

Outward FDI and home employment. Is Italy experiencing skill upgrading?

Stefano Elia

DIG-Politecnico di Milano, P.zza L. da Vinci, 32 – 20133 MILAN (Italy)

Tel. (+39) 02 2399 2756, Fax (+39) 02 2399 2710

E-mail: stefano.elia@polimi.it

Ilaria Mariotti

DiAP-Politecnico di Milano, P.zza L. da Vinci, 32 – 20133 MILAN (Italy)

Tel. (+39) 02 2399 3928, Fax (+39) 02 2399 4105

E-mail: ilaria.mariotti@polimi.it

Lucia Piscitello (*corresponding author*)

DIG-Politecnico di Milano, P.zza L. da Vinci, 32 – 20133 MILAN (Italy)

Tel. (+39) 02 2399 2740, Fax (+39) 02 2399 2710

E-mail: lucia.piscitello@polimi.it

Acknowledgments: This paper has benefited from the helpful comments and suggestions of participants at the AIB Annual Conference 2008, the EUNIP Annual conference 2007, the ETSG Annual conference 2007, the ERSA Annual conference 2007. Financial support from the FIRB-RISC 2003 is gratefully acknowledged.

BIOGRAPHICAL NOTES

Stefano Elia is a PhD student at Politecnico di Milano, under the supervision of Professors Sergio Mariotti and Lucia Piscitello. His thesis concerns the impact of M&As from EMNCs on European companies. He will be visiting CIBUL (Leeds, UK) , under the supervision of Professor Peter Buckley, for one year, starting in October 2008.

Ilaria Mariotti is assistant Professor of Territorial Planning at Politecnico di Milano. Her main research interests concern internationalisation processes in industrial districts, and the impact of globalisation on the logistics sector.

Lucia Piscitello is Professor of International Institutions and Regulation at Politecnico di Milano. Her main research interests concern direct and indirect effects of FDI on the host and the home country, the relationship between internationalisation and skill upgrading, the relationship between forms of internationalization, the location of R&D activities by MNCs, the internationalisation of SMEs, clusters and industrial districts, knowledge transfer and technological catching up through FDI.

The impact of outward FDI on the home country's labour demand and skill composition

ABSTRACT

The contribution of the present paper to the literature investigating the effects of outward FDI on the home country employment and skill composition is twofold. First, by considering the “industrial region” as unit of the analysis, it allows to capture both direct and indirect effects of foreign production on the parent company’s environment. Second, by modelling separately the demand for high and low skilled workers, it allows to assess whether outward FDI can be held responsible for any skill upgrading in the home country. Empirical evidence refers to the Italian case throughout the period 1996-2002, and shows that outward FDI has a significant negative impact upon the demand for low skilled workers in the parent company’s “industrial region”, but this is true only for FDI in lower wage (namely, CEE) countries. Conversely, the demand for high skilled workers in the MNE’s industrial region does not seem to be influenced by outward FDI.

Keywords: Demand for labour; skill composition; horizontal FDI; vertical FDI

1. Introduction

Recent theoretical and empirical literature has been devoting increasing attention to the relationship between outward FDI and the demand for labour in the MNEs' parent companies and in their home countries. In particular, the increasing extent of firms' internationalisation has been held responsible for a drop in employment levels in advanced countries (mainly in the manufacturing sector), as well as for the decrease in low skilled workers' real wages, both in absolute and in relative terms. Within the last thirty years, the United States have, indeed, registered a loss of about 2.5 millions of labour force in the manufacturing sector (the share on the total has decreased from 26.4% to 14.7%); the United Kingdom has lost about 3.5 millions of workers in 1970-1998 (the share of the employees in the manufacturing sector dropped from 34.7% to 18.6%), and similar trends have also been recorded in other advanced countries (Legrain, 2002; Wolf, 2004). At the same time, since the beginning of the Eighties, a consistent acceleration in the demand for skilled workers is observed (Katz & Murphy, 1992; Autor *et al.*, 1998).

The economic literature associates such phenomena with the following three events: (i) information and communication technologies, which are capital intensive and skill intensive (Bound & Johnson, 1992); (ii) changes and pressures induced by globalisation (Wood, 1994; Borjas & Rames, 1995); (iii) international fragmentation, reorganization of production and outsourcing (see among the others, Feenstra & Hanson, 2001; Bardhan & Kroll, 2004; McKinsey, 2005). Nevertheless, while several empirical investigations have underlined the role of technological change and capital deepening on the increase of the high skilled workers' demand (Machin & Van Reenen, 1998; Piva *et al.*, 2003; Piva & Vivarelli, 2004), the evidence on the impact of globalisation and international division of labour on the change of employment and wages of the MNEs' parent companies and the countries involved is far from being conclusive (see Molnar *et al.*, 2007 for a recent survey).

Additionally, the empirical literature on the impact of outward FDI has so far:

- (1) mainly focused on the MNE's parent, thus investigating only the so called "direct" effects (i.e., foreign activities substitute the parent's domestic employment or do they rather complement it?); however, while acknowledging that outward FDI may also indirectly impact the MNE's relevant business environment (customers, suppliers, competitors), empirical studies fail to capture this dimension, and simply extend the analysis at the MNE parent's industry or country level;
- (2) tested the impact of outward FDI on the domestic skill composition mainly by using the share of skilled workers over the total employment, thus pointing to skill upgrading whenever such a ratio increased.

The contribution of the present paper to the literature investigating the effects of outward FDI on the home country employment and skill composition is twofold. First, it investigates the overall impact of outward FDI on the MNE's home country employment and its skill composition, by allowing for both direct (i.e., on the MNE's parent) and indirect (i.e., on the parent's relevant business environment) effects, by considering as the unit of analysis the "regional industry", i.e. each ensemble of firms operating in the same industrial macro-sector – constituted by interdependent sectors belonging to the same industrial *filière* – and localised in the same geographical region (see Mariotti et al., 2003). In particular, we claim that the analysis at the firm-level does not allow to take into account how foreign production affects the parent's relevant business environment. The fundamental hypothesis is that the lion share of such impact is sectorally and spatially circumscribed within the regional industry (as previously defined) in which the firm operates and carries out the most of its external relations.

Second, by using a translog cost function approach to estimate the effect of outward FDI on the relative demand for high and low skilled workers, it allows to assess whether outward FDI can be held responsible for any skill upgrading in the MNE's relevant regional industry

(Adams, 1999, Driffield et al., 2005; Hijzen et al., 2005; Ekholm & Hakkala, 2006; Ahn et al., 2008). In fact, the effects of outward investments on the skill composition of the parent company are difficult to capture (Agarwal, 1997), and this is even harder when the measure adopted to proxy skill composition and skill upgrading is the share of skilled workers over total employment (Feenstra & Hanson, 1996, 1999, and Slaughter, 2000 for the US; Anderton & Brenton, 1999 and Gorg *et al.*, 2003 for the UK; Head & Ries, 2002 for Japanese MNEs; Strauss-Kahn, 2002 for France; Anderton *et al.*, 2001 and Hansson, 2005 for Sweden; Brenton & Pinna, 2001, Helg & Tajoli, 2005, and Castellani *et al.*, 2008 for Italy). Indeed, such a measure does not allow to single out the effects of outward FDI on each typology of workers (high vs. low skilled), as the ratio might register an upsurge (reduction) when only low skilled employment decreases (increases), without any real change in the high skilled workers, or when both high and low skilled workers decrease, but the latter decreases more than the former.

Empirical evidence is provided with reference to the Italian case along the period 1996-2002. Using a SUR econometric technique, our analysis shows that (i) outward FDI has a significant negative impact upon the demand for low skilled workers in the parent company's regional industry, and (ii) this is true only for FDI in lower wage countries (namely, Central and Eastern European countries – CEECs), while FDI in high income markets (namely, OECD countries) does not seem to impact significantly on the demand for labour (neither high or low skilled workers). These findings are important for our understanding of the effects of outward FDI on the home country's employment because they suggest that not all types of FDI do equally influence the domestic skill composition, and that only low skilled workforce is more likely to be (negatively) affected by the MNEs' internationalisation of production.

The remaining of the paper is organized as follows. The next section provides a brief review of the literature on the direct and indirect effects of outward FDI on domestic employment and skill composition, and it illustrates our research approach. The third Section describes the

empirical analysis, namely the model and the variables considered, the data employed and the results obtained. The fourth Section concludes the paper.

2. Research background

2.1. Previous literature on the effects of outward FDI on domestic employment and skill composition

The theory of the multinational firm does not provide clear predictions on the effect of investment abroad on the employment level and skill composition in the investing firm and its home country, but some of the mechanisms and effects that outward FDI might have on the labour markets in source economies have been illustrated (see Barba Navaretti & Venables, 2004, and Molnar *et al.*, 2007, for recent discussions). One of the most basic issues is the distinction between vertical and horizontal investments (henceforth VFDI and HFDI, respectively). The former refer to investments through which different stages of production are geographically fragmented across different countries with the location of such stages depending on where the factor of production they use intensively is relatively cheap (Braconier *et al.*, 2005). The latter are instead defined as the replication of all or part of the home production process in a foreign country, thus producing similar output in both home and host countries, and economising on any cost of exporting (Molnar *et al.*, 2007).

Therefore, as concerns the effects on home employment level, and particularly the relationship between employment in the parent company and its foreign affiliates, firms undertaking vertical investment actually dismantle the structure of their value chain through the re-localisation of the labour intensive activities in low cost countries. VFDIs are principally driven by differences in factor endowments between home and host countries, and they are explained by the need to exploit location specific factors of production. As a consequence, the structure of domestic production changes, since low skilled employment

decreases while both the capital and the high skilled labour do increase, therefore, the effect on the domestic market would be, *ceteris paribus*, a net decrease in the employment level. Nonetheless, because of other compensatory effects, the *ceteris paribus* condition does not generally hold. In fact, the increased efficiency associated to the new structure of the production chain can enhance the parent company's competitive position and increase its (domestic and foreign) market share through positive externalities exerted on domestic production and demand (Chen & Ku, 2003). Additionally, some complementarities between foreign and domestic production can also arise due to the foreign trade flows stimulated by the presence *in loco*.

The effect of HFDI on the employment of the parent company is also ambiguous (for a survey, see Agarwal, 1997). On the one hand, as HFDI replicates the activities of the parent, this implies that foreign affiliates serve the local market and substitute previous exports from the parent company that could, therefore, reduce production (and employment) in the home activities. On the other hand, whenever HFDI only replicates the final segment of production, demand for intermediate goods and services, produced by the parent company, would rise. Furthermore, in the case of multi-product companies, HFDI may increase the firm's market penetration, determining a bandwagon effect on export (and therefore, on home production) of other product varieties within the same firm.

It is also worth considering that both HFDI and VFDI may require more supervision, coordination and control over the activities geographically dispersed, i.e. those "headquarter services" (such as R&D, finance, marketing, logistics, etc.), which are typically concentrated in the parent company. Hence, outward FDI might also crucially impact the domestic skill composition, as the parent company's requirements for high-skilled workers and white collars increase (Helpman & Krugman, 1985; Blömstrom *et al.*, 1997; Fors & Kokko, 1999; Mariotti *et al.*, 2003; Castellani *et al.*, 2008; Driffield & Chiang, 2007). Additionally, skill upgrading

in domestic employment might also occur in the case of VFDI, when firms move their labour intensive production phases to other countries where wages are lower.

2.2. *Our approach*

We argue that this is only part of the story. Outward FDI may have (direct) effects not just on the parent company's domestic employment but also (indirect) effects on the business environment in which it operates (Mariotti *et al.*, 2003; Savona & Schiattarella, 2004; Mariotti & Piscitello, 2007). Namely, the latter refer to subcontracting relations and local externalities induced by the demand (originated from the parent company) for specialised inputs, services, managerial and operative skills (Rodriguez-Clare, 1996). Indeed, production in foreign affiliates could induce:

- *substitutive* effects on domestic employment in the local context in which the MNE operates due to: (i) a reduction of domestic low skilled labour force; (ii) a loss of market shares by local suppliers, and a loss of the opportunity to learn and grow through the relationship with the parent company; and (iii) the write-off of previous subcontracting relations;
- *complementary* effects, whenever the enhanced competitive position of the parent company and its additional demand for specialised inputs do increase the externalities on the local context. The transfer of production abroad may have a positive effect when the parent company's suppliers become also suppliers for the foreign affiliates. In such a case, the market for suppliers could even expand, at least as long as the costs for logistics and reorganisation do not overwhelm the marginal advantage. Specifically, VFDI may induce an upgrading in the local system and in the supply chain competitiveness by promoting a differentiation in specialisation and competencies between countries, with the consequent development of a quality service sector linked to it (Savona & Schiattarella, 2004; Mariotti & Piscitello, 2007). HFDI's effects (for instance, in terms of greater requirements for highly

skilled workers and white collar employees) could also extend to the whole economic area in which the parent company operates, because of the externalities generated by the induced demand for specialised inputs and high skilled labour.

Moreover, results obtained in previous empirical studies on the influence of globalisation on the demand for skilled labour do often suffer from the adoption of proxies that measure skill upgrading only indirectly. Namely, the most popular one, i.e. the share of skilled workers over total employment may point to skill upgrading even when the low skilled component does not change at all. Specifically, the increase of the ratio may stem from the decrease of low skilled employment, as well as from the unbalanced decrease in both high and low skilled workers (the latter decreases more than the former). Within this context, the analysis by Head & Ries (2002) on Japanese MNEs in the period 1956-1990 shows a positive and significant effect of outward investments on the parent company's skill intensity only when foreign affiliates are located in low-income countries. The measure adopted for skill intensity is defined as $w_H H / (w_H H + w_L L)$, where H and L are employments of high and low-skilled workers and w_H and w_L are their respective wages. Slaughter (2000) demonstrates that the US industry data provide no support for a positive relationship between MNE activities and skill upgrading (measured by the nonproduction worker share of the wage bill of US industries) over the 1977–1994 period. Using the same proxy, Feenstra & Hanson (1996) find that foreign outsourcing (defined by the authors as the substitution of imported inputs and finished goods for domestically produced goods) can account for 18.9–21.3% of the observed increase in the nonproduction worker share of the wage bill for their 4-digit SIC industries sample in 1979–1990. Likewise, Hansson (2005) finds that the relocation of activities by Swedish MNEs to non-OECD regions (CEECs, in particular) contributed to the skill upgrading of their home activities, as measured by the level change in the skilled-labour share of the total wage bill, in the period 1990-1997. Likewise, Ito & Fukao (2005) and Yamashita (2006) found that

vertical intra-industry trade with Asian countries or imports from Asian countries had a significant positive impact on the skilled labour share in Japan. More recently, Castellani *et al.* (2008), studying Italian manufacturing firms that became multinational (for the first time) in the period 1998-2003, find a positive and significant impact on the share of skilled workers in parent companies. However, such a result holds only when foreign initiatives are undertaken in Central and Eastern Europe.

Although such apparent univocal results, it is worth noting that they are not always robust to changes in the unit level of analysis. In fact, evidence significantly differs when adopting the firm level, the industry level or the regional-industry level, as they capture different effects (direct vs. indirect) of outward FDI. For instance, Head & Ries (2002) find that VFDI have a positive and significant effect on the skill intensity of Japanese MNE parent companies, but such an effect disappears when repeating the analysis at the industry level (therefore, when including part of the FDI's). Mixed results emerge also in Driffield *et al.* (2005), investigating the UK MNEs' outward FDI over the period 1987-1996. Namely, they find that foreign investments reduce the demand for low-skilled labour and to some extent also for high-skilled labour. However, while the former is associated with FDI that are strongly motivated by the search for lower factor costs, the latter refers to FDI directed to countries characterised by foreign industries more R&D intensive than those in the UK, i.e. technology seeking.

Likewise, using a cost function approach to estimate the effect of offshoring of intermediate input production on the composition of labour demand, Ekholm & Hakkala (2006) find that offshoring to low-wage economies tend to shift demand away for workers with upper secondary education, benefiting workers in the highest skill group. On the other hand, they do not find any statistically significant effect of offshoring to high-income countries.

Following these latter studies, which adopted structural equations for factor demand, in order to test whether FDI impacts differently on various factors of production, our study aims at investigating the impact of FDI separately on high and low skilled workers.

3. The empirical analysis

3.1. The model

The dynamics of high and low skilled employment is analyzed in the literature mainly through the use of a translog cost function, whose specification depends on the inputs that are assumed to be part of the cost and production functions (for further details, see Christensen et al., 1973; Diewert, 1974; Brown & Christensen, 1982; Berndt, 1990). . As in Adams (1999), we assume that the variable inputs are labour (both high skilled and low skilled) and materials; instead, capital and technology are considered to be quasi-fixed factors since they require a long period to change (Berman et al., 1994). Therefore, using material price as *numeraire*, the final normalized translog function becomes:

$$\begin{aligned} \ln(C/w_M) = & \alpha_0 + \sum_{k=H,L} \sum_{j=H,L} \beta_{k,j} \ln \frac{w_k}{w_M} \ln \frac{w_j}{w_M} + \beta_Y \ln Y + \sum_{j=H,L} \beta_{j,Y} \ln \frac{w_j}{w_M} \ln Y + \\ & + \beta_Y Tech_Change + \sum_{j=H,L} \beta_{j,Y} \ln \frac{w_j}{w_M} Tech_Change + \beta_K \ln K + \sum_{j=H,L} \beta_{j,K} \ln \frac{w_j}{w_M} \ln K + \sum_{j=H,L} \beta_{j,u} u_j \ln \frac{w_j}{w_M} + u_c \end{aligned}$$

where w_M is the cost of materials, w_j is either the cost of high (H) or the cost of low (L) skilled workers, Y is the output, $Tech_Change$ is technological change, K the capital, and u_c the error term.

According to the Shephard's Lemma, the cost share for each input j , which also expresses the demand for that input, is given by:

$$s_j = \frac{\delta \ln(C/w_M)}{\delta \ln(w_j/w_M)}$$

Hence, by differentiating the cost function with respect to the relative price of high and low skilled workers, we obtain the following system of cost share functions:

$$\begin{cases} s_L = \alpha_L + \sum_{j=L,H} \beta_{L,j} \ln \frac{w_j}{w_M} + \beta_{LY} \ln Y + \beta_{LK} \ln K + \beta_{LR} Tech_Change + u_L \\ s_H = \alpha_H + \sum_{j=L,H} \beta_{H,j} \ln \frac{w_j}{w_M} + \beta_{HY} \ln Y + \beta_{HK} \ln K + \beta_{HR} Tech_Change + u_H \end{cases}$$

Since the aim of our analysis is to understand whether outward FDI is among the factors affecting the demand for high skilled and low skilled workers, we augment the equations by adding the FDI term:

$$\begin{cases} s_L = \alpha_L + \sum_{j=L,H} \beta_{L,j} \ln \frac{w_j}{w_M} + \beta_{LY} \ln Y + \beta_{LK} \ln K + \beta_{LR} Tech_Change + \beta_{LI} \ln FDI + u_L \\ s_H = \alpha_H + \sum_{j=L,H} \beta_{H,j} \ln \frac{w_j}{w_M} + \beta_{HY} \ln Y + \beta_{HK} \ln K + \beta_{HR} Tech_Change + \beta_{HI} \ln FDI + u_H \end{cases}$$

It is worth reminding here that our observation unit is not the firm but the “regional industry” defined as the ensemble of firms operating in the same industrial macro-sector – constituted by interdependent sectors belonging to the same industrial *filière* - and localised in the same geographical region (see Mariotti *et al.*, 2003). Specifically, as a proxy for the regional industry, we considered the combination of the 20 Italian administrative regions (defined at the NUTS2 level¹), and 9 macro sectors (see Table 1). Such a definition is intentionally based on a quite aggregate level in order to capture the most of the interdependencies between multinational firms and their business environment, with reference to both the intersectoral relations² and their spatial dimension. As far as the Italian case is concerned, the hypothesis is corroborated by the distinctive nature of the Italian industrial system whose competitiveness is grounded on a specific structure based on local systems, which allow to exploit agglomerative advantages and to capture the efficiency of proximity between suppliers and users (Porter, 1992; Mariotti *et al.*, 2007).

3.2. Data and variables

As our aim is to understand whether and how outward FDI undertaken by Italian firms in a certain period do influence the composition of domestic employment in their regional

¹ The Nomenclature of Territorial Units for Statistics (NUTS) refers to the Eurostat scheme of classification. It is based on the institutional divisions currently in force in the member states, according to the tasks allocated to territorial communities, to the sizes of population necessary to carry out these tasks efficiently and economically, and to historical, cultural and other factors.

² As in Mariotti *et al.* (2003), we are aware that this high aggregate level might lead to attribute to FDI other employment variations occurring in the regional industry, i.e., variations which have nothing to do with it. Nevertheless, an excessively disaggregate sectoral breakdown might miss the *filière* effect, as it would ascribe the FDI impact only to a single unit even when it is attributable to another unit or to several units at the same time. A trade-off does actually exist but the chosen level seems to be reasonably appropriate to face it.

industry, our dependent variables refer to the growth rate of both high skilled and low skilled workers (in the relevant regional industry) in the period 1996-2001. Data come from the Italian National Institute for Social Security (INPS), which provides a census of manual workers, clerks and managers in Italian firms. Specifically, we associate manual workers to the low skilled category, while clerks and managers to the high skilled category³. Therefore, our variables are defined as follows:

$$\Delta High_skilled_{i,r} = \log High_skilled_{i,r,2002} - \log High_skilled_{i,r,1996}$$

$$\Delta Low_skilled_{i,r} = \log Low_skilled_{i,r,2002} - \log Low_skilled_{i,r,1996}$$

Where $r = 1, \dots, 20$ regions, and $i = 1, \dots, 9$ macro sectors.

According to both previous empirical studies and data availability, we considered the following explanatory variables:

- $\Delta FDI_{i,r}$ is the variation in the number of employees in foreign affiliates by Italian firms belonging to industry i and region r along the period 1994-2000⁴. Data come from the Reprint database⁵. It is worth observing that, in order to take into account that the effect of each Italian MNE's foreign initiative may influence not only the employment of the region where the MNE's headquarters is located, but also the employment of those regions where the firm is present with its plants, we distributed the workers of each foreign affiliate among the several relevant regions (in which plants of the Italian MNE are located). Furthermore, to account for different investments' type, we followed the convention largely used in literature that considers investments in high-income countries mainly as horizontal, and investments towards low-income countries as vertical (e.g. Head & Ries, 2002; Hansson, 2005; Ekholm &

³ It is worth observing that considering blue collars as low skilled workers and white collars as high skilled workers may be susceptible of criticism. However, the other classifications suggested by the literature are not entirely satisfactory as well. In fact, distinguishing between high and low skilled workers by looking at their education level (e.g. Hansson, 2001; Ekholm & Hakkala, 2006) might present significant problems too (e.g., more educated people do not necessarily have a high skilled position).

⁴ It is worth noting that FDI have been lagged two years because it seems reasonable to expect the effect on employment will manifest with a certain time lag (see Mariotti et al., 2003 and Castellani et al., 2008).

⁵ The database provides a census of inward and outward Italian FDI since 1986, and it is updated every year. It is developed by the Department of Economics, Management and Industrial Engineering of the Politecnico di Milano and it is sponsored by ICE (National Institute for Foreign Trade) since the beginning of 2001.

Hakkala, 2006). Hence, the variable $\Delta FDI_{i,r}$ has been further specified according to the country of destination: $\Delta FDI_OECD_{i,r}$ refers to investments undertaken in high income (namely, OECD) countries⁶, $\Delta FDI_CEE_{i,r}$ refers to investments undertaken in Central and Eastern European countries⁷, which attracted about 23% of the total Italian FDI in 1994-2000, thus constituting one of the preferred destination areas by Italian MNEs, and $\Delta FDI_DEV_{i,r}$ refers to the investments undertaken in other low-income countries.

- The proxy for technological change (*Tech*) refers to the cumulated sum of patents granted to region r in industry i over the period considered, weighted by the total number of employees in the same industrial region (as at the beginning of the period of analysis). Data comes from the Crenos research institute of the University of Cagliari⁸.

- The proxy used for capital has been built through the perpetual inventories method, by using the year 1996 as basis⁹. The data used to obtain the capital through the perpetual inventory method are the gross fixed investments¹⁰, which have been provided for each couple of industry-NUTS 2 regions at current prices for each year of the period 1996-2002. The other data employed for capital are the productivity growth of each region, the employment growth rate for each region and the national depreciation rate of the capital: the first two data come from the Eurostat database, while the third one has been derived by using data provided by the Italian Statistical Institute (ISTAT).

⁶ OECD countries consist of Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Luxembourg, the Netherlands, New Zealand, Norway, Portugal, Spain, Switzerland, the United Kingdom and the United States. Countries that became members after 1994 have been excluded (i.e. Czech Republic, Hungary, Poland, Romania, South Korea and Mexico).

⁷ CEE countries consist of Poland, Czech Republic, Slovakia, Hungary, Estonia, Latvia, Lithuania, Byelorussia, Ukraine, Russia, Slovenia, Croatia, Bosnia-Herzegovina, Serbia-Montenegro, Macedonia, Albania, Romania, Moldavia and Bulgaria.

⁸ Specifically, data refer to patents granted to Italian inventors from 1996 to 2002. These data have been associated to each industry-region, according to the Yale Technology Concordance (YTC) table, which allows to convert the International Patent Classification (IPC) provided by the EPO into the NACE codes, and to the origin of the inventors, respectively.

⁹ The capital of the initial year (1996) has been computed as follows: $K_{i,r}^{1996} = \frac{I_{i,r}^{1996}}{(n_i + p_i + \delta)}$, where $I_{i,r}^{1996}$ are the gross fixed investments of the year 1996, while $n_i + p_i + \delta$ are the productivity growth of each region, the employment growth rate for each region and the national depreciation rate of the capital, respectively. To compute the capital for the year 2002, the accumulation law that has been used is: $K_{i,r}^{t+1} = (1 - \delta)K_{i,r}^t + I_{i,r}^t$.

¹⁰ The gross fixed investments data come from the Eurostat database.

- The variable Y is measured in terms of value added expressed at current prices for the years 1996 and 2002. Data come from ISTAT.

- Wage data come from the INPS database. Specifically, the salary of high skilled workers has been computed as a mean between the wages of clerks and managers.

Finally, we introduced dummies (D_r) in order to control for regional fixed effects.

An overview of the descriptive statistics and the correlations of our variables are shown in Table 2.

3.3. Results

Results from the SUR estimations are reported in Table 3. Specifically, Equations (1a) and (1b) include the proxy for the overall FDI undertaken by Italian MNEs, while Equations (2), (3) and (4) refer to FDI undertaken in OECD, CEE and other low-income countries, respectively.

First of all, from column (1b) it emerges that the overall foreign activities do negatively impact (at $p < .10$) on the demand for low skilled workers at home (i.e. in each industrial region), while they do not have a significant effect on the skilled side of the labour demand (column 1a). Columns (2a) and (2b) incorporate FDI to OECD countries, i.e. those initiatives that are more likely to respond to MNEs' market seeking strategies. Results show that HFDI has no significant effect on the domestic demand for labour. Substituting FDI_OECD for FDI_CEE in columns (3a) and (3b), it emerges that foreign activities undertaken in Central and Eastern Europe are responsible for a negative and significant (at $p < .05$) impact upon the low skilled employment in the Italian MNE's industrial region. Instead, they do not influence the demand for high skilled workers. Such a result is consistent with the idea that investments in the geographically closer low wage countries are of a cost-saving type, thus implying the transfer of labour-intensive activities from the home to the host countries and, hence, a decrease of demand for domestic low-skilled workers. However, as results reported in

columns (4a) and (4b) show no impact on the demand for labour at home, this may reflect that Italian FDI in other low-income (extra-European) countries follow hybrid strategies combining traditional de-localisation with the penetration of the local market (see also Mariotti et al., 2003). Our results are in line with previous findings obtained, for example for Swedish MNEs (Ekholm & Hakkala, 2006), whose offshoring initiatives - in particular to low-income countries - tends to shift labour demand away from workers with an intermediate level of education. Instead, offshoring to high-income countries does not have any statistically significant effect on the composition of labour demand.

Moreover, compared to earlier studies in which there appears to be a generalised consensus about the skill upgrading of the domestic employment stemming from MNEs' foreign production, this study suggests that internationalisation undertaken by Italian firms induces (negative) changes in the demand for low skilled workers, and that high skilled workers are instead not significantly influenced by that.

4. Conclusion and discussion

The paper contributes to the debate concerning the impact of internationalisation of production on employment in the home country, a debate according to which outward FDI, especially those towards low-wage countries, are responsible for the substitution of employment between parent companies and foreign affiliates. Specifically, at least to our knowledge, this is the first study investigating the impact of outward FDI, by taking into account both direct effects on the MNE undertaking the investment, and indirect ones, i.e. those on its relevant environment, defined both at the industrial and geographical level. Indeed, international production may involve an increase in competitiveness of the firm investing abroad in terms of productivity, output and trade, labour intensity and skills, managerial capabilities, technological sourcing, etc. This holds intuitively when firms that

relocate abroad are likely to move their relatively inefficient production phases to another country where costs are lower, thus becoming more efficient and expanding production and employment along in other stages for which they have a comparative advantage (Markusen et al., 1996; Agarwal, 1997; Carr et al., 1998). Therefore, when a MNE undertakes a VFDI, the labour intensive activities are transferred towards low-wage countries while the other (skill-intensive) activities remain in the home country, thus giving rise to the phenomenon known as skill upgrading. However, in line with other recent studies (Driffield et al., 2005; Ekholm & Hakkala, 2006), we claim that in order to properly capture the impact of outward FDI on the domestic demand for labour it is necessary to single out the effects on each typology of workers (high vs. low skilled). Therefore, our results corroborate the canonical interpretation which distinguishes between horizontal investments driven by market seeking strategies (which constitute the bulk of FDI in high income countries); and vertical investments led by strategies of allocating labour intensive portions of the output or labour intensive stages of production, which represent the most of FDI towards low income countries¹¹ (ALFARO!!!). In particular, we find that outward FDI has a significant negative impact upon the demand for low skilled workers in the parent company's "industrial region", but this is true only for FDI in lower wage (namely, CEE) countries. Conversely, the demand for high skilled workers in the MNE's industrial region does not seem to be influenced by outward FDI.

Our future research agenda is quite rich. First of all, further research might extend the estimation to embrace a longer time span because the relationship between outward FDI and the parent company's employment may change over time. Specifically, FDI might impact on the demand for high skilled workers at home, but after the first post-investment period, which is instead likely to be affected by the negative consequences of the reorganization process. Additionally, in order to take into account possible spillover effects across regions, appropriate spatial econometric tools may be used. Indeed, the impact of an MNE's

¹¹ However, recent studies (e.g. Alfaro & Charlton, 2007) have shown that the share of VFDI (subsidiaries which provide inputs to their parent firms) is larger than commonly thought, even within developed countries. More empirical analysis is certainly needed on this issue.

international activity may sometimes cross the administrative border of the relevant NUTS2 region, and affect the employment of other bordering regions (i.e. through backward and forward linkages).

In policy terms, our results indicate that concerns about the impact on jobs of outward FDI may be somehow well placed. Indeed, the empirical exercise developed suggests that the dominant forms of outward FDI (i.e. those directed to Central and Eastern Europe countries) reduce the demand for low skilled labour in Italy. Although it would be necessary to take into account all the complex relationships between foreign production, domestic employment and production, foreign trade and the variations in the investing firms' competitive advantages, nonetheless it is possible to draw some considerations on the issue. Specifically, a lasting increase of vertical investment, causing such a depressive impact on the domestic employment, would become unsustainable in the long term unless adequately balanced by other initiatives abroad either market seeking or aiming at tapping into local source of excellence. Secondly, the changes induced on the domestic employment imply systematic and flexible adjustments upon the labour market. In particular, that concerns the greater supply of higher vocational profiles and the consequent need of additional investment in human capital. The lack of such structural adjustment processes would cause other fatal consequences for the competitiveness of the country, and the stability and growth of the domestic employment.

References

- Adams, J.D. (1999). The structure of firm R&D, the factor intensity of production, and skill bias, *The Review of Economics and Statistics*, 81, 499-510.
- Agarwal, J.P. (1997). Effect of foreign direct investment on employment in home countries?, *Transnational Corporations*, 6/2, 1-28.
- Ahn, S., Fukao, K. and Ito, K. (2008). *Outsourcing in East Asia and its impact on the Japanese and Korean Labour Markets*, OECD Trade Policy working paper 65, Paris.
- Alfaro, L. and Charlton, A. (2007). *Intra-Industry Foreign Direct Investment*, NBER working paper 13447, Cambridge.
- Anderton, R. and Brenton, P. (1999). Outsourcing and low-skilled workers in the UK, *Bulletin of Economic Research*, 51, 267-286.
- Anderton, R., Brenton, P. and Oscarsson, E. (2001). *What's trade got to do with it? Relative demand for skills within Swedish manufacturing*, CEPS working paper 162, Brussels.
- Anderton, R., Brenton, P. and Oscarsson, E. (2002). *Outsourcing and inequality*, CEPS working paper 187, Brussels.
- Barba Navaretti, G. and Castellani, D. (2004). *Does investing abroad affect performance at home? Comparing Italian multinational and national enterprises*, CEPR discussion paper 4284, London.
- Barba Navaretti, G., Castellani, D. and Disdier, A.C. (2006). *How Does Investing in Cheap Labour Countries Affect Performance at Home? France and Italy*, CEPR discussion paper 5765, London.
- Barba Navaretti, G. and Venables, A.J. (2004) *Multinational firms in the world economy*. Princeton: University Press.

- Bartel, A.P. and Lichtenberg, F.R. (1987). The comparative advantage of educated workers in implementing new technology, *Review of Economics and Statistics*, 69, 1–11.
- Berman, E., Bound, J. and Griliches, Z. (1994). Changes in the demand for skilled labor within U.S. manufacturing: evidence from the annual survey of manufacturers, *Quarterly Journal of Economics*, 109/2, 367-397.
- Blomström, M., Fors, G. and Lipsey, R.E. (1997). Foreign direct investment and employment: home country experience in the United States and Sweden, *The Economic Journal*, 107,1787-1797.
- Brainard, S.L. and Riker, D.A. (1997). *U.S. multinationals and competition from low wages countries*, NBER working paper 5959, Cambridge.
- Braconier, H. and Ekholm K. (2000). Swedish multinationals and competition from high and low-wage location, *Review of International Economics*, 8/3, 448-461.
- Braconier H., Norback, P.J. and Urba, D. (2005). Multinational enterprises and wage costs: Vertical FDI revisited, *Journal of International Economics*, 67, 446-470.
- Brenton, P. and Pinna, A.M. (2001). *The declining use of unskilled labour in Italian manufacturing: is trade to blame?*, CEPS working paper 178, Brussels.
- Bruno, G. and Falzoni, A.M. (2003). Multinational corporations, wages and employment: Do adjustment costs matter?, *Applied Economics*, 11, 1277-1290.
- Cantwell, J. A. (1993). Corporate technological specialization in international industries. In M.C. Casson and J. Creedy (eds.), *Industrial Concentration and Economic Inequality*, Aldershot: Edward Elgar.
- Carr, D.L., Markusen, J.R. and Maskus, K.E. (2001). Estimating the knowledge capital model of the multinational enterprise, *American Economic Review*, 91/3, 693-708.

- Castellani, D., Mariotti, I. and Piscitello, L. (2008), The impact of outward investments on parent company's employment and skill composition. Evidence from the Italian case, *Structural Change and Economic Dynamics*, 19/1, 81-94.
- Chen, T.-Y. and Ku, Y.-H. (2003). *The effect of overseas investment on domestic employment*, NBER working paper 10156, Cambridge.
- Debaere, P., Lee, H. and Lee, J. (2006). *Does Where you Go Matter? The Impact of Outward Foreign Direct Investment on Multinationals' Employment at Home*, CEPR discussion paper 5737, London.
- Diewert, W.E. (1974) Applications of Duality Theory. In M. Intriligator and D. Kendrick (eds.), *Frontiers of Quantitative Economics*, Amsterdam: North-Holland, 106-171.
- Driffield, N. and Chiang, M. (2007), The effects of offshoring to China: reallocation, employment and productivity in Taiwan, paper presented at the AIB conference, April, London.
- Driffield, N., Love, J.H. and Taylor, K. (2005), Productivity and labour demand effects of inward and outward FDI on UK industry, Aston Business School, mimeo.
- Ekholm, K. and Hakkala, K. (2006). *The Effect of Offshoring on Labour Demand: Evidence from Sweden*, CEPR discussion paper 5648, London.
- Falzoni, A.M. and Grasseni, M. (2005). *Home Country Effects of Investing Abroad: Evidence from Quantile Regressions*, CESPRI working paper 170, Milan.
- Feenstra, R.C. and Hanson, G.H. (1996). Globalization, outsourcing and wage inequality, *American Economic Review*, 86, 240-245.
- Feenstra, R.C. and 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*, 114/3, 907-940.

- Feenstra, R.C. and Hanson, G.H. (2001). *Global production sharing and rising inequality: A survey of trade and wages*, NBER working paper 8372, Cambridge.
- Fors, G. and Kokko, A. (1999) “Home country effects of FDI: Foreign production and structural change in home country operations”, Paper presented at the Seventh Sorbonne International Conference, Paris, June 1999.
- Gorg, H., Hijzen, A. and Hine, R.C. (2003). *International fragmentation and relative wages in the UK*, IZA discussion paper 717, Bonn.
- Hansson, P. (2005). Skill upgrading and production transfer within Swedish multinationals, *Scandinavian Journal of Economics*, 107, 673-692.
- Head, K. and Ries, J. (2002). Offshore production and skill upgrading by Japanese manufacturing firms”, *Journal of International Economics*, 58, 81–105.
- Helg, R. and Tajoli, L. (2005). Patterns of International Fragmentation of Production and Implications for the Labor Markets, *The North American Journal of Economics and Finance*, 16, 233-254.
- Helpman, E. and Krugman, P. (1985) *Market Structure and Foreign Trade*. Cambridge: MIT Press.
- Hijzen, A., Gorg, H. and Hine, R.C. (2005). International outsourcing and the skill structure of labour demand in the United Kingdom, *The Economic Journal*, 115, 860–878.
- Hijzen, A., Inui, T. and Todo, Y. (2007), The Effects of Multinational Production on Domestic Performance: Evidence from Japanese Firms, mimeo.
- Konings, J. and Murphy, A. (2001). *Do multinational enterprises substitute parent jobs for foreign ones? Evidence from European firm-level panel data*, CEPR discussion paper 2972, London.

- Lipsey, R.E. (2002). *Home and host country effects of FDI*, NBER working paper 9293, Cambridge.
- Machin, S. and Van Reenen, J. (1998). Technology and changes in the skill structure: evidence from seven OECD countries, *Quarterly Journal of Economics*, 113, 1215–1244.
- Mariotti, S., Mutinelli, M. and Piscitello, L. (2003). Home country employment and foreign direct investment: evidence from the Italian case, *Cambridge Journal of Economics*, 27, 419-431.
- Mariotti, I. and Piscitello, L. (2007) The impact of outward FDI on local employment. Evidence from the Italian case. In M. Arauzo, D. Liviano and M. Martín (eds.), *Entrepreneurship, economic growth and industrial location*, London: Edward Elgar, 299-320.
- Markusen, J.R., Konan, D.E., Venables, A.J. and Zhang, K.H. (1996). *A Unified Treatment of Horizontal Direct Investment, Vertical Direct Investment and the Pattern of Trade in Goods and Services*, NBER working paper 5696, Cambridge.
- Molnar, M., Pain, N. and Taglioni, D. (2007). *The internationalisation of production, international outsourcing and employment in the OECD*, OECD working paper 21, Paris.
- Piva, M., Santarelli, E. and Vivarelli, M. (2003). The skill bias effect of technological and organisational change: Evidence and policy implications, *Research Policy*, 34, 141–157.
- Savona, M. and Schiattarella, R. (2004). International relocation of production and the growth of services. The case of the “Made in Italy” industries, *Transnational Corporations*, 2, 57-76.
- Slaughter, M.J. (2000). Production transfer within multinational enterprises and American wages, *Journal of International Economics*, 50, 449–472.
- Strauss-Kahn, V. (2003). *The role of globalisation in the within-industry shift away from unskilled workers in France*, NBER working paper 9716, Cambridge.

Table 1 - Italian NUTS 2 regions and macro-sectors

Italian NUTS 2 regions	Macro-sectors (NACE codes)
Abruzzo	Food-beverage-tobacco (15, 16)
Basilicata	Textile-clothing-leather-shoes (17, 18, 19)
Calabria	Paper, printing and publishing (20, 21, 22)
Campania	Chemicals and pharmaceuticals (23, 24, 25)
Emilia Romagna	Non metallic products (26)
Friuli Venezia Giulia	Metals (27)
Lazio	Metal products machinery (28, 29, 31, 32, 33)
Liguria	Transport equipments (34, 35)
Lombardy	Other manufacturing (36, 40, 41, 45)
Marche	
Molise	
Pidmont	
Puglia	
Sardinia	
Sicily	
Tuscany	
Trentino Alto Adige	
Umbria	
Valle d'Aosta	
Veneto	

Table 2 - Descriptive statistics and correlation coefficients

	$\Delta_{96}^{02} \log H_{i,r}$	$\Delta_{96}^{02} \log L_{i,r}$	$\Delta_{96}^{02} \log \frac{w_{H i r}}{w_{M i}}$	$\Delta_{96}^{02} \log \frac{w_{L i r}}{w_{M i}}$	$\Delta_{96}^{02} \log Y_{i,r}$	$\Delta_{96}^{02} \log K_{i,r}$	$\sum_{t=96}^{02} Tech_{i,r}$	$\log \sum_{t=94}^{00} FDI_{t,i,r}$	$\log \sum_{t=94}^{00} FDI_OECD_{t,i,r}$	$\log \sum_{t=94}^{00} CEE_{t,i,r}$	$\log \sum_{t=94}^{00} FDI_LOW_{t,i,r}$
Obs. (No.)	172	172	165	165	150	155	171	172	172	172	172
Mean	-0.0468	-0.0218	-0.0150	-0.0897	0.1005	0.4198	-6.7982	5.2177	4.0958	3.5534	3.7873
Std. Dev.	0.2212	0.2003	0.1179	0.1113	0.3208	0.3285	1.6628	2.8178	2.8172	2.6069	2.6995
Min	-0.8414	-0.5535	-0.3270	-0.3372	-0.6917	-0.0724	-11.2994	0	0	0	0
Max	0.5716	0.4819	0.3433	0.3078	2.0525	1.9535	-3.6183	10.8989	10.3608	9.6451	8.9703
$\Delta_{96}^{02} \log H_{i,r}$	1										
$\Delta_{96}^{02} \log L_{i,r}$	0.3983	1									
$\Delta_{96}^{02} \log \frac{w_{H i r}}{w_{M i}}$	-0.1575	-0.3461	1								
$\Delta_{96}^{02} \log \frac{w_{L i r}}{w_{M i}}$	-0.1953	-0.2209	0.6399	1							
$\Delta_{96}^{02} \log Y_{i,r}$	0.1978	0.0957	-0.3107	-0.2365	1						
$\Delta_{96}^{02} \log K_{i,r}$	0.0301	0.1235	0.1110	0.0336	0.0915	1					
$\sum_{t=96}^{02} Tech_{i,r}$	0.2825	0.0690	-0.2569	-0.2807	0.1326	-0.0397	1				
$\log \sum_{t=94}^{00} FDI_{t,i,r}$	-0.0399	-0.2035	0.1479	-0.0355	-0.2178	-0.2285	0.3038	1			
$\log \sum_{t=94}^{00} FDI_OECD_{t,i,r}$	-0.0455	-0.1821	0.1444	0.0461	-0.2483	-0.1799	0.3746	0.8847	1		
$\log \sum_{t=94}^{00} FDI_CEE_{t,i,r}$	-0.0011	-0.1880	0.0884	-0.1331	-0.1426	-0.2553	0.3188	0.8317	0.6813	1	
$\log \sum_{t=94}^{00} FDI_LOW_{t,i,r}$	0.0104	-0.1073	0.0828	-0.1129	-0.2737	-0.2711	0.2169	0.8603	0.7266	0.7326	1

Table 3 – SUR models

<i>Dep. variable</i>	Total FDI		FDI_OECD		FDI_CEE		FDI_LOW	
	[1]		[2]		[3]		[4]	
	$\Delta_{96}^{02} \log H_{i,r}$	$\Delta_{96}^{02} \log L_{i,r}$						
$\Delta_{96}^{02} \log \frac{w_{H,i,r}}{w_{M,i}}$	-0.055 (-0.25)	-0.948 *** (-4.57)	-0.042 (-0.19)	-0.974 *** (-4.69)	-0.053 (-0.24)	-0.943 *** (-4.56)	-0.073 (-0.33)	-0.986 *** (-4.71)
$\Delta_{96}^{02} \log \frac{w_{L,i,r}}{w_{M,i}}$	0.040 (0.19)	0.263 (1.36)	0.027 (0.13)	0.310 (1.6)	0.046 (0.22)	0.231 (1.18)	0.090 (-0.42)	0.299 (-1.5)
$\Delta_{96}^{02} \log K_{i,r}$	-0.080 (-1.16)	0.080 (1.25)	-0.083 (-1.21)	0.086 (1.35)	-0.077 (-1.11)	0.067 (1.04)	-0.073 (-1.06)	0.090 (-1.39)
$\Delta_{96}^{02} \log Y_{i,r}$	0.136 ** (2.47)	-0.043 (-0.83)	0.134 ** (2.41)	-0.040 (-0.78)	0.134 ** (2.44)	-0.035 (-0.69)	0.147 *** (-2.64)	-0.035 (-0.66)
$\sum_{t=96}^{02} Tech_{i,r}^t$	0.060 *** (4.5)	0.006 (0.51)	0.060 *** (4.42)	0.007 (0.58)	0.060 *** (4.49)	0.007 (0.55)	0.060 *** (-4.59)	0.005 (-0.38)
$\log \sum_{t=94}^{00} FDI_{t,i,r}$	0.004 (0.49)	-0.013 * (-1.64)	0.000 (0.04)	-0.007 (-0.94)	0.004 (0.46)	-0.016 * (-1.93)	0.010 (-1.27)	-0.001 (-0.13)
Constant	-	-	-	0.143	0.573 ***	0.141	-	0.118
Regional dummies	Yes							
Obs.	146	146	146	146	146	146	146	146
Chi-2	94.68	72.82	94.28	68.13	83.62	72.29	96.94	66.88
P-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
R-2	0.3643	0.3265	0.3632	0.3182	0.3642	0.3312	0.3702	0.3142

* if $p < 0.10$, ** if $p < 0.05$; *** if $p < 0.01$

Note: The Breusch-Pagan test for the independence of errors rejects the hypothesis that the errors of the two equations are independent for all the specifications, hence, it confirms that the two equations are highly correlated and that the SUR analysis is appropriate for our specification.

