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Italian Multinationals and De-localisation of Production

by

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Abstract

In this paper we test the firm-specific determinants of delocation to low-wage countries on the part of Italian firms. We collect data through a survey on 167 firms the in mechanics and textile industries. Our data show that in recent years there has been an upsurge in FDI activity by Italian firms, mostly directed to cheap labour countries.
Our hypothesis is that investments to cheap labour countries are mainly cost-driven, and undertaken by firms that focus on a low-quality, low-cost strategy. We test this hypothesis through a probit analysis, finding that investments to cheap labour countries are more likely to be of a vertical type, being associated with low local sales abundant employment and high shares of intra-firm trade. For textile, there is also weak evidence that investments to low wage countries are associated with low shares of skilled employment in parent companies.

Keywords: foreign direct investments, production de-localisation, product differentiation.
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1. INTRODUCTION

This paper is the first attempt to quantify the firm specific determinants of production re-deployment to low wage countries on the part of Italian firms. The stylised facts are striking. Total employees in foreign affiliates of Italian multinationals have grown from 244,188 in 1986 to 606,266 in 1998 (+148%), a large share of them in developing countries. Italian foreign employees rose from 2,100 to 102,503 in Eastern Europe and from 158 to 20,880 in China (Cominotti – Mariotti – Mutinelli, 1999).

When coupled with a decline in Italian manufacturing employment of roughly 500,000 units, these figures raise concerns on whether foreign investments are in fact exporting jobs: faced with rising competition from developing countries in traditional manufacturing sectors, Italian producers have been forced to move stages of production to cheap labour countries. So the story goes, but the simplistic conclusions that can be derived from aggregate figures deserves further enquiry.

The correct question should be : how demand for labour would change firms had not invested abroad ? The answer depends on firm specific and industry specific determinants such as the characteristics of the investment (vertical or horizontal), the overall process of restructuring of the industry, the alternative strategic options facing firms (raising product quality, increasing automation) and so on.

When analysing the link between FDI and employment it is therefore necessary to narrow down the focus of analysis . Some papers (Slaughter (1995), Brainard and Riker (1997a, 1997b)) have analysed the degree of substitutability between home and foreign employment in multinational enterprises (MNEs) as alternative production factors. Other works (Blomstrom et al. (1997)) have tested the effect of FDI activity on labour demand per unit of output. In this paper we take a different route, concentrating on firm-specific determinants of the decision to invest in low-wage countries, where the most part of FDI directed at reducing labour costs are expected

to take place. In this sense, our work is close to those investigating the determinants of investment decisions (e.g., Belderbos and Sleuwagen (1996)).

The recent literature has emphasised the difference between vertical and horizontal foreign investments (Markusen et al. (1996), Zhang and Markusen (1997)). Vertical FDI take place when the multinational re-deploys only part of its production process. Horizontal investments replicate in a foreign country the complete production structure of the home country. The former are principally driven by differences in factor endowments between home and host countries, they are explained by the need to exploit location specific factors of production (cheap labour, natural resources, specific skills) and they are complementary to trade. The latter are instead more often market driven, they are generally explained by the need to overcome trade barriers and transport costs, by the availability of firm specific intangible assets and they are substitute to trade (Markusen, 1995 ; Markusen et al., 1996 ; Zhang and Markusen, 1997 ; Carr et al., 1998). Many of the foreign investments that are located in developing countries are of a vertical type, and aimed at saving labour costs .

Not all firms in an industry are necessarily equally likely to redeploy. We would otherwise observe corner equilibria (all firms in an industry either redeploy or do not redeploy). Firms can often choose from a range of alternative strategies: increasing automation, increasing product quality, strengthening the brand name of their products. Some theoretical papers have focused on the trade-off between redeployment and product quality faced by imperfectly competitive firms in vertically differentiated industries (Barba Navaretti, 1994, Motta, 1994, Cordella and Grilo, 1998). High quality makes demand less sensitive to price changes and allow firms to preserve and improve their profit margins. High quality products, however, require skilled labour. Skilled labour is in general scarce in countries where unskilled labour is abundant and cheap. Hence, it is more expensive to produce high quality in cheap labour countries.

This paper develops a theoretical model analysing the choice of relocation for a vertically (different product quality) and horizontally (different varieties) differentiated industry, where firms are heterogeneous in their ability to produce quality. The model

generates predictions on the relationship between re-location, product quality, skilled employment and the structure of intra-firm trade. In particular, it predicts that vertical investments in cheap labour countries will be undertaken by the firms that find greater difficulties in adding quality to their products. This is because quality requires skills that are scarce in low-wage, less developed economies. So, if a firm chooses to redeploy in a cheap labour country, it is because its technological constraint makes it preferable to follow a low-quality strategy . At equilibrium, it emerges that investments generate a more abundant flow of intra-firm trade when they are located in cheap labour countries, and that the firms with a small share of skilled workers in their parent company are those that are more prone to invest in low-wage locations.

These results are tested by using data collected through a survey of 167 manufacturing Italian firms and by carrying out a probit analysis of the decision to locate a subsidiary in developing or in industrialised countries. The econometric results are in line with the theoretical a-priori.

Important policy implications can be derived. The Italian production structure is characterised by a strong concentration in traditional sectors. The recent surge of redeployment shows that Italy is bad at ease in preserving its competitiveness in these industries and that increasing labour costs are binding. The employment effects of de-localisation could be partly offset by accelerating the path of specialisation of Italian firms in high quality products.

The rest of the paper is structured as follows. The next section summarises the main stylised facts concerning Italian FDI. Section 3 develops the theoretical model. Section 4 focuses on the empirical analysis. It first looks at the time trend of FDI and employment and then examines the determinants of the choice to invest to low-wage countries. Section 5 concludes.

2. STYLISED FACTS ON ITALIAN MULTINATIONALS

Compared with the leading industrial countries, the pattern of Italian foreign direct investment (FDI) shows some distinctive features.

For much of the post-war period, Italy appears to play a relatively minor role as international investor. It is only in the last decade that the trend of Italian outward FDI has showed a considerable upswing. At the end of 1997, there were 804 Italian multinational enterprises (MNEs) with 2034 foreign affiliates, of which three fourth were under majority ownership[1]. Total employment abroad amounted to 606,266 units, roughly 17.6% of Italian domestic industrial employment (Cominotti – Mariotti - Mutinelli, 1999).

There are three distinctive features of Italian outward FDI.

First, the share of Italy's FDI to developed countries is modest compared with the European partners, both in absolute and in relative terms. Until the eighties, there was a strong bias toward Less Developed Countries (Onida – Viesti, 1988). However, during the 1990s, the geographical composition of Italy's FDI has become increasingly similar to that of the other advanced countries, thanks to the rise of FDI toward other European countries. Thereafter Italian operations in this area declined, in line however with the orientation of the whole of European investors. Indeed, as the rationalisation of production through FDI in response to European integration had reached its peak, firms were turning increasingly towards untapped markets, most of which were to be found in the developing world. Italian FDI outflows experienced a boom towards Central and Eastern Europe, particularly between 1990 and 1994 (Table 2.1).

Second, the sectoral pattern of Italian FDI is atypical. In contrast to other industrialised countries, Italian high-technology and science-based sectors are characterised by low and declining share of outward FDI. Conversely, traditional consumer goods sectors, which on a world-wide scale have a low propensity to invest abroad, show a growing share both in terms of employees in foreign affiliates and in terms of sales (Table 2.2).

[1] The main source of information on Italian multinationals and their affiliates is provided by the Reprint database developed at the Department of Economics and Production of the Politecnico of Milano. The database is updated every two years (with the most recent version dating of January 1998). Despite its attempt to achieve a comprehensive coverage, there are some indications that the

Tables 2.1 and 2.2 here

Third, small and medium sized firms, that should typically be at a disadvantage when investing abroad because of the fixed costs involved in such operations, have been nonetheless extremely active in expanding their foreign operations in the most recent years. In fact, in the period 1994-1995, while the contribution to FDI from major Italian groups fell considerably, the new foreign subsidiaries established by small MNEs were between 35% and 40% of the total number of new Italian operations abroad (Cominotti - Mariotti, 1997). At the end of 1997, investors with less than 500 employees accounted for 44.7% of total foreign subsidiaries. Small MNEs are concentrated in traditional consumer goods industries (textiles, clothing, leather and wood) and mechanical engineering sector and have shown a high propensity to invest in Central and Eastern Europe and LDCs (Cominotti – Mariotti - Mutinelli, 1999).

Overall, FDIs in Italy show a bias toward traditional sectors. Many of this FDIs seem to be motivated by the search of better labour cost conditions in labour-intensive sectors. This picture is supported by the growing involvement of small firms in foreign investment activity and by the growing share of FDIs taking place in low-wage countries.

Understanding the firm-specific determinants of FDIs in cheap labour countries is key to the comprehension of the degree of pervasiveness of this trend and for identifying a framework for policy intervention. The crucial question is "why do we observe some firms delocating to low wage countries, meanwhile others do not need such a strategy to maintain their competitiveness?". The next section aims at developing a conceptual framework to deal with this issue.

3. FIRM-SPECIFIC TECHNOLOGY, WORKERS' SKILLS AND PRODUCT QUALITY. A MODEL OF REDEPLOYMENT.

data underestimate the outward FDI by Italian companies, particularly by small and medium sized firms.

We propose here a model of firms' redeployment that inspires our empirical work on the Italian case. The model focus on imperfectly competitive firms deciding, in successive stages, upon the location of their plants, the quality level of their good, and the price to charge to consumers. This framework is close to that used in previous work (e.g. Barba Navaretti (1994), Motta (1994), Cordella and Grilo (1998)). However, in contrast with the oligopolistic market structure characterising previous papers, we neglect strategic interaction, relying on the "large group" Chamberlinian hypothesis. Firms are many, and their technology differ. Delocating production to locations where unskilled labour is cheap may be profitable for some firms, and not for others. The object of the model is that of selecting a restricted number of observable, firm-specific variables that may crucially affect the decision of redeploying some stages of the production process.

Consider an industry consisting of a collection of firms that produce goods which are differentiated along both a horizontal and a vertical dimension. Each firm is the exclusive owner of a particular technology *j*, giving raise to a particular product variant, indexed by *j* as well. The number of firms (technologies) operating in the industry is given, and denoted by N_i. All goods are produced out of two production factors only: skilled and unskilled labour. We consider a world consisting of two locations, denoted by *c=h,f*. Locations are big: each of them may include more than one country. We have in mind location *h* consisting of EU countries, and location *f* being a set of non-EU neighbour developing countries (e.g. East Europe, Turkey and the Maghreb). Consistently, we assume locations *h* and *f* to be characterised, respectively, by high and low wages for unskilled labour. Differences in skilled labour costs are instead considered to be negligible. We only consider firms that have their parent company in location *h.*

Firms' production process consists of two stages. In the first stage (stage 1) "raw" products are produced, and only unskilled labour is used. In the second stage (stage 2) raw products are turned into perfectly finished goods, and "quality" is added. During the execution of stage 2, both skilled and unskilled workers are required. While stage 1 is footloose, and may be located in either *h* or *f*, stage 2 requires a close monitoring, and must be executed within the parent company.

We simplify all the following analysis assuming that transport costs are null, and that all output is sold to a representative consumer, with income *R* and preferences given by[2]

$$U = \prod_{i=1}^{M} C_i^{\alpha_i} \tag{1}$$

C_i is a sub-utility index referring to goods produced in industry *i* and $\sum_{i=1}^{M} a_i = 1$. Sub-utility C_i is derived from the consumption of different varieties of good *i*. Each variety, in turn, may take different quality levels. Utility is increasing both in the extent of product differentiation (variety) and in the quality of each variant. Assuming a CES representation for preferences, and denoting by $s_{i,j}$ the quality level of each variant, we have

$$C_i = \sum_{j=1}^{N_i} \left[C_{i,j}^{q} s_{i,j}^{(1-q)} \right]^{1/q} \tag{2}$$

where $q \in (0,1)$. Note that in this formulation parameter q affects both the degree of substitution between different varieties and the "taste" for the quality of each variety. Matters are simplified by the fact that the elasticity of substitution between quantity and quality is equal to one for all varieties. The consumer problem is solved in two stages. In a first stage consumption of different goods is chosen; in a second stage, expenditure is allocated across different variants of each good. Expenditure minimisation, given C_i, leads to

$$C_{i,j} = C_i P_i^{(h-1)} p_{i,j}^{-h} s_{i,j} \tag{3}$$

[2] As long as inter-firm differences in transport costs are negligible, non-null transport costs do not affect the conclusions of the model.

where $h = \frac{1}{1-q}$ is the elasticity of substitution among varieties and $P_i = \left[\sum_{j=1}^{N_i} p_{i,j}^{1-h} s_{i,j} \right]^{1/(1-h)}$ is the CES price index of good *i*. Given the Cobb-Douglas specification for utility, it follows that

$$C_i = \frac{a_i R}{P_i} \tag{4}$$

Firms decide, in sequence, where to locate their production and marketing stages, which quality level to supply, and which price to charge to consumers. The number of firms operating in each sector is assumed to be high (large Chamberlinian groups). Consistently, strategic effects can be neglected, and h is the demand elasticity perceived by each firm.

Production costs for a firm operating in sector *i*, supplying variant *j*, and located in country *c*, *c*=*h*,*f*, are as follows[3]

$$c_{i,j} = (w_u^c + w_u^h d_{i,j}) X_{i,j} + w_s g_{i,j}^c s_{i,j}^{l_{i,j}} \tag{5}$$

where $X_{i,j}$ is output, w_u^c denotes the (hourly) wage for unskilled labour in location *c*=*h*,*f*, w_s is the wage for skilled labour, $d_{i,j}$ is the requirements of unskilled labour per unit of output in the finishing stage of production. Recall that $w_u^h > w_u^f$. The remaining symbols in (5) characterise technology, and $l_{i,j} > 1$ for all *i*,*j*. Some features of this formulation for technology must be noticed. First, variable costs are paid in terms of unskilled labour, while fixed costs consists of expenses for a staff of skilled workers. While quality does not affect marginal costs, the higher the supplied quality level, the higher the amount of skilled labour required. Second, marginal costs include a "footloose component", summarised by w_u^c, (i.e., unit labour costs in location *c*, *c*=*h*,*f*) and a "domestic component", summarised by $d_{i,j} w_u^h$. Finally, the location of

[3] Setting equal to one the unit labour requirements in stage 1 of production is without loss of generality.

stage 1 affects the technology for quality development. Carrying out stage 1 of production in location *f* yields "raw" products of a lower quality, thus requiring a more abundant amount of skilled labour to obtain the same quality level in stage 2. Consistently, in the following we assume

(6) $g^{f}_{i,j} = k g^{h}_{i,j}$, $k > 1$.

As usual we derive the equilibrium for the last stage of our game first. Firms set their price solving

(7) $$\max_{p_{i,j}} \left(p_{i,j} - w_u^c - w_u^h d_{i,j} \right) C_{i,j}(p_{i,j}, s_{i,j}) - w_s g^{c}_{i,j} s_{ij}^{l_{i,j}}$$

which yields

(8) $$p_{i,j} = \frac{h(w_u^c + w_u^h d_{i,j})}{h-1}$$

All firms charge the same mark-up over marginal costs. Firms' prices, and then sales (from (3)), depend upon firm-specific technology and the chosen location for stage 1.

As for the choice of quality levels, this is the outcome of the following problem

(9) $$\max_{s_{i,j}} \left(\frac{h(w_u^c + w_u^h d_{i,j})}{h-1} \right)^{1-h} \frac{C_i s_{i,j}}{h P_i^{1-h}} - w_s g^{c}_{i,j} s_{i,j}^{l_{i,j}}$$

whose solution is given by

(10) $$s_{i,j} = \left[\left(\frac{h(w_u^c + w_u^h d_{i,j})}{h-1} \right)^{1-h} \frac{C_i}{h\, l_{i,j} w_s g^{c}_{i,j} P_i^{1-h}} \right]^{1/(l_{i,j}-1)}$$

Quality is affected by firms' technology and the location of stage 1. Where stage 1 is located affects both the marginal cost of producing raw output, and the marginal cost of quality. On the one hand, locating stage 1 in *f* leads to lower marginal cost and higher sales *ceteris paribus*, thus raising the payoff from adding quality. On the other hand, locating stage 1 in *f* raises in a direct way the marginal cost of quality. The net effect of location on quality depends upon firm-specific technology, and in particular on parameter $l_{i,j}$, which measures the elasticity of skilled labour requirements with respect to quality.

Using (3), (8) and (10), firms' equilibrium profits are then expressed as follows

$$(11) \qquad p_{i,j}^{c} = \left[\left(\frac{h(w_u^c + w_u^h d_{i,j})}{h-1} \right)^{1-h} \frac{C_i}{hP_i^{1-h}} \right]^{l_{i,j}/(l_{i,j}-1)} \frac{(l_{i,j}-1)/l_{i,j}}{(w_s l_{i,j} g_{i,j}^{c})^{1/(l_{i,j}-1)}}$$

Again, profits depend upon the chosen location. From simple comparison of equilibrium profits we get that locating in *f* will be preferred by firm *i,j* whenever

$$(12) \qquad p_{i,j}^{f} \geq p_{i,j}^{h} \Leftrightarrow \frac{g_{i,j}^{h}}{g_{i,j}^{f}} = \frac{1}{k} \geq \left(\frac{w_u^f + w_u^h d_{i,j}}{w_u^h + w_u^h d_{i,j}} \right)^{l_{i,j}(h-1)} \equiv w_{i,j}$$

Hence,

$$\Pr ob(\textit{firm } i, j \textit{ locating in } f) = \Pr ob(p_{i,j}^{f} \geq p_{i,j}^{h}) = \Pr ob\left[w_{i,j} \leq 1/k \right]$$

The term $w_{i,j}$ as defined in (12) varies across firms only because $l_{i,j}$ is allowed to differ from one firm to another. Recall that $l_{i,j}>1$, $w_u^f / w_u^h<1$, and $k>1$. It follows that the probability of locating in *f* is monotonically increasing in $l_{i,j}$ and decreasing in $d_{i,j}$. The intuition is simple. First, the higher the percentage increase in skilled labour costs for any increase in quality ($l_{i,j}$), the lower the quality level chosen at the optimum, *at any location*. So, when $l_{i,j}$ is high, locating in *f* would entail a small negative cost impact, while still having a first order effect on sales via reduced

marginal costs. Second, the lower is $d_{i,j}$, the higher the incidence of this stage on variable costs, and then the more likely is a firm to locate stage 1 of production in a cheap labour country.

Parameters $l_{i,j}$ and the lower is $d_{i,j}$ cannot be directly observed. Other observable variables can be used as proxies exploiting equilibrium relations.

Define by $r_{i,j}$ the ratio between the number of unskilled over that of skilled workers employed in the parent company, i.e.

$$r_{i,j} = \frac{d_{i,j} X_{i,j}}{g^{c}_{i,j} s_{i,j}^{l_{i,j}}} \tag{13}$$

From equations (3), (8), and (10), at equilibrium it must be that

$$l_{i,j} = \frac{r_{i,j}\left(w_u^c + w_u^h d_{i,j}\right)}{d_{i,j}(h-1)w_s} \tag{14}$$

Denote further, by $g_{i,j}$ the ratio obtained dividing the value of "raw" output by total sales, and use (8) to obtain

$$g_{i,j} = \frac{w_u^c X_{i,j}}{p_{i,j} X_{i,j}} = \frac{(h-1)w_u^c}{h\left(w_u^c + w_u^h d_{i,j}\right)} \tag{15}$$

Using (15), equation (14) rewrites as follows

$$l_{i,j} = \frac{r_{i,j}}{h\left(1-g_{i,j}\right)-1} \tag{16}$$

From (15) and (16) it emerges that parameter $d_{i,j}$ is negatively related with $g_{i,j}$, while $l_{i,j}$ is positively related with both $r_{i,j}$ and $g_{i,j}$. Other things being equal, parameter $l_{i,j}$ is higher for those firms that are using a higher share of unskilled labour

in their home plants. This is understood recalling that high values of $l_{i,j}$ entail low quality at equilibrium, and then a little use of skilled labour. $l_{i,j}$ will be higher and $d_{i,j}$ lower the higher the share of "raw" output in total costs. This is because, at equilibrium, a high value of $l_{i,j}$ and a low value for $d_{i,j}$ are associate with low quality and therefore with a low value added from stage 2 of the production process. Overall, the value of the term $w_{i,j}$ as defined in (12) is decreasing in both $r_{i,j}$ and $g_{i,j}$, so that the probability of locating production in a low-wage country is increasing in both variables.

Turning to the empirical implementation of the model, in a cross-firm probit/logit regression, the probability of locating subsidiaries in *f* (versus the alternative of locating them in countries belonging to *h*) is expected to depend positively on:

-the ratio of unskilled/skilled workers in the parent company.

-the extent of intra-firm trade.

4. DETERMINANTS AND FEATURES OF DELOCALISATION TO LOW WAGE COUNTRIES

This section examines the time trend of employment in Italian FDIs and the firm level characteristics associated with the choice of setting up a subsidiary in a cheap labour country rather than in an industrialised one. This work is based on data collected with a survey on a sample of about 167 enterprises in the textile and clothing (T&C) and mechanical industries. These are the two sectors where Italy has a strong comparative advantage and which have re-deployed substantially.

The aim of the survey was two-fold: to gather ex-ante and ex-post figures on de-localisation and to combine data for the parent company and the subsidiary. Most of Italian foreign investments have started taking place in the early Nineties. Consequently, we collected information for 1990 and 1997. Moreover, we have collected information on the nature of the links between the parent company and the subsidiary and in particular on intra-firm trade.

The whole sample includes 167 investing and non investing firms; 41 are the investors in the textile and clothing sector, with 106 foreign affiliates in 1997, and 81 are the multinationals enterprises in the mechanic industry, with 156 affiliates abroad in 1997. From a geographical point of view, the large majority of foreign affiliates in the sample are located in cheap labour countries (CLCs)[4] (67% in textile and clothing and 57% in mechanics) (Table 4.1). Within the CLCs, Eastern European countries are the most important host area for textile investors (with 32 affiliates out of 106), while foreign affiliates in the mechanic sector are highly concentrated in the Far East (38 affiliates out of 84) and in western Europe (47 affiliates). Looking at the size of the parent companies, we find that our sample is dominated by small and medium firms, particularly in the case of new foreign investments.

Table 4.1 here

4.1 FDIs in T&C and mechanics: analysing the trend

The basic facts inspiring our analysis are shown in figures 4.1 and 4.2. Figure 4.1 reports total employment in 1990 and 1997 for the T&C and the mechanic industries and its composition between workers based in foreign affiliates and in parent companies at home. Whereas domestic employment is stable or declining over the period, foreign employment rises dramatically. The share of foreign employees jumps from 26.7% and 4%% in 1990 to 48.3% and 10.9% in 1997 for textile and mechanics respectively.

Figures 4.1 and 4.2 here

Figure 4.2 distinguishes between the growth of foreign employment due to affiliates based in cheap labour countries (CLCs) and affiliates based in industrialised countries (ICs). Growth of employment in CLCs dominates by far in both industries.

[4] We define as CLCs the following: African countries, Latin American countries and Mexico, Former USSR countries, Eastern European countries, China, India, Pakistan, Korea, Hong Kong, Singapore, Thailandia, Jordan, Turky.

For each region we also decompose the growth of employment due to affiliates which had already been established in 1990 and the one due to affiliates which had been established after 1990. The contribution of the new affiliates is dominant in both industries, besides for investments to CLCs by firms in the mechanic industry.

To examine whether the increase in employment in foreign affiliates in CLCs is a generalised and significant process across our sample, we regress the ratio between foreign employment in CLCs and domestic employment in the parent company on a time dummy. We also control for the composition of the textile sector between textile and garment producers, by including a sub-sector dummy. Garment uses a labour intensive production process and opportunities for substituting labour with capital are quite limited there. We therefore expect this sub-sector to redeploy a larger share of production. Given that the share foreign employment is zero for some of the firms, particularly in 1990, we use a Tobit specification to allow for the censored dependent variable. More formally, we run the following regression:

$$(17) \quad S_{i,t} = \beta_1 + \beta_2 T + \beta_3 D_i + \beta_4 S_{i,90} + \varepsilon_{i,t}$$

where, $S_{i,t}$ is the share of total employees in affiliates based in CLCs on employees based at headquarters for parent company i at time t , T is a time dummy which is 1 if t = 1997 and 0 if t = 1990, D_i is a sector dummy, which is 1 if i is a textile firm and 0 if i is a mechanical firm. S_{i90} is a variable controlling for the size of the firm in 1990, using total employees as a size measure. Results are reported in Table 4.2.

Table 4.2 here

We run three regressions, one for the whole sample and one for each of the two industries. We keep the sector dummy in the textile regression, to distinguish between clothing and textile firms. The time dummy is significant for both sectors with the expected sign. The sector dummy is significant for the textile sample, showing that clothing firms have a larger share of foreign employees. Given that clothing requires a labour intensive production process, this results is in line with our expectations.

The fact that the employment growth in foreign affiliates is mostly concentrated in new plants rather than in existing ones implies that re-deployment of production is a relatively new strategy. This is consistent with earlier findings which showed that up to 1992 Italian textile firms had mostly followed product strategies like high quality and the development of brand names or that they had managed to reduce production costs by increasing automation or by re-deploying production to local subcontractors. In contrast, German competitors had already out-sourced to CLCs a large share of their production processes (Barba Navaretti et al. (1994)). The same study evidenced a clear trade off between product quality and re-deployment of production, in line with the model presented here and with earlier theoretical works (e.g., Barba Navaretti (1994), Motta (1994), Cordella and Grilo (1998)).)

4.2. Firm-specific determinants of re-deployment to CLCs

We want to address empirically what are the firm-level characteristics that are associated with he choice of locating affiliates in CLCs. From our theoretical model, it emerges that FDIs are more likely to be located in CLCs if they are of a vertical type (therefore the more the investment is labour saving rather than market oriented and the larger the share of intra-firm trade the investment generates) and the lower the share of skilled employment in the parent company.

Foreign affiliates are our unit of observation; we estimate the probability that a foreign affiliate is located in a CLC rather than in an IC, against a set of characteristics of the parent company and of the subsidiary itself. Formally, we test the following regression using the Probit technique:

$$(18) \qquad P_{i,j} = \beta_1 + \beta_2 C_j + \beta_3 C_i + \varepsilon_i$$

where, $P_{i,j}$ is the probability that subsidiary i belonging to parent company j is located in a CLC, Cj is a vector of parent specific variables and Ci is a vector of subsidiary

specific factors. Results are reported in table 4.3. We run three sets of regressions: jointly for both industries and separately for the two industries

Tables 4.3

LABINT, measures the ratio between the share of affiliates employment on parent employment over the share of affiliates sales on parent sales. A higher value of LABINT is associated with those investments that are relatively more "labour-saving oriented" rather than "market oriented", relatively to the parent company's production structure, as measured by output per worker. This variable has a significant and positive sign in all regressions. So, it emerges that subsidiaries in CLCs are used to redeploy employment rather than sales. This may be due to the fact that since labour is cheaper in CLCs, the whole production process is more labour intensive there. However, a more likely interpretation is that investments in CLCs are more often of a vertical type, with only the most labour-intensive production stages taking place there.

To check whether this is the case, we look at intra-firm trade. This is measured by the share of sales from the subsidiary to the parent company on total sales of the subsidiary (Parent sales). As expected from the model, Parent sales is positive and significant when all data are pulled together and for textile. For the mechanic industry it is never significant. As a final test on how far subsidiaries based in CLCs are market oriented, we estimate the impact of the share of sales to the local market (Local sales). This variable is significant with a negative sign for textile; not significant but with the right sign for the pooled regression. It is significant with a positive sign for mechanics. These results show that textile investments in CDCs are more likely to be of a vertical type; as for mechanics, the non significance of parent sales and the significant positive sign of local sales show that also investments in CDCs are market oriented.

Finally, as for the role of skilled workers at home, we expect the ratio of white collar employment in the parent company (WHITE) to be negatively related with the probability of locating investments in CLCs. This variable has a negative and significant regression coefficient for the pooled regression and for textile, but it is not very robust

when it is used jointly with variables looking at the market orientation of the subsidiary.

In conclusion, our preliminary evidence seems to support the presumption that FDIs in CLCs are mostly of a vertical type and that, as predicted by our theoretical model, they are likely to generate more abundant intra-firm trade. The ratio of skilled employment in the parent company seems to behave as expected, even if with robustness problems. Our model appears to better predict the behaviour of firms in labour intensive sectors like textile, rather than the one of firms for which competition from cheap labour countries is not a major issue.

5. CONCLUSIONS

This paper is a preliminary analysis of the determinants and characteristics of the Italian FDI in CLCs. The paper focuses on two industries where Italy has a strong comparative advantage, textile and mechanics and it is based on new data base joining data on the parent and the affiliates.

Data from our sample show that the share of workers based in foreign subsidiaries increased very considerably between 1990 and 1997, mostly in CLCs. Recent theories on multinationals predict that investments in CLCs generally are of a vertical type and that they are driven by the need to reduce production costs and exploit cheap resources (like labour) in the host country. To understand better the firm-specific determinants of these investments we develop a theoretical model which examines the choice between producing at home and investing in a cheap labour market. The model predicts that the firm-specific trade-off between high quality products and redeployment in low-wage countries is likely to be solved in favour of redeployment for those firms that suffer from a technological disadvantage in producing quality. Investments in CLCs are expected to generate abundant intra-firm trade and to be undertaken by firms employing low shares of skilled employment in their parent companies.

We carry out some preliminary econometrics to test these predictions.

We find that subsidiaries in CLCs are mostly of a vertical type and that they have a large share of intra-firm trade with their parent companies. This evidence is particularly strong for textile. Results on the link between the choice of redeployment in low wage countries and skilled employment, are also in line with the predictions.

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Table 2.1: Geographical distribution of Italian FDI in mining and manufacturing industries

Employees of foreign affiliates

	1.1.1986 %	1.1.1990 %	1.1.1994 %	1.1.1998 %
Western Europe	36.1	47.8	40.4	36.9
Central and Eastern Europe	0.9	1.5	17.2	16.9
North America	13.5	14.3	10.6	10.0
Latin America	27.1	19.4	15.8	17.0
Pacific Area	11.2	10.3	11.0	14.0
Africa	11.3	6.7	5.0	5.2
TOTAL	100.0	100.0	100.0	100.0
Total employees	244188	435690	578294	606266

Source: database Reprint in Cominotti-Mariotti - Mutinelli (1999)

Table 2.2: Sectoral composition of Italian FDI in mining and manufacturing industries

Employees of foreign affiliates

	1.1.1986	1.1.1990	1.1.1994	1.1.1998
	%	%	%	%
Science-based	9.8	12.4	9.0	9.1
Specialised suppliers	7.3	5.5	9.9	10.1
Scale-intensive	75.0	68.6	65.3	65.2
Traditional	7.9	13.5	15.8	15.7
TOTAL	100.0	100.0	100.0	100.0
Total employees	244188	435690	578294	606266

Source: database Reprint in Cominotti-Mariotti - Mutinelli (1999)

Table 4.1: Geographical distribution of Italian investment in textile/clothing and mechanic industry

Number of foreign affiliates

	Textile and clothing		Mechanic	
	Number	%	Number	%
Western Europe	29	27.36	47	30.13
Central and Eastern Europe	32	30.19	21	13.46
North America	5	4.72	21	13.46
Latin America	5	4.72	21	13.46
Asia	14	13.21	39	25.00
Africa	15	14.15	6	3.85
Other	6	5.66	1	0.64
TOTAL	106	100	156	100

Source: sample data

Table 4.2: Tobit Regressions by Sectors

Tobit model: dependent variable = ratio of employees in affiliates located in LDC to total emplyed in the parent firm

	Mechanical and Textile	Mechanical	Textile
Number of Observations	144	76	68
Constant	-1.115***	-0.417	-2.59***
	(-2.586)	*(-1.014)*	*(-2.649)*
Tdummy	0.663***	0.626***	0.624*
	(3.197)	*(2.687)*	*(1.909)*
Lad90	0.030	-0.076	0.195
	(0.437)	*(-1.067)*	*(1.503)*
Dset	0.522		
	(0.272)		
Dsubsec			0.838**
			(2.375)
Pseudo-R^2	0.0652	0.1084	0.1377
Log-Likelihood	-89.037	-42.105	-40.643

Source: sample data

Legend

Tdummy:	1 if year = 1997; 0 if year = 1997
Lad90:	Log (Parent company's employees in 1990)
Dset:	1 if sector = Textile; 0 if sector= Mechanical
Dsubsec:	1 if subsector = Garment; 0 if sector = Textile

Table 4.3: Probit Regressions by Sectors

Dependent Variable = 1 if the subsidiary is located in a CLC country, 0 if it is located in an industrialised country.

	Mechanical and Textile Sector			Textile Sector			Mechanical Sector		
	EQ1	EQ2	EQ3	EQ1	EQ2	EQ3	EQ1	EQ2	EQ3
Number of Observations	105	85	85	48	49	49	54	43	43
Constant	0.283	0.757	0.835	0.533	-2.230***	0.846	-0.517	-1.005	-2.839**
	(0.671)	*(0.138)*	*(1.431)*	*(0.724)*	*(-2.621)*	*(0.760)*	*(-0.829)*	*(-1.273)*	*(-2.135)*
Dset	-0.649*	-0.811*	-0.597						
	(-1.894)	*(-1.877)*	*(-1.456)*						
Labint	0,796***	0,968***	0,942***	0.836***	1.067**	2.695*	1.022***	0.944***	1.097***
	(5.574)	*(4.534)*	*(4.763)*	*(3.624)*	*(2.077)*	*(1.869)*	(4.266)	(3.582)	*(3,596)*
Local Sales			-0,008			-0.644**			0.200*
			(-1.501)			*(-2.275)*			*(1.679)*
Parent sales		0,171**			0.044**			-0.003	
		(2.309)			*(2.084)*			*(-0.229)*	
White	-1,718**	-1,733	-1,722	-4.611***			-0.200	1.132	1.306
	(-2.065)	*(-1.555)*	*(-1.545)*	*(-3.059)*			*(-0.160)*	*(0.704)*	*(0.795)*
Dsubsec				0.491	0.437	0.749			
				(0.955)	*(0.734)*	*(1.043)*			
Pseudo-R^2	0.3581	0.4867	0.4508	0.4604	0.5794	0.7261	0.484	0.494	0.5582
Log-Likelihood	-45.091	-28.624	-30.915	-16.836	-12.329	-8.030	-19.013	-14.789	-13.04

Source: sample data

Legend

Labint =log(adco/adcm)/(fatco/fatcm)
where

where
adco = affiliate's employees;
adcm = parent company's employees;
fatco = affiliate's sales;
fatcm = parent company's sales

Parent Sales: Share of sales of subsidiary to the parent company on total sale of the subsidiary

White: Share of white collar workers on total workers of parent company

Local Sales: Share of sales of subsidiary in the host country market on total sale of the subsidiary

Dset: 1 if sector = Textile; 0 if sector= Mechanical

Dsubsec: 1 if subsector = Garment; 0 if sector = Textile

Fig. 4.1 Employment Growth in Foreign Affiliates: Textile and Mechanical Sector

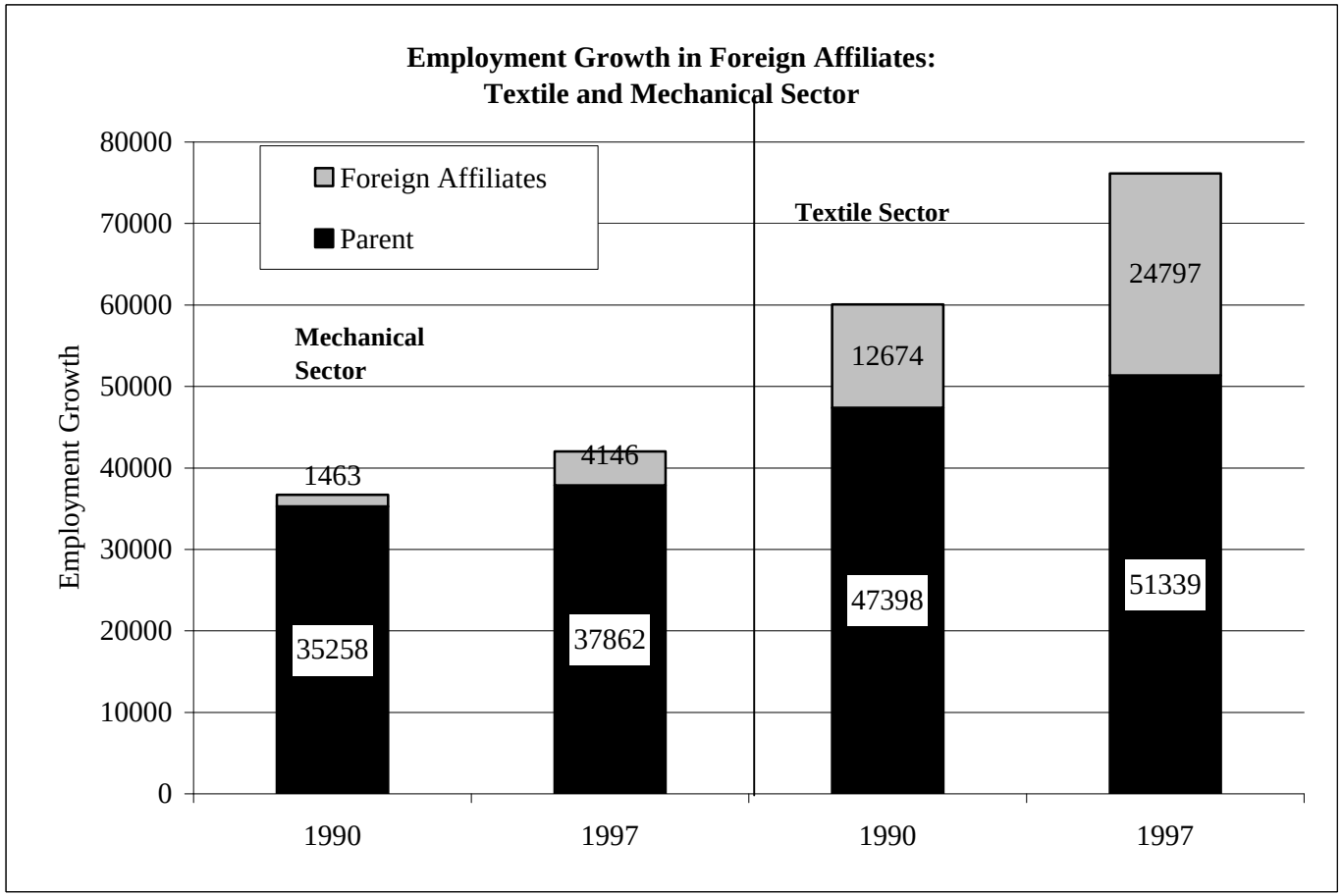

Fig. 4.2a Employment Growth in Foreign Affiliates - Textile Sector

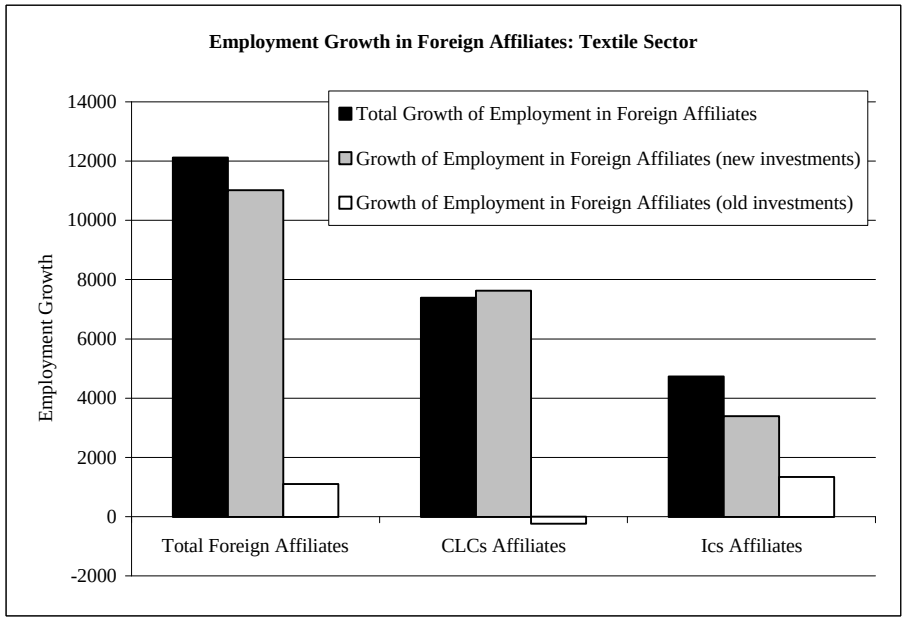

Fig. 4.2b Employment Growth in Foreign Affiliates - Mechanical Sector