# Migration and the location choices of FDI. Evidence from Italian provinces

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**Abstract**

We contribute to the scant, although growing, literature analysing the effect of migration on the location choice of inward Foreign Direct Investments. To this end, we employ detailed investment-level data on Italian provinces, linked to a variety of province-level characteristics, we consider emigration along with immigration and we distinguish the investment ventures by function (R&D, manufacturing and market-access). This framework allows us to dig deeper into the understanding of the mechanism underlying the migrants' effect on FDI. Our results support a positive and significant effect of immigrants on FDI both through an information effect, as usually argued in the previous literature, and through an additional channel that we call a "demand effect".

***Keywords:*** Foreign Direct Investment – migration – demand effect – location choice

***JEL classification:*** F22 – F21 – R30

## 1 INTRODUCTION

This paper focuses on migration as a location determinant for inward FDI. Indeed, in spite of the standard predictions of neoclassical models that view labour and capital to

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be perfect substitutes, the two are often found to move in the same direction pointing to a complementary relationship (Felbermayr et al., 2015). The literature has identified two main channels for this complementarity: a labour channel and a transaction cost channel (for recent reviews, see Jayet and Marchal, 2016; Felbermayr et al., 2015). To the best of our knowledge, in spite of the relevant theoretical developments in the construction of models that are able to accommodate the observed complementarity between migration and FDI, no received contributions have attempted to empirically disentangle the relative importance of the underlying mechanisms, thereby missing an important opportunity for tailoring ad hoc policies. Furthermore, in spite of the wide literature recognizing the substantial distinction in the motives between horizontal and vertical FDI (e.g. Markusen, 1984) (and to the largely overlapping distinction between resource-seeking and market seeking FDI Dunning, 1993; Franco et al., 2010), previous studies have completely neglected the role of migrants in promoting those foreign direct investments that aim at enlarging the size of the market for the firm's products and to directly supply foreign markets, essentially substituting for exports[1]. In addition to narrowly defined horizontal FDI where similar goods as those of the parent company are produced abroad by subsidiaries, a variety of other foreign direct investments aim at supporting foreign sales of the parent company: e.g. sales and support centres, marketing investments, customer contact centres. We label the latter kind of FDI as "market-access FDI". Migrants may affect this kind of FDI through a relatively standard reduction of transaction costs but also by directly increasing the demand for home country goods. We attempt to fill this gap by exploiting the availability of detailed investment-level data — originating from the FDI markets database — which allow us distinguish the function in which the investment is operating. We focus in particular on manufacturing, R&D and market-access FDI[2]. We argue that different underlying mechanisms drive the immigrants' effect on different FDI functions; hence, disentangling the functions gives important insights on the drivers of the immigrants' effect. The availability of data on emigrants' stocks along with data on the immigrant stocks allows us distinguishing the demand effect from the transaction cost effect. Our econometric strategy further contributes to digging into the determinants of these effects.

The remainder of the paper is organised as follows. Section 2 discusses the theoretical

[1]The literature on the substitutability between exports and FDI is wide. See for instance Brainard (1997); Markusen and Venables (1998, 2000); Helpman et al. (2004).

[2]While manufacturing FDI could in turn be classified as either vertical or horizontal investments, to the ends of this work we consider them as a single category as distinguishing the specific production would require even more detailed data on the sales of the subsidiaries.

framework for our study. The empirical strategy (Section 3) is articulated into a first subsection 3.1, which introduces the empirical model and a second subsection 3.2, which briefly presents our data and variables. In Section 4 we present our econometric results; a discussion of their implications and some concluding remarks follow in Section 5.

# 2 THEORETICAL FRAMEWORK

In this study, we focus on FDI from foreign countries into Italian provinces and investigate whether their localization choice in a given province is affected by the stocks of immigrants from that country into the same province and/or by the stocks of emigrants from that province into the same country.

A growing international economics literature pioneered by Gould (1994), Wagner et al. (2002) and Rauch and Trinidade (2002), has shown that migration acts as a factor that decreases the costs of trade between partner countries. Underlying such transaction cost effect, two mechanisms have been singled out in the literature: an "information effect" and an "enforcement effect". Through the "information effect", migrants facilitate the flow of information between the origin and the destination country regarding business opportunities thanks to their knowledge of the home country institutions and language. Through the "enforcement effect" the inclusion of migrants within co-ethnic networks generates reputational bounds that act as an enforcement mechanism for transnational contracts and can be especially valuable in countries where the rule of law is weakly enforced (Dunlevy, 2006). Recognizing that similar arguments could support a similar brokering role of migrants with respect to capital flows, in the last decade, the empirical literature has started to investigate whether migration favour FDI (Buch et al., 2006; Gao, 2003; Kugler and Rapoport, 2007; Docquier and Lodigiani, 2010; Javorcik et al., 2011). The important role of information costs affecting the location decision of FDI (Head et al., 1995; Jayet and Marchal, 2016), allows extending the transaction cost interpretation of the immigrants' effect from the trade to the FDI literature. Indeed, information constraints are likely even more binding in FDI than in trade: the capital investment and the cognitive barriers to entry may be higher; knowledge of business opportunities abroad, of labour market pools of specific skills and of foreign institutions may be even more critical (Javorcik et al., 2011; Daude and Fratzscher, 2008). Indeed, compared with trade, FDI involve greater fixed costs and lower variable costs(Buckley and Casson, 1981; Helpman et al., 2004); considering that Peri and Requena-Silvente (2010) found thast immigrants' effect on trade operates at the level of fixed rather than

variable costs, their effect on FDI may ceteris paribus be even more critical. Highly skilled migrants may actually even transfer relevant knowledge for the development of FDI ventures. In essence, according to this literature, migrants may act as a factor that reduces what the International Business literature has called the "liability of foreignness" (Hymer, 1976; Zaheer, 1995; Nachum, 2003), i.e. the costs faced by foreign firms when operating in an overseas market, which underlie several barriers and possibly even a differential treatment with respect to local firms.

While, ceteris paribus, migrants could play a particularly salient role in reducing these costs, we recognise that migrants could affect other drivers of the localization choice of FDI. This is actually implied in previous contributions. Indeed, the literature attempting to accommodate the observed complementarity between migration and FDI proposes extensions of the Heckscher-Ohlin model that link FDI and migration through a labour channel. Either by considering migrant labour as a homogeneous or by distinguishing skilled from unskilled foreign workers, the link between FDI and migration in neoclassical models is due to the supply of labour. Different works have studied the relationship and both directions of causality, from FDI to migration and from migration to FDI (see the review in Jayet and Marchal, 2016). Usually, the results point to a complementarity between skilled migration and FDI: FDI respond to the availability of skilled labour and, in turn, attract skilled labour from the source country of FDI. The relationship between migration and FDI is one of substitution, instead, when unskilled migration is considered. Most studies highlight different effects according to the direction of FDI that is considered (outward vs. inward) which ultimately implies recognizing heterogeneity in their motives kind of investment, in their motives and in the determinants of their location choice. As no work has attempted to study the relative importance of the labour channel with respect to the transaction cost channel, gaining more understanding on these issues can yield important insights for policy making.

Furthermore, as mentioned in the introduction, another channel that may play a role in the location of FDI is a demand channel. This effect can be seen as analogous to what the trade literature has called a "preference effect" or a "transplanted-home bias effect" (Gould, 1994; White, 2007) and applies to imports, migrants prefer consuming goods originating from their home country and therefore add up directly to the demand for that good. In a similar way, the preference for home country goods may enlarge the size of the market for such goods and stimulate horizontal FDI that intend to serve this market (provided that the proximity-concentration trade-off is in favour of foreign production; see e.g. Horstmann and Markusen, 1992), as well as direct investments in

sales support, marketing, and customer contact services associated with them.

Distinguishing the investments by function and studying whether there is heterogeneity in the associated immigrants' effect can therefore yield insights as to the prevailing mechanisms underlying the migration effect[3]. We posit that, due to the importance of the liability of foreignness in all kinds of FDI, asymmetry of information and hence the transaction cost channel of the migration effect should apply to all kinds of ventures. Being familiar with both the home and host country environments, and in particular with their languages, migrants may in all cases play a role in facilitating administrative procedures, bridging business cultures and diffusing familiarity and trust about the foreigners. However, the sensitivity of FDI to the information borne by immigrants is likely to be greater for those ventures which more strongly rely on information. Investments in market-access and R&D, consisting of relatively less capital-intensive ventures compared with the establishment of production plants in manufacturing FDI (see also Table 4), are more likely to be responsive to changes in the availability of information.

For instance, the decision of a potential Chinese investor to establish a design and R&D center overseas is likely to be motivated by the recognition of the presence of learning economies from the agglomeration of other firms in the same sector; the actual establishment of such a center depends on the availability of financial capital, and on the human and infrastructural capital of the location. The specific relevance of the knowledge base accumulated in a given location for a specific foreign direct investment project is likely to be more easily understandable to skilled migrants who are familiar with both contexts. In fact, the knowledge flow between the origin and the destination country is likely made easier if there is a significant pool of skilled migrant workers who understand both the specific needs of foreign investors as well as the potential attractiveness of the Italian locations. Even more, we expect the effect of the information brokerage by migrants to play a key role in the case of market-access FDI, aimed essentially at supporting the sales of multinational corporation in the local/regional markets. In this case, the co-ethnic community may additionally provide information about opportunities for business development. At the same time, the establishment of a sales and support center of a Chinese firm may be motivated by market considerations: the presence of a significant market to home country products is likely to attract the establishment of sale and support centres oriented to back the export activities (which, from the point of view

[3]In a similar way, Rauch and Trinidade (2002), in their discussion of the migrants' effect on trade, have argued and found consistent evidence that the "enforcement effect" due to migrants' networks should apply throughout to the trade to any kind of goods; instead, the "information effect" should apply more strongly to the trade of differentiated, hence more information-intensive, goods.

of Italy, will be recorded as imports). Hence, detecting a significant migrant effect for both R&D and market-access FDI would signal the importance of the transaction cost channel; detecting it for market-access FDI only would rather point to the prevalence of the market channel.

In this respect, our data allow us making a further distinction that is also likely to contribute to disentangling the migrants' effects. We rely on data on both directions of migration (i.e. on immigrants and on emigrants). While the market channel obviously only applies to immigrants, there is no reason to consider that the transaction cost channel would not operate both ways, as emigrants may communicate with foreign investors about the availability of investment opportunities in their home countries as well as immigrants may maintain contacts to their homeland and inform them about potential business opportunities. Consistently with this argument, Flisi and Murat (2011), with a country-level focus, find that inward Italian FDI are actually mainly driven by emigration. Therefore, including both directions of migration in the analysis can help us provide a significant contribution to the understanding of the mechanism.

On the contrary, the establishment of a manufacturing plant is likely to be relatively less responsive to both the transaction cost and the market channels, as a stronger role is likely played by labour market factors and by logistical considerations relating to the infrastructural endowment of the location; in turn, the relative weight of the information carried by migrants on these issues is likely minor. As for manufacturing FDI, however, the presence of migrants in a location may act as a signal to potential investors on the availability of low-cost labour. Hence, detecting a migrants' effect on this kind of FDI may actually reflect the importance of the labour channel of the migration effect.

To the best of our knowledge, this is the first attempt to actually disentangle, by using detailed information on the function and on both immigrants and emigrants, the different mechanisms underlying the migrants' effects on FDI[4] As there may be substantial heterogeneity in the migration effects on FDI, we implement an empirical strategy that accommodates different sources of heterogeneity: along with a more standard conditional logit, we implement a mixed logit model which allows for heterogeneous effects of the variables of interest.

A further contribution of our study is the sub-national focus. As noted by Buch et al. (2006), the choice of the geographic level of analysis crucially affects the accuracy

[4]The study by Kugler and Rapoport (2007) similarly disaggregates the immigrants' effect by sector and study manufacturing and services FDI separately; however, this is not done in response to a specific hypothesis and their results are not exploited to yield specific insights on the underlying mechanism.

of the results. A sub-national focus is better suited to take into account "the regional patterns of factor market integration"; furthermore, considering that the knowledge flows relevant for migrants' information effect are likely to take place within networks of proximity (Rauch, 1999), the analysis is likely to be more accurate if we take the smallest unit of analysis available, i.e. the province level. Failing to study the phenomenon at the right scale is likely to lead to the modifiable areal unit problem (MAUP; see Openshaw, 1983), which arises when the aggregation of data into arbitrary units leads to loss of variation; for this reason, Bratti et al. (2014) have taken province-country dyads as units for the analysis of migrants' effects on Italian trade.

# 3 EMPIRICAL APPLICATION

## 3.1 Model

Our paper positions in between the literature on the location choice of FDI and on the migrant's effects on trade and FDI. Both branches of the literature have a fairly established set of estimation strategies of reference. The literature on the migration-FDI nexus mainly applies gravity-like models (see for instance De Simone and Manchin, 2012; Javorcik et al., 2011; Buch et al., 2006; Felbermayr et al., 2015). Looking at the question at stake from a gravity perspective, however, necessarily implies aggregating investments at some geographic scale, loosing potentially insightful information about the decision-making process underlying the location choice. Hence, we follow the literature on the location choice of FDI (e.g. Head et al., 1995; Du et al., 2008), which usually appeals to discrete-choice models (conditional, nested and mixed logit models) (Marschak, 1974; McFadden, 1974; McFadden and Train, 2000; Train, 2009). These models share an underlying Random Utility Model, i.e. a model assuming in a partial equilibrium setting that the location chosen by a multinational firm should yield the highest utility compared to the other possible locations, subject to uncertainty deriving from unobservables (Train, 2009). A crucial advantage of such models relies in the ability to study the location choice for each individual investment project[5]. Specifically, in the light of our discussion about the potential heterogeneity of the migrants' effect on FDI, we compare conditional logit and mixed logit (Train, 2009) to analyse the determinants of the choice of a specific province as a destination market for the investment.

[5]Lacking detailed information on investment projects, many works have resorted to aggregating data and estimated Poisson and NB models (e.g. Kogut and Chang, 1991; Coughlin and Segev, 2000; Barry et al., 2003; Blonigen, 1997; Basile, 2004).

Mixed logit, or random parameters models, indeed, allow estimating the heterogeneity in the effects of the parameters across decision makers, in our case, the heterogeneity in the migrants' effects across investment projects. Seen another way, mixed logit models allow relaxing the independence of irrelevant alternatives (IIA) assumption typical of conditional logit models and to explore the substitution patterns between alternative provinces in Italy. Although discrete choice models are fairly standard in the FDI literature, their application to the analysis of the migration effect on FDI is, to the best of our knowledge, novel.

The application of the mixed and conditional logit models implies modelling each choice as a separate logit regression, where the dependent variable "Choice" is equal to one if a specific alternative is selected, and zero otherwise. In our case, the alternatives are constituted by the choice set of Italian provinces where the FDI could locate (which is in turn composed of any provinces selected at least once in our data). These models imply that no variables that are choice-invariant (e.g. the country of origin of the FDI, its GDP, etc.) will be included in the specification (unless in interaction with alternative varying variables)(see Train, 2009). For each investment project $n$, the utility deriving from investing in province $j$ is assumed to be linear in the parameters. In the case of conditional logit, utility is modelled as a function of alternative-specific (varying by province or by investment and province) regressors. The coefficients of these regressors are taken as fixed in the conditional logit; all of them, or some of them, are interpreted as varying by decision-maker in the mixed logit model. With this background, we model utility as follows:

$$U_{nj} = \beta' x_{nj} + \gamma_n' z_{nj} + \delta_n' w_j + \epsilon_{nj} \tag{1}$$

Where $\beta$ is a vector of fixed coefficients, $x_{nj}$ and $z_{nj}$ are vectors of observed variables varying by investment project and by province, $w_j$ is a vector of observed variables relating to the province, $\gamma_n$ and $\delta_n$ are vectors of coefficients of $z_{nj}$ and $w_j$ representing the importance of such variables for investment project $n$, and $\epsilon_{nj}$ is iid extreme value. $\gamma_n$ and $\delta_n$ are unobservable to the researcher and they are assumed to vary over investment projects with densities $f(\gamma)$ and $g(\delta)$, respectively. Conditional on these parameters, the investment project locates in a specific province $i$ if the utility associated with it exceeds that of all other provinces $j \neq i$, which can be modelled as a standard logit model. Because, however, the parameters are unknown to the researcher, the unconditional probability of a given project to locate in a specific province is the integral of these

logits over all possible values of $f(\gamma)$ and $f(\delta)$:

$$P_{ni} = P(Choice_{ni} = 1|x, z, w) = \int_{\delta} \left[ \int_{\gamma} \left( \frac{e^{\beta' x_{ni} + \gamma_n' z_{ni} + \delta_n' w_i}}{\sum_j e^{\beta' x_{nj} + \gamma_n' z_{nj} + \delta_n' w_j}} \right) f(\gamma|\delta)\, d\gamma \right] g(\delta)\, d\delta \tag{2}$$

Drawing on simulation, the distribution parameters of the random coefficients $\gamma$ and $\delta$ can be estimated; primarily, the means and standard deviations of their distributions $f(\gamma)$ and $f(\delta)$. Specifically, the magnitude and significance of their standard deviations are measures of the heterogeneity of the effects of $\gamma$ and $\delta$ on the location choice of FDI. Model 2 reduces to a conditional logit model if $f(\gamma)$ and $f(\delta)$ are degenerate at fixed parameters $c$ and $d$: $f(\gamma) = 1$ for $\gamma = c$ and 0 for $\gamma \neq c$; $f(\delta) = 1$ for $\delta = d$ and 0 for $\delta \neq d$ (see Train, 2009, for a more formal and detailed explanation).

## 3.2 Variables

This study analyzes the location choices of $1,147$ inward FDI into 85 Italian provinces having occurred over the 2003-2015 period. Based on previous literature on the location choice of FDI as well as on the migration effect on FDI, we run different specifications of model (2). In a first specification, we include the province-level determinants of location choice that have been established in the literature. Specifically, we include distance between the origin country of the investment and the destination province, province-level GDP, the count of the patent applications filed by the province to the EPO as a measure of the province-level human capital endowment, as well as a measure of the infrastructural endowment of the location. We also include labour market indices, i.e. the log of the average wage at regional level and the province-level unemployment rates. We also include two variables aiming to capture the effects of, respectively, Jacobian and Marshallian externalities. Jacobian externalities are measured through a standard sectoral diversity measure calculated as $1 - H$, where $H$ is the sectoral Herfindahl-Hirschman concentration index; Marshallian externalities are measured through a province-level specialisation index in the same sector as the investment project[6] In separate specifications, we add our variables of interest, i.e. the log of bilateral immigrants and emigrants stocks, first one by one and then jointly. Then, recognizing that the effect of migration may actually reflect the effect of other bilateral variables, we confirm the robustness of our results by including other bilateral time-varying variables that may correlate

[6]A detailed description of the data sources is provided in the Data Appendix.

with migration: the log of bilateral imports and exports (e.g. Gould, 1994; Rauch and Trinidade, 2002; Bratti et al., 2014), and the pre-2000 stock of FDI from the same country to the same province (Head et al., 1995). Finally, in our last specification we take into account the recent literature on the effects of co-location on the location choice of FDI (Castellani and Santangelo, 2016; Castellani and Lavoratori, 2017) and include a binary variable equal to 1 if the same parent company has already invested in the province and zero otherwise.

**Table 1: Summary Statistics**

| Variable | Obs | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|---|
| Choice | 96,726 | .012 | .11 | 0 | 1 |
| Log Distance | 96,726 | 7.77 | 1.09 | 4.55 | 9.84 |
| Common Border | 96,726 | .01 | .08 | 0 | 1 |
| Log GDP Destination Prov. | 96,726 | 9.25 | .76 | 7.79 | 11.87 |
| Province Patent Count | 96,726 | 51.08 | 81.35 | 0 | 602.29 |
| Infrastructure endowment | 96,348 | 102.64 | 66.62 | 23.09 | 522.21 |
| Log average wage (region) | 96,726 | 9.75 | .13 | 9.41 | 10.00 |
| Province unemployment rate | 96,726 | 7.85 | 4.64 | 1.86 | 26.10 |
| Agglomeration (sector) | 93,783 | 1.03 | .88 | .03 | 33.63 |
| Sectoral diversity | 96,726 | .02 | .99 | -4.94 | 1.94 |
| Log Immigrants | 95,969 | 4.35 | 1.60 | 0 | 11.73 |
| Log Emigrants | 96,726 | 6.01 | 2.39 | 0 | 11.02 |
| Bilateral FDI stock (pre-2002) | 96,726 | 2.29 | 9.05 | 0 | 125 |
| Log Import | 96,034 | 17.29 | 2.20 | 1.95 | 23.68 |
| Log Export | 96,467 | 17.93 | 1.20 | 4.16 | 22.33 |
| Colocation, parent company | 96,726 | .00 | .05 | 0 | 1 |

Table 1 reports the summary statistics and Table 2 the correlation matrix of our included variables.

Table 3 reports the first 16 countries of origin of Italian FDI, which account for about 90% of our sample of investments. Clearly, OECD countries represent the vast majority of the origin countries of Italian FDI; however, China and the Philippines also rank high among the origin countries.

Table 4 distinguishes Italian inward FDI by function and reports their frequencies as well as the average capital investment in each function. The vast majority of Italian inward FDI is represented by what we call "market-access FDI" (i.e. "Sales, Marketing & Support" and "Customer Contact Centres"). Several FDI also classify as "Business services" and "Manufacturing". Instead, our definition of R&D FDI (corresponding to FDI in the functions of "Research and Development" and "Design, Development & testing") corresponds to a smaller number of ventures. Among the most expensive

**Table 2: Correlation matrix**

| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Choice | 1.00 | | | | | | | | | | | | | | | |
| 2 | Log Distance | -0.01 | 1.00 | | | | | | | | | | | | | | |
| 3 | Common Border | 0.02 | -0.16 | 1.00 | | | | | | | | | | | | | |
| 4 | Log GDP Destination Prov. | 0.23 | -0.03 | 0.04 | 1.00 | | | | | | | | | | | | |
| 5 | Province Patent Count | 0.31 | -0.06 | 0.06 | 0.74 | 1.00 | | | | | | | | | | | |
| 6 | Infrastructure endowment | 0.07 | -0.02 | -0.01 | 0.21 | 0.16 | 1.00 | | | | | | | | | | |
| 7 | Log average wage (region) | 0.07 | -0.11 | 0.06 | 0.26 | 0.35 | 0.18 | 1.00 | | | | | | | | | |
| 8 | Province unemployment rate | -0.04 | 0.13 | -0.05 | -0.15 | -0.33 | -0.15 | -0.54 | 1.00 | | | | | | | | |
| 9 | Agglomeration (sector) | 0.06 | -0.03 | 0.02 | 0.03 | 0.07 | 0.06 | 0.06 | -0.08 | 1.00 | | | | | | | |
| 10 | Sectoral diversity | -0.03 | 0.04 | 0.03 | -0.12 | -0.13 | 0.06 | -0.16 | 0.15 | 0.06 | 1.00 | | | | | | |
| 11 | Log Immigrants | 0.14 | -0.12 | 0.08 | 0.51 | 0.40 | 0.19 | 0.23 | -0.15 | 0.02 | -0.04 | 1.00 | | | | | |
| 12 | Log Emigrants | 0.06 | -0.22 | 0.08 | 0.24 | 0.14 | 0.04 | -0.06 | 0.18 | -0.01 | 0.06 | 0.39 | 1.00 | | | | |
| 13 | Bilateral FDI stock (pre-2002) | 0.33 | 0.04 | 0.04 | 0.42 | 0.62 | 0.09 | 0.17 | -0.11 | 0.05 | -0.06 | 0.27 | 0.20 | 1.00 | | | |
| 14 | Log Import | 0.13 | -0.26 | 0.07 | 0.51 | 0.45 | 0.20 | 0.33 | -0.30 | 0.07 | -0.08 | 0.60 | 0.47 | 0.32 | 1.00 | | |
| 15 | Log Export | 0.11 | -0.18 | 0.08 | 0.50 | 0.46 | 0.11 | 0.39 | -0.38 | 0.05 | -0.10 | 0.53 | 0.51 | 0.32 | 0.78 | 1.00 | |
| 16 | Colocation, parent company | 0.29 | -0.01 | 0.01 | 0.09 | 0.12 | 0.04 | 0.02 | -0.02 | 0.03 | -0.01 | 0.07 | 0.03 | 0.09 | 0.06 | 0.04 | 1.00 |

**Table 3: Origin countries for FDI**

| Country | FDI count | %* |
|---|---|---|
| United States | 290 | 25.28 |
| United Kingdom | 134 | 11.68 |
| Germany | 117 | 10.20 |
| France | 101 | 8.81 |
| Spain | 93 | 8.11 |
| Switzerland | 59 | 5.14 |
| Japan | 36 | 3.14 |
| China | 31 | 2.70 |
| Netherlands | 29 | 2.53 |
| Belgium | 27 | 2.35 |
| Austria | 25 | 2.18 |
| Ireland | 24 | 2.09 |
| Canada | 20 | 1.74 |
| Sweden | 18 | 1.57 |
| Finland | 14 | 1.22 |
| Philippines | 11 | 0.96 |
| *Other* | *118* | *10.29* |
| **TOTAL** | **1,147** | **100.00** |

*Of total inward FDI into Italy, 2003-2015. Source: FDI markets

ventures are, as anticipated, Manufacturing FDI, as well as FDI in services ("Electricity", Logistics, Distribution and Transportation", and "ICT and internet infrastructure").

# 4 RESULTS

Table 5 reports the results of the conditional logit model of equation (2).

In column (1) we include standard province-level variables considered to promote the attractiveness of investments in the literature. Distance results to have the expected negative and significant effect; common border, province GDP, the count of patent applications filed by the province to the European Patent Office in the previous year, and infrastructure endowment result having a positive and significant effect on the location choice of FDI, as also expected. Depending on the determinants of the investment decision, the expected direction of the effect of the average wage was a priori ambiguous. Indeed, if the FDI is intended to save on labour costs, higher wages may have a negative effect on the location of FDI. On the other hand, if human capital and skills considerations would prevail, we may expect to observe a positive coefficient on wage. According to our results, labour-cost saving considerations seem to prevail, as wage results having a negative effect on the location choice. We also observe a negative coefficient for un-

**Table 4: Functions of Italian inward FDI**

| Function | FDI count | % | Capital investment* |
|---|---|---|---|
| *Market-access:* | *414* | *36.1* | *11.43* |
| Customer Contact Centre | 10 | 0.9 | 61.77 |
| Sales, Marketing & Support | 404 | 35.2 | 10.18 |
| *Manufacturing* | *153* | 13.3 | *112.20* |
| *R&D:* | *72* | *6.3* | *31.41* |
| Design, Development & Testing | 46 | 4.0 | 23.89 |
| Research & Development | 26 | 2.3 | 44.71 |
| *Other functions:* | | | |
| Business Services | 250 | 21.8 | 17.01 |
| Construction | 83 | 7.2 | 60.89 |
| Logistics, Distribution & Transportation | 82 | 7.2 | 111.76 |
| Electricity | 24 | 2.1 | 163.68 |
| Headquarters | 24 | 2.1 | 31.74 |
| Education & Training | 17 | 1.5 | 11.30 |
| ICT & Internet Infrastructure | 14 | 1.2 | 105.98 |
| Maintenance & Servicing | 9 | 0.8 | 8.98 |
| Recycling | 2 | 0.2 | 26.00 |
| Technical Support Centres | 2 | 0.2 | 9.70 |
| Extraction | 1 | 0.1 | 521.10 |
| **TOTAL** | **1,147** | **100.0** | **43.31** |

*Average, Millions US$. Source: FDI Markets

employment suggesting that demand side considerations or the dynamism of the local labour market do play a role in the location choice. The positive effect of Marshallian externalities is also highlighted in our results. Instead, Jacobian externalities ("sectoral diversity") are not found to affect in any significant way the location choice of FDI.

In column (2) we augment the model with the first of our variables of interest: immigrants from the origin country into the destination province. A positive and statistically significant effect is observed, confirming the hypotheses on the positive effect of migrants on FDI. We further augment the model with emigration data in column (3). The coefficient of emigration results positive and significant and close to 0.14. Including the migration variables leaves the above-discussed location determinants unaffected in terms of sign and significance, with the only exception of the common border variable. In column (4) we include both migration variables in the same specification. According to our results, immigrants' effect prevails over the effect of emigrants. Recognising that one

may question that the detected positive effect of immigrants be due to other bilateral province-country variables which are correlated with immigration, in column (5) we add the log of imports and exports to our specification, as well as the pre-2002 FDI stock. While imports and pre-existing FDI stocks do result to positively and significantly affect the location choice of FDI, the effect of immigration and emigration is not prejudiced and remains positive and significant. The coefficient of the log exports results in this specification negative and weakly significant. Finally, in column (6), the co-location of previous investments of the the same parent company in the same province is added to the specification and is found to positively affect the location choice of FDI, confirming the recent findings of the literature. The coefficient is extremely large and significant, but the effect of immigration remains robust to the inclusion of this variable.

Overall, our expectations about the positive effect of migration on FDI are supported with respect to immigration, while the evidence about a positive effect of emigration seems not to be robust.

We check the robustness of our findings by relaxing the assumption of Independence of Irrelevant Alternatives (IIA) and allowing some locations to be closer substitutes than others or, equivalently, by allowing for heterogeneity in the effect of the considered variables and interpreting the coefficients as random parameters (Train, 2009). Table 6 reports the results of the same specifications as in Table 5 estimated by mixed logit, where log distance, patent count, regional wage, sectoral diversity, immigrants, emigrants, FDI stock, imports and exports enter as random parameters[7]. Overall, the picture that emerges from this model is similar to the previous one: the positive effects of immigration, province-level GDP, infrastructure endowment, agglomeration, pre-2002 FDI stocks, imports and co-location are confirmed, as are the negative effects of distance and unemployment. Yet, the significant likelihood ratio tests on the joint significance of the standard deviations allow rejecting the null hypothesis of fixed coefficients and suppor the expectation that there is indeed significant heterogeneity in some of the parameters. In particular, the mixed logit estimates highlight that the positive effect of province-level patent counts detected before is actually marked by significant heterogeneity; once this is taken into account, the variable looses significance in the full specification reported in column (6), while its standard deviation remains significant[8]. This implies that the effect of patent counts on the location choice of FDI, while zero on average, is actually heterogeneous and positive for only about 50% of the investments: some

[7]The estimates are robust to different specifications of the random parameters

[8]The sign of the coefficient is irrelevant to the interpretation of the heterogeneity, see Hole (2007)

**Table 5: Estimation results - Conditional Logit**

| Model | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| *Dep. var: Choice* | | | | | | |
| Log Distance | −0·675*** | −0·448** | −0·651*** | −0·461** | −0·298 | −0·381* |
| | (0·194) | (0·193) | (0·191) | (0·192) | (0·196) | (0·205) |
| Common Border | 0·564** | 0·295 | 0·228 | 0·124 | 0·160 | 0·205 |
| | (0·249) | (0·252) | (0·258) | (0·261) | (0·264) | (0·277) |
| Log GDP Destination Prov. | 1·276*** | 0·802*** | 1·022*** | 0·734*** | 0·613*** | 0·690*** |
| | (0·059) | (0·089) | (0·074) | (0·091) | (0·096) | (0·100) |
| Province Patent Count | 0·002*** | 0·003*** | 0·002*** | 0·003*** | 0·001*** | 0·001*** |
| | (0·000) | (0·000) | (0·000) | (0·000) | (0·000) | (0·000) |
| Infrastructure endowment | 0·005*** | 0·004*** | 0·004*** | 0·003*** | 0·003*** | 0·003*** |
| | (0·001) | (0·001) | (0·001) | (0·001) | (0·001) | (0·001) |
| Log average wage (region) | −1·708* | −1·298 | −1·105 | −1·039 | −0·786 | −0·961 |
| | (0·950) | (0·939) | (0·964) | (0·949) | (0·940) | (0·962) |
| Province unemployment rate | −0·037* | −0·025 | −0·054*** | −0·039* | −0·040* | −0·032 |
| | (0·020) | (0·020) | (0·021) | (0·020) | (0·021) | (0·021) |
| Agglomeration (Sector) | 0·304*** | 0·289*** | 0·300*** | 0·287*** | 0·271*** | 0·255*** |
| | (0·023) | (0·023) | (0·023) | (0·023) | (0·023) | (0·025) |
| Sectoral diversity | −0·042 | −0·013 | −0·061 | −0·029 | 0·032 | 0·035 |
| | (0·046) | (0·047) | (0·046) | (0·047) | (0·050) | (0·052) |
| Log Immigrants | | 0·386*** | | 0·318*** | 0·320*** | 0·276*** |
| | | (0·056) | | (0·060) | (0·061) | (0·063) |
| Log Emigrants | | | 0·288*** | 0·171*** | 0·167*** | 0·099* |
| | | | (0·053) | (0·057) | (0·055) | (0·058) |
| Bilateral FDI stock (pre-2002) | | | | | 0·009*** | 0·010*** |
| | | | | | (0·001) | (0·001) |
| Log Imports | | | | | 0·164*** | 0·147*** |
| | | | | | (0·047) | (0·049) |
| Log Exports | | | | | −0·094* | −0·079 |
| | | | | | (0·053) | (0·054) |
| Colocation, parent company | | | | | | 4·171*** |
| | | | | | | (0·203) |
| Observations | 91,502 | 91,502 | 91,502 | 91,502 | 90,915 | 90,915 |
| AIC | 6,198.174 | 6,152.979 | 6,171.269 | 6,146.014 | 6,088.106 | 5,598.019 |
| BIC | 6,282.991 | 6,247.220 | 6,265.511 | 6,249.680 | 6,219.953 | 5,739.285 |
| Pseudo $R^2$ | 0.369 | 0.374 | 0.372 | 0.375 | 0.380 | 0.431 |

Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

FDI seeking to lower production costs may actually prefer locations with less innovation capacity. Giving this result an error component interpretation, one would conclude that provinces with greater patenting capacity be closer substitutes than provinces with low patenting capacity. Significant standard deviations are also detected for distance: specifically, the estimates in column (6) imply that the effect of distance is negative for the majority of the investments (67.35%), but it is actually positive for the remaining 32.65%. This finding is consistent with recent results by Castellani and Santangelo (2016), who find that specific types of FDI, namely R&D investments, travel longer distances. Finally, and most relevantly to our research question, the standard deviation of the log of immigrants is also found to be highly significant. The estimated parameters of the distribution of the immigration coefficient imply that, while heterogeneous, the effect is positive for the wide majority of investments (75.99%).

In Tables 9-11 we report the results disaggregated by function (R&D, manufacturing and market-access). In these function-specific models, the likelihood ratio tests on the joint significance of the standard deviations of the random coefficients result insignificant, not allowing to reject that the coefficients are fixed. In this case, as mentioned in section 3.1, the mixed logit reduces to a conditional logit. For this reason, below we only report the more parsimonious conditional logit estimates[9]. Results support the expectations of a stronger effect of immigrants in promoting market-access ventures and R&D investments, while the evidence about the emigrants' effect is inconclusive.

As for R&D investments (Table 9), the effect of immigrants is positive and significant, in line with the interpretation that immigrants transfer relevant information about R&D investments. The coefficient of emigrants, instead, results insignificant.

Along with the positive effect of Marshallian externalities, the location of R&D FDI results also to respond positively to sectoral diversity, suggesting that besides sector-specific spillover effects, R&D FDI seek to grasp the Jacobian externalities associated with the cognitive diversity. The magnitude of the sectoral agglomeration effect for this kind of investments results twice as large as the one for the aggregate sample, confirming the expectation that location-specific spillover effects play a crucial role in determining the location of R&D investments. Province innovative capability, as measured by the province patent count, is also found to play an important role in attracting R&D investments. In line with the results in Tables 5 and 6, R&D FDI are also found to respond positively and significantly to the previous co-location of their parent company in the same province.

[9]The mixed logit estimates are available upon request.

**Table 6: Estimation results - Mixed Logit**

| Model | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| *Dep. var: Choice* | | | | | | |
| **(a) Means** | | | | | | |
| Common Border | 0·060 | −0·081 | −0·184 | −0·163 | −0·115 | 0·099 |
| | (0·307) | (0·306) | (0·314) | (0·311) | (0·306) | (0·335) |
| Log Distance | −1·114*** | −0·871*** | −1·065*** | −0·851*** | −0·655** | −0·787*** |
| | (0·290) | (0·283) | (0·287) | (0·282) | (0·269) | (0·302) |
| Log GDP Destination Prov. | 1·444*** | 0·938*** | 1·204*** | 0·891*** | 0·697*** | 0·946*** |
| | (0·073) | (0·105) | (0·094) | (0·110) | (0·113) | (0·125) |
| Province Patent Count | 0·001*** | 0·002*** | 0·002*** | 0·002*** | 0·001** | 0·000 |
| | (0·000) | (0·000) | (0·000) | (0·000) | (0·000) | (0·001) |
| Infrastructure endowment | 0·004*** | 0·003*** | 0·004*** | 0·003*** | 0·003*** | 0·002*** |
| | (0·001) | (0·001) | (0·001) | (0·001) | (0·001) | (0·001) |
| Log average wage (region) | −0·605 | −0·672 | −0·740 | −0·613 | −1·011 | −0·415 |
| | (1·004) | (0·995) | (1·041) | (1·014) | (1·001) | (1·020) |
| Province unemployment rate | −0·053** | −0·042** | −0·069*** | −0·049** | −0·050** | −0·041* |
| | (0·021) | (0·021) | (0·022) | (0·022) | (0·022) | (0·023) |
| Agglomeration (Sector) | 0·300*** | 0·289*** | 0·301*** | 0·290*** | 0·278*** | 0·252*** |
| | (0·026) | (0·026) | (0·026) | (0·026) | (0·025) | (0·029) |
| Sectoral diversity | 0·022 | 0·035 | −0·002 | 0·024 | 0·052 | 0·085 |
| | (0·051) | (0·051) | (0·051) | (0·051) | (0·053) | (0·055) |
| Log Immigrants | | 0·414*** | | 0·370*** | 0·344*** | 0·340*** |
| | | (0·067) | | (0·073) | (0·074) | (0·077) |
| Log Emigrants | | | 0·260*** | 0·107 | 0·136* | −0·003 |
| | | | (0·066) | (0·070) | (0·071) | (0·067) |
| Bilateral FDI stock (pre-2002) | | | | | 0·009*** | 0·011*** |
| | | | | | (0·002) | (0·003) |
| Log Imports | | | | | 0·174*** | 0·127** |
| | | | | | (0·061) | (0·061) |
| Log Exports | | | | | −0·072 | −0·036 |
| | | | | | (0·057) | (0·060) |
| Colocation, parent company | | | | | | 5·000*** |
| | | | | | | (0·270) |

*Continues on next page*

**Table 6: Estimation results - Mixed Logit *(ctd.)***

| Model | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| *Dep. var: Choice* | | | | | | |
| **(b) Standard Deviations** | | | | | | |
| Log Distance | −2·458*** | −2·012*** | −2·146*** | 1·914*** | 1·666*** | 1·802*** |
| | (0·438) | (0·438) | (0·453) | (0·449) | (0·444) | (0·487) |
| Province Patent Count | −0·005*** | 0·004*** | 0·004*** | 0·004*** | −0·001 | −0·005*** |
| | (0·001) | (0·001) | (0·001) | (0·001) | (0·002) | (0·001) |
| Log average wage (region) | 0·140 | −0·152 | −0·029 | −0·208 | 0·051 | 0·202 |
| | (1·881) | (2·274) | (2·226) | (2·280) | (2·205) | (1·955) |
| Sectoral diversity | −0·002 | 0·005 | −0·003 | 0·004 | −0·002 | −0·008 |
| | (0·115) | (0·132) | (0·114) | (0·132) | (0·147) | (0·144) |
| Log Immigrants | | 0·372*** | | 0·347*** | 0·291*** | 0·487*** |
| | | (0·086) | | (0·096) | (0·109) | (0·077) |
| Log Emigrants | | | −0·376*** | −0·188 | −0·261* | 0·046 |
| | | | (0·102) | (0·183) | (0·143) | (0·250) |
| Bilateral FDI stock (pre-2002) | | | | | 0·001 | 0·015 |
| | | | | | (0·008) | (0·011) |
| Log Imports | | | | | 0·102 | 0·105 |
| | | | | | (0·140) | (0·144) |
| Log Exports | | | | | −0·003 | −0·004 |
| | | | | | (0·181) | (0·156) |
| *Likelihood ratio test on the joint significance of the standard deviations* | | | | | | |
| LR $\chi^2$ | 45.052 | 38.524 | 32.402 | 32.262 | 16.462 | 57.122 |
| df | 4 | 5 | 5 | 6 | 9 | 9 |
| | 0.000 | 0.000 | 0.000 | 0.000 | 0.058 | 0.000 |
| Observations | 91,502 | 91,502 | 91,502 | 91,502 | 90,915 | 90,915 |
| AIC | 6,161.122 | 6,124.455 | 6,148.867 | 6,125.752 | 6,089.644 | 5,558.897 |
| BIC | 6,283.635 | 6,265.816 | 6,290.229 | 6,285.962 | 6,306.251 | 5,784.921 |

Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

**Table 9: Estimation results - Conditional Logit - R&D FDI**

| Model | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| *Dep. var: Choice* | | | | | | |
| Log Distance | 0·868 | 1·037 | 0·844 | 1·035 | 1·077 | 0·288 |
| | (0·704) | (0·702) | (0·701) | (0·702) | (0·718) | (0·829) |
| Log GDP Destination Prov. | 0·838*** | 0·296 | 0·705*** | 0·290 | 0·282 | 0·366 |
| | (0·219) | (0·326) | (0·272) | (0·338) | (0·368) | (0·418) |
| Province Patent Count | 0·003*** | 0·003*** | 0·003*** | 0·003*** | 0·004*** | 0·001 |
| | (0·001) | (0·001) | (0·001) | (0·001) | (0·002) | (0·002) |
| Infrastructure endowment | 0·003 | 0·002 | 0·002 | 0·002 | 0·001 | 0·002 |
| | (0·002) | (0·002) | (0·002) | (0·002) | (0·002) | (0·002) |
| Log average wage (region) | 3·821 | 4·691 | 4·074 | 4·701 | 4·456 | 4·625 |
| | (3·332) | (3·337) | (3·360) | (3·342) | (3·402) | (3·661) |
| Province unemployment rate | −0·043 | −0·034 | −0·057 | −0·035 | −0·038 | −0·001 |
| | (0·075) | (0·075) | (0·078) | (0·078) | (0·081) | (0·089) |
| Agglomeration (Sector) | 0·295*** | 0·301*** | 0·303*** | 0·302*** | 0·302*** | 0·217*** |
| | (0·059) | (0·060) | (0·061) | (0·060) | (0·061) | (0·074) |
| Sectoral diversity | 0·425*** | 0·476*** | 0·412** | 0·475*** | 0·446** | 0·333* |
| | (0·162) | (0·167) | (0·163) | (0·169) | (0·176) | (0·195) |
| Log Immigrants | | 0·465** | | 0·460** | 0·444* | 0·629*** |
| | | (0·215) | | (0·227) | (0·232) | (0·241) |
| Log Emigrants | | | 0·166 | 0·015 | −0·013 | −0·375 |
| | | | (0·208) | (0·218) | (0·225) | (0·272) |
| Bilateral FDI stock (pre-2002) | | | | | −0·005 | 0·002 |
| | | | | | (0·006) | (0·007) |
| Log Imports | | | | | 0·071 | 0·157 |
| | | | | | (0·196) | (0·210) |
| Log Exports | | | | | −0·057 | −0·051 |
| | | | | | (0·219) | (0·232) |
| Colocation, parent company | | | | | | 7·022*** |
| | | | | | | (1·323) |
| Observations | 5,807 | 5,807 | 5,807 | 5,807 | 5,795 | 5,795 |
| AIC | 449.529 | 446.986 | 450.898 | 448.981 | 454.004 | 376.775 |
| BIC | 502.864 | 506.987 | 510.899 | 515.649 | 540.646 | 470.082 |
| Pseudo $R^2$ | 0.306 | 0.314 | 0.307 | 0.314 | 0.315 | 0.442 |

Standard errors in parentheses. $^{*}$ $p < 0.10$, $^{**}$ $p < 0.05$, $^{***}$ $p < 0.01$

The effect of immigrants (as well as of emigrants) is instead clearly insignificant on manufacturing FDI. The choice of the destination province of FDI within Italy appears not to follow labour cost considerations—neither in terms of wages nor in terms of exploiting labour with a potentially lower bargaining power as immigrants could represent. For this kind of FDI, the main drivers that emerge are infrastructure endowment, sectoral agglomeration, patent count and co-location of other investments from the same parent company. The weakly significant negative effect of sectoral diversity vanishes when co-location is included. Moreover, the log of imports displays positive and significant coefficients, suggesting complementarity between trade and manufacturing FDI.

A robustly positive and significant effect of immigrants is instead found when focussing on market-access FDI (Table 11). This suggests that migrants represent a significant market for home-country products, similarly to what has been called the "transplanted home bias effect" (Gould, 1994; White, 2007; Bratti et al., 2014). Yet, the same result would be compatible with an "information effect" played by immigrants which is arguably more salient for comparatively less complex ventures such as the establishment of sales, marketing and support ventures. The positive and significant effect of province-level GDP, along with the negative and significant effect of the province-level unemployment rate, confirm the crucial role of demand conditions in the location of this kind of FDI. Accessibility through infrastructural endowment and the pre-existing availability of a market for the FDI products through Marshallian externalities in the sector of operation of the investment are also found to be attraction factors for this kind of investments, while the effect of Jacobian externalities is insignificant. Once again, co-location is found to have a positive and significant effects on the location of market-access FDI, suggesting possible synergies between different functions performed by different facilities established of the same parent company. The coefficient of the log of emigrants, which could have signalled that migrants facilitate market access FDI by providing information on potential business opportunities in the home province, is positive and significant in columns (3)-(5) but not robust to the inclusion of co-location in column (6).

Overall, our results strongly confirm the role of information channels in promoting the location choice of FDI. In line with recent evidence on the issue, co-location is consistently found to be a fundamental determinant of the location choice of FDI, no matter the function of the investment and beyond the effect of bilateral FDI stock, which since (Head et al., 1995) have been recognized as channels for extraction of private knowledge on the foreign economy. According to our results, the previous location of

**Table 10: Estimation results - Conditional Logit - Manufacturing FDI**

| Model | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| *Dep. var: Choice* | | | | | | |
| Log Distance | −0·270 | −0·150 | −0·354 | −0·223 | 0·209 | −0·130 |
| | (0·425) | (0·426) | (0·425) | (0·430) | (0·444) | (0·520) |
| Common Border | 0·754 | 0·484 | 0·486 | 0·343 | 0·460 | 1·035 |
| | (0·620) | (0·641) | (0·647) | (0·661) | (0·670) | (0·694) |
| Log GDP Destination Prov. | 0·262* | −0·031 | 0·113 | −0·079 | −0·456** | −0·237 |
| | (0·155) | (0·195) | (0·173) | (0·199) | (0·220) | (0·260) |
| Province Patent Count | 0·002** | 0·002** | 0·002* | 0·002* | 0·001 | 0·002 |
| | (0·001) | (0·001) | (0·001) | (0·001) | (0·001) | (0·001) |
| Infrastructure endowment | 0·003*** | 0·002** | 0·003*** | 0·002** | 0·002** | 0·002 |
| | (0·001) | (0·001) | (0·001) | (0·001) | (0·001) | (0·001) |
| Log average wage (region) | 1·619 | 1·834 | 1·967 | 2·009 | 0·889 | 0·050 |
| | (1·699) | (1·692) | (1·721) | (1·708) | (1·695) | (1·975) |
| Province unemployment rate | 0·043 | 0·049 | 0·031 | 0·040 | 0·053 | 0·071 |
| | (0·037) | (0·037) | (0·038) | (0·038) | (0·039) | (0·044) |
| Agglomeration (Sector) | 0·212*** | 0·209*** | 0·213*** | 0·210*** | 0·203*** | 0·207*** |
| | (0·060) | (0·059) | (0·060) | (0·059) | (0·060) | (0·066) |
| Sectoral diversity | 0·184* | 0·198* | 0·167 | 0·185* | 0·165 | 0·049 |
| | (0·106) | (0·108) | (0·106) | (0·108) | (0·110) | (0·118) |
| Log Immigrants | | 0·287** | | 0·240* | 0·151 | 0·050 |
| | | (0·121) | | (0·128) | (0·132) | (0·150) |
| Log Emigrants | | | 0·183* | 0·119 | 0·089 | −0·027 |
| | | | (0·098) | (0·103) | (0·105) | (0·121) |
| Bilateral FDI stock 2002) | | | | | −0·000 | −0·007 |
| | | | | | (0·006) | (0·009) |
| Log Imports | | | | | 0·377*** | 0·320*** |
| | | | | | (0·088) | (0·100) |
| Log Exports | | | | | 0·089 | 0·142 |
| | | | | | (0·106) | (0·123) |
| Colocation, parent company | | | | | | 6·254*** |
| | | | | | | (0·491) |
| Observations | 11,601 | 11,601 | 11,601 | 11,601 | 11,563 | 11,563 |
| AIC | 1,187.356 | 1,183.792 | 1,185.889 | 1,184.467 | 1,166.470 | 858.895 |
| BIC | 1,253.586 | 1,257.381 | 1,259.477 | 1,265.415 | 1,269.448 | 969.229 |
| Pseudo $R^2$ | 0.058 | 0.063 | 0.061 | 0.064 | 0.082 | 0.332 |

Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

FDI of the parent company in a given province substantially increases the likelihood of a new investment to occur in the same province. Beyond what found in Castellani and Lavoratori (2017), we find that the effect is not limited to the location choice of R&D FDI but applies troughout to all functions.

# 5 DISCUSSION AND CONCLUSIONS

This paper aimed at shedding light on the link between migration and FDI. Our results confirm a positive and significant effect of immigration on FDI, in line with the previous literature, and highlight a strongly heterogeneous effect of migration across different functions in the value chain, which contributes to substantiating our understanding of the underlying mechanisms.

The detected positive effect of immigrants in the aggregate sample results, on the one hand, to be driven by their positive effect on what we called market-access FDI, i.e. investments aiming to promote the sales of the MNC. This supports our expectation that the immigrants effect operates in terms of creating a market for home country products, in line with what the trade literature calls a "preference effect" or "transplanted home-bias effect"; in line with this interpretation, a variety of other demand condition variables result significant in the location choice of this kind of FDI.

Our results also support the interpretation that immigrants facilitate FDI by reducing their transaction costs, considering that they are found to promote R&D FDI as well as market-access FDI, hence effectively reducing the liability of foreignness (LOF) in international business. Unexpectedly, however, we could not identify a robust effect for emigrants, who, we argued, would be channeling a similar information effect but no market effect. This suggests that the effect has a specific direction, implying that the FDI-promotion effect by migrants is itself responding to specific factors. Future research should address the determinants of these choices.

The labour channel of the migration effect, instead, found no support in our results.

Overall, our paper bears significant implications for policy making that partially contrast with the public discourse on immigration. Indeed, beyond the usual interpretation of migrants as a burden to public welfare, we actually found that immigrants play a significant role in determining the location choice of R&D investments across Italian provinces. More R&D investments locally are very likely to further contribute, though spillover effects, to the spreading of knowledge and innovation locally and nationally. Comparatively low-cost measures to promote the migrants' information effects

**Table 11: Estimation results - Conditional Logit - Market-access FDI**

| Model | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| *Dep. var: Choice* | | | | | | |
| Log Distance | −1·004*** | −0·725* | −0·901** | −0·698* | −0·381 | −0·453 |
| | (0·377) | (0·381) | (0·376) | (0·381) | (0·385) | (0·399) |
| Common Border | 0·622 | 0·433 | 0·334 | 0·281 | 0·328 | 0·346 |
| | (0·434) | (0·433) | (0·442) | (0·442) | (0·446) | (0·467) |
| Log GDP Destination Prov. | 1·927*** | 1·409*** | 1·624*** | 1·323*** | 1·162*** | 1·247*** |
| | (0·136) | (0·195) | (0·167) | (0·201) | (0·207) | (0·213) |
| Province Patent Count | 0·002*** | 0·002*** | 0·002*** | 0·002*** | 0·001 | 0·001 |
| | (0·001) | (0·001) | (0·001) | (0·001) | (0·001) | (0·001) |
| Infrastructure endowment | 0·005*** | 0·003** | 0·004*** | 0·003** | 0·003** | 0·003** |
| | (0·001) | (0·001) | (0·001) | (0·001) | (0·001) | (0·001) |
| Log average wage (region) | −5·484** | −4·800** | −4·795** | −4·542** | −3·948* | −4·045* |
| | (2·174) | (2·157) | (2·216) | (2·184) | (2·176) | (2·203) |
| Province unemployment rate | −0·149*** | −0·132*** | −0·168*** | −0·148*** | −0·136*** | −0·128*** |
| | (0·048) | (0·047) | (0·049) | (0·048) | (0·049) | (0·049) |
| Agglomeration (Sector) | 0·330*** | 0·295*** | 0·319*** | 0·292*** | 0·275*** | 0·266*** |
| | (0·038) | (0·040) | (0·037) | (0·039) | (0·039) | (0·041) |
| Sectoral diversity | −0·168* | −0·129 | −0·189* | −0·149 | −0·061 | −0·038 |
| | (0·097) | (0·100) | (0·098) | (0·100) | (0·107) | (0·110) |
| Log Immigrants | | 0·402*** | | 0·323*** | 0·355*** | 0·384*** |
| | | (0·111) | | (0·121) | (0·121) | (0·125) |
| Log Emigrants | | | 0·328*** | 0·200* | 0·195* | 0·099 |
| | | | (0·110) | (0·119) | (0·116) | (0·121) |
| Bilateral FDI stock (pre-2002) | | | | | 0·008*** | 0·009*** |
| | | | | | (0·002) | (0·002) |
| Log Imports | | | | | 0·101 | 0·105 |
| | | | | | (0·100) | (0·101) |
| Log Exports | | | | | 0·016 | −0·019 |
| | | | | | (0·118) | (0·119) |
| Colocation, parent company | | | | | | 5·307*** |
| | | | | | | (0·709) |
| Observations | 32,785 | 32,785 | 32,785 | 32,785 | 32,588 | 32,588 |
| AIC | 1,627.832 | 1,616.909 | 1,621.187 | 1,616.124 | 1,606.642 | 1,541.392 |
| BIC | 1,703.412 | 1,700.887 | 1,705.164 | 1,708.499 | 1,724.126 | 1,667.267 |
| Pseudo $R^2$ | 0.546 | 0.550 | 0.549 | 0.551 | 0.554 | 0.573 |

Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

by simplifying the communication channels to their homeland could actually be seen as supporting the activities of regional investment promotion agencies.

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# A Data Appendix

The database we use originate from the linkage of different data sources.

The data on the FDI flows, 1,147 inward FDI into 85 Italian provinces having occurred over the 2003-2015 period, originate from the FDI markets database, which is a comprehensive and regularly updated online database of crossborder greenfield investments constructed by the Financial Times Intelligence Unit. It covers all countries and sectors worldwide. We extracted from this repository the data relating to inward FDI into Italian provinces for which the destination city was available.

The data on the main variables of interest, i.e. immigrant and emigrant stocks, are drawn respectively from the demography unit of the ISTAT, which publishes yearly data on the foreign residents in each province by nationality, and from the electoral register of Italians residing abroad, the AIRE (*Anagrafe Italiana dei Residenti all'Estero*, as in Murat and Pistoresi, 2009); the latter are available on a yearly basis and are disaggregated by province of origin and foreign country of residence. Immigrants' data are available for a panel of 13 years, from 2002 to 2015, while emigrants' data are currently available for five years only, i.e. from 2006 to 2013, which shrinks the size of the database when this variable is included. To preserve the sample size, the data have been imputed for the missing period[10]. Both immigrants and emigrants are included in the model as log stocks; we add one unit to both variables in order to tackle the indeterminacy of the log of zero.

In addition to these, we included a set of control variables:

1. *Sectoral agglomeration by province.* Considering that agglomeration factors are likely to play an attractive role for FDI, we matched the sector of the investment with the corresponding agglomeration in each province and included such variables to the list of our regressors. The province-level measures of agglomeration have been calculated based on the AIDA database, that includes the firms registered in Italy above a given turnover threshold.[11] The data cover the 2002-2014 period. In principle, different measures of sectoral agglomeration could be used, comparing the agglomeration deriving from the count of firms per sector with the agglomeration based on value added, sales revenues, and employment. Because, however, the information on such variables is only complete for a subset of sectors, it was opted

[10]The results of the specifications that include the original non-imputed emigration data support the findings of the paper and are available upon request.

[11]The version we use of AIDA is the largest available, the so-called "full" one, which covers firms above a fairly low turnover threshold (one million Euros).

to compute the agglomeration as a location index based on counts of firms in each sector and province. The sectoral classification used in AIDA is the NACE rev. 2. To match this with the sectoral classification used in the FDI markets database, which partly resembles the NAICS classification, a conversion table was prepared. However, as the correspondence is not exact, the available correspondence table for the NAICS and NACE classification[12] could not be applied as such and the match was done manually. It is worth noticing that the classification provided by the FDI markets database allows distinguishing the function (classified under the category *industry_activity*, e.g. Headquarters, Business Services, Manufacturing) from the sector of operation (classified under the category *industry_sector*, e.g. Aerospace, Automotive Components, Biotechnology, which is further detailed by the variable *sub_sector*). The match was operated using the combination of these three categories. The NACE codes corresponding to such combinations do not uniquely correspond to a single level of partitioning (e.g. 2, 3, 4-digits). While in many cases it was possible to associate investments with the corresponding sectoral agglomeration at the 3-digit level, it was only possible to obtain a complete correspondence with the 2-digit level. Because of its structure, the sectoral classification of FDI markets conveniently allows studying agglomeration forces at the functional level separately from the agglomeration at the sectoral level. Just to make an example, a venture by an entertainment company establishing its headquarters in Milan may be driven by the presence of other Headquarters of any kinds of firms, or by the agglomeration of other firms in the entertainment industry. Hence, we constructed two different conversion tables, one based on the function of the investment and one on the sector, which allow us comparing which one affects the location choices of FDI.

Furthermore, the AIDA data allow constructing a province-level measure of sectoral diversity, which gives a measure of the relevance of Jacobian externalities at the 2- and 3-digit level in the location choices of FDI; we calculated sectoral diversity as $1 - H$, where $H$ is a standard Hirschman-Herfindahl concentration index. In the analysis, we include the 2-digit sectoral diversification measure.

2. *Bilateral (province-country) controls: FDI stocks up to 1997, bilateral trade, distance, common border.* Using the REPRINT - ICE database developed by the Polytechnic of Milan (`http://actea.ice.it/ide.aspx`), we constructed a mea-

[12] e.g. `http://ec.europa.eu/eurostat/ramon/miscellaneous/index.cfm?TargetUrl=DSP_NACE_2_US_NAICS_2007`

sure of the bilateral stock of manufacturing FDI from the same country into the same province between 1985 and 1997. Trade flows data are drawn from Italian international trade data publicly available at the province-country pair level (`https://www.coeweb.it`). Because the data downloading is an extremely time-consuming manual process, we opted to exclude minor remote islands from the analysis, a choice which did not affect the quality of the merge with the FDI data. The data cover both import and export flows over the 2002-2015 period.

The distances are calculated as great circle distances as in Bratti et al. (2014) based on latitude and longitude (in decimal degrees) of provinces and partner countries[13]. A dummy variable for common border is equal to 1 if a given pair (province and country) shares a border, and to 0 otherwise[14].

3. *Province-level controls: population, per capita value added, aggregate value added, infrastructure endowment, education, count of patent applications per province, average wage, unemployment rate.* As regards the per capita value added and aggregate value added of the provinces, the pre-2008 data are drawn from the ISTAT; the post-2008 data are from the Istituto Tagliacarne and are publicly available[15]. The data about the resident population over the 2002-2015 period are drawn from the demography unit of the ISTAT[16]. The time coverage of the GDP and population data is complete and it is up to, respectively, 2014 and 2015. Instead, reportedly due to its limited time variation, the infrastructural endowment is only calculated for a limited number of years. It is publicly available for the years 2007, 2009, 2010, 2011, and 2012, and has been interpolated and extrapolated for the remaining years to cover the entire period.

   A critical point relating to all province-level data is that the data are available for the seven newly-constituted Italian provinces (i.e. those founded in 2005 and 2009) only after their constitution: in the current structure of the data, we opted to maintain the original structure of the data in order to preserve the coherence in the reference areas across different variables.

   To add a measure of the R&D intensity of the region, the publicly available Eurostat data on the number of patent applications to the European Patent Office by

[13] Source websites for the geographic coordinates include `https://www.matematicamente.it/staticfiles/approfondimenti/astronomia/CoordGeogProvince.pdf`, `www.wikipedia.org` and `http://thematicmapping.org/downloads/world_borders.php`.

[14] By construction, the variable is equal to one in a minority of cases and it gives rise to perfect collinearity in the analysis that is focussed on the R&D FDI; because this hampers convergence in the model, it has been excluded in this case

[15] `http://dati.italiaitalie.it`

[16] `http://demo.istat.it`

province have been added for the years 2002-2012 (currently, they are not available at the province level for later years).

Finally, in order to make sure that our results are not confounded by measures of the labour costs, we included the province-level unemployment rate (because this statistics is only available for the period 2004-2013 due to changes in the computation rules at ISTAT, but it is available at the regional level from Eurostat data, we employed the region-level variation to impute the missing data for 2002-2003 and 2014). In addition, wage data originating from the social security data of the Work Histories Italian Panel (WHIP) (Bena et al., 2012) yielded an average measure of the regional (not province-level) labour costs.

4. *Co-location.* Recent studies (Castellani and Lavoratori, 2017) have highlighted the positive effect on locational choice of previous investments of the same parent company in a given province. These studies argue that firms investing in R&D build on the presence of previous investments in manufacturing and locale their R&D facilities close to previous manufacturing plants. Due to the limited number of observations in our data, we are unable to disentangle the function of the previous investment, nor to detail the number of previous investments; hence, we opted to construct a binary variable for co-location that is equal to 1 in the case that the same parent company has already invested in the same province, and zero otherwise.