ISAE Istituto di Studi e Analisi Economica

ACQUISITION VERSUS GREENFIELD INVESTMENT: THE LOCATION OF FOREIGN MANUFACTURERS IN ITALY

by

Roberto Basile

ISAE

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ABSTRACT

This paper investigates the location of foreign direct investment (FDI) in Italy over the period 1986-1999. FDI are measured through the frequencies of acquisitions and greenfield investments per province and sector, so count data models are applied. The results show that the location determinants strongly differ according to the foreign entry mode. Unlike the results of many other studies, foreign ventures do not emulate their domestic counterparts. When foreign firms decide to make a greenfield investment in Italy, they are strongly influenced by location decisions of previous foreign investors, but they must also take into account congestion costs mainly linked to the lack of available labor force in the big northern cities. Thus, Southern provinces (with high unemployment rates) have a high potential attractiveness, which might be implemented with a strong investment in public infrastructures, as demonstrated by simulations. Foreign acquisitions are affected not only by supply of acquisition candidates, but also by the other location characteristics, such as the demand level, public infrastructure, stock of foreign firms and unit labor costs.

JEL Classification: F23, R30, C35

Key words: Foreign Direct Investments; Location; Count Data Models

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NON-TECHNICAL SUMMARY

This paper investigates the location of foreign direct investment (FDI) in Italy over the period 1986-1999. As in many other countries, the geographical distribution of inward FDI is characterised by huge asymmetries: FDI inflows are strongly concentrated in the North-West; on the other hand, it is commonly accepted that FDI to the *Mezzogiorno* of Italy are disappointingly few. This paper has a two-fold objective. On the one hand, it analyzes the role of different kinds of externalities (such as agglomeration economies and public infrastructures) as FDI locational determinants. Since inward FDI are mainly driven by acquisitions rather than by greenfield investments, the paper explores which factor mainly influence the location of the two types of investments. On the other hand, it is aimed at assessing the common assertion that FDI to the South are disappointingly few.

The results show that the main location determinants strongly differ according to the type of foreign investment considered. Firstly, foreign acquisitions' geographical distribution is not only constrained by the supply of acquisition candidates. The consistent significance of variables other than the stock number of existing firms (such as public infrastructures and the prior concentration of foreign manufacturing firms within the province, as well as in adjacent provinces) confirms that supply alone does not decide the location of foreign acquisitions flows in Italy. Thus, scholarly disinterest in the distribution of acquisitions is unjustified.

Differently from the results of many other studies, foreign ventures in Italy do not emulate their domestic counterparts. In other words, *ceteris paribus*, foreign business groups do not invest more intensively in those regions where there is a higher concentration of other firms. When foreign investors decide to build new production facilities in Italy, they are strongly influenced by location decisions of previous 'foreign' investors, but they also must take into account congestion costs (which contrast agglomeration forces) mainly linked to the lack of available labor force, especially in the big Northern cities. Therefore, high unemployment provinces in the South have a greater potential capability of attracting greenfield FDI than Northern-Central ones.

However, the potential attractiveness of Southern provinces can only emerge if certain conditions are met: firstly, the necessary infrastructures are to be created; secondly, the gap between the labor cost and the productivity trends must be narrowed; thirdly, an adequate system of public incentives aimed at favoring foreign direct investments must be created.

In particular, with regard to the infrastructures, the results of some simulations suggest that, with endogenous agglomeration effects in force (foreign firms seem to prefer provinces chosen by other foreign investors), a small improvement in the public infrastructure stock does not affect the regional

distribution of FDI. Only a very strong leap forward in Southern infrastructures might allow a significant reallocation of foreign capital towards Southern regions. This finding is very important, since each year the actual expenditure for public works systematically falls short of the planned figure.

ACQUISIZIONI E INVESTIMENTI GREENFIELD: LA LOCALIZZAZIONE DELLE IMPRESE MANIFATTURIERE STRANIERE IN ITALIA

SINTESI

Questo lavoro analizza la localizzazione degli investimenti diretti esteri (IDE) in Italia nel periodo 1986-1999. I flussi di IDE sono misurati come numero di acquisizioni e investimenti *greenfield* in ciascuna provincia e in ciascun settore; si applicano quindi i modelli per *count data*. I risultati mostrano che le determinanti della localizzazione differiscono ampiamente a seconda della modalità di entrata. Contrariamente a quanto riscontrato in molti altri lavori, gli investitori stranieri non sembrano emulare le scelte localizzative degli investitori nazionali. Quando le imprese straniere decidono di effettuare investimenti *greenfield* in Italia, esse sono fortemente condizionate dalle decisioni localizzative dei precedenti investitori stranieri, ma devono anche tener conto dei costi di congestione principalmente connessi alla mancanza di forza lavoro disponibile nelle grandi città del Nord. Pertanto, le province meridionali, con i loro alti tassi di disoccupazione, sembrano possedere un potenziale di attrazione molto elevato, il quale, come dimostrano alcune simulazioni, potrebbe essere sfruttato tramite grossi investimenti in infrastrutture pubbliche. Le acquisizioni straniere sembrano condizionate non solo dall'offerta di imprese candidate, ma anche da altre caratteristiche localizzative, come il livello della domanda, le infrastrutture pubbliche, lo stock di imprese straniere e il costo del lavoro per unità di prodotto.

Classificazione JEL: F23, R30, C35

Parole chiave: Investimenti diretti esteri; Localizzazione; Modelli per Count Data

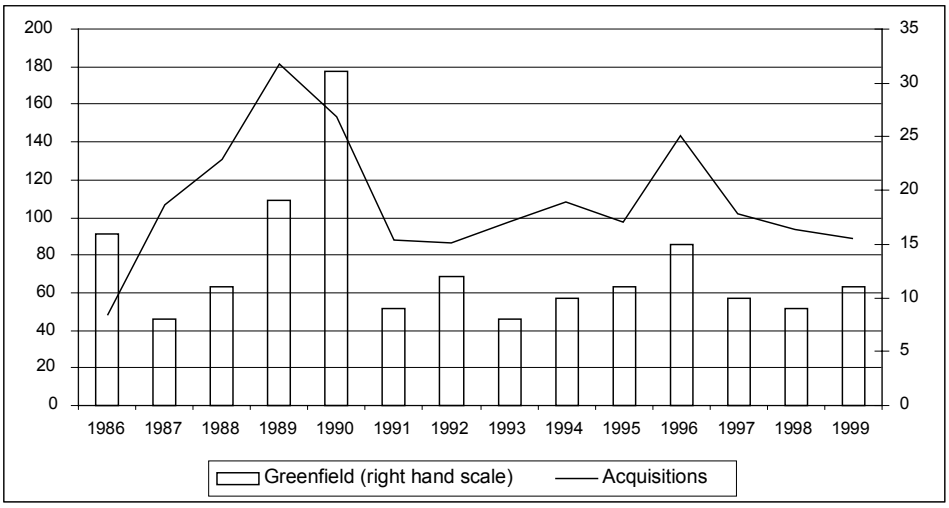
CONTENTS

INTRODUCTION

Over the last fifteen years, the Italian economy has shown to be hardly able to attract foreign direct investments (FDI). According to the data collected by the *Politecnico* of Milan on the number of new foreign acquisitions and greenfield investments in Italy, the major increase of inward FDI occurred from 1987 to 1989 (Figure 1). In the two following years (1990-1991), the number of new inward FDI steeply decreased. Afterwards, in spite of the Lira devaluation occurred in 1992, the number of new foreign entrants did not significantly vary. Admittedly, over the last decade, the Italian Government has not changed its policy in the attempt to attract new FDI.

Figure 1

Number of manufacturing firms acquired and created by foreign firms in Italy, 1986-99



Source: Data Bank Reprint, *Politecnico* of Milan

A less-debated and scarcely analysed issue concerns the location determinants of foreign manufacturing firms within the country. In Italy, as well as in many other countries, the geographical distribution of inward FDI is characterised by huge asymmetries[1]: FDI inflows are strongly concentrated in the North-West (the most industrialised area), Milan and Turin being the main target provinces.

[1] Many other studies carried out in the United States, in Canada, in the United Kingdom and in other European countries, as well as in some developing countries (such as China), have outlined the strong concentration of FDI in the core regions of each country and have analysed the location determinants of FDI (Glickman and Woodward, 1988; Bagchi-Sen and Wheeler, 1989; Coughlin *et al*., 1991; Hill and Munday, 1991; Woodward, 1992; Friedman et al., 1992; Hines, 1996; O'hUallachain and Reid, 1997; Chunlai, 1997; Devereux and Griffith, 1999; Head *et al*., 1999, Wei, 1999; Belderbos and Carree, 2000).

On the other hand, it is commonly accepted that FDI to the South (the *Mezzogiorno* of Italy, that is the least developed area) are disappointingly few (Mariotti and Mutinelli, 1999).

However, stating that the *Mezzogiorno* is hardly attractive, basing on the simple comparison with the FDI flows towards the North of Italy, may be misleading. The regional potential attractiveness might depend on a variety of demand- and supply-side factors. Thus, it would be better to compare the attractiveness of each geographical area, after controlling for the basic FDI location determinants. This is what this paper tries to do, as it analyses the relationship between the number of new foreign entrants in each Italian province, corresponding to the NUTS 3 level in the official EU classification (e.g. *dèpartements* in France, counties in the UK, provincial in Spain), and the various provincial characteristics, which are expected to affect the FDI location. In particular, this paper has a two-fold objective. On the one hand, it analyzes the role of different kinds of externalities (such as agglomeration economies and public infrastructures) as FDI locational determinants in Italy. Since inward FDI in Italy are mainly driven by acquisitions rather than by greenfield investments, the paper explores which factor mainly influence the location of the two types of investments[2]. On the other hand, it is aimed at assessing the common assertion that FDI to the South are disappointingly few.

To fulfil this goal, the effects of different potential location factors are tested by directly modelling individual firms' entry decisions. Since data are available at a semi-aggregate level (number of firms acquired and created by foreign firms in different manufacturing industries in each Italian province during the period 1986-1999), the final econometric model explains the number of new foreign entrants in each province/sector[3]. Starting from the recognition of the discrete nature of the dependent variable (non-negative integers with presence of zeros) and of the high dispersion characterising its distribution, count data models are applied.

The relevance of the paper lies in the evaluation of the benefits deriving from foreign manufacturing firms within a region. These benefits are well known and recall those generally cited in the literature on the role of large firms in least developed regions (see Giunta *et al.* 2000, for the case of *Mezzogiorno*): job creation, development of subcontracting relationships with local small and

[2] Greenfield investment refers to the construction of new production facilities by an investor, while acquisition is the purchase of existing assets (see also O'Huallachain and Reid, 1997).
[3] Mariotti and Piscitello (1994) carried out a similar analysis for the period 1986-1991.

medium-sized firms, introduction of new technologies, skills and capital[4]. In the perspective of a stronger European economic integration, Southern economy must aggressively compete to attract new manufacturing plants (from other Italian regions and from abroad) by offering a variety of industrial location factors (e.g. infrastructure, tax incentives)[5]. This paper may help understand the real competitiveness of the South of Italy in supplying such location factors.

The paper is organized as follows. Section 2 discusses the hypotheses concerning the location determinants of foreign firms. Section 3 presents the variables introduced in the econometric model. Section 4 shows the empirical findings. Section 5 reports some simulation results. The last Section provides the concluding remarks and the policy prescriptions.

1. THE LOCATION DETERMINANTS OF FDI IN ITALY: SOME HYPOTHESES

During the period 1986-92, more than 50% of the total number of FDI in Italy were oriented to Northwestern regions; 35% to the North-East-Center (NEC) regions (the so-called 'Third Italy'); while, the share of FDI inflows to the South was only 8.7% (Table 1)[6]. In the following period (1993-99), the share of new foreign entrants in the Northwest decreased in favor of NEC (especially in traditional sectors, machinery and transportation), while the relative position of the South did not improve at all (with the exception of chemicals).

Now, it is worth stressing that FDI inflows in Italy are mainly driven by mergers and acquisitions, while the number of foreign greenfield start-ups is very low (see Figure 1)[7]. As it is well known, the location process of those two

[4] Recently, many theoretical and empirical contributions have shown that inward FDI can generate positive externalities on the host country and that the extent to which domestic firms benefit from foreign presence might be geographically bounded. Nevertheless, it has also been noticed that multinational firms can induce monopolistic pressures which crowd out domestic firms and impoverish local economic systems (see Blomstrom and Kokko, 1998). For the case of Italy, Castellani and Zanfei (2001) examined the foreign presence impact on the productivity of domestic enterprises. The present paper recognises that even foreign acquisitions play an important role for the regional development, since they represent a transfer means for international technological and organizational knowledge.

[5] In the nineties, the South of Italy remained excluded from the big flows of international investments, which indeed boosted the economic development of other European peripheral areas, such as in Ireland and Spain.

[6] The number of acquisitions and greenfield investments is reported at the bottom of Table 1.

[7] This problem is related to the low international competitiveness of the country as a whole. A thorough analysis of this problem cannot be made in this paper.

Table 1

Regional distribution of manufacturing firms created and acquired by foreign firms in Italy, 1986-99 *(Percentage values)*

	Total FDI		*Acquisitions*		*Greenfield investments*	
	1986-92	1993-99	1986-92	1993-99	1986-92	1993-99
North-West	56.2	52.2	56.9	53.0	51.4	44.9
Traditional sectors	48.0	35.6	51.1	36.8	20.0	22.2
Chemicals	59.9	65.8	60.5	66.4	53.3	60.0
Machinery	58.4	47.3	57.4	46.2	64.7	58.3
Electronics	57.2	53.1	58.1	55.3	52.4	30.0
Transport	55.2	46.8	59.6	46.0	36.4	50.0
Paper & Rubber	60.1	60.5	59.2	59.8	66.7	71.4
Metal products	50.8	52.7	49.1	56.0	62.5	22.2
North-East Center	35.1	39.3	35.7	40.1	30.5	31.9
Traditional sectors	42.6	54.8	42.9	54.7	40.0	55.6
Chemicals	36.0	25.6	35.7	27.1	40.0	10.0
Machinery	36.8	48.8	38.9	49.6	23.5	41.7
Electronics	32.4	34.5	33.1	35.0	28.6	30.0
Transport	27.6	41.9	19.1	44.0	63.6	33.3
Paper & Rubber	30.1	33.6	32.8	34.8	11.1	14.3
Metal products	36.1	37.6	39.6	38.1	12.5	33.3
Mezzogiorno	8.7	8.4	7.4	6.9	18.1	23.2
Traditional sectors	9.5	9.6	6.0	8.4	40.0	22.2
Chemicals	4.1	8.5	3.8	6.5	6.7	30.0
Machinery	4.8	3.9	3.7	4.3	11.8	0.0
Electronics	10.3	12.4	8.9	9.7	19.0	40.0
Transport	17.2	11.3	21.3	10.0	0.0	16.7
Paper & Rubber	9.8	5.9	8.0	5.4	22.2	14.3
Metal products	13.1	9.7	11.3	6.0	25.0	44.4
TOTAL	900	803	794	729	106	74

Note: Traditional sectors include food, textile, clothing, leather, footwear, wood and furniture. Chemicals include chemical products, synthetic and artificial fibers and fuel. Machinery are industrial machinery. Electronics include office machines, electrical machinery, computer and telecommunications. Transport includes road vehicles and other transport equipment. Percentage values are calculated putting, for each sector, Italy = 100.

Source: Data Bank Reprint, *Politecnico* of Milan

types of investment flows may be very different (see also O'hUallachain and Reid, 1997). Using firm level data[8] on multinational firms in Italy, a very different interregional distribution of foreign greenfield start-ups and acquisitions may be observed: the share of FDI located in the *Mezzogiorno* is higher in the case of greenfield investments (18.1% in the period 1986-92 and 23.2% in the following period), than in the case of acquisitions. It is no surprise to learn that the acquisition activity is lowest in regions having less manufacturing plants (the *Mezzogiorno*), as scarcity of procurable assets in a region limits the supply of acquisition candidates. However, it is important to investigate which factors - apart from the presence of manufacturing plants in the province – do affect the location of foreign firms in Italy.

The above-mentioned figures seem to leave no doubt on the exceptional asymmetry characterizing the geographical distribution of FDI in Italy and, in particular, on the very low attractiveness of the South. However, to make a proper assessment of whether the amount of FDI to the South is above or below its potential level, the use of a carefully specified model of the location determinants of multinational firms is required.

Generally speaking, empirical studies on foreign firms' site selection assume that foreign firms, like all firms, seek branch location with the highest expected profits. Thus, the profit that each individual firm derives from locating in any of the potential province I is a sole function of the characteristics of that location: $\pi_i = \pi_i (Z_i)$, where Z_i is a vector of the characteristics of the region. In "traditional" literature, this vector comprises measures of costs and accessibility to production factors (labor and raw materials), costs of transportation, size and characteristics of domestic and adjacent markets and primary infrastructures[9]. If the investor produces easily-transportable goods, local demand has little influence on location decisions. By considering the whole country as its outlet

[8] Unfortunately, plant level data distinguished by modes of entry are not available at local level in Italy. Only firm level data allow separate location analysis of foreign acquisitions and greenfield investments. According to the data provider (Politecnico of Milan), however, the geographical distribution of firms tends to coincide with that of plants in the case of greenfield investments, while in the case of acquisitions there might be significant differences between firms' and plants' spatial distributions.

[9] Traditionally, inward foreign investments have been studied at a cross-country level. Dunning (1993) provides a review of this literature within its "Ownership-Location-Internalisation" framework (p. 164-167). Apart from the above-listed variables, these studies also include the following: barriers to trade (that is the level of effective protection imposed by host countries), language variable, balance of payment deficit, rate of domestic inflation, efficiency of Government macro-economic policies and environmental rules and regulations (e.g. pollution, health and safety standards). Obviously, all those variables have no intra-State variation, thus they are not relevant in a cross-region study.

market, the firm would choose its location on the basis of cost considerations. On the other hand, when transport costs are important, the local market size plays a major attraction role. Traditional literature has also emphasized the role of regional promotion incentives in affecting FDI location decisions. Policy incentives may assume different forms: a) financial incentives (public subsidies)[10], b) tax incentives[11], c) labor-promotion incentives and d) indirect State aids (for example, infrastructure upgrading investments).

Recently, however, the empirical literature on foreign firms' site selection has grown alongside with the advances in our understanding of domestic branch plant location (Fujita *et al.*, 1999). In particular, many studies have emphasized the role of different kinds of external economies as foreign firms' location determinants. Firstly, following a typical cumulative causation approach, it is often suggested that industrial firms tend to localize where other firms are present. The benefits of this form of externality, connected with the number of manufacturing plants clustered in a specific area (agglomeration economies), are well known, namely access to a more stable labor market, availability of intermediate goods, production services and skilled manpower and knowledge spillover between close firms.

Now, the regional distribution of domestic manufacturing can affect the location of foreign investments in different way according to the foreign entry mode (acquisitions and greenfield). In principle, in both cases, agglomeration economies may temper location flexibility. In the case of acquisitions, however, the domestic industry also supplies candidates and, generally speaking, it is not easy to disentangle the effect of procurement opportunities from that of agglomeration economies.

Admittedly, agglomeration economies tend to reach limit values and agglomeration diseconomies eventually emerge. Indeed, firms operating on markets with a relatively large number of firms face stronger competition in product and labor markets. This acts as a centrifugal force, which tends to make activities dispersed in space. Once the centrifugal forces surpass the effects of the agglomeration economies in a region, firms will look for locations in contiguous regions where production costs are lower, while at the same time taking advantage of some degree of external economies, given the short distances involved. In this case, agglomeration economies would operate at a

[10] With regard to Italy, it is important to underline that while foreign firms do benefit from financial incentives, there is no specific policy instrument "dedicated" to the attraction of foreign investments, as there is in other European countries, such as England and Ireland.

[11] Devereux and Griffith (1999) investigate the role played by public policy in the guise of taxes on profits as foreign location factor.

supra-regional level, giving rise to an external regional effect. This hypothesis is in line with the process of progressive industrialization in the periphery proposed in Puga and Venables (1996), where the distance between economies plays a role in location selecting.

The geographical distribution dynamics of the total FDI number in Italy shown in Table 1 seems to corroborate this hypothesis: the number of FDI decreased in the most congested area (the North West) in favor of its most proximate one (the NEC), while leaving the peripheral zone (the South) out of this process. A more careful analysis, however, suggests that only the distribution of foreign acquisitions followed this process. Conversely, in the case of greenfield investments, the hypothesis of progressive industrialization does not hold: the Southern share of greenfield start-ups increases, while the NEC share remains stable. The different distribution dynamics of greenfield investments might partially depend on labor market factors. In the nineties, different regions in the North of Italy suffered the problem of labor availability, while most regions in the South showed high unemployment rates. To better understand this problem, we must consider that in that period local labor markets in Italy were characterized by lack of labor mobility (from the South to the North-Center), by lack of wage flexibility (because of the centralized wage bargaining) and by job-matching problems. Those characteristics are enough to understand that in Italy congestion costs are not mirrored in wage levels (labor cost) but in labor availability (labor quantity). Thus, in the case of greenfield start-ups, foreign investors are assumed to avoid congested areas, while a high number of unemployed makes a Southern region potentially more attractive. In the case of foreign acquisitions, instead, the labor force is available. Thus, from the point of view of an acquiring firm, high unemployment regions are thought to offer less-competitive industrial conditions and a worse quality of life.

There are also agglomeration economies connected not to the generic number of local incumbents, but to the number of foreign firms operating in the same geographical area. As suggested by Head *et al.* (1999), "if foreign investors - who have less initial knowledge about regional locations than their domestic counterparts - only receive signals on costs and benefits of location decision, but face strong difficulties to observe them directly, they might mimic each others' location decision". DeCoster and Strange (1993) also argue that clustering might occur because of an agency problem: local decision-takers might decide to follow prior investors because they are afraid of the reputational consequences of an 'eccentric' decision which fails.

The infrastructure level (e.g. roads, railways and telecommunications) can also represent an important FDI location determinant. Generally speaking, the

analyses of the relevance of public infrastructures for regional development and for the process of geographical concentration of industrial activities[12] show that poorly-infrastructured regions have a relatively low level of productivity and return to private investments, which might indeed be smaller than in regions with better infrastructures. The relatively low return to private investments within poorly-infrastructured regions reduces the attractiveness for both domestic and foreign investments[13].

However, it is worth emphasizing that the relationship between infrastructures and localization might not be linear. The agglomeration mechanism might indeed affect the role of public infrastructures in industrial re-location. If a circular causation mechanism is at work and if the concentration of firms in the core region is self-sustaining, then improving the attractiveness of the periphery by public investments in infrastructures may have no impact on firms' location choices. In the New Economic Geography models, there is a threshold level of transaction costs below which the agglomeration mechanism takes place and is self-sustaining. A small change in the attractiveness of the periphery will not bring a small relocation of economic activities. Only a very large change in the attractiveness of the periphery would give it a chance to attract industrial activities.

2. DATA AND VARIABLES

The dependent variables used in this work are the number of firms acquired and created by foreign firms in each of the 95 Italian provinces (NUTS-3 level regions[14]) and in each of the seven sectors (the list of the industrial sectors considered is reported in Table 1) in two different periods (1986-1992 and 1993-1999). The total number of observations is therefore 1,330. The two variables are summarized in Table 2.

The macro variables (Z_i), expected to influence the number of foreign firms intentioned to entry, are approximated with data coming from different sources by taking into account a time lag compared with the dependent variables. These explanatory variables, expressed in logs, may be grouped into five categories: market demand, agglomeration economies, asymmetric information,

[12] See, for example, Vickerman (1990).

[13] Using data on FDI from the United States, Wheeler and Mody (1992) found that infrastructures play a relevant role in US multinationals location decisions.

[14] In Italy there are 20 NUTS-2 regions and within each region there are some provinces (NUTS-3 level). Data refer to the period before 8 new provinces were created. 95 provinces are therefore considered rather the present 103.

infrastructures and local labor market (see Table 3). The expected signs of the variables are all positive except for "unit labor cost" and "unemployment rate" (for the case of acquisitions).

Table 2

Distribution of foreign greenfield investments and acquisitions, 1986-99 *(Percentage values)*

	0	1	2	3	4	>4
Greenfields 1986-92	89.7	8.3	0.9	0.5	0.0	0.6
Greenfields 1993-99	92.2	6.5	0.8	0.2	0.3	0.2

	0	1	2	3	4	5	6	7	8	9	10	>10
Acquisitions 1986-92	60.5	20.9	7.2	3.9	2.7	1.4	1.2	0.8	0.2	0.2	0.0	1.2
Acquisitions 1993-99	61.2	21.4	7.1	4.2	2.4	0.9	0.9	0.2	0.3	0.2	0.2	1.2

Note: The Table reports the percentage of province/sectors with 0, 1, 2, …, number of new foreign acquisitions and greenfield investments in the two periods 1986-92 and 1993-99.

Differently from other empirical studies on FDI location, the total amount of electrical consumption (i.e. the amount of electricity consumed by firms and households) is considered as proxy for market demand, rather than Gross Domestic Product (GDP), given that, in the case of Italian provinces, the available GDP measures tend to underestimate the role of the underground economy, while electrical consumption is not affected by this problem[15].

Potentially, however, the outlet market is much wider than the provincial one. According to Woodward (1992), the market variable used in the econometric analysis (*MARKET*) is a gravity-adjusted measure: it accounts for both the size of a provincial market and its relative position to other provincial markets. The variable for a province *i* is created by taking the sum of the provincial electrical consumption and the electrical consumption of all other provinces, weighted by distances: $MARKET_i = D_i + \Sigma_k(D_k / d^2_{ik})$, where, *D* is the electrical consumption in province *k*; and d_{ik} is the distance from province *i* to province *k*.

[15] The two variables are highly correlated (R^2=0.91). Moreover, econometric results do not significantly change while using the two alternative market size measures.

Table 3

Variable description

	Variables	***Description***	***Source***	***Mean***	***Standard deviation***
Demand	Market	Electrical consumption (see Section 3)	Enel	7.37	0.81
Agglomeration Economies	Within-Province Agglomeration	Number of manufacturing establishments in the province	Istat, Census of Industry and Service	8.37	0.84
	Adjacent-Province Agglomeration	Number of manufacturing establishments in the adjacent provinces	Istat, Census of Industry and Service	8.65	0.62
Asymmetrical information	Stock of Foreign Plants Within the Province	Cumulative number of foreign-owned manufacturing plants within the province	Data Bank Reprint, Polytechnic of Milan	2.36	1.15
	Stock of Foreign Plants in Adjacent Provinces	Cumulative number of foreign-owned manufacturing plants in adjacent provinces	Data Bank Reprint, Polytechnic of Milan	2.75	1.09
Infrastructures	Public Infrastructure	Index of infrastructure stock	Confindustria	4.50	0.36
Local labor market	Unit Labor Cost	Average labor cost / Labor productivity (in each region)	Istat, Regional Accounts	4.04	0.06
	Unemployment Rate	Unemployment rate	Istat, Labour Force Survey	2.27	0.56

Agglomeration economies are approximated by the number of manufacturing plants in the same industry in each province, as revealed by the Census data for the two years 1981 and 1991. As discussed in Head *et al*. (1999, p.203), external economies may cross the weak and sometimes artificial provincial boundaries. To account for nearby activities, the econometric specification of the location equation must include another variable, measuring the stock of manufacturing plants in the same industry in adjacent provinces. Thus, a spatially weighted average of the neighboring values is constructed for the agglomeration variable using the first-order binary contiguity matrix.

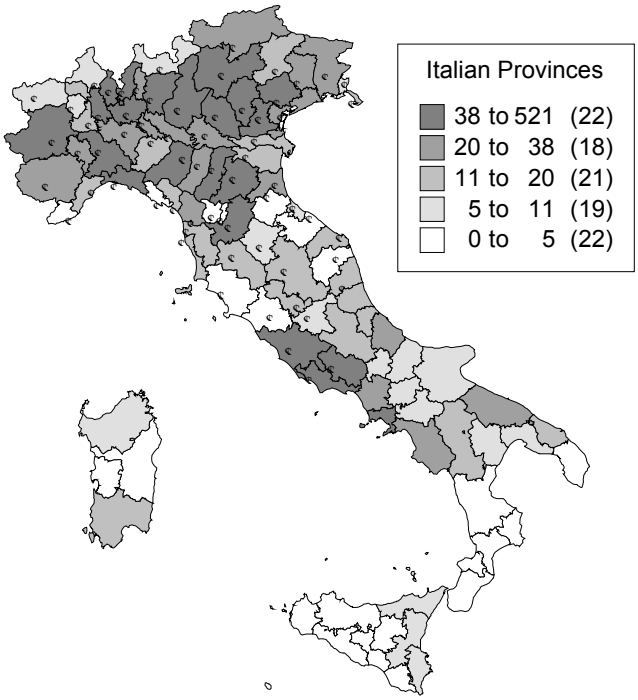
In addition to the "industry" agglomeration effects, recent studies have also assumed "nationality" agglomeration effects. Head *et al*. (1995), for example, state that Japanese investors appear to be attracted to American States with other Japanese plants in the same industry. Unfortunately, the data set used in the present paper does not contain any information on the investors' nationality.

The role of asymmetric information in affecting the location choice of multinational firms is captured by the (stock) number of foreign manufacturing

establishments previously concentrated in each province, as well as in adjacent provinces[16]. Figure 2 plots the provincial map of FDI stock in 1996. A simple statistical analysis suggests that in 1996 the geographical concentration of (the number of) foreign manufacturing plants was much higher than the spatial concentration of the total number of manufacturing plants.

Figure 2

Spatial distribution of the stock number of foreign manufacturing establishments in Italy in 1996



Note: The Legend reports the values of the inter-quintile distribution of the provincial number of foreign manufacturing plants in Italy and, in brackets, the number of provinces within each class. North-Central provinces are shown with a star.

Source: Data Bank Reprint, *Politecnico* of Milan

Provincial differentials in public infrastructures are approximated by a stock index, developed by Confindustria for the two years 1985 and 1995. Previous location studies, summarized in Friedman *et al.* (1992), used to characterize local labor markets with the measure of a regional average manufacturing wage (sometimes relative to productivity), its unionization and unemployment rate. Here, the ratio between industrial workers wage level and the industrial labor productivity is used as a measure of local labor cost. Unfortunately, this variable

[16] In calculating the natural logs of these two variables, a 1 was added since for some province/sectors the number of foreign establishments was zero.

is only available at the NUTS-2 regional level, since there is no information available on labor cost at NUTS-3 (provincial) level[17].

The unemployment rate is also included as independent variable. As discussed above, the role of the province unemployment rate variations as a location determinant depends on the foreign entry mode: a high unemployment rate may serve either as an indicator of labor availability (in the case of greenfield investments) or as a proxy of less-competitive industrial conditions and lower quality of life (in the case of acquisitions).

3. REGRESSION RESULTS

This Section contrasts the location determinants of greenfield and acquisition FDI in Italy. Generally speaking, previous location analyses examined either aggregate investments or greenfield plants. Rarely, did they contrast greenfield and acquisition entry. Apart from rare exemptions (see, for example, O'hUallachain and Reid, 1997), scholars mostly ignore the distribution of acquisitions, because they are mainly constrained by the supply of acquisition candidates and play a secondary part in the formulation of regional industrial development policies (Head *et al.*, 1995[18]). Quite the reverse, the present paper starts from the recognition that a higher stock of foreign capital (also cumulated through foreign acquisitions) may have a positive impact on regional development. Obviously, greenfield investments have a direct impact on regional employment through job creation, but foreign acquisitions may also exert an important role in terms of technological and organizational knowledge transfer.

3.1 A dartboard specification: does the number of investments in the South fall short of its market potential?

One of the objectives of the paper is to assess the relative attractiveness of the *Mezzogiorno* of Italy. While the summary statistics show that the South received a relatively small fraction of FDI, it is important to know whether the investment counts fall short of the market potential of the region. Thus, a simple "dartboard" specification of the location choice model is considered at first (Column 1 in Table 4 and 5): the greenfield investment count and the acquisition count are regressed on the size of the market, measured by the gravity-adjusted

[17] Actually, we are aware that having variables at different level of aggregation might bias the estimate of the coefficients' standard errors.

[18] "While new ventures may locate wherever they want, acquirers are limited to the current locations of potential targets" (Head *et al*, 1995, p.230).

demand variable, and on the dummy variable "*Mezzogiorno*", which indicates whether a province belongs to the South or not. As regard to the functional form,

Table 4
Foreign acquisitions' location determinants in Italy

Variable		1	2	3	4
Market		0.992***	0.276***	0.280***	0.319***
		(19.020)	(3.516)	(3.595)	(3.963)
Within-Province Agglomeration			0.376***	0.266***	0.259***
			(5.569)	(3.925)	(3.821)
Adjacent-Province Agglomeration			-0.241***	-0.131**	-0.137**
			(-3.824)	(-2.036)	(-2.169)
Stock of Foreign Plants Within the Province			0.454***	0.442***	0.456***
			(7.818)	(7.331)	(7.498)
Stock of Foreign Plants in Adjacent Provinces			0.230***	0.146**	0.129*
			(3.312)	(2.081)	(1.760)
Public Infrastructures				0.852***	0.676***
				(4.794)	(3.442)
Unit Labor Cost					-1.005***
					(-4.260)
Unemployment Rate					-0.292**
					(-2.365)
Mezzogiorno		-1.376***	-0.964***	-0.558***	-0.464***
		(-10.419)	(-7.259)	(-3.444)	(-2.520)
Mezzogiorno (discrete change)	Mezz = 1	1.03	0.67	1.33	1.77
	Mezz = 0	4.09	1.75	2.32	2.81
	δ	-3.06	-1.08	-0.99	-1.04
a		13.308***	38.784***	39.571***	43.767***
		(4.649)	(3.847)	(3.580)	(3.543)
b		2.507***	14.315***	9.426***	8.245***
		(5.364)	(3.333)	(3.354)	(3.460)
Number of observations		1330	1330	1330	1330
Log-likelihood		-1441.2	-1371.3	-1358.6	-1346.3
Bayesian Information Criterion		2911.2	2800.2	2782.0	2771.7

Note: The dependent variable is the number of firms acquired by foreign firms in each province and in each sector. Model specification: Negative binomial model with random effects. t-values in parenthesis. Coefficients of the constant term are not reported. *denotes t-statistics at the 90% confidence level; ** at 95%; ***at 99%.

a *random-effect* negative binomial model (NEGBIN2) is used, since both the restrictions imposed by the NEGBIN2 pooling and by the Poisson regression model were rejected by different tests[19].

[19] See Appendix for a discussion on the econometric specifications. In the case of greenfield investments, however, the evidence of random effects and the rejection of the Poisson restriction are both less robust.

Table 5

Foreign greenfield investments' location determinants in Italy

Variable	1	2	3	4
Market	+1.011***	0.469***	0.414***	0.467***
	(9.979)	(2.983)	(2.610)	(2.776)
Within-Province Agglomeration		-0.015	-0.125	-0.136
		(-0.107)	(-0.885)	(-0.935)
Adjacent-Province Agglomeration		0.074	0.173	0.189
		(0.444)	(1.079)	(1.100)
Stock of Foreign Plants Within the Province		0.753***	0.707***	0.703***
		(4.888)	(4.552)	(4.412)
Stock of Foreign Plants in Adjacent Provinces		-0.151	-0.153	-0.112
		(-0.814)	(-0.856)	(-0.606)
Public Infrastructures			1.759***	1.395***
			(4.128)	(2.849)
Unit Labor Cost				-1.907***
				(-2.879)
Unemployment Rate				0.076
				(0.221)
Mezzogiorno	-0.134	0.193	1.161***	0.800**
	(-0.489)	(0.742)	(3.572)	(1.981)
a	106.56	99.441	182.62	200.28
	(0.297)	(0.801)	(0.588)	(0.360)
b	0.625*	2.062*	2.787*	2.397*
	(2.883)	(1.864)	(1.669)	(1.723)
Number of observations	1330	1330	1330	1330
Log-likelihood	-439.7	-422.5	-414.9	-409.5
Bayesian Information Criterion	908.2	902.5	894.4	898.2

Note: The dependent variable is the number of firms created by foreign firms in each province and in each sector. Model specification: Negative binomial model with random effects. t-values in parenthesis. Coefficients of the constant term are not reported. *denotes t-statistics at the 90% confidence level; ** at 95%; ***at 99%.

Firstly, the coefficient of market size is positive and significant in both equations, thus indicating that foreign firms concentrate where demand is highest and serve smaller markets via exporting. Since variables Z logarithmically enter the FDI equation $(E[Y|Z] = exp(\beta lnZ))$, β_j is an elasticity, giving the percentage change in the expected number of FDI for 1% change in Z. Thus, the results suggest that a 1% increase in the market size leads to a 1% increase in the expected number of foreign acquisitions and greenfield investments.

Controlling for the market size effect, the coefficient of the dummy variable *Mezzogiorno* turns out to be negative and strongly significant in the case of

acquisitions, while it is not significantly different from zero in the case of greenfield investments. Thus, the amount of acquisitions in the South is smaller than expected, compared to the economic dimension of the area. Instead, the *Mezzogiorno* received a number of greenfield investments which is by no means smaller relative to its market size.

The expected South's attractiveness of acquisitions can be assessed by computing the discrete change in the expected value of y for a change in the dummy variable *Mezzogiorno* from 0 to 1 (holding Z constant at the sample mean):

$$\frac{\Delta Acquisitions}{\Delta Mezzogiorno} = \exp\left(\beta \ln \overline{Z} + \delta 1\right) - \exp\left(\beta \ln \overline{Z} + \delta 0\right) = \delta$$

The results show that, if *Mezzogiorno* equals 1, the expected count of foreign acquisitions is 1.03; if *Mezzogiorno* equals 0, the expected count is 4.09. Thus, being a Southern province, the expected count of foreign acquisitions decreases by 3.06 (δ).

3.2 Foreign acquisitions' location determinants

This and the next Sections show the estimation results of more general specifications, including potential location factors other than the market size. Bayesian Information Criterion tests are used to identify the most reliable specification.

Table 4 reports the results for the acquisition equation. Firstly, the effect of different forms of geographical agglomeration is tested (Column 2). The NEGBIN2 random effect estimated coefficients reveal that the expected number of foreign acquisitions is higher, the larger the number of domestic establishments in the same industry. The elasticity of "Within-province agglomeration" is 0.38%. As already pointed out, however, in the case of acquisitions this variable may be interpreted as measure of both procurement opportunities and agglomeration economies, and it is difficult to disentangle each effect.

Surprisingly, the coefficient of "Adjacent-Province Agglomeration" is negative and significant (the elasticity is –0.24%). This result reinforces any possible doubt about the existence of positive agglomeration externalities generated by geographical concentration of domestic plants in the same industry.

Unlike the effects of the two generic agglomeration variables discussed above, the result of the "Stock of Foreign Plants Within the Province" reveals a 'follow-the-leader' pattern of foreign investments "that is difficult to interpret as anything other than agglomeration effects" (Head *et al*. 1995, p. 233). The location of foreign acquisitions is significantly influenced by the location of previous foreign investments in the same industry. The elasticity of this variable (0.45%) is higher than that of "Within-Province Agglomeration" (0.38%), thus suggesting that the attractive effect of prior foreign investments exceeds that of prior domestic investments.

The border-province variable ("Stock of Foreign Plants in Adjacent Provinces") is positive and significant, thus indicating that agglomeration externalities generated by the stock of foreign plants operating in the same industry cross province boundaries, although, the magnitude of the effect declines. This result corroborates the hypothesis that provincial borders do not define the relevant economic boundaries for agglomeration effects.

"Public Infrastructure" are added in Column 3 to determine whether externalities generated by public investments provide an additional impetus to foreign firms' location decisions. The results confirm that the public infrastructure stock has a strong positive influence on acquisition inflows. The elasticity of the variable is 0.85%; it becomes 0.68 in the most general specification.

The labor market variables are included in Column 4. The variable "Unit Labor Cost" has the expected sign and its coefficient is statistically significant. Thus, holding the other variables constant, foreign investors are very responsive to the differences in labor costs across regions. The variable's elasticity (-1%) is considerably higher than that of any other variables. As expected, the unemployment rate has a negative effect and its coefficient is statistically significant: foreign investors tend to avoid distressed areas with high unemployment rates; the elasticity is -0.3%.

It is worth noticing that the demand-pull mechanism has some explanatory power even after controlling for the other location determinants. In the most general specification, however, the market variable elasticity strongly decreases from that observed in the dartboard model (from 0.99 to 0.31%). The dummy variable "*Mezzogiorno*" is still negative and significant, thus suggesting that the South receives a number of foreign acquisitions which is "low" relative to its economic development. However, the discrete change decreases from -3.06 to –1.04.

As shown in the basic analysis, over the period 1986-99, the geographical distribution of foreign acquisitions changed. In order to make the model robust to time variation affecting the relative attractiveness of a province in the eyes of the average investor, a dummy variable ("Period 1986-92") was added. This variable's coefficient, however, is not significantly different from zero and a likelihood ratio test reveals that its inclusion does not add significant explanatory power to the specification.

3.3 Foreign greenfield investments' location determinants

As expected, foreign greenfield investments' location determinants are different from acquisitions' ones (Table 5). Unlike acquisitions, the "Within-Province Agglomeration" variable is negative, although not significant in the greenfield equation: foreign ventures do not emulate their Italian counterparts. This result conflicts with that of Head *et al.* (1995 and 1999) and with many other studies, stating that the domestic number of manufacturing establishments has a positive influence on FDI inflows. This means that in Italy congestion costs, mainly connected to the lack of available labor force in Northern cities, generate centrifugal forces, which contrast agglomeration forces.

Like acquisitions and in line with many other studies (e.g. Wheeler and Mody, 1992; Head *et al*. 1995; O'Huallachain and Reid, 1997), Table 5 shows that provinces with a higher stock of foreign manufacturing plants in the same industry are more likely to attract further "greenfield" investments, even after controlling for the other provincial characteristics. This variable's elasticity is quite high (0.75%), thus confirming the importance of positive agglomeration externalities conferred by other foreign investors proximity to clusters, which may be due to the information externalities concerning the operating environment.

To understand the simultaneous evidence of a positive effect of 'foreign agglomeration' (connected to the spatial concentration of foreign plants) and of the null effect of 'generic agglomeration' (connected to the spatial concentration of domestic plants), we must consider that location characteristics have changed over time, firms are not perfectly mobile, and the stock of foreign plants are of more recent vintage than the overall stock of plants. In this case, foreign investments distribution may reflect current economic conditions better than the distribution of all plants.

The two border-province agglomeration variables ("Adjacent-Province Agglomeration" and "Stock of Foreign Plants in Adjacent Provinces") are not significant. Thus, in Italy, agglomeration benefits conferred by proximity to

clusters of other foreign investors operate over small geographical areas, such as provinces, instead of extending over greater distances: unlike what observed in other countries, namely in the United States (see Head *et al.* 1995), in Italy foreign firms are still far from creating extended industrial clusters.

The infrastructure stock is positive and strongly significant (Column 3); its coefficient is very high (between 1.7% and 1.4%). After controlling for the public infrastructure effect, the dummy variable "*Mezzogiorno"* – interestingly enough - becomes positive and highly significant[20]. Thus, with similar public infrastructures levels, the expected number of foreign greenfield investments attracted by the South would be much higher than that attracted by the North-Center. This suggests that, if the strong difference between North and South in terms of public infrastructures had been removed in the past, congestion costs connected to the stronger competition on product and labor markets in the North might have acted as a centrifugal force, encouraging foreign investors to locate in Southern regions, where production costs are lower, labor is more available and public incentives are higher. Therefore, the public infrastructure stock appears as a very important policy variable to promote foreign location to the South. Section 5 provides simulations to quantify the changes in the geographical distribution of foreign manufacturing (greenfield) investments that would have occurred if strong infrastructure differences between North and South had been removed by State interventions in the past.

Like acquisitions, the unit labor cost has a significant negative effect on foreign greenfield start-ups. Again, this variable's elasticity (-1.91) is considerably higher than that of any other one. The unemployment rate has a positive sign, although its coefficient is not significant. In the next Section, however, this result is revised in the light of a different model specification.

3.4 Foreign greenfield investments' location determinants: an extension

So far, the greenfield analysis has been based on the results of a random-effect negative binomial regression model. However, neither the evidence of random effects nor that of non-Piossonness (i.e. the inequality between the mean and the variance of the distribution) due to unobserved heterogeneity is robust. Thus, in this Section a different extension of the Poisson regression model is considered (the Zero Inflated Poisson model), which is based on the assumption that over-dispersion arises from the nature of the process generating the zeros (see Appendix).

[20] It was also tested whether this effect on the coefficient of the dummy variable South occurred after introducing the variable "Unit Labor Cost" or "Unemployment Rate". The results confirm that only "Public Infrastructure" have such an impact.

First, it is worth noticing that the zero outcome of the greenfield investment model can arise from two underlying responses. Some provinces may never attract a greenfield investment in a specific sector, thus the outcome is always zero. If the province is an attractive one, however, the zero outcome may be just the number of investments attracted in the period considered and the response might be some positive number in a different period. A two-regime model is, therefore, necessary. In the former regime (the splitting equation), a probit model is used; in the latter, the usual Poisson process is at work. Potentially, the same set of explanatory variables can be introduced in each stage of the process. After different attempts, however, a subset of variables was selected to specify the splitting function: "Within-Province Agglomeration", "Stock of Foreign Plants Within the Province", "Unit Labor Cost" and "Unemployment Rate". The variables included in the Poisson function are those included in Column 4 of Table 5.

Table 6 illustrates the results of the ZAP and the Poisson model. The Vuong statistics, shown at the bottom of the Table, are higher than 2, clearing arguing in favor of the splitting model. On the other hand, if the model prediction rather than its diagnostic is examined, then it appears that the Poisson model performs better without the regime split[21].

The coefficient results shown in Table 6 are strongly consistent with those reported in Table 5. It is worth noticing that, in the ZAP model splitting equation, the variable "Unemployment Rate" is positive and significant, even controlling for the dummy "*Mezzogiorno*". This last result strongly corroborates the assumption whereby a high unemployment rate makes an Italian province more attractive for greenfield investments.

[21] A similar finding was observed by Greene (1994).

Table 6

Foreign greenfield investments' location determinants in Italy

Variable	**Poisson model**	**ZAP model**
		Poisson Equation
Market	0.504*** (3.004)	0.625*** (3.917)
Within-Province Agglomeration	-0.146 (-1.095)	-0.211 (-1.489)
Adjacent-Province Agglomeration	0.173 (1.377)	0.209 (1.349)
Stock of Foreign Plants Within the Province	0.726*** (6.464)	0.708*** (5.123)
Stock of Foreign Plants in Adjacent Provinces	-0.118 (-0.864)	-0.124 (-0.743)
Public Infrastructures	1.501*** (3.582)	1.318*** (2.836)
Unit Labor Cost	-1.876*** (-3.270)	-2.580*** (-4.139)
Unemployment Rate	0.079 (0.299)	0.314 (0.924)
Mezzogiorno	0.871** (2.298)	1.193*** (2.757)
		Splitting equation
Within-Province Agglomeration		-0.182 (-0.669)
Stock of Foreign Plants Within the Province		-0.510 (-0.899)
Unit Labor Cost		-6.756 (-1.549)
Unemployment Rate		4.245** (2.194)
Mezzogiorno		4.388 (0.100)
Number of observations	1,330	1,330
Log-likelihood	-414.2	-404.7
Voung statistics		4.230

Note: The dependent variable is the number of establishments created by foreign firms in each province and in each sector. t-values in parenthesis. Coefficients of the constant term are not reported. Vuong statistics testing ZAP vs. unaltered model is distributed as standard normal (see Appendix).

4. PUBLIC INFRASTRUCTURES AS LOCATION DETERMINANTS: COUNTERFACTUAL POLICY EXPERIMENTS

As shown above, the coefficient of "Public Infrastructure" is statistically significant in the greenfield equation and seems to raise a location attractiveness by a respectable percentage. The purpose of this Section is offering quantitative simulations of the extent to which the existing public infrastructure stock in the *Mezzogiorno* should be increased to encourage foreign firms to heavily invest in this area. Three different hypotheses are proposed: 1) an "heroic" assumption of an increase by about 160%; 2) a 80% rise; and 3) a "reasonable" increase by about 10%. Under those different assumptions, the changes in the geographical distribution of foreign greenfield start-ups are quantified.

Following Head *et al.* (1999), for each simulation both a static and a dynamic version was estimated. In the static version counterfactual policy experiments do not alter the foreign agglomeration counts (the "Stock of Foreign Plants Within the Province"), which are exogenously determined by the actual historical investment pattern. By contrast, the dynamic simulations allow changes to affect foreign agglomeration counts in successive years. Instead of historical counts, those simulations apportion foreign investments according to the predicted probabilities that arise under different hypotheses. Thus, policies that raise foreign investment in the first period shall enhance the expected value of foreign investments in the second period through higher foreign agglomeration.

The simulations adopt the coefficients of the greenfield Poisson equation from Table 6, specified without the dummy variable "*Mezzogiorno*". The actual regional distribution of greenfield investments is reported in Column 1 of Table 7. The predicted distribution is reported in Column 2: it represents the baseline case when foreign firms locate on the basis of provincial characteristics and a random term. The predicted distribution fits the actual one quite well. Though the Southern share is slightly under-predicted, to compute changes caused by infrastructure variations, the predicted results rather than the actual number of FDI are used as a benchmark. This prevents reported changes from reflecting deviations due to the model-data mismatch.

As already said, three different scenarios are taken into account. The first scenario is a "provocative" one, since it is based on the very strong assumption that Southern provinces have the same infrastructure as Milan (the most favored location) in both periods (Column 3). On average, this corresponds to an increase by about 160% in the Southern public infrastructure stock! The second scenario assumes that Southern provinces have the average infrastructure level of North-Center regions in both periods (Column 4). This second assumption

corresponds to an increase of about 80% in the Southern public infrastructure stock. This scenario tells us which changes in the geographical distribution of foreign start-ups would have occurred if strong infrastructure differences between Center-North and South had been removed in the past by State interventions. The third scenario considers a mere 10% increase in Southern public infrastructures stock (Column 5).

Table 7

Regional distribution of greenfield investments under different hypotheses on public infrastructures in the South (*Percentage values)*

	1	2	3		4		5	
	Actual distribution	Predicted distribution	KG South = KG Milan (shr Δ)		KG South = average KG in the North-Center (shr Δ)		KG South increased by 10% (shr Δ)	
			Static	Dynamic	Static	Dynamic	Static	Dynamic
North-West	48.9	49.2	-11.0	-11.3	-5.1	-5.2	-0.6	-0.6
North-East Center	31.0	34.3	-7.6	-7.9	-3.6	-3.6	-0.4	-0.4
South	20.0	16.3	+18.6	+19.1	+8.7	+8.8	+0.9	+1.0

Note: The predicted distribution (Column 2) derives from calculating the expected count of foreign greenfield investments in each province/sector. The employed coefficients come from a greenfield Poisson equation specified as in Table 6, but without the dummy variable "*Mezzogiorno*". The regional distribution of greenfield investment reported in Columns 3, 4 and 5 stem from the expected count of foreign greenfield investments in each province/sector under three different hypotheses on the level of Southern public infrastructures. In the static version counterfactual policy experiments do not alter the foreign agglomeration count ("Stock of Foreign Plants Within the Province"), which are exogenously derived by the actual historical pattern of investment. By contrast, the dynamic simulations allow changes to affect foreign agglomeration counts in successive years.

The Table reports the regional distribution changes in the static and the dynamic simulations under the three different scenarios. Notice that the dynamic effects are not strong enough to produce major alterations in the geographical distribution of foreign investment, because the stock of pre-1986 foreign investments is large compared to new investments subsequent to that date. Thus, policies attracting additional foreign investors do not change the overall geographical distribution of foreign investment so much.

In the first hypothesis the South is strongly better off in terms of investment count, since the Southern share increases by 18 and 19 percentage points in the static and dynamic simulations respectively. His gain comes at the expense of the other regions especially the North-West, whose share of investment declines by more than 11%. In the second hypothesis the Southern share increases by 9

percentage points. Finally, the Table shows that a 10% increase in the Southern public infrastructure stock would not have an appreciable effect on foreign investment geographical distribution.

Generally speaking, this experiment corroborates the hypothesis, discussed in Section 2, that, with endogenous agglomeration effects in force (foreign firms seems to prefer provinces chosen by preceding foreign investors), a small change in the attractiveness of the periphery would not bring about any economic activity relocation. Only a very large change in the periphery attractiveness would have a chance of attracting industrial activity.

This might sound as a pessimistic signal for policy makers, since it is not feasible to image an increase in the Southern infrastructure stock by about 160% (to reach the level of Milan) or by about 80% (to reach the average level of the North-Center). The message, however, is to heavily invest in infrastructures in the South (each year the actual expenditure for public works systematically falls short of the planned figure), while using also other more direct measures aimed at attracting FDI, such as a higher labor flexibility and financial and fiscal incentives. This last point will be thoroughly discussed in the last Section.

5. CONCLUDING REMARKS AND POLICY IMPLICATIONS

This paper starts from the recognition that FDI may play a key role for the economic development of the South of Italy (the *Mezzogiorno*) and tries to identify which location factors might influence foreign entry in this country. This issue is gaining relevance because of the progress in the European integration: the *Mezzogiorno* of Italy is thus called to compete with several peripheral areas in the supply of location factors for industrial activities. In the nineties, the South of Italy was excluded from the big flows of international investments, which have boosted the economic development of other European peripheral areas, such as in Ireland and Spain.

The results show that the main location determinants strongly differ according to the type of foreign investment considered. Firstly, foreign acquisitions' geographical distribution is not only constrained by the supply of acquisition candidates. The consistent significance of variables other than the stock number of existing firms (such as public infrastructures and the prior concentration of foreign manufacturing firms within the province, as well as in adjacent provinces) confirms that supply alone does not decide the location of foreign acquisitions flows in Italy. Thus, scholarly disinterest in the distribution of acquisitions is unjustified.

Differently from the results of many other studies, foreign ventures in Italy do not emulate their domestic counterparts. In other words, *ceteris paribus*, foreign business groups do not invest more intensively in those regions where there is a higher concentration of other firms. When foreign investors decide to build new production facilities in Italy, they are strongly influenced by location decisions of previous 'foreign' investors, but they also must take into account congestion costs (which contrast agglomeration forces) mainly linked to the lack of available labor force, especially in the big Northern cities. Therefore, high unemployment provinces in the South have a greater potential capability of attracting greenfield FDI than Northern-Central ones.

However, the potential attractiveness of Southern provinces can only emerge if certain conditions are met: firstly, the necessary infrastructures are to be created; secondly, the gap between the labor cost and the productivity trends must be narrowed; thirdly, an adequate system of public incentives aimed at favoring foreign direct investments must be created.

With regard to the infrastructures, the results of some simulations suggest that, with endogenous agglomeration effects in force (foreign firms seem to prefer provinces chosen by other foreign investors), a small improvement in the public infrastructure stock does not affect the regional distribution of FDI. Only a very

strong leap forward in Southern infrastructures might allow a significant reallocation of foreign capital towards Southern regions. This finding is very important, since each year the actual expenditure for public works systematically falls short of the planned figure.

With regard to labor cost, a centralized system of wage bargaining is inadequate to the development conditions and to the location disadvantages of the South of Italy. Compared to a strongly negative productivity differential with North-Central regions, the average labor cost in the South is not sufficiently different from the one prevailing in the rest of the country. Thus, collective wage bargaining should be decentralized at a regional or firm level, thus taking account of local or firm-specific conditions.

Finally, with regard to the incentives to attract foreign direct investments to the South, they should be set within what are known as "*Contratti di Programma*" ("*Planning Contracts*"). The evaluation of this policy instrument seems to be positive. Recently, however, the "Planning Contracts" have been stopped.

Apart from financial incentives, tax incentives should also be prompted to attract new foreign investments. Some cross-state analysis in the United States (see, for example, Head *et al.*, 1999) show that regional fiscal differences do substantially affect the location of Japanese firms in the USA. Furthermore - as demonstrated by the experience of some European countries, such as Ireland, - the use of fiscal incentives may be very effective to attract foreign direct investments. However, when fiscal incentives operate indistinctly over the whole national territory, there is no room for diversified fiscal treatments which could create an advantage for substantial capital movements towards developing regions, as it happened in Ireland.

Thus, the adoption of a regionally diversified fiscal policy aimed at prompting regional economic growth seems a necessary step to attract investments in the most backward areas of the South. Nowadays, because of the constraints imposed by the European Union in the interpretation of "State aids", the condition of being a country partition and not a State hampered the introduction of particular fiscal advantages for the *Mezzogiorno*. The irrelevance of national boundaries within an integrated area, such as the European Union, induces, however, to overcome that approach. The ongoing process of fiscal and administrative decentralisation taking place in Italy, as well as in many other European countries, seems to overcome the old positions of the European Commission on competition distortions induced by State aids granted in some peripheral areas of Core countries and paves the way to regionally diversified fiscal policies in Europe, irrespective of the country, which the region belongs to.

APPENDIX: ECONOMETRIC SPECIFICATIONS

The dependent variables y_{it} used in the econometric analysis (the number of firms acquired and created by foreign firms in each province *i* and in each period *t)* assume discrete values, that is non-negative integer values (count data). The standard model for count data is the Poisson regression model[22]. A less restrictive model, which allows for multiplicative gamma-distributed unobserved heterogeneity, is the negative binomial model. The most common implementation of this model is the NEGBIN2 model, with density:

$$\Pr(y_i \mid z_i) = \frac{\Gamma(y_i + \theta)}{y_i!\Gamma(\theta)}\left(\frac{\theta}{\theta + \lambda_i}\right)^{\theta}\left(\frac{\lambda_i}{\theta + \lambda_i}\right)^{y_i} \quad (1)$$

where $\theta = 1/\alpha$. Γ is the gamma function. The first two conditional moments are:

$$E[y_i|Z_i] = \lambda_i. = exp(\beta' Z_i) \quad (2)$$

$$Var[y_i|Z_i] = E[y_i|Z_i]\ \{1 + \alpha E[y_i|Z_i]\} \quad (3)$$

The model approaches the Poisson distribution as the dispersion parameter goes to zero.

Panel data treatments are provided for both the Poisson and negative binomial models. The random effects model for the negative binomial framework is $log\lambda_{it} = \beta' Z_{it} + u_i$, $i = 1 \ldots N$, $t = 1 \ldots T$, where u_i is a random effect for the *ith* group such that $exp(u_i)$ has a gamma distribution with parameters (θ_i, θ_i), which produces the negative binomial model with a parameter that varies across groups. Then, it is assumed that $\theta_i/(1+\theta_i)$ is distributed as a beta random variable with parameters (a,b). All in all, the random effect is added to the negative binomial model by assuming that the overdispersion parameter is randomly distributed across groups. Using the beta density, the joint probability of a province's FDI inflows over the panel years can be derived:

$$\Pr[y_{i1}, \ldots\ldots, y_{iT}] = \left[\prod_t \frac{\Gamma(\lambda_{it} + y_{it})!}{\Gamma(\lambda_{it})!\Gamma(y_{it} + 1)!}\right]\frac{\Gamma(a+b)\Gamma\left(a + \sum_t \lambda_{it}\right)\Gamma\left(b + \sum_t y_{it}\right)}{\Gamma(a)\Gamma(b)\Gamma\left(a + b + \sum_t \lambda_{it}\sum_t y_{it}\right)} \quad (4)$$

[22] For a thorough review of the literature on count regression models, see Cameron and Trivedi (1998).

This is the basis for the maximum likelihood estimation of β, a and b. Under the assumption of no random effect, $a = b = 0$. This restriction can be tested with a standard Wald test or a likelihood ratio test.

Excess zeros, like unobserved heterogeneity, lead to overdispersion. A more appropriate formulation for these data is the "Zero Altered Poisson" (ZAP) model (see Greene, 1994), where with probability q_i the only possible observation is zero, and with probability $(1-q_i)$ a Poisson (λ_i) random variable is observed. Both q_i and λ_i may depend on covariates. The overall probability of a zero outcome is then

$$Prob[Y_i = 0] = q_i + (1-q_i)R_i(0) \quad (5)$$

and $$Prob[Y_i = y>0] = (1-q_i)R_i(y), \quad (6)$$

where $R_i(y) = e^{-\lambda_i}\lambda_i^{y_i} / y_i!$ (the Poisson probability) (7)

and $$\lambda_i = exp(\beta'Z) \quad (8).$$

Probability q_i may follow either a logistic or a normal distribution, so that the splitting model may be either a logit or a probit model, which is then integrated into the Poisson regression model. However, there will be a problem distinguishing the ZAP model from an underlying negative binomial specification as source of overdispersion. The testing procedure is complicated by the fact that the ZAP model is not nested within either the Poisson or the negative binomial models. Vuong (1989) proposed a test statistic for non-nested models, which appears to have some power to distinguish between non-Piossonness due to over-dispersion of the negative binomial model and the force of the splitting mechanism in the ZAP part of the model. The statistic is asymptotically distributed as a standard normal, so its values may be compared to the critical value from the standard normal distribution, e.g. 1.96.

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