Fear of Relocation? Assessing the Impact of Italy's FDI on Local Employment *

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Abstract

Using data from *Ufficio Italiano dei Cambi* and *Istituto Nazionale di Statistica*, we empirically assess the impact of Italy's outward foreign direct investment (FDI) on local employment growth between 1996 and 2001 for 12 manufacturing industries. We find that FDI towards advanced countries is associated with faster local employment growth, relatively to the national industry average. Local areas whose firms invest more towards developing countries show instead an employment performance in line with the national industry average; only for two industries the relationship turns out to be negative.

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1 Introduction

As an increasing number of firms expands operations abroad, there are many fears that domestic jobs are being exported to foreign countries. The relocation of labor-intensive activities towards low-wage developing countries is often evoked in the public debate as a major determinant of job losses at home, at the expenses of unskilled labor. Foreign Direct Investment (FDI) towards advanced economies could also negatively affect domestic employment, as firms choose to serve foreign markets by local production rather than by exports from the home country. There could even be a dynamic effect through which FDI indirectly determines lower employment, as in the model of Basevi and Ottaviano (2002), where firms' relocation abroad implies lower externalities and a higher cost of innovation at home: the domestic location will therefore become less attractive to new firms, ending up with an amount of firms and employment smaller than the optimum.

At a closer analysis, however, the effects of FDI on home-country employment appear to be less clear-cut. First of all, there is not necessarily a perfect investment-substitution between the home and the foreign country: firms may invest abroad in order to diversify or expand in foreign markets, without reducing at the same time the domestic capital stock.[1] Second, FDI, through lower operating costs or improved access to distant markets, may be the only way to expand firms' scale of output: in other words, FDI amounts to pick an investment opportunity that otherwise would have been taken by other competitors. Finally, co-ordinating and supervising the activities of foreign affiliates may require more labor in the home-based headquarters.

Since theoretical predictions about the effects of FDI on employment vary greatly, it is very useful to address the question at an empirical level. So far, the literature has focused on multinational companies, looking mainly at how parent employment responds to changes in foreign affiliate's wages (Brainard and Riker, 1997, Braconier and Ekholm, 2000, Konings and Murphy, 2001). However, as convincingly argued in Barba Navaretti,

[1]However, if there are constraints on the firm's ability to finance its projects, the funds used for the FDI may be in competition with funds needed for domestic investment.

Venables et al. (2004), the results of these studies are conditional on the multinational having already invested abroad. In other words, this approach is not able to deal with the potential substitution effect which takes place when a company moves production activities away from home for the first time. Another important limitation is that it ignores the external effects of FDI on non-multinational companies, such as local suppliers.

In this paper, we tackle the issue from a different perspective, focusing on the effects of FDI with respect to the whole local area. Our contention is that investing abroad might have important consequences not only on the performance of multinational firms but on that of the whole local area, because pecuniary and technological externalities may play a role. In other words, home local suppliers and home local labor market are likely to be influenced through market and non-market interactions descending from outward FDI. The fine level of spatial disaggregation used in our work to assess these effects is appropriate for our purposes.

We employ a suitable adaptation of employment growth regressions commonly used in the literature dealing with agglomeration economies (Glaeser, Kallal, Scheinkman, and Shleifer, 1992, Henderson, Kuncoro, and Turner, 1995, and Combes, 2000). Using data by local areas and industry, this method estimates whether changes in employment levels are associated with various features of the local industrial structure (specialization, variety, average firms' size, etc.). We modify the standard regression adding a measure related to FDI, so that we explain employment dynamics also as the outcome of the decision to invest abroad.

To this end, we use an innovative database coming from *Ufficio Italiano dei Cambi* (UIC), which provides information on Italy's FDI outflows not only by industry and destination country but also by the local area of origin. Another advantage of the data is that they cover a wide range of equity-type internationalization of production, including greenfield investments and foreign takeovers. This database is then matched with two waves of the *Censimento dell'Industria e dei Servizi* by *Istituto Nazionale di Statistica* (Istat), from which we derive the local employment growth as well as the set of variables describing

the industrial structure. In this way, we can test the direct effect of FDI on changes in employment over the period 1996 - 2001, for 12 manufacturing industries and 103 Italian local areas. As in previous literature, we concentrate on manufacturing because concerns about jobs losses in that sector have been widespread.

Our estimates indicate that the effects on local employment crucially depend on the destination of FDI. Specifically, we find that FDI towards advanced countries is positively associated with local employment growth. Local areas whose firms invest more towards developing countries show instead an employment performance in line with the national industry average; the relationship turns out to be negative only in two industries (plastic and rubber products, other manufacturing products).

The rest of the paper is structured as follows. The next section reviews the empirical literature, while section 3 presents the data. The econometric specification is described in the following section, and the results are illustrated in section 5. Section 6 concludes.

2 Related literature

One of the first empirical assessments of the effect of FDI on employment was made by Brainard and Riker (1997), who estimate an equation of U.S. multinationals labor demand across different plant locations. The coefficients on cross-elasticity of substitution provide then information on whether foreign affiliate labor is complement or substitute to parent labor. They find that the cross-elasticity between the parents and the affiliates is less than one, implying only partial substitution. Substitution between affiliates in different countries is instead markedly higher, especially for low value-added industries and for affiliates located in countries with similar levels of development. They conclude that labor in the U.S. does compete only at the margin with labor abroad, and that employment shifting takes place predominantly between foreign affiliates in less developed countries. Other studies based on the same methodology find similar results: contrary to conventional wisdom, employment in foreign affiliates located in low-wage countries

appears to be complementary to home employment, while there is substitution between the latter and employment in advanced countries.[2] As mentioned earlier, this literature does not assess the impact of investments abroad made for the first time.

A different approach is taken by Barba Navaretti and Castellani (2004), who compare the employment performance of firms investing abroad for the first time with an appropriate counterfactual of national firms. Using data on Italian companies, they find that becoming a multinational firm has no significant effect on employment performance, while it is associated with a better performance in terms of output and total factor productivity growth. This work does not distinguish across investment destination countries, which may significantly influence its effect on employment.

Our work is also related to other two strands of literature. One looks at the effects of FDI on the labor intensity of home-country production, showing that they depend not only on the location of the affiliates, but also on certain structural features of the home country. As outlined by Blomstrom, Fors and Lipsey (1997), for instance, larger affiliate production implies a lower labor intensity in the U.S., while the opposite is observed for Sweden. This difference presumably reflects different investment strategies, with US firms allocating production activities across countries in order to exploit factor price differences, and Swedish affiliates more engaged in selling to local customers.[3]

The other branch of the literature focuses on the skill composition of domestic employment. Using various measures of affiliate activity, Slaughter (2000) finds that they do not appear to influence the share of non-production worker wages in the total wage bills

[2]See Braconier and Ekholm (2000) on Swedish multinationals, and Konings and Murphy (2001) on European multinationals and their affiliates located in former EU-15 countries and in Eastern Europe. In another work, Bruno and Falzoni (2003) employ U.S. industry-level data.

[3]Lipsey, Ramstetter and Blomstrom (2000) extend the analysis to Japan, finding a higher labor intensity in parent companies doing more FDI. Looking at Italian regions, Mariotti, Mutinelli and Piscitello (2000) show that larger employment in affiliates located in developing countries is associated with lower labor intensity at home, consistently with the allocation of labor-intensive activities to low-wage countries; the opposite effect is observed for affiliates located in advanced economies.

of 32 US manufacturing industries. Replicating his industry-level estimates with data on Japanese firms, Head and Ries (2002) obtain similar results. However, once they move to a firm-level analysis, higher affiliate employment implies a higher non-production worker wage share in the parent firm. There are also differences depending on the destination of FDI: the positive effect is associated with affiliate employment in low-wage countries, while more employment in the US appears to have the opposite effect.

3 Description of the data

Our data come from two sources. The first is the Italian Census of Industrial and Services Sectors, *Censimento dell'Industria e dei Servizi*, carried out by Istat. We use the two most recent waves, relative to 1996 (intermediate census) and 2001. Data on employment and on the number of plants and firms are provided at a very fine level of disaggregation (in terms of local labor system as well as industry classification). To match our data on FDI, which are only available on a less detailed basis, we aggregate Istat data up to 103 spatial units (administrative provinces) and 12 manufacturing industries.[4] For each of them, we compute the employment variation at the national level between 1996 and 2001 in Table 2. It is important to remind that census data cover the universe of Italian plants, including smaller units, which were instead often unavailable in many previous studies: in Combes (2000), for instance, only plants with at least 20 workers were included.

The second source is a database provided by the UIC, which collects FDI data in order to produce Italy's balance of payments statistics. It includes the outward FDI flows by industry, source province and destination country, for the period 1997-2001. Moreover the distinction between investment (acquisition of foreign activities by Italian residents) and divestments (selling of foreign activities by Italian residents) is available. Thanks to the information on the source province and industry, we may estimate whether and in which direction higher levels of FDI do influence local employment. The detail on the destination countries is particularly useful since it allows us to distinguish between FDI

[4]See Appendix 7.1 for the list of manufacturing industries.

towards advanced and developing economies, where the motivation behind the investment, and consequently its effects on home employment, can differ in many respects.

According to the IMF (1993) guidelines, foreign transactions by Italian residents are included in the FDI category when the they reflect "the objective of a resident entity in one economy obtaining a lasting interest in an enterprise resident in another economy". In practice, in all the advanced countries, including Italy, the lasting interest is identified on the basis of the 10 per cent threshold: if the investor has more than 10 per cent of the shares (or voting rights) of a foreign company, it will be classified as FDI, otherwise it will be a portfolio investment. FDI is made up of three components: the affiliate company's shares held by the parent; loans from the parent to the affiliate; affiliate's earnings reinvested abroad. This distinction is however not available in our database.[5]

Although quite common in the empirical literature on FDI, the use of balance of payments data faces a number of problems (Lipsey, 2001). First, they do not include FDI that are financed on foreign capital markets (if, for instance, the foreign affiliate raises money on the local market by issuing a bond or through an IPO). Second, the balance of payments statistics tend to systematically underestimate the value of the assets held abroad, presumably as a consequence of tax-avoiding behaviors. Looking at the case of Italy, Committeri (1999) finds indeed that actual foreign assets are larger than those appearing in the official data, although the discrepancy is not too wide. Third, for each transaction, FDI data generally report only the immediate recipient, which however may not coincide with the ultimate recipient: for instance, if an Italian company wants to build a plant in Brazil, but the money is first sent to a holding located in Luxembourg and only afterwards goes to Brazil, FDI data will report only the first step of this chain of

[5]Data collection is mainly based on mandatory reports, compiled by Italian banks, on their customers's monthly transactions with foreign counterparts. To extend the coverage to transactions carried out through foreign banks, there is also an obligation, on all resident entities, including therefore all companies, to report foreign transactions above a given threshold (equal to approximately 10,000 euro until 2001, and 12,500 afterwards). Finally, reinvested earnings are estimated on the basis of annual surveys of companies with foreign affiliates (Banca d'Italia and Ufficio Italiano dei Cambi, 2004).

transactions (from Italy to Luxembourg). While these problems may be very important in theory, in practice they have a minor relevance. The distribution of FDI data is, under many respects, is remarkably similar to that of foreign affiliates of Italian companies. Analogous evidence is found for Japan.[6]

Table 1 shows, for each Italian region, its share on total FDI, as well as FDI towards advanced, developing and "small" countries. Among the latter, we included all those countries (typically very small-sized and with a favorable tax legislation) where FDI are not presumably related to production investments in the country itself (the list is provided in Appendix 7.2). In terms of FDI, however, their incidence appears to be small, being less than 10 per cent of total flows. Analogously to previous results in the literature, a large majority of FDI goes towards advanced economies, while the share of developing countries is much smaller.

The last column of Table 1 reports the absolute change in the regional employment between 1996 and 2001, allowing us to gather some preliminary evidence on the home-country effects of FDI. The two regions with the largest levels of FDI (Piemonte and Lombardia) are also those with the strongest decrease in employment levels. Other large regions, such as Veneto and Emilia-Romagna, having instead a lower share in terms of

[6]Federico (2005) compares UIC data with the Reprint database (Cominotti, Mariotti, Mutinelli, and Piscitello, 2002), which provides information on the foreign affiliates of many Italian companies and is the most complete alternative source on the subject. Overall, however, the correlation between the sum of flows of FDI from 1997 to 2001 and the stock of foreign affiliates' employment in 2000, across nine industries and six destination areas, is quite high (0.70); similar results are obtained when one industry is dropped at a time, meaning that the correlation is not driven by a single industry. Furthermore, when looking at the provenance of foreign activities, both sources point to the same picture: around three-quarters of FDI come from the North-West of Italy, whose share in terms of foreign employment, according to Reprint, is only slightly smaller. Looking at the correlation between cumulative sums of FDI flows and overseas employment for Japanese manufacturing firms over the period 1976-1989, Head and Ries (2002, p. 88, footnote 4) find a correlation coefficient of the two time series of 0.92: this result confirms that there is a strong relationship between FDI and employment data regarding internationalization of production activities.

FDI, are among the group of regions with the best employment performance. While these data seem to point to a negative relationship between FDI and employment, the picture becomes more blurred once we look at data by industry (Table 2). In the Textiles, apparel, and leather industry, where jobs losses were above 100,000 persons, FDI flows represent only a tiny share of total manufacturing flows. Among the three industries with higher levels of FDI (Office equipment and computers; Industrial machinery; Transport vehicles), only in the latter employment actually fell, while the first recorded a marked growth. To clarify the issue, we need to carry a more sophisticated analysis, whose methodology is presented in the next section.

4 Methodology and econometric specification

Our econometric analysis is based on an employment growth regression, which has been widely used in the empirical literature on agglomeration economies. The traditional equation is modified by adding a measure of FDI among the explanatory variables. The unit of analysis is province-industry (P-I hereafter). We acknowledge that this specification is not explicitly derived from micro-foundations; it mainly aims at controlling for those historical industrial structure variables that the literature on agglomeration has shown to significantly affect employment. We are also aware that, as Cingano and Schivardi (2004) persuasively show, the results of an employment growth regression with respect to local industrial structure variables cannot be strictly interpreted as evidence of dynamic externalities. However, our interest lies more in understanding the effect of FDI on employment than in verifying competing theories of agglomeration.

As to the unit of analysis, the use of province-industry is dictated by the unavailability of FDI data with a deeper detail, and it is less accurate than previous works in the agglomeration literature, which has generally employed finer spatial levels of aggregation such as local labor systems. The main advantages of working with local labor systems are twofold: first, their larger number yields more degrees of freedom;[7] second, being identified

[7]Italy is divided into 784 local labor systems, and 103 provinces.

on the basis of workers' daily mobility, they are, by construction, more homogenous in terms of local industrial structure. Aggregating over space, we may therefore lose some precision in the estimation, because the change in employment as well as the other variables are averaged over a greater and less homogeneous area. However, we are confident that our choice of P-I should not have a major impact on our results, which, as we will show below, are in line with previous empirical findings as far as local industrial structure is concerned.

Following Combes (2000), the dependent variable is the difference between the employment growth rate of industry i in province p between 1996 and 2001 and the national employment growth rate in the same industry. Approximating growth rates with logarithms, the dependent variable is

$$y_{p,i} = \log\left(\frac{L_{p,i,2001}}{L_{p,i,1996}}\right) - \log\left(\frac{L_{i,2001}}{L_{i,1996}}\right)$$

where $L_{p,i}$ is employment in province p and industry i, and L_i is total Italian employment in industry i. Measuring the local employment growth rate in deviation from the national rate we aim at controlling for all the factors affecting Italian employment performance as a whole. These factors are related to variables such as comparative dis/advantage of foreign countries in some industries with respect to Italy, but since our analysis focuses on the local determinants of employment growth we are interested only in deviations from the national average.

The following variables, describing local industrial structure, are taken at their 1996 values. All the regressors are normalized to the national industry average.

First, for each province-industry, we consider a measure of specialization of production in a given industry, computed as follows:

$$\text{spec}_{p,i} = \frac{L_{p,i}/L_p}{L_i/L}$$

where L_p is total manufacturing employment in province p, and L is total manufacturing employment in Italy.

Second, in order to capture the effect of local variety of production in the manufacturing industries other than the one i under scrutiny, we introduce a Hirschman-Herfindahl type index, as in Henderson et al. (1995), measuring the degree of concentration of production in the $j \neq i$ industries in the local area. Actually we compute the inverse of such an index, so that, for each P-I, higher values indicate higher diversity (less concentration) of the surrounding industrial environment:

$$\text{div}_{p,i} = \sum_{j \neq i} \left(\frac{L_j}{L - L_i} \right)^2 \Bigg/ \sum_{j \neq i} \left(\frac{L_{p,j}}{L_p - L_{p,i}} \right)^2$$

We then consider a variable concerning the effect of the scale of production in P-I, computing the average plant size:

$$\text{size}_{p,i} = \frac{L_{p,i}/n_{p,i}}{L_i/n_i}$$

where $n_{p,i}$ is the number of plants in the P-I, and n_i is the total number of plants in Italy in industry i.

A first measure to capture the intensity of investments abroad could be to divide the sum of FDI flows in the 1997-2000 period[8] by the corresponding industry value at the national level:

$$\text{fdishare}_{p,i} = \frac{\sum_t \text{FDI}_{p,i,t}}{\sum_p \sum_t \text{FDI}_{p,i,t}} \tag{1}$$

where t are years (1997, 1998, 1999, 2000).

As we measure FDI as absolute share on the national total, however, we carry the risk of underestimating the effect of FDI on small P-Is: potentially significant employment

[8] We sum FDI flows over the years 1997-2000 on the basis of two different considerations. First, we do not have data for 1996, as the series only starts in 1997: this exclusion should have minor consequences, given that 1996 FDI flows represent only 12.2 per cent of 1996-2000 FDI flows (detailed aggregate statistics on the amount of FDI are available from the *Relazione del Governatore* annually published by the Banca d'Italia). Second, we deliberately choose to exclude FDI flows relative to 2001, because the figures on employment for 2001, measured by Istat with reference to 22nd October of that year, were unlikely affected by FDI flows taking place in 2001 itself. In Appendix 7.3 we show how the numerator of (1) and $\text{FDI}_{p,i,t}$ for each year are distributed.

growth variations in small local areas would be then associated to small values of (1). By the same line of reasoning, employment growth variations in those (large) P-Is responsible for the highest shares of FDI, will be given more weight. This is confirmed by the strong correlation between $\text{fdishare}_{p,i}$, and total employment in each P-I, $L_{p,i}$ (Table 3).

Our measure of FDI is therefore obtained dividing the share of foreign investments of each p, i in the national total for the analogous share in terms of employment in 1996:

$$\text{fdipro}_{p,i} = \frac{\sum_t \text{FDI}_{p,i,t}}{\sum_p \sum_t \text{FDI}_{p,i,t}} \Bigg/ \frac{L_{p,i}}{L_i} = \frac{1}{L_{p,i}} \sum_t \text{FDI}_{p,i,t} \Bigg/ \frac{1}{L_i} \sum_p \sum_t \text{FDI}_{p,i,t} \qquad (2)$$

We believe that this variable correctly measure the propensity to invest abroad, as it controls for the absolute size of the P-I. Notice also that this is equivalent to compute the ratio between FDI per employee in the P-I and FDI per employee in the national industry total. Values of $\text{fdipro}_{p,i}$ greater than one indicate that FDI per employee in the P-I is larger than the national average in the same industry; if they are less than one, FDI propensity is smaller than the corresponding Italian value.

Finally, using a measure of FDI propensity we also manage to reduce the potentially important issue of collinearity with the other regressors, as shown in Table 3[9]. The correlation of FDI with firms' average size can be explained in the following way. According to Helpman, Melitz, and Yeaple (2004), firms' productivity distribution in a given industry influences foreign affiliates' employment in two ways. In a first instance, only firms characterized by higher productivity establish plants abroad. In a second instance, the size of domestic *as well as* foreign plants belonging to multinationals is proportional to productivity itself. Our measure of FDI propensity is a remedy for the latter type of productivity-induced correlation between domestic size and foreign activities, but does not solve the first type of correlation (the one partitioning firms into a set not making FDI and a set making it according to productivity, as proxied by the size distribution),

[9]When computing pairwise correlations for the propensity index to invest abroad we dropped an outlier, a P-I that made an extraordinary investment relatively to its employment level and national average in that sector. Including that outlier correlations of the propensity index with other regressors would have been even lower.

because the relation is clearly not linear[10].

Finally, we add to the regression a set $\mathbf{X_p}$ of spatial controls, i.e. dummy variables for the 103 provinces, in order to control for area fixed effects (geographical position, local institutions, transport infrastructures, etc.) affecting employment growth at the local level.

The equation to be estimated is therefore the following semilog expression:

$$y_{p,i} = \alpha_0 + \alpha_1 \text{fdipro}_{p,i} + \alpha_2 \ln(\text{div}_{p,i}) + \alpha_3 \ln(\text{spec}_{p,i}) + \alpha_4 \ln(\text{size}_{p,i}) + \alpha_{\mathbf{5}} \mathbf{X_p} + u_{p,i} \quad (3)$$

where $u_{p,i}$ is a random error, assumed to be normal and i.i.d., and $\alpha_{\mathbf{5}}$ is the vector of the coefficients on the dummy variables.

An important issue is related to the estimation technique. We estimate equation (3) through OLS. This only represents a first approach. We recognize that more elaborated estimation techniques (and possibly more data) may be needed in order to deal with issues such as endogeneity of variables that could arise in our context. Namely, this would be the case if both employment performance at the firm (and consequently aggregate) level and FDI be determined by firms' productivity. In particular, if higher productivity is conducive to a better employment performance and higher levels of FDI, the OLS would overestimate the effect of FDI.

5 Results

The results of the first set of estimates of equation (3) are presented in Table 4. We have data for 1207 out of the 1236 observations that would result as a combination of 103 provinces and 12 industries; we are forced to drop 28 observations with zero employment in

[10]The causal link we have just described, going from productivity to the size of foreign affiliates, applies to investments to advanced countries, called horizontal FDI, made to replicate in the foreign economy the production of some final good. To the best of our knowledge there are no works in the literature linking firms' productivity and investments to developing countries of the vertical type, made to establish abroad just few intermediate steps of the production process. Further research efforts are needed in this area to deepen our understanding of how to deal with vertical FDI.

either 1996 or 2001 and one outlier. In order to check that our estimates of the FDI effect are not influenced by collinearity, we introduce the regressors one by one. FDI appears to have a positive and statistically significant effect on local employment, suggesting that, relatively to the national industry average, local areas whose firms invest more abroad have a better employment performance. This result holds in all the specifications, and the coefficient tends to be constant (between 0.014 and 0.017), so that it does not seem to be affected when we progressively add the other regressors.

As regards the other independent variables, we find that higher specialization affects negatively employment, in line with Combes (2000). Employment growth is instead significantly higher in environments with larger products' variety. This fact is in contrast with previous findings in the literature, that found a negative effect of diversity on industrial sectors' employment growth, and may be due to the spatial aggregation unit employed in this paper, considerably more aggregated than the spatial unit employed in other studies[11] or to the considerably shorter time span we observe in our regression (only 5 years). Our data support the idea that sectors located in more diversified provinces had higher growth rates over the period 1996-2001, while more specialized provinces lagged behind. In accordance with previous literature, a smaller average plant size benefits growth. As outlined in Combes (2000), this may simply reflect a life cycle story: newly-born firms are smaller and they grow faster.

The empirical literature suggests that the degree of labor substitution induced by FDI may differ even widely between advanced and developing countries. It is therefore quite important to take into account the destination of Italy's FDI. Thanks to the UIC data, which include details by country receiving the investment, in the last two columns of Table 4 we are able to replace the world FDI variable with the value it takes including only investments directed to advanced and developing countries.[12] We find that the positive

[11]The spatial unit generally used in the literature on agglomeration in Europe is the local labor system of employment, a finer measure than provinces. Henderson et al. (1995) focus on the U.S., with data available for 224 Metropolitan Statistical Areas (MSAs), a spatial unit that can be thought to match more closely administrative provinces in Italy.

[12]We exclude FDI towards "small" countries, as we do not have any prior about their effect on em-

effect of FDI is concentrated in advanced countries, while there appears to be no significant effect in the case of FDI towards developing countries. Various factors may explain our findings. FDI to advanced countries could improve firms' access to rich markets, allowing therefore to expand the scale of their output. The need for intermediate goods to be used by the foreign affiliates may boost imports from the parent company. Supervision and coordination activities in the headquarters may also be required as the amount of FDI grows. In the case of FDI towards developing countries, positive effects could be offset by some labor substitution.

We can also get an idea of the quantitative impact of FDI towards advanced countries. On the basis of the specification in column [3], the magnitude of the coefficient can be be interpreted as follows: an increase by one in $\text{fdipro}_{p,i}$ (equal to the national average FDI per employee) implies, ceteris paribus, a 1.1% faster employment growth rate over a five-year period, relatively to the national industry average. In other words, employment in a P-I whose FDI propensity is double than the industry average (ie. its share in terms of FDI is double relatively to the corresponding share in terms of employment) grows 1.1% quicker than a P-I whose FDI propensity is in line with the national industry average.

Sectoral specificities in the relationship between FDI and employment could be hidden under the cross-industries regression of equation (3). To capture effects in single industries we have built interaction variables between the FDI variable and industries' dummies. The model to be estimated is then modified in the following way:

$$y_{p,i} = \alpha_0 + \alpha_1 \text{fdipro}_{p,i} + \overline{\delta}_1 \mathbf{D_i} \text{fdipro}_{p,i} + \alpha_2 \ln(\text{div}_{p,i}) + \alpha_3 \ln(\text{spec}_{p,i}) + \alpha_4 \ln(\text{size}_{p,i}) + \overline{\alpha}_5 \mathbf{X_p} + u_{p,i}$$

with $\overline{\delta}_1$ the vector of coefficients on the interaction terms, and $\mathbf{D_i}$ sectoral dummies.[13]

Considering FDI to advanced countries, the coefficient on the interaction variable is positive and significant for two industries only (non-metallic products and paper and

ployment; consider, furthermore, that investments directed to those countries are often not intended for production.

[13]To avoid perfect collinearity, one sectoral dummy must be dropped each time the regression is performed. In the first run of the regression we dropped the dummy for non-metallic mineral products. To obtain an estimate for this sector as well, in a second run we dropped metallic products.

printing), suggesting that for them the positive impact of FDI is bigger than the main effect common to all industries. Turning to investments to developing countries, the interaction between FDI and industry dummies is positive and significant for paper and printing, while it is negative and significant for plastic and rubber products and for the other manufacturing products category. Performing a F-test on the linear restriction $\alpha_1 + \delta_{1,i} = 0$, where $\delta_{1,i}$ is the coefficient on the interaction term for industry i, we assess if the overall impact of investments abroad for a specific industry is significantly different from zero. The only restrictions to be significantly smaller than zero are those for plastic and rubber products and other manufacturing products (a category including sectors such as toys, furniture, sportswear). The only evidence about a negative impact of relocation concerns these two industries.

5.1 Sensitivity analysis

Our results are robust to a series of sensitivity tests. First, we drop some observations in the tails of the distribution of the dependent variable. We eliminate the observations belonging to the first 2 percentiles and last 2 percentiles of the distribution. The first three columns of Table 5 show that this does not affect our results, pointing to a significantly positive effect of FDI to advanced countries. Similar results are obtained using different thresholds (1 or 5 percentiles). The only variable to become insignificant is specialization, meaning that the local areas who experienced the worst performance, those concentrated in the first 2 percentiles of the distribution, were all highly specialized in a certain industry.

In the next two columns we analyze only those P-Is making positive investments abroad[14] and find that the results are unchanged. This amounts to saying that the positive effect on FDI to advanced countries is not to be attributed merely to the partitioning of P-Is between a set making positive FDI and a set with zero FDI but also descends from the intensity of investments abroad.

Replacing FDI propensity with FDI share, the findings are robust to the new specifica-

[14] In this case we take the logarithm of the FDI propensity variable.

tion of the FDI variable. We have a positive and significant effect on local employment of FDI, due to foreign investment in advanced countries. There is still evidence of a positive relationship between FDI and employment performance even when we exclude the P-Is with the largest values of FDI (generally concentrated in big cities such as Milan and Turin).

Finally, in order to check that results are not influenced by industries with small absolute values of FDI at the national level,[15] we have replicated the estimates without the following industries: metal products, non-metallic mineral products, and plastic and rubber products, which together only account for 8.5 per cent of total manufacturing FDI. The results remain unchanged.

5.2 FDI to the new EU Member States

This section focuses on the employment effects deriving from FDI to the new EU Member States from Central and Eastern Europe (NMS).[16] Fears about jobs losses caused by relocation towards these countries have been particularly widespread in the public debate. The first remark to be made is that FDI flows to this group of countries, although increasing over the last few years and relevant in terms of those countries' GDP or capital expenditure, represent a tiny share of world FDI flows. Our data, relative to the manufacturing FDI flows over the period 1997-2000, show that only 1.2 per cent went to the NMS. Similar results are obtained for other countries: for instance, UNCTAD (2004, p. 302) estimates that in 2002 only 3.7 per cent of the world FDI stock for manufacturing sectors was held by Central and Eastern European countries (which includes the NMS as well as other countries such as Bulgaria, Romania, the Russian Federation, etc.).

Building the FDI variable along the same lines as before, we obtain the results reported in the first column of Table 6, where the whole set of P-Is is considered. As with FDI to developing countries, the coefficient on the FDI measure is not significant. In the next two columns we include only P-Is with positive FDI towards the NMS. Since their number is

[15] Remember that all variables, including FDI, are normalized to the industry-wide Italian average.

[16] Out of the ten countries which entered the EU in May 2004, only Cyprus and Malta are left aside.

small, we are obliged to reduce our set of spatial controls in order to preserve sufficient degrees of freedom. Columns [2] and [3] therefore report the results with no spatial control and regional dummies respectively. In both cases, the coefficient is negative but is not significant. We conclude that there is no evidence of a significant effect of FDI to the NMS on local employment growth.

5.3 How do FDI influence firms' overall employment?

So far we made the implicit assumption that the effects of FDI on employment are restricted to the local area (and to the local firms) where multinational companies are headquartered. In this way we just measure the labor substitution effects in plants located in the same province of the headquarters. However, if multinational firms have establishments located in other provinces of Italy, one could expect that they also may be affected by FDI, in either directions: plants may be closed and production moved abroad, or they may benefit from the stronger competitiveness of the multinational firm. Fortunately, census data provide information not only on employment in local plants, but also on employment in all Italian plants belonging to firms headquartered in a given local area. We then replicate our estimates with a modified dependent variable, as we consider employment growth of local firms (i.e. headquartered in the province) relative to the Italian industry average. In this second specification we are still able to capture linkages between multinationals' headquarters and suppliers whose head offices are located in the same province of the multinational's headquarter. We are not able to measure any more changes in the employment of local suppliers whose head office is in a different province. In both types of regression we cannot capture external effects on suppliers located in a different province than the one of origin of the investment. The results for firms' employment growth turn out to be very similar, as we still find evidence of a positive effect of FDI, which is restricted to FDI towards advanced countries: the magnitude of the coefficient is even bigger than before (Table 7).

6 Concluding remarks

Public concerns about firms moving jobs abroad through FDI are increasingly loud. Only empirical analyses can shed light on this very important issue. Rather than focusing on multinational employment performance only, as in the previous literature, we tackle the problem from a different angle, comparing the employment performance across whole local areas. Our findings should be viewed as complementary to the previous literature. Even with a totally different methodology, which takes into account also non-multinational companies, such as local suppliers, the evidence suggesting a negative impact of FDI toward developing countries is weak (limited to only two industries). Actually, the employment performance of local areas doing more FDI towards advanced economies appears to be better than the industry average. Clearly, we cannot completely exclude that some unobserved variables, such as local firms' average productivity, may hide behind the latter result. It should be reminded, however, that we are already controlling for several variables, including province fixed effects.

Two considerations need to be added. First, due to data availability, we observe employment changes only on a five-year span. This is admittedly a relatively short time period and we cannot completely exclude that our results may be driven by the business cycle or by sector-specific shocks. Second, it must be remembered that production may be moved abroad not only through FDI, but also through non-equity agreements with foreign producers. For instance, using U.S. data, Antràs (2004) shows that non-equity agreements happen more frequently in the most labor-intensive industries. In the present paper we could be missing part of the story.

In future work, we plan to extend our analysis using employment data disaggregated by firm size: it would be interesting to compare employment growth between large and small firms. This would shed light on whether the effects of FDI are restricted to the - presumably large - multinational companies or extend also to smaller firms, such as local suppliers.

7 Appendix

7.1 List of manufacturing industries

The list of manufacturing industries analyzed in the paper follows. In parenthesis we report the corresponding Ateco 2002 classification (in turn derived from the Nace Rev. 1.1 classification). The level of aggregation generally corresponds to the two-letters classification, except in some cases where data are disaggregated up to a two-digits level. The matching is provided by UIC.

Non-metallic mineral products (14, 26); Chemical products (DG); Metal products (DJ); Industrial machinery (DK); Electric, electronic products (31, 32, 33); Office equipment and computers (30); Transport vehicles (DM); Food, beverage, tobacco (DA); Textiles, apparel, leather (DB, DC); Paper and printing (DE); Plastic and rubber products (DH); Wooden products, furniture, toys, sportswear, other manufacturing (20, 36).

7.2 List of countries

Advanced countries: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Hong Kong, Iceland, Ireland, Israel, Japan, Mexico, Netherlands, New Zealand, Norway, Portugal, Singapore, South Korea, Spain, Sweden, Switzerland, Taiwan, United Kingdom, United States. **Small countries**: Bahamas, Bermuda, British Virgin Isles, Cayman Islands, Dutch Antilles, Gibraltar, Guernsey, Jersey, Liechtenstein, Luxembourg, Madeira, Malta, Monaco, Panama. **Developing countries**: all the remaining countries.

7.3 The distribution of FDI per province-industry

The cumulative distribution function for total foreign direct investments in P-I over the period 1997-2000 is strongly asymmetric. If we concentrate only on those P-I displaying positive values of FDI, the distributions of these measures can be graphically approximated by a lognormal. In Figure 1 we plot the logarithm of the sum of FDI in each province-industry from 1997 to 2000. Superimposed on the plot is a line joining the first and third

quartiles of the distribution of the sample (a robust linear fit of the sample order statistics). This line is extrapolated out to the ends of the sample to help evaluate the linearity of the data.

Performing the Lilliefors normality test, the p-value is 0.038, so that we reject the null hypothesis of normality at a significance level of 5%, while we cannot reject it at a significance level of 3%. In addition we should keep in mind that the obligation for Italian residents to declare FDI concerns only those investments above 10,000 euros (in the logarithmic scale this means above 2.3), precisely the threshold above which we get a dense number of observations. We can therefore conclude the normality of the logarithm of the data.

A second way to look at FDI data is to see whether there are significant changes in their distribution across years. Consequently we take each elementary observation from the UIC dataset (the absolute value of flows from a given P-I in a given year) putting on the horizontal axis the logarithm of the rank (in descending order) and on the vertical axis the logarithm of the value FDI takes in a certain year. As can be seen from Fig. 2, the distribution across years is remarkably similar, indicating that the same process generates data across different years. By the way, this makes us more confident on the aggregation of FDI from 1997 to 2000.

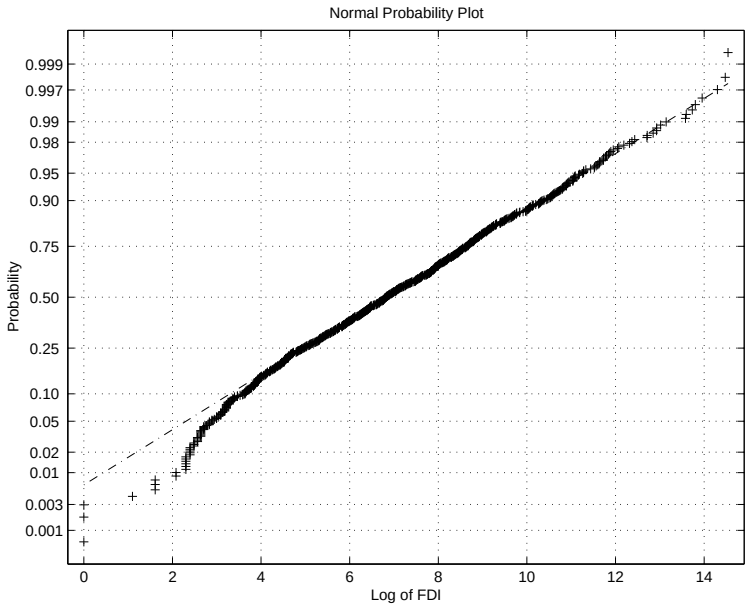

Figure 1: The plot of the logarithm of the sum of FDI flows from 1997 to 2000 for those P-I showing positive investment abroad is approximately distributed as a normal function.

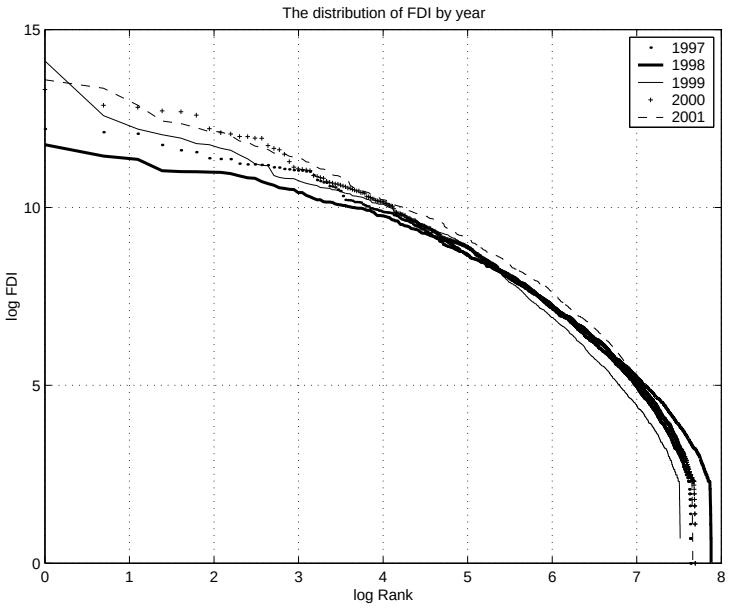

Figure 2: In the rank-size space, the distributions of FDI in each P-I for every year appear to be remarkably similar.

Descriptive statistics: FDI and employment change by region

	FDI World	FDI Advanced	FDI Developing	FDI Small	Employment (Tho. change)
Piemonte	31.4	20.8	8.6	2.0	-16.7
Valle d'Aosta	0.0	0.0	0.0	0.0	0.8
Lombardia	43.3	36.9	2.6	3.7	-53.2
Trentino Alto-Adige	0.5	0.5	0.0	0.0	1.5
Veneto	5.8	4.2	0.5	1.0	16.6
Friuli Venezia-Giulia	1.7	0.9	0.3	0.5	9.4
Liguria	0.4	0.2	0.1	0.2	-4.0
Emilia-Romagna	7.2	5.1	1.0	1.1	25.9
Toscana	2.2	1.6	0.2	0.4	-5.1
Umbria	0.3	0.3	0.0	0.0	6.2
Marche	1.6	1.2	0.3	0.1	14.3
Lazio	3.9	3.6	0.2	0.1	-13.7
Abruzzo	0.2	0.2	0.0	0.0	13.5
Molise	0.0	0.0	0.0	0.0	2.4
Campania	0.6	0.5	0.0	0.1	8.6
Puglia	0.7	0.6	0.0	0.1	16.7
Basilicata	0.0	0.0	0.0	0.0	6.7
Calabria	0.0	0.0	0.0	0.0	4.3
Sicilia	0.1	0.0	0.1	0.0	5.3
Sardegna	0.0	0.0	0.0	0.0	3.9
Italy	**100.0**	**76.8**	**13.8**	**9.3**	**43.4**

Table 1: The table reports each region's share on total FDI flows over the period 1997-2000 and the change in manufacturing employment between 1996 and 2001 (in thousands of people).

Descriptive statistics: FDI and employment change by industry

	FDI World	FDI Advanced	FDI Developing	FDI Small	Employment (Tho. change)
Non-metallic products	2.7	2.0	0.2	0.4	1.6
Chemical products	10.2	8.3	1.2	0.7	-3.2
Metal products	3.9	2.9	0.4	0.7	82.5
Industrial machinery	14.2	12.0	1.0	1.2	44.8
Electronic products	10.1	9.8	0.1	0.2	0.6
Office equipment	17.0	15.3	0.7	1.0	6.9
Transport vehicles	13.8	5.3	7.2	1.2	-5.4
Food and beverage	8.2	6.6	1.5	0.1	6.0
Textiles, apparel, leather	5.9	4.6	0.8	0.5	-108.5
Paper and printing	5.1	4.2	0.2	0.7	-1.0
Plastic and rubber products	1.9	1.2	0.3	0.4	-1.0
Other manufacturing	7.1	4.7	0.3	2.1	0.6
Total manufacturing	**100.0**	**76.8**	**13.8**	**9.3**	**43.4**

Table 2: The table reports each industry's share on total FDI flows over the period 1997-2000 and the change in manufacturing employment between 1996 and 2001 (in thousands of people).

Correlation matrix among independent variables

	fdishare	fdipro$^{(*)}$	spec	size	div	$L_{p,i}$
fdishare	1.000	0.510				
specialization	0.134	0.020	1.000			
size	0.161	0.120	0.679	1.000		
diversity	0.111	0.089	0.260	0.138	1.000	
$L_{p,i}$	0.625	0.285	0.321	0.334	0.156	1.000

Table 3: The table reports pairwise correlation coefficients among the explanatory variables. (*)Correlations of $fdipro$ are computed after having dropped an outlier.

Local employment growth

	[1]	[2]	[3]	[4]	[5]
specialization	-0.160***	-0.163***	-0.067*	-0.067*	-0.063*
	(0.026)	(0.026)	(0.035)	(0.035)	(0.035)
diversity	-	0.272***	0.188***	0.187***	0.202***
		(0.065)	(0.070)	(0.070)	(0.071)
size	-	-	-0.175***	-0.174***	-0.174***
			(0.042)	(0.042)	(0.042)
fdipro (world)	0.015**	0.014**	0.017**	-	-
	(0.007)	(0.007)	(0.008)		
fdipro (advanced)	-	-	-	0.011*	-
				(0.006)	
fdipro (developing)	-	-	-	-	0.012
					(0.009)
spatial controls	103	103	103	103	103
adj. R-squared	0.15	0.15	0.17	0.17	0.17
no. observations	1207	1207	1207	1207	1208

Table 4: White-adjusted Standard errors are in parentheses. ***, ** and * denote significance at the 1, 5 and 10 per cent level.

Local employment growth (without tails)

	[1]	[2]	[3]	[4]	[5]
specialization	-0.022	-0.022	-0.023	-0.016	-0.024
	(0.015)	(0.015)	(0.015)	(0.018)	(0.022)
diversity	0.119***	0.117***	0.126***	0.091*	0.083
	(0.045)	(0.045)	(0.045)	(0.052)	(0.057)
size	-0.127***	-0.125***	-0.125***	-0.180***	-0.106**
	(0.022)	(0.022)	(0.023)	(0.029)	(0.041)
fdipro (world)	0.016**	-	-	-	-
	(0.007)				
fdipro (advanced)	-	0.012***	-	0.009**	-
		(0.004)		(0.004)	
fdipro (developing)	-	-	0.001	-	-0.006
			(0.004)		(0.006)
spatial controls	103	103	103	99	81
adj. R-squared	0.23	0.23	0.22	0.31	0.22
no. observations	1160	1160	1160	737	435

Table 5: White-adjusted Standard errors are in parentheses. ***, ** and * denote significance at the 1, 5 and 10 per cent level. Tails of the dependent variable at 2 and 98th percentile are excluded. In columns [4] and [5] the FDI variable is taken in logarithm.

Local employment growth (FDI to new EU Member States)

	[1]	[2]	[3]
specialization	-0.024	-0.013	-0.018
	(0.015)	(0.024)	(0.024)
diversity	0.125***	-0.140*	-0.087
	(0.045)	(0.075)	(0.067)
size	-0.123***	-0.055	-0.061*
	(0.023)	(0.039)	(0.037)
fdipro (NMS)	0.000	-0.002	-0.004
	(0.002)	(0.006)	(0.005)
spatial controls	103	-	14
adj. R-squared	0.22	0.09	0.28
no. observations	1159	191	191

Table 6: White-adjusted Standard errors are in parentheses. ***, ** and * denote significance at the 1, 5 and 10 per cent level. Tails of the dependent variable at 2 and 98th percentile are excluded. In columns [2] and [3] the FDI variable is taken in logarithm.

Local employment growth (firms, without tails)

	[1]	[2]	[3]
specialization	-0.015	-0.015	-0.017
	(0.018)	(0.019)	(0.018)
diversity	0.090	0.085	0.094*
	(0.055)	(0.054)	(0.056)
size	-0.076**	-0.074**	-0.073**
	(0.032)	(0.032)	(0.032)
fdipro (world)	0.017*	-	-
	(0.009)		
fdipro (advanced)	-	0.016**	-
		(0.007)	
fdipro (developing)	-	-	-0.006
			(0.004)
spatial controls	103	103	103
adj. R-squared	0.09	0.09	0.08
no. observations	1159	1159	1159

Table 7: White-adjusted Standard errors are in parentheses. ***, ** and * denote significance at the 1, 5 and 10 per cent level.Tails of the dependent variable at 2 and 98th percentile are excluded.

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