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Offshoring and the labour market: What are the issues?

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Preface

Offshoring – that is in itself is not a new phenomenon – has recently gained a new dynamic through the decrease in transportation costs and dramatic advances in information technology. This has facilitated further fragmentation of production processes as well as the relocation of production stages. Developing countries play an increasingly important role in this process. The inclusion of developing countries in "global production networks" enables multinational firms to profit from the generally lower labour costs in developing countries. It is this aspect that has led to fears in the industrialized countries that jobs previously held in the North will be "relocated" to developing and transition countries. Market research companies have fuelled these fears by presenting alarming headline statistics that predict massive job losses at the expense of workers in developed countries.

Although offshoring is often blamed for lower job creation and downward wage pressure in advanced economies, a thorough examination of the literature leads to the conclusion that these fears are often greater than the actual threat. The literature has mainly focused on the impact of offshoring in developed countries, i.e. those countries that relocate tasks abroad. However, few attempts have been made to investigate the impact of this process in receiving countries in the developing world. The effect on the recipient economies could be more complex, since it induces the start-up of new activities and consequent externalities. Approaching "offshoring" from this perspective is often done under the label "inshoring".

This paper reviews some of the issues brought forward in the debate on offshoring. It defines the term clearly and draws the border between offshoring and related terms. The study also identifies the forces that drive offshoring, the tasks that are most susceptible to relocation, and the most likely destinations. A more technical section presents the tools and the available data to measure offshoring and its consequences. Special focus will be given to the impact of offshoring on employment and inequality, both in the countries that offshore and those that host offshored activities.

Two broad conclusions emerge from the discussion: Firstly, for developing countries offshoring has the potential to generate employment, both in services and manufacturing. As far as those jobs correspond to good working conditions, offshoring represents a possibility to benefit from globalization and help countries in their development process and in the rise of formal jobs. Secondly, in developed countries, the employment impact has so far been rather limited in terms of net job gains or losses. However, offshoring has often predominantly affected unskilled workers and put pressure on their wages relative to those of skilled workers, thus contributing to greater wage inequality. Therefore, offshoring has an effect that is similar to that of technological change, exacerbating the later. Nevertheless, new offshoring trends, in particular in services, shows a rising offshoring of "higher skilled" activities.

Briefly put, the further fragmentation of production processes has added to the division of labour around the world. This dynamic element of globalization leads to new opportunities of specialization, but also fiercer competition. The private sector is driving the process, but public policy may play an important role in grasping the benefits of offshoring through the design of "modern" industrial policies, FDI policies, as well as educational and skill development policies.

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1. Introduction: Offshoring and the labour market[1]

Although offshoring, which means the relocation of production processes abroad, is an age-old phenomenon, it has recently gained a new dynamic through the decrease in transportation and communication costs and dramatic advances in information technology. This has facilitated the relocation of "traditional" production stages (the so called "material offshoring") and has allowed the relocation of immaterial process, i.e. service offshoring. These transformations have involved firms across many different economic sectors and new economic actors. Indeed, in the last decade, offshoring towards developing countries – both material and immaterial – has increased. The inclusion of developing countries in global production systems enables firms to profit from the generally lower labour costs in developing countries. It is this aspect that has led to fears in the industrialized countries that jobs previously held in the North will be "re-located" to developing and transition countries. Market research companies have fuelled these fears by presenting alarming headline statistics that predict massive job losses at the expense of workers in developed countries (McCarthy et al. 2002, McCarthy 2004 and Parker 2004). Offshoring has thus been hotly debated in the United States but also in Europe.[2]

Production relocation has been defined in different ways but, following the more widespread terminology in FDI literature, we call it "offshoring", even though we integrate other approaches in our analysis[3]. Although a lot of effort has been done recently to collect firm and sectoral level information, the scarcity of accurate data still presents a main challenge to quantify offshoring, and consequently to analyze its determinants and economic impact. Indeed, though production relocation, firms could improve their productivity; countries could change their specialization pattern; and this could have a positive outcome on economic growth and development. On the other side, this process could imply high adjustment costs in term of unemployment and inequality.

Although offshoring is often blamed for lower job creation and downward wage pressure in advanced economies, a thorough examination of the literature leads to the conclusion that these fears are often greater than the actual threat. Moreover, the public debate has mainly focused on the impact of offshoring away from those countries that relocate tasks abroad, but it has rarely taken into consideration that these countries are both "origin" and "destination" of production relocation. Finally, few attempts have been made to investigate the impact on developing countries, which are increasing their importance as a destination for offshoring. The effect on the recipient economies could be more complex, since it induces the start-up of new activities and consequent externalities. From a labour market point of view, it could encourage the creation of new job, but at the same time increase inequality. Approaching "offshoring" from this perspective is often done under the label "inshoring".

The rising importance of offshoring activities and the segmentation of production provide new opportunities for developed and developing countries. Nevertheless, to maximize efficiency without neglecting equity concerns, offshoring requires "active governance". This means that public policies should focus on providing an appropriate business environment for offshoring activities, but also on easing the transition of workers between jobs, and on containing rising inequality within the domestic economy.

This paper reviews some of the issues brought forward in the debate on offshoring. It starts by defining the term and drawing the border between offshoring and related terms like outsourcing, vertical FDI and value chains. Then we identify the forces that drive offshoring, the tasks that are most

[1] Parts of this working paper draw on a previous paper by Luebker (2006).The authors would like to thank the participants of an internal ILO seminar held in November 2007 for helpful comments, and Gerhard Reinecke and Peter Auer for reviewing earlier draft versions. Anne Drougard provided valuable assistance in compiling the bibliography and prepared the layout of this paper

[2] See e.g. the reports by the French Senate's *Groupe de travail sur la délocalisation des industries de main-d'œuvre* (Grignon, 2004) and the *Conseil d'analyse économique* (Fontagné and Lorenzi 2005).

[3] We mainly refer to the literature on global value chains and global production networks, but also to general literature which combines trade with FDI or MNEs activities.

susceptible to relocation, and the most likely destinations. After this descriptive part, we move to a more technical section where we present the tools and the available data to measure offshoring and its consequences. This is done with a particular focus on the impact of offshoring on employment and inequality, both in the countries that offshore and those that host offshored activities. Lastly, section 7 concludes the paper by discussing the main policy implications.

2. Definitions: Offshoring, outsourcing and related concepts

Since the 1950s, the world economy has been characterized by an increase in international trade. The initial fall in transportation costs has boosted trade in final goods, with countries specializing in the production of completed goods, on the basis of their comparative advantages. The recent advances in transportation and communication technologies have deeply modified the international trade features. Indeed, intermediate goods and components can now be moved quickly and cheaply and instructions to external suppliers can be delivered more easily. As a result, firms in one country can take advantage of lower factor prices or specific assets in another country by relocating some activities there. This implies a profound change in the competition pattern. The first globalization phase was characterized by geographic clustering of production, whereas in the second phase we can see an increasing separation of various production stages (Baldwin, 2006)[4]. The latter phenomenon has been described by Grossman and Rossi-Hansberg (2006a) as "trade in tasks", since behind each production stage a specific task could be identified. Indeed, Grossman and Rossi-Hansberg suggest that is useful to think of the production process as a bundle of tasks.[5]

Whilst during the first unbundling of production, competition was between firms and sectors in different nations, competition now regards workers performing the same tasks in different nations (Baldwin, 2006). In the earlier stage, "trade in tasks" has mainly affected the manufacturing sector. Indeed, the fall in transportation and communication costs had induced firms to relocate labour-intensive stages of production (e.g. the assembly of automotive engines).[6] More recently, this trend has also involved services – Indian call centres that serve European or American customers are one prominent example. Indeed, as telecommunication costs have dropped to almost zero, services that were previously defined as non-tradable have increasingly become tradable (Baldwin, 2005). For example, imports of computing and business services by the United States have doubled between 1993 and 2003 as a share of GDP – albeit, at 0.4 percent of GDP, they have remained very small (see Amiti and Wei, 2004).

However, what is often overlooked is that a country involved in the process of offshoring can simultaneously be the destination for offshoring – or for "inshoring", as it is sometimes called. As emphasized by Jensen et al. (2006: 1), "Globalization entails a cross-border flow of jobs, but contrary to the mainstream media portrayal of globalization, it is not a one-way but a two-way street". Hence, in evaluating the impact of global production reallocation on a country, we should consider both aspects. To return to the example used above, the United States still export far more computing and business services than they import and are thus a net beneficiary from trade in services (see Amiti and Wei, 2004).

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[4] Baldwin (2006) defines these two phases as the first and the second unbundling, respectively.

[5] Grossman and Rossi-Hansberg (2006b, p. 1) write: "Countries like England and Portugal still produce some goods from start to finish, but increasingly they participate in global supply chains in which the many tasks required to manufacture complex industrial goods (or, increasingly, to provide knowledge-intensive services) are performed in several, disparate locations."

[6] For other evidence on the evolution of material offshoring in the United States, European Union and OECD countries see, for example, Borga and Zeile (2004), Feenstra and Hanson (1996, 2001), Campa and Goldberg (1997), Yeats (2001), and Hanson, Mataloni and Slaughter (2003).

The literature has discussed trade in intermediate goods and the re-location of services under many different, but related concepts. The latest addition is the concept of "trade in tasks" by Grossman and Rossi-Hansberg (2006a), and a number of authors have referred to the same or related phenomena under the terms outsourcing (Feenstra and Hanson, 1996; Egger and Stehrer, 2003), offshore sourcing (Arndt, 1997), de-localisation (Leamer, 1996), fragmentation (Deardoff, 2001; Jones and Kierzkowski, 2001a & b; Arndt and Kierzkowski, 2001), international fragmentation of production (Helg and Tajoli, 2005), intra-product specialization (Arndt, 1997), vertical specialization (Hummels et al., 2001) and "slicing up the value chain" (Krugman, 1995)[7].

The most widespread term in the more recent literature is "offshoring" and we adopt this terminology across the paper. However, some specifications are worth noting:

First of all, firms can relocate "material" and "immaterial" stages of production. We call these phenomena as "material offshoring" and "service offshoring", respectively. The first concept refers to manufacturing tasks, such as assembly and intermediate goods production, whereas the second captures the offshoring of business services, such as call-centres, accountancy, financial services and customer services[8]. While theoretically these two factors could be set under the notion of "trade in tasks", they differ in terms of their measurement and their consequences on the home and host country economy. These differences are analyzed throughout the paper.

Second, although both terns are often used interchangeably, it is important to distinguish between outsourcing and offshoring. We do this on the basis of two criteria, the *location* where a task is performed (domestic or abroad) and the *ownership* of the unit where the task is performed (in-house or external). Whenever a task is carried out by an external supplier rather than in-house, we refer to this as "outsourcing" (see Figure 1). Since this supply can either be located in the same country or abroad, we can further distinguish between domestic and international outsourcing. On the other hand, whenever a task that used to be performed at home is relocated abroad, we refer to this as "offshoring" – regardless of the ownership of the production unit. Thus, offshoring includes tasks are performed by a foreign affiliate of the parent company and by independent supplier through arm's-length contracts. The two concepts thus overlap to some degree as both include international outsourcing (i.e. those tasks that are performed abroad by an outside supplier).

Figure 1: Definition of offshoring and outsourcing

		Location	
		Domestic	**Abroad**
Ownership	**In-House**	Domestic internal production	Vertical FDI / Production by foreign affiliate
	External	Domestic outsourcing	International outsourcing / arm's-length contracts → **Outsourcing**

↓ **Offshoring**

Source: Adapted from Kirkegaard (2007).

Third, although FDI is an important aspect in the creation global production chains and hence offshoring, the two should be kept apart on a conceptional level. As Kirkegaard (2005: 4) emphasizes, "not all FDI is offshoring"[9]. Indeed, it is important to separate horizontal FDI, whereby a multi-

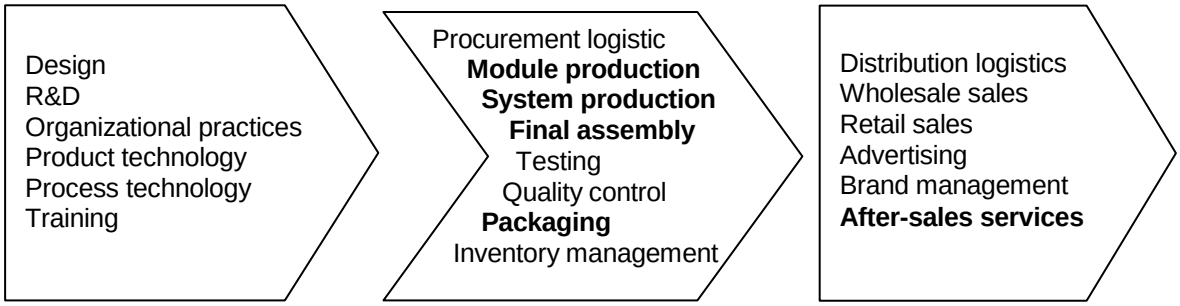
[7] See also Hansen et al. (2007) on a general discussion of different streams of research.

[8] Service offshoring is close to the literature on trade in service. In particular, service offshoring in the form of "arm's length contract" could be classified as Mode 1 in the GATS-classification. See Hoekman (2006) for a careful survey on service trade liberalization.

[9] Recently, the choice between vertical FDI and arm's-length contracts has been widely analyzed by different authors (see for example Antràs, 2003; Antràs and Helpman, 2004; Nunn, 2005 and Levchenko, 2004). For a theoretical discussion see Appendix 1.

national enterprise (MNE) builds a factory in a foreign country to serve its market (*market seeking*), from vertical FDI, which is where a MNE opens an affiliate in a host country to produce specific intermediate or final goods (or services) that are imported back into the home country (*efficiency seeking*). In particular, while the accelerated growth in FDI during the 1990s is attributable to a surge in horizontal mergers and acquisitions (UNCTAD, 2002), several authors have argued that an increasing share of multinational activity is now of vertical form. This is portrayed by data on the foreign subsidiaries of multinationals from the United States, showing that these subsidiaries are becoming less oriented to supplying local markets and more oriented to exporting. Both their imported inputs and exported outputs have increased as a percentage of the overall MNE activity (Hanson et al., 2003). As a recent OECD report (OECD, 2007b) suggests, offshoring to developed countries tends to be done mainly through affiliated companies, but when the destination is a less developed country, arm's length contracts are widely applied.[10]

Figure 2: The global value chain of product components



Note: Tasks more likely to be offshored are highlighted in **bold**.

Source: Adapted from UNCTAD, World Investment Report 2002, p. 123.

Fourth, the concept of offshoring could also be linked to the idea of global production systems. In particular, the term "global value chain" is used to describe the functional integration of the value-adding stages across countries (Hayter, 2004). Trade in tasks (and in particular service offshoring) is a traversal concept, which involves different stages of the global value chain. Indeed, a firm could offshore the module production, the system production, final production or packaging (material offshoring) as well as after-sale services, accounting and consultancy (services offshoring; see Figure 2). A more detailed description of the offshored activities is presented in section 1.3.

Fifth, some authors emphasize the similarity between the economic impact of offshoring and factor-biased technical change (Ekholm and Hakkala, 2006; Geishecker and Görg, 2004; Feenstra and Hanson, 1996). Indeed, offshoring is considered an exogenous shift in the production function that affects labour demand and firm productivity in a non-uniform way. Consequently, the impact of offshoring on labour demand is modelled in a similar way as it was previously done for factor-biased technological change, i.e. using a cost function approach (see Section 7.1. for a review of the methodological tools).

Finally, while offshoring identifies relocation decisions and implementation, the term "inshoring" refers to the other side of this process, i.e. the relocation from the point of view of the receiving country. It is worth noting that receiving countries are not only developing countries, although their share is increasing, but the majority of production relocation is between industrialized economies. Although the main theoretical models and the bulk of empirical evidence focus merely on the *demand side* of offshoring, i.e. the firm's decision to relocate some production stages abroad, new empirical evidence has shed light on the *supply side*.

[10] The decision between the two types of offshoring options depends on different factors and is analysed in appendix.

3. Driving factors behind offshoring

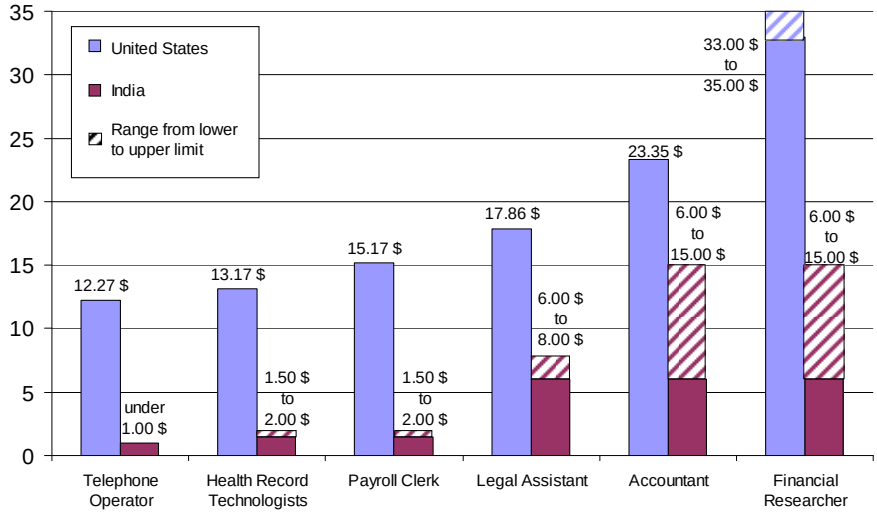
3.1. Globalization, wage arbitrage and firms' offshoring decisions

A major driving force behind offshoring are international differences in factor prices (see e.g. Nunnenkamp, 2004; Kohler, 2002). Offshoring firms could be seen as *efficiency seekers* (in line with the internationalization theory of Dunning, 1981 and 1993) since they relocate their production abroad to take advantage of better or less costly resources and assets. This potential cost advantage is fundamental in explaining offshoring decisions[11]. Given that capital is generally more mobile than labour, price differences are usually greatest for labour. Offshoring labour-intensive production stages to a low-wage country can hence be seen as a "vehicle for arbitraging" on these differences (Kohler, 2004). In particular, the opening of China and India has given multinational enterprises access to a large pool of labour and increased the profitability of material and service offshoring (see e.g. ILO, 2004). The entrance of these countries into world trade implies that the effective wage differential between the industrialized economies has widened substantially, and that the lowest available wage rate has further decreased. Indeed, wages in some service professions are only a fraction of those paid in the United States (see Box 1). Similarly, the transformation of Central and Eastern Europe has

Box 1: Wage Differences as a Driving Force for Services Outsourcing

A fundamental driving force behind outsourcing is the difference in labour costs (see e.g. Dossani and Kenney 2004: 10ff.). While this has long been the case for manufacturing, the advances in information and communication technology have made outsourcing a viable option for services. Bardhan and Kroll (2003) have illustrated the potential for cost saving by contrasting average hourly wages in the United States (as published by the US Bureau of Labor Statistic) with the typical range in India (based on their own research). Their results show that Indian wages in medium-skill occupations like health record technologists or payroll clerks are typically 10 to 20 per cent of those in the United States. However, the wage differential is smaller for higher-skilled professions such as accountants or financial researchers where Indian workers get a higher percentage of their US counterparts.

Hourly Wages for Selected Occupations in the United States and India, 2002/2003 (in US$)



Source: Bardhan and Kroll (2003).

[11] See Dossani and Kenney (2004), Quelin and Duhamel (2003), and Girma and Görg (2003) for empirical evidence on the importance of costs in offshoring decisions.

effectively added millions of workers, many of them highly skilled, to the global labour force – and this in close proxy to the industrialized economies of Western Europe. The opening of these countries, and their embracement of capitalism, has effectively doubled the global labour force from 1.47 billion to just below 3 billion workers (Freeman, 2005).

Empirical studies have investigated the relevance of the aforementioned factors in a firm's decision to outsource production stages to a foreign country. For the manufacturing sectors in Austria, offshoring to Eastern Europe is essentially low-wage seeking and was boosted by the reduction of tariff barriers after 1990 (Egger and Egger, 2003). A study of the European Union apparel sector concludes "labour costs, along with geographical and cultural proximity [and language], are the most important reasons for the original choice of a given country as a processing partner" (Baldone et al., 2001). In line with this approach, distance, promptness in delivery and flexibility in organisation production are important variables in choosing the offshoring location (Evans and Harrigan, 2003). Using firm-level data from Italy, Razzolini and Vannoni (2007) and Casaburi and Minerva (2007) show that productivity, supplier-buyer proximity and product differentiation are important determinants of sub-contracting decisions. In a nutshell, firms are not just interested in lower factor costs, but seek to balance the lowest wages with quality, productivity level and good infrastructure. On the basis of this consideration, Alcacer (1999) explains why most countries in Africa, where labour cost per hour are among the lowest in the world, hardly receive any efficiency-seeking FDI.

Jensen and Pedersen (2007) provide evidence that cost savings were the main driver in the earlier stages of offshoring when material offshoring predominated. However, when firms offshore advanced, high technology and R&D activities, the main explanation is the "strategic option": they relocate these tasks to get access to more competences, expand capabilities and exploit new business opportunities (see also Quinn and Hilmer, 1994). Offshoring can enable companies to cope with peak period in demand and exploit economies of scale for specialised services, in particular for small and medium-sized firms (Girma and Görg, 2004). Chen, Ishikawa and Yu (2002) make the example of PC producers and the automotive industry from Taiwan, Province of China, that engage in offshoring to diversify their production and strengthen their market position.

Moreover, while cost differences remain an important aspect, the choice of an offshoring location is often quasi-irreversible – even when, at a later stage, cheaper labour becomes available in another country (Baldone et al., 2001; Grossman and Helpman, 2002b). This is especially the case when firms incur substantial search costs and relationship-specific investments, as well as effort to the establish trust between partners in an environment of often non-enforceable contracts.

3.2. Exogenous factors that facilitate offshoring

While there are potentially large arbitrage gains to be made, several barriers restrict the feasibility of offshoring. Among them are technological limits to decompose the production process, customs tariffs and transportation costs[12]. Hence, as these barriers are overcome (or as factor price differences widen) offshoring can be expected to grow. Researchers have thus sought to make this link in order to explain the rise in offshoring. Venables (1999) develops a simple model to demonstrate that, as trade costs fall, fragmentation of production becomes feasible. One interesting implication of his model is that when the final production stage is re-located to the country where a final good is consumed, overall trade in value terms might actually fall, since exports of intermediates replace exports of final products. Trade will only grow as a result of offshoring when intermediates that were previously produced domestically are imported.

Reduction of trade barriers

Yi (2003) accounts for the fact that "vertically specialized goods or goods in process cross multiple international borders while they are being produced" (Yi, 2003, p. 55). When they incur a tariff upon crossing every border, tariffs accumulate and can make production fragmentation unfeasible. However, a small decrease in the tariff rate can lower the overall cost below a critical threshold

[12] All these elements are part of a broad concept: "trade costs", which includes "all costs involved in getting a good from producer to final user: transportation costs, policy barriers, information costs, contract enforcement, legal and regulatory costs, and local distribution costs" (Anderson and van Wincoop, 2004 p. 691).

and generate a large effect. Yi uses this logic to explain the non-linear response of trade volumes to tariff reductions. He develops a model that explains more than 50 per cent of United States trade growth since the early 1960s (by his account substantially more than standard trade models). In addition to a general fall in tariffs, regional free-trade agreements such as NAFTA have often facilitated the offshoring of production stages (Arndt, 2002). The reduction of trade barriers between West and Eastern Europe after 1990 and the subsequent integration of Eastern European countries into the European Union is another example (Egger and Egger, 2005).

Reduction of transportation costs

Hummels (1999) confirms that the cost of air transport has fallen substantially over the past 50 years, however he concludes that – contrary to conventional wisdom – the cost of ocean transport has actually risen. Moreover, Hummels (2001b) shows that faster transport (both by air and ocean) has reduced the tax equivalent of trade costs for the US from 32 percent to 9 percent over the period 1950-1998. At the same time, changes in the rate structure have favoured long-distance shipments relative to shorter distances. However, in contrast to the impact of falling trade barrier, Hummels (1999) suggests that changes in freight costs have played a comparatively minor role.

Technological change

More generally, technological change is often cited as one of the enabling factors for offshoring (McKinsey Global Institute, 2003; Jensen and Pedersen, 2007). The ILO's *World Employment Report 2001* analyses how advances in computing and network technology have led to 'spatial dynamics' in teleworking, call-centres, software production and information-processing work (ILO, 2001). See for example telecommunication costs, which were prohibitively high only a few decades ago, the price for a single voice circuit had become almost infinitesimally small by the late 1990s (see Blake and Lande, 1999: Table 12). This rapid decline plays a major role in services offshoring expansion: a call centre in India to serve British customers would have been unthinkable until very recently (ILO, 2004). Moreover, the possibility to store and transmit information digitally has led to the 'tradability' of services that were formerly considered non-tradable (UNCTAD, 2004b: 148). The new developments in communications technologies have had an important impact even in manufacturing. Hummels et al. (2001, p. 94) suggest that "the sequential nature of vertical specialization" make "oversight and coordination of production" an important restraining factor that can be overcome more easily with the help of modern technology.

4. Measuring trends in offshoring

4.1. The two waves of offshoring: from intermediate inputs to services

Overall, recent research indicates that there has been a rise in offshoring, particularly since the early 1990s, though the extent of offshoring has remained stable in some industries. The business strategy perspective provides a primary basic rule to identify "what" is offshored. In general, firms concentrate on their "core competencies" and leave other tasks to suppliers (Prahalad and Hamel, 1990; Quinn and Hilmer, 1994). To identify the tasks that have been more suitable for relocation, we should differentiate between the first and the second wave of offshoring.

The first wave of offshoring was characterised by material offshoring, predominantly in labour-intensive industries such as consumer electronics, textiles and apparels, footwear and leather goods.[13] Imported parts and components are also important factors in the motor vehicle and other manufacturing industries, which have relied on production sharing for several decades. In these cases, production has been re-located from the old OECD countries to low-cost destinations such as Central America and Eastern Europe. For instance, Germany and the United Kingdom have re-located some

[13] See Alic and Harris (1986) and Magaziner and Patinkin (1989) for consumer electronics; Yoffie and Gomes-Cassares (1994) and Brenton et al. (2000) for footwear; Waldinger (1986) and Gereffi (1993) for textiles.

production stages of the medical equipment industry to low-wage countries (Anderton and Schultz, 1999). Likewise, Jarvis and O'Mahony (2000) illustrate the importance of offshoring in the ceramic tableware industry in Germany.

However, the second wave of offshoring has added a new element to the established patterns: service relocation. As discussed in the previous section, the improvement in communication technology has facilitated the re-location of immaterial tasks. Although trade in business services and computer and information services is still at a nascent stage, it is the most dynamic and fastest growing area. Developing countries like India and China have managed to gain a share in this market, but are still far behind the leading exporters of these services, the United States and the United Kingdom, who continue to enjoy substantial trade surpluses. The increasing importance of service offshoring has moved the object of analysis from the sector that offshores to the type of tasks that is offshored. Indeed, service offshoring is a transversal concept across sectors, i.e. it does not involve one particular sector only. For example, the relocation of back-office services to developing countries will have an impact in sectors as diverse as the financial sector and automotive manufacturing. Moreover, it affects different stages of the production process, from the research/product architecture to the administrative, marketing and customer service sphere (Pedersen and Petersen, 2006b).

Box 2: The Rise of India as an Exporter of IT-related Services

While wage differentials between India and developed countries like the United States can account for the drive to outsource activities to India (see Box 1 above), they cannot explain why India has been immensely more successful in exporting IT-related services than other countries with similar – or even lower – wage levels. The key to the phenomenal growth in Indian service exports since the early 1990s is that the country was able to offer high-quality IT-related services, easing the skill-shortages that became particularly severe in the developed countries during the boom years of the late 1990s. Kumar and Joseph (2004) attribute this success in IT world markets to a series of strategic policy choices that build the country's export capacity. As far back as the 1970s, the Indian Government recognized the potential of the software sector, and subsequently the first degree courses in computer sciences were offered. The tertiary-level training capacities were further extended under the Computer Manpower Development Programme, launched in 1983. In addition to courses offered at public institutes, privately run centres established a range of courses since the early 1980s, many of which have since been accredited (see ibid.: 7ff.). The rapid growth in the number of graduates with degrees in computer science and related engineering and technology disciplines was arguably "crucial for software success" in India (Arora and Gambardella 2004: 8). However, as a result of the sector's rapid growth, some Indian companies now find it hard to recruit adequately trained professionals (see Vijayabaskar et al. 2001).

Public policy was not limited to investment and promotion of education. The Department of Electronics played an active role in fostering the industry, most notably by establishing networking infrastructure during the 1980s, and from 1990 onwards by setting up Software Technology Parks in cities such as Mumbai and Bangalore. The parks provided firms with the necessary infrastructure, especially high-speed communication links (see Kumar and Joseph 2004: 9ff; Kumar 2001: 5). This was supplemented by promotional measures such as tax and import duty exemptions, and an early relaxation of foreign ownership rules. Kumar and Joseph hence call the Indian success "a typical case of proactive state intervention wherein the Government laid the foundation and the industry took off with greater participation by the private sector" (Kumar and Joseph 2004: 1). Another crucial factor that helped the export-led growth in IT-related services was the emigration of Indian IT specialists who provided links between the emerging Indian software industry and the established companies abroad (see Arora and Gambarella 2004: 10f.). While the companies that provide outsourced software services – either on-site in the developed countries or from India – are mainly home-grown (see Kumar 2001: 31f.), India has also managed to attract many export-oriented FDI projects. A survey commissioned by UNCTAD found that the country had received a total of 118 greenfield and expansion projects in IT-related services during 2002-2003. With a share of 19 per cent in worldwide projects within this category, India was the FDI leading destination in numerical terms – ahead of the United Kingdom (12 per cent) and China (9 per cent) (see UNCTAD 2004b: 161ff.).

In this context, it is useful to identify the characteristics that make tasks suitable for offshoring. Levy and Murnane (2004) make the distinction between "routine" tasks, which are performed in a 'mechanical' way and follow precise instructions, and 'non-routine' tasks that require inductive reasoning, interaction with the counterpart and "leave more space for personal decisions". As they argue, the former tasks are easier to relocate abroad. Leamer and Storper (2001) present a similar

classification of tasks, drawing a distinction between 'codifiable' and 'tacit' information.[14] There is some evidence that shows that if the degree of 'tacitness' of activities is high, transfer of technology and knowledge become inefficient and ineffective (Martin and Salomon, 2003). Analysing service offshoring in this light, we can understand that this new wave of trade in tasks will not affect all service workers indiscriminately, but predominantly those who perform semi-skilled tasks that require routine processes with a low content of tacit knowledge and little face-to-face interaction and judgment.[15] Broadly speaking, we can see that routine tasks are offshored, while more complex tasks are done domestically. However, with further technological improvements, it could become feasible to offshore even more complex and critical tasks such as research and development.[16] Another study of Bardhan and Tang (2006) shows that occupations well diversified across sectors are less susceptible and vulnerable to service offshoring.

The world economy may in fact move towards a new outsourcing paradigm that weakens the current division between OECD countries (that specialize in higher-end activities) and developing countries that engage in lower-end and lower value-added activities (see also Kakabadse and Kakabadse, 2000). For example, India has become an important exporter for IT-related services (see Box 2 above). Also US firms are starting to offshore knowledge and innovation creation activities due to the shortage of high skilled technical workers domestically (Lewin et al., 2007). A similar phenomenon has been observed in Denmark with rising offshoring in advanced services, innovation and R&D (Jensen and Pedersen, 2007)

As already mentioned, material offshoring has been mainly between industrialized countries and from industrialized countries towards developing countries in order to take advantage of lower wages (see Section 3 for a more detailed analysis of offshoring determinants). To a more limited degree, we find offshoring flows between developing countries – take the example of China that has relocated some production activities to Africa (Broadman, 2007, and Taylor, 2006). Moreover, the diffusion of service offshoring has further modified the geographical pattern of relocation. While there is a sizable flow towards developing countries such as India (see Dossani and Kenney, 2003), a flow has also developed in the reverse direction. For example, Indian companies have offshored some ITC activities to Finland in order to gain technological spillovers (Ali-Yrkkö and Jain, 2005).

As a result, economies are characterised by a "double flow" of tasks: they are the receiver and the sender of activities. Hence, in evaluating the impact of job relocation, it is important to evaluate the net impact of "inshoring" and "offshoring". In this context, there is the risk that the process of global production relocation will exclude some countries, in particular less developed countries, which are not an attractive location for offshoring, owing to their weak economic structure.[17] Thus, offshoring is another feature of globalization that could increase the gap between those who participate in it and those who are excluded or left on the margins (see WCSDG, 2004).

[14] On the importance of "tacit skills" and eligibility for offshoring, see also Sako (1999).

[15] See Mann (2005), van Welsum (2004), van Welsum and Vickery (2006), and Crinò (2006).

[16] Pedersen and Petersen (2006a and 2006b) show this trend in the case of Danish companies that strongly increased offshoring of higher value added activities, such as research & development or administration.

[17] These countries rely too much on primary sectors and the development of manufacturing industry is still in its infancy stage.

4.2. Measurement issues

Measuring offshoring is a less than straightforward task. Although several approaches have been developed, most face considerable data problems. Thus, many researchers have resorted to 'proxy' measures, i.e. they do not measure offshoring directly, but make use of available data to estimate the extent of offshoring. As a general rule, these measures face a trade-off between coverage – both geographical and over time – and the precision of measurement: data for a single point in time at the level of the individual firm can often contain a lot of detail, but global time-series data will necessarily have to rely on somewhat crude proxies of offshoring. As several publications emphasise, "there are currently no reliable statistical indicators of the extent or nature of global outsourcing" (European Foundation for the Improvement of Living and Working Conditions, 2004, p. 10). For the international sourcing of services, van Welsum regrets that "there are no official data measuring the extent of the phenomenon or its economic impact" (van Welsum, 2004). One of the root causes for this dilemma is that offshoring refers to management decisions made at the micro-level (e.g. to replace in-house production by the purchase of intermediate inputs) that cannot be easily linked to trade statistics that are collected on national and sectoral levels (World Trade Organization, 2005).

Offshoring measurement tools

Most measures of offshoring try to capture the foreign inputs a final good contains, be it in the form of intermediate goods or offshored service components. Following this approach, Feenstra and Hanson propose a *narrow* and a *broad* measure for offshoring. The *broad* definition "measures offshoring as the share of imported intermediate inputs in the total purchase of non-energy materials" (Feenstra and Hanson, 1996, p. 240). Hence, it includes imported non-energy intermediate inputs from all the industries. There is, however, some uneasiness about this definition since e.g. the purchase of foreign steel by a carmaker would fall under it – even though most people would hardly consider this to be a case of 'offshoring'. Feenstra and Hanson therefore suggest an additional, *narrow* definition of offshoring that only contains imported intermediate inputs from the same industry[18] (e.g. brakes and gearboxes in the case of the car-maker). Both measures of offshoring are defined as imported intermediate inputs in relation to industry output[19]:

$$OFF\_material^{B}{}_{i} = \sum_{j}\left[\frac{input\_purchases_{j,i}}{total\_nonenergy\_inputs_{i}}\right] * \left[\frac{imports_{j}}{production_{j} + imports_{j} - \exp orts_{j}}\right]$$

$$OFF\_material^{N}{}_{i} = \sum_{j}^{j \in i}\left[\frac{input\_purchases_{j,i}}{total\_nonenergy\_inputs_{i}}\right] * \left[\frac{imports_{j}}{production_{j} + imports_{j} - \exp orts_{j}}\right]$$

Although the offshoring measures presented by Feenstra and Hanson (1996) is the most widely applied, other indexes have been used. Some authors consider only vertical FDI (i.e. production by a foreign affiliate of the parent company)[20] while others adopt a wider definition of offshoring.[21] Offshoring has been measured by the following proxies:

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[18] In the attempt of measuring the impact of offshoring on employment, Lorentowicz et al. (2005) prefer the narrow definition of offshoring to the broad one. This choice is driven by the consideration that workers in a particular sector are affected only by decisions that regard the goods produced in their sector. In other words, whether intermediate goods from other sectors are produced at home or offshored, does not impact on their condition.

[19] This methodology has been adopted my many authors such as Ekholm and Hakkala (2006) for Sweden (using the share of import over total output as a weight); Geishecker and Görg (2004) for Germany; Hijzen et al. (2004) for the United Kingdom; and Egger and Egger (2001a&b) for Europe countries.

[20] See e.g. Lorentowicz et al. (2005), Marin (2004), Head and Ries (2002), and Slaughter (2000).

[21] For example, Helg and Tajoli (2005), Görg et al. (2004), Anderton and Brenton (2002, 1999).

a) The share of foreign-owned fixed assets in domestic assets. This measure arises from disaggregating the capital stock into the domestic capital and the foreign capital (Lorentowicz et al., 2005).

b) The flow of intra-firm exports from the parent firm to the affiliate as well as intra-firm import from affiliate to parent firm (Marin, 2004). The analysis is based on MNE firm level data.

c) The share of a firm's (or a sector's) total work force that is located in overseas affiliates (Head and Ries, 2002; Slaughter, 2000).

d) The ratio of the value of re-imported goods that were processed abroad over the value of domestic production (Helg and Tajoli, 2005). They use outward processing trade data.

e) The value of imported [services and non-services] intermediates as a share of a plant's total wage bill, as done by Görg et al. (2004) and Girma and Görg (2004). They argue that the cost of offshoring is equal to the opportunity wage that firms should pay to their employee if the tasks had not been offshored.

f) The import of all goods – including final goods – as long as they originate from low-wage countries. The idea is that companies sometimes outsource the entire production of a product, but continue to sell it under their own brand name in their home market (Anderton et al., 2002; Anderton and Brenton, 1999). Others have criticized this method as an "excessively wide" measure for offshoring (Egger and Egger, 2001, p. 247).[22]

Finally, some attempts have been made to measure service offshoring. Amiti and Wei (2004) adapt the broad measure of material offshoring suggested by Feenstra and Hanson (1996, 1999) to quantify service offshoring. The total amount of offshored services is estimated by using the purchases share of each type of service (j), and multiplying it by the economy-wide import share of that service. Amiti and Wei (2004) point out two main drawbacks of this computation. First of all, since we measure service in term of their value and not of quantity, these measures could underestimate the value of offshoring. Indeed, the cost of importing services is likely to be lower than the cost of producing them domestically (ibid.). Secondly, this measure includes only inputs purchased from different industry and excludes those produced within the industry.

4.3. Estimates from different data sources

The literature on offshoring has made use of a variety of data sources to measure the extent of offshoring, and researchers have often adapted the measurement tools to the available data. Some of the principal data sources used in the offshoring literature are summarized below, starting with the most accurate measures. Details and concrete examples from studies using these methodologies can be found in Appendix 3.

Input-output tables

Many researchers have relied on input-output tables to measure offshoring. These tables generally break down the inputs received by each industry according to the industry of origin and their source (domestic or foreign) and state the value added by the industry itself – the sum of which is an industry's total output. This makes it possible to calculate the share of foreign inputs contained in the final product, and therefore the degree of offshoring as defined by Feenstra and Hanson (1996). If a disaggregation by foreign and domestic inputs is not available, the share of foreign inputs can be estimated on the basis of trade data. In essence, this approach calculates how much of a certain input is imported and how much is produced domestically, and then assumes that the inputs used by an industry follow the same mix.[23]

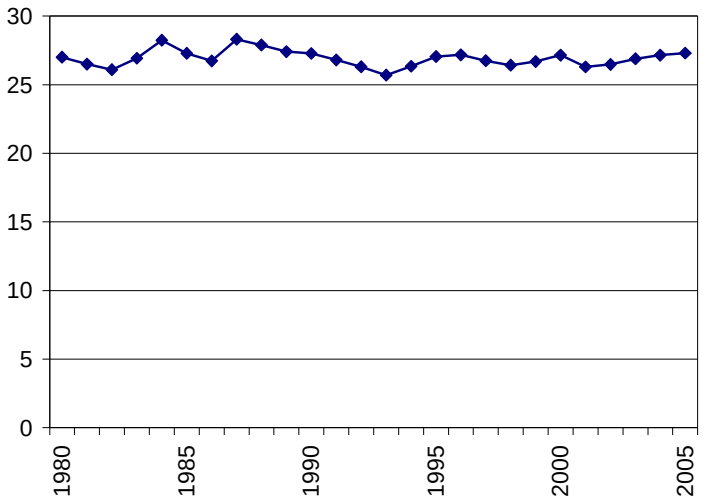
[22] Falk and Koebel (2002) measure material and service offshoring as the value of imported material and purchased services, respectively. Using the same idea, Egger and Stehrer (2003) measure the impact of in-shoring in Eastern Europe as the value of imported and exported intermediate goods. Morrison Paul and Siegel (2001) measure offshoring using a still broader definition: the value of purchased inputs.

[23] The main shortcoming of this approach is that the same import share is applied to all industries.

Box 3: Offshoring in the automotive industry

Since offshoring will generally generate trade in intermediate products, other researchers have attempted to map the flow of such products. Usually, these data are matched with input-output table suggested by Feenstra and Hanson (1996, 1999). However, Yeats (2001) uses trade data as a stand-alone source and concentrates on the machinery and transport equipment group (SITC 7) where parts and components can be identified with relative ease under SITC Revision 2. He can demonstrate that the share of parts and components in all OECD imports of machinery and transport equipment rose from 26 to 30 per cent between 1978 and 1995. While studies such as that of Yeats (2001) show that trade in intermediate products has risen slightly over the past two decades, the available data also show that the import of intermediaries is by no means a new phenomenon. The car industry is a good example for this: Even through trade in parts and accessories of motor vehicles (such as bodies, brakes, gearboxes and axles) grew rapidly in dollar terms since 1980, this expansion has been roughly in line with total trade in motor vehicles (see Figure 3).

Figure 3: Trade in automotive parts relative to total motor vehicle trade, 1980-2005 (%)



Note: Data refer to trade in automotive parts (SITC 784) as a percentage of total motor vehicles trade (SITC 722, 781, 782, 783 and 784).

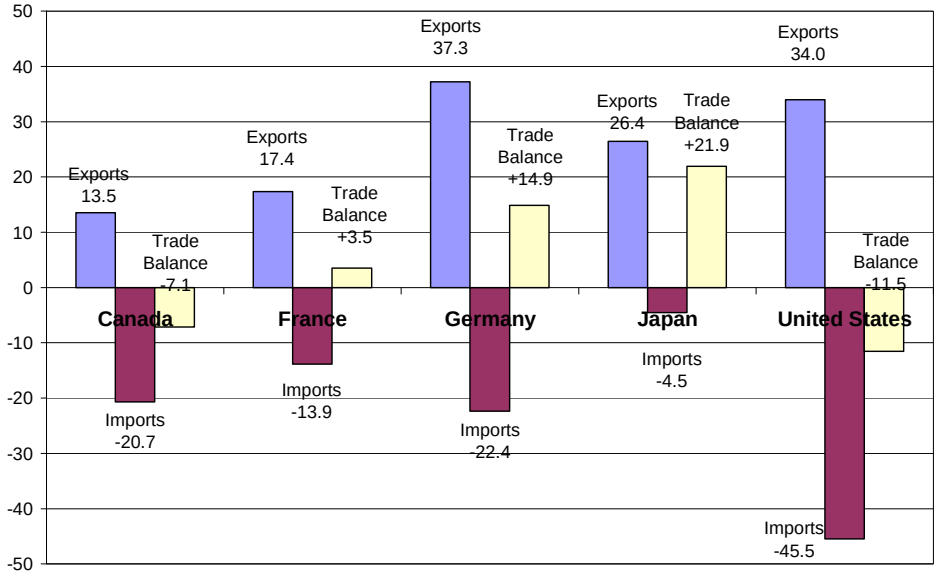
Source: United Nations Commodity Trade Statistics Database (UN-COMTRADE).

Nonetheless, this is no direct evidence of increased offshoring since the parts and components that are recorded in trade statistics might have been used for repair and maintenance purposes – rather than as intermediate inputs. However, sectoral studies reinforce the view that offshoring is a likely driving force behind these changes. For example, the content of imported intermediaries in cars produced in Germany has almost quadrupled in real terms between 1980 and 2002 (Nunnenkamp, 2004). Again, the debate on offshoring needs to be supplemented with a data on "inshoring" to avoid the false impression that offshoring is a unidirectional process. For example, Nunnenkamp (2004) reports that intermediates exports by the German car industry grew by 170 per cent between 1980 and 2002. Thus, the country was a not only a source country for offshoring, but also a recipient country. The pattern holds not only for Germany, but also for the other important car exporters. In fact, three of the five largest exporters of motor vehicles (Germany, Japan and France) record substantial trade surpluses in automotive parts, while the United States and Canada are net importers of automotive parts (see Figure 4).

Trade statistics for intermediate inputs

Since offshoring will generally generate trade in intermediate products, other researchers have attempted to map the flow of such products. While ready-to-use statistical compilations such the UN's COMTRADE database have the advantage of comprehensive coverage across time and countries, the approach necessarily relies on "rather arbitrary classifications of goods into intermediate and final" (Hummels et al., 2001, p. 70). Nonetheless, for some industries this data source can be highly informative (see Box 3). Usually, these data are matched with input-output tables in order to compute the offshoring indexes suggested by Feenstra and Hanson (1996, 1999).

Figure 4: Trade in automotive parts, 2006 (in billion US$)



Note: Data refer to SITC (Rev. 3) classificcation 784.

Source: United Nations Commodity Trade Statistics Database (UN-COMTRADE).

Trade statistics for services

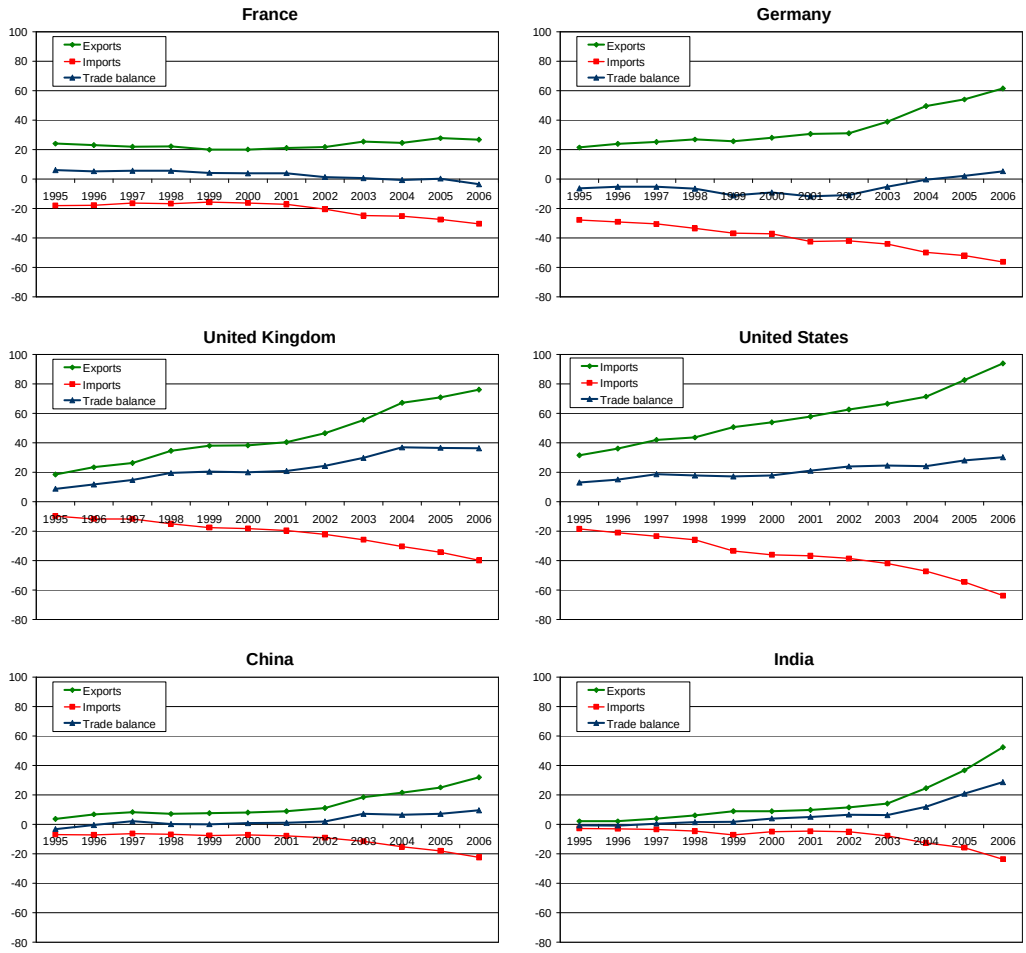
Although offshoring of service inputs still accounts for only a small portion of total offshoring, concentrating solely on statistics for tangible inputs would mean missing an important, dynamic part of the overall picture. It is therefore useful to supplement statistics on material offshoring with data on trade in services. Precisely this task was undertaken by Amiti and Wei (2004) who draw on the IMF's Balance of Payments (BoP) statistics for 'computer & information services' and 'other business services' – two categories that much of the recent public debate has concentrated on. While trade statistics do not differentiate by the use of these imports, they are typically (and in contrast to service imports such as travel or education) demanded by firms – and not final consumers – and are therefore a good proxy for services outsourcing (see Box 4).

Box 4: Some Evidence on Trade in Services from the IMF's Balance of Payments Statistics

The IMF's Balance of Payment data allow taking a closer look at recent developments in the two service categories that Amiti and Wei (2004) concentrate on: 'computer & information services' and 'other business services'. Aggregating the two categories, the graphs below show the trading positions of four main industrialized trading partners alongside with those of China and India. With exports worth US$ 93.8bn in 2006, the United States remains unchallenged as the world's largest exporter of computer & information services and other business services, followed by the United Kingdom with exports worth US$ 76.1bn. Between 1995 and 2006, both countries have maintained or increased their substantial trade surpluses that are now in excess of 30 billion US$ per year. Germany has also significantly expanded its exports (that tripled in nominal terms between 1995 and 2006) and moved from a small trade deficit to a small surplus. By contrast, the exports of France have stagnated in real terms and the country now records a small trade deficit.

The graphs also show the rapid rise of India and China as service exporters: Starting with relatively minor exports in 1995, they expanded their exports rapidly that are now larger than those of France. However, as the World Trade Organization (2005: 277ff.) cautions, these figures should be taken with a grain of salt, given the large discrepancies between reported exports and imports on a global level. In the case of bilateral trade between India and the United States, two of the largest trading partners, India reported exports to the United States worth 6.8 billion US$ in 2003, while the United States only recorded imports from India worth 0.9 billion US$. The WTO argues that these figures can only be reconciled "if one takes into account the earnings of Indian IT specialists which are […] considered by the US Department of Commerce as residents" (WTO 2005: 280). According to a WTO estimate, such earnings that should not have been included in Indian export statistics could explain as much as 4.8 billion US$ of the discrepancy. Indian export statistics are thus likely to be an overestimate of actual exports.

Imports and Exports of Computer and Information Services and Other Business Services, 1995-2006 (in billion US$)



Note: China only reported Computer and Information services from 1997 onwards, and India from 2000 onwards.
Source: IMF Balance of Payments Statistics, February 2008.

Data on outward-processing trade

A number of studies have illustrated trends in offshoring by making use of bilateral trade data that capture the re-import of products that were shipped abroad for assembly or processing. However, these data are only a good measure of offshoring if countries levy tariffs on import and export of these goods. Indeed, firms only have an incentive to declare the value of the goods imported for processing and re-export if this procedure allows them to avoid tariffs payment[24].

Business surveys and other micro-level data

The data on the rapid rise of cross-border services and manufacturing offshoring must be put into perspective. To do so, business surveys are a valuable complementary source. For example, the Centre for European Economic Research (2005) conducted a large-scale survey among 4,400 German companies and found that some 87 per cent of them had outsourced some or all of their IT-related activities. However, the lion's share of the contracts went to domestic suppliers: only 0.1 per cent of the surveyed companies awarded contracts to overseas service providers, and 5.9 per cent to companies from other EU countries.

Recently, panel data with information at firm level have became available. These data sets include detailed information about employment, sales, inputs, and capital for each firm in different years. Moreover, specific data on material and service offshoring at firm level have been recently collected (see for example the Inquiry into International Trade in Services (ITIS) for the UK; Hijzen et al., 2007a) . These data allow a more careful analysis of offshoring and of its impact on labour market dynamics (Kletzer, 2000 and 2002), productivity (Hijzen, Inui and Todo, 2007; Liu and Tung, 2005; Girma and Görg, 2004; Görg, Hanley and Strobl, 2005) and profits (Görzig and Stephan, 2002; Görg and Hanley, 2004)[25]. Moreover, using these data it would be possible to detangle the effect of arm's length contracts from vertical FDI (Liu and Tung, 2005).

Data from multi-national enterprises

The increasing importance of multi-national enterprises (MNEs) in international trade and their role in the technological transfer has increased the demand for statistical data on their overseas activities. The Bureau of Economic Analysis (BEA), for example, created a detailed data set on MNEs from the United States that includes employment data, R&D expenditures, trade in goods and services, and selected financial data. Detailed MNEs information are now available also for European countries. For example the French Ministry of Industry collected in 1999 information on French MNEs' import at product level and by sourcing modes though independent suppliers and/or affiliates (Echanges Internationaux Intra-Groupe, EIIG Survey).

5. The consequences of offshoring: A theoretical perspective

Offshoring raises several issues about welfare gains or losses in developed and developing countries alike. However, the controversy on production relocation is not new and must be put in the context of a wider debate on trade and global economic integration. With regard to developed countries, economists have mainly focused their attention on employment issues. Indeed, by relocating

[24] However outward-processing trade data from European Union to Eastern Europe are reliable only until 1997, when East European countries entered the customs union. Indeed, before that date, firms that imported goods for re-export were exonerate in paying tariff and thus had to declare the origin and destination of imported goods. Contrarily, in the custom union no tariffs apply and firms need not declare whether goods are imported for re-export.

[25] However these studies (as well as Girma and Görg, 2004) do not distinguish between domestic and international outsourcing.

some production stages abroad, firms substitute domestic workers with foreign labour. However, offshoring also has an indirect impact on overall employment through intra-sector and inter-sector linkages that might add to or offset the direct impact. Neglecting these interdependencies would be "a major shortcoming, since the estimated wage and employment effects of international outsourcing may be downward biased" (Egger and Egger, 2005, p. 351).

With respect to developing countries – in so far as they are at the receiving end for offshored activities –, the impact of offshoring is more complex. Indeed, through production relocation, new activities would be started in these countries. However, under certain circumstances, a strategy that exclusively focuses on attracting vertical FDI and neglects the promotion of domestic investment can be counter-productive (see UNCTAD, 2005). Some authors have argued that, at the extreme, foreign investment can generate a crowding-out effect whereby it replaces domestic investment, rather than adding to overall fixed capital formation. This could be mainly at the expense of small and medium-size companies, the backbone of employment in most developing countries (see Ghose, 2004).

In any case, new productive activities imply a direct effect on employment as well as indirect effect in terms of forward and backward linkages between plants of MNEs and domestic firms. When offshoring is limited to the assembly of intermediary imports for further re-exportation, few positive externalities on domestic firms in terms of technology spillovers, skill upgrading and wages should be expected. However, as the example of Costa Rica shows, the re-orientation of offshoring sectors towards higher technology sectors can entail technology spillovers, though backward and forward linkages remained rather limited (Paus, 2005; Ernst and Sanchez-Aconchea, forthcoming).

Offshoring is also linked to rising wage inequality. Even though the offshored tasks are labour intensive, their skill content is generally above the domestic average of developing countries. This can increase the wage premium for the higher-skilled workers and thus widen wage differentials.

The literature on offshoring has focuses on three main fields: the labour market; firm level productivity and profitability; development issues and macroeconomic ramifications. Although the present paper is primarily concerned with the labour market impact of offshoring, the other aspects remain since offshoring can indirectly affect employment and wages through these channels. Thus, we address them in turn in the following section. The main conclusions are summarized in Table 1.

5.1. Employment levels and wage differentials

Effects on employment levels and wage differentials in developed countries

In the public debate, "material" offshoring has been blamed for worsening working conditions for unskilled workers, and more recently service offshoring has been linked to the displacement of skilled workers. This idea is linked to the negative "supply effect" of offshoring: relocation of tasks abroad has the same effect as an increase in workers supply for that specific task. This either implies a substitution of domestic workers with foreign workers and a decline in the level of employment (Grossman and Rossi-Hansberg, 2006a) or downward pressure on wages (Krugman, 1995; Feenstra and Hanson, 1996). Whether offshoring does impact wages or employment levels depends on the country labour market features (Anderton et al., 2002). From this point of view, the effect of offshoring is similar to the technological change, and indeed economists have used the same tool to evaluate their labour market impact and usually control for both effects (Feenstra and Hanson, 1996). With regard to "service offshoring" there is the additional fear that the substitution of domestic skilled workers with foreign employees could reduce the incentive to invest in education and hence hinder the accumulation of human capital.[26]

However, we should take into account the fact that new jobs may also be created as a result of offshoring. Firstly, there is a direct job creating effect, since the fragmentation of production or service provision process, entails need for co-ordination and supervision (Burda and Dluhosch, 2001). Secondly, offshoring might lead to efficiency gains for the firm that re-locates some of its labour-intensive activities abroad and improve its overall competitiveness with a final positive effect on employment. Mitra and Ranjan (2007) demonstrate in their theoretical model that thanks to the

[26] See Blinder (2006), Trefler (2005), and Gregory Mankiw and Swagel (2006).

productivity enhancing (cost reducing) effect of offshoring sectoral unemployment decreases and wage increases (see section 6.2. for more details).

Economists have developed different theoretical tools to understand the impact of offshoring on employment levels and its skill-bias. Jones and Kierzkowski (1990, 2001b) model what can happen to employment when a formerly integrated production process is broken down into two (or more) segments that can be traded internationally[27]. One possibility is that a country that was able to produce the integrated product ceases to produce the labour-intensive segment (or, in the alternative terminology, *offshores* it), but remains competitive in world markets for the more capital-intensive segment. I would then become an exporter for this segment, and – if the country is relatively capital-abundant – it will employ more labour to produce the remaining fragment than it previously did for the integrated product (Jones and Kierzkowski, 2001b). At the other extreme, there is the possibility that a country is initially "second best" in either of the segments of an integrated product, but has the most competitive *average* cost structure. However, once it becomes possible to fragment production, either segment will move to the country that is best in producing it. In this case, the country looses all production (and employment) as a consequence of fragmentation. Therefore, Jones and Kierzkowski explain opposite employment outcomes from within a single theoretical framework, and attribute them to a country's factor endowments.

The skill-bias of offshoring is an area that has been subject to intense academic research, especially with respect to source countries (and to a lesser degree for those that provide service or goods inputs). Feenstra and Hanson (2001) develop a simple theoretical model where the production of a low-skill labour intensive input is outsourced. They show how different specifications will depress the relative demand for low-skill labour within industries, and how relative wages for low-skilled workers will fall. They emphasise that the employment shift in favour of skilled workers occurs *within* industries, whereas standard models of trade can only explain shifts *between* industries (generally from low-skill to high-skill industries). Offshoring thus has effects similar to those of skill-biased technological change, and adds to the labour market consequences of the latter. On the other hand, Kohler (2002) concludes from his general equilibrium model that the distributional consequences are not determined by the factor-intensities of the production stage that is outsourced, but by the factor intensities of the activities that remain in the domestic economy. Since these increase in value, it may well be that unskilled labour actually benefits.[28] Similarly, Jones and Kierzkowski (2001b) not only model how the loss of a labour-intensive production segment will lead to a drop in unskilled wages, but also that – under certain conditions – wages will actually rise. They stress that they do not wish "to dispute the wisdom of the observation that losses of labour-intensive activities to other countries in trade spells trouble for unskilled labour, but to suggest that this is not always the case" (p. 29). Antràs et al. (2006b) suggest that agents in different countries can join together in teams through offshoring. In their model they show that production relocation increases between-worker inequality in the North only if the costs of communicating knowledge are relatively low. Ekholm and Ulltveit-Moe (2007) develop a general equilibrium model where they distinguish between the "specialization" and the "competition" effect of offshoring, which have different effect on wage inequality and causes the bell-shape relationship between the two phenomena. The "specialization" effect explains by the well-known relocation of labour-intensive production stages and the consequent increase in wage inequality biased versus low-skilled workers. The "competition" effect introduces a new dynamic in the offshoring literature: increasing competition induces merge and acquisition and consequently firm restructuring, which mainly involves skilled-intensive headquarters' activity such as management, marketing, accounting. Hence through the competition effect skilled-workers wages shrink and wage inequality decreases. Ekholm and Ulltveit-Moe (2007) conclude that offshoring doesn't cause a widening in the wage gap in the short run, but the long-term effect may be more worrisome since improving technology may boost future offshoring.

In a nutshell, the theoretical literature suggests that the net employment effect of offshoring in the source countries of the developed world could be either positive or negative. By contrast, the

[27] On the same approach see also Deardorff (2001) and Kohler (2004).

[28] A similar point was previously made by Arndt (1997).

literature come to a more unanimous conclusion that offshoring is likely increase wage differentials (although this need not always be the case). Thus, only empirical investigation can resolve both questions. Section 6 will therefore return to both questions and review the empirical findings on impact offshoring on employment levels (6.2.) and wage differentials between skilled and unskilled workers (6.3.).

Effects on employment levels, job quality and wage differentials in developing countries

In developing countries, we would expect a positive effect of offshoring in the labour market, since these countries are mainly destinations of production relocation. Hence, for these countries offshoring (or "inshoring") means the establishment of new activities. This should lead to job creation in particular when developing countries specialize on the production of labour-intensive components (Arndt, 1997). As a result, the employment and output of the industry rises and national welfare increases. Further, new jobs should usually be more productive than the average jobs in these countries (Goldberg and Pavcnick, 2006)[29].

However, while employment creation would be a beneficial aspect of offshoring, some concerns remain with respect to job quality and the ramifications on wage inequality.

Under the traditional Stolper-Samuelson-model, since developing countries are abundant in unskilled labour, one would expect that they specialize on tasks that require unskilled labour. This should lead to greater demand for unskilled workers and hence to an increase in their relative wages, leading to declining wage inequality. However, the empirical evidence contradicts the theoretical framework. Economists have explained this discrepancy by referring to the knowledge and technological externalities of offshoring as well as to the high skill content of offshored activities (that is on average higher than for domestic activities in the recipient country). Hence, local firms increase the demand for relatively skilled labour, which in turn causes an increase in the relative wage of skilled labour, as well as inequality (Feenstra and Hanson, 1997; and Pissarides, 1997). Antràs et al. (2006b) in their theoretical model demonstrate that offshoring always increases within-country inequality in developing countries.

With respect to the quality aspect, one important question is whether new jobs are created in the formal or in the informal sector. The latter would happen if firms in the formal sector that get an offshoring contract further subcontract the task to home-workers or enterprises in the informal sector (see Jansen and Lee, 2007). This trend could be exacerbated by an increase in competition among suppliers as more firms enter the market, creating downward pressure on prices and profitability (Görg and Hanley, 2004), and thus prompting firms to reduce labour costs by subcontracting some tasks to the informal sector. Another main concern regards labour standards and respect for workers' rights. There is the risk that competition for offshoring contracts is mainly done on the basis of price, and that firms – and countries – attempt to gain a cost advantage by lowering labour standards. Finally, one should consider how "inshoring" modifies the production chain. If production relocation induces the local firms to specialise in the production of intermediate goods and discourages the development of all production stages, it could undermine the future development and growth of the receiving country. Moreover, the decrease in the value-added by production stages causes a job content impoverishment (see for example the case of *maquiladora* in Mexico).

Unfortunately, very few papers have analysed the impact of offshoring on receiving countries in terms of employment levels and job quality. The section below will present some of the available studies.

Global effects

On a global scale, offshoring is likely to have positive effects on the level of employment. If different factor scarcities drive offshoring, relocation of production or services to a country with relative abundance of labour should change the factor mix used for production or service provision towards higher employment intensity. For instance, more jobs will be created in the 'South' than are lost in the 'North'. Agrawal et al. (2003) provide examples of why it makes sense, from a business

[29] However, as we point out later, offshoring could also cause a down-grading in the value-chain with negative consequences on the job qualify and workers skills.

stand point, to reengineer service provision processes (or production methods) towards greater use of labour, while decreasing the use of capital. Lower labour costs also allow companies to carry greater "slack" to meet peak demand, hence increasing the quality of service delivery (Dossani and Kenney, 2004: 13). Moreover, the availability of low-wage labour can make it feasible to carry out activities where the cost previously exceeded the value created (ibid.; Agrawal et al., 2003; Bhagwati et al., 2004: 99). It is thus possible that a job created in the 'South' is not just a job re-located from the 'North', but a genuinely new job. As UNCTAD emphasizes in the *World Investment Report 2004*, offshoring is not a "zero sum game" and "jobs created in [service] exporting locations through offshoring do not equal jobs lost in importing countries" (UNCTAD 2004b: 176). It would thus be misleading to look at the employment effects in terms of jobs being "exported" from one country to another.

Box 5: The Gender Dimension of Offshoring

The mainstream economic literature remains largely silent about the gender implications of offshoring. This is a crucial omission since some of the jobs that are most in danger are dominated by female employment. For manufacturing, this is the case in the textiles, apparel, leather and leather goods industries that have all seen a substantial re-location away from the industrialized countries. The rising import penetration for these goods therefore often led to a disproportionate fall in female employment in the old OECD countries. Kucera and Milberg (2000) can show that this was crucial to the gender-biased, negative employment effects caused by an expansion in trade with non-OECD countries. For the service sector, the re-location of call centres from the high-income countries to lower-wage destinations could again affect female employment disproportionately. Estimates for the United Kingdom show that about two thirds of all call centre-agents are female, and women would thus bear most of any potential job losses (see Department of Trade and Industry 2004: 61).

There is a similar gender dimension on the receiving end of outsourcing. Ngai (2004) reports for the Shenzhen Special Economic Zone in China that "more than 90 per cent of the labour force in the light manufacturing industries was young, female, and under 25 years of age" (ibid.: 30). While the establishment of factories producing for European and North American corporations provides female migrant workers with job opportunities absent in the rural areas, the jobs created often do not constitute 'decent work'. For example, a case study of a typical garment factory in Shenzhen by the NGO Chinese Working Women Network gives testimony of a lack of rights at work (including no protection against unfair dismissal). In contravention of Chinese law, working times were between 72 and 77 hours per week (Ngai 2004). Like in the case of China, the textiles and apparel sector is strongly dominated by female employment in most of the countries that produce for Western brands. Again, the general picture is that outsourcing has helped to create jobs for women that are superior to traditional alternatives in e.g. agriculture, but that gender-biased wage discrimination and poor working conditions often remain issues of concern (see Tran-Nguyen and Beviglia Zampetti 2004: 141ff.). As Barrientos et al. (2004) argue, female employment is generally concentrated at the informal end of global production chains, leaving women without adequate social protection and job security.

Services offshoring has also created numerous job opportunities for women in developing countries such as India and the Philippines. While reliable data are scarce, some studies suggest that women are still significantly under-represented and that female employment is concentrated in the relatively low-skilled segments of the software industry and in ITC-enabled services (for India see Vijayabaskar et al. 2001: 41).

However, the positive effect of offshoring in terms of job creation is not a real gain if the quality of new jobs low. Indeed, there is the danger that "bad" jobs in developing countries replace "good" jobs developed countries: First of all, as we have shown in the previous section, there is the possibility that jobs created in developing countries though production relocation occurs in the informal sector and not in the formal one. Secondly, if jobs were created in the formal sector, workers in developing countries would face considerable insecurity as labour turnover is higher and labour market regulation is weaker than in advanced economies. Thirdly, the new jobs created in the "South" will have a lower productivity than those that are lost in the "North" (owing to the lower technology which means that more work hours are spent producing the same output). Fourth, there are various complaints about the missing respect of labour rights and working conditions related to offshored activities in developing countries, in particular in the garment industry, but also in other industries.

5.2. Offshoring, productivity and factor prices

As indicated earlier, the relocation of production stages can improve a firm's productivity. Arndt (1997) argues along these lines and concludes that by shedding "their less competitive operations" companies become "more effective competitors in world markets for end products" (Arndt, 1997). For example, there is some evidence that offshoring contributed to changes in industry productivity and product prices in the United States during the 1980s and 1990s (Feenstra and Hanson, 2001). However, it is not possible to identify a clear pattern between offshoring and productivity (Olsen, 2006). Indeed, whether offshoring increases productivity depends on both sector and firm-specific characteristics. In particular, the degree of firm involvement in international trade is a key factor (ibid.).

Through this channel, offshoring can have an indirect positive effect on employment and productivity. While greater productivity could induce a firm to downsize its work force in the short run (since the same amount of goods can be produced with fewer workers), in the long run more productive firms should grow and ultimately to hire new workers. Thus, higher productivity could bring about an increase in labour demand, at least in the long run. Grossman and Rossi-Hansberg (2006a) decompose the impact of offshoring on wages through three components: the labour supply effect, the relative price effect, and the productivity effect. They show that while the first two effects exert a negative impact on wages, but that productivity has a positive influence that can outweigh the others. Hence, offshoring of low-skilled (or high-skilled) tasks can raise the wage of domestic workers who perform the remaining tasks. Similarly, Jensen and Turrini (2004) build a theoretical model to demonstrate that international trade in intermediate goods can improve productivity and – in the long run – increases employment.

Another effect of higher productivity can be a boost in firms' profits (McKinsey Global Institute, 2003). In addition, offshoring can also raises profits through downward pressure on factor prices.[30] Empirical evidence on the positive link between offshoring and profit is provided for a number of countries, including Ireland, Japan, Germany and the United States.[31] However, to move from static gains, in terms of higher productivity and higher profitability, to dynamic gains, firms should invest their profits (Milberg and von Arnim, 2006). The lack of correspondence between profits and investment is mirrored in the unusual high liquidity of the corporate sector and through increased dividend payments. McKinsey (2003) argues that offshoring-induced cost-savings "will lead to higher profitability [and] increased [stock market] valuations" (McKinsey Global Institute, 2003). There are thus good reasons to predict that offshoring increases the share of profits in national income and, conversely, exerts a downward pressure on the labour share – an argument that will be taken up again in Section 6.2.

5.3. Offshoring and its development dimension

The discussion about the development consequences of offshoring is closely linked to the broader debate on global production chains. Some authors stress that offshoring could be a useful way for developing countries to integrate into international trade (Feenstra and Hanson, 1999; World Bank, 1997). During the "first unbundling", firms and countries took part in international trade only if they were able to produce the entire good. However, when the production process becomes fragmented, a firm is also competitive if it only specialises in a specific task. Although this would typically be at the low-skilled end of the production chain, the insertion into the global value chain could be the first step towards technologically more advanced and skill-intensive tasks.[32] This was, for example, the case in

[30] See Feenstra and Hanson (1999), Blecker and Razmi (2006), Palley (2002), Kaplinsky and Morris (2002), UNCTAD (2002) for this argument.

[31] For Ireland see Görg and Hanley (2004), for Japan see Kimura (2002), for Germany Görzig and Stephan (2002) and for the United States see Milberg and von Arnim (2006).

[32] Note that now developing countries have another option to upgrade in the global value chain. Instead of developing all the tasks in-house, they could offshore some, taking advantage of the better technological or factor endowment of foreign countries.

several East Asian counties where firms started with simple assembly tasks and later on fabricated original equipment, which required a broader range of manufacturing functions. Some countries have moved a step further by designing original products and marketing them under their own brand (Gereffi, 2002).[33]

Table 1: The consequences of offshoring: a theoretical perspective

	Developed Countries	**Developing Countries**
Labour Market Effect		
Employment Effect		
Employment Level	- Decrease	+ Increase
Skilled/Unskilled Employment	- Increase (mainly if material offshoring)	- Increase (if driven by Technological Change); + Decrease (if Stolper-Samuelson Effect)
Unskilled Employment	- Decrease	+ Increase
Skilled Employment	- Decrease if service offshoring; + Increase/Not Change if material offshoring	+ Increase
Wage Gap between Skilled and Unskilled labour	- Increase (mainly if material offshoring)	- Increase (if driven by Technological Change); + Decrease (if Stolper-Samuelson Effect)
Indirect Effect	+ Increase Productivity → increase employment and decrease wage inequality	+ Positive externalities for the economy; + Skill upgrading; - Increase informal sector size; - Hurt job quality.
Global Employment Effect	+ Positive Net Effect: More jobs created in the South than destroyed in the North; - Negative Effect in term of Job Quality (informal sector; lower productivity; insecurity)	
Productivity Effect	+ Increase (with positive indirect effect of employment and wage inequality) + Increase Profits	+ Increase + Skill Upgrading
Development		+ Increase integration in international trade; + Favour skill upgrading; + Better trade opportunities; + Upgrading in value chain; - Risk of simple subcontracting and production process detriment.

Source: authors' compilation.

This view is linked to the idea that market access favours the acquisition of technological capabilities, which might enhance the exploitation of better opportunities (Humphrey and Schmitz, 2004). The upgrading in the global value chain would increase labour demand and wages, generate more skill-intensive jobs and create incentives for investment in education at the household level. However, some authors suggest that offshoring could equally be a "trap" for developing countries (Hayter, 2004). Their specialisation in specific labour-intensive and routine tasks could impede the development of more advanced skills and hence increase the technological gap with industrialized countries. This effect can be observed in the case of firm de-specialisation in Latin America, and in

[33] Milberg and von Arnim (2006) present evidence for upgrading in China, India and Korea.

particular Mexico (Milberg and von Arnim, 2005; Moreno-Brid, 2005). Indeed, as emphasized in the *World Investment Report 2002* (UNCTAD, 2002) in relation to the apparel sector, international production sharing only brings benefits for receiving countries in terms of technological change and industrialisation if offshoring involves full-package agreements and not just simple assembly subcontracting.[34] Moreover, UNCTAD (2004) argues that offshoring of services may be footloose because of lower capital intensity and weaker links to local suppliers.[35]

Offshoring – and policies aimed at attracting it – can, however, have wider ramifications for recipient countries. The World Bank (1997) argues that governments that want to attract vertical FDI to establish their country as a supplier for intermediate goods and offshored services have an incentive to pursue a range of policies, in particular to invest into education, to reduce corruption, and protect property rights. On the other hand, there are fears that governments that want to attract foreign investment and offshoring contracts could begin a "race to the bottom" in terms of fiscal incentives, but also in terms of labour standards. While the empirical evidence suggests that lower labour standards do not lead to higher FDI inflows[36], there is no a clear picture of their link with offshoring. However, FDI inflows for offshoring activities are linked to many macroeconomic variables such as exchange rate, interest rate and various external balances.[37]

6. Offshoring and the labour market: Empirical findings

The discussion of the theoretical literature in the previous section does not allow drawing any firm conclusions on the impact offshoring has on labour markets. For developed countries, the main fear is that offshoring in effect shifts jobs previously held in these countries to developing economies, and hence has negative impact on employment levels – particularly for low-skilled workers, whose wages might also fall relative to those of higher skilled workers. However, in addition to this "supply effect", offshoring might also increase productivity in the advanced economies – and hence, in the long run, lead to job creation not only in the receiving countries but also in the source countries. The balance of these two effects, and hence the net impact, will depend on a number of country-specific characteristics, and in particular on labour market institutions (Anderton et al., 2002). Hence, it becomes an empirical question whether job gains will be sufficient to offset job losses, and whether a positive net effect remains in developed countries. Since receiving countries are likely to gain jobs through offshoring, the global net effect on employment should be positive. While this should hold true from a "quantitative" point of view, less clear is net "qualitative" effect: as some authors have argued, offshoring could replace "good jobs" in developed countries with "bad jobs" in the receiving countries. Another issue that emerged from the preceding discussion is in how far offshoring can exacerbate growing wage inequality in developed countries, and whether it narrows or widens skills differentials in developing and transition countries that host offshored activities.

6.1. Methodological issues

Different authors have analysed the impact of offshoring on labour markets in developed and developing countries. Although they use different data sources and control for different factors, they mainly rely on two models[38]: labour demand and quasi-fixed trans-log cost function (see Appendix 2).

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[34] See also Bair and Dussel Peters (2006) on the different experience of East Asia (full packages) and Mexico (subcontracting).

[35] See also Bardhan (2006) for a similar point on ITC service offshoring in India.

[36] See for example Hayter (2004), Brown (2001), and Kucera (2001).

[37] Ernst (2005) illustrated these impacts for the case of Mexico between 1992 and 2003.

[38] These models have been applied to analyze different aspects of offshoring impact on the labour market. They are used to estimate the impact of both material and service offshoring; vertical FDI as well as arms' length contract; offshoring and inshoring effect in developed and developing countries.

Although the trans-log cost function has been the most applied method, other cost function estimations have been adopted. Morrison Paul and Siegel (2001) use a generalised Leontief cost function to analyse the impact of offshoring on United States labour composition; Falk and Koebel (2002) use a generalised Box-Cox cost function to examine the effect of purchased services and imported intermediate materials on the labour demand for different skills in Germany's manufacturing sectors; Egger and Stehrer (2003) adopt a dynamic cost function to analyse the impact of job relocation on wage bill in eastern Europe.

On the other hand, Amiti and Wei (2004) adopt the labour demand approach (Hammerers, 1993) to analyse the impact of material and services offshoring in the United States and the United Kingdom. They estimate the following equation:

$$\Delta \ln L_{it} = \alpha_o + \alpha_1 \Delta \ln w_{it} + \alpha_2 \Delta \ln OFF_{it} + \alpha_3 \Delta \ln \omega_{it} + \alpha_4 \Delta \ln Y_{it} + \alpha_5 D_t + \varepsilon_{it} \qquad (7)$$

where OFF_{it} measures service and the material offshoring, ω_{it} the input prices, and Y_{it} output. A similar approach has been adopted by Falk and Wolfmayr (2005) and by Marin (2004)[39] to estimate the employment effect of trade in intermediate inputs in Europe. Hijzen and Swaim compare the estimation of (7), defined as conditional labour model (obtained through a process of cost minimization conditional on output) to the unconditional demand model (maximize profits given input and output prices). In so doing they capture two different effect of offshoring: the technology effect, which causes job destruction though production relocation; and the scale effect, which favors job creation though the productivity enhancing effect. Hsieh and Woo (2005) decompose the change in the relative demand for less-skilled workers following a standard "between within" decomposition in order to capture the impact of offshoring on the Chinese labour market. Finally, Geishecker and Görg (2004) incorporate the offshoring variable as a shift parameter in a Mincerian (Mincer, 1974) wage model to estimate the impact of job reallocation on wages in Germany.

In order to estimate the impact of offshoring on the labour market, data on trade, intermediate inputs and employment are needed. In Section 4 we have already presented the main data sources to measure offshoring. However, these data sets do not always include information on employment. This is particularly the case for input-output tables, outward processing trade and statistics for intermediate inputs. Authors using this kind of data need to match them with employment statistics.[40] Some use labour market data at industry level[41], while others use household surveys and aggregate these data at sectoral level to match them with trade data, like Geishecker and Görg (2004) who matched them with input-output tables. On the other hand, if authors use firm-level data and MNE surveys, they do not need other data sources, since these data sets usually include detailed data on employment, input and trade flows.[42]

6.2. Employment levels: empirical findings on the impact of offshoring

Relatively few authors have analyzed the impact of offshoring on changes in employment levels in developed and developing countries (this section), while more studies are available on skill-bias of trade in tasks (Section 6.3).

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[39] Marin (2006) focuses on the impact of vertical FDI on Austrian and German labour market.

[40] In these cases the main problem is to make the data sets compatible. Sometimes different classifications of trade data are available, at a more disaggregated level than employment statistics. However, on the web there are many routines that confirm different classifications.

[41] See for example Helg and Tajoli (2005), who linked them with data on outward-processing trade, Amiti and Wei (2005) for a combination with input-output data, or Anderton and Brenton (1999), who added bilateral trade data.

[42] See for example Görg and Strobl (2002), Fajnzylber and Fernandes (2004), and Marin (2004). Since most data-sets include information on different sectors in different years, the best analysis tool are fixed effect analysis (Hijzen et al., 2004), Arellano-Bond GMM estimations (Helg and Tajoli, 2005), Brundell-Bond GMM estimations (Egger and Strehrer, 2005), OLS first differences (Fajnzylber and Fernandes, 2004), quintile regressions (Falk and Wolfmayr, 2005), IV-GMM estimations (Lorentowicz et al., 2005).

Employment effects in developed countries

Dramatic estimates of offshoring activities have stirred up a great deal of public debate about the employment impact of offshoring. For example, Forrester Research predicts that by 2015, Europe will lose more than 1 million jobs as a result of 'offshoring' to overseas service providers (Forrester, 2004a). An even greater impact is predicted in the United States, with an estimate of 3.3 million jobs lost during the same period. The claim was first made by the consultancy in 2002, and then was revised, slightly upwards, two years later (McCarthy 2002 and 2004). Others believe that this figure is still 'conservative' and estimate that in the United States alone some 14 million jobs are 'at risk' as a result of offshoring (Bardhan and Kroll, 2003). On the other hand, some studies argue, "fears about job losses, however reasonable they might be, tend to overplay the likely impact of offshoring" (McKinsey Global Institute, 2003, p. 9). By the latest estimates from McKinsey, offshore employment in services had reached 1.5 million jobs worldwide in 2003 and could grow to 4.1 million jobs by 2008 (Farrell et al., 2005a). Still, this would equal only a small fraction of services employment in developed countries (around 1.2 per cent).[43] Similarly, the *World Employment Report 2001* concludes that "very few jobs in industrialized countries are contestable by developing countries" (ILO, 2001). A study commissioned by the Information Technology Association of America even predicts that offshore sourcing will lead to a net gain of 317,000 jobs in the United States by 2008 (ITTA, 2004).

One crucial shortcoming of most estimates at the higher end is that they only consider direct job losses due to offshoring, and neglect both the indirect employment effects and offshoring flows in the opposite direction. For the heated debate on services offshoring from the United States, this seems particularly ironic, given that the United States remain the world's largest exporter of computer and information services and other business services (see Box 4 above). In contrast to the figures published by management consultancies, academic studies generally arrive at a far more nuanced picture and the majority of studies provide evidence that the impact of offshoring on the domestic labour market is rather limited in quantitative terms[44]. Most empirical studies found either a negative, but small[45] impact on employment, or a non-significant impact[46] (some of the main results are presented in Table 5). Anderton et al. (2002) focus on the impact of material offshoring on low-skill workers in Sweden, Italy, the United States and the United Kingdom. They find that offshoring is associated with a relative decline in demand for less-skilled labour, which is reflected in falling employment and wage-bill shares for low-skill labour. The authors use imports from low-wage countries as a (very wide) proxy for offshoring. Kucera and Milberg (2003: 604) use the same measure to examine how growing import penetration from these countries has affected absolute employment in the manufacturing sector (albeit without labelling it 'offshoring'). Based on a factor content analysis, they estimate that trade with non-OECD countries led to a loss of 3.5 million manufacturing jobs in ten old OECD member-countries from the late 1970s to the mid-1990s. However, it is important to bear in mind that this should not be equated with the net effect of offshoring, and that gains in service employment could potentially offset these job losses.

Falk and Koebel (2002) take a different approach (the previously mentioned Cox-Box cost function) in their study of the German manufacturing sector. They conclude that the growing demand for imported intermediates and purchased services is a consequence of output growth, and does not substitute domestic labour inputs. Falk and Wolfmayr (2005), using 2-digit industry level data for the European Union, show that imported materials from low-wage countries (as a share of gross output) have a significant and negative impact on total employment. Moreover, they split the sample on the basis of skill-intensity and they find that this result holds only for low skill intensive sectors. Matching trade data with a survey on Austrian male workers, Egger et al. (2003) show that an increase in the

[43] While this puts the dimension of outsourcing into perspective, it would be misleading to equate the number of jobs created through outsourcing in transition and developing countries with the number of jobs lost in developed countries, as will be argued below.

[44] See Harrison and McMillan (2006), Borga (2005), Falk and Wolfmayer (2005), Schultze (2004), Kucera and Milberg (2003), Egger et al. (2003), and Anderton et al. (2002).

[45] See Marin (2004), OECD (2007b), and IMF (2007).

[46] See OECD (2007a), Amiti and Wei (2004), and Falk and Koebel (2002).

share of offshoring negatively affects the probability of staying in (or changing into) the manufacturing sector. These effects are more accentuated for industries with a comparative disadvantage (i.e., net importing industries). Harrison and McMillan (2006) examine the employment changes between parents and affiliates of United States MNEs. They find that jobs in low-income countries are substitutes for United States jobs, while jobs in high-income countries are complementary with United States jobs. Moreover, they analyse how imports and exports within MNEs affect employment in the United States and find that vertical FDI is associated with lower employment in the United States, regardless of whether the destination is a high- or a low-income country.

The analysis by Biscourp and Kramarz (2007) differs from the previous ones since they use a firm-level data set, instead of sectoral level data to investigate the impact of trade in final and intermediate goods on employment in France. The results suggest that, over the period 1986-1992, increasing exports raised employment but more import penetration destroyed job. The negative impact is more accentuate in firms that import finished goods than in firms importing intermediate inputs. Yet another approach was adopted by Egger, Pfaffermayr and Weber (2003). Using a survey on Austrian male workers they investigate whether international factors affect the probability of workers of staying in (or changing into) the manufacturing sector. Their results show that increasing offshoring has negative effects on the transition probabilities between sectors. These effects are more accentuated for industries with a comparative disadvantage (i.e., net importing industries).

A potential source of error in most conventional studies is the assumption of inter-sectoral independence, i.e. they assume that jobs are lost in the sector that offshores activities. As Egger and Egger (2005) argue, neglecting any interdependence of industries is "a major shortcoming, since the estimated wage and employment effects of international outsourcing may be downward biased, if inter-sectoral multiplier effects are ignored". This critique also applies to some of their earlier research for Austrian manufacturing (Egger and Egger 2003).

A different point of view is provided by Marin (2004), Castellani et al. (2007), Hijzen and Swam (2007), OECD (2007a), Ando and Kimura (2007). Following these analyses, offshoring is a wide phenomenon that involves all sectors, but its impact on employment is either small or positive. In particular, Marin (2004) finds that vertical FDI towards Easter Europe leads to surprisingly small job losses in the source countries. Indeed, low-wage jobs in affiliates do not substitute parents' employees, but help Austrian and German firms to stay competitive. In Italy, there was no evidence for employment loss due to offshoring of manufacturing firms, but a slight skill upgrading, when offshoring occurred in Eastern European countries (Castellani et al., 2007). In their analysis on 17 OECD countries, Hijzen and Swaim (2007) differentiate between intra- and inter- industry offshoring as well as explicitly account for the "technology" effect and the "scale" effect of offshoring. The former reflect the destruction of jobs that occurs when firms relocate part of their production activities abroad and it's captured by estimating the conditional labour demand model (where output is keeping constant). The latter effect captures the creation of jobs due to the productivity enhancing effect of offshoring, that leads to an increase in output and employment. The difference between the conditional and unconditional[47] labour demand estimation gives an indication of the "scale effect". Their results show that "offshoring within the same industry (intra-industry offshoring) reduces the labour intensity of production, but does not affect overall industry employment. By contrast, inter-industry offshoring does not affect labour-intensity, but may have a positive effect on overall industry employment" (Hijzen and Swaim, 2007; pp.19). On the base of these results, the authors suggest that the productivity gains from offshoring are sufficiently large to offset the job losses due to production relocation. The effect is significant only for material offshoring.

A similar data set is used in the OECD (2007b) report, which shows that the industrial sectors that have most downsized their workforce are generally not those that have most engaged in offshoring (with the exception of the textiles, apparel and footwear industries). The study also finds that short-term employment losses due to offshoring are more important for manufacturing than for services and impacts vary from one sector to another, from one country to another and according to the period (ibid.). Finally, the study suggests that the negative evaluation of the impacts of offshoring on

[47] The unconditional labour demand captures the total effect of offshoring.

the labour market is due to a myopic judgment. Indeed, while the negative consequences of relocation are known and immediately visible, the benefits – in terms of productivity and low prices of imported goods – appear only after a certain period and are not directly linked to offshoring (ibid.).

Using cross-country data, the OECD's *Employment Outlook* (OECD, 2007a) provides evidence that offshoring has no effect or even a positive effect on sectoral employment: "while some jobs are lost when production activities are relocated abroad, offshoring also generates a similar number of new jobs because it tends to increase the scale of production by making firms more competitive. However, this does not mean that the jobs created require identical skills as those destroyed". Moreover, the report identifies offshoring as one of the driving forces behind the increase in the elasticity of labour demand. This result is consistent with Senses' analysis (Sense, 2006), who finds that since 1985 those industries that have been heavily offshored have a higher elasticity of labour demand. This is due to a higher flexibility in production given by relocation, as firms can react more quickly to shocks by choosing a mixture of production at home and abroad. Finally, they emphasize that the expansion of international production networks is potentially an important source of vulnerability for workers (OECD, 2007a). Hence, the negative impact of offshoring on the labour market is not quantitative but qualitative. Using Japanese firm level data, Ando and Kimura (2007) show that "manufacturing firms expanding operations in East Asia have domestic employment growth rates of 3 to 8 percentage points higher than other manufacturing firms, while the positive effect of offshoring on domestic employment is not as statistically robust for non-manufacturing firms" (Ando and Kimura, 2007: 4).

Amiti and Wei (2004) examine the job effects of services offshoring for the United States and the United Kingdom. They summarize their main findings as follows:

> "When the U.S. economy was decomposed into 450 sectors, a faster growth in outsourcing at a sector level is associated with a small negative growth in jobs in that sector […]. However, when the U.S. economy was decomposed into 96 sectors […] there is no correlation between job growth and growth of outsourcing at the sector level. These results seem sensible. At sufficiently disaggregated levels, every outsourced job is a job lost. Hence, job growth and outsourcing may be negatively related. At the other extreme, for the economy as a whole, outsourcing is likely to change only the sectoral composition of the jobs, but not necessarily the aggregate level of employment."

The results for the United Kingdom are similar and support the assumption that offshoring services has no negative net effect on manufacturing employment, while no robust results were obtained for service employment. While these findings are highly informative in themselves, they contain no information about the effects of non-service offshoring. Further, they only cover two countries with particularly flexible labour markets. Crinò (2006), using much disaggregated data for skilled workers, shows that service offshoring has a positive impact on the level of employment among skilled workers in the United States. Indeed, he provides evidence that offshoring raises labour demand for each white-collar group. Borga (2005), using the BEA's MNC data, shows that while parent's reliance on imported goods from foreign affiliates is negatively associated with changes in parent company employment, the relationship was not significant for imports of services. Schultze (2004) finds that job losses in the United States were mainly caused by productivity gains. He shows that job losses due to vertical integration from 1990 to 2001 were estimated to be 195,000 jobs per year, hence a small portion of the 13 million jobs that were lost in the United States.

Table 2: Synopsis of studies on employment effects in developed countries

Author	Country	Period	Data	Offshoring Type and Destination	Results
Anderton et al. (2002)	Sweden, Italy, United States, United Kingdom	UK (1979-1986) US (1970-1993) Sweden (1979-1993) Italy (1973-1995)	Import data	Material; Developed and developing countries	↓ demand for less skilled workers; ↓ wage bill share for unskilled workers.
Kucera and Milberg (2003)	OECD countries	1970s to mid-1990s	Input-Output Table	Material; OECD and non-OECD countries	↓ manufacturing jobs (mainly from North-South trade)
Falk and Köbel (2002)	Germany	1978-1990	Input-Output Table	Material; general	No substitute effect on domestic labour
Falk and Wolfmayer (2005)	European Union	1995-2000	Trade statistics+ input-output table	Material; Developed and developing countries	↓ Total Employment; ↓ Employment in low skill intensive sectors
Egger and Egger (2003)	Austria	1988-2001	Trade data + micro level data	Material; Eastern Europe	↓ Probability of staying in manufacturing.
Harrison and McMillan (2006)	United States	1977-1999	MNE data	Material; Developed and developing countries	↓ Total Employment; If low-income countries→ substitute domestic jobs; If high-income countries → complementary with domestic jobs;
Biscourp and Kramarz (2007)	France	1986-1992	Firm level data	Material: Developed and developing countries	Import of intermediate goods↓ firm level employment (mainly from North-South trade) but the effect is smaller than the import of final goods
Egger, Pfaffermayr and Weber (2007)	Austria	1988-2001	Male workers survey	Material; general	↓ The transition probabilities of employment between sectors.
Marin (2004)	Austria and Germany	1990s	MNE data	Material; Eastern Europe	Small job losses

Author	Country	Period	Data	Offshoring Type and Destination	Results
Hijzen and Swaim (2007)	17 OECD countries	1995-2000	Input-Output Table; sectoral production data (OECD STAN database); R&D expenditure data (OECD ANBERD dataset)	Material and Service; General.	Intra-Industry offshoring → ↓ labour intensity; Neither Intra- and Inter- Industry offshoring → ↓ Total Employment; → JC from productivity gains offset JD from production relocation (more evident for material offshoring!)
OECD (2007a)	OECD countries	1980-2004	Trade Data	Material and service; Developed and developing countries	Myopic evaluation and small negative impact on employment
OECD (2007b)	OECD countries	1990-2004	Trade Data and Input-Output Table	Material and service; general	No Δ or ↑ employment; ↑ elasticity of labour demand; ↑ job vulnerability.
Ando and Kimura (2007)	Japan	1998-2003	Firm level data	Material; East Asia	ffshoring → ↑ employment only in manufacturing firms
Castellani et al. (2008)	Italy	1998-2004	MNE and national firms data	Material Developed (Italy) and developing countries	No↓ employment
Amiti and Wei (2004; 2005)	United Kingdom; United States	UK (1995-2001); US (1992-2000)	Trade Data and Input-Output Table	Service; general	Δ in employment composition and NOT in employment level
Crinò (2006)	United States	1997-2002	Labour statistics + import-matrix coeff.	Service; general	↑ skilled workers employment ↓ medium and low skilled employment
Head, Mayer and Ries (2007)	European Union	1994-2004	Trade Data Eurostat	Service; general	Nowadays limited displacement impacts but it could increase in the future.
Van Welsum and Reif (2006)	14 OECD country	1996-2003	Trade Data,	Service (net offshoring); general	No↓ employment
Hijzen et al. (2007a)	United Kingdom	1997-2004	Firm level survey	Service; general	Importing service sector ↑ employment growth rate

Source: authors' compilation.

Also, Mankiw and Swagel (2006) in their survey of the empirical literature on offshoring[48] conclude that "[offshoring] is unlikely to have accounted for a meaningful part of the job losses in the recent [American] downturn or contributed much to the slow labor market rebound" (Mankiw and Swagel, 2006:1028). Moreover, they suggest that "increased employment in the overseas affiliates of US multinationals is associated with more employment in the US parent rather than less" (ibid.). On the basis of Eurostat data for 64 countries over the period 1992-2004, Head et al. (2007) use a gravity model to estimate the impact of service offshoring on job destruction. They argue that local workers are not seriously at risk of displacement, since delivery costs create a significant advantage for them relative to workers in distant countries. Indeed, customers are willing to pay more for nearby than for remote service provision. However, the price gap is getting smaller in the recent years and if this trend goes on, local workers could be hurt by the higher competition pressure from foreign workers. Van Welsum and Reif (2006), using data for 14 OECD countries over the period 1996-2003, make a further step and take into consideration also the simultaneous impact of service inshoring. Their econometric analysis shows that net outward investment in business services is not associated with a significant decline in the share of employment potentially affected by offshoring. The evidence that service offshoring is not destroying jobs is also corroborated by the firm-level analysis. Hijzen at al. (2007a), using a survey of English enterprises, show that firms which start to trade in services grow faster than those who do not. However, the positive effect of importing services on employment growth is larger and more significant than that of exporting services. The results are robust to different estimation methodologies[49].

Employment effects in developing and transition countries

It is difficult to say with any certainty how much employment is generated in the host countries as a result of offshoring (or, from the perspective of these countries, "inshoring"). This is true for manufacturing offshoring (where one would, contingent on the definition used, have to distinguish between the production of intermediate inputs and final products), but even for services offshoring (some of the main results are presented in Table 3). For India, the National Association of Software and Services Companies (NASSCOM) estimates that IT-enabled services and business process offshoring accounted for 553,000 jobs in the fiscal year 2007 (up from 106,000 in 2001). The software exporting sector employed another 270,000 people, compared to 170,000 two years earlier.[50] However, the number of job opportunities is relatively minor in relation to India's rapidly growing labour force. Bardhan (2006) suggests that while the benefits of job creation due to business process offshoring are irrefutable, other factors should be considered. In particular, he emphasizes the geographic and social distribution of economic gains, the spillover effects for the rest of the economy and the sustainability of the offshoring model. He concludes that the impact of the IT industry is "too little, too concentrated, too hyped and too detached from the rest of the economy". Moreover, a detailed study shows that there are "high entry barriers based on caste, class and gender in the software [and IT-enabled] labour market in India" that work against already disadvantaged groups (Vijayabaskar et al., 2001).

A survey by UNCTAD indicates that, in terms of new jobs created, India is the greatest net beneficiary in the developing world (UNCTAD, 2004b).The Philippines have also seen a rapid growth in service centres; the call centre industry alone employs some 27,000 people. Costa Rica was first the destination of offshoring in textiles and the garment industry, but moved into higher skilled activities since the late 1990s, mainly electrical material and medical device, but also services (Ernst and Sanchez-Aconchea, forthcoming). Many sub-Saharan countries received strong FDI inflows from Asia, mainly from China, into the textile and garment industry as a result of the African Growth and Opportunity Act (AGOA) of 2000, which gives them privileged access to the US market. The end of the Multi-Fibre Arrangement, however, strongly lowered those privileges, which caused a significant decline of productive activities in Africa. In Africa, service investment has mainly been in call-centres. Here, South Africa has become the prime location that now employing close to 80,000 people to handle calls from overseas customers. Countries like Ghana, Mauritius, Morocco, Senegal and Tunisia have

[48] They mainly focus on business service offshoring.

[49] They use OLS estimation (in first difference), quantile regressions and the propensity matching score technique.

[50] See various fact sheets on www.nasscom.org.

also attracted some offshoring contracts. In Eastern Europe, the Czech Republic, Poland and Hungary have received major investments by multinationals into service centres; among them are DHL's new European IT centre in the Czech Republic and the re-location of Philips' European accounting services to Lódz (UNCTAD, 2004b; Engman, 2007). However, gains from service inshoring are not immediate and widespread across developing countries (van Welsum and Xu, 2007; Catching and Vinswanath, 2007). Indeed, service provision requires the availability of skilled workers, a common language (English and French have been important factors in the development of service inshoring in India and Africa), and cultural similarities (Coe, 2007).

While the number of jobs created as a result of offshoring or re-location of in-house service provision is likely to grow in the future, there are supply-side constraints that restrict future growth. Although the previously cited figure on the "doubling of the global workforce" (Freeman, 2005) suggests that labour supply is abundant, only a small fraction of the new entrants have college education in disciplines relevant to the skilled segment of service offshoring – such as engineering, accounting and finance, life sciences and medicine. A recent study by the McKinsey Global Institute estimates that there are some 33 million young professionals with such degrees in the 28 developing and transition countries such as India, China, Russia and Brazil that are the main offshoring destinations (see Farrell et al., 2005b). However, interviews with human resource managers of multinational companies suggest that only 13 per cent of these would be suitable for actual employment, given obstacles such as insufficient language proficiency, cultural barriers and lower educational standards. Competition for talent from domestic companies and lacking regional mobility further reduce the pool. As a result, McKinsey estimates that only "2.8 to 3.3 million […] young professionals are available for hire by export-oriented service offshoring companies" (Farrell et al., 2005b). However, the study also indicates that, with the possible exception of engineering, demand falls far short of supply in the short term (Farrell et al., 2005c). By 2008, total offshore service employment in eight high-skills job categories, is expected to reach 1.24 million, up from an estimated 570,000 in 2003 (Farrell et al., 2005a).

Extrapolating to all job categories (including support staff), McKinsey arrives at a total of 4.1 million offshoring-related services jobs by 2008, up from 1.5 million in 2003. However welcome such a job creation would be, it is obvious that it does not by itself solve the un- and underemployment problem that developing and transition countries face. Finally, Hansen et al. (2006) provide evidence that "full package" and "specific task" vertical FDI[51] exert an opposite impact on affiliate's employment in terms of quantity and quality. In particular, they show that affiliates of MNEs with dispersed value chain configurations create more jobs in local firms than do affiliates in concentrated value chain configurations. On the other hand, closely coordinated affiliates induce more jobs upgrading in local firms, than do loosely coordinated affiliates.[52] On the basis of these results they argue that "the gap between winners and losers among developing countries may widen considerably" (ibid.).

[51] Following Porter (1986), the authors define these two options as "concentrated" and "dispersed" global value chain configurations, respectively.

[52] However, as pointed out by the authors, owing to the limited sample size, these results are not irrefutable.

Table 3: Synopsis of studies on employment effects in developing and transition countries

Author	Country	Period	Data	Offshoring Type	Results
Bardhan (2006)	India	1998-2005	Employment Growth	Service	↑ employment but not wide positive externalities because it's too concentrate.
UNCTAD (2004b)	India	1990-2003	FDI	Service	↑ employment (+up-grading) but small impact on total economy
UNCTAD (2004b)	Philippines; Eastern Europe; South Africa	1990-2003	FDI	Service	↑ employment in service
Farrell (2005a to c)	India; China; Russia; Brazil			Material and service	↑ labour demand
Hansen, Pedersen and Petersen (2006)	Denmark and developing countries	2005	MNE data	Material and service	The effects depend on the type of offshored activity: "dispersed value chain configuration" (positive) v "concentrated VC configuration" (less positive)
Sanchez-Ancochea (2005)	Costa Rica	1980-2003	Trade Data	Material	Create new jobs; No effect on growth
Jenkins (2004)	Vietnam	1990s	MNE data	Material	Limited effect on employment both direct and indirect

Source: authors' compilation.

Although the available evidence focuses mainly on the effects of service inshoring in developing countries, the "material" inshoring consequences are relevant as well. While the apparel sector in Costa Rica and in the Dominican Republic creates new jobs by attracting offshoring from the United States and developing countries, it is unlikely to act as an engine for economic development (Sanchez-Ancochea, 2005). Jenkins (2004) shows that the considerable inflow of FDI that characterised Vietnam in the 1990s has had a very limited impact on the creation of new jobs. This is due to the high labour productivity and the low ratio of value added to output of this investment. Moreover, he shows that indirect employment effects have been minimal and possibly negative, owing to the lack of linkages between foreign investors and the rest of the economy and the possibility of "crowding out" domestic investment. Material inshoring in African countries involves mainly the textile sector. The traditional investors in these countries are American and European firms, attracted here by the different trade agreements signed since the 1980s. However, more recently firms from emerging countries, such as China, have stated to relocate some of their production process here (Broadman, 2007).

6.3. Effects on skill differentials and inequality

Skill bias, factor shares and income inequality in developed countries

Looking at the employment impact of offshoring exclusively in terms of the number of jobs lost or gained would mean missing an important part of the picture. After a careful survey of the available evidence, a publication by the European Union concludes that "the impact on employment in the European Union may not be so much a quantitative one, in terms of absolute decline in the numbers of jobs, but a qualitative one" since the remaining jobs (and the newly created ones) were "likely to demand relatively high skill levels" (European Foundation for the Improvement of Living and Working Conditions, 2004). Similarly, in the United States low-skilled/low-wage jobs in call centres, for example, will be lost, while higher-skilled jobs in medical, legal and other services will be gained as a result of insourcing – with little overall net gains or losses (Bhagwati et al., 2004). This skill-bias implies that the transition from one job to another can be difficult for individual workers. Therefore there can be substantial adjustment costs at the micro-level even when the overall number of jobs does not decline. The problem is exacerbated when job losses accumulate in one region (Rowthorn, 2004). Given the distributional consequences and the danger that unskilled workers or other groups may be excluded from the labour market, this becomes an area of high social and political relevance (some of the main results are presented in Table 4).

A substantial number of studies have addressed the skill-bias of offshoring explicitly. In line with these theoretical arguments, the majority reports a skill-biased effect of offshoring, either in favour of high-educated workers[53] or at detriment of low-skilled workers[54]. Other studies only find a small impact (Hijzen, 2007; OECD, 2007a; Morrison Paul and Siegel, 2001) or an uncertain effect that depends on the country features (Helg and Tajoli, 2005) or on the relocation country (Ekholm and Hakkala, 2006; Head and Ries, 2002).

For example, the influential paper by Feenstra and Hanson (2001) shows on the basis of data for the United States, Japan, Hong Kong and Mexico that offshoring is indeed associated with a rising wage share for non-production (i.e., skilled) workers. This is consistent with their earlier findings that offshoring explains roughly 15 per cent of the rise in relative wages of skilled workers, whereas technological change accounts for about 35 per cent (Feenstra and Hanson, 1999). Head and Ries (2002) investigate the impact of vertical FDI by Japanese multinationals on domestic skill intensity. They show that increased offshoring to developing countries (measured as a share of foreign affiliate employment) raises skill intensity in Japan. However, this positive effect disappears as production stages are relocated in high-income countries. Other studies support the same conclusion, putting in light the negative impact of offshoring on unskilled workers. Anderton et al. (2002) demonstrate that offshoring to low-income countries has lead to falling employment and wage-bill shares of low-skilled workers in the United Kingdom, the United States, Italy and Sweden. In a study for the United Kingdom, Hijzen et al. (2004) find that "international outsourcing has had a strong negative impact on the demand for unskilled labour". For Germany, Geishecker and Görg (2004) show that offshoring reduced real wages for workers in the lowest three skill categories by 1.5 per cent during the 1990s, while real wages for those workers in the highest group increased by 2.6 per cent due to offshoring. Moreover, they show that only low-skilled workers in low-skill intensive industries experience reductions in their real wage owing to production relocation. Indeed, low-skilled workers in high skill intensive industries have not been hurtled. The same holds for high-skilled workers: gains are only made if they are in high skill intensive sectors (Geishecker and Görg, 2005).

In the case of France, Strauss-Kahn (2003) argues that the country's labour market institutions prevented large movements in relative wages and that offshoring predominantly affected the employment prospects of unskilled workers. According to her findings, offshoring (or, in her terminology, vertical specialization) "accounts for 11% to 15% of the within-industry shift away from unskilled workers toward skilled workers over the 1977-1985 period and to about 25% over the 1985-1993 period". Much of the remainder can, however, be attributed to technological change[55]. A similar result is reported by Egger and Egger (2003) for Austria, a country with one of the highest unionisation rates in Europe. They find that manufacturing offshoring to Eastern Europe had little effect on wage rates, and attribute this to union bargaining power and the centralized wage-setting process (Egger and Egger, 2003). Offshoring did, however, have a significant skill bias in terms of employment prospects. They conclude that "[o]utsourcing to Eastern economies accounts for about one quarter of the change in relative employment in favour of high-skilled labour in the last decade". In a more recent article, they concede "these results are potentially as preliminary as those of others, since they were derived under the assumption of inter-sectoral independence" (Egger and Egger, 2005). However, they show how indirect spillover effects from one industry to another can have substantial impacts on employment, and that neglecting them leads to an underestimation of the employment impact of offshoring.

Offshoring to low-income countries decreases the demand for workers with an intermediate level of education in Sweden (Ekholm and Hakkala, 2006). On the other hand, offshoring to high-income countries, which constitute the larger share of Sweden production relocation, does not affect employment composition. Hsieh and Woo (2005) find evidence that offshoring to China increases the relative demand for skilled workers in Hong-Kong. In particular, by differentiating between service and material offshoring, they show that these two phenomenon account for the same proportion (roughly 15

[53] See Head and Ries (2002) and Feenstra and Hanson (2001).

[54] See Ekholm and Hakkala (2006), Hsieh and Woo (2005), Geischeker and Görg (2005, 2004), Hijzen et al. (2004), Strauss-Kahn (2003), Anderton et al. (2002) and Slaughter (2000).

[55] One can also argue that offshoring has an effect similar to that caused by technological change.

percent) of the aggregate relative demand shift. Finally, they show that the relative share of non-production workers increased more in sectors that shifted a larger share of their production to China. For the United States, there is evidence that vertical FDI has contributed to within-industry shifts, in relative demand, towards more-skilled workers (Slaughter, 2000).

Other studies suggest that the skill-bias effect of offshoring is relatively small and doubtful. Using three-digit level manufacturing data, Hijzen (2007) suggest that technological change was the main factor behind the increase in wage inequality in the United Kingdom during the 1990s. Nonetheless, offshoring also played a significant role, though its impact was smaller. The OECD (2007) report suggests that while offshoring contributes to the changing skill-structure of the labour market, and consequently earning inequalities – by reducing the demand for low-skilled workers relative to medium-and high-skilled workers – its contribution is small. Indeed, the increase in earnings inequalities has grown at a much faster rate than production relocation. The same conclusion is achieved by Morrison Paul and Siegel (2001) for the manufacturing sector in the United States. They show that offshoring seems to have a relatively small negative impact on demand across all education levels, with the strongest effects for workers with less than a college degree. Even in developed countries offshoring will not necessarily widen the inequalities between workers (Helg and Tajoli 2005). Indeed, in Italy production relocation increases the skilled/unskilled labour ratio (Helg and Tajoli, 2005). On the other hand, the effect is not significant in Germany. These results are explained by comparing the labour composition of offshored activities. While in Italy offshored tasks are characterized by lower skilled/unskilled ratios than the national average; in Germany sectors most affected by offshoring present skilled/unskilled ratios much closer to the national manufacturing average (Helg and Tajoli, 2005). Moreover, Schöller (2007) uses sectoral level data for Germany and shows that also service offshoring reduced the relative demand for less-skilled workers between 1991 and 2000. In particular, the author quantifies the effect by on average -0.06 to -0.16% per year. In contrast to the above cited studies, Lorentowicz et al. (2005) find that Austrian offshoring has decreased the relative wages for Austrian skilled workers by 2 percent in the period 1995 to 2002. They suggest that this happened because Austria's human capital levels are poor relative to its trading partners (mainly East European countries).

The majority of these studies show that offshoring plays an important role in explaining skilled-biased inequality in developed countries, though other explanations like technological change and country specific characteristics cannot be ignored (Regev and Wilson, 2007; Ekholm and Hakkala, 2006; Geishecker and Görg, 2004; Morrison Paul and Siegel, 2001). The empirical evidence is thus broadly in line with the theoretical argument that offshoring of low-skill intensive production stages away from the high-wage countries predominantly affects low-skilled workers. They will, depending on labour market institutions, either suffer a fall in relative wages or see their employment prospects diminish. Falling relative wages and zero earnings in case of unemployment both work in the same direction and increase inequalities between (market) incomes. Thus, offshoring has effects similar to those of labour-saving technological change, and adds to the consequences of the latter (see e.g. Feenstra and Hanson, 1999 and 2001; Strauss-Kahn 2003). Shifts in demand from low-skilled towards high-skilled workers, was in fact a significant factor behind the rise in earnings dispersion, which can be detected for most industrialized countries in the 1980s (Gottschalk and Smeeding, 1997). In turn, a rise in the dispersion of earnings was a major cause of growing inequalities of disposable household incomes. [56] Most recent studies confirm that income inequality has grown in many OECD-countries during the 1980s and 1990s (Atkinson, 2003; Cornia et al., 2004).

[56] However, it should not be overlooked that growth at the very top of the distribution, is in part, through capital income (Atkinson, 2003).

Table 4: Synopsis of studies on the skill bias of offshoring in developed countries

Author	Country	Period	Data	Offshoring: Type and Destination	Results
Feenstra and Hanson (2001)	US, Japan, Hong-Kong, Mexico	US (1979-1990)	4-digit ISIC data	Material, general	↑ wage share of skilled workers
Head and Ries (2002)	Japan	1965-1993	MNE data	Material; Developed and developing countries	↑ skill intensity if towards developing countries; NO skill bias if towards developed countries
Anderton et al. (2002)	Sweden, Italy, United States, United Kingdom	UK (1979-1986) US (1970-1993) Sweden (1979-1993) Italy (1973-1995)	Import data	Material; Developed and developing countries	↓ employment and wage share of less skilled workers
Hijzen et al. (2004)	United Kingdom	1984, 1990, 1995	Input-output table	Material; general	↓ demand for unskilled workers
Geischecker & Görg (2004)	Germany	1991-2000	Input-output table	Material; general	↓ real wages lowest three unskilled categories = 1.8%; ↑ real wages highest skilled categories = 3.3%
Geischecker & Görg (2005)	Germany	1991-2000	Input-output table	Material; general	The impact on skill bias depends on the sector skill intensity
Strauss-Kahn (2003)	France	1977-1985; 1985-1993	Input-output table	Material; OCED vs non-OECD	Within industry shifts from unskilled to skilled jobs: 11-15% in 1977-1985; 25% in 1985-1993; labour market institutions matter
Egger and Egger (2003)	Austria	1990-1998	2-digit NACE	Material; East European countries	Little effect of offshoring on wage rates; Union bargaining power and centralized wage setting process
Ekholm and Hakkala (2006)	Sweden	1995-2000	Input-output table	Material; Developed and developing countries	↓ demand for workers with intermediate education level if towards developing countries; NO effect if developed countries
Hsieh and Woo (2005)	Hong-Kong	1976-1996	Firm level data + trade statistics	Material and Service; China	↑ demand for skilled workers
Slaughter (2000)	United States	1982-1990	MNE data	Material; Developing and developed countries	Within-industry shift towards skilled jobs
Morrison Paul and Siegel (2001)	United States	1959-1989	4-digit SIC Database	Material; general	Small negative effect across all education level but strongest effect for workers with less than a college degree
Helg and Tajoli (2005)	Germany and Italy	1990s	Export Processing Data	Material; general	↑ skill bias in Italy; NO effect in Germany
Lorentowicz et al. (2005)	Austria	1995-2002	2-digit NACE data	Material and service; East European countries	↓ relative wage for skilled workers by 2%
Hijzen (2007)	United Kingdom	1993-1998	LFS; ONS for production data; I-O Table (R&D); OECD Trade Database	Material; general	Offshoring minor role in ↑ wage inequality; Main factor = technological change

Source: authors' compilation.

In addition to shifts in the skill-premium, there is another channel through which offshoring can affect inequality: general changes in the returns on labour (of all skill levels) relative to those on capital. Richard Freeman (2005) argues that the entry into the global workforce of workers from countries with relatively low capital stocks has led to a substantial a decline in the global capital/labour ratio. This is likely to depress wages since it "shifts the balance of power in markets towards capital, as more workers compete for working with that capital" (ibid.). The power shift in favour of capital holds for trade in general, but also for the specific case of outsourcing. As discussed above, outsourcing enables companies to cut labour costs by a substantial margin while retaining identical levels of output, or even improving them. The McKinsey Global Institute (2003) estimates that the direct cost savings amount to 58 cents for every 1 US$ a company spends on outsourced services in India. In theory, these cost savings could be passed on to consumers, distributed to the company's remaining workforce (through increased wages), or kept as profits (and hence accrue to the owners of capital). While benefits to consumers do not directly influence the relative returns on capital and labour (and are hence distribution neutral), McKinsey argues that offshoring will boost profits (McKinsey Global Institute 2003: 10). Indeed, there is little reason to believe that workers in industrialized countries will have the bargaining power to appropriate offshoring-related rents (see also Guscina, 2006).

These distributional aspects are not discussed prominently in the empirical literature, but the IMF's Spring 2007 *World Economic Outlook* (IMF, 2007) sheds some light on the issue. In line with other studies (Guscina, 2006), the report finds been a clear decline in the labour share since the early 1980s in the advanced economies. In line with the argument above, the IMF report shows that offshoring indeed had a negative impact on labour shares. Given that offshoring still plays a relatively minor role, it is unsurprising that other factors such as migration and technological change had greater (negative) impact on the labour share (ibid.: 174).

Skill bias and income inequality in developing and transition countries

According to the predictions of mainstream economic theory, the consequences of offshoring on are quite clear for the countries that *receive* outsourced activities: since offshoring predominately involves in low-skilled segments of productions, low-skilled labour should benefit in destination countries. However, this need not be the case since activities that are considered to involve low skills from the perspective of a developed country might well be high-skilled from the perspective of a developing country (Feenstra and Hanson, 1997). Again, the effect of offshoring on skill differentials and overall wage dispersion remains open to empirical investigation. Unfortunately, the evidence collected to resolve the issue is still rather patchy (some of the main results are presented in Table 5). Feenstra and Hanson (1997) offer some insights through the case of Mexico. Here, the offshoring of production from the United States caused a sharp increase in the demand for skilled labour in the country's northern border regions. Their estimations show that FDI into the *maquila* sector, that is closely associated with the offshoring activities, can "account for a large portion of the increase in the skilled labour share of total wages" and an associated shift in relative wages (ibid.: 391). In a similar exercise, Egger and Stehrer (2003) examine the distributional effects of rising intermediate goods exports of fourteen manufacturing industries in the Czech Republic, Hungary and Poland during the 1990s. They find that, while the skill-premium in all three countries has risen over the period, offshoring activities have helped to contain this rise. Thus, and in contrast to Mexico, offshoring has worked in favour of unskilled labour there.

A likely explanation for these diverging results is that skill levels in Central and Eastern Europe are similar to those in the old European Union countries, while there is a gap in terms of skill endowments between the United States and Mexico. The same would hold for offshoring of IT services to India, where the increased demand for software engineers is likely to widen wage gaps. While strongly advocating the free trade in services on the merits of welfare gains, the World Trade Organization concedes that IT offshoring "may not have a […] favourable effect on income distribution" in India (WTO, 2005).

As emphasized in Section 2 and in Appendix 1, the re-location of production by a parent firm to its foreign affiliate through vertical FDI is one model for offshoring – through not all FDI falls under the definition of offshoring used here. Nonetheless, the related literature on FDI can shed some further light on the skill bias effect. For Poland, Lorentowicz et al. (2005) show that the ratio of foreign-owned to domestic assets rose by 71 percent over the period from 1994 to 2002. In the same period, the skill premium in Poland increased by 41 percent, with FDI contributing roughly a third of this increase. In Brazil, the use of imported inputs and FDI is linked to greater demand for skilled workers (Fajnzylber and Fernandes, 2004). Contrarily, the use of imported inputs, exports and FDI are all associated with a lower demand for skilled labour in China (ibid.). Bardhan (2006) emphasises how vertical FDI in China has created a large middle class mainly located in the coastal regions and in the larger cities. Again, technological change is an additional factor. For Ghana, Görg and Strobl (2002) identify the greater importing of technology-intensive capital, as the main factor behind the increases in relative wages of skilled workers. For Indonesia, Amiti and Konings (2005) show that greater gains in terms of productivity arise from reducing import tariffs. Indeed, imported inputs are an important channel of technological upgrading.

Table 5: Synopsis of studies on the skill bias of offshoring in developing and transition countries

Author	Country	Period	Data	Offshoring Type	Results
Ernst and Sanchez-Ancochea forthcoming)	Costa Rica			Material	Skill upgrading
Feenstra and Hanson (1997)	Mexico	1975-1988	2-digit ISIC data	Material	↑ demand for skilled workers; ↑ skilled workers' wage share in total wage
Egger and Stehrer (2003)	Czech Republic; Hungary; Poland	1993-1999	2-digit NACE	Material	↑ unskilled workers wage
Lorentowicz et al. (2005)	Poland	1994-2002	23 ISIC industries (foreign capital)	Material	Offshoring explain roughly 35% of total skill premium increase
Fajnzylber and Fernandes (2004)	Brazil and China	China (2001) Brazil (2003)	Imported input and FDI	Material	↑ demand for skilled workers in Brazil; ↓ demand for skilled workers in China
Bardhan (2006)	China		FDI	Material	Create a larger middle class
Görg and Strobl (2002)	Ghana	1991-1997	Firm level data	No direct link to offshoring!	Import of technology intensive capital → ↑ skilled workers wage
Amiti and Konings (2005)	Indonesia	1991-2002	5-digit ISIC level (tariffs)	No direct link to offshoring!	↓ in input tariff → ↑ technological upgrading and skill bias

Source: authors' compilation.

7. Conclusions and policy implications

Although there are difficulties in carefully measuring offshoring – due to data scarcity and inadequacy of tools to capture inter- and intra-sector linkages – empirical work has put some light on direct and indirect effects of offshoring on employment in developed and, to a lesser extent, in developing countries. More research is still needed, in particular with regard to "inshoring" countries, to fully understand the phenomenon. In addition, new forms of offshoring emerge such as the offshoring of highly skilled activities, an area of future research. So far, the rising trend in offshoring has had several implications for both national and international policies. Three areas would seem of particular importance:

- Firstly, offshoring has an employment-generating effect in developing countries. If it can be ensured that the jobs created are 'decent jobs', offshoring could offer women and men a chance to work their way out of poverty. From this angle, offshoring is a facet of globalization that has the potential to make it more 'fair' between countries.[57] On the other hand, this will be of little comfort to those workers in the developed world who see their own jobs put at risk by offshoring. However, a thorough examination of the literature leads to the conclusion that fears of job-losses due to offshoring are often greater than the actual threat for developed countries. The literature indicates that international outsourcing might even have a positive net effect on the quality and quantity of employment in industrialized countries. Hence, the simplistic notion of jobs being "exported" from one country to another is often misleading.

- Secondly, offshoring has important consequences for labour markets in industrialized countries. Since offshoring is likely to shift the demand towards highly skilled workers, policy makers need to find ways to mitigate the social and economic costs of job losses, for low-skilled workers. This necessitates not only adequate social safety nets, but also makes skill upgrading even more urgent, as a strategy for the industrialized countries. Key to making offshoring a 'win-win game' is to re-employ those workers that are made redundant in a productive way and to ease their transition into a new job (ILO 2004: 79). Arguably, carefully designed active labour market policies have a role to play in achieving this objective (Auer et al., 2005).

- Thirdly, offshoring can have potentially negative effects on inequality – both in the South and the North. It has often led to rising skill-premiums and growing wage-differentials, or, when labour market regimes in the North prevent a fall in wages for low-skilled workers, reduced the employment prospects of workers in this group. Moreover, it can weaken the position of workers versus the owners of capital, and change the relative returns on labour and capital. The development of policies that ensure social inclusion and distributional justice thus become a central issue, if offshoring is to be made politically and socially sustainable.

The rising importance of offshoring and the disaggregation of production, the so-called trade in tasks, may provide new opportunities for developed and developing countries. Nevertheless, to maximize efficiency without neglecting equity concerns, offshoring requires a more active role of the state in this process.[58] Public policies should focus on providing an appropriate business environment for offshoring activities, but also on easing the transition of workers between jobs, and on containing rising inequality within the domestic economy. Actively

[57] This is one of the main themes of the World Commission on the Social Dimension of Globalization (2004).

[58] See more detailed discussion on "active governance" by the World Commission on the Social Dimension of Globalization (2004: 54ff.).

managing change will be the best way to avoid a protectionist response, the initial instinct of many policy makers,[59] and to reap the potential benefits that offshoring can bring for the whole world.

Briefly put, the further fragmentation of production processes has added to the division of labour around the world. This dynamic element of globalization leads to new opportunities of specialization, but also fiercer competition. The private sector is driving the process, but public policy may play an important role in grasping the benefits of offshoring through the design of "modern" industrial policies, FDI policies, as well as educational and skill development policies.

There has been much debate on offshoring and there is an extensive literature on international production networks and industrial development of involved countries, as shown in this paper. Nevertheless, the empirical research on the employment implications of offshoring is rather limited, especially as regards the developing countries. A current ILO research programme has the ambition to fill this gap. The focus is on employment in developing countries and how it has been affected by the evolution of trade in tasks and related offshoring activities of MNEs. The main question of the research programme is: What are the circumstances, which will make a participation in global production networks and thus offshoring beneficial from an employment point of view?

[59] For an overview of existing and proposed anti-outsourcing legislation in the United States, see Klinger and Sykes (2004). The authors conclude that both the constitution of the United States and the WTO's Government Procurement Agreement limit the ability of state and federal governments' attempts to restrict services outsourcing.

Bibliography

Acemoglu, D., Antràs, P. and Helpman, E. 2006. "Contracts and Technology Adoption", *American Economic Review*, Vol. 97, No. 3, pp. 916-943.

Aghion, P.; Tirole, J. 1997. "Formal and Real Authority in Organizations", *Journal of Political Economy*, Vol. 105, No. 1, pp. 1-29

Agrawal, V.; Farrell D; and Remes, J.K. 2003. "Offshoring and beyond. Cheap labour is the beginning, not the end", *The McKinsey Quarterly*, No. 4/2003 (Special Edition: Global Directions), pp. 25-35.

Alcacer, J. 1999. *The Role of Human Capital in Foreign Direct Investment*. Paper Presented at the Academy of International Business (AIB), Charleston (SC) 20-23 November, 1999.

Ali-Yrkkö, J. and Jain, M. 2005. *Offshoring Software Development - Case of Indian Firms in Finland.* Discussion Papers 971, Helsinki: Research Institute of the Finnish Economy.

Alic, J. A.; Harris, M. C. 1991. "Appendix: The NBER immigration, trade and labour markets data files", in Borjas, G.; Freeman, R, Editors: *Immigration, Trade and the Labour Market* (Chicago: University of Chicago Press and NBER), pp. 407-420.

Altomonte, C.; Bonassi, C. 2004. "FDI, International Outsourcing and Linkages". CESPRI, working paper No. 155. (Milano: Università Bocconi).

Amiti, M.; Konings, J. 2005. "Trade Liberalization, Intermediate Inputs, and Productivity: Evidence from Indonesia" IMF Working Paper No. 05/146. (Washington, D.C.: International Monetary Fund).

—.; Wei, S.-J. 2004. "Fear of Service Outsourcing: Is It Justified?" IMF Working Paper No. 04/186. (Washington, D.C.: International Monetary Fund).

—.; Wei, S.-J. 2005. "Service Offshoring Productivity, and Employment: Evidence from the United States". IMF Working Paper No. 05/238. (Washington, D.C.: International Monetary Fund).

Anderson,, J.E. and van Wincoop, E. 2004. "Trade Costs", *Journal of Economic Literature*, Vol. XLII (September 2004), pp.691-751.

Anderton, R. and Brenton, P. 1999. "Outsourcing and low-skilled workers in the UK", *Bulletin of Economic Research*, Vol. 51, No. 3, pp.1-19.

Anderton, B.; Brenton, P.; Oscarsson, E. 2001. *What's trade got to do with it? Relative demand for skills within Swedish manufacturing* CEPS Working Document No. 162. (Brussels: Centre for European Policy Studies).

Anderton, B.; Brenton, P.; Oscarsson, E. 2002. *Outsourcing and Inequality*, CEPS Working Document No. 187. (Brussels: Centre for European Policy Studies).

Anderton, R. and Schultz, S. 1999. *Explaining export success in the UK and German medical equipment industry*, (London: Anglo-German Foundation for the study of industrial society), Discussion Paper No. 185. http://www.nottingham.ac.uk/economics/staff/details/papers/bob_anderton_e3.pdf

Ando, M.; Kimura, F. 2003. *The Formation of International Production and Distribution Networks in East Asia.* (Tokyo: Keio University, mimeo).

Ando, M.; Kimura, F. 2007. *Can Offshoring Create Domestic Jobs? Evidence from Japanese data*, CEPR, Policy Insight No.16, December 2007.

Antràs, P. 2003. "Firms, Contracts and Trade Structure", *Quarterly Journal of Economics*, Vol. 118, No. 4, pp. 1375-1418.

—.; Garicano, L.; Rossi-Hansberg, E. 2006. "Offshoring in a Knowledge Economy", *Quarterly Journal of Economics*, Vol. 121, No. 1, pp. 31-77.

—.; Garicano, L.; Rossi-Hansberg, E. 2006. *Organizing Offshoring: Middle Managers and Communication Costs*, NBER Working Paper No. 12196 (Cambridge, MA: National Bureau of Economic Research).

—.; Helpman, E. 2004. "Global Sourcing", *Journal of Political Economy*, Vol. 112, No. 3, pp. 552-580.

—.; Helpman, E. 2006. *Contractual Friction and Global Outsourcing.* (Cambridge, MA: Department of Economics, Harvard University).

Arndt, S. W. 1997. "Globalization and the Open Economy", *North American Journal of Economics and Finance*, Vol. 8, No. 1, pp. 71-79.

—. 2002 “Production Sharing and Regional Integration”. Claremont Colleges Working Paper No. 2002-10. (Claremont, CA: Claremont Colleges).

—. & Kierzkowski, 2001. *Fragmentation: New Production Patterns in the World Economy* Oxford: Oxford University Press).

Arora, A.; Gambardella, A. 2004. “The Globalization of the Software Industry: Perspectives and Opportunities for Developed and Developing Countries”, NBER Working Paper No. 10538. (Cambridge, MA: National Bureau of Economic Research).

Atkinson, A. B. 2003. “Income Inequality in OECD Countries: Data and Explanations”. *CESifo Economic Studies*, Vol. 49, pp. 479-513.

—. B. 2004. ‘Increased Income Inequality in OECD Countries and the Redistributive Impact of the Government Budget’, in: G. A. Cornia (ed.), *Inequality, Growth, and Poverty in an Era of Liberalization and Globalization* (Oxford: Oxford University Press), pp. 221-248.

Auer, P.; Besse, G.; Méda, D. 2006. *Offshoring and the Internationalization of Employment.* (Geneva: International Labour Office).

—.; Efendioğlu, U. and Leschke, J. 2005. *Active labour market policies around the world. Coping with the consequences of globalization.* (Geneva: International Labour Office).

Bair, J. and Dussel Peters, E. 2006. “Global Commidity Chains and Endogenous Growth: Export Dynamism in Mexico and Honduras” *World Development*, 34 (2): 203-221.

Baldone, S., Sdogati,F. and Tavoli, L. 2001. “Patterns and Determinants of International Fragmentation of Production: Evidence from Outward Processing Trade between the European Union and Central Eastern European Countries”, *Review of World Economics* (*Weltwirtschaftliches Archiv*), Vol. 137, No. 1, pp. 81-104.

Baldwin, R. 2006. “Globalisation: the great unbundling(s)”, Paper prepared for the project: *Globalisation Challenges and Finland*, organised by the Secretariat of the Economic Council.

—. 2005. *Heterogeneous firms and trade: testable and untestable properties of the Melitz model*. NBER Working Papers 11471.

—; Robert-Nicoud, F. 2006. *Offshoring and globalisation: What is new about the paradigm*? (Geneva: Institute of International Studies).

—; Robert-Nicoud, F. 2007. “Offshoring:General Equilibrium Effects on Wages, Production and Trade”, NBER Working Paper No.12991.

Barba-Navaretti G.; Venables, A. G. 2004. *Multinational firms in world economy*. (Princeton University Press).

Bardhan, A. 2006. “Globalization, Job Creation and Inequality: The Challenges and Opportunities on Both Sides of the Offshoring Divide”, mimeo, University of California, Berkeley. Forthcoming in *Studies in Inequality and Social Justice: Festschrift for Ved Prakash Vatuk*. Meerut, India: Archana Publications.

—.; Tang, J. 2007. “Diversified Occupations, Offshoring and Labour Market Volatility”, MPRA Paper No.4477.

—.; Kroll, C. 2003. *The New Wave of Outsourcing.* Fisher Centre for Real Estate & Urban Economics Paper 1103 (Berkeley: University of California).

Barrientos, S.; Kabeern N.; Hossain, N. 2004. “The gender dimensions of the globalization of production”, Integration Working Paper No. 17. (Geneva: International Labour Office).

Berman E.; Bound J.; Griliches Z. 1994. “Changes in the demand for skilled labor within U.S. manufacturing: Evidence from the annual survey of manufactures”, *Quarterly Journal of Economics*, vol. 109, pp. 366-397.

Bhagwati, J.; Panagariya, A.; Srinivasan, T. N. 2004. “The Muddles over Outsourcing”, *Journal of Economic Perspectives*, Vol. 18, No. 4, pp. 93-114.

Biscourp, P.; Kramarz, F. 2004. *Employment, skill structure and international tranade: Firm-level evidence for France*. Centre de Recherche en Economie et Statistique working paper No. 2004-28 (Paris : Institut national de la Statistique et des Etudes économiques).

Blake, L.; Lande, J. 1999. *Trends in the U.S. International Telecommunications Industry*. (Washington, D.C.: Federal Communications Commission).

Blecker, R.; Razmi, A. 2006. “Developing Countries Exports of Manufactures: Moving Up the Ladder to Escape the Fallacy of Composition?” American University Department of Economics, Working Paper No. 2006-06.

Blinder, A. S. 2006. “Offshoring: The Next Industrial Revolution”, *Foreign Affairs*, Vol. 85, No. 2, pp. 113-128.

Borga, M. 2005. *Trends in Employment at U.S. Multinational Companies: Evidence from Firm-Level Data.* (Brookings).

—.; Zeile, W. J. 2004. “International Fragmentation of Production and the Intrafirm Trade of U.S. Multinational Companies”. Paper presented at the NBER conference on Research in Income and Wealth meeting on Firm-level Data, Trade and Foreign Investment (Cambridge, MA: National Bureau of Economic Research).

Brainard, S. L.; Riker, D. A. 1997. “Are U.S. Multinationals Exporting Jobs?”, NBER Working Paper No. 5958. (Cambridge, MA: National Bureau of Economic Research).

Brenton, P.; Pinna, A. M. 2001. “The declining use of unskilled labour in Indian manufacturing: Is trade to blame?” CEPS Working Paper No. 178. (Brussels: CEPS).

—.; Pinna, A. M.; Vancauteren, M. 2000. “Globalisation and Social Exclusion: A Study of Footwear Industry in Europe”, CEPS Working Paper No. 151. (Brussels: CEPS).

Broadman, H.G. 2007. *Africa’s Silk Road.* (Washington, D.C.: World Bank).

Brown, D. 2001. “Labour Standards: Where do they belong in the international trade agenda?”, *Journal of Economic Perspectives*, Vol. 15, No. 3, pp 89-112.

Burda, M.; Dluhosch, B. 2001. “Fragmentation, Globalization and Labour Markets”. Research Paper 2001 No. 05 (Nottingham: Leverhulme Centre).

Campa, J.; Goldberg, L. S. 1997. “The Evolving External Orientation of Manufacturing: A Profile of Four Countries”, *Federal Reserve Bank of New York Economic Policy Review*, Vol. 3, No. 2, pp. 53-81.

Cassaburi, L.; Minerva, G.A. 2008. “Supplier-Buyer Proximity and Production to Order Choice”, paper presented at the conference “The International Firm: Access to Finance and Organisational Modes”, Centro Studi Luca D’Agliano, Milan, 21-22 February 2008.

Castellani, D., Mariotti, I., Piscitello, L. 2008. “The impact of outward investments on parent company’s employment and skill composition – Evidence from the Italian case”, in *Structural Change and Economc Dynamics* (Elsevier), Vol 19:1.

Centre for European Economic Research (ZEW). 2005. *ZEW-Umfrage unter 4.400 Unternehmen – Deutsche Unternehmen setzten beim Outsourcig von IT-Dienstleistungen auf heimische Partner.* Press Release dated 07. 03. 2005. (Mannheim: Centre for European Economic Research/Zentrum für Europäische Wirtschaftsforschung).

Chen, Y.; Ishikawa, J.; Yu, Z. 2002. *Trade Liberalization and Strategic Outsourcing.* (Carleton University, manuscript).

Coe, D.T. 2007. “Globalisation and Labour Markets: Policy Issues arising from the Emergence of China and India”, OECD Social Employment and Migration Working Papers, No.63, OECD Publishing.

Cornia, G, A.; Addison, T.; Kiiski., S. 2004. ‘Income Distribution Changes and Their Impact in the Post-Second World War Period’, in Cornia, G. A. (ed.), *Inequality, Growth, and Poverty in an Era of Liberalization and Globalization*. (Oxford: Oxford University Press) pp. 26-54.

Costinot, A. 2004. *Imperfect contract enforcement: firm size and the pattern of trade.* (Department of Economics, Princeton University, mimeo).

Crinò, R. 2006. *Are U.S. white-collar really at risk of service offshoring*? CESPRI, Working Paper No. 183, (Milano: Bocconi University).

Deardorff, A. V. 2001. *International provision of trade services, trade, and fragmentation*, Policy Research Working Paper Series No. 2548 (Washington, D.C.: World Bank).

Department of Trade and Industry. 2004. *The UK Contact Centre Industry: A Study*. (London: Department of Trade and Industry).

Desai, M. A.; Foley F. C.; Hines, J. Jr. 2005. *Foreign Direct Investment and Domestic Economic Activity.* NBER, October, No. 11717. (Cambridge, MA: National Bureau of Economic Research).

Dossani, R.; Kenney, M. 2003. *Went for Cost, Stayed for Quality? Moving the Back Office to India.* Available at. *http://APARC.stanford.edu*

—.; Kenney, M. 2004. *The Next Wave of Globalization? Exploring the Relocation of Service Provision to India.* Working Paper No. 156. (Berkeley, CA: Berkeley Roundtable on the International Economy).

Dunning, J. H. 1981. *International Production and the Multinational Enterprise.* (London: George, Allen, and Unwin).

—., 1993, *Multinational Enterprises and the Global Economy*, Addison-Wesley.

—.; Egger, P. 2001. "Cross-border sourcing and outward processing in European Union manufacturing", *North American Journal of Economics and Finance*, Vol. 12, pp. 243-256.

—.; Egger, P. 2001. *International Outsourcing and the productivity of low-skilled labour in the European Union*, WIFO, Working Paper, No. 152.

—.; Egger, P. 2003. "Outsourcing and skill-specific employment in a small economy: Austria after the fall of the Iron Curtain", *Oxford Economic Papers*, Vol. 55, pp. 625-643.

Egger, H.; Egger, P. 2005. "Labor market effects of outsourcing under industrial interdependence", *International Review of Economics and Finance*, Vol. 14, pp. 349-363.

—.; Pfaffermayr, M.; Weber, A. 2007. "Sectoral Adjustment of Employment to shifts in Outsourcing and Trade: Evidence from a Dynamc Fixed Effects Multinomial Logit Model", *Journal of applied Econometrics, Vol.22, pp.559-580.*

—.; Pfaffermayr, M.; Wolfmayr-Schnitzer, Y. 2001. "The international fragmentation of Austrian manufacturing: the effects of outsourcing on productivity and wages" *North American Journal of Economics and Finance*, Vol. 12, pp. 257-272.

—.; Stehrer, R. 2003. "International Outsourcing and the Skill-Specific Wage Bill in Eastern Europe", *The World Economy*, Vol. 26, No. 1, pp. 61-72.

Ekholm, K.; Hakkala, K. 2006. *The Effect of Offshoring on Labor Demand: Evidence from Sweden.* (Stockholm: Stockholm School of Economics and Centre for Business and Policy Studies).

—.; Ullveit-Moe, K-H. 2007. *A new look at Offshoring and Inequality: Specialization versus Competition*, CEPR Discussion Paper No.6402.

Engman, M. 2007. *Expanding International Supply Chains: the Role of Emerging Economies in Providing it and Business Process Services*, OECD Trade Policy Working Papers, No.52, OECD Publishing.

Ernst, C. 2005. *The FDI – employment link in a globalizing world: The case of Argentina, Brazil and Mexico*, Employment Strategy Paper, 2005/17, ILO, Geneva.

—. ; Sanchez-Ancochea, D., forthcoming. *Offshoring and employment: The case of Costa Rica* (working title). (Geneva: International Labour Office, forthcoming).

European Foundation for the Improvement of Living and Working Conditions. 2004. *Outsourcing of ICT and related services in the European Union*. (Luxembourg: Office for Official Publications of the European Communities).

Evans, C. L.; Harrigans J. 2003. *Distance, Time, and Specialization*, NBER Working Paper No. 9729. (Cambridge, MA: National Bureau of Economic Research).

Fajnzylber, P.; Fernandes, A. M. 2004. *International Economic Activities and the Demand for Skilled Labor: Evidence from Brazil and China.* (Washington, D.C.: World Bank).

Falk, M.; Koebel, B.M. 2002. "Outsourcing, Imports and Labour Demand", *Scandinavian Journal of Economics*, Vol. 104, No. 4, pp. 567-586.

—.; Wolfmayer, Y. 2005. "Employment Effects of Trade in intermediate Inputs with the European Union Member States and Asia" *Aussenwirtschaft*, Vol. 60, pp. 441-462.

Farrell, D. et al. 2005a. *The Emerging Global Labor Market: Part I — The Demand for Offshore Talent in Services.* (San Francisco: McKinsey Global Institute).

Farrell, D.et al. 2005b. *The Emerging Global Labor Market: Part II — The Supply of Offshore Talent in Services.* (San Francisco: McKinsey Global Institute).

Farrell, D. et al. 2005c. *The Emerging Global Labor Market: Part III — How Supply and Demand for Offshore Talent Meet.* (San Francisco: McKinsey Global Institute).

Feenstra, R. C.; Hanson G. H.; Swenson, D. L. 2000. "Offshore Assembly from the United States: Production Characteristics of the 9802 Program", in: Robert C. Feenstra (ed.), *The Impact of Trade on Wages.* (Chicago and London: University of Chicago Press), pp. 85-122.

—.; Hanson, G. H. 1996. "Globalization, Outsourcing, and Wage Inequality", *The American Economic Review*, Vol. 86, No. 2, pp. 240-245.

—.; Hanson, G. H. 1997. "Foreign direct investment and relative wages: Evidence from Mexico's maquiladoras", *Journal of International Economics*, Vol. 42, pp. 371-393.

—.; Hanson, G. H. 1999. "The Impact of Outsourcing and High-Technology Capital on Wages: Estimates for the United States, 1979-1990", *Quarterly Journal of Economics*, Vol. 114, No. 3, pp. 907-940.

—.; Hanson, G. H. 2001. "Global Production Sharing and Rising Inequality: A Survey of Trade and Wages" NBER Working Paper No. 8372. (Cambridge, MA: National Bureau of Economic Research).

—.; Hanson, G. H. 2003. *Ownership and control in outsourcing to China: estimating the property-rights theory of the firm*. NBER Working Paper No. 10198. (Cambridge, MA: National Bureau of Economic Research).

—.; Spencer, B. J. 2005. *Contractual versus generic outsourcing: The Role of Proximity*. (University of British Columbia, mimeo).

Fontagné, L.; Lorenzi, J.-H. 2005. *Désindustrialisation délocalisations.* (Paris: Conseil d'analyse économique).

Freeman, R. 1995. "Are Your Wages Set in Beijing?", *Journal of Economic Perspectives*, Vol. 9, No. 3, pp. 15-32.

—. 2005. "What Really Ails Europe (and America): The Doubling of the Global Workforce", *The Globalist*, dated June 3, 2005. Available at www.theglobalist.com.

Geishecker, I.; Görg, H. 2004a. *Winners and Losers: Fragmentation, Trade and Wages Revisited* Discussion Paper 385 (updated version as of March 2004). (Berlin: German Institute for Economic Research). Also published as CEPR Discussion Paper # 6484 2007.

—.; Görg, H. 2005. "Do unskilled workers always lose from fragmentation?", *North American Journal of Economics and Finance*, Vol. 16, pp. 81-92.

Gereffi, G. 1993. "The Organization of Buyer-Driven Global Commodity Chains." in Gereffi, G.; Korzeniewicz, M., *Commodity Chains and Global Capitalism*. (Westport, CT: Greenwood), pp. 95-122.

—. 2002. *The International Competitiveness of Asian Economics in the Apparel Commodity Chain*. (Asian Development Bank, Manila).

—. 2005. *The new offshoring of jobs and global development.* (Geneva: International Labour Office).

Ghose, A. 2004: *Capital inflows and investment in developing countries*, Employment Strategy Paper, 11/2004. (Geneva: International Labour Office).

Girma, S., Kneller, R., Pisu, M. 2005. Export versus FDI: an empirical test. *Review of World Economics* #141, 193-218.

—.; Görg, H. 2004. "Outsourcing, Foreign Ownership, and Productivity: Evidence From UK Establishment Data", *Review of International Economics*, Vol. 12, No. 5, pp. 817-832.

Goldberg, P. K.; Pavcnik, N. 2007. *Distributional Effects of Globalization in Developing Countries*. NBER Working Paper No. 12885. (Cambridge, MA: National Bureau of Economic Research).

Görg, H.; Henley A.; Strobl, E. 2005. *Productivity effect of international outsourcing: Evidence from Panel Level Data*. (Nottingham: University of Nottingham).

—.; Hanley, A. 2004. "Does outsourcing increase profitability?", *Economic and Social Review*, Vol. 35, pp. 267-288.

—.; Hanley, A.; Strobl, E. 2004. "Outsourcing, foreign ownership, exporting and productivity: An empirical investigation with plant level data", Research Paper 2004/08. (Nottingham: Leverhulme Centre).

—.; Strobl, E. 2002. *Relative Wages, Openness and Skill-Biased Technological Change*, IZA Discussion Paper No. 596. Bonn: Institute for the Study of Labour.

Görzig, B.; Stephan, A. 2002. *Outsourcing and firm level performance*, Discussion Paper No. 309. (Berlin: DIW).

Gottschalk, P.; Smeeding, T. M. 1997. 'Cross-National Comparisons of Earnings and Income Inequality', *Journal of Economic Literature*, Vol. 35, No. 2, pp. 633-687.

Gregory Mankiw, N. and Swagel, P. 2006. "The politics and economics of offshore outsourcing," *Journal of Monetary Economics*, Elsevier, vol. 53(5), pages 1027-1056, July

Grignon, F. 2004. *Rapport d'information fait au nom de la commission des Affaires économiques et du Plan par le groupe de travail sur la délocalisation des industries de main-d'œuvre.* Sénat, session ordinaire de 2003-2004, No. 374. (Paris: Sénat).

Grossman, G.M.; Helpman, E. 2002. "Outsourcing versus FDI in industry equilibrium", NBER Working Paper, No. 9300. (Cambridge, MA: National Bureau of Economic Research).

—.; Helpman, E. 2002. *Outsourcing in a Global Economy,* NBER Working Paper No. 8728. (Cambridge, MA: National Bureau of Economic Research).

—. Helpman, E. 2004. 'Managerial Incentives and International Organization of Production,' *Journal of International Economics* 63, 237-262.

—., Helpmam, E., Szeidl, A., 2005. Complementarities between outsourcing and foreign sourcing. *American Economic Review* #95, Papers and Proceedings, pp. 19–24.

—.; Rossi-Hansberg, E. 2006a. "Trading Tasks: A Simple Theory of Offshoring", *NBER Working Paper* No. 12721. (Cambridge, MA: National Bureau of Economic Research).

—.; Rossi-Hansberg, E. 2006b. *The Rise of Offshoring :It's Not Wine for Cloth Anymore.* Paper prepared for the symposium "The New Economic Geography: Effects and Policy Implications", Jackson Hole, (Wyoming; Federal Reserve Bank of Kansas City).

Grossman, S, J.; Hart, O. D. 1986. "The Costs and Benefit of Ownership: A Theory of Vertical and Lateral Integration", *Journal of Political Economy*, Vol. 94, No. 4, pp. 691-719.

Guscina, A. 2006. *Effects of Globalization on Labor's Share in National Income*. IMF Working Paper No. 06/294. (Washington, D.C.: International Monetary Fund).

Hansen, M. W.; Pedersen, T.; Petersen, B. 2006. *MNC Strategies and Linkage Effects in Developing Countries.* Paper submitted to special issue of Journal of World Business (JBW) - Revisiting the Impact of MNCs on Economic Development.

—.; Schaumburg-Müller, H. 2007: *Outsourcing For Development: Towards a Developing Country Firm Perspective*, Paper presented at the EIBA Conference, Catania.

Hanson, G. H.; Mataloni, R. J. Jr.; Slaughter, M. J. 2003. *Vertical Production Networks in Multinational Firms*, NBER Working Paper No. 9723. (Cambridge, MA: National Bureau of Economic Research).

Hansson, P. 2001. *Skill upgrading and production transfer within Swedish multinationals in the 1990s*, CEPS Working Paper No. 163.

Harrison, A. E.; McMillan, M. S. 2006. *Outsourcing Jobs? Multinationals and US Employment*. NBER Working Paper No. 12372. (Cambridge, MA: National Bureau of Economic Research).

Hart, O.; Moore, J. 1990. "Property Rights and the Nature of the Firm", *Journal of Political Economy*, Vol. 98, No. 6, pp. 1119-1158.

Hayter, S. 2004. *The social dimension of global production systems: A review of the issues.* (Geneva: International Labour Office).

Head, K,; Mayer, T., and Ries, J. 2007. *How remote is the offshoring threat?* CEPR Discussion Paper No. 6542.

—.; Ries, J.; Spencer, B. J. 2004. "Vertical Networks and the U.S. Auto Parts Exports: Is Japan Different? *Journal of Economics and Management Strategy*, Vol. 13, No. 1, pp. 37-67.

—.; Ries, J. 2002. "Offshore production and skill upgrading by Japanese manufacturing firms*"*, *Journal of international economics*, Vol. 58, pp. 81-105.

—.; Ries, J. 2005. "Judging Japan's FDI: The verdict from a dartboard model", *Journal of the Japanese and International Economies*, Vol. 19, No. 2, pp. 215-232.

Helg, R. Tajoli, L. 2005. "Patterns of international fragmentation of production and the relative demand for labor*"*, *North American Journal of Economics and Finance*, Vol. 16, pp. 233-254.

Helpman, E. 2006. "Trade, FDI, and the Organization of Firms", *Journal of Economic Literature*, Vol. XLIV, No. 3, pp. 589-630.

Hijzen, A. 2007. "International Outsourcing, Technological Change, and Wage Inequality", *Review of International Economics*, Vol. 15(1), pp.188-205.

—.; Görg, H.; Hine, R. C. 2004. *International Outsourcing and the Skill Structure of Labour Demand in the UK*, Research Paper No. 2004/24. (Nottingham: Leverhulme Centre).

—.; Inui, T.; Todo, Y. 2007b. *Does Offshoring Pay? Firm-Level Evidence from Japan*, Research Paper No.2007/14 (Nottingham: Leverhulme Centre).

—.; Pisu, M.; Upward, R.; Wright, P. 2007a. *Employment, Job Turnover and Trade in Produces Services: Firm-Level Evidence*, Research Paper No.2007/37 (Nottingham: Leverhulme Centre).

—.; Swaim, P. 2007. *Does Offshoring reduce industry employment?*, Reseach Paper No.2007/24. (Nottingham: Leverhulme Centre).

Hoekman, B. 2006. *Liberalizing Trade in Services: A Survey*, mimeo, World Bank.

Holmström, B.; Milgrom, P. 1991. "Multitask principal-agent analysis: incentive contracts, asset ownership and job design", *Journal of Law, Economics and Organisation*, Vol. 7, Special Issue, pp. 24-52.

Hsieh, C. T.; Woo, K. T. 2005. *The Impact of Outsourcing to China on Hong Kong's Labor Market.* (Berkeley: University of California).

Hummels, D. 1999. *Have International Transportation Costs Declined?* (Chicago: University of Chicago, mimeo).

Hummels, S.; Ishii, J.; Yi, K.M. 2001, "The nature and growth of vertical specialization in world trade", *Journal of International Economics*, Vol. 54, pp. 75-96.

Humphrey, J. and Schmitz, H.. 2004. "Globalized Localities: Introduction", in H. Schmitz (ed.): *Local Enterprises in the Global Economy*. Cheltenam and Northampton:Edward Elgar.

ILO. 2001. *World Employment Report 2001: Life at work in the information economy*. (Geneva: International Labour Office).

—. 2004. *World Employment Report 2004-05: Employment, productivity and poverty reduction*. (Geneva: International Labour Office).

IMF. 2004. *Balance of Payments Statistics Yearbook 2004*. (Washington, D.C.: International Monetary Fund).

—. *World Economic Outlook 2007*. (Washington, D.C.: International Monetary Fund).

ITTA. 2004. *'ITAA/Global Insight Study Finds Global Sourcing of Software and IT Services Bolsters Domestic Employment and Wages Across the Entire US Economy', Press Release March 30, 2004.* (Arlington, VA: ITTA).

Jansen, M.; Lee, E. 2007. *Trade and Employment: challenges for Policy Research.* (Geneva: International Labour Office and WTO Secretariat).

—.; Turrini, A. 2004. "Job Creation, Job Destruction, and the International Division of Labour", *Review of International Economics*, Vol. 12, No. 3, pp. 476-494.

Jarvis, V.; O'Mahony, M. 2000. "Outsourcing, outward processing and output quality: a case-study from the ceramic tableware industry". Paper presented at Centre for European Policy conference 1-2 December 2000 on *Globalisation and Social Exclusion: The Impact of Trade with Low-Wage Countries on European Labour Markets.*

Jenkins, R. 2004. *Globalization, FDI and employment in Vietnam.* (Norwich: University of East Anglia).

Jensen, P. D. Ø.; Kirkegaard, J. F.; Laugesen, N. S. *Offshoring in Europe - Evidence of a Two-Way Street from Denmark*. IIE Working Paper No. 2006-3 Available at SSRN: http://ssrn.com/abstract=902035.

—; Pedersen, T. 2006. *The antecedents of offshoring advanced activities* (Copenhagen: Copenhagen Business School, manuscript).

Jones, R. W.; Kierzkowski, H. 2001a. 'A Framework for Fragmentation', in Arndt, S. W.; Kierzkowski, H. (eds.), *Fragmentation. New Production Patterns in the World Economy*. (Oxford: Oxford University Press), pp. 17-34.

—.; Kierzkowski, H. 2001b. 'Globalization and the Consequences of International Fragmentation', in Calvo, G.; Dornbusch, R.; Obsfeld, M. (eds.), *Money, Capital Mobility, and Trade. Essays in Honor of Robert Mundell.* (Cambridge, MA: MIT Press), pp. 365-383.

—.; Kierzkowski, H. 1990. 'The Role of Services Production and International Trade: A Theoretical Framework', in: Ronald W. Jones and A. Krueger (eds.), *The Political Economy of International Trade. Essays in Honor of Robert E. Baldwin*. (Oxford: Blackwell), pp. 31-48.

June-Dong, K. and In-Soo, K. 1997. "Outward FDI and Exports: The Case of South Korea and Japan", *Journal of Asian Economics*, Vol. 8, No. 1, pp. 39-50.

Kakabadse, N. and Kakabadse, A. 2000 'Critical Review – Outsourcing: A Paradigm Shift', *Journal of Management Development*, 19(8): p. 668.

Kaplinsky, R. and Morris, M. 2002. "The globalisation of product markets and immiserising growth: Lessons from the South African Furniture Industry", *World Development*, Vol. 30, No. 7, pp. 1159-1177.

Kimura, F. 2002. "Subcontracting and the performance of small e medium firms in Japan", *Small Business Economics*, Vol.18, pp.163-175

Kirkegaard, J, F. 2005. *Outsourcing and Offshoring: Pushing the European Model Over the Hill, Rather Than Off the Cliff!* Institute for International Economics Working Paper No. 05-1.

—. 2007. *Offshoring, Outsourcing and Production Relocations – Labor Market Effects in the OECD and Developing Asia, Working Paper* Peterson Institute for International Economics Washington D.C.

Kletzer, L.G. 2000. "Trade and Job Loss in US manufacturing: 1979-94", in Feenstra, R. C. *The Impact of International Trade on Wages*, (Chicago: University of Chicago Press) pp. 349-393.

—. 2002. *Imports, Exports, and Jobs: what does trade mean for employment and job loss?* (W.E. Upjohn Institute for Employment Research, mimeo).

Klinger, S.; Sykes, M. L. 2004. *Exporting the Law: A Legal Analysis of State and Federal Outsourcing Legislation.* (Arlington, VA: National Foundation for American Policy).

Kohler, W. 2001. “A specific-factors view on outsourcing”, *North American Journal of Economics and Finance*, Vol. 12, No. 1001, pp. 31-53.

—. 2002, “The Distributional Effects of International Fragmentation”, Department of Economics Working Paper No. 0201. (Linz: Johannes Kepler University Linz).

—. 2004. “International Outsourcing and Factor Prices with Multistage Production”, *The Economic Journal*, Vol. 114, pp. C166-C185.

Konings, J.; Murphy, A. 2001. “Do Multinational Enterprises Substitute Parent Jobs for Foreign Ones? Evidence from European Firm Level Panel Data”, CEPR Discussion Paper No. 2972.

Krugman, P. 1995. “Growing World Trade: Causes and Consequences*” Brookings Papers on Economic Activity*, pp. 327-77.

Kucera, D. 2001. *The Effects of Core Worker Rights on Labour Costs and Foreign Direct Investment: Evaluating the ‘Conventional Wisdom’*, IILS Decent Work Research Programme Working Paper No. 130. (Geneva: International Labour Office).

—.; Milberg, W. 2000. “Gender Segregation and Gender Bias in Manufacturing Trade Expansion: Revisiting the ‘Wood Asymmetry’”, *World Development*, Vol. 28. No. 7, pp. 1191-1210.

—.; Milberg, W. 2003. “Deindustrialization and Changes in Manufacturing Trade: Factor Content Calculations for 1978-1995”, *Review of World Economics (Weltwirtschaftliches Archiv)*, Vol. 139, No. 34, pp. 601-624.

Kucera, D.; Sarna, R. 2004. *How trade union rights affect trade competitiveness?*, Policy Integration Working Paper No. 39. (Geneva: International Labour Office).

Kumar, N. 2001. *Indian Software Industry Development: International and National Perspective*. RIS Discussion Paper No. 19/2001. (New Delhi: Research and Information System for the Non-aligned and other Developing Countries).

Kumar, N.; Joseph, K. J. 2004. *National Innovation Systems and India’s IT Capability: Are there any lessons for ASEAN newcomers?* RIS Discussion Paper No. 72/2004. (New Delhi: Research and Information System for the Non-aligned and other Developing Countries).

Landefeld, S. J.; Kozlow, R. 2003. “Globalization , Offshoring, and Multinational Companies: What re the questions, and how well are doing in answering them?” Paper presented at the *American Economic Association Annual Meeting*, Boston, January 6, 2006.

Leamer, E. 1996. “The Effects of Trade in Services, Technology Transfer and Delocalisation on Local and Global Income Inequality,” *Asia-Pacific Economic Review*, April 1996, Vol. 2, No. 1, 44-60.

—.; Storper, M. 2001. “The economic geography of the Internet Age”, *Journal of International Business Studies*, Vol. 32, pp. 641-665.

Lee, E. 1998. *The Asian Financial Crisis. The Challenge for Social Policy*. (Geneva: International Labour Office).

Levchenko, A. 2004. *Institutional Quality and International Trade*, IMF Working Paper 04-231. (Washington, D.C.: International Monetary Fund).

Levy, F.; Murname, R. 2004. *The new division of Labor.* (Princeton University Press, Princeton).

Lewin, A., Massini, S. Peeters, C., 2007. *From offshoring to globalization of human capital and innovation*, Paper presented at the EIBA Conference, 13-15 November, Catania.

Liu, B. J.; Tung, A.C. (2005): *Export Outsourcing and Foreign Direct Investment: Evidence from Taiwanese Exporting Firms.* (Taipei: Department of Economics, National Taiwan University, manuscript).

Lorentowicz, A.; Marin, D.; Rauold, A. 2005. *Is Human Capital Losing From Outsourcing? Evidence from Austria and Poland*, CEPR, Discussion Paper No. 5344. (London: CEPR).

Luebker, M. 2006. “International outsourcing, employment, and inequality: some issues”, in: Peter Auer, Geneviève Besse and Dominique Méda (eds.), *Offshoring and the Internationalization of Employment: A challenge for a fair globalization?* Proceedings of the France/ILO symposium, Annecy 2005. (Geneva: International Institute for Labour Studies), pp. 203-226.

Mankiw, N.G.; Swagel, P. 2006. “The politics and economics of offshore outsourcing”, *Journal of Monetary Economics*, Vol.53, pp. 1027-1056.

Mann, C. L. 2005. ‘Offshore outsourcing and the globalisation of services: Why now, how important, and what policy implications’, Chapter 9 in *The United States and the World Economy: Foreign economic policy for the next decade* (C.F. Bergsten ed.), Institute for International Economics, Washington, D.C.

Marin, D. 2004. *A nation of poets and thinkers – less so with eastern enlargement? Austria and Germany*. CEPR Discussion Paper No.4358.

—. 2006. 'A New International Division of Labor in Europe: Outsourcing and Offshoring to Eastern Europe.' *Journal of European Economic Association*, Vol. 4, No. 2-3, Pages 612-622

—.; Verdier, T. 2002. *Power Inside the firm and the market: a general equilibrium approach*. Centre for Economic Policy Research Discussion Paper No. 4358. (London: CEPR).

—.; Verdier, T. 2003. "Globalisation and the empowerment of Talent", *Centre for Economic Policy Research*, Discussion Paper No. 4129 (London: CEPR).

—.; Verdier, T. 2005. *Corporate Hierarchies and International Trade: Theory and Evidence.* (Munich: University of Munich, mimeo).

Mariotti, S.; Piscitiello, L. 2002. "Foreign Direct Investment and Employment: Home country experience in Italy", in Lipsey, M. E.; Mucchielli, J. L. *Multinational firms and Impacts on employment, trade and technology: new perspectives for a new century*. (London: Routledge).

Martin, X.; Salomon, R. 2003. "Tacitness, learning and international expansion: A study of foreign direct investment in a knowledge intensive industry", *Organization Science*, Vol. 14, No. 3, pp. 297–311 (Hanover, MD: INFORMS online).

McCarthy, J.; Dash, A.; Liddell, H.; Ferrusi Ross, C.; Temkin, B. 2002. *3.3 Million US Service Jobs To Go Offshore*. (Cambridge, MA: Forrester Research Inc.).

McCarthy, J. 2004. *Near-Term Growth of Offshoring Accelerating*. (Cambridge, MA: Forrester Research Inc.).

McKinsey Global Institute. 2003. *Offshoring: Is it a win-win game?* (San Francisco: McKinsey).

Milberg, W. 2004. *Labor and the globalization of production*. (London: Palgrave Macmillan).

—.; von Arnim, R. 2006. "U.S. Offshoring: Implication for Economic Growth and Income Distribution", Schwarz Center for Economic Policy Analysis Paper 2006-3, forthcoming in D. Sanchez-Ancochea and K. Shadlen (eds.), *Responding to Globalization in the Americas: The Political Economy of Hemispheric Integration.* (London: Palgrave Macmillan).

Mincer, J. .1974. *Schooling, Experience and Earnings.* Columbia University Press: New York.

Mitra, D.; Ranhjan, P. 2007. *Offshoring and Unemployment.* NBER Working Paper No.13149.

Moreno-Brid, J. et al. (2005) "Industrialization and Economic Growth in Mexico after NAFTA: The Road Travelled," *Development and Cultural Change*, V. 36, No. 6, pp. 1095-1119.

Muendler, M. A.; Becker. S. O. 2006. *Margins of Multinational Labor Substitution*, UCSD Working Paper, April 15 2006.

Ngai, P. 2004. "Women workers and precarious employment in Shenzhen Special Economic Zone, China", *Gender and Development*, Vol. 12, No. 2, pp. 29-36.

Nunn, N. 2005. *Relationship-specific, Incomplete Contracts and the Pattern of Trade* (Toronto: Department of Economics and Institute for Policy Analysis, University of Toronto, mimeo).

Nunnenkamp, P. 2004. 'Der Automobilstandort Deutschland unter Wettbewerbsdruck', *ifo Schnelldienst*, Vol. 57, No. 7, pp. 28-36.

OECD. 1995. *OECD Input-Output Tables*. (Paris: OECD).

—. 2002. *OECD Input-Output Tables*. (Paris: OECD).

—. 2007a. *OECD Employment Outlook.* (Paris: OECD).

—. 2007b. *OECD Offshoring and Employment: Trends and impacts*. (Paris: OECD).

Olsen, K. B. 2006. *Productivity Impacts of Offshoring and Outsourcing: A Review*, OECD Science, Technology and Industry Working Papers 2006/1, (Paris: OECD Directorate for Science, Technology and Industry).

Magaziner, I., Patinkin, M., 1989. *Fast Heat: How Korea Won the Microwave War*. Harvard Business Review, January, pp. 83–93.

Morrison Paul, C.J.; Siegel, D. S. 2001. "The Impacts of Technology, Trade and Outsourcing on Employment and Labor Composition", *Scandinavian Journal of Economics*, Blackwell Publishing, Vol. 103, No. 2, pp. 241-264.

Palley, T.I. 2002. *A new development paradigm: domestic demand led-growth.* FPIF Discussion Paper.

Parker, A. 2004. *Two-Speed Europe: Why 1 Million Jobs will move Offshore*. (Cambridge, MA: Forrester Research Inc.).

Paus, E., 2005: *Foreign investment, development and globalization*, (Wetherby: Palgrave).

Pedersen, T. and Petersen, B. 2006b: *Offshoring of advanced activities*. (Copenhagen: Business School Copenhagen).

Pedersen, T. Petersen, B. 2006a. *How do Danish firms approach white collar offshoring?"* Paper presented at the EIBA Conference in Fribourg, 7-10 December.

Pissarides, C. A. 1997. "Learning by trading and the returns o human capital in developing countries". *World Bank Review*, Vol. 11, pp. 17-32.

Porter, M .E. 1986, "Changing Patterns of International Competition", *California Management Review*, Vol. XXVIII, No. 2, pp. 9-40.

Prahalad, C. K.; Hamel, G. 1990. "The Core Competence of the Corporation", *Harvard Business Review*, Vol. 68, No. 3, p. 79.

Puga, D.; Trefler, D. 2002. *Knowledge Creation and the Control in Organisation.* (Toronto: University of Toronto, manuscript).

Qiu, L. D.; Spencer, B, J. 2002. "Keiretsu and Relationship-Specific Investment: Implications for Market-Opening Policy", *Journal of International Economics*, Vol. 58, No. 1, pp. 49-79.

Quèlin, B.; Duhamel, F. 2003. "Bringing together strategic outsourcing and corporate strategy: outsourcing motives and risks", *European Management Journal*, Vol. 21, No. 5, p. 647.

Quinn, J. B.; Hilmer, F.G. 1994. "Strategic Outsourcing", *Sloan Management Review*, Vol. 35, No. 4, p. 43.

Razzolini, T.; Vannoni, D. 2007 *Export Premia and Sub-Contracting Discount. Passive Strategies and Performance in Domestic and Foreign Markets*, paper presented at the conference "The International Firm: Access to Finance and Organisational Modes", Centro Studi Luca D'Agliano, Milan, 21-22 February 2008.

Regev,T; Wilson, D. 2007. "Changes in Income Inequality across the U.S", *Economic Letter*, Vol.28, September 21, 2007.

Rowthorn, R. 2004. *The Impact on Advanced Economies of North-South Trade in manufacturing and Services.* (Cambridge: University of Cambridge, mimeo).

Sako, M. 1999. "From Individual Skills to Organizational Capability in Japan", *Oxford Review of Economic Policy*, Vol. 15, No. 1, p. 114.

Samuelson, P. A. 2004. 'Where Ricardo and Mills Rebut and Confirm Arguments of Mainstream Economists Supporting Globalization', *Journal of Economic Perspectives*, Vol. 18, No. 3, pp. 135-146.

Sanchez-Ancochea. 2005. "Development Trajectories and New Comparative Advantages: Costa Rica and the Dominican Republic under Globalization", *World Development*, Vol. 34, No. 6, pp. 996-1015.

Schöller,D. 2007. *Service Offshoring and the Demand for Less-Skilled Labour. Evidence from Germany.* Hohenheimer Discussion Paper, Universität Hohenheim

Schultze, C. L. 2004. "Offshoring, Import Competition, and the Jobless Recovery", *The Brookings Institution*, Policy Brief, No.136.. (Brookings. August).

Senses, M.Z. 2006. *The Effects of Outsourcing on the Elasticity of Labor Demand.* CES Working Paper, No. 06-07, US Census Bureau.

Slaughter, M. J. 2002. "Does Inward Foreign Direct Investment Contribute to Skill Upgrading in Developing Countries?" SCEPA Working Paper No. 2002-08. (New York: Schwartz Center for Economic Policy Analysis, New School University).

—., 2000. Production transfer within multinational enterprises and American wages. *Journal of International Economics*, Vol. 50, 449-472.

Spencer, B. J. 2005. "International Outsourcing and Incomplete Contracts*", NBER Working Papers*, No. 11418. (Cambridge, MA: National Bureau of Economic Research).

—.; Qiu, L. 2001. "Keiretsu and Relationship-Specific Investment: A Barrier to Trade?", *International Economic Review*, Vol. 42, No. 4, pp. 871-901.

Strauss-Kahn, V. 2003. "The Role of Globalization in the Within-Industry Shift Away from Unskilled Workers in France". NBER Working Paper No. 9716. (Cambridge, MA: National Bureau of Economic Research).

—. 2004. "The role of globalization in the within-industry shift away from unskilled workers in France", in Baldwin, R.E.; Winter, L.A. *Challenges to globalisation.* (NBER and University of Chicago Press).

Taylor, I. 2006. "China's oil diplomacy in Africa", *International Affairs*, Vol. 82, No. 5, pp. 937-959.

Tomiura, 2007. "Foreign outsourcing, exporting, and FDI: A productivity comparison at the firm level". *Journal of International Economics* #72 (2007) 113–127.

Tran-Nguyen, A.N. and Zampetti, A.B. (eds.) 2004. *Trade and Gender: Opportunities and Challenges for Developing Countries.* (New York and Geneva: United Nations).

Trefler, D. 2005. *Service Offshoring: Threats and Opportunities*. Brookings Trade Froum, pp. 35-60.

UNCTAD. 2002. *World Investment Report 2002*. (New York and Geneva: United Nations).

—. 2004a. *UNCTAD Handbook of Statistics.* (New York and Geneva: United Nations).

—. 2004b. *World Investment Report 2004. The Shift Towards Services.* (New York and Geneva: United Nations).

—. 2005. *Economic Development in Africa: Rethinking the Role of Foreign Direct Investment.* (New York and Geneva: United Nations).

van den Berghe, D.A.F. 2003. *Working Across Borders: Multinational Enterprises and the Internationalization of Employment*. Erasmus Research Institute of Management (ERIM), PhD Series Research in Management 29.

van der Hoeven, R.; Saget, C. 2004. "Labour Market Institutions and Income Inequality: What are the New Insights after the Washington Consensus?", in Cornia, G. A. (ed.), *Inequality, Growth, and Poverty in an Era of Liberalization and Globalization*. (Oxford: Oxford University Press), pp. 197-220.

—.; Taylor, L. 2000. "Introduction: Structural Adjustment, Labour Markets and Employment: Some Considerations for Sensible People", *Journal of Development Studies*, Vol. 36, No. 4, pp. 57-65.

van Welsum, D. 2004. *In Search of 'Offshoring': Evidence from U.S. Imports of Services.* (London: Birkbeck College, mimeo).

—.; Xu, T. 2007. *Is China the new centre for offshoring of IT and ICT-enabled services?*, Directorate for Science, Technology and Industry, OECD, DSTI/ICCP/IE(2006)10/FINAL.

—.; Vickery, G. 2006. "The share of employment potentially affected by offshoring – An empirical investigation". *Report of the OECD Working Party* on the Information Economy DSTI/ICCP/IE(2005)8, (Paris: OECD).

—.; Reif X. 2006. *The share of employment potentially affected by offshoring – an empirical investigation*. DSTI Information Economy Working Paper, OECD, Paris; available at www.oecd.org/sti/offshoring.

Venables, A. J. 1999. 'Fragmentation and multinational production', *European Economic Review*, Vol. 43, pp. 935-945.

Vijayabaskar, M.; Rothboeck, S.; Gayathri, V. 2001. 'Labour in the New Economy: The Case of the Indian Software Industry', *Indian Journal of Labour Economics*, Vol. 44, No. 1, pp. 39-54.

Waldinger, R.D. 1986. *Through the Eye of the Needle*. (New York: New York University Press).

Williamson, O.E. 1975. *Markets and Hierarchies: Analysis and Antitrust Implication.* (New York: Free Press).

—. 1985. *The Economic Institution of Capitalism.* (New York: Free Press).

World Bank. 1997. *World Bank Annual Report.*

World Commission on the Social Dimension of Globalization. 2004. *A Fair Globalization: Creating Opportunities for All.* (Geneva: International Labour Office).

WTO. 2005: *World Trade Report 2005. Exploring the links between trade, standards and the WTO.* (Geneva: World Trade Organization).

Yeats, A. J. 2001. "Just How Big is Global Production Sharing?", in Arndt, S. W.; Kierzkowski, H. (eds.), *Fragmentation. New Production Patterns in the World Economy*. (Oxford: Oxford University Press), pp. 108-143.

Yi, K. M. 2003. "Can Vertical Specialization Explain the Growth of World Trade?", *The Journal of Political Economy*, Vol. 111, No. 1, pp. 52-102.

Yoffie, D.B.; Gomes-Casseres, B. 1994. *International Trade and Competition.* (New York: McGraw-Hill).

Appendix 1: Offshoring options : Arm's-length transactions or vertical FDI?

Once a firm has decided to perform some tasks abroad, it has to decide what form offshoring takes. It faces two options: conduct them in-house, by opening an affiliate in the foreign country, or subcontract the job to an independent supplier. Some authors refer to the first option as "offshoring" and to the second as "offshore outsourcing" (Kirkegaard 2007); Grossman and Helpman (2002a) use the terms "FDI" and "international outsourcing", respectively. Shaalf (2005) refers to these phenomena as "captive offshoring" and "offshoring outsourcing". Others do not differ between these two phenomenon and use generic concepts such as "vertical specialisation" (Hummels, Ishii and Yi 2001).

The lack of a clear terminology could be misleading, and it is thus preferable to use "vertical FDI" to identify the first option and "arm's length contract" or "international outsourcing" for the second one (Feenstra and Hanson, 2001, and Grossman and Rossi-Hansberg, 2006 (b), for the same terms).

From an industrial-organisation perspective, the choice between "vertical FDI" and "arm's-length contract" could be explained by the Dunning (1981) framework; the well-known "OLI" theory. While both options satisfy the *location advantage*, i.e. in both cases firms relocate production abroad in order to take advantage of better factor endowments and lower factor prices[60]. Vertical FDI and "arm's length contract" could differ on the base of the *ownership advantage,* i.e. ownership of a specific asset; *and the internationalisation advantage,* i.e. the firm will be better off using its assets itself rather than contracting with another independent firm. In particular, if firms relocate production stages that require a high content of tacit knowledge, patents, proprietary technologies, trademarks etc., they would prefer the vertical FDI option (Slaughter 2002; Hansen et al., 2006). More recently, the theoretical literature on this topic has made progress and has linked the trade theory model to the concepts of contract theory (property right, incentive system and imperfect information), searching and matching problems (link to transaction costs and thickness of the market), relation-specific investment, country's institution quality and industrial organisation (in term of delegation authority)[61].

The property rights approach analyses the consequences of ex-post enforceable agreements, i.e. the distribution of surplus after a sunk investment. This theory can be linked to the trade-off between vertical FDI and arms length-contract, because if the importance of the agent's effort to overall output is high, international outsourcing is preferred to vertical FDI (Spencer, 2005). At the same time, the property rights theory (Grossman and Hart, 1986;[62] Hart and Moor, 1990; Antràs, 2003) demonstrates that there is a positive correlation between the capital intensity of intermediate-goods production (i.e. investment) and the attractiveness of vertical integration (i.e. assets property). As a result, while final-goods in the capital-intensive sector are produced under vertical integration, those in labour-intensive sectors are outsourced. Antràs and Helpman (2004) also consider the difference between fixed costs in the North and South, FDI and offshoring, as well as different productivity levels among firms. In particular, they show that only more productive firms within a sector choose to open an affiliate in the South (and hence pay higher fixed costs of production) in order to gain lower marginal costs. Moreover, reduction in transport costs or lower Southern wages induces less productive firms to switch from vertical integration in the North to offshoring contracts in the South.

A further step in understanding the choice between vertical FDI and international outsourcing is to consider the importance of monitoring and incentives. The existing trade-off between monitoring and incentives is mirrored by the relationship between vertical FDI and offshoring. Indeed, vertical integration allows better monitoring, but there is no system of incentives for internal management. On the other hand, independent suppliers cannot be monitored although there are higher-powered incentives for such efforts, since supply contracts will be lost in cases of bad performance. Following the incentive-system approach of Holmström and Milgrom (1991), Grossman and Helpman (2004) identify a non-linear correlation between productivity levels and relocation options. Indeed, firms with the highest and lowest productivity opt for international

[60] This reason is known in the FDI literature as "efficiency seeking"

[61] See Spencer (2005) and Helpman (2006) for a detailed review of these topics.

[62] They emphasize that ownership should be allocated in order to minimize investment distortions and the resulting loss in surplus.

offshoring in the South. Medium productive firms prefer vertical FDI in the North, but as their productivity declines they move to vertical FDI and offshoring in the South. This strategy allows them to remain competitive by taking advantages of lower costs of production and higher levels of effort made by independent contractors. However, it leaves them a low monitoring power. A similar ownership pattern was analysed by Feenstra and Hanson (2003): multinational firms engaged in export processing in China delegate the control over input purchases to Chinese managers. They show that this relationship-specific is lowest in southern coastal provinces, where markets are thickest (i.e. value-added in the factory is low and the specificity of human capital investment is high), and highest in the interior and northern provinces. Moreover, southern coastal provinces are characterised by weaker legal enforcement. Hence, in these regions the best way to increase the local manager's effort is by giving them control rights over input, whereas a monitoring system would be inefficient.

Another factor determining the choice between vertical FDI and arms-length-contract is the "thickness" of the market, with thicker markets favouring offshoring (Grossman et al., 2005). While vertical FDI implies higher fixed and marginal costs, offshoring requires higher costs in terms of searching for a supplier. Hence, if the markets have many suppliers, it is easier to subcontract a job and offshoring prevails due to vertical FDI.

Spencer and Qiu (2001), Qiu and Spencer (2002), Head, Ries and Spencer (2004) and Feenstra and Spencer (2005) analyse how the specificity of the intermediate inputs impact on the form and location of offshoring. In particular, if firms need specific and high productive components, they prefer contractual offshoring to the North due to the higher proximity with the supplier. On the other hand, firms will import generic parts from markets in the South. Another option is to produce specific components more cheaply in the South by incurring a fixed cost for vertical FDI. Arm's length contracts are preferred to vertical FDI when: the productive advantages of supplier firms increase; the industry size of the final producer gets bigger; the contracting environment improves and the wages of workers in supplier firms decrease (Grossman and Helpman, 2002a).

The institutional environment is another important factor in understanding the extent of offshoring and the prevalence of vertical FDI versus arm's-length contract. Indeed, the quality of contracting institutions impacts the patterns of comparative advantages across countries[63]. The differences in gains from trade are driven by differences in the quality of contract enforcement (Levchenko, 2004). In particular, Levchenko (2004) provides evidence that better institutional environments in the North would attract "good jobs", whereas the poor quality of contract enforcement in the South could decrease the gains from trade in these countries. Nunn (2005) shows that the proportion of enforced contracts depends on the strength of the authorities to implement contracts .The transaction-cost literature (e.g. Williamson, 1975 and 1985) predicts that any type of contractual improvement increases offshoring. However, these authors do not differentiate between arm's-length contract and vertical FDI. We would instead expect to see firms with strong contract enforcement to prefer arm's-length contracts over vertical FDI, since in this case matching is easier and safer. Hence, firms could exploit the benefits of offshoring in terms of saving investment costs and increased efficiency (Altomonte and Bonassi, 2004). Antràs and Helpman (2006) link the contractual friction with the choice of offshoring pattern. Their model shows how better contracting institutions in the South raise the prevalence of offshoring, but may reduce the relative prevalence of vertical FDI. In particular, improvement in the contractibility of an input provided by the final-producer, encourages arm's-length contracts, while improvement in the contractibility of input provided by a supplier encourages integration (Antràs and Helpman, 2006).

Finally, the choice between offshoring and vertical FDI requires a decision on the authority delegation. Hence, the "theory of delegation of authority" could be matched with the literature on trade in order to improve understanding of the organisational form. However, the literature has focused only on the link between delegation, as modelled in Aghion and Tirole (1977), and vertical integration in the home country[64], i.e. the best form of organisation within the company, rather than the best way to procure specialised intermediate inputs (Spencer, 2005).

[63] See Nunn (2005) for an empirical analysis; Acemoglu, Antràs and Helpman (2006) and Costinot (2004) for an interaction between contract incompleteness, technology and comparative advantages.

[64] See for example, Marin and Verdier (2002, 2003, 2005) and Puga and Trefler (2002).

Following the scheme of Spencer (2005), we could summarise the features that favour arm's-length over to vertical FDI:

1. Higher fixed costs of FDI (Antràs and Helpman, 2004; Feenstra and Spencer, 2005);
2. A lower capital intensity in intermediate-good production (Antràs, 2003);
3. Differences in productivity of final-good firms (however it is impossible to detangle a clear pattern as seen from the different results illustrated by Antràs and Helpman, 2004, and Grossman and Helpman 2004);
4. Supply of generic intermediate goods with low content of tacit information and low productivity of relationship-specific investment by component suppliers (Feenstra and Spencer, 2005);
5. Greater geographic distance (Feenstra and Spencer, 2005);
6. Shift of up-front costs of production from final-good firms to component supplier (Grossman and Helpman, 2004);
7. thicker market (Grossman and Helpman, 2002);
8. Decrease in the wage of workers in supplier firms (Grossman and Helpman, 2002);
9. Rise in the size of industry of the final producer (Grossman and Helpman, 2002);
10. Increase in the productive advantages of supplier firms (Grossman and Helpman, 2002);
11. Improvement in the contracting environment (Grossman and Helpman, 2002), in particular in the contractibility of input provided by the final-good producer (Antràs and Helpman, 2006);

Due to data scarcity, these theories have not been largely tested. Among the few attempts, we cite the paper of Head and Ries (2005) on the choice between FDI and exports; Girma et al. (2005) and Tomiura (2007) on the productivity differences between firms that export, offshore, or invest abroad. Marin (2006) provides evidence of the features that encourage Austrian and German firms to offshore in Eastern Europe. She find that falling trade costs, reduced levels of corruption and improvements in the contracting environment of Eastern Europe favour arms' length contract over vertical FDI. On the other hand, low organisational costs of hierarchies and large costs of hold-up, exert the contrary effect. Borga and Zeile (2004) and Hanson, Mataloni and Slaughter (2003) provide evidence of vertical FDI in the United States, but they ignore arms' length contract. Hanson, Mataloni and Slaughter (2003) show that demand for imported inputs is higher when affiliates face lower trade costs, lower wages for less-skilled labour and lower corporate income tax rates. Borga and Zeile (2004) demonstrate that parents in the United States import more intermediate goods from their affiliates when: they invest intensively in R&D and are capital intensive; the host country has some factor cost advantage and the affiliates do not invest in their own R&D and are in the same industry as their parent companies.

Finally, it would be interesting to have an idea of which goods are offshored through vertical FDI or arm's-length contracts. Vertical FDI prevails among capital-intensive intermediate goods (such as chemical products), while labour-intensive goods (such as textiles) are imported from independent suppliers (Antràs, 2003). This is confirmed by the fact that the share of imports from affiliates (on the total of United States imports) is higher in capital abundant countries than labour-abundant ones (Antràs, 2003). Hayter (2004) and Milberg (2004) emphasize the importance of other elements in determining the offshoring pattern. They show that as the technological content, the design and the specification requirement of intermediate goods decreases, firms move from vertical FDI to arm's-length contracts. Hence, the proportion of arm's-length contracts is higher in the standard apparel, electronics, and textile sectors. In the non-standard apparel, footwear, electronics and services we could observe a mix of both offshoring types, whereas in the automobile sector FDI prevails. Similar classifications are presented by OECD (2002), which identifies offshoring as the major form of production relocation in the clothing sector; and Feenstra and Hanson (2001) for the United States economy. A more disaggregated distinction between goods imported through arm's-length contracts and vertical FDI is hard to determine, since it would require more detailed data. However, the offshoring pattern does not only depend on the factor intensity of goods, but also on the characteristics of final-good producer countries. The OECD (2002) examines the difference in the way Japanese and United States firms organize offshoring of electronic components in East Asia. While Japanese firms rely more on vertical FDI (*keiretsu*[65]), United States firms interact much more with local independent suppliers.

[65] See also Spencer and Qiu (2001; 2002), Head, Ries and Spencer (2004).

Appendix 2: The trans-log cost function

The trans-log cost function has been the most applied methodology in the more recent literature. It was first introduced in the context of trade and employment by Berman et al. (1994). Since then, it has been widely used in literature to capture the impact of offshoring on the demand for skills. The starting point for this approach is the following cost function for industry *i*:

$$\ln C_i(w,x) = \alpha_j + \sum_{j=1}^{S} \alpha_j \ln w_j + \sum_{k=1}^{K} \beta_k \ln x_k + \frac{1}{2}\sum_{j=1}^{S}\sum_{s=1}^{S} \gamma_{js} \ln w_j \ln w_s$$
$$+ \frac{1}{2}\sum_{k=1}^{K}\sum_{l=1}^{K} \delta_{kl} \ln x_k \ln x_l + \sum_{j=1}^{S}\sum_{k=1}^{K} \phi_{jk} \ln w_j \ln x_k \qquad (1)$$

where w_j denotes the prices of the optimally chosen variable inputs j=1,…S, and x_k denotes the quantity of fixed inputs k=1….K. By differentiating (1) with respect to w_j and applying the Shephard's Lemma, we get the expression for the cost share of labour:

$$\theta_{ij} = \alpha_j + \sum_{s=1}^{S} \gamma_{js} \ln w_s + \sum_{k=1}^{K} \phi_{jk} \ln x_k \qquad (2)$$

where θ_{ij} represents the industry *i*'s cost share of labour belonging to skill group *j*.

Given its flexibility, the quasi-fixed trans-log cost function is preferred over other production function forms like Cobb-Douglas and Leontief (Slaughter, 2002). Indeed, the general industry production function presented in equation (1) could be extended by adding any structural variables that shift the production functions and therefore affect costs. Hence, in order to capture the impact of labour reallocation on skill demand Feenstra and Hanson (2001) added on the right side a measure for offshoring. Moreover, they control also for the factor biased technological change. The estimating equations became:

$$\theta_{it} = \beta_0 + \beta_1 \ln Y_{it} + \beta_2 \ln K_{it} + \beta_3 \ln z_{it} + \varepsilon_{it} \qquad (3)$$

where z_{it} captures the offshoring and the technological change effect.

On the base of this methodology, authors estimate the impact of offshoring on both the relative skill-wage share[66] and skill-employment share[67]. However, in the latter case we need to slightly change equation (3). Since the industry' *i*s cost share is written as:

$$\theta_{it} = \frac{w_j L_{ij}}{\sum_{s=1}^{S} w_s L_{is}} \qquad (4)$$

it can be transformed in the following way:

$$\theta_{ij} = \frac{w_j}{\sum_{s=1}^{S} w_s} * \frac{L_{ij}}{\sum_{s=1}^{S} L_{is}} \qquad (5)$$

[66] See for example Feenstra and Hanson (2001) for USA; Ekholm and Hakkala (2006) for Sweden; Hijzen et al. (2004) for the United Kingdom; Lorentowicz et al. (2005); Faijnzylber and Fernandes (2004) for Brazil and China; Görg and Strobl (2002) for Ghana; Hsieh and Woo (2005) for China. Moreover, see Head and Ries (2002) and Slaughter (2000) for skill wage shares in Japanese and United States MNE, respectively.

[67] As we demonstrate below, the dependent variable in this case could be the share of skilled or unskilled workers on total employment or the relative skilled/unskilled share.

Then, taking the logarithm of equation (5) and moving the log wage ratio to the right-hand side in equation (3), we obtain the following equation:

$$S_{it} = \beta_0 + \beta_1 \ln Y_{it} + \beta_2 \ln K_{it} + \beta_3 \ln z_{it} + \beta_4 \ln(\frac{w_j}{w}) + \varepsilon_{it} \qquad (6)$$

where S_{it} is the share of skill group j on total employment or the relative share of skilled on unskilled workers. This approach was adopted by Anderton and Brenton (1999) for the United Kingdom, Anderton et al. (2001) for Sweden, Helg and Tajoli (2005) for Italy and Germany, Strauss-Kahn (2004) for France, Lorentowicz et al. (2005), Egger et al. (2001) for Austria and Harrison and McMillan (2006) for United States MNE employment.

Appendix 3: Details on estimates from different data sources

Input-output tables

Many researchers have relied on input-output tables to measure offshoring. Given that inputs are listed by supplier industry, both the broad and the narrow definition of offshoring, as proposed by Feenstra and Hanson (1996), can be applied. The approach, however, is not without drawbacks: for instance, offshoring of the final production stage (as in the case of outward processing trade) will not be captured by input-output tables (Hijzen et al., 2004). Moreover, input-output tables do not discriminate between imports from independent suppliers and affiliates so that the two different forms of offshoring – through vertical FDI or in the form of arms' length contracts – cannot be distinguished. Crinò (2006) highlights that input-output tables are not the best tool to measure service offshoring, since they rely on service output. However, since each service sector has its own peculiar type of output, this methodology is subject to measurement errors. Using import-matrix coefficients, Crinò (2006) attempts to overcome this problem.

National statistical offices provide one source for input-output tables. Hijzen et al. (2004) had access to those from the United Kingdom and calculated the ratio of intermediate inputs over the value added in the industry (not gross output or total inputs, as done elsewhere). In the narrow version (that takes into account only inputs from the same industry), the share went up from 15.2 per cent in 1984 to 18.6 per cent in 1995, and under the broad definition it increased from 45.9 (1984) to 48.8 per cent (1995) (non-weighed averages across all industries). Matching United Kingdom input-output tables and international trade data from the IMF, Amiti and Wei (2004) show that growth in offshoring during the 1990s in the United Kingdom was mainly due to developments in non-tangible inputs. The authors distinguish between service inputs and manufactured inputs. For manufactured inputs, they find a peak of just over 30 per cent in the mid-1990s, but that this ratio fell again to 28 per cent of total non-energy inputs in the years from 1998 to 2001 – similar to its level in 1992. By contrast, the share of imported service inputs has been on a steady rise between 1992 (3.5 per cent) and 2001 (5.5 per cent).

For Germany, Geishecker and Görg (2004) find an even steeper increase in total offshoring during the 1990s. Using the narrow measure proposed by Feenstra and Hanson (1996), here expressed as a share of gross output, they show that offshoring increased from 5 per cent in 1991 to more than 8 per cent in 2000. Using the broad version, offshoring increased from 11 per cent to 15 per cent in the same period.[68] Campa and Goldberg (1997) report a similar result from their four-country study of manufacturing industries. Since the input-output tables used by them do not differentiate between domestic and imported inputs, Campa and Goldberg combine them with data on import penetration to derive a similar measure. For the United States, the estimated share of imported inputs from manufacturing industries in total production rose from 4.1 per cent (1975) to 8.2 per cent (1995), and for the United Kingdom from 13.4 per cent (1974) to 21.7 per cent (1993). While the measure of offshoring for these two countries lies somewhere between the narrow and the broad definition as described above, the data for Canada and Japan include all imported inputs (and hence apply the broad definition). The imported inputs share raised from 15.9 per cent (1974) to 20.2 per cent (1993) in Canada, but fell from an already low 8.2 per cent (1974) in Japan to only 4.1 per cent (1993). Among all the countries surveyed, Japan therefore stands out as the single country where the use of foreign inputs actually declined. Strauss-Kahn (2003) faces a similar data-problem in her study of France and proceeds like Campa and Goldberg (1997). Her within-industry measure of offshoring raised from 4.9 per cent in 1977 to 7.3 per cent in 1993, while the broad measure increased from 9.2 per cent to 13.8 per cent over the period.

Standardized input-output tables produced by the OECD (1995) better facilitate cross-country comparison. They cover the G-7 nations plus Australia, Denmark and the Netherlands for the period 1970 to 1990 in intervals of approximately five years. Even though the number of countries included is small, they still capture roughly 60 per cent of world trade. Geographical coverage was extended in a later – but not compatible – issue until the mid-1990s; it includes a total of eighteen OECD countries alongside with China and Brazil (OECD 2002). Hummels et al. (2001) base their measure of 'vertical specialization' on the earlier dataset and calculate the "value of imported inputs embodied in goods that are exported" (ibid.: 77). This ratio grew from an average 0.162 to 0.198 over the 20-year-period covered (export-weighed). With the exception of Japan, the ratio increased in all ten countries they cover. Additional data from national sources show rising 'vertical specialization' for Ireland, Taiwan Province of China and the Republic of Korea, and a particularly sharp increase in Mexico (from 0.10 in 1979 to 0.32 in 1997). The latter reflects the growth of

[68] Note that the different denominators of the ratios make it impossible to directly compare the extent of offshoring across these three studies; they only allow to asses relative trends.

export processing in the country's *maquiladoras* that heavily rely on imported inputs. Yi (2003) provides an extension on the article by Hummels et al. (2001) and explores the impact of vertical specialization on the volume of world trade.

Data on outward-processing trade

A number of studies have illustrated trends in offshoring by making use of bilateral trade data that capture the re-import of products that were shipped abroad for assembly or processing. Anderton et al. (2002) argue that the more accurate proxies for offshoring are obtained using highly disaggregated bilateral trade data, preferably expressed in volume terms instead of value. They prefer the use of direct import measure because by using these data it is possible to capture offshoring of both intermediate inputs and final goods, whereas the input-output table does not capture the later. European Union producers of textiles and apparel have increasingly re-located some stages of their production, mainly to Central and Eastern Europe (Baldone et al., 2001). For example, re-imports of apparel to the Netherlands were equal to 42.2 per cent of domestic production in 1994-96 (up from 20.4 per cent in 1988-90), and they increased in Germany from 10.8 per cent in 1988-90 to 24.1 per cent in 1994-96. French and Italian producers have engaged in production offshoring to a far smaller degree (with ratios of 4.9 and 2.3 per cent in the final year, respectively).[69]

The results presented by Egger and Egger (2001) indicate that this particular kind of 'offshoring' is less prevalent in other sectors. According to their data, outward processing equalled only 0.25 per cent of gross production of all European Union industries in 1995-1997. A similar picture emerges for the United States. Feenstra et al. (2000) utilize United States customs data for the Offshore Assembly Program (OAP) and find a marked increase of re-imports in the Apparel (SIC 23) and Footwear and Leather (SIC 31) industries, mainly from Mexico and Caribbean countries. By 1993, OAP imports accounted for 6.4 per cent of all incoming shipments of apparel (up from 1.1 per cent in 1981) and 8.5 per cent of leather goods and footwear (up from 1.0 per cent in 1981). By contrast, OAP imports fluctuated around their initial level over the period for the machinery (at 1.0 per cent or below), electrical machinery (between 2.4 and 4.0 per cent) and transportation equipment (below 1.0 per cent in all years but 1987).

Data from multi-national enterprises

The increasing importance of MNEs in international trade has increased the demand for statistical data on their overseas activities. The Bureau of Economic Analysis (BEA) created a detailed data set on MNEs from the United States that includes employment data, R&D expenditures, trade in goods and services, and selected financial data. This information is available at aggregate and detailed level, cross-classified by country and industry (see Landefeld and Kozlow, 2003); similar data are available for Austria, Germany, Italy and Japan.[70] These data allow a more careful measurement of vertical FDI since they report the flow of goods and services between parent and affiliate. This allows analyzing the impact of vertical FDI on employment dynamics, wages, the growth of parents and affiliates and their market access, and on productivity and proficiency.[71] Two types of problems are frequently associated with FDI and MNE employment data (both at aggregate and micro-level): reliability of data source and coverage and validity of FDI measures as a proxy to firm activities (van den Berghe, 2003). Moreover, Landefeld and Kozlow (2003) emphasize the need to harmonize the statistical standards for FDI surveys[72].

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[69] Helg and Tajoli (2005) show that Germany has a higher propensity to offshore than Italy. Moreover, while the apparel sector is the most affected in both countries, they widely differ with regard to the textile and the footwear industry: the share in offshoring in these two sectors is increasing in Italy and decreasing in Germany. Finally, they put in evidence that offshoring is relevant also in relatively advanced industries, like office machine, communication equipment, precision instrument and transport equipment.

[70] For Austria see Marin (2004), for Germany see Muendler and Becker (2006), for Italy see Mariotti and Piscitello (2002), and for Japan see Ando and Kimura (2003). Konings and Murphy (2001) provide further data for Europe.

[71] For employment dynamics see Borga (2005), Schultze (2004), Desai et al. (2005), Slaughter (2000), Brainard and Riker (1997), Harrison and McMillan (2006), Hanson, Mataloni and Slaughter (2003); for wages Slaughter (2002), Head and Ries (2002); for the growth of parents and affiliates and market access Borga (2005); and for productivity and proficiency Bhagwati et al. (2004).

[72] Other important sources for data on FDI are UNCTAD and the ITC's, Investment Map. They contain information at sectoral level on sales, employment, import and export for parents and affiliates in many developed and developing countries

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