



Industrial districts, urban areas or both? The location behaviour of foreign and domestic firms in an Italian manufacturing region

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Abstract

The present paper aims at exploring the location behaviour of manufacturing firms, according to their ownership: domestic firms (henceforth DOMs) and inward foreign direct investments (henceforth IFDIs). This issue is empirically addressed by using data on manufacturing IFDIs and on DOMs in Veneto (north-east Italy) from the Reprint, AIDA and ISTAT databases. Veneto is an industrial district region, specialized in the Made-in-Italy sectors, hosting a central metropolitan area (Padua) and attracting a high share of IFDIs. Geo-referenced mapping and econometric analysis (counterfactual) are developed to explore the location behaviour of the two groups of firms. In line with previous work, findings show that IFDIs are more likely to be located in areas close to the main urban centres, such as the metropolitan area of Padua, to exploit the advantages of complex environments and higher connectivity. However, they also tend to locate in district areas more often than their DOMs counterfactual, suggesting the objective of acquiring a system of specialized productive knowledge and skills developed within a district ecosystem, and hardly reproducible in other contexts.

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1 Introduction

Inward foreign direct investments (IFDIs) are often considered to be key players influencing local, regional and national performance in terms of learning, innovation, competitiveness, growth and development (see, among others, Cantwell and Mudambi 2005). Fostering the location of foreign domestic investments (FDIs) and the networking strategies by enhancing the embeddedness in the territory where they are located has, therefore, become a crucial priority for local and regional development policy (Zanfei 2000; McCann and Mudambi 2005). In the context of firms operating in the manufacturing sector, the location strategies of IFDIs tend to follow defined economic objectives, which in mature industrial countries cannot be traced back only to costs reduction, but to the possibility of accessing market shares, and a set of specific skills and productive knowledge (Dunning 1993; Barba-Navaretti and Venables 2004). As reported by Hausmann et al. (2013, p. 8), '[a]ccumulating productive knowledge is difficult. For the most part, it is not available in books or on the Internet. It is embedded in brains and human networks. It is tacit and hard to transmit and acquire. It comes from years of experience more than from years of schooling'. In this perspective, two different contexts can be identified as possible targets of IFDIs: industrial districts¹ (IDs) and cities or metropolitan areas.

The industrial variety and the specificity of the skills developed in a local production system, present in an ID, can outline important drivers to foreign investments. Indeed, IDs are characterized by an industrial atmosphere of collective information and knowledge specific to business (Becattini 1990). Such an industrial atmosphere allows foreign investments to benefit from agglomeration economies relating to collective learning, labor market pooling, supply chain relationships and local buzz (Bronzini 2007; Ellison et al. 2010; Mariotti et al. 2014).

On the other hand, as reported by McKinsey Global Institute in 2013, 20 major cities hosted one-third of all large companies. The forecast predicts that, by 2030, the biggest cities will contribute 61% of total world gross domestic product (GDP). These figures point out that the global geography has become more and more spiky (McCann 2008; Rodríguez-Pose and Crescenzi 2008) with a high concentration of economic activities in global cities, and it also appears that this pattern will be a long-term trend (Castellani and Santangelo 2016). Foreign investors favor global cities for their ability to reduce the liability of foreignness (Nachum 2003; Goerzen et al. 2013), a competitive disadvantage experienced by foreign subsidiaries due to their less, compared to domestic firms, deep knowledge on the hosting socio-economic environment (Hymer 1976). Accordingly, these information asymmetries result in high information costs (Mariotti et al. 2010). In the light of this

¹ The industrial district is a socio-economic model characterized by a geographical concentration of small and medium enterprises (SMEs), specialized in specific industries with potential productive fragmentation and high-demand variability (see, among others, Becattini 1990). These SMEs are flexible and prone to a rapid adjustment to market volatility; they share social proximity (a system of institutions, codes and rules that regulates the market), which enhances firms' cooperation and incremental innovation (Corò and Micelli 2011).

disadvantage, world cities² offer global interconnectedness, cosmopolitanism and an abundance of activities with high added value for local and regional economies (i.e. finance, insurance, real estate, accountancy, law, advertisement, management and consultancy): the advanced producer services (APS) (Sassen 1991; Beaverstock et al. 1999), which reduce unfamiliarity, differential treatment and spatial separation that foreign investors have to face in investing abroad. World cities have become centres for the production and consumption of APS in the organization of global capital, and the Globalization and World City Research Network (GaWC) classifies the global cities according to their connectivity through APS activity (Sassen 1991; Taylor 2001³).

Within this context, the present paper aims to explore the location behaviour of manufacturing domestic⁴ firms (henceforth DOMs) and IFDIs in the Veneto region (north-east of Italy), thus enriching the literature pertaining to the location of foreign investments, which has mainly stressed the attractiveness of global cities and metropolitan areas, in general, neglecting the role of IDs. The focus on Veneto is explained by its peculiarity: (1) it is a typical industrial district region, and a world renowned economic area for manufacturing production in the Made-in-Italy sectors; (2) it hosts a central metropolitan area (the area of Padua); and (3) it also hosts a significant share of IFDIs, showing a growing attractivity among Italian regions (Mariotti and Mutinelli 2016). Specifically, Padua, together with the Provinces of Venice and Treviso, constitutes the Venice city region that is the largest wetland in the Mediterranean and one of the most touristic areas in the world (OECD 2010; Micelli 2012). Venice city region comprises about half of Veneto's population and more than half value added. It hosts important industrial districts in the Made-in-Italy sector. According to the OECD Regions and Cities Report (2018), three metropolitan areas⁵ are present in Veneto, with Padua being the richest, in terms of GDP per capita (OECD 2018), followed by Verona and Venice, and it is an attractive location for firms' headquarters.

Moreover, our aim is to understand whether the ownership of manufacturing firms (IFDIs or DOMs) affects their location strategy (with a specific focus on the access to specific urban and metropolitan factors as well as the inclination for localization economies that can be found in the IDs) in a temporal window (2007–2013) that, due to the financial crisis, represented a critical period for the manufacturing

² For a review, see Taylor (2001).

³ In the early 2000s, Peter J. Taylor and the GaWC research network at the University of Loughborough developed an original methodology for analysing the World City Network, which found wide approval from the scientific community. According to Taylor (2001), the world city network is identified as an unusual form of network with three levels of structure: cities as the nodes, the world economy as the supra-nodal network level, and advanced producer service firms forming a critical sub-nodal level.

⁴ We consider uni-national companies those firms that have neither been acquired in the period of analysis, nor have invested abroad.

⁵ According to the article 114 of the Italian Constitution and the Act no. 56 of the 7 April 2014, Italy hosts the following 14 metropolitan cities: Rome, Turin, Milan, Venice, Genoa, Bologna, Florence, Bari, Naples, Reggio Calabria, Palermo, Messina, Catania and Cagliari. Therefore, in Veneto only Venice is a metropolitan city, while Padua and Verona are classified as metropolitan areas (OECD 2018). Further information can be found at: <https://www4.istat.it/it/archivio/145343> [Last accessed 22 November 2019].

sector. We believe that understanding companies' behavioural choice in these conditions can contribute to the urban studies literature, which has more extensively focused on companies manufacturing firm location choice under different market conditions.

We empirically investigate this issue by using data on manufacturing IFDIs and on DOMs in Veneto between 2007 and 2013 from Reprint, which has recorded inward FDIs in Italy since 1986 (Mariotti and Mutinelli 2016).⁶ These data have been matched with balance sheets data provided by AIDA along with information about ID provided by the Italian Statistical Institute (ISTAT), in order to distinguish between district firms and non-district firms. Geo-referenced mapping and econometric analysis (counterfactual) were combined to explore the location behaviour of the two groups of firms. This joint analysis allows a more comprehensive explanation of the phenomenon and helps to visualize it.

This paper is structured in six sections. Section 2 reviews the literature on the location behaviour of IFDIs and the attractiveness of the city and the IDs. Section 3 describes IDs and IFDIs in the Veneto region. Data and methodology are presented in Sect. 4, while mapping and econometric analysis are discussed in Sect. 5, where the location behaviour of DOMs and IFDIs is investigated. Section 6 draws conclusions and policy implications.

2 Literature review on IFDIs

2.1 Location behaviour of IFDI

The literature on FDI determinants indicates that one way in which multinational enterprises (MNEs) maximize their risk-adjusted profits is by spreading their investments between countries (Caves 1974). In the OLI (Ownership, Location and Internalization) paradigm developed by Dunning (1979, 1993, 2009), these profits may depend on three groups of factors. First, 'Ownership advantages' are firm-specific factors enabling the firm to grow more successfully than competitors in the home or host country (e.g. proprietary technology and management expertise). Second, 'Location advantages' are location-specific factors in the host country that attract firms to set up their businesses (e.g. cheap labor, a convenient cost and productivity ratio, growing market size and good infrastructure). Third, 'Internalization advantages' are factors associated with the firm's trade-off between carrying out activities within firms (via FDIs and exporting or licensing) or through arms-length transactions (e.g. trade barriers and difficulties in finding a trustworthy licensee).

The main location determinants identified by research on location advantages are: (1) the factors endowment (labor costs and availability; labor skills and labor

⁶ The Reprint database is compiled by the Politecnico di Milano and sponsored by the Italian Institute for International Trade (ICE). This dataset provides an annually updated census of both foreign affiliates of Italian firms and Italian affiliates of foreign firms (in terms of numbers of employees and sales) since 1986 (for details, see Mariotti and Mutinelli 2016).

unionization; market size and market potential; competitiveness level and density; land costs and availability; agglomeration economies; transportation and other costs; taxes and financing); (2) infrastructure, services and intangible assets; (3) environmental and social contexts; (4) policy framework; and (5) information costs (for a review, see Brouwer et al. 2004). Besides, the location factors driving foreign MNEs to choose a specific host economy are linked to the typology of investments that companies envisage to undertake. Following Behrmann's 1972 classification, four main types of FDI can be identified (see also Dunning 1993; Iammarino and McCann 2013): (1) resource or asset seeking; (2) market seeking; (3) efficiency seeking; and (4) strategic asset seeking. In the first case, MNEs invest abroad in order to gain access to tangible or intangible resources and assets, such as raw materials, labor and skills that are either unavailable in the home location or available at a lower cost in the host location. An investment is market seeking when the MNE wants to access new markets or to expand its existing one. MNEs that invest in order to rationalize and restructure previous investments, that are either resource or market led, make an efficiency-seeking investment. The last type of investment is the strategic-asset-seeking kind. This is undertaken by MNEs engaged in foreign operations, usually by acquiring the tangible and intangible assets of foreign firms, and with the principal purpose of advancing their long-term strategic objectives in terms of global capabilities and competitiveness.

Investments in advanced economies are generally market seeking and strategic asset seeking, while those in developing countries tend to be mainly resource seeking and cost saving. Nevertheless, developing countries are increasingly attracting market-seeking investments. China, for example, is not only advantageous for labor-intensive investments, due to the presence of relatively low-cost labor but also because it offers a direct market in which to sell goods (Elia et al. 2009).

The study on the location behaviour of MNEs in Italy by Mariotti et al. (2010) shows that foreign MNEs are willing to agglomerate with other MNEs because they gamble on a positive balance between knowledge inflows and outflows. These scholars suggest that the agglomeration behaviour of MNEs with local competitors can be influenced by: (1) information externalities, producing locational cascades and imitation of other MNEs and (2) potential knowledge spillovers, which might act as both a centrifugal and a centripetal force, depending on the nature of local counterparts.

2.2 Urban areas versus industrial districts

Over the last four decades, the proportion of people living in urban areas has increased throughout the global economy. Large cities are predicted to contribute 61% of the world's GDP by 2030 (Ernest and Young 2015). This trend suggests that being geographically close is becoming increasingly important for people employed in high-knowledge and high-skill activities (Moretti 2012; Iammarino and McCann 2013). Tacit knowledge still requires close contact to be exchanged and shared, facilitated by co-location, and through regular or less regular travel (McCann 2008). The key role of cities has been long studied in the literature; among others, Jacobs (1970)

stressed that cities are the engine of national, regional and global economic growth because they offer advantages related to agglomeration (Glaeser 2011), knowledge capabilities and connectedness with the rest of the world. Agglomeration economies, and specifically urbanization economies, enhance creativity (Florida 2005), efficiency (Combes et al. 2012) and innovation (Acs 2002). Moreover, the great connectedness of global cities makes geographical distance less of an obstacle for firms (Sassen 1991, 2012; Castells 1996).

Countries are increasingly competing to attract IFDIs because of their potential benefits (Lipsev 2002; Crescenzi et al. 2015). As has been extensively emphasized in the literature, foreign MNEs are more likely to adopt new technologies, achieve higher productivity and therefore employ a more highly skilled labor force. Therefore, the affiliates of foreign MNEs—that is, IFDIs—generate technologically and managerially cumulative effects on the local environment in which they settle, and the spillovers spur from the interaction between foreign enterprises and the local context. IFDIs indeed contribute to diversifying the economic system, improving innovative capabilities, productivity and competitiveness of local firms. However, IFDIs may also have a negative effect on the local area by monopolizing the market and displacing the domestic production of inputs (Aitken and Harrison 1999).

Studies on the location of IFDIs have mainly devoted their focus to investing countries; more recently, increased attention has been placed on the location choices at the sub-national level, either regional (NUTS2—Castellani and Pieri 2016), micro-territorial (Mariotti et al. 2010) or city level (Goerzen et al. 2013; Castellani and Santangelo 2016). Castellani and Pieri (2016) find that 10% of the most attractive European NUTS2 regions make 26 times more IFDIs than the 10% of NUTS2 regions on the lower part of the scale. Mariotti et al. (2010) analyze the MNEs location behaviour in Italy across 686 territorial units (Local Labor Systems⁷) and find that the location behaviour is influenced by information externalities and knowledge spillovers. MNEs tend not to agglomerate with domestic firms, as they perceive knowledge flows to be lower than depletions, unless domestic firms enjoy some comparative advantages. On the other hand, MNEs are willing to agglomerate with other MNEs, as they home for a positive balance between knowledge inflows and outflows. Goerzen et al. (2013) and Castellani and Santangelo (2016) focus on the attractiveness of the city, specifically global cities, which offer firms advantages linked to: urbanization and localization economies, market size and potential, skilled labor force availability and business opportunities, transportation accessibility and connectedness with the rest of the world. Moreover, agglomeration economies enhance creativity (Florida 2005) as they are favorable locations for talents and the best creative minds, efficiency (Combes et al. 2012) and innovation (Acs 2002). These cities contribute to a reduction in liability of foreignness (Zaheer 1995; Nachum 2003; Goerzen et al. 2013) because they can reduce the uncertainty of foreign operations and

⁷ The Local Labor Systems (LLSs), defined by the Italian Statistical Institute—ISTAT, consist of several municipalities and identify geographic areas that mimic economic activity and not administrative boundaries.

information asymmetries leading to high information costs, offering global connectedness, cosmopolitanism and the abundance of advanced producer services and information (Castellani and Santangelo 2016). Metropolitan cities also offer advantages in accessing the market and therefore tend to attract market-seeking investments. Nevertheless, investments in these areas have led to the presence of some negative externalities, such as congestion, raising costs and lowering the quality of life. This explains why some MNEs' activities (i.e. logistics), which require large areas in which to operate, are mainly located outside global cities, even if they are near to the cities (Holl and Mariotti 2017). The same holds true for research and development (R&D) activities: indeed, they require the construction of large laboratories, which seem to favor locations outside global cities, in areas that are still agglomerated and which offer a quality of life that is attractive to the most skilled workers. Conversely, peripheral areas should attract more labor-intensive activities.

The analysis by Castellani and Santangelo (2016) based on 111,310 greenfield FDIIs, undertaken within global cities in the period 2003–2015, investigates the attractiveness of global cities for cross-border investments originating from distant locations and across different types of value chain activities. In this study, FDI activities have been grouped into the following five categories: (1) coordination activities (i.e. headquarter); (2) R&D-related activities; (3) production activities; (4) support services (i.e. logistics, maintenance, technical support); and (5) advanced services. The research highlights the fact that 57% of coordination activities (headquarters) are located in global cities. Specifically, they prefer the metropolitan areas of these cities, which are sufficiently proximate and well connected to global cities to enjoy the liability of foreignness, and which also present lower congestion costs and tax payments. On the other hand, R&D-related activities are more likely to be located in moderately global cities, which offer urban contexts that are especially conducive to innovation (Feldman and Audretsch 1999), while peripheral cities primarily attract cross-border production activities.

In the light of the literature on urban studies and building upon the role played by urban agglomerations, such as global cities and metropolitan areas, in attracting foreign investments, the following hypothesis is tested:

H1 IFDIIs are more likely to locate in main urban centres compared to their DOM counterparts.

Concerning the location of IFDIIs in IDs, the literature emphasizes that these investments may benefit from being located in certain agglomerations (Andersson et al. 2002; Bronzini 2007). Specifically, location in an ID provides access to a trio of key agglomeration economies—a local pool of skilled labor, local input–output linkages and local spillovers (Marshall 1890)—and therefore to industry-specific knowledge and skills (Mariotti et al. 2014). Evidence from Italian IDs confirms that IFDIIs' strategy of acquiring district firms enables them to become deeply immersed in the industrial atmosphere of the district, to identify novelties and market changes and to grasp contextual knowledge produced locally (e.g. Belussi and Asheim 2010).

According to Iammarino and McCann (2013: p. 203), “following a combination of Marshall, Vernon, Porter and Alchian’s arguments, ‘knowledge-intensive’ MNE operations should be located in ‘knowledge-intensive’ regions characterized by other similar knowledge-intensive activities and establishments”.

Studies on the location of IFDIs in the Italian IDs are scant. Mariotti et al. (2008), in their work on the internationalization of production by Italian industrial district firms in 2003, found that the presence of foreign MNEs positively impacts the district’s degree of internationalization, since there is a correlation between the attractiveness towards IFDIs and the propensity of district firms to internationalize. The analysis shows that the benefits stemming from the presence of foreign MNEs take off only once the district has already started internationalizing, and smaller district firms seem to benefit more from foreign presence, probably because they reduce cognitive asymmetries with the foreign MNEs, and can therefore face them through imitation, learning and cooperative relationships. The study by Petrobelli et al. (2011) focuses on 78 Chinese IFDIs in Italy in 2010 and emphasizes some Italian IDs attracted foreign investments because they are known globally for their production and design excellence, for the density of agglomeration economies and the competitiveness of the supplier networks. Specifically, two Chinese automotive companies, Jac Anhui Janghuai and Changan, have established R&D facilities, design centres and headquarters in the specialized automotive cluster in Turin. Haier—the Chinese giant specialized in the white goods sector—established the investment Haier Europe in the home appliances district in Varese,⁸ to absorb foreign technology and improve their technical know-how (especially in design skills) and to benefit from the pool of specialized suppliers to outsource a breadth of activities ranging from engineering to modelling and prototyping. In line with these arguments, we define our second hypothesis as follows:

H2 IFDIs are more likely to locate in district areas compared to their DOM counterparts.

3 Veneto region: industrial districts and IFDI

The latest classification of Italian IDs is provided by ISTAT’s Ninth Census of Industry and Services (ISTAT 2015), which identifies 141 Italian IDs specializing in 11 macro sectors. IDs represent about a quarter of the Italian productive system in terms of local labor systems, jobs and local units; and IDs’ manufacturing employment represents more than a third of total Italian employment.

Table 1 shows the distribution of the 141 IDs by geographical area. The north-east macro area, which represents the traditional reference area of the Italian ID model, hosts the majority (45; 31.9%), with Veneto accounting for 28 IDs (19.9% of Italian IDs) and 26.2% of total employees (Table 1). The regions of Veneto and Lombardy

⁸ Varese is well known for its white goods production and is home to important IFDIs such as Philips and Whirlpool.

Table 1 Geographical distribution of Italian industrial districts in 2011. *Source:* authors' elaboration of ISTAT data

	Industrial districts		Employees	
	<i>N</i>	%	<i>N</i>	%
North-west	37	26.2	1,812,392	37.1
North-east	45	31.9	1,788,770	36.6
Veneto	28	19.9	1,278,439	26.2
Centre	38	27.0	959,537	19.6
South and Islands	21	14.9	326,828	6.7
Italy	141	100.0	4,887,527	100.0

are home to about 40% of Italian IDs (19.9% and 20.6%, respectively) and 60% of the district's manufacturing employment (26.2% in Veneto and 33.7% in Lombardy).

Among 141 Italian IDs, 130 (92.2% of the total) specialize in Made-in-Italy sectors, with a prevalence in machinery and equipment (27%), textiles and clothing (22.7%), wood and furniture (17%) and leather and footwear (12.1%). In terms of geographical distribution, area specializations emerge: the north-west reveals an above-average number of districts specialized in metal products, machinery and equipment, and textiles and clothing. Veneto registers the highest percentage of IDs in machinery and equipment (31.6%), followed by wood and furniture (29.2%). It also hosts a quarter of Italian IDs in jewelry, 15.6% in textiles and clothing, 11.8% in leather and footwear and 6.7% in food and beverage.

According to Reprint, 257 foreign MNEs invested in Veneto in 2013. This led to a presence of 299 affiliates of foreign companies (IFDIs) operating in the manufacturing sector in Veneto, representing about 11% of total number of foreign affiliates in Italy (Table 2). Within the region, Padua together with the provinces of Venice and Treviso constitutes the Venice city region, which comprises about half of Veneto's population and more than half value added. Venice city region hosts important industrial districts in the Made-in-Italy sector and accounts for 23% of all national exports and over 40% of Italian luxury goods sold abroad (Micelli 2012). According to the OECD Regions and Cities Report (2018), Veneto hosts three metropolitan areas, with Padua being the richest in terms of GDP per capita, followed by Verona and finally Venice.

Table 2 Inward FDIs in Italy and Veneto in 2013—manufacturing industry. *Source:* Reprint data

	Inward FDIs in Italy (total)	Inward FDIs in Italy (control)	Inward FDIs in Veneto (total)*	Inward FDIs in Veneto (control)**
Investing MNEs	1673	1552	257 (15.4%)	226 (14.6%)
Affiliates of MNEs (IFDIs)	2723	2425	299 (11%)	258 (10.6%)
Employees—affiliates	484,784	430,676	35,053 (7.2%)	30,134 (7%)
Foreign affiliates' turnover (million Euros)	211,484	180,003	10,815 (5.1%)	8956 (5%)

*Total inward FDIs; **Only control inward FDIs

4 Data and methodology

To determine how firm ownership (DOMs or IFDIs) impacts on manufacturing firm location choice, this study uses data from three sources: Reprint, AIDA and ISTAT. The Reprint Database contains data on the flows of inward and outward manufacturing FDIs occurring in Italy since 1986; while the AIDA Database, by the Bureau van Dijk, provides balance sheet data of active Italian firms. This dataset allows for the retrieval of data from the balance sheets of manufacturing firms located in Veneto from 2007 to 2013. We use the most recent classification of Italian districts⁹ published by the Italian National Institute of Statistics (ISTAT) to define whether a firm is located in an ID area or not and, if it is, whether the sector in which the company operates is the same as the industrial specialization of the district. We combined these three sources at firm level. Variables and data sources are summarized in Table 3.

The study considers manufacturing companies, both foreign owned and domestic owned, that have more than ten employees and are located in the Italian region of Veneto (Fig. 1). Foreign-owned companies (IFDIs) are affiliates of foreign multinational enterprises. As per Reprint's definition, a company is considered foreign owned, if the foreign investor owns 50% or more of ordinary shares/voting rights or the investor has a significant influence on the management of the enterprise. Domestic firms (DOMs) are Italian firms that have neither been acquired by nor merged with foreign companies, nor have they invested abroad between the period of 2007–2013. We analyze firms located in the same region to control for the legal, cultural and economic framework in regard to the case under investigation. Moreover, the rationale behind the choice of investigating the Veneto region is that the manufacturing sector represents an important source of competitiveness for the region itself and, by and large, for the country. In particular, we investigate the role of ownership on firms' location behaviour in this high-manufacturing region in a specific temporal window: the economic downturn originating with the global financial crisis, during which manufacturing was put under a deep strain. Exploring companies' behavioural choice in these conditions should allow for the identification of the tools policy makers could use to foster sustainable growth.

Firstly, we examined the location behaviour of DOMs and IFDIs through geo-referenced mapping. Secondly, drawing upon Barzotto et al. (2019), we build an appropriate counterfactual of national firms which are as similar as possible to foreign-owned companies' affiliates of multinational enterprises (Barba-Navaretti et al. 2009: p. 241). We apply the method of propensity score matching (Rubin 1974) to overcome the self-selection problem, allowing the condition of a natural experiment with non-experimental data to be established (Heckman et al. 1997; see Barba-Navaretti et al. 2009 for a literature review of contributions in international economics using propensity score matching and see Becker and Muendler 2008 on the effect of FDIs on job security). The propensity score estimates the probability of being an

⁹ Further information (available in Italian language) can be found at: <https://www.istat.it/it/archivio/150320> [Last accessed 22 March 2019].

Table 3 Variables and data source

Label	Variable	Description and unit	Year	Source
Firm characteristics	Ownership	Dummy variable = 1 if IFDI; = 0 if DOM	2007–2013	Reprint and AIDA
	Sector	Dummy variable, OECD classification	2007–2013	AIDA
	Firm size (turnover)	Thousands of euros	2007–2013	AIDA
Performance	ROE	Percentage	2007–2013	AIDA
Location behaviour	Distance	Minimum distance (metres) from the firm and any Veneto provincial capital	2013	Geoportale Regione Veneto
	District location	1 = localized in a district with the same industrial specialization; 0 otherwise	2011	ISTAT
Province characteristics	Population density	Ratio between the annual initial population and the land area of the province, dummy variable	2013	ISTAT

Building on, among the others, Holl and Mariotti (2017), we compute this variable as follows. First, we geo-localized each firm using their postcode. Second, we create a proximity matrix that includes the Euclidian distances (in metres) between the company and each provincial capital in the Veneto region. Third, we keep the minimum value among the Euclidian distances

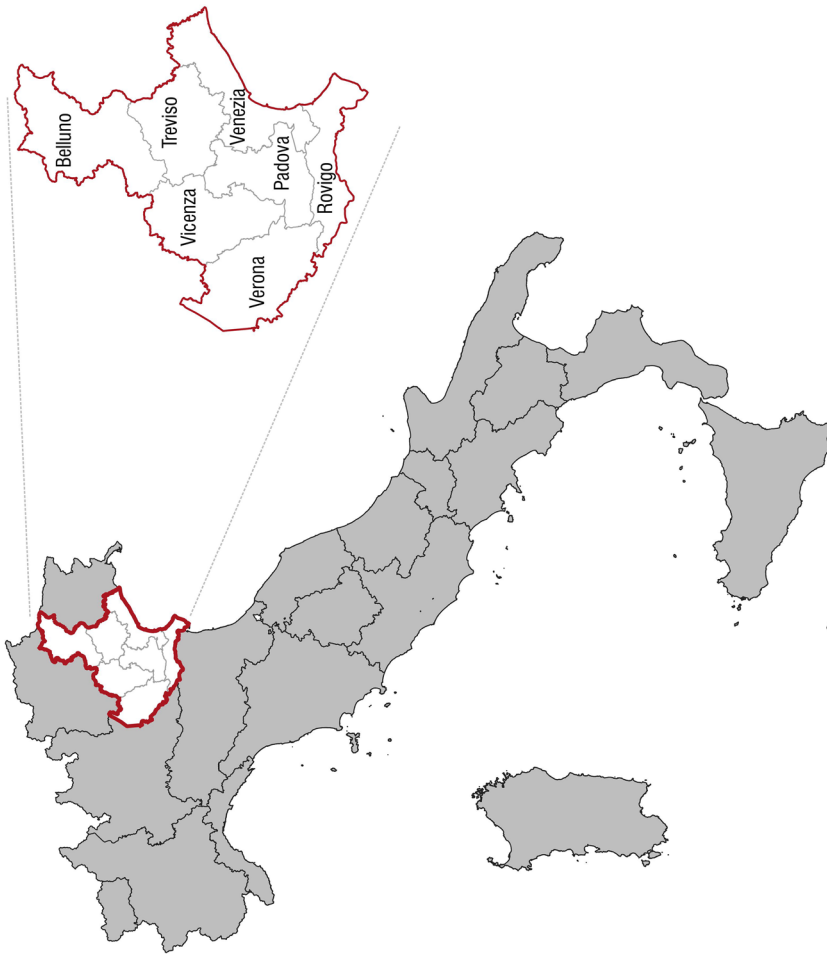


Fig. 1 Veneto NUTS2 region and its NUTS3 provinces. *Source:* authors' elaboration on ISTAT data

Table 4 IFDIs in Veneto and DOMs in 2013 by OECD classification (NACE Rev. 1.1)

OECD classification	DOMs		IFDIs	
	<i>N.</i>	%	<i>N.</i>	%
High tech	251	3.80	17	12.06
Medium–high tech	1623	24.54	66	46.81
Medium–low tech	2621	39.63	34	24.11
Low tech	2118	32.03	24	17.02
Total	6613	100	141	100

IFDI as conditional on a number of observables (Becker and Ichino 2002; Brouwer and Mariotti 2014; Caliendo 2008). Specifically, such a counterfactual dataset has been defined by matching the IFDI with firms from the DOM sample which have been selected based on the following four characteristics: size, return of equity, sector and population density. We expressed *size* in terms of the natural logarithm of the turnover (e.g. Bernardini Papalia and Pinuccia 2008; Grimpe and Sofka 2009; Saebi et al. 2017) in 2010. The turnover referred to the data in 2010 in order to control for the argument regarding the cherry-picking of IFDIs. In fact, it could be argued that the best performing local firms were taken over by foreign investors (see, among others, Crinò 2010). Subsequently, for each IFDI, one or more cases of companies with a sufficiently close propensity score are identified (Barba-Navaretti et al. 2009: p. 242). We built the *sector* variable drawing from the OECD classification of manufacturing industries based on their R&D intensities.¹⁰ More specifically, (1) high-technology industries (e.g. pharmaceuticals; office, accounting and computing machinery; medical, precision and optical instruments); (2) medium–high-technology industries (e.g. electrical machinery and apparatus, n.e.c., motor vehicles, trailers and semi-trailers, chemicals excluding pharmaceuticals, machinery and equipment, n.e.c.); (3) medium–low-technology industries (e.g. building and repairing of ships and boats, rubber and plastics products: coke, refined petroleum products and nuclear fuel); and (4) low-technology industries (manufacturing, n.e.c.; recycling; wood, pulp, paper, paper products, printing and publishing; food products, beverages and tobacco; textiles, textile products, leather and footwear). Table 4 reports the distribution of IFDIs and DOMs by sector. We computed *population density* at the province (NUTS3) level. Descriptive statistics and correlations for all variables are reported in Tables 5 and 6, respectively.

A logit regression was run based on the probability of being IFDIs (which corresponds to 1 if the company has foreign participation) as a function of company attributes, such as size, ROE, sector and population density. The multinomial logit estimation allowed us to compute, for each single company, the probability of being an IFDI.

¹⁰ Further details on the classification of manufacturing industries can be found at <https://www.oecd.org/sti/ind/48350231.pdf> [Last accessed 22 March 2019].

Table 5 Descriptive statistics

Variable	Mean	SD	Min	Max
Ownership	0.21	0.14	0	1
Firm size (ln)	7.22	2.10	0	13.44
ROE	6.59	25.62	- 149.25	134.29
Distance	18,489.01	95,617.07	68.85	7,840,793
District location	0.09	0.29	0	1

Table 6 Correlation matrix

Variable	1	2	3	4	5
Ownership (1)	1				
Firm size (ln) (2)	0.14	1			
ROE (3)	0.01	0.10	1		
Distance (4)	- 0.01	- 0.01	- 0.01	1	
District location (5)	0.07	0.01	- 0.02	0.01	1

With these propensity scores, we ran the matching algorithm (Barba-Navaretti et al. 2009: p. 250). Once a coherent control group for IFDIs defined, we compare different outcome variables with the DOMs: distance and district index. This allowed for the estimation of the effect of being an affiliate of a foreign-owned multinational enterprise on a firm's location behaviour. Such an effect is obtained by computing the difference between the IFDIs and the DOMs in terms of the average outcome variables. This is called the average treatment effect on the treated (ATT) and is computed as follows:

$$\alpha_{ATT} = \gamma^1 - \gamma^0$$

where γ^1 is the value of an outcome variable of the IFDIs and γ^0 is the value of an outcome variable of the control group (DOMs) (Barba-Navaretti et al. 2009: p. 242). We then ran a nearest neighbour matching method (following a random draw). This method identifies the control company with the close propensity score for each IFDI. As previously mentioned, we ran our matches according to size, ROE, sector and population density. This ensures that each firm with size x (expressed in terms of turnover), ROE z , sector j and population density d is matched with a control firm of the same size, ROE, sector and population density.

Drawing upon the work of Barba-Navaretti et al. (2009: p. 251), a good match should also result in characteristics of the counterfactual composed by national firms being as close as possible to IFDIs. In formal terms, the matched sample should satisfy the balancing property, that is, the distribution of the vector of observables should be balanced across IFDIs and control firms. This specific matching method has been applied in response to the goodness of fit of the

statistical model. The sample validity has been checked through an econometric test that the balancing property holds.

The new sample resulting from the p -score matching (counterfactual analysis) is composed of 141 IFDIs and 179 DOMs.

5 Comparing IFDIs and DOMs in Veneto

5.1 Mapping firm location behaviour

The final sample consists of 6755 firms, of which 141 are IFDIs and 6614 DOMs. The location patterns of IFDIs and DOMs were explored by means of geo-referenced mapping (Fig. 2), and the firm location choice was classified according to their sector and ownership (Table 8). Specifically, the minimum Euclidian distance matrix (metres) from each firm to each NUTS3 province capital has been developed (Fig. 3). Both Figs. 3 and 4 underline the IFDIs privileged central locations within 12.5 km (59%) from the NUTS3 province capital.

Concerning the location in an ID with the same specialization, results show that 31 IFDIs (22%) favor the district versus 578 (9%) of DOMs (Table 7,

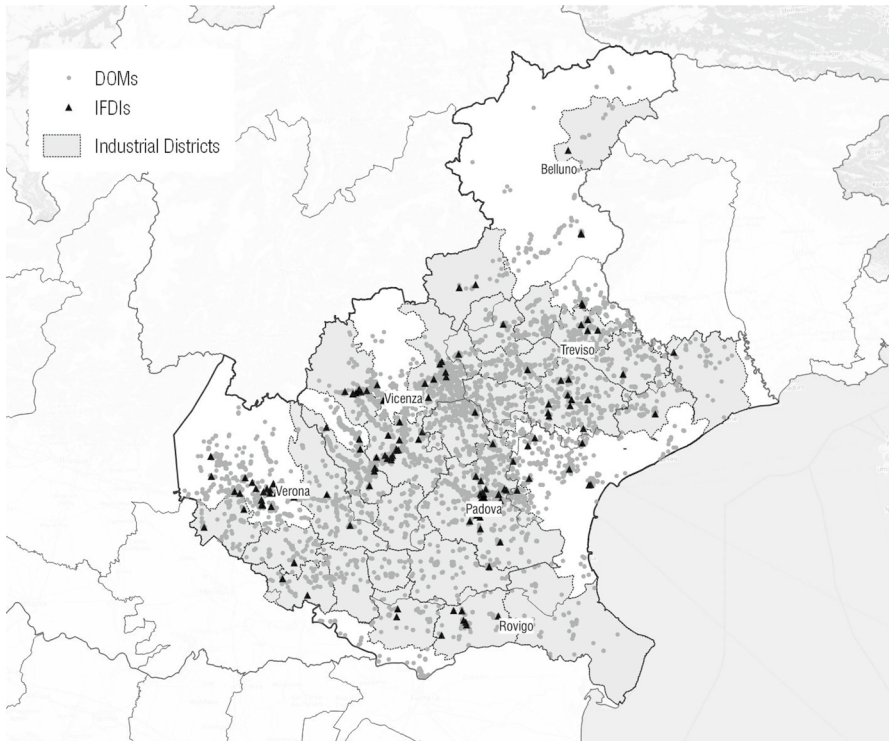


Fig. 2 The location of DOMs and IFDIs in Veneto region. *Source:* authors' elaboration

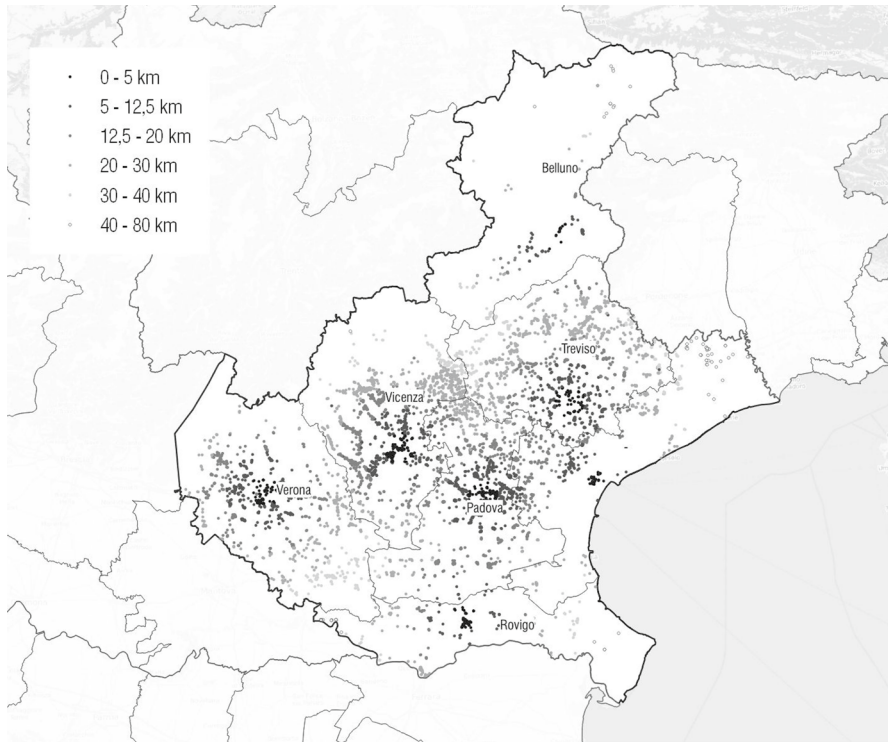


Fig. 3 Minimum Euclidian distance matrix: firms in NUTS3 province capital. *Source:* authors' elaboration

Fig. 5). Therefore, both foreign and local firms recognize the importance of the localization economies. Besides, the mechanical industry attracts more firms (238) than other sectors, with a significant presence of IFDIs (90.3% of total FDIs); DOMs, on the other hand, also located in the ID, specialized in other Made-in-Italy sectors (Table 8).

5.2 Firm characteristics: IFDIs versus DOMs

The analysis of the dataset of DOMs and IFDIs points out that about 59% of IFDIs operate in the high- and medium-tech sectors, while about 71% of the DOMs are in the low-high- and low-technology sectors (Table 4). This is consistent with the evidence that foreign investors tend to acquire market shares in technologically advanced sectors, fostering a wider sectorial diversification of the regional economic structure. Simultaneously, they also invest in Italian firms that specialize in the sectors that most often characterize 'Made-in-Italy', which are traditionally low tech. This complementarity in the industrial structure could represent the first interesting result that offers an explanation as to why IFDIs follow a specific location strategy. IFDIs locate themselves in those economic spaces (in technologically advanced

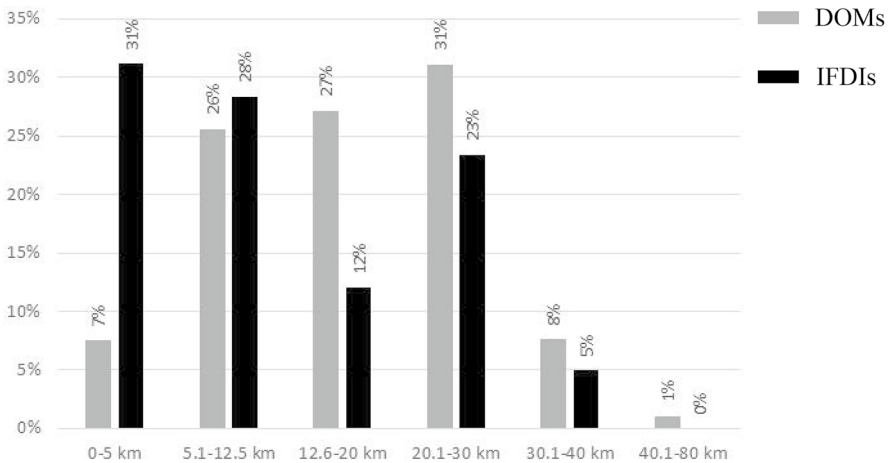


Fig. 4 Minimum Euclidian distance of DOMs and IFDIs from each NUTS3 province capital (%). *Source:* authors' elaboration

Table 7 IFDIs and DOMs inside and outside an ID with the same specialization

Firm typology	In an ID with the same specialization (%)	Outside the ID (%)	Tot.
IFDIs	31 (22%)	110 (78%)	141 (100%)
DOMs	578 (9%)	6035 (91%)	6613 (100%)
Tot.	609 (9%)	6145 (91%)	6754 (100%)

sectors) that are less covered by local businesses. The presence of IFDIs in these sectors may lead to an efficient economic allocation, which supplies national industries (operating mainly in low-tech industry) with the technologies they lack locally.

The geo-economic origin of investments in the Veneto region is similar to that within the whole of Italy. Indeed, the strong presence of neighbouring advanced countries (Germany, France and UK) and emerging ones (such as China, India and the Russian Federation) can be observed.

The logit model allows for the development of an appropriate counterfactual of DOMs, which takes into consideration the size, ROE, sector of the firms and the population density of the area in which the company is located. Such an analysis shows that IFDIs tend to be larger in terms of turnover than the DOMs, which is expected if we consider the strong presence of small companies in the productive fabric of the Veneto region. Additionally, IFDIs are more open to the high-tech sector than to other sectors (Table 9), as previously shown in the descriptive analysis reported in Table 4. This finding is consistent with the evidence that the R&D investment per employee in Italian manufacturing firms is, on average, four times higher in the IFDIs.

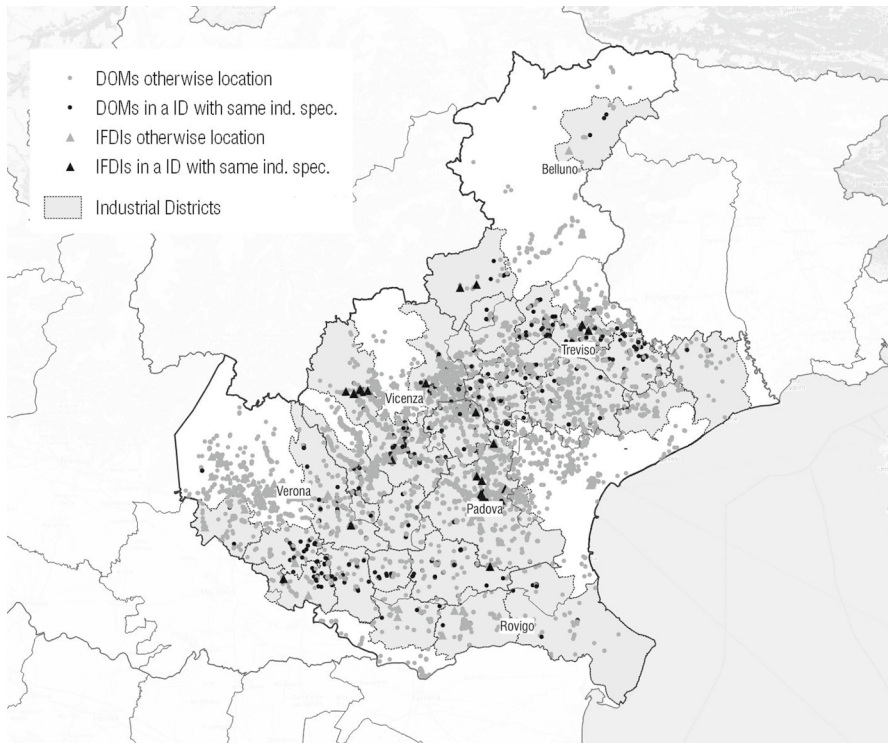


Fig. 5 Firm location inside an ID belonging to the same sector specialization by firm group (DOM and IFDI). *Source:* authors' elaboration

With regard to the counterfactual analysis, it takes into consideration a control group that selects from among all DOMs: those that are structurally similar to IFDIs in terms of size, ROE, sectors and population density.

Results show that IFDIs tend to locate in areas close to the provincial capitals (Table 10). This finding suggests that they prefer to be located in more complex socio-economic environments, where accessibility is greater and the number and variety of services is higher, in line with theoretical insights on regional contexts (Castellani and Pieri 2016; Basile et al. 2015). The statistically significant result on the district index seems to highlight that IFMNs tend to locate in district areas more often than their DOMs counterfactual. This result might seem less intuitive, both in relation to the economic literature and the results of our analysis concerning the proximity to urban areas. This finding indicates that the localization strategy of IFDIs is never left to chance. If, on the one hand, IFDIs need complex environments and higher connectivity and, on the other hand, they have the objective of acquiring a system of specialized productive knowledge and skills grown within district ecosystem, and hardly reproducible in other contexts. In this perspective, looking at IFDIs location strategies, urban or district environments are not alternatives, but rather complementary. In other words, foreign MNEs are more aware and acquainted with their localization strategy than domestic

Table 8 Focus on the industry typology of the IFDIs and DOMs inside the ID with the same specialization

	Furniture	Mechanical industry	Food and processing industry	Jewelry, musical instrument, etc.	Footwear	Textiles and clothing	Total
IFDIs	1 (3.2%)	28 (90.3%)	–	1 (3.2%)	1 (3.2%)	–	31 (100%)
DOMs	174 (30.1%)	210 (36.3%)	2 (0.35%)	79 (13.6%)	51 (8.8%)	62 (10.7%)	578 (100%)
Tot.	175 (28.7%)	238 (39.1%)	2 (0.3%)	80 (13.1)	52 (8.5%)	62 (10.1%)	609 (100%)

Table 9 Logistic regression

	Coefficient	Standard errors
Firm size (logarithm)	0.88***	0.06
ROE 2010	-0.01	0.01
Medium/high-tech sector	-0.88***	0.30
Medium/low-tech sector	-1.89***	0.33
Low-tech sector	-2.13***	0.34
Population density	Yes	
Constant	-9.64***	0.61
Number of observations	6754	
Prob > chi2	0.00	
Pseudo-R2	0.21	

*** Significant at 1%

With regard to the counterfactual analysis, it takes into consideration a control group that selects from among all DOMs, those that are structurally similar to IFDIs in terms of size, ROE and sectors

Table 10 ATT estimation

Outcome variable	No. of IFDIs	No. of DOMs	IFDIs	DOMs	ATT	Significance
Distance	141	179	12,461.62	16,485.09	-4023.47	Statistically significant
District location	141	179	0.22	0.07	0.15	Statistically significant

As robustness checks, using STATA command 'psmatch2', we run: (1) a nearest neighbour matching with replacement and caliper equal to 0.01, conditioning on the common support; and (2) a nearest neighbour matching method (following a random draw) without replacement, ultimately conditioning on the common support. Results hold. To check whether balancing property holds for the two models, we also run the covariate imbalance testing, *pstest*, directly after the propensity score matching, command 'psmatch2'. The balancing property is satisfied. Results are available from the authors upon request

companies, choosing complex and high-connectivity environments, or local systems with highly specialized production skills such as those available in the districts. Indeed, building upon the work by Mariotti et al. (2010), domestic companies seem to enjoy a significant comparative advantage in these local production systems. This allows MNEs to forecast a positive net balance of knowledge flows, thus possibly willing to co-locate with them. But they are also able to choose a good balance between both choices.

6 Conclusions

This analysis sheds some insight on manufacturing company location behaviour in relation to their ownership: IFDIs versus DOMs. By investigating the most recent financial crisis (2007–2013), this present work contributes to the urban studies literature, in which manufacturing firm location choices have been less

explored under worldwide economic slowdowns. The present article focuses on Veneto, a region hosting several Made-in-Italy IDs and one of the biggest metropolitan areas of the country. The joint use of geo-referenced mapping and econometric analysis (counterfactual) allows us to best depict the phenomenon. The results seem to suggest that IFDIs opt for either complex and high-connectivity environments (metropolitan areas), or local systems with highly specialized production skills such as those available in the IDs. The findings enrich the literature on the location of IFDIs, which have mainly stressed the attractiveness of global cities and metropolitan areas, neglecting the role of IDs. Foreign investors choose to settle in an ID to exploit localization economies, and utilize the advantages related to skilled labor abundance, transaction cost reduction and knowledge spillovers. Since district domestic firms enjoy a significant comparative advantage, IFDIs are more willing to co-locate with them because they perceive a positive net balance of knowledge flows (outflows from IFDIs to domestic firms and inflows from domestic firms to IFDIs) (McCann and Mudambi 2004; Mariotti et al. 2010). Indeed, the endowment of scientific and technological infrastructure, qualified localized capabilities and specifically local industrial commons are pivotal location factors attracting foreign MNEs to the Italian IDs.

The foreign presence may lead to a positive impact on the ID by, for instance, augmenting the local commons and improving the international atmosphere in the IDs. Indeed, IFDIs can absorb the contextual knowledge that is produced locally to reduce the liability of foreignness, and strengthen the knowledge spillover within the local context. IFDIs located in ID tend to conduct more value-added production and hire more experienced workers who are embedded in the local environment (Barzotto and Mariotti 2018). This inclination to hire skilled workers, augments the concentration of specialist workers, thus fostering the circulation of know-how and knowledge spillovers (Capello and Lenzi 2015) and enabling human capital regeneration and development.

This paper, therefore, suggests that policy makers should focus more effort on maximizing the mutual gains between IFDIs and DOMs: firstly, by attracting foreign investments able to generate positive spillover in the local context. Policy interventions should be directed to pull foreign investments towards peripheral location like IDs, which would enable IFDIs (as well DOMs) to overcome negative externalities of metropolitan areas (i.e. congestion, land availability, high real estate prices, etc.). IDs can benefit from external knowledge inflows coming from MNEs which tend to be more technologically advanced and productive than domestic companies (Caves 1974).

The present work has, nevertheless, three main limitations due to data availability. First, it only explores the locations of manufacturing IFDIs and DOMs, neglecting Italian MNEs. As the literature has shown, there is a correlation between the attractiveness of IDs towards IFDIs and the propensity of district firms to internationalize through export and outward FDIs (Mariotti et al. 2008). A complete analysis of the firms' ownership might shed light on the three location behaviours. Secondly, no evidence is provided about the typology of IFDI: specifically whether they are greenfield or brownfield investments. This information might explain whether the foreign MNEs willingness to invest in an ID is

the result of merge and acquisition (M&A) strategy or if it is a choice to locate the affiliate in the district through a greenfield investment. Finally, more detailed data on firms' categories (i.e. coordination activities—headquarter, R&D-related activities and production activities) might allow us to better understand the entrepreneur's managerial choices and the effects of the investment on the local socio-economic context. Furthermore, additional research might concern the analysis of IFDIs' typology and country. The exploration of the typology might help speculate regarding the impact on the local context. While competence-exploiting affiliates, which focus on the incremental adaptation of their parent firm' products to the local market, suffer the risk of technological leakages and prevent the co-location with domestic firms, competence-creating affiliates are willing to locate to countries close to the innovation frontier, thus co-locating with domestic firms likely to possess valuable knowledge (Cantwell and Mudambi 2005; Mariotti et al. 2010). It is also important to note that IFDIs' nationality may influence the location choices, as firms may find it easier to imitate other firms' location choices whenever the latter share the same cultural and institutional system of values (Lu 2002).

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