar to offshoring and economists have developed tools for isolating such effects with a reasonable degree of reliability. As a result, there is some evidence on which to draw.

For obvious reasons, most empirical work has focused on employment effects. After all, it is a popular perception that offshoring destroys jobs that gives the phenomenon the visibility it has in public discourse. But we should not only focus on (direct) employment effects. Rather we should endeavour to gain as accurate a picture as possible of its effects overall, positive and negative. Not all work does that. However, in addition to employment effects, some studies focus on links between offshoring and productivity change; some on offshoring and consumer welfare; some on overall price level/inflation effects; and some on exports.

### **5.2 Employment Effects**

Table 2.1 in chapter 2 provided a selection of examples of offshoring cases from the UK. For example, Barclays is reported to have offshored 500 back-office staff to India. When such numbers are reported in the media, there is a presumption that

this is the net effect of offshoring. In other words, 500 jobs are destroyed in the UK. In fact, the calculation is more complicated than that. To use the terminology of Hijzen and Swaim (2007), these 500 jobs constitute a relocation, or technology effect. If, however, offshoring these jobs results in the business increasing productivity and operating more efficiently, sales can expand, increasing employment. This is the scale effect of offshoring. Empirical work should account for both. Note, however, that these are direct effects impacting only on the enterprise engaging in offshoring. In addition, there is a strong likelihood of indirect employment effects of two forms. First, if as a consequence of offshoring Barclays can provide its services to other businesses at lower cost, they may be able to expand activity and employment (depending upon their employment-sales ratio). Second, if offshoring results in lower prices to final consumers, their real income increases and some proportion of that real income will be spent on domestically produced goods and services.

When offshoring occurs, there will therefore be second order effects within the sector where the offshoring has taken place and ripple effects across the economy more widely. In principle, we should account for all of these changes in any evaluation; in practice the data requirements for full 'general equilibrium' analyses are just too demanding and most analysts focus on what we refer to as the direct effects.

The final point which must be borne in mind when assessing employment effects is that offshoring is not the only phenomenon which results in separations between employer and employee: changes in technology; changes in consumers' tastes and preferences; changes in the origin of imports and in competitiveness of the environment more generally; and cyclical changes in economic activity all impact on job destruction *and* job creation. And the scale of churn, or turnover in labour markets, in modern dynamic economies is quite staggering. For example, Hijzen, Upward and Wright (2007) estimate that in the United Kingdom 51,000 jobs are destroyed and 53,000 jobs created in the private sector, every week. This is equivalent to 2.65 and 2.76 million jobs each year, or 15 to 16 per cent of the private sector workforce. Thus, it is vitally important that the headlines are appropriately contextualised. Table 5.1 reported in OECD (2007) and based on (survey) work conducted by the European Restructuring Monitor (ERM) does that

in an interesting way. This reports total jobs lost from enterprise restructuring in 2005 and job losses attributed to offshoring. Note that only a little over three per cent of the UK's total was deemed attributable to offshoring. Note also that some of the highest proportions are in economies like Ireland and Slovenia which are generally thought of as being only recipients of offshored jobs.

*Table 5.1: Total job losses due to offshoring announced in the ERM, by country, in 2005*

Total job losses		Job losses due to offshoring		Offshoring as a percentage of the total	
United Kingdom	200,706	Germany	7,765	Portugal	54.7
Germany	108,233	United Kingdom	6,764	Austria	29.6
France	45,405	Portugal	2,448	Denmark	28.8
Poland	27,117	France	2,080	Slovak Republic	25.2
Netherlands	22,111	Slovenia	1,516	Slovenia	24
Sweden	16,691	Denmark	1,505	Ireland	23.6
Czech Republic	14,949	Ireland	1,345	Finland	15.9
Spain	13,963	Italy	1,171	Italy	15.7
Hungary	10,960	Finland	1,153	Belgium	10.9
Italy	7,467	Sweden	904	Germany	7.2
Finland	7,240	Hungary	620	Hungary	5.7
Slovenia	6,327	Poland	610	Sweden	5.4
Ireland	5,697	Slovak Republic	600	France	4.6
Belgium	5,266	Belgium	576	United Kingdom	3.4
Denmark	5,234	Austria	505	Spain	2.3
Portugal	4,478	Spain	320	Poland	2.2
Lithuania	3,398	Netherlands	160	Czech Republic	0.9
Slovak Republic	2,383	Czech Republic	130	Netherlands	0.7
Austria	1,708	Cyprus	0	Cyprus	0
Estonia	1,068	Estonia	0	Estonia	0
Malta	850	Latvia	0	Latvia	0
Latvia	600	Lithuania	0	Lithuania	0
Cyprus	60	Malta	0	Malta	0

*Source: ERM, 2005*

In Chapter 6, we provide new estimates of employment effects in the UK using enterprise level data. Prior to that, we summarise other work which has been completed to date, generally using (more aggregated) industry level data. We will first briefly look at work on economies other than the UK, then focus on the UK.

### *Employment Effects in OECD Countries*

Amiti and Wei (2005a) and Brown and Spletzer (2005) both analyse the impact of offshoring on jobs in the US, using different approaches. Amiti and Wei (2005a) estimate a labour demand equation, allowing for both substitution effects and output effects (equivalent to the relocation/technology effect and scale effects mentioned above). As the study is multi-industry and multi-year, they control for industry specific characteristics (such as differences in reliance or technology). They report modest employment effects, the magnitude of which depends on how narrowly or broadly defined a sector is. When it is narrowly defined (450 sectors in their case) there is evidence of a link between job losses and outsourcing, though the numbers are small. When they consider employment change across 96 broader sectors, there is no observable link between outsourcing growth and job loss (or job gain) by sector. Intuitively this makes sense: the more narrowly defined an economic activity and the shorter the time period investigated, the more likely one is to identify a negative link because only the direct effects in general and the relocation effect in particular are being picked up. When the field of vision is broadened, both sectorally and temporally, we are more likely to pick up both direct and indirect effects.

Brown and Spletzer (2005) take a different approach, focusing on ‘mass lay-offs’ defined as lay-offs involving more than 50 workers. Of all such lay-offs in their sample frame, more than half (55 per cent) were within the company and within the country. In other words straightforward internal restructuring. Another 29 per cent were offshored within the company and just six per cent offshored to separate companies. This finding resonates with that for some European countries which have recently been studied. Egger et al (2003) find that offshoring reduces the chance of a worker entering the manufacturing sector in Austria and Munch (2005) reports that the phenomenon increases the likelihood of an employer-employee separation in Denmark. But in both instances the effect is small.

The most comprehensive multi-country analyses to date are OECD (2007) and Hijzen and Swaim (2007). The former takes as its indicator of outsourcing the

share of value added in turnover by sector. Broadly speaking, they find that smaller countries outsource more than larger countries, for the same reasons that smaller countries tend to trade more than larger countries (as a share of GDP); and that in almost all countries (Germany being the exception) countries outsource more in services than manufacturing. But this measure does not discriminate between domestic and foreign outsourcing. When this is adjusted for, country patterns are maintained but the outsourcing of goods by the manufacturing sector becomes the most common form of foreign outsourcing. In linking this to jobs, OECD (2007) adopts a similar methodology to Amiti and Wei (2005a) and applies it to sectoral data for 12 OECD countries (Austria, Belgium, Denmark, Finland, France, Germany, Greece, Italy, Korea, Norway, Sweden, United States), 26 industries and for two years (1995 and 2000). Using this method, they identify a job destruction effect of foreign outsourcing, albeit a small one. Thus, a one per cent increase in foreign outsourcing results in a 0.15 per cent decrease in sectoral employment in manufactures and 0.08% in services. In both cases these are direct effects only.

Hijzen and Swaim (2007) use the same data sources and same years as OECD (2007) but refine the methodology to disentangle relocation and scale effects and extend the country coverage to seventeen countries (the OECD twelve minus Korea and plus Australia, Canada, the Netherlands, Portugal, Spain and the United Kingdom). They find that offshoring within the same industry has no overall effect on employment because the productivity effect is sufficiently strong that new jobs created by increased sales (the scale effect) offset jobs lost because production becomes less labour intensive (the relocation effect). When offshoring is inter-industry, labour intensity does not seem to be affected and the scale effect means that overall offshoring has a positive effect on employment.

### ***Employment Effects in the UK***

Recently, two evaluations of the employment impact of offshoring in the UK have been completed: Amiti and Wei (2005b) and Hijzen et al (2007), both of which focus mainly on services.

Amity and Wei (2007b) apply the methodology outlined above in their work on the US. They focus on 69 manufacturing industries and 9 service industries from 1995

to 2001. For manufacturing, they conclude that “*outsourcing does not have a negative effect on manufacturing employment at the sectoral level.....*” (p.337).

Their services sample captures the key sectors which are most typically ‘headlined’ in connection with offshoring, namely: telecommunications; banking and finance; insurance and pension funds; ancillary financial services; renting of machinery; computer services, research and development; legal activities; accountancy services; market research, management consultancy; architectural activities and technical consultancy; advertising. They examine both material and service outsourcing from these service sectors and can find no negative employment effects. In fact, they conclude that jobs displaced “..... *are likely to be offset by new jobs created in the same sector.*” (p338).

Hijzen et al (2007) use information on a new dataset, the *Inquiry into International Trade in Services* (ITIS) which actually collects data at the firm rather than sectoral level and covers 39 different kinds of services transacted. They link this to data from the Annual Business Inquiry (ABI) and use sophisticated econometric methods to identify the implications of increased offshoring for employment and turnover. For the period 1997-2004 they can find no evidence that increased imports of intermediate services results in job destruction. In fact, those firms that outsource service provision actually grow faster and have faster employment growth. A second interesting finding is that intra-industry trade in intermediate services takes place on a significant scale. In other words, many of the same firms that are offshoring are also ‘inshoring’.

### **5.3 Non-Employment Effects**

As we noted at the start of this chapter, a full analysis of offshoring should ideally account for a range of non-employment effects, on which some evidence has been generated.

#### ***Productivity and Enterprise Competitiveness***

We have explicitly and implicitly referred to productivity effects in our discussion of employment. It is after all improved productivity that underpins the scale effect on employment. Notwithstanding this and due to the fact that there are non-

employment dimensions of productivity growth (improved competitiveness and increased profitability, for example) links between offshoring and productivity have attracted a great deal of attention.

Table 5.2, taken from Olsen (2006), provides a summary of work undertaken on the US, a number of European countries and Taiwan. As can be seen, a number of studies identify a positive association and in some cases an association which is quantitatively large, with the strongest effects arising when services are outsourced in the services sector.

### *Price Level Effects*

Clearly if offshoring results in markets becoming more competitive then, other things being equal, it should be counter-inflationary. This particular dimension has not been studied extensively. That said, OECD (2007) does draw attention to it and proxies its benefit by estimating the effects of increased imports on inflation. They estimate that imports into the United States from China reduced inflation by 0.1 percentage points per annum between 1996 and 2000 and in the case of the Euro area by 0.2 percentage points per annum between 2000 and 2005.

Table 5.2: Empirical evidence on outsourcing and productivity

Source	Country	Industry	Period	Type of outsourcing	Productivity measure	Remarks	Productivity effects from outsourcing		
							<b>M</b>	<b>S</b>	<b>SC</b>
Aggregate level							<b>M</b>	<b>S</b>	<b>SC</b>
Egger & Egger (2001b)	EU12	Manufacturing	1992-1997	Offshore	Low-skill labour level	Short-run effect	-	n/a	n/a
						Long run effect	+	n/a	n/a
Amiti & Wei (2006)	United States	Manufacturing	1992-2000	Offshore	Labour growth	General	+	++	n/a
					TFP growth	General	+	++	n/a
Amiti & Wei (2004b)	United States	Manufacturing	1992-2001	Offshore	Labour growth	General	0	+	n/a
Egger et al (2001)	Austria	Manufacturing	1990-1998	Offshore	TFP growth	General	+	n/a	n/a
Plant level							<b>M</b>	<b>S</b>	<b>SC</b>
Görzig & Stephen (2002)	Germany	Manufacturing	1992-2000	Any	Return per employee	Short-run effect	++	-	+
						Long-run effect	++	+	+
Görg & Hanley(2003 b)	Republic of Ireland	Manufacturing & services	1990-1995	Offshore	Labour growth		0	0	n/a
					Labour level	Electronics sector	0	0	n/a
					Labour level & growth	Upstream firms	0	0	n/a
						Downstream firms	0	+	n/a
							<b>M</b>	<b>S</b>	<b>MS</b>
Görg & Hanley(2005)	Republic of Ireland	Manufacturing & services	1990-1995	Offshore	TFP level	Electronics sector	n/a	n/a	+
							+	0	n/a
Görg et al (2004)	Republic of Ireland	Manufacturing	1990-1998	Offshore	Labour level	General	+	0	n/a
						Exporting firms	+	0	n/a
						Domestic firms	0	0	n/a
						General	n/a	+	n/a

Criscuolo & Leaver (2005)	United Kingdom	Manufacturing & services	2000-2003	Offshore	TFP level	Manufacturing	n/a	0	n/a					
						Services	n/a	+	n/a					
						Domestic	n/a	+	n/a					
						Foreign	n/a	0	n/a					
						MNEs	n/a	0	n/a					
						Non MNEs	n/a	+	n/a					
						Exporter	n/a	0	n/a					
Non exporter	n/a	+	n/a											
						<b>MS</b>	<b>MS*FO</b>							
Girma & Görg (2004)	United Kingdom	Manufacturing (subsectors)	1980-1992	Any	Labour/TFP level	Chemicals	++	++						
						Engineering	++/++	++/++						
						Electronics	0/0	0/0						
						Labour/TFP growth						Chemicals	0/0	0/0
						Engineering	0/+	+/+						
						Electronics	0/0	0/0						
						(see Type of out.)								
Lui & Tung (2004)	Chinese Taipei	Manufacturing	2000/2001	FDI	Labour level	General			-					
				Offshore		Export outsourcing			+					
				FDI	Labour growth	General			-					
				Offshore		Export outsourcing			+					

*Note: M = material outsourcing, S = services outsourcing, MS = material and services outsourcing, FO = foreign ownership. A ‘+(-)’ indicates a positive (negative) significant effect, whereas ‘0’ indicates insignificant effects. Double signs indicate that effects are larger relative to single signs for the same study. Not all effects depicted here are necessarily robust over all model variations in the different studies.*

*Source: Olsen (2006)*

### *Consumer Benefits*

This brings us on to a key benefit but one which is often disregarded in discussions about offshoring, namely the benefits to consumers. If prices of goods and services fall as a consequence of offshoring, consumers' real incomes rise and they are better off. Moreover, the extent to which they are better off may be enhanced by the fact that they also get more choice and better quality. These benefits can be forgotten, or discounted, for the same reason as consumer benefits are disregarded in discussions of import competition and import protection more broadly. Whereas the costs are concentrated and from an individual's standpoint may be large, the benefits, whilst invariably greater, are widely dispersed across a much larger number of people and at an individual level, at a particular point in time, may be small in magnitude. Thus, if 500 people lose their jobs because an overseas call centre is opened, the cost to those individuals will seem huge relative to the (say) £50 an individual saves on his/her insurance policy. But aggregated across a large number of policy-holders and cumulated through time, these add up to significant real income gains.

There has been no comprehensive evaluation of the real income gains to consumers from offshoring (as opposed to the gains from trade more generally). Some indicative calculations have been made by CEPII for the period 2003-05 which range from a per capita gain of \$1,800 in the United States to \$400 in Germany, or from six per cent to one per cent of average annual earnings in each country.

## **5.4 Summary**

This chapter has reviewed the existing literature on the economic effects of offshoring. For the most part we have focused on employment effects as that is the dimension on which most public discourses focus. But we have also drawn attention to a range of non-employment effects including productivity gains and consumer benefits.

There does appear to be a degree of consensus where employment effects are concerned. Specifically, if jobs are destroyed, it is on a modest scale, once one

makes allowance for the scale effect. There is, however, an 'if', as quite a lot of research suggests either no overall effect or a net gain. This too is driven by the scale effect, i.e. firms becoming more efficient and expanding output and employment. Many researchers have focused specifically on productivity dimensions of offshoring and the consensus here is that where such links can be identified they are stronger in services than manufacturing.

## 6. UK Multinationals and Enterprise Performance

### 6.1 Introduction

Having reviewed the economic arguments behind the decision to offshore production drawing upon evidence from existing studies, some of which are for the UK, in this and the following Chapter we develop a more complete characterisation of the offshoring decisions by British firms. To do so we use a comprehensive firm level database for UK firms which spans the period 1996 to 2005, combined with some other data sources.

The first issue that arises is the question already touched upon in Chapter 2: how should we define offshoring? We exploit two possibilities in our data. Firstly, the data provides us with information about whether or not a firm has affiliates abroad – i.e., whether or not they are a multinational enterprise. As discussed in Chapter 2, firms can offshore part of their productions to affiliates they own abroad, which would be captured by our data. Secondly, we have used industry level trade statistics to calculate an industry's propensity to import intermediate inputs, either materials or services. The overall development of these measures of trade in intermediates was also discussed in Chapter 2, and a precise definition of how these variables were calculated is given in the Appendix to Chapter 2.

Using these data we consider four sets of questions for which we provide some “stylised facts”. The first set looks at *who* and *where*: *how many* firms are actually multinationals, i.e., have affiliates abroad? Where are they located? Is there any relationship with the hard business performance of the firm? Are multinationals the larger and more successful firms within manufacturing and services?

The third section considers the question of *why*: Which factors determine where the decisions about where to locate affiliates abroad are made? Which factors appear more important than others and what happens if these factors change?

The final set of questions examines the impact on various aspects of firm performance of offshoring by other firms within the industry, using data on imported services and materials. Is more offshoring in an industry associated with a loss of employment as is sometimes feared? And is the effect of offshoring different for different types of firms? These are addressed in Chapter 7.

The raw data used for Chapters 6 and 7 are drawn from recognised data sources, the details of which can be found within the Appendix to this chapter. These have been reorganised to generate a data set which is unique in a UK context. These data are of a comparable form to that found for other countries however, allowing us to compare the results when we apply a similar methodology.

## **6.2 Number and Location of UK Multinationals**

In the economics literature multinational enterprises are often distinguished as horizontal or vertical. In a nutshell, the former produce products abroad that are similar to what they produce at home (prominent examples are soft drink manufacturers); while the latter locate different stages of the production process in different countries (as, for example, generally in the production of computers or sportswear). Strictly speaking, only the vertical multinational engages in offshoring as they split up the production process. While this has been a reasonably good distinction for some theoretical work on why multinationals exist, it has become increasingly recognised in empirical work and case studies that the simple classification of multinationals by these two motives can be too restricting; FDI has become far more complex often combining both types as well as other motives (see Yeaple, 2003).

In the light of this we do not artificially distinguish multinationals in this way. In any case, our dataset does not provide us with information on the employment, sales and investment activities of *foreign subsidiaries* but only information for the part of the company located in the UK. As such we are not able to classify subsidiaries according to whether they purely replicate activities within the UK (i.e., horizontally motivated) or source inputs abroad (vertically motivated).

We observe information on the location of foreign subsidiaries of firms in only one year.<sup>6</sup> It is immediately obvious from this year that being a multinational is a rare event. Of the 66,339 firms in our sample, 1,319 manufacturing firms have foreign subsidiaries and 2,743 in the service sector. In total multinationals represent just 6.1 per cent of all firms.

Breaking this down by industry, 8.1 per cent of firms in the manufacturing sector are multinational and 5.4 per cent in services. Firms in the manufacturing sector are spread across some 139 different countries (although the maximum for any single firm is 64 separate locations), whereas in services they are spread across 132 countries (here the maximum for any single firm is 51 separate locations). This translates to an average 2.6 locations per multinational in manufacturing and a slightly lower figure of 2.3 in services.

*Stylised Fact 1*  
Multinationals are rare.

Some of these firms are foreign owned however. When we restrict the sample just to firms that are UK owned we have 53,149 firms (12,040 manufacturing firms and 41,109 service firms).<sup>7</sup> Of the domestically owned firms 925 manufacturing and 1,928 service sector firms have foreign subsidiaries. These represent 5.7 per cent of the total number of manufacturing firms (7.7 per cent of all domestic firms) and 3.8 per cent of all service sector firms (4.7 per cent of all domestic firms).

A second stylised fact evident within the data is that most multinationals locate their subsidiaries in a small number of locations. Of the UK multinationals 1,949 have only one foreign subsidiary, 336 have two, 159 have three and 81 have four. There are therefore only 112 manufacturing and 216 service firms with more than four foreign subsidiaries. These represent just 0.6 per cent of all of the firms in the sample.

---

<sup>6</sup> For the benefit of the statistical estimation further below we concentrate on the location (each country) in which multinationals operate and avoid the complication of when firms operate several subsidiaries in the same location.

<sup>7</sup> The ratio of foreign firms is therefore somewhat higher in the manufacturing sector, 26 per cent versus 18 per cent.

*Stylised Fact 2*  
Most multinationals do not have subsidiaries in lots of different locations.

Moreover overwhelmingly these multinationals have subsidiaries that are located in other OECD countries. Of the 925 domestic multinationals in the manufacturing sector 96 per cent have at least one subsidiary located within the OECD member countries (74 per cent of firms have a subsidiary within the EU and 36 per cent within the US), while just 20 per cent have subsidiaries in non-OECD countries. Only 8 per cent (72 in total) have subsidiaries in either China or India.

In the service sector the figures are similar. Of the 1,928 UK multinationals in this sector, 95 per cent have at least one subsidiary located within OECD member countries (77 per cent of firms within the EU and 24 per cent in the US) and just 18 per cent in non-OECD countries (17.8 per cent). Here choosing China and India is even more rare at 4.5 per cent.

A strong suggestion from this pattern is that UK firms choose other OECD countries when establishing their first subsidiaries abroad. To provide further detail, multiplying firms with the number of locations in which they have subsidiaries gives a total number of 2,721 separate subsidiary locations in manufacturing and 4,864 in services. For manufacturing, of the total number of subsidiary-locations, 76 per cent are within the OECD, (50 per cent within the EU and 12 per cent within the US) and for services 79 per cent of subsidiaries are located in OECD countries (56 per cent within the EU and 9.7 in the US).

*Stylised Fact 3*  
Most subsidiaries are within other developed countries.

Further detail on the regional breakdown of the location of subsidiaries can be found in Table 6.1. A general pattern suggested is that firms are more likely to choose to locate subsidiaries within the OECD. The dominance of other OECD countries as a location is demonstrated further however by considering the number of firms choosing multiple locations in the OECD, compared to those choosing a non-OECD country (either with subsidiaries in an OECD, or even more strongly if just the non-OECD country). For example, there are 843 manufacturing firms that have subsidiaries either in Europe or the US. Of these, 60 per cent have subsidiaries only in Europe, 21 per cent have subsidiaries in both and 19 per cent only in the US. In comparison, of the 889 manufacturing firms that have subsidiaries in the OECD or in Central and Eastern Europe, 91 per cent have subsidiaries only in the OECD, 8.2 per cent have a subsidiary in both locations and just 4 firms, 0.45 per cent of the total, have a subsidiary only in Central and Eastern Europe. For South East Asia the percentage of firms with a subsidiary in South East Asia (alone or with an OECD country) is 13 per cent of firms for other locations the figure is 14 per cent.

*Table 6.1: Number of firms with subsidiaries and the percentage of multinationals in each location*

		<b>Manufacturing</b>	<b>Services</b>
<b>Non-MNEs</b>		12,040	41,109
<b>MNEs</b>		925	1,928
<i>Of which %</i>	<i>US</i>	36.2	24.4
<i>have subsidiaries</i>	<i>Western Europe</i>	74.6	78.1
<i>located in</i>	<i>Australia, Canada,</i>	19.0	15.6
	<i>Japan, NZ and South</i>		
	<i>Africa</i>		
	<i>Central and Eastern</i>	8.3	5.8
	<i>Europe</i>		
	<i>South East Asia,</i>	12.3	9.0
	<i>China and India</i>		
	<i>Other locations</i>	17.3	12.2

The comparison with the service sector, while confirming the general pattern, highlights some differences between the two sectors. Firstly, of the 1,717 firms with subsidiaries in Europe and/or the US, the balance is now in favour of locations in the US. Just 13 per cent of firms have subsidiaries in Europe only whereas 73 per cent have a subsidiary only in the US. Firms in the service sector also appear to have a somewhat narrower geographic spread than those in manufacturing. Of the service sector firms with subsidiaries in the OECD and Central and Eastern Europe, 5.5 per cent have subsidiaries in both, compared to 8.2 per cent in manufacturing.

Consistent with the manufacturing sector the proportions with subsidiaries only in Central and Eastern Europe are very similar. The differences are similar for other regions also. For South East Asia the percentage of MNEs with a subsidiary in another OECD country is 8 per cent (11 per cent in manufacturing) and for the Other region 9.5 per cent (11.5 per cent for manufacturing).

It is worth noting at this stage that Stylised Facts 1 to 3 are in line with findings from a comparable dataset for firms in the euro area by Geishecker et al (2007). They also find that only a very small fraction of firms have affiliates abroad (around three per cent), that the average multinational has affiliates in only few locations (three on average) and that the most frequent locations of foreign affiliates are in other developed countries, mainly other European countries or the US.

### ***Multinationality and Firm Characteristics***

In this section we compare the characteristics of multinationals and non-multinationals and evaluate whether any differences matter for where they invest. The basic relationship can be shown by grouping firms into different size bands based on number of employees.

In Table 6.2 below we separate firms according to their size in the UK and the percentage of firms within each of those size bands that are multinational. As expected there is a strong relationship between multinationality and firm size in the UK. In the smallest size category (<25 employees) the rate of multinationality is almost identical in services and manufacturing: around 3.0 per cent of firms with less than 25 employees have a foreign affiliate, compared to 3.7 per cent for firms with 25-50 employees. This occurs despite there being disproportionately more small firms in the service sector. After this point there is some divergence between the two sectors, with rates of multinationality higher in manufacturing. In the very largest size band (employment greater than 250) the difference is at its greatest. Some 12 per cent of service sector firms in this size band are multinational compared to 20 per cent of manufacturing firms.

*Stylised Fact 4*

There is a strong relationship between firm size and whether it is an MNE.

Another way to demonstrate the same phenomenon is to consider the average number of locations used for subsidiaries for each of the employment categories. Although the median number of subsidiaries is one for all firms with employment less than 250, and 2 for firms with employment greater than this, the averages display a strong sense of skew to the distribution. The mean number of locations is just over one (1.2) when employment is between 1 and 249 (with no difference between size bands) and 4.6 locations when employment is greater than this.

*Stylised Fact 5*

The bigger the multinational the more subsidiaries it has.

Table 6.2 also displays the percentage of multinationals that have subsidiaries in one, two, three or more than four locations. Again there are some differences between sectors here. Overall service sector multinationals are more likely to have subsidiaries in more than one location and perhaps most noticeably they are much more likely to have subsidiaries in more than four locations than in manufacturing. These differences are much smaller however for the largest employment category, where the distributions appear much more similar.

Again, it should be noted that Stylised Facts 4 and 5 are consistent with results for firms in the euro area by Geishecker et al. (2007).

Table 6.2: Percentage of Firms that are Multinationals and Non-multinational by Firm Size and the Percentage Number of Subsidiary Locations

Number of Employees	% of firms that are Non-Multinational	% that are Multinational	% of MNEs with Subsidiary			
			1	2	3	4+
<b>Manufacturing</b>						
<25	97.0	3.0	88.9	7.4	1.9	1.9
25-50	96.3	3.7	91.8	6.8	0.0	1.4
50-100	95.7	4.3	82.6	12.4	4.1	0.8
100-250	93.4	6.6	75.9	16.3	4.4	3.4
>250	79.9	20.1	48.9	13.9	9.5	27.6
<b>Services</b>						
<25	97.7	2.3	77.9	9.9	3.1	9.1
25-50	96.4	3.6	85.0	8.6	3.0	3.4
50-100	96.4	3.6	76.2	10.7	5.3	7.8
100-250	94.4	5.6	75.6	10.5	6.8	7.1
>250	87.8	12.2	56.7	12.7	5.9	24.7

One difference between the manufacturing and service sectors which is not visible in Table 6.2 is the location of subsidiaries where firms have more than four subsidiaries. In the manufacturing sector there are just three firms in the smallest employment categories (below 100 employees) that have subsidiaries in more than four different locations. Further investigation suggests these subsidiaries are in Europe in the case of firms with less than 25 and between 25-50 employees and in Europe, Canada and the US for the firms with between 50 and 100 employees. In comparison there are 59 firms in the service sector that have more than 4 subsidiaries. 43 have between 4 and 10, a further 11 have between 11 and 20 and five have between 21 and 30 (the maximum). Given the number of subsidiaries it is perhaps not surprising that these extend beyond Europe and North America and include Asia, Africa and Latin America.

In Table 6.3 we investigate the issue of location further by reporting the number of firms that have subsidiaries in particular regions or groups of countries by the size of the firm. As is clear from the table, larger firms tend to have subsidiaries in more locations, whereas small firms are more likely to choose to locate within one of the other OECD countries. Within this general pattern however it is the case that the smaller service sector firms choose a more diverse set of locations. This appears to

suggest the relationship between firm size and where the firm locates is stronger within the manufacturing sector. For example, of the total number of manufacturing firms with subsidiaries in the US or Western Europe 57 per cent have more than 250 employees. In the service sector just 42 per cent of firms with subsidiaries in the US or Western Europe have more than 250 employees. Beyond Europe and the US the effect is even stronger. The percentage of MNEs with subsidiaries in Central and Eastern Europe that have more than 250 employees is 75 per cent in manufacturing and 59 per cent in services; for Other countries it is 83 per cent in manufacturing and 59 per cent in services and for South East Asia, China and India it is 89 per cent in manufacturing but only 67 per cent in services.

*Table 6.3: Number of MNEs with Subsidiaries by Locations and Firm Size*

Number of Employees	Number Located					
	US	Western Europe	Australia, Canada, Japan, NZ and South Africa	Central and Eastern Europe	South East Asia, China & India	Other countries
<i>Manufacturing</i>						
<25	8	43	5	2	0	5
25-50	17	47	6	1	1	6
50-100	43	78	6	5	3	6
100-250	55	151	12	11	9	11
>250	212	371	147	58	101	132
<i>Total</i>	<i>335</i>	<i>690</i>	<i>176</i>	<i>77</i>	<i>114</i>	<i>160</i>
<i>Services</i>						
<25	72	258	42	21	16	37
25-50	41	174	28	6	9	16
50-100	57	184	24	5	19	22
100-250	81	275	35	14	14	23
>250	220	614	171	66	116	138
<i>Total</i>	<i>471</i>	<i>1505</i>	<i>300</i>	<i>112</i>	<i>174</i>	<i>236</i>

### 6.3 Other Aspects of Firm Performance

As the data thus far make clear, offshoring production via establishing affiliates abroad is a relatively rare event. However, those firms that have foreign operations are larger than those that do not. An interesting question not answered above is how

British multinationals differ from foreign-owned multinationals located in the UK, or whether they differ from domestic firms that export rather than establish overseas affiliates. In this section we make such comparisons across a number of dimensions of business performance, which are again measured in terms of their operations in the UK.

Table 6.4 reports the average (median) size of firms in the UK according to the extent of their global engagement – identified by whether the firm sells its output to the domestic market only, whether it exports (but is not a multinational) or whether it is a multinational (domestic or foreign). We report similar comparisons for two other firm characteristics, namely, total turnover (in £000s) and the share of exports in total sales in Tables 6.5 and 6.6, respectively.

The data show that, of the domestically owned firms there is a clear ordering in the average values: firms that are multinational employ more workers, have a greater turnover and export a greater share of total output compared to firms that export, who are in turn bigger than firms that serve the domestic market only. By comparison foreign firms employ on average similar numbers to firms that export, although they have much higher turnover and are more export intensive.

This implies that although British multinationals account for just 5.7 per cent of the number of firms in the sample they account for 14.6 per cent of employment (compared to 29.1 for foreign multinationals and 56.3 per cent for non-multinationals); 16.4 per cent of total turnover (compared to 38.2 for foreign multinationals and 45.4 per cent for non-multinationals); and 33.1 per cent of exports (compared to 49.0 for foreign multinationals and 17.9 per cent for non-multinationals).

Table 6.4: Employment by form of global engagement

<b>Type of Firm</b>	<b>Median</b>	<b>Standard deviation</b>	<b>No. of observations</b>
<i>Manufacturing</i>			
Domestic only	69	669.4	6163
Exporters	102	1068.8	4952
Domestic multinationals	262	11572.2	925
Foreign multinationals	112	2247.4	4292
<i>Total</i>	<i>92</i>	<i>33124</i>	<i>16332</i>
<i>Services</i>			
Domestic only	40	2278	33312
Exporters	58	1425	5869
Domestic multinationals	136.5	18397	1928
Foreign multinationals	48	2124	9198
<i>Total</i>	<i>45</i>	<i>4216</i>	<i>50307</i>

Table 6.5: Sales by form of global engagement

<b>Type of Firm</b>	<b>Median</b>	<b>Standard deviation</b>	<b>No. of observations</b>
<i>Manufacturing</i>			
Domestic only	5881	408542	6163
Exporters	8376	383828	4952
Domestic multinationals	30383	4605756	925
Foreign multinationals	15256	898532	4292
<i>Total</i>	<i>8872</i>	<i>1238804</i>	<i>16332</i>
<i>Services</i>			
Domestic only	5197	358614	33312
Exporters	9222	223607	5869
Domestic multinationals	25714	2035299	1928
Foreign multinationals	9644	667555	9198
<i>Total</i>	<i>6519</i>	<i>580072</i>	<i>50307</i>

Table 6.6: Exports/Total Sales by form of global engagement

Type of Firm	Median	Standard deviation	No. of observations
<i>Manufacturing</i>			
Domestic only	0	0	6163
Exporters	1401.6	0.285	4952
Domestic multinationals	13890.4	0.307	925
Foreign multinationals	4433	0.311	4292
<i>Total</i>	<i>2231</i>	<i>0.303</i>	<i>16332</i>
<i>Services</i>			
Domestic only	0	0	33312
Exporters	1226	129275	5869
Domestic multinationals	6880	635383	1928
Foreign multinationals	2760	149163	9198
<i>Total</i>	<i>1751</i>	<i>219452</i>	<i>50307</i>

To determine whether these differences in average values between domestic multinationals and non-multinational firms are statistically significant we perform pair-wise t-tests, which consider whether the mean values of the different types of firm are similar or not, given the distribution of firm characteristics.

In columns 2 and 4 of Table 6.7 we include the test statistic of not rejecting the hypothesis that the average values for multinational and non-multinational firms are the same; the probability of not-rejecting the null is in parenthesis.<sup>8</sup> A positive value indicates that the business performance indicator for multinational firms is larger than that for non- multinational firms, and a negative test statistic indicates that the business performance indicator for non-multinationals is higher.

To allow for the potential importance of industry factors in explaining differences in performance characteristics in columns 2 and 4, in columns 3 and 5 we estimate a regression that controls for such effects. Here we regress the firm characteristic in question on a dummy variable which is equal to one if a firm is multinational, and zero if not.<sup>9</sup> In the appropriate columns we again report the test statistic that the estimated coefficient on the multinational dummy is equal to zero (with the associated probability value in parenthesis).

<sup>8</sup> We aggregate firms that export with those that just serve the domestic market for this exercise.

<sup>9</sup> We control for industry effects by including a set of industry dummy variables which take the value 1 if a firm is in the industry and zero if not. This controls for general differences across industries.

For both types of test the probability values are all very small (tests statistics are large relative to the critical value) indicating strong statistical evidence that multinational firms are different from non-multinationals for both manufacturing and service sector firms. This occurs for all of the business performance indicators considered without exception. Being a multinational means you are a very different type of business compared to a non-multinational firm.

These results on “performance premia” for multinationals compared to domestic firms are in line with a large body of research for the UK and other countries. For example, recent work for the UK shows convincingly that multinationals are more productive than comparable domestic firms (Criscuolo and Martin, 2004; Girma and Görg, 2007a) and pay higher wages (Girma and Görg, 2007b).

*Table 6.7: Statistical tests of Differences between Multinationals and Non-Multinational Firms*

<b>Firm Characteristic</b>	<b>Manufacturing</b>		<b>Services</b>	
	<i>t-test</i>	<i>Regression test</i>	<i>t-test</i>	<i>Regression test</i>
<i>Employment</i>	29.72 (0.00)	29.28 (0.00)	35.08 (0.00)	36.15 (0.00)
<i>Sales</i>	32.63 (0.00)	30.01 (0.00)	38.09 (0.00)	38.20 (0.00)
<i>Average wage</i>	7.11 (0.00)	4.34 (0.00)	16.32 (0.00)	11.10 (0.00)
<i>Fix Assets/ Employment</i>	14.99 (0.00)	14.05 (0.00)	14.93 (0.00)	21.03 (0.00)
<i>Labour productivity</i>	7.06 (0.00)	3.24 (0.00)	5.79 (0.00)	5.13 (0.00)
<i>Intangible assets</i>	19.19 (0.00)	16.85 (0.00)	24.89 (0.00)	23.11 (0.00)
<i>Exports</i>	26.86 (0.00)	24.42 (0.00)	23.86 (0.00)	22.83 (0.00)
<i>Export share</i>	16.84 (0.00)	15.01 (0.00)	9.43 (0.00)	8.85 (0.00)

*Notes: All variables are in log form; p-values in parentheses*

*Stylised Fact 6*  
**Multinational firms are statistically  
different to non-multinationals  
across all firm performance  
characteristics.**

In Table 6.8 we examine whether these differences in business performance are likely to widen over time by using the growth of the various firm performance variables. Is it the case that multinational firms are bigger and better, and this difference grows through time? To investigate this we repeat the analysis of Table 6.7 for a sub-set of performance indicators, replacing the level of the variable with its rate of growth.

The answer would appear to be an emphatic no for most cases, as indicated by the high p-values for the tests. Taking a cut-off point of 0.05 (i.e., a 5 % level of statistical significance) shows that only the growth rates of employment and sales are higher for multinationals in manufacturing. However, this is only true in the pair-wise t-test but not in the more general regression tests which control for industry effects also. Hence, we discard the result of the pairwise t-test in this case. Overall, we can therefore conclude that there are no statistically significant differences in growth rates of firm characteristics between multinationals and non-multinationals. Or, to put it differently, the differences uncovered in Table 6.7 are stable across time.

*Table 6.8: Pair-wise t-test of Differences between Multinationals and Non-Multinational Firms*

<b>Firm Characteristic</b>	<b>Manufacturing</b>		<b>Services</b>	
	<i>t-test</i>	<i>Regression test</i>	<i>t-test</i>	<i>Regression test</i>
<i>Employment</i>	2.62 (0.01)	1.79 (0.07)	1.74 (0.08)	0.43 (0.67)
<i>Sales</i>	2.82 (0.00)	1.77 (0.08)	1.18 (0.24)	1.18 (0.24)
<i>Average wage</i>	1.82 (0.07)	1.76 (0.09)	-0.20 (0.84)	0.74 (0.46)
<i>Labour productivity</i>	0.89 (0.37)	0.43 (0.67)	0.01 (0.99)	0.99 (0.32)
<i>Export share</i>	1.59 (0.11)	0.22 (0.83)	1.69 (0.09)	1.16 (0.24)

*Notes: All variables are in log form; p-values in parentheses*

A reasonable question that arises from the above analysis is whether adding subsidiaries in more and more locations continues to improve firm performance relative to non-multinational firms, or whether there comes a point where increasing the number of locations is associated with some reduction in relative business performance in the domestic market. Table 6.9 explores how multinationals differ from non-multinationals, but also whether the number of subsidiary-locations is correlated with business performance characteristics.

The difference between multinationals and non-multinationals is again captured using a dummy variable which takes the value 1 if a firm is a multinational, zero if not. Consistent with the previous table in all cases the coefficient on this variable is statistically significant (denoted by the number of stars). The effect of having subsidiaries in more locations is captured by a variable that counts the number of locations in which the firm has a subsidiary and the same variable squared (to capture any non-linearities). Here we notice that not all of the coefficients are statistically significant. For example while it appears that on average multinationals pay higher wages than non-multinationals there is no evidence that the extent of the number of overseas affiliates owned by the firm has an impact on wages paid in the domestic economy. The same relationship also occurs for labour productivity, it is the distinction between being multinational and not that helps to explain variations in the data.

For the remaining measures of business performance we find a non-linear relationship. The combination of signs on the coefficients suggests that business performance measures such as employment, sales and exporting increase with the number of foreign locations that the firm has subsidiaries in, but that this diminishes as the number of locations increases and peaks. It appears that the firms with subsidiaries in the greatest number of locations do have a relatively poorer set of characteristics. The data do not allow us to identify the direction of causation in this relationship, however. It might be for example, that the reduction in output, employment and so on reflects the decision to offshore part of the production process overseas for these firms. This would appear plausible given that it is those firms with the greatest number of subsidiaries that have subsidiaries in the type of locations where offshoring is likely. An alternative, and perhaps more plausible,

explanation might be that beyond some point co-ordination and management of a business spread across so many locations becomes difficult and the overall performance of the business worsens. Either way it suggests that being too big can be detrimental for firm performance.

Where the maximum effect of multinationality with firm characteristics lies differs between the manufacturing and service sectors, but is remarkably similar across the performance indicators. The maximum effect on business performance is found for between 34 and 43 subsidiaries for manufacturing and between 27 and 35 for services. In all cases the value for manufacturing lies above that for services. The tipping point for services occurs at a lower point.

To compare the extent of the reduction in firm performance that occurs as the number of subsidiary locations increases under these estimates, a manufacturing firm with subsidiaries in 63 different locations has employment that is on average similar to a firm with subsidiaries in 17 locations and in terms of output to a firm with 16 locations. For firms in the service sector the most number of locations is 51, such that the firm with subsidiaries in this number of locations has on average employment levels that are the same as those of a firm with subsidiaries in 12 locations in terms of employment and 14 locations in terms of output. The negative effect from the additional subsidiary is therefore stronger in services than in manufacturing. For reference there are 72 firms in the manufacturing sector with subsidiaries in 34 or more locations and 79 service sector firms with subsidiaries in 27 or more locations, that is beyond the maximum point.

Table 6.9: Relationship between Multinationality and Firm Characteristics

	<b>Multinational Dummy</b>	<b>Number of foreign subsids</b>	<b>Square no. of foreign subsids</b>	<b>Turning point</b>
<b>Employment</b>				
- <i>Manuf</i>	0.600**	0.324**	-0.004**	41
- <i>Services</i>	0.833**	0.252**	-0.004**	32
<b>Sales</b>				
- <i>Manuf</i>	0.724**	0.319**	-0.004**	40
- <i>Services</i>	0.961**	0.259**	-0.004**	32
<b>Average wage</b>				
- <i>Manuf</i>	0.075**	-0.000	-0.000	-
- <i>Services</i>	0.177**	0.008	0.000	-
<b>Fix Ass./ Emp</b>				
- <i>Manuf</i>	0.587**	0.067**	-0.001**	34
- <i>Services</i>	0.863**	0.0862**	-0.001	-
<b>Labour prod.</b>				
- <i>Manuf</i>	0.119**	-0.004	-0.000	-
- <i>Services</i>	0.128**	0.007	0.000	-
<b>Intang. assets</b>				
- <i>Manuf</i>	1.417**	0.367**	-0.005**	37
- <i>Services</i>	1.318**	0.350**	-0.005**	35
<b>Exports</b>				
- <i>Manuf</i>	1.194**	0.426**	-0.006**	36
- <i>Services</i>	1.086**	0.383**	-0.007**	27
<b>Export share</b>				
- <i>Manuf</i>	0.109**	0.034**	-0.0004**	43
- <i>Services</i>	0.065**	0.022**	-0.0004**	28

Notes: \*\* denotes significance at the 5% level of significance.

Given that firms with more subsidiaries are more likely to have them in locations further from the UK, an interesting question is whether business performance differs according to the locations of these foreign subsidiaries. These effects are captured by generating a (0/1) variable measuring whether the firm has a subsidiary in that region or not.

The evidence from Table 6.10 is that in general firms that locate production in subsidiaries in locations outside the OECD are not characterised as having lower average performance to other multinational firms. Indeed the estimates are generally

positive, suggesting improved performance relative to those that do not invest in that region. Perhaps the region that provides the strongest exception to this is when subsidiaries are located in Central and Eastern Europe, but only for firms in the manufacturing sector. Manufacturing firms with subsidiaries in this region have on average lower sales, lower productivity, lower ratios of capital per employee and pay on average lower wages. A reasonable interpretation is that this reflects the loss of employment and output as a result of offshoring production to that region.

Table 6.10: Location of Foreign Subsidiaries and Firm Characteristics

	MNE. Dummy	Subsidiary US	in Western Europe	Australia, Canada, Japan, NZ and South Africa	Central and Eastern Europe	South East Asia, China and India	Other locations
<b>Employment</b>							
- Manuf	0.62**	0.525**	0.296**	0.472**	-0.13	-0.074	0.071
- Services	0.921**	0.363**	0.187**	0.209**	0.093	-0.059	0.175**
<b>Sales</b>							
- Manuf	0.759**	0.305**	0.368**	0.362**	-	-0.072	0.075**
- Services	1.029**	0.194**	0.265**	0.109	0.249** 0.019	-0.047	0.175**
<b>Average wage</b>							
- Manuf	0.026	0.078**	0.03**	-0.012	-	-	0.004
- Services	0.142**	0.073+	0.037**	-0.034	0.062** -0.06	0.058** 0.044	-0.045**
<b>Fix Ass./ Emp</b>							
- Manuf	0.56**	-0.061	0.186**	-0.022	-0.205	-0.121	0.024
- Services	0.859**	0.287**	0.076**	-0.022	-0.107	0.133	0.007
<b>Labour prod.</b>							
- Manuf	0.132**	-0.21**	0.071**	-0.109	-0.118	0.002	0.004
- Services	0.108**	-0.17*	0.078**	-0.1	-0.074	0.012	0
<b>Intang. assets</b>							
- Manuf	1.28**	1.084**	0.389**	0.407	-0.282	-0.225	0.14
- Services	1.334**	0.881**	0.322**	0.176	0.271	-0.144	0.105
<b>Exports</b>							
- Manuf	1.229**	0.704**	0.403**	0.388**	-0.228	0.237	-0.046
- Services	1.253**	0.275	0.349**	0.271	0.119	-0.088	0.014
<b>Export share</b>							
- Manuf	0.098**	0.127**	0.017**	0.021	-0.024	0.047**	-0.005
- Services	0.075**	0.052	0.008	0.042	0.018	-0.022	0.006

Notes: \*\* denotes significance at the 5% level of significance.

### *Probit Model of Multinationality*

In this section we build upon our results to consider what factors lead firms to establish affiliates abroad. To do so we essentially estimate an empirical model of the determinants of the 0/1 indicator of whether the firm is a multinational or not, as a series of probabilities. The regressions include a list of variables measured at the level of the firm as well as fixed industry factors to control for any general differences across industry in the propensity to become multinational. The empirical model is estimated using probit techniques. We report the results for the manufacturing and service sectors in the same table.

Table 6.11 tests for the sensitivity of the results to changes in the firm variables. In columns 1 and 2 we include a measure of firm size, measured as the log of employment, as well as a measure of firm productivity and whether the firm exports (as both a simple 0/1 indicator as well as the share of exports in total output). In columns 3 and 4 we change the measure of firm size of the firm measured by sales to the domestic market and the measure of labour productivity with the amount of capital per employee.

The firm variables behave as expected. We find that firms that are larger, measured either by output or employment, are more globally engaged (measured by the export share) are more capital intensive and more productive are all more likely to become multinationals. This occurs for both manufacturing and service sector firms, although the estimated effects are typically larger for manufacturing firms (the exception is the coefficient on labour productivity in columns 1 and 2). This would suggest that firms in the manufacturing sector are more responsive to changes in their underlying characteristics. This matches the relationships suggested by the more simple analysis in the previous section.

The coefficients reported in this table are marginal effects and can be interpreted fairly straightforwardly. The results in column 1, for example, indicate that a one per cent increase in employment size is associated in an increase in the probability of becoming a multinational by 0.023 in the manufacturing sector and around half of that in the service sector. This is around one-third of the observed probability that

the firm will be a multinational in the manufacturing and quarter of that in the service sector. By comparison, a one per cent increase in labour productivity is associated with a much smaller increase in the probability of being a multinational (0.004 in manufacturing and 0.006 in services), while that for exports differs between sectors. Whether or not a firm is an exporter per se (indicated by the export dummy) does not matter for whether or not a firm becomes a multinational in the manufacturing sector, as indicated by the statistically insignificant coefficient on that variable, but the extent of involvement in export markets does matter (the export share is significant). In the service sector we find that both effects are important, with estimated marginal effects that are large relative to the other firm variables.

*Table 6.11: Probit Model of Multinationality*

	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
	<b>Manufacturing</b>	<b>Services</b>	<b>Manufacturing</b>	<b>Services</b>
<i>Employment</i>	0.023 (22.06)**	0.012 (29.09)**		
<i>Labour productivity</i>	0.004 (2.02)*	0.006 (8.99)**		
<i>Output for Dom. Mkt</i>			0.019 (18.80)**	0.010 (25.85)**
<i>Capital/Labour</i>			0.007 (5.25)**	0.005 (12.44)**
<i>Export dummy</i>	0.000 (0.14)	0.014 (7.03)**	-0.003 (0.70)	0.013 (6.06)**
<i>Export Share</i>	0.043 (7.49)**	0.037 (12.28)**	0.091 (13.97)**	0.061 (16.75)**
<i>Observations</i>	11649	35977	11343	33799

*Notes: The estimated model is a Probit model. The dependent variable is a 0/1 indicator of whether the firm is a multinational or not. The sample excludes all foreign owned firms. The reported coefficients are the marginal effects calculated at the mean of the right hand side variables. \*\* denotes significance at the five per cent level. Z-statistics from the test that the estimated coefficient is equal to zero are reported in parenthesis*

## 6.4 Summary

In this chapter we use a large specially assembled company level panel data set which comprises information on UK firms over the ten year period 1996 to 2005. We use this data set to investigate the characteristics and relative performance of UK multinational enterprises.

Our analysis generates a number of clear results. First, multinationals comprise a very small proportion of the population of firms in our sample. Second, typically multinationals do not have many subsidiaries nor do they operate in a large number of different locations. Third, most subsidiaries are in OECD rather than non-OECD locations. Fourth, there is a strong positive relationship between firm size and whether it has affiliates abroad and the bigger the multinational the more subsidiaries it generally has. Finally, multinational firms are statistically different to non-multinationals across all firm performance characteristics: they have greater turnover, higher productivity, export more, pay better wages and are more capital intensive.

## **7. Offshoring and Enterprise Performance**

### **7.1 Introduction**

The results in the previous chapter point to firm characteristics as important in the decision to become a multinational. In this chapter we investigate the country factors that determine which locations firms choose, i.e., where they offshore activities and why. The evidence presented earlier showed clearly that not all multinationals invest in all locations. This suggests that the location decision of firms is likely to depend upon both firm and country characteristics. We then extend the analysis further to identify the effects of industry offshoring on business performance, including generating new estimates of employment effects.

### **7.2 The Decision on Where to Offshore**

To explore this issue, we reorganise the data such that we have a 0 or 1 for each firm-country pairing. The variable is set equal to 1 when the firm invests in a given location and 0 otherwise. The estimation method employed means that the analysis can be performed only for multinational firms in the sample (for non-multinationals each firm-country pair has a zero). We have 925 manufacturing multinational firms spread over 139 country locations and 1,928 service sector multinationals spread over 132 separate locations giving a total of 383,071 possible firm-country combinations.

To measure the elements of firm performance likely to be important we build upon the results of the previous chapter and use a measure of employment, labour productivity and whether the firm exports. These are all expected to be positively related to having affiliates in a given location; the best firms invest in the greatest number and most diverse set of locations.

The country variables we choose are motivated by those used elsewhere in the literature and by information obtained from interviews with managers on offshoring decisions which were carried out as part of this project. We build these up systematically through the regressions. The core set of country variables we add are

country size (GDP), wealth (GDP per capita) and distance from the UK. It is expected that larger and wealthier markets will be attractive to more UK firms. In addition, issues of management control and cultural similarity are expected to become more difficult as physical distance from the UK increases. Multinationality is therefore expected to decrease with distance.

Historical and cultural links with distant locations, such as Australia, New Zealand and India, are however likely to be important factors considered by UK firms when establishing affiliates abroad such that the relationship with distance is unlikely to be that simple. We therefore add to the regression a variable that captures the use of English as the main language.

To capture the effect of harmonisation of trade and investment policy within EU member countries we also add a dummy variable that equals one when the partner country is a member of the EU. The other control variables include whether there is any residual effect from being a member of the OECD that is not captured by the other variables; and a border dummy that equals 1 for the Republic of Ireland. Also included in the regression, although not reported in the table, are a series of industry dummy variables to capture other general industry differences.

Perhaps the most striking feature of the results in columns 1 (manufacturing) and 2 (services) of Table 7.1 is the similarity in the determinants of the location of FDI. This occurs for both the firm and country controls. In columns 1 and 2 the size of the firm is found to be significantly correlated with the probability of being a multinational within a given country. Bigger firms are multinationals in more countries. There are some differences between sectors however. At the mean the marginal effect of size is greater in the results for the manufacturing sector, approximately double that for services. The other firm variables, labour productivity and exporting, appear to matter for the location decision of firms in the service sector but not for manufacturing. Given the significance of both the labour productivity and export variables in Table 7.1 this suggests these matter more for the firm becoming a multinational for the first time.

We now turn to country controls. Our choice of country characteristics is determined by the broader literature that emphasises market size and level of

development, as key determinants of establishing affiliates abroad. The first two variables that capture size and wealth are country size, measured by GDP, and the share of wealth per person in the population. Again the similarities between the service and manufacturing sectors are striking. Both GDP and GDP per capita can be seen to have a significant positive effect on locating affiliates within a given country in both sectors, and the marginal effect is very similar. Big countries and rich countries attract more manufacturing and services multinationals and in the same way.

To capture the ease of investing in a country we include measures of the distance from the UK, whether they are another European country, whether they also speak English as a first language, whether they share a common border and whether they are a fellow member of the OECD. The results suggest that UK MNEs are likely to locate production in countries that are physically close to the UK (distance) and that share common language or laws and regulations (Europe). We also find that manufacturing firms are less likely to locate in Ireland, while there is no residual impact from being a member of the OECD.

In columns 3 and 4 we extend the set of control variables to include a measure of human capital. This also has the expected relationship with the decision to invest in a given location. Countries with high levels of human capital are more likely to attract FDI, even controlling for size and wealth. Perhaps unsurprisingly this effect is stronger for services compared to manufacturing. At the mean of the right hand side variables the estimated marginal effect of human capital is around half of that of GDP and GDP per capita in the manufacturing sector at 0.001, but the same size in services. Human capital is a more important factor in determining the location decision in services compared to manufacturing.

Table 7.1: The location decision of UK multinationals

	1	2	3	4
	Manufacturing	Services	Manufacturing	Services
<i>Employment</i>	0.002 (17.07)**	0.001 (12.74)**	0.002 (17.06)**	0.002 (12.51)**
<i>Labour productivity</i>	0.000 (0.41)	0.000 (3.41)**	0.000 (0.57)	0.001 (3.51)**
<i>Export dummy</i>	-0.000 (0.64)	0.001 (2.39)*	-0.000 (0.80)	0.001 (2.31)*
<i>GDP</i>	0.002 (39.43)**	0.002 (42.27)**	0.002 (39.54)**	0.002 (42.29)**
<i>GDP per capita</i>	0.002 (9.27)**	0.003 (16.57)**	0.002 (6.17)**	0.003 (9.19)**
<i>Distance</i>	-0.002 (17.75)**	-0.002 (19.72)**	-0.003 (17.54)**	-0.003 (19.39)**
<i>R. Ireland Dummy</i>	-0.001 (4.63)**	0.000 (0.56)	-0.002 (4.12)**	0.001 (1.39)
<i>English Language</i>	0.009 (21.60)**	0.008 (19.73)**	0.011 (19.83)**	0.009 (18.13)**
<i>European dummy</i>	0.001 (3.70)**	0.001 (4.55)**	0.001 (4.45)**	0.002 (5.65)**
<i>OECD dummy</i>	-0.000 (0.58)	0.000 (1.24)	-0.000 (1.58)	0.000 (0.15)
<i>Human capital</i>			0.001 (2.26)*	0.002 (3.95)**
<i>Observations</i>	76528	147456	63387	122880

Notes: The estimated model is a Probit model. The dependent variable is a 0/1 indicator of whether the firm is located in a given country. The sample includes only multinationals. The reported coefficients are the marginal effects calculated at the mean of the right hand side variables. \*\* denotes significance at the five per cent level

In Table 7.2 we investigate the importance of human capital by adding to the regression an interaction term between whether the country uses the English language and its level of human capital.<sup>10</sup> A combination of high levels of human capital and spoken English together makes countries attractive locations for offshoring activities than if either one of these factors exists alone. This is exactly what we find, indeed the English language no longer matters directly when we control for its interaction with human capital (it is even negative in the manufacturing sector regression), while human capital does not matter for manufacturing firms. Human capital becomes a more important variable when English is the first language of the country: a very striking result.

<sup>10</sup> In order to focus on the role of human capital we do not report the results for the other variables included in the regressions. These control variables are identical to those reported in regressions 3 and 4 in Table 6.12.

In regressions 3 and 4 within Table 7.2 we investigate the importance of human capital further by capturing the importance of scientific and technical knowledge within a country. We measure this as (the log) of a count of the number of scientific and technical journal articles. It is expected that this variable will capture both the depth of scientific and technical knowledge, but also the quality of the tertiary education sector. Unfortunately this data results in a sharp drop in the number of observations (the data exist for 78 countries for which we also have GDP data).

Despite this we find that it enters significantly into the regression equation however. A greater depth of high end-scientific knowledge is an attraction for UK firms to locate production within a country. At the mean of the right hand side variables the estimated marginal effect reported in the tables is noticeably stronger for manufacturing over services, although it matters in both sectors.

*Table 7.2: The location decision of UK multinationals – the role of human capital*

	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
	<b>Manufacturing</b>	<b>Services</b>	<b>Manufacturing</b>	<b>Services</b>
<i>Human capital</i>	0.001 (1.65)	0.002 (3.14)**	0.001 (0.70)	0.004 (2.52)*
<i>HC*English</i>	0.006 (5.73)**	0.004 (3.86)**	0.014 (5.95)**	0.009 (3.66)**
<i>Log (journal articles)</i>			0.014 (8.17)**	0.001 (2.19)*
<i>Observations</i>	63387	122880	44062	86016

*Notes: The estimated model is a Probit model. The dependent variable is a 0/1 indicator of whether the firm is located in a given country. The sample includes only multinationals. The reported coefficients are the marginal effects calculated at the mean of the right hand side variables. \*\* denotes significance at the five per cent level. The model includes all of the firm and country control variables reported in regressions 3 and 4 in Table 6.12, along with dummy variables for each 3-digit industry.*

Given the statistical importance of the interaction between human capital and English language in regressions 1 and 2 of Table 7.2, a reasonable question to ask is what would happen if the language skills of competitor countries improved to the level of other English speaking countries. We investigate this in Table 7.3 below by estimating the increase in the probability of locating from assuming that all non-English speaking nations now speak English. This would not mean that more UK FDI was attracted to India, South Africa or the US in this exercise, but would be attracted to China, Brazil and so on. In some cases the estimated increase in probability would appear large, over 100 per cent. This occurs because for many

countries the estimated probability of multinationals locating production there is very low. For that reason we also report the original estimated probability (i.e. without the effect of improving English language skills) of UK multinationals locating production in that country.

As already mentioned some of the percentage increases in the estimated probabilities are quite large. Improving English language skills would increase the probability of UK multinationals locating in that country by over 500 per cent in 12 of the 34 countries listed in Table 7.3, where in all cases these occur for the manufacturing sector. It would appear that English language skills are currently a significant barrier to outward FDI. UK multinationals in the service sector are less affected by these changes. The associated probability remains a rare event however. For example an increase in the probability of locating production in Uruguay of 891 per cent increases the probability that a UK multinational will locate there from 0.002 to 0.1982. That is even with this change only 1.9 per cent of firms would be expected to locate there, compared for example to 40 per cent in the US.

Perhaps some of the more interesting changes occur when the increase in the probability is smaller. For example the improvement in English language in China would increase the probability of locating there from 0.14 to 0.31 in the manufacturing sector and from 0.075 to 0.165 in the service sector. Or for a Central and Eastern European country such as the Czech Republic the probability would now be 0.25 in manufacturing and 0.10 for service sector firms.

Similar changes are observed for developed countries also. For example were France to start using English as their first language the estimated probability that a UK multinational would have a subsidiary there would be 0.59 in manufacturing and 0.4 in services, while in Germany it would be 0.65 in manufacturing and 0.44 in services. Removing the language barrier between the UK and Continental Europe would mean that it was a more important destination for UK outward FDI than the US.

*Table 7.3: Estimated Effect of Improving English Language Skills*

<b>Manufacturing</b>	<b>Services</b>
----------------------	-----------------

<b>Country</b>	<i>Original Probability</i>	<i>% increase</i>	<i>Original Probability</i>	<i>% increase</i>
Argentina	0.0089	800.0	0.0049	398.9
Bangladesh	0.0043	-20.7	0.0013	71.9
Brazil	0.0213	149.0	0.0108	159.6
Bulgaria	0.0120	928.3	0.0074	414.0
Cameroon	0.0020	0.0	0.0011	0.0
Chile	0.0090	688.2	0.0068	339.8
China	0.1442	120.8	0.0751	120.4
Czech Republic	0.0409	511.0	0.0277	272.2
Egypt	0.0149	215.7	0.0070	200.1
France	0.2449	142.4	0.2053	100.8
Germany	0.2425	168.6	0.2107	109.7
Greece	0.0260	529.7	0.0204	272.3
Hong Kong	0.0672	0.0	0.0490	0.0
Hungary	0.0324	510.0	0.0224	273.3
India	0.0623	0.0	0.0320	0.0
Italy	0.0998	204.7	0.0778	143.1
Japan	0.0408	533.6	0.0336	260.7
South Korea	0.0220	804.8	0.0148	363.9
Malaysia	0.0088	690.3	0.0056	355.3
Mexico	0.0175	395.8	0.0095	263.3
Netherlands	0.1470	236.2	0.1330	139.3
Pakistan	0.0080	-19.3	0.0028	65.3
Paraguay	0.0008	595.1	0.0003	406.4
Portugal	0.0395	150.8	0.0323	133.9
Romania	0.0185	742.3	0.0104	368.5
Singapore	0.0448	0.0	0.0370	0.0
South Africa	0.0484	0.0	0.0269	0.0
Spain	0.1055	209.6	0.0884	139.8
Thailand	0.0102	379.4	0.0052	269.9
Tunisia	0.0148	127.2	0.0085	149.9
Turkey	0.0172	181.7	0.0091	177.3
Uruguay	0.0020	891.9	0.0014	434.9
USA	0.4063	0.0	0.2819	0.0

*Note: The estimated probabilities are the predicted probabilities for each firm averaged for each given destination. Estimated probabilities are calculated using regressions 1 and 2 in Table 6.13.*

In Table 7.4 we extend the set of country characteristics to more fully control for the ease of investing in a given location, in particular to test for the importance of institutional infrastructure and the general policy environment. In columns 1 and 2 we add controls for the quality of the general policy environment using data constructed by the Fraser Institute. Five measures are used here: the size of government within the economy; the protection offered by the legal system and the quality of property rights; macroeconomic stability; the freedom to trade internationally; and the extent of regulation of credit, labour and business. It is expected that countries with market friendly policy environments attract more FDI.

Countries are rated on a 1-10 index, where 10 denotes greater economic freedom and protection of the individual enterprise.

For both sectors we find a strong positive correlation from a number of these factors. In particular countries with small government sectors, that offer high levels of protection through the legal system for property rights and are free from regulation attract higher levels of multinational investment from the UK. In addition the freedom to trade internationally appears to be important within the service sector, where unexpectedly macroeconomic stability has a negative effect.

In columns 3 and 4 we investigate the insignificance of the variable describing restrictions on international trade and FDI. Within the Fraser Institute data it is possible to break down this category into a number of sub-categories that include a measure of taxes on international trade (including tariffs), regulatory barriers (including non-tariff barriers) and international capital market controls. This has some interesting effects on the results. It would appear for example that restrictions placed on FDI through international capital markets have a significant effect on the volume of foreign affiliates by UK multinationals located within a country. For services it again appears that regulatory elements are more important.

Finally in columns 5 and 6 we test the relationship between corruption and FDI. The World Bank has recently identified corruption as a serious impediment to development. The results in column 5 and 6 support this view; countries that are more corrupt (have greater values in the index) attract lower levels of multinational investment from the UK. Interestingly a number of the policy variables are non-robust to the inclusion of the measure of corruption; for example the protection of property rights and the quality of the legal system and freedom from regulation are no longer statistically significant. This reflects the use of policy distortions by corrupt bureaucracies to engender the use of bribes and other corrupt activities. Corrupt countries have high levels of policy distortions.

*Table 7.4: The location decision of UK multinationals – The role of policy*

	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
	<b>Manufacturing</b>	<b>Services</b>	<b>Manufacturing</b>	<b>Services</b>	<b>Manufacturing</b>	<b>Services</b>
<i>Size of</i>	0.000	0.000	0.000	0.000	0.001	0.000

<i>Govt.</i>	(2.32)*	(1.69)+	(2.08)*	(2.88)**	(2.54)*	(1.46)
<i>Legal system</i>	0.000	0.001	0.001	0.001	0.000	0.000
<i>&amp; prop right</i>	(4.00)**	(5.45)**	(4.28)**	(5.39)**	(0.83)	(1.38)
<i>Macro</i>	-0.000	-0.000	-0.000	-0.000	-0.000	-0.001
<i>Stability</i>	(1.45)	(2.99)**	(2.18)*	(1.10)	(0.98)	(2.79)**
<i>International</i>	0.000	0.001			-0.000	0.001
<i>Trade</i>	(0.13)	(4.67)**			(0.31)	(4.43)**
<i>Regulation</i>	0.001	0.000	0.001	0.000	0.001	0.000
	(4.07)**	(2.04)*	(2.83)**	(1.98)*	(1.80)	(0.19)
<i>Taxes on Int.</i>			-0.000	0.000		
<i>Trade</i>			(0.29)	(0.48)		
<i>Int. Capital</i>			0.000	0.000		
<i>Mkt. Control</i>			(2.08)*	(0.78)		
<i>Regulatory</i>			-0.000	0.001		
<i>Trade</i>			(0.21)	(4.00)**		
<i>barrier</i>						
<i>Corruption</i>					-0.001	-0.001
					(2.91)**	(3.55)**
<i>Observations</i>	62614	121344	60295	116736	51019	99840

*Notes: The estimated model is a Probit model. The dependent variable is a 0/1 indicator of whether the firm is located in a given country. The sample includes only multinationals. The reported coefficients are the marginal effects calculated at the mean of the right hand side variables. \*\* denotes significance at the five per cent level. The model includes all of the firm and country control variables reported in reported in regressions 3 and 4 Table 6.12, along with dummy variables for each 3-digit industry.*

In Table 7.5 we repeat the what-if analysis of improving English language skills to assess what would happen were policy conditions abroad to improve to a level comparable to the UK. Specifically we assume that the quality of the protection offered by the legal system, the extent of bureaucracy and regulation and so on improve to those levels found in the UK (if they are currently above the UK we leave them as such). In the table we again report the initial estimated probability as well as the percentage increase for multinational firms in the manufacturing and service sector. We repeat this for the same countries in Table 7.3 for which we have data.

Once again some of the associated percentage increase in probability are large, with manufacturing and service sector multinationals responding in a similar manner. The responses are on average smaller than those from improving English language skills however. This occurs because other developed countries have similar policy environments to those of the UK. Now for example the percentage increase in the probability for France and Germany is just over 35 per cent in manufacturing and

just under 20 per cent in services. For the US the estimated probability increases by 6.7 per cent to 0.42 for manufacturing and by 11 per cent to 0.29 in services.

Perhaps the interesting question is to consider the effect on those fast growing emerging nations such as China, India, Brazil and South Africa. Here the increases in the probability of current UK multinationals locating there are in several cases quite large. For manufacturing improving policy conditions to those of UK standards would increase the probability of locating production in Brazil to 0.07 (from 0.016) in China to 0.37 (from 0.013), in India to 0.19 (from 0.10) and in South Africa to 0.09 (from 0.04). Against the estimated probabilities from the original model, that of China would be second only to that for the US. The effects are greatest in China because they score much lower than the UK on index scores that underlie this result for regulation, legal protection of property rights and size of government. Policy conditions are on average much closer in India to UK levels in comparison to those in China, although were these improvements in policy conditions realised this would suggest that levels of UK FDI in India would be higher than those in Australia, Canada or the Netherlands for example.

For service sector firms the effect of improving policy conditions to those of UK standards for these same four countries is slightly smaller. The probability of locating production in Brazil would increase to 0.02 (from 0.008), in China to 0.37 (from 0.15), in India to 0.19 (from 0.07) and in South Africa to 0.05 (from 0.03). Using the estimated probability from Table 7.5 this would make China the most likely destination for UK FDI, while those in India would be similar to that currently found in Germany, France and Ireland.

*Table 7.5: Estimated Effect of Improving English Language Skills*

<b>Country</b>	<b>Manufacturing</b>		<b>Services</b>	
	<i>Original Probability</i>	<i>% increase</i>	<i>Original Probability</i>	<i>% increase</i>
Argentina	0.0125	321.9	0.0072	227.4
Bangladesh	0.0031	558.4	0.0006	561.8
Brazil	0.0159	356.2	0.0075	230.7
Bulgaria	0.0094	297.6	0.0067	176.8
Cameroon	0.0037	396.1	0.0011	348.7
Chile	0.0085	118.5	0.0057	82.7
China	0.1261	196.0	0.0711	105.8
Czech Republic	0.0256	391.1	0.0122	515.7
Egypt	0.0092	430.2	0.0039	296.4
France	0.2459	36.0	0.2027	22.6
Germany	0.2427	37.3	0.2243	12.8
Greece	0.0289	189.4	0.0246	122.5
Hong Kong	0.0727	18.1	0.0603	17.4
Hungary	0.0380	72.0	0.0291	54.3
India	0.1012	85.0	0.0428	65.7
Italy	0.1067	94.4	0.0820	68.6
Japan	0.0675	39.2	0.0433	52.9
South Korea	0.0313	142.9	0.0217	97.8
Malaysia	0.0126	86.1	0.0092	27.0
Mexico	0.0204	233.4	0.0114	140.0
Netherlands	0.1351	24.7	0.1296	9.2
Pakistan	0.0061	278.6	0.0013	342.6
Paraguay	0.0005	1868.2	0.0003	679.4
Portugal	0.0384	70.3	0.0303	42.5
Romania	0.0194	213.6	0.0142	109.9
Singapore	0.0396	13.6	0.0351	12.6
South Africa	0.0437	116.0	0.0287	66.6
Spain	0.1040	70.7	0.0824	47.7
Sri Lanka	0.0030	346.7	0.0015	216.6
Thailand	0.0150	125.0	0.0087	64.1
Tunisia	0.0115	122.9	0.0060	97.1
Turkey	0.0202	167.4	0.0150	59.3
Uruguay	0.0023	164.7	0.0014	138.4
USA	0.3936	6.7	0.2639	11.3

*Note: The estimated probabilities are the predicted probabilities for each firm averaged for each given destination. Estimated probabilities are calculated using regressions 1 and 2 in Table 6.15.*

The final exercise we undertake is to evaluate the importance of ICT in attracting UK multinationals to locate commercial activity abroad. It has been suggested to us in interviews with leading industry figures that the quality of the ICT framework can be an important factor in choosing where to locate subsidiaries abroad.

Unfortunately high quality data on ICT on a cross-country basis is difficult to come

by, or at least that which covers a reasonably high proportion of the wide range of countries are available within our sample.

To generate sufficient country coverage we use a measure of the extent of computer and communication and other services as a ratio to total commercial service exports taken from the World Bank Development Indicators for the year 2000 and covers 108 countries. We also have an equivalent measure for imports. This compares for example with a measure of ICT investment (as a ratio to GDP) which covers 61 countries (this variable is also insignificant – though only at the 10 per cent level). We use both the exports and imports measure, where it is expected that both are positively correlated with the size and quality of the ICT sector. In addition to these measures we also use (the log) of the number of internet used per thousand people within the population, which is a good proxy for capturing the depth of ICT penetration within a country.

It would appear that while ICT exports are significant, in regression 1 the import variable does a better job of explaining the ICT-attractiveness of a country. The share of ICT imports in total commercial service imports is strongly positively correlated with outward FDI from the UK. The depth of internet penetration also appears to matter as expected. In countries in which internet penetration is widespread the population is more likely to be ICT literate and therefore more attractive to overseas investors. Interestingly, despite anecdotal evidence of the importance of ICT to the investment decisions of firms in the service sector, the estimated marginal effect is identical to that for manufacturing sector firms.

Table 7.6: The location decision of UK multinationals – The role of ICT

	1	2	3	4
	Manufacturing	Services	Manufacturing	Services
<i>ICT exports</i>	0.000 (1.96)*	-0.000 (0.08)		
<i>ICT imports</i>			0.000 (2.82)**	0.000 (5.59)**
<i>Internet penetration</i>	0.003 (6.53)**	0.003 (8.10)**	0.002 (5.26)**	0.002 (5.34)**
<i>Observations</i>	57976	113664	57976	113664

Notes: The estimated model is a Probit model. The dependent variable is a 0/1 indicator of whether the firm is located in a given country. The sample includes only multinationals. The reported coefficients are the marginal effects calculated at the mean of the right hand side variables. \*\* denotes significance at the five per cent level. The model includes all of the firm and country control variables reported in regressions 1 and 2 of Table 6.15, along with dummy variables for each 3-digit industry.

In Table 7.7 we draw on the results in Table 7.6 to quantify the effect of improving ICT levels abroad on the probability of locating production there. For this exercise, for those countries that currently have very low levels of internet penetration and low levels of imports of ICT services, the estimated impacts are very large. For example for Bangladesh, Pakistan, Paraguay and Sri Lanka the increases are over 1000 per cent. It is worth remembering however that even with such increases the number of existing multinationals that choose to locate production there is still likely to be very low.

A feature of this exercise, less evident for example when we consider what would happen were policy conditions to improve to UK levels is the increased number of zero impacts. Of those countries in the table ICT levels in Germany, Japan, South Korea and the Netherlands are currently above UK levels.

ICT levels in India have been identified as an important factor encouraging UK firms to locate subsidiaries there. According to the estimates in Table 7.7 we show that improving ICT levels in India still further would have the expected positive impact on UK outward FDI. In the manufacturing sector the probability an existing multinational would have a subsidiary there would be 0.40, the same probability of having a subsidiary in the US and much higher than France or Germany. In the service sector the figure would be 0.14. This the same probability of a richer country more currently associated with much higher levels of UK outward FDI such as the Netherlands.

Table 7.7: Estimated Effect of Improving English Language Skills

Country	Manufacturing		Services	
	Original Probability	% increase	Original Probability	% increase
Argentina	0.0113	151.7	0.0060	113.7
Bangladesh	0.0015	8969.1	0.0003	3783.6
Brazil	0.0185	243.6	0.0090	149.1
Bulgaria	0.0096	215.1	0.0059	148.0
Chile	0.0117	33.1	0.0077	22.2
China	0.1132	170.8	0.0565	131.4
Czech Republic	0.0304	69.3	0.0157	48.2
Egypt	0.0092	801.4	0.0047	389.7
France	0.2291	19.4	0.1867	14.4
Germany	0.2521	0.0	0.2323	0.0
Greece	0.0201	101.9	0.0161	77.6
Hong Kong	0.0647	10.2	0.0525	15.3
Hungary	0.0349	94.9	0.0284	59.2
India	0.0956	317.2	0.0430	234.3
Italy	0.1217	5.2	0.0929	3.8
Japan	0.0644	0.0	0.0421	0.0
South Korea	0.0448	0.0	0.0322	0.0
Malaysia	0.0201	12.7	0.0157	8.6
Mexico	0.0151	345.4	0.0076	244.3
Netherlands	0.1550	0.0	0.1458	0.0
Pakistan	0.0050	2564.6	0.0010	1448.0
Paraguay	0.0003	3384.1	0.0001	1411.9
Portugal	0.0464	2.6	0.0354	1.8
Romania	0.0186	209.5	0.0136	120.4
Singapore	0.0412	0.1	0.0376	0.2
South Africa	0.0385	152.0	0.0233	121.8
Spain	0.1060	29.5	0.0874	20.4
Sri Lanka	0.0018	1722.2	0.0008	765.8
Thailand	0.0151	211.3	0.0088	125.8
Tunisia	0.0097	366.3	0.0050	229.6
Turkey	0.0208	228.2	0.0150	130.5
Uruguay	0.0026	141.4	0.0014	119.3
USA	0.4066	0.3	0.2722	0.6

Note: The estimated probabilities are the predicted probabilities for each firm averaged for each given destination. Estimated probabilities are calculated using regressions 1 and 2 in Table 6.17.

### 7.3 The Effect of Industry Offshoring on Business Performance

Thus far we have examined the relationship between the characteristics of a business and the decision to offshore by establishing affiliates abroad. In a sense

this is the *direct effect* of offshoring at the level of the firm – firms that offshore tend to be larger and more productive than businesses that do not.

In this section we now consider what might be called the *indirect effect* of offshoring in an industry. Specifically, we investigate the effect of offshoring activity on the performance of businesses operating in the industry. Here the most widely debated question is of course whether offshoring leads to employment losses or gains in the industry and this is something we look at closely. However, we also consider the impact of offshoring on other aspects of business performance, such as wages, productivity and exports. Furthermore, we exploit the firm level dimension of our data by investigating whether the effect of offshoring on business performance differs for different types of firms. For example, are employment gains only in firms that do not engage in offshoring, or are they similar in those that do and those that do not?

To undertake this analysis we use the following methodology. We estimate regressions where the dependent variables are different measures of business performance. In particular, we use employment, turnover, wages, labour productivity and exports. We then regress these dependent variables on measures of offshoring activity in the industry, calculated as the ratios of imported intermediate materials and services over output in the industry. (These are described in Chapter 2 and further definitions are in the Appendix to Chapter 2.) We then interpret the results, using the coefficients obtained from the estimations.

Tables 7.8 and 7.9 report the results of the basic estimation for manufacturing and services respectively.<sup>11</sup> In each we report the estimated coefficient and the t-statistic from the hypothesis that the coefficient is equal to zero. We conclude that the variable is statistically significant if it is significant at the 5% level or less. (This is the case if the reported t-statistics is above the critical value of 1.96).

For the manufacturing sector the regression analysis shows that effect of offshoring is positive on all aspects of firm performance except wages, where the effect is not

---

<sup>11</sup> The regression includes a series of fixed time firm-specific effects, to capture unobserved factors such as managerial ability that are likely to effect firm performance, as well as common time effects, such as changes in aggregate demand.

statistically significantly different from zero. Offshoring, hence, has net positive effects on the manufacturing sector of the UK economy. In particular we find that as offshoring increases in the industry, so does employment in the average firm in that industry. Such a finding of a positive employment effect is evidence against the common fear that offshoring is associated with job losses, and in line with previous studies using more aggregated industry level data which show for the UK (Amiti and Wei, 2005) and a number of OECD countries (Hijzen and Swaim, 2007) that industry level outsourcing is not negatively, and in some cases positively, related to industry level employment. Our analysis goes a step further and shows that offshoring activity in an industry is positively associated with other aspects of firm performance in addition to employment.

The results for the service sector are similar, although they differ in a couple of respects. As in the manufacturing sector the effect of offshoring on employment and output for the average firm in the industry is positive. Unlike the manufacturing sector, however, the effect on wages is negative, whereas the effect on labour productivity and export ratio of the firm is statistically insignificant. Hence, while offshoring in the services sector also leads to employment gains, the average wage paid by firms seems to decline as offshoring increases. This, in contrast to manufacturing, may be in line with the idea that in services sector more high skill activities are being offshored. Hence, there are fewer skilled workers employed in the firm and this implies the average wage taken over all workers is lower as a result (assuming that low skill workers' wages are lower than high skill workers').

In addition to this evidence on statistical associations and signs of the coefficients we can use our estimation to say more about the magnitude of the implied effects. Given the way the empirical model is set up we can interpret the reported coefficients as elasticities. In other words, they represent the effect of a one percentage point change in industry level offshoring on the dependent variable. The elasticities, thus, suggest for example that a one per cent increase in offshoring increases employment in the average firm in the manufacturing sector by 0.147 per cent, and output (total, domestic or exported) in that sector by roughly 0.2 per cent (coefficients of 0.194, 0.205 and 0.220). There is also a non-negligible effect of

offshoring on labour productivity: For every one per cent increase in offshoring labour productivity rises by around 0.05 per cent.

In comparison the effect on business performance in the service sector is not as strong. In the service sector a one per cent increase in offshoring increases employment on average by 0.045 per cent and output by 0.06 per cent.

To provide more detail on the effect of these numbers we present in the last two rows of Tables 7.8 and 7.9 the results of two scenarios of what would happen if the importance of offshoring increased in the UK economy. In the penultimate row we show the effect if offshoring in an industry increased from its current mean by one standard deviation.

In the case of manufacturing total offshoring is as an un-weighted average 2.06 per cent of industry output, with a standard deviation of 2.68, while in the services sector offshoring is an (unweighted) average 0.187 per cent, with a standard deviation of 0.16. Hence, if offshoring in the manufacturing sector were to increase from its mean (2.06) by one standard deviation (2.86) then this would represent a rather large increase of 130 per cent in offshoring activity, compared with a growth of 86 per cent in offshoring in the services sector.

Under such a scenario increasing offshoring in the manufacturing sector would increase employment in the manufacturing sector by around 19 per cent and by 4 per cent in services. This is an additional 13 employees for the average (median) firm in manufacturing and two employees in services.

The effects on turnover are larger. A one standard deviation increase in offshoring in the manufacturing sector would increase output by 25 per cent and by five per cent in the service sector. Labour productivity in the two sectors would rise by six per cent and one per cent respectively.

One could argue that a one standard deviation increase in offshoring is perhaps unrealistically large to expect. If we instead track the increase in actual offshoring by industry over time then we find that between 1994 and 2004 total offshoring increased by 35 per cent whereas in services it increased by close to 48 per cent. If

the same change were to occur again the increase in employment would be five per cent in manufacturing and two per cent in services, while in the increase in output would be 6.8 and 2.9 per cent respectively.

For the average (median) firm this would translate as 6 manufacturing employees per firm (1 in services) and £600,000 increase in sales (£237,000 in services). The effect is smaller in the service industry even though the percentage change in offshoring was larger because of the smaller elasticity in that sector.

*Table 7.8: The Effect of Offshoring on Firm Performance in Manufacturing*

	(1)	(2)	(3)	(4)	(5)	(6)
<i>Imported inputs of...</i>	<b>Employment</b>	<b>Turnover</b>	<b>Domestic Turnover</b>	<b>Wages</b>	<b>Labour Productivity</b>	<b>Exports</b>
<i>Total</i>	0.147	0.194	0.205	-0.009	0.047	0.220
<i>Outsourcing</i>	(7.52)**	(9.25)**	(8.08)**	(0.56)	(3.08)**	(4.76)**
<i>Observations</i>	85453	85449	84956	40418	85263	45718
<i>No. of firms</i>	14346	14345	14318	11654	14340	8793
<i>1 standard deviation change</i>	19.12	25.24	26.67	0.00	6.11	28.62
<i>Change over 1994-2004</i>	5.15	6.79	7.18	0.00	1.65	7.70

*Notes: All variables are in log form. The regression is estimated using two-way fixed effects. All measures of offshoring are lagged one period. \*\* denotes statistical significance at the 5% level*

*Table 7.9: The Effect of Offshoring on Firm Performance in Services*

	(1)	(2)	(3)	(4)	(5)	(6)
<i>Imported inputs of...</i>	<b>Employment</b>	<b>Turnover</b>	<b>Domestic Turnover</b>	<b>Wages</b>	<b>Labour Productivity</b>	<b>Exports</b>
<i>Total</i>	0.045	0.061	0.058	-0.041	0.015	-0.133
<i>Outsourcing</i>	(2.59)**	(2.84)**	(2.50)**	(2.68)**	(0.90)	(1.96)
<i>Observations</i>	185226	185205	183085	94422	185205	43279
<i>No. of firms</i>	35950	35948	35791	29550	35948	10377
<i>1 standard deviation change</i>	3.87	5.25	4.99	-3.53	0.00	0.00
<i>Change over 1994-2004</i>	2.16	2.93	2.78	-1.97	0.00	0.00

*Notes: All variables are in log form. The regression is estimated using two-way fixed effects. All measures of offshoring are lagged one period. \*\* denotes statistical significance at the 5% level*

In Tables 7.10 and 7.11 we investigate the effect of offshoring further by separating the effect of imported intermediate inputs into materials (i.e., manufactured goods) and service inputs. Here the differences between the manufacturing and service sectors become stronger.

In the manufacturing sector it appears that the strong positive association between offshoring and firm performance found above is largely due to the effect of importing intermediate goods rather than services. Offshoring manufactured inputs has a positive effect on employment and output, with an elasticity of around 0.8-0.1. In contrast service inputs that are imported have a negative association with firm turnover (total and domestic) and labour productivity, albeit where these effects are relatively small.

The results for the service sector are similar to the extent that importing manufactured machinery, equipment and materials has a positive effect on a number of aspects of business performance, whereas service imports has a generally negative effect. Also of interest here is the explanation for the relatively small elasticities found for offshoring in the service sector found previously. Once we separate offshoring into manufactured goods and services we find that the elasticities are now much larger, around 0.05-0.1 and broadly offsetting.

*Table 7.10: The Effect of Manufactured and Service Offshoring on Firm Performance in Manufacturing*

	(1)	(2)	(3)	(4)	(5)	(6)
<i>Imported inputs of...</i>	<b>Employment</b>	<b>Turnover</b>	<b>Domestic Turnover</b>	<b>Wages</b>	<b>Labour Productivity</b>	<b>Exports</b>
<i>Manufactured</i>	0.168	0.156	0.157	-0.005	-0.012	0.249
<i>Outsourcing</i>	(9.02)**	(7.82)**	(6.50)**	(0.27)	(0.83)	(5.68)*
<i>Services</i>	-0.018	-0.046	-0.049	-0.008	-0.028	0.033
<i>Outsourcing</i>	(1.74)+	(4.20)**	(3.71)**	(1.03)	(3.58)**	(1.41)
<i>Observations</i>	85267	85263	84771	40418	85263	45597
<i>No. of firms</i>	14341	14340	14313	11654	14340	8785

*Notes: All variables are in log form. The regression is estimated using two-way fixed effects. All measures of offshoring are lagged one period. \*\* denotes statistical significance at the 5% level*

*Table 7.11: The Effect of Manufactured and Service Offshoring on Firm Performance in Services*

	(1)	(2)	(3)	(4)	(5)	(6)
<i>Imported inputs of...</i>	<b>Employment</b>	<b>Turnover</b>	<b>Domestic Turnover</b>	<b>Wages</b>	<b>Labour Productivity</b>	<b>Exports</b>
<i>Manufactured Outsourcing</i>	0.084 (4.93)**	0.127 (6.10)**	0.089 (3.94)**	-0.073 (4.05)*	0.043 (2.56)*	0.204 (2.88)*
<i>Services Outsourcing</i>	-0.051 (4.49)**	-0.041 (2.98)**	-0.038 (2.52)*	0.010 (0.95)	0.009 (0.84)	-0.175 (4.18)*
<i>Observations</i>	185226	185205	183085	94422	185205	43279
<i>No. of firms</i>	35950	35948	35791	29550	35948	10377

*Notes: All variables are in log form. The regression is estimated using two-way fixed effects. All measures of offshoring are lagged one period. \*\* denotes statistical significance at the 5% level*

Concerns about offshoring are most often raised when economic activity is relocated to countries with ‘cheap-labour’. In Tables 7.12 and 7.13 we separate offshored activity according to the country of origin. For offshoring of service activities we are able to separate the country of origin according to whether it was located inside or outside of the EU only. For the manufacturing sector it is possible to disaggregate the country of origin further but we still use a EU non-EU split for purposes of comparison.

Again there appear to be a number of interesting patterns between offshoring and firm performance when using more aggregated data. In the manufacturing sector disaggregation according to the origin of the imported intermediate shows that offshoring to locations outside of the EU does indeed have a negative effect on employment and output of UK firms, but this is confined exclusively to manufactured inputs. There is no significant correlation between services imported from outside the EU on firm performance. Indeed the negative impact of service imports appears to occur from services originating from inside the EU on labour productivity and capital-intensity.

The estimated elasticities differ not only in their sign but also in their magnitude. To quantify the effects of the numbers generated in the Table we repeat the exercise of taking the average increase in offshoring over the period. The effects now also differ

between the different types of offshoring as a result of differences in the growth of each type of offshoring over the 1994-2004 period. For example, the average increase in offshoring of material inputs from inside and outside the EU was 28 and 26 per cent, whereas that of offshored service inputs from outside the EU was 150 per cent (that within the EU was 43 per cent). Combining the estimated elasticities with these changes suggests that were this growth repeated the change employment would rise by 10 per cent as a result of offshoring of materials within the EU and fall by 4.8 and 1.8 as a result of offshoring of materials outside of services outside of the EU (the effect from service offshoring inside the EU is just 0.2 per cent).

The output effects are also a combination of positives and negatives. Offshoring of material inputs inside the EU and services outside the EU was associated with increased output for the average firm of 8.9 per cent and 1.8 per cent respectively, whereas materials from outside the EU and services inside were associated with falls in output of 3.9 and 2.4 per cent.

The largest effect from the changes that occurred was on exports. Here offshoring of materials within the EU and of services outside of the EU were associated with rises in exports of 15 and 12 per cent respectively.

The message for the service sector is somewhat similar. There is no evidence that outsourcing services to non-EU countries has a negative effect on firm performance. Indeed, again, to the extent that negative effects occur, they are confined to manufactured inputs from outside the EU and to services imported from inside the EU.

Table 7.12: The Effect of Manufactured and Service Offshoring by Origin on Firm Performance in Manufacturing

	(1)	(2)	(3)	(4)	(5)	(6)
<i>Imported inputs of...</i>	<b>Employment</b>	<b>Turnover</b>	<b>Domestic Turnover</b>	<b>Wages</b>	<b>Labour Prod.</b>	<b>Exports</b>
<i>EU Material</i>	0.351	0.313	0.238	-0.014	-0.039	0.543
<i>Outsourcing</i>	(10.50)**	(8.79)**	(5.52)**	(0.42)	(1.51)	(7.02)**
<i>Non-EU</i>	-0.182	-0.148	-0.087	0.023	0.035	-0.236
<i>Matrl Outsrc</i>	(5.83)**	(4.45)**	(2.16)*	(0.80)	(1.45)	(3.31)**
<i>EU Services</i>	-0.004	-0.056	-0.038	-0.001	-0.052	-0.034
<i>Outsourcing</i>	(0.15)	(2.03)*	(1.15)	(0.06)	(2.59)**	(0.54)
<i>Non-EU</i>	-0.011	0.012	-0.015	-0.003	0.023	0.081
<i>Serv Outsrc</i>	(0.47)	(0.46)	(0.49)	(0.17)	(1.22)	(1.37)
<i>Observations</i>	75079	75075	74646	35518	75075	39811
<i>No. of firms</i>	12881	12880	12856	10229	12880	7808
<i>Change over 1994-2004</i>						

Notes: All variables are in log form. The regression is estimated using two-way fixed effects. All measures of offshoring are lagged one period. \*\* denotes statistical significance at the 5% level

Table 7.13: The Effect of Manufactured and Service Offshoring by Origin on Firm Performance in Services

	(1)	(2)	(3)	(4)	(5)	(6)
<i>Imported inputs of...</i>	<b>Employment</b>	<b>Turnover</b>	<b>Domestic Turnover</b>	<b>Wages</b>	<b>Labour Prod.</b>	<b>Exports</b>
<i>EU Material</i>	-0.052	0.306	0.232	-0.015	0.361	0.492
<i>Outsourcing</i>	(1.48)	(7.13)**	(4.98)**	(0.35)	(10.45)**	(3.42)**
<i>Non-EU</i>	0.124	-0.185	-0.147	-0.062	-0.312	-0.310
<i>Matrl Outsrc</i>	(3.56)**	(4.33)**	(3.16)**	(1.58)	(9.08)**	(2.04)*
<i>EU Services</i>	-0.070	-0.050	-0.036	0.017	0.020	-0.150
<i>Outsourcing</i>	(5.89)**	(3.45)**	(2.25)*	(1.44)	(1.68)+	(3.06)**
<i>Non-EU</i>	0.017	0.009	-0.001	0.000	-0.008	-0.030
<i>Serv Outsrc</i>	(1.97)*	(0.87)	(0.08)	(0.04)	(0.90)	(0.78)
<i>Observations</i>	185226	185205	183085	94422	185205	43279
<i>No. of firms</i>	35950	35948	35791	29550	35948	10377
<i>Change over 1994-2004</i>						

Notes: All variables are in log form. The regression is estimated using two-way fixed effects. All measures of offshoring are lagged one period. \*\* denotes statistical significance at the 5% level

When generating the above results an assumption made is that the effect of offshoring is identical across all firms. In Tables 7.14 and 7.15 we investigate the possibility that the effects on firm performance differ according to the extent of a firm's global engagement. Are globally engaged firms more or less affected by offshoring? Here we define global engagement according to whether the firm serves the domestic market only, whether they export or whether they are a

multinational (UK or foreign owned). These are measured in the final time period available for each firm, because we do not observe FDI over time.<sup>12</sup>

There are few general patterns to the results from this exercise. One that can be identified, is that, in the manufacturing sector, of the different types of firms foreign multinationals are the least affected by offshoring at the industry level. This manifests itself both as few statistically significant coefficients, and where significance does occur, typically the estimated elasticities are smaller than those on other firm types. This perhaps reflects the fact that there were specific factors, such as the size of the domestic market, the flexibility of labour markets, the levels of human capital, the tax and regulatory regimes and so on that attracted these firms to the UK in the first place and have not changed. Hence, further offshoring activity in the industry does not have that much of an impact on such firms.

Looking more closely at the different types of offshoring we find that the positive effect from materials outsourcing within the EU on employment and turnover identified in Tables 7.12 and 7.13 would appear to be reasonably common across firms. The estimated coefficients are all statistically significant at the five per cent level of significance and similar in size. The estimated elasticities are largest for domestic multinationals, then firms that serve just the domestic market, then exporters and then foreign owned firms. It is not the case therefore that the smallest firms within the industry are either negatively affected or the least likely to benefit from increased offshoring at the industry level. The relationship appears similar for total turnover.

The same variable behaves somewhat differently for firms in the service sector. Here we find that increased offshoring of material inputs from sources within the EU has a negative effect on employment in firms that serve the domestic market only (although it has a positive effect on turnover and labour productivity) but a positive effect on employment and turnover of UK owned multinational firms.

The negative employment and turnover effects of materials outsourcing from sources outside of the EU identified in Table 7.13 appear confined to domestically

---

<sup>12</sup> To estimate different effects for different firm types we use interaction terms in the regression, where we multiply the offshoring variables with dummy variables which are equal to one if the firm is of a certain group (i.e., say, a multinational) and zero if not.

owned firms (including exporters and British multinationals) only. Employment and turnover in foreign owned firms are not affected by such changes. The reductions in employment and sales that do occur as a result of this offshoring are strongest for UK multinationals and firms that serve just the domestic market.

In the service sector the impact on firm sales and employment is more mixed. Increased offshoring of materials outside the EU has a significant positive impact on the employment of firms that serve just the domestic market and exporters, with the effect stronger on the latter, but a negative impact on total sales by firms that serve just the domestic market. A combination of rising employment and falling sales explains the negative effect on labour productivity for both types of UK owned non-multinationals in the sample.

The effect of service offshoring on the performance of manufacturing firms was insignificant in Table 7.13 and we identify few effects when we consider the extent of global engagement of firms. Of those identified they appear confined to exporters. The turnover of UK exporters benefits from increased service offshoring from outside the EU, and for the same change is harmed by an almost identical amount when the offshoring is from inside the EU.

The effects of offshoring of service inputs across different types of firms in the service sector are somewhat more variable compared to firms in manufacturing. In particular there are a number of significant relationships for service offshoring to other EU countries. Increased service offshoring to the EU is associated with declining levels of turnover for all types of firm. Interestingly the strongest effects are found for exporters in both cases.

As a final exercise we estimate the output and employment effects of changes in offshoring for each of the average (median) of the different types of firm. We again use changes in materials and service offshoring from inside and outside the EU that occurred over the sample period as the benchmark against which to measure these effects. We report the results from each of the different components of offshoring (we report the percentage changes in parenthesis) and add these effects to provide a total effect in Table 7.16. In all cases we use only those elasticities that are statistically significant in Tables 7.14 and 7.15.

Table 7.14: The Effect of Manufactured and Service Offshoring by Origin on Firm Performance by Global Engagement in Manufacturing

	(1)	(2)	(3)	(4)	(5)	(6)
<i>Imported inputs of...</i>	<b>Employment</b>	<b>Turnover</b>	<b>Domestic Turnover</b>	<b>Wages</b>	<b>Labour Prod.</b>	<b>Exports</b>
<i>EU Matrls Outsorc</i>						
Domestic Only	0.404 (5.85)**	0.377 (5.17)**	0.402 (5.27)**	-0.027 (0.41)	-0.032 (0.62)	1.537 (3.79)**
Exporters	0.352 (7.40)**	0.319 (6.44)**	0.244 (3.75)**	-0.018 (0.33)	-0.034 (0.89)	0.563 (5.33)**
Domestic MNEs	0.527 (4.33)**	0.495 (3.66)**	0.448 (2.54)**	-0.085 (0.86)	-0.034 (0.40)	0.271 (1.30)
Foreign MNEs	0.265 (4.03)**	0.166 (2.33)**	0.029 (0.31)	-0.032 (0.46)	-0.099 (1.82)	0.377 (2.68)**
<i>Non-EU Matrl Outsrc</i>						
Domestic Only	-0.305 (4.62)**	-0.182 (2.61)**	-0.156 (2.14)**	0.066 (1.12)	0.128 (2.59)**	-0.883 (2.39)**
Exporters	-0.135 (2.97)**	-0.173 (3.66)**	-0.072 (1.16)	0.026 (0.59)	-0.038 (1.05)	-0.256 (2.53)**
Domestic MNEs	-0.377 (3.23)**	-0.375 (2.90)**	-0.433 (2.57)**	0.072 (0.91)	0.002 (0.02)	-0.070 (0.37)
Foreign MNEs	-0.082 (1.43)	-0.043 (0.70)	0.065 (0.81)	-0.005 (0.09)	0.038 (0.82)	-0.097 (0.80)
<i>EU Services Outsrcing</i>						
Domestic Only	-0.022 (0.41)	-0.107 (1.92)	-0.115 (1.98)**	-0.035 (0.88)	-0.085 (2.16)**	0.089 (0.26)
Exporters	-0.063 (1.60)	-0.091 (2.20)**	-0.087 (1.61)	0.030 (0.93)	-0.027 (0.86)	-0.079 (0.89)
Domestic MNEs	0.011 (0.11)	-0.063 (0.57)	-0.095 (0.66)	-0.073 (1.31)	-0.075 (1.09)	0.213 (1.29)
Foreign MNEs	0.009 (0.20)	-0.052 (1.02)	0.013 (0.20)	-0.000 (0.00)	-0.062 (1.58)	-0.016 (0.15)
<i>Non-EU Serv Outsrcing</i>						
Domestic Only	-0.082 (1.82)	-0.041 (0.86)	-0.015 (0.31)	0.025 (0.70)	0.040 (1.19)	0.115 (0.39)
Exporters	0.069 (1.87)	0.092 (2.37)**	0.080 (1.58)	-0.051 (1.62)	0.022 (0.75)	0.113 (1.35)
Domestic MNEs	0.037 (0.40)	0.070 (0.67)	0.078 (0.58)	0.005 (0.10)	0.034 (0.52)	-0.143 (0.92)
Foreign MNEs	-0.011 (0.25)	0.018 (0.37)	-0.065 (1.01)	0.015 (0.37)	0.029 (0.78)	0.046 (0.45)

Notes: All variables are in log form. The regression is estimated using two-way fixed effects. All measures of offshoring are lagged one period. \*\* denotes statistical significance at the 5% level

Table 7.15: The Effect of Manufactured and Service Offshoring by Origin on Firm Performance by Global Engagement in Services

	(1)	(2)	(3)	(4)	(5)	(6)
<i>Imported inputs of...</i>	<b>Employment</b>	<b>Turnover</b>	<b>Domestic Turnover</b>	<b>Wages</b>	<b>Labour Prod.</b>	<b>Exports</b>
<i>EU Matrls</i>	<i>Outsurc</i>					
Domestic Only	-0.190 (4.19)**	0.170 (2.95)**	0.207 (3.53)**	-0.011 (0.19)	0.365 (7.83)**	0.318 (0.60)
Exporters	-0.051 (0.58)	0.210 (2.10)**	-0.119 (0.91)	-0.078 (0.68)	0.262 (3.33)**	0.228 (1.07)
Domestic MNEs	0.420 (2.39)**	0.441 (2.23)**	0.386 (1.69)	-0.313 (1.71)	0.022 (0.15)	0.206 (0.53)
Foreign MNEs	0.066 (0.87)	0.532 (5.83)**	0.347 (3.31)**	0.081 (0.93)	0.466 (6.28)**	0.688 (2.75)**
<i>Non-EU Matrl</i>	<i>Outsrc</i>					
Domestic Only	0.141 (3.16)**	-0.225 (3.98)**	-0.254 (4.41)**	-0.047 (0.87)	-0.371 (8.10)**	-0.922 (1.80)
Exporters	0.205 (2.18)**	0.014 (0.13)	0.205 (1.47)	-0.031 (0.30)	-0.191 (2.29)*	-0.328 (1.44)
Domestic MNEs	0.158 (0.89)	0.195 (0.97)	0.092 (0.40)	0.073 (0.45)	0.037 (0.24)	0.859 (2.14)**
Foreign MNEs	0.091 (1.20)	-0.213 (2.33)*	-0.108 (1.03)	-0.154 (1.99)*	-0.304 (4.10)**	-0.453 (1.70)
				*		
<i>EU Services</i>	<i>Outsrcing</i>					
Domestic Only	-0.060 (3.88)**	-0.031 (1.57)	-0.031 (1.54)	0.009 (0.52)	0.030 (1.85)	-0.263 (1.35)
Exporters	-0.093 (3.03)**	-0.114 (3.27)**	-0.105 (2.32)**	0.010 (0.35)	-0.021 (0.75)	-0.156 (2.20)**
Domestic MNEs	-0.106 (1.83)	-0.080 (1.23)	0.042 (0.55)	0.086 (1.90)	0.026 (0.52)	-0.009 (0.07)
Foreign MNEs	-0.076 (2.93)**	-0.075 (2.43)**	-0.061 (1.71)	0.015 (0.67)	0.000 (0.01)	-0.187 (2.16)**
<i>Non-EU Serv</i>	<i>Outsrcing</i>					
Domestic Only	0.025 (2.20)**	0.016 (1.07)	0.019 (1.30)	-0.000 (0.03)	-0.010 (0.81)	-0.080 (0.56)
Exporters	-0.012 (0.51)	0.011 (0.38)	0.067 (1.87)	0.007 (0.33)	0.023 (1.06)	-0.019 (0.33)
Domestic MNEs	0.017 (0.39)	0.082 (1.64)	-0.003 (0.04)	0.040 (1.20)	0.064 (1.73)	-0.059 (0.56)
Foreign MNEs	0.018 (0.97)	-0.006 (0.28)	-0.033 (1.23)	-0.007 (0.51)	-0.025 (1.34)	-0.012 (0.18)

Notes: All variables are in log form. The regression is estimated using two-way fixed effects. All measures of offshoring are lagged one period. \*\* denotes statistical significance at the 5% level

The results in Table 7.16 suggest that some of the changes that occurred over the sample period in the extent of offshoring translated into large changes in employment and output, although in total the effects are somewhat more modest. For example the increase in offshoring of materials from the EU of 28 per cent translates into an addition 50 employees for the average domestic multinational and some £4,643,000 rise in total sales. In the aggregate however the net increase in jobs was 18 employees and £1.4 million in sales. Of interest from the comparison of the total effect for manufacturing firms was that in all cases the estimated impact is positive, with the largest employment and turnover effects occurring for UK multinational firms.

The estimated effect of offshoring in the service sector is less clearly positive, and is in general larger than those for manufacturing. For example, the 71 per cent increase in offshoring of materials from the EU was associated with around a 30 per cent increase in employment and turnover for UK multinationals and a 37 per cent increase in turnover for foreign owned multinationals. Again the total effects are smaller however. While employment in the average UK multinational rose by 50 employees as a result of offshoring at the industry level, and 5 employees for firms that export, employment fell in firms that serve just the domestic market and foreign multinationals. Finally, the effect on turnover was more clearly positive than that of employment and on average larger than that for the manufacturing sector. For the average UK multinational offshoring was associated with a rise of £8 million, of £2.2 million for foreign multinationals and just under £1 million for exporters.

Table 7.16: Estimated Effect on Employment and Turnover of Increased Offshoring for Firms with Different Degrees of Global Engagement

<i>Imported inputs of...</i>	<b>Employment</b>	<b>Turnover £000s</b>	<b>Employment</b>	<b>Turnover £000s</b>
	<i>Manufacturing</i>		<i>Services</i>	
<i>EU Matrls</i>	<i>Outsurc</i>			
Domestic Only	10.38 (11.53)	821.25 (10.76)	-6.14 (-13.47)	783.47 (12.05)
Exporters	11.73 (10.05)	874.60 (9.11)	0.00 (0.00)	1458.33 (14.88)
Domestic MNEs	53.29 (15.04)	4643.10 (14.13)	50.31 (29.77)	8078.69 (31.25)
Foreign MNEs	10.90 (7.56)	821.04 (4.74)	0.00 (0.00)	4207.33 (37.70)
<i>Non-EU</i>	<i>Matrl Outsurc</i>			
Domestic Only	-7.22 (-8.02)	-365.40 (-4.79)	4.24 (9.29)	-963.91 (-14.82)
Exporters	-4.15 (-3.55)	-437.15 (-4.55)	7.37 (13.51)	0.00 (0.00)
Domestic MNEs	-35.14 (-9.92)	-3241.91 (-9.87)	0.00 (0.00)	0.00 (0.00)
Foreign MNEs	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	-1565.86 (-14.03)
<i>EU Services</i>	<i>Outsurc</i>			
Domestic Only	0.00 (0.00)	0.00 (0.00)	-1.21 (-2.65)	0.00 (0.00)
Exporters	0.00 (0.00)	-379.54 (-3.95)	-2.24 (-4.10)	-492.95 (-5.03)
Domestic MNEs	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Foreign MNEs	0.00 (0.00)	0.00 (0.00)	-1.91 (-3.35)	-369.33 (-3.31)
<i>Non-EU Serv</i>	<i>Outsurc</i>			
Domestic Only	0.00 (0.00)	0.00 (0.00)	0.50 (1.10)	0.00 (0.00)
Exporters	0.00 (0.00)	1327.11 (13.82)	0.00 (0.00)	0.00 (0.00)
Domestic MNEs	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Foreign MNEs	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
<b>Total</b>				
<i>Domestic only</i>	3.16	455.85	-2.61	-180.44
<i>Exporters</i>	7.58	1385.02	5.13	965.38
<i>Domestic MNEs</i>	18.16	1401.19	50.31	8,078.69
<i>Foreign MNEs</i>	10.90	821.04	-1.91	2,272.14

Aggregating up from these average effects suggests that the net impact of offshoring over the sample period has been close to 100,000 additional jobs and £10 billion in turnover. These are detailed in Table 7.17 below. As has already been made clear the impact of this offshoring has been uneven on both turnover and employment both in the firms that have benefited and across sectors. According to these estimates the employment gains in manufacturing were around twice those in services, while the gains to turnover have been around three times larger.

*Table 7.17: Estimated Aggregate Effect on Employment and Turnover of Increased Offshoring for Firms with Different Degrees of Global Engagement*

Effect of Offshoring	Employment	Turnover	Employment	Turnover
	<i>Manufacturing</i>	<i>£000's</i>	<i>Services</i>	<i>£000's</i>
<i>Domestic Only</i>	8,460	1,221,212	-36,318	-2,511,669
<i>Exporters</i>	18,839	3,440,377	16,466	3,096,932
<i>Domestic MNEs</i>	10,730	828,106	61,227	9,831,767
<i>Foreign MNEs</i>	28,382	2,138,800	-10,669	1,2719,419
<b>Total</b>	<b>66,411</b>	<b>7,628,495</b>	<b>30,705</b>	<b>2,3136,449</b>

## 7.4 Summary

In this Chapter we began by asking: which factors determine the decision of where to locate a foreign affiliate? Our econometric results show that firms are more likely to offshore in countries that are: relatively large and relatively wealthy, relatively close to the UK and English speaking, relatively human capital abundant and with good ICT infrastructure and a ‘market friendly’ policy environment.

We also find that the importance of human capital is particularly strong when the country is also English speaking. Furthermore, countries appear more attractive if they have a good legal system and property right protection, and business friendly regulations.

We then went on to ask: what is the effect of industry level offshoring on business performance? Our analysis yielded a range of clear results. These indicate that, in general: offshoring has a positive effect on employment and other aspects of business performance (including turnover, productivity, exports) in the manufacturing sector; whilst, in the services sectors, only employment and turnover are positively affected by offshoring and average wages show a small decline.

## 8. CONCLUSIONS

This Report has focused on economic effects of offshoring in general and implications for the UK economy in particular. As we noted at the outset, we live in an increasingly globalised world and growing offshoring activity is a manifestation of that phenomenon, fuelled by some of the same drivers as globalisation in general, notably the proliferation of new technology and declining costs of doing business internationally.

Offshoring, though growing in prevalence, is not yet as pervasive as media headlines often imply, nor does it largely involve multinationals in rich countries setting up affiliates in poor countries. Most offshoring business is still between OECD economies, though at the margin India and China are increasing in importance. The secondary evidence that we reviewed suggested that offshoring tended to be associated with productivity improvement and overall had benign employment consequences, in the sense that employment effects were either neutral or modestly beneficial.

Secondary evidence supporting this conclusion exists for the UK, which we discuss. We go beyond that, however, in assembling a purpose built dataset to investigate in more detail the performance characteristics of UK enterprises which offshore. This shows that it tends to be high performing firms that do so; and doing so results in increased turnover, improved productivity, increased exports and higher employment.

Clearly, from an economy wide perspective, activities which result in improved productivity, increased exports and higher employment are to be welcomed rather than discouraged and economic policy should not therefore be targeted at obstructing the process. Equally clearly, however, we need to acknowledge that offshoring does lead to increased job turnover and is a contributory factor in changing the skill / job mix within the enterprise and within the economy more widely. Policy should therefore help smooth adjustment. That does not mean offshoring-specific adjustment policies. After all, it is a minority contributor to job turnover. Rather it means continued investment in skill upgrading to increase adaptability and facilitate transition from one job to another and continued investment in research and development to sustain new business.

## References:

- Abramovsky, L., Griffith, R. and Sako, M. (2004) *Offshoring and Business Service and its Impact on the UK Economy*, AIM Research Report
- Amiti, M. and S. Wei (2005a) 'Fear of Service Outsourcing: Is it Justified?,' *Economic Policy* 20, 308-347
- Amiti, M. and S. Wei (2005b) 'Service offshoring and productivity: Evidence from the United States,' NBER Working Paper 11926
- Antras, P. and E. Helpman (2004), Global sourcing, *Journal of Political Economy* 112, pp. 552-580
- Arndt, S. and H. Kierzkowski (2001), Introduction, in: Arndt and Kierzkowski, *Fragmentation: New production patterns in the world economy*, Oxford University Press
- Baier, S. and J. Bergstrand (2000), The growth of world trade and outsourcing, mimeo, Notre Dame University
- Baldone, S., F. Sdogati and L. Tajoli (2001), Patterns and determinants of international fragmentation of production, *Review of World Economics* 137, pp.80-104
- Brown, S. and J. Spletzer (2005), Labour Market Dynamics Associated with the Movement of Work Overseas. Meeo, US Bureau of Labour Statistics
- Cairncross, F. (1997), *The Death of Distance*, London, Orion Publishing.
- Crafts, N.F. (2004), Globalisation and Long Run Growth, *The World Economy* 27, pp.45-58
- Criscuolo, C. and M. Leaver (2006) "Offshore outsourcing and productivity", mimeo, Office for National Statistics
- Criscuolo, C. and R. Martin (2004), Multinationals and US Productivity Leadership: Evidence from Great Britain, CEP Discussion Paper 0672, London School of Economics
- Deutsche Bank Research (2004), *Offshoring: Globalisation wave reaches services sector* (available at [www.dbresearch.com](http://www.dbresearch.com))
- Egger, P., M. Pfaffermayr and A. Weber (2003), Sectoral Adjustment of Employment: the Impact of Outsourcing and Trade at the Micro Level, IZA Discussion Paper 921
- Geishecker, I., H. Görg and D. Taglioni (2007), Survival, exit and entry: the contribution of multinationals to euro area aggregate productivity growth, mimeo, GEP University of Nottingham and European Central Bank

- Geishecker, Ingo (2006), Does outsourcing to Central and Eastern Europe really threaten manual workers' jobs in Germany?, *The World Economy*, Vol. 29, pp. 559-583
- Girma, S. and H. Görg (2007a), Multinationals' productivity advantage: Scale or technology?, *Economic Inquiry*, Vol. 45, pp. 350-362
- Girma, S. and H. Görg (2007b), Evaluating the foreign ownership wage premium using a difference-in-differences matching approach, *Journal of International Economics*, Vol. 72, pp. 97-112
- Görg, H. (2000), Fragmentation and trade: US inward processing trade in the EU, *Review of World Economics* 136, pp. 403-422
- Görg, H. and A. Hanley (2005), Labour demand effects of international outsourcing: Evidence from plant level data, *International Review of Economics and Finance*, Vol. 14, pp. 365-376
- Görg, H., A. Hanley and E. Strobl (2007), Productivity effects of international outsourcing: Evidence from plant level data, *Canadian Journal of Economics* (forthcoming)
- Greenaway, D. and R. Kneller (2007), Firm Heterogeneity, Exporting and Foreign Direct Investment, *Economic Journal*, Vol. 117, pp.F134-161
- Greenaway, D. and R. Kneller (2008), Exporting, Agglomeration and Productivity, *European Economic Review*, Vol. 52, pp. 919-939
- Hanson, G.H., R.J. Mataloni and M.J. Slaughter (2003), Vertical production networks in multinational firms, mimeo, Dartmouth College
- Hijzen, A. and P. Swaim (2007), Does offshoring reduce industry employment?, mimeo, OECD
- Hijzen, A., M. Pisu, R. Upward and P. Wright (2007), Employment, Job Turnover and Trade in Services: Firm Level Evidence. Mimeo, University of Nottingham
- Hijzen, A., R. Upward and P. Wright (2007) Job Creation, Job Destruction and the Role of Small Firms: Firm-Level Evidence for the UK. *GEP Research Paper 2007/01*, University of Nottingham
- Jacobson, L., R. LaLonde and D. Sullivan (1993), Earnings Losses of Displaced Workers, *American Economic Review*, Vol.83, pp.685-709
- Kurz, C.J. (2006) 'Outstanding outsourcers: A firm and plant level analysis of production sharing,' Working Paper, Federal Reserve Board, Washington DC
- Lipsey, R. (2001), Foreign direct investment and the operations of multinational firms: Concepts, history, and data, NBER Working Paper 8665, Cambridge, M.A., National Bureau of Economic Research

- Markusen, James R. (2007), Trade and foreign direct investment in Business Services: a modelling approach, mimeo, University of Colorado, Boulder
- Munch, J. (2005), International Outsourcing and Individual Job Separations. Meeo, Institute of Economics, University of Copenhagen
- OECD (2007), Offshoring and Employment: Trends and Impacts, Paris, OECD
- Olsen, K.B. (2006), Productivity Impacts of Offshoring and Outsourcing: A Review. DSTI Working Paper 2006/1, OECD
- Swenson, D. (2000), Firm outsourcing decisions: Evidence from U.S. foreign trade zones, *Economic Inquiry* 38, pp. 175-189
- Swenson, D. (2004), Entry costs and outsourcing decisions: evidence from the US overseas assembly provision, *North American Journal of Economics and Finance*, 15, 267-286
- Tomiura, E. (2005) 'Foreign outsourcing and firm-level characteristics: Evidence from Japanese manufacturers,' *Journal of the Japanese and International Economies* 19, 255-271
- Yeaple, S. (2003), The complex integration strategies of multinational firms and cross country dependencies in the structure of FDI, *Journal of International Economics*, Vol.60, pp.293-314
- Yeats, A. (2001), Just how big is global production sharing?, in: Arndt and Kierzkowski, *Fragmentation: New production patterns in the world economy*, Oxford University Press

## Appendix to Chapter 2:

### Calculation of offshoring measures (imported intermediate inputs)

This definition is taken from Geishecker (2006).

Offshoring is measured as the value of an industry's imported intermediate inputs from industries abroad as a share of the domestic industries output. In order to allocate imports according to their use as inputs across industries we employ input-output tables for the UK. This enables us to observe the share of imports from an industry abroad that is used by the domestic industry in a given period (denoted  $k$  in the equation below).

Formally, offshoring in domestic industry  $j$  in year  $t$  is defined as

$$\text{OFF}_{jt} = \sum (\text{IMP}_{jt} * k_{jt}) / Y_{jt}$$

Where  $IMP$  are imports,  $k$  is the proportion of imports used by the domestic industry, and  $Y$  is industry output. By differentiating imports by the origin while assuming  $k$  to be constant across countries one can construct offshoring measures for different geographic regions.

Data come from OECD trade statistics, UK Input output tables and the EU KLEMS database (available at <http://www.euklems.org/>).

## Appendix to Chapter 6:

### Data Appendix

The primary source of information on firms used in the study is the FAME (Financial Analysis Made Easy) database of private and public companies made available by Bureau van Dijk. This data is derived from the accounts that companies are legally required to deposit at Companies House. The description of FAME given by Bureau van Dijk reads as follows:

*" FAME is a database that contains information for companies in the UK and Ireland. FAME contains information on 3.4 million companies, 2.4 million of which are in a detailed format. For the top 2.4 million companies the reports typically include: contact information including phone, e-mail and web addresses plus main and other trading addresses, activity details, 29 profit and loss account and 63 balance sheet items, cash flow and ratios, credit score and rating, security and price information (listed companies only), names of bankers, auditors, previous auditors and advisors, details of holdings and subsidiaries (including foreign holdings and subsidiaries), names of current and previous directors with home addresses and shareholder indicator, heads of department, shareholders, news plus access to the scanned image of the latest annual returns and reports."*

The database has a number of attractions as a sample frame for investigating the relationship between multinationality and business performance.

- Information on employment, physical capital, output and wages are provided in a consistent way both across firms and across time.
- FAME contains very recent data, making it more relevant for policy analysis.
- The data contain rich information on a host of non-performance variables such as a company's main activity (the five-digit industry indicator) and geographical location.
- FAME is one of a very small number of datasets to contain firm level export data.
- The database has a time series element, allowing the study of the dynamics of firm performance.

The data are collected from FAME and cover the period 1996-2005. Having excluded firms from Ireland, and companies that are dissolved or in the process of liquidation gives a total number of 629,810 observations (259,699 in the manufacturing sector and 370,111 in the service sector). This number falls to 377,092 (103,411 manufacturing and 273,681 in services) when we exclude firms that do not have complete information on output or employment. This represents information on 16,332 manufacturing firms and 50,307 in the service sector. Thus the sample frame for analysis is large, with the potential to capture significant variations in corporate behaviour across companies and through time. To allow cross-time comparisons we converted current to constant price values using highly disaggregated price deflators (at the SIC 92 level) collected from the Office for National Statistics. The number of observations by firm is given in Table 1.

**Table 1: Number of Observations per Firm**

<b>Number of Years</b>	<b>Number of Observations</b>	
	<i>Manufacturing</i>	<i>Services</i>
1	1,878	7,789
2	2,436	10,966
3	3,723	14,484
4	4,860	17,036
5	5,695	20,600
6	6,714	21,696
7	6,909	23,072
8	8,640	24,080
9	17,946	45,918
10	44,610	88,040

In order to make meaningful comparisons of business performance we have excluded some industries from the analysis. We include in the sample those firms with a SIC code 15-36 (manufacturing industries) and between 45-74 (business services).

**Table 2: SIC Codes Used**

<b><i>SIC Code</i></b>	<b><i>Industry</i></b>
15	Manufacture of food products & beverages
16	Manufacture of tobacco products
17	Manufacture of medical, precision & optical instruments, watches & clocks
18	Manufacture of radio, television & communication equipment
19	Manufacture of machinery & equipment
20	Manufacture of electrical machinery
21	Manufacture of textiles
22	Manufacture of chemicals & chemical products

---

23	Manufacture of other transport equipment
24	Manufacture of rubber & plastic products
25	Manufacture of wearing apparel
26	Manufacture of basic metals
27	Manufacture of motor vehicles, trailers & semi-trailers
28	Manufacture of office machinery
29	Manufacture of fabricated metal products (except machinery)
30	Manufacture of furniture & other manufacturing
31	Manufacture of pulp, paper & paper products
32	Manufacture of other non-metallic mineral products
33	Manufacture of leather & leather products
34	Manufacture of wood & wood products
35	Processing of nuclear fuel
36	Publishing printing & reproduction of recorded media
45	Construction
50	Sale, maintenance and repair of motor vehicles and motorcycles; retail sale of automotive fuel
51	Wholesale trade and commission trade
52	Retail trade; repair of personal and household goods
55	Hotels and restaurants
60	Land transport
61	Water transport
62	Air transport
63	Supporting and auxiliary transport activities; activities of travel agencies
64	Post and telecommunications
65	Financial intermediation, except insurance and pension funding
66	Insurance and pension funding, except compulsory social security
67	Activities auxiliary to financial intermediation
70	Real estate activities
71	Renting of machinery and equipment
72	Computer and related activities
73	Research and development
74	Other business activities

---

GDP, GDP per capita are measured in US\$ at PPP exchange rates. These data are from the IMF and for 2005 and are available for 123 countries.

Fraser Institute index are from the year 2004 and are available for 106 countries. These data include the following

---

<i>Index Measuring</i>	<i>Includes information on</i>
Legal Structure and Property Rights	<ul style="list-style-type: none"> <li>• Judicial independence: the judiciary is independent and not subject to interference by the government or parties in disputes</li> <li>• Impartial courts: A trusted legal framework exists for private businesses to challenge the legality of government actions or regulation</li> <li>• Protection of intellectual property</li> </ul>

---

---

Macroeconomic Stability	<ul style="list-style-type: none"> <li>• Military interference in rule of law and the political process</li> <li>• Integrity of the legal system</li> <li>• Standard inflation variability in the last five years.</li> </ul>
Credit Market Regulation	<ul style="list-style-type: none"> <li>• Ownership of banks: percentage of deposits held in privately owned banks.</li> <li>• Competition: domestic banks face competition from foreign banks</li> <li>• Extension of credit: percentage of credit extended to private sector.</li> <li>• Avoidance of interest rate controls and regulations that lead to negative real interest rates.</li> <li>• Interest rate controls: interest rate controls on bank deposits and/or loans are freely determined by the market</li> </ul>
Business Regulations	<ul style="list-style-type: none"> <li>• Price controls: extent to which businesses are free to set their own prices.</li> <li>• Administrative conditions and new businesses: administrative procedures are an important obstacle to starting a new business</li> <li>• Time with government bureaucracy: senior management spends a substantial amount of time dealing with government bureaucracy</li> <li>• Starting a new business: starting a new business is generally easy</li> <li>• Irregular payments: irregular, additional payments connected with import and export permits, business licenses, exchange controls, tax assessments, police protection, or loan applications are very rare</li> </ul>
Labour Market Regulations	<ul style="list-style-type: none"> <li>• Impact of minimum wage: the minimum wage, set by law, has little impact on wages because it is too low or not obeyed</li> <li>• Hiring and firing practices: hiring and firing practices of companies are determined by private contract</li> <li>• Share of labor force whose wages are set by centralized collective bargaining</li> <li>• Unemployment Benefits: the unemployment benefits system preserves the incentive to work</li> </ul>
International Capital Market Controls	<ul style="list-style-type: none"> <li>• Use of conscripts to obtain military personnel</li> <li>• Access of citizens to foreign capital markets and foreign access to domestic capital markets.</li> <li>• Restrictions on the freedom of citizens to engage in capital market exchange with foreigners—index of capital controls among 13 IMF categories.</li> </ul>

---

*Source: Fraser Institute*

Human capital measured as the mean years of schooling of the population aged over 25. This data is taken from the update of Barro and Lee (2000) and is available for 92 countries.

Corruption measured using the Transparency International corruption perception index. These data are for 2003 and are for 86 countries.

Distance, measured as by the great arc circle distance, dummies indicating common language, common borders (Republic of Ireland Dummy), membership of the EU and OECD all taken from Andrew Rose website . These data are available for a total of 107 countries. The countries included as using English as their primary language are Australia, Bahamas, Barbados, Cameroon, Canada, Fiji, Ghana, Guyana, Hong Kong, India, Ireland, Jamaica, Malawi, Malta, Mauritius, New.Zealand, Nigeria, Philippines, Singapore, Solomon Islands, South Africa, Tanzania, Trinidad and Tobago, USA, Uganda, Zambia, Zimbabwe. Summary information on the variables used in the regressions are available in Table ~.

	<b>Observations</b>	<b>Mean</b>	<b>Standard deviation</b>	<b>Min</b>	<b>Max</b>
<i>Log(GDP)</i>	123	11.37	1.87	6.86	18.29
<i>Log(GDP per capita)</i>	123	9.02	1.15	6.56	11.30
<i>Log(Distance)</i>	103	8.47	0.92	5.77	9.84
<i>R. Ireland</i>	107	0.01	0.10	0.00	1.00
<i>English Language</i>	107	0.25	0.44	0.00	1.00
<i>Regional</i>	107	0.08	0.28	0.00	1.00
<i>OECD Dummy</i>	107	0.19	0.39	0.00	1.00
<i>Log(Human capital)</i>	92	1.79	0.55	-0.27	2.51
<i>Size of Govt.</i>	106	6.02	1.43	2.54	9.18
<i>Legal system &amp; property rights</i>	106	5.49	2.02	1.08	9.17
<i>Macro stability</i>	106	8.11	1.64	0.00	9.80
<i>International Trade</i>	106	6.93	1.15	1.88	9.48
<i>Regulation</i>	106	6.09	0.98	3.63	8.51
<i>Taxes on Int. Trade</i>	99	7.53	1.54	2.83	10.00
<i>Int. Capital Mkt. Control</i>	99	5.57	2.36	0.00	9.31
<i>Regulatory Trade barrier</i>	95	6.46	1.50	0.61	9.47
<i>Corruption</i>	86	5.36	2.45	0.30	8.70