Antonella BELLINO, Giuseppe CELI
University of Foggia
Department of Economics

The Migration-Trade Nexus in the Presence of Vertical and Horizontal Product Differentiation

Corresponding author

giuseppe.celi@unifg.it

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Scientific Committee
Adalgiso AMENDOLA, Floro Ernesto CAROLEO, Marcello D’AMATO, Cesare IMBRIANI, Pasquale PERSICO

CELPE - Centro di Ricerca Interdipartimentale di Economia del Lavoro e di Politica Economica
Università degli Studi di Salerno
Via Giovanni Paolo II, 132 - 84084 Fisciano, I- Italy
http://www.celpe.unisa.it
E-mail celpe@unisa.it
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Antonella BELLINO, Giuseppe CELI
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Abstract

This paper provides an exploration of the migration-trade nexus in the case of Italy over the period 2005-2010 by crossing the two dimensions of migration (immigration and emigration) and the two dimensions of intra-industry trade (vertical and horizontal). This empirical strategy turns out to be useful to improve interpretation of econometric results. In general, we find that both immigration and emigration are positively and significantly related to intra-industry trade. However, the magnitude and the statistical significance of migration’s impact on trade vary, depending on the type of trade flows considered (vertical or horizontal), the direction of migration (immigration or emigration) and the partner countries considered (OECD or non-OECD). In particular, we find that immigrants from non-OECD countries have a positive and significant impact both on “variety trade” and “quality trade”, immigrants from OECD countries affect significantly only “variety trade” and emigrants to non-OECD enhance only “variety trade” too. These results are largely consistent with predictions deriving from theoretical models of IIT and from the literature on migration-trade nexus.

Keywords  International migration, Intra-industry trade, Economic integration, Human capital

JEL  F22, F12, F15, J24
Introduction

Over the last twenty years, a vast literature, especially empirical, has been developed in order to analyse the impact of migration flows on international trade under the hypothesis that ethnic networks play a key role. The basic idea is that immigrants are connected to their home countries by various types of links, including knowledge of home institutions, available products, home-country markets, languages and preferences. International trade can be influenced by immigrants’ ties to their home countries because these linkages could help to decrease trading transaction costs. (Gould, 1994; Head and Ries, 1998; Dunlevy and Hutchinson, 1999; Rauch, 1999, 2001; Girma and Yu, 2002; Wagner et al., 2002; Bruder, 2004; Mundra, 2005; Jansen and Piermartini, 2009; Murat and Pistoressi, 2009; Peri and Requena-Silvente, 2010; Aleksynska and Peri, 2011; Egger et al., 2012; Bratti et al., 2012; Parsons, 2012; Felbermayr et al., 2012, to name but a few).

However, the great bulk of the literature has not remarked sufficiently that, in order to deeply explore the relationship between migration and international trade, it becomes noteworthy to take into account the nature of trade flows. In other words, an accurate analysis of the migration-trade nexus requires the crucial distinction between inter-industry and intra-industry trade (IIT, hereafter) flows and the further separation of vertical and horizontal components inside IIT. In fact, the theoretical literature on IIT’s determinants - see Krugman (1979, 1980), Helpman and Krugman (1985), Balassa (1986a), Falvey and Kierzkowsky (1987), Flam and Helpman (1987) - shows that transaction costs are a negative determinant of the share of IIT in total trade since changes in transaction costs have a stronger impact on trade in differentiated products than in homogeneous goods. This theoretical prediction finds support in the data. For instance, Rauch (1999) shows that differentiated goods benefit from a reduction of international transaction costs more than homogeneous goods. Gould (1994) finds that the additional information which immigrants bring with them and the consequent reduction of informational barriers to trade can have more value for consumer manufactured products than producer goods since the former are more differentiated across countries.

Therefore, if immigration allows a decline in trading transaction costs, this reduction will have a larger positive effect on the volume of IIT than on the volume of inter-industry trade. However, previous literature has shown that immigration typically affects trade flows when the immigrants come from countries that are dissimilar to the host country, and we know that intra-industry-trade is more prevalent between more similar countries. How to solve this apparent contradiction? We believe that the investigation of the migration-trade link by discriminating vertical and horizontal components of IIT could help to solve the puzzle. Actually, the literature on IIT has largely demonstrated that theoretical explanations of vertical intra-industry trade (VIIT, hereafter) differ significantly from Krugman-style models of horizontal intra-industry trade (HIIT, hereafter), and consequently, empirical tests on the industry-specific determinants of IIT should be carried out separately for VIIT and HIIT (Greenaway, Hine and Milner, 1995). In analogy with these prescriptions of IIT literature, empirical tests on the migration-trade nexus should be performed independently for VIIT and HIIT. Furthermore, disentangling the impact of migration on HIIT and VIIT contributes to overcome the above-mentioned contradiction. On the one hand, the pro-trade role of immigration, in terms of transaction costs reduction, seems

1 Vertical IIT concerns trade in commodities differentiated in terms of quality, while horizontal IIT refers to trade in commodities that are similar in terms of quality but differentiated in terms of product attributes.

more appropriate when HIIT is involved because the immigrants' knowledge of home-country markets and available products should enhance more “variety trade” than “quality trade”, and we know that the former is more prevalent between similar countries. On the other hand, income disparities between partner countries (especially in North-South trade) and between immigrants and natives should activate more VIIT, which is more prevalent between dissimilar countries.

This last observation calls into question the relevance of differences in human capital endowment between trade partners and between immigration and emigration flows. Usually, in theoretical frameworks analysing the migration-trade link, no distinction is made between immigrants and emigrants with reference to their pro-trade role (Gould, 1994). In addition, in empirical contributions testing the relationship between migration and trade, the nexus is explored by considering the exclusive role of immigrants, except in some rare studies in which the role of emigrants is explicitly explored. However, in the presence of human capital differences between immigrants and emigrants, an in-depth analysis of the migration-trade nexus should not overlook the distinction between emigrants and immigrants, given that their influence on trade flows—and on the nature of trade flows—is virtually different.

In this paper we show that the investigation of the pro-trade effects of migration conducted for the first time by crossing the two dimensions of IIT (VIIT and HIIT) and the two dimensions of migration (immigration and emigration) provides a richer set of information by improving the interpretation of empirical results. In particular, four major questions are addressed here: 1) Does migration help to increase IIT? 2) Does migration have a different impact on VIIT and HIIT? 3) Do the trade effects of immigration and emigration have different characteristics, also in terms of different impact on VIIT and HIIT? 4) How the origin/destination country of migration flows, distinguished by OECD and non-OECD partner country, impacts on IIT types? We try to answer these questions, focussing on the Italian case, which, in our opinion, seems to be the right country for this type of analysis: it was a land of emigration and has also become a land of immigration over time, and the share of its bilateral IIT has increased in the early twenty-first century (from 44% in 2000 to 47% in 2010) together with migration flows. Moreover, Italy lends itself to the separate analysis of the two components of IIT since, especially for Italy, the “quality” trade (VIIT) represents the predominant amount of all IIT (63% in 2010). Furthermore, the Italian outward and inward flows of migrants, other than having a different historical importance, are dissimilar because of the countries from which they come or to which they go, and they differ in educational level too. Italian emigrants mostly go to developed countries, whereas immigrants in Italy are coming from developing countries. This circumstance—supported by other sources of information (Fondazione Migrantes)—indicates that Italian emigrants are mostly more skilled than immigrants arriving in Italy.

The present work fills the gap in literature, focussing on the Italian case, which, moreover, represents a novelty of this analysis, as there is no other study like this one for Italy. Two rather recent works, Bratti et al. (2012) and Murat and Pistoresi (2009), have investigated the link between migration and total trade using Italian data (province-level and country-level data, respectively), but they do not explore the link with IIT, as we do. Indeed, the literature on migration and trade is fairly developed, whereas the literature dealing with migration flows and IIT is still rather scarce. A first attempt to explore this linkage empirically comes from Blanes (2005), who, using Spanish data, shows that the stock of immigrants in Spain has a positive effect on the share of its bilateral IIT. However, Blanes does not take account of the distinction between VIIT and HIIT in the analysis of the migration-trade nexus, as we do. Unlike Blanes (2005), the present work carries out a separate econometric test for HIIT and VIIT.

As in Murat and Pistoresi (2009) and Parsons (2012).
Overall, the novelty of the paper is the joint consideration of various dimensions of migration-trade link: 1) the focus on both immigration and emigration; 2) the country breakdown of migration (OECD vs non-OECD); 3) the separation between HIIT and VIIT. In our study on Italy, we use country-level data that combines the Italian bilateral VIIT and HIIT indices ⁴ and both the stock of immigrants and emigrants by country. Data cover the period 2005-2010. We find that migration has different effects on the two types of IIT. Indeed, the estimated coefficients and the impact on VIIT and HIIT are quite different. In particular, the effect of migration on international trade turns out to be more relevant and significant when the “variety” trade (HIIT) is explicitly considered. Therefore, not to separate IIT into its two components leads to underestimating the potential effect of migration on IIT since it rules out the notable effect on HIIT. In addition, both emigration and immigration exert a positive influence on the share of IIT between Italy and its partner countries. However, the coefficient of the emigration variable is not statistically significant in all regressions, but it becomes statistically different from 0 only with reference to HIIT, confirming the relevance of disentangling VIIT and HIIT in empirical tests ⁵.

The structure of the work is as follows. The next section deals with literature on the migration-trade link. Section 2 is concerned with the history and characteristics of both emigration and immigration in Italy, and also it focuses on Italian IIT patterns. Section 3 presents the econometric model. Sections 4 discuss the regression analysis’ results, and finally, in section 5, some concluding remarks and suggestions for further research are provided.

⁴ We follow the methodology proposed by Greenaway, Hine and Milner (1995) and based on the unit values of imports and exports as proxies of quality in order to disentangle horizontal and vertical components in IIT and to check which one is more affected by migration.

⁵ These results seem encouraging, particularly in light of the fact that we used very highly disaggregated data and, unlike other studies, our calculations are based on a dataset where both manufacturing and non-manufacturing industries are included.
1. The Empirical Literature on the Migration-Trade Nexus

The pioneering contribution in empirical literature that paved the way for several papers on the subject of migration-trade is undoubtedly the study by Gould (1994). In this work, Gould investigates the effects of immigration on trade between the United States and 47 trading partners in the years 1970-1986, estimating a gravity model and employing the non-linear least-square econometric method. Gould states that migrants may positively affect trade in the receiving country through two mechanisms, which he defines as “preference channel” and “information channel”. The former refers to migrants’ preferences for their home country’s goods, which could cause an increased demand in the host country for goods from their homeland, leading to a rise in imports. The information channel refers to the key role played by migrants in reducing various information costs: communication costs, costs of obtaining foreign market information and costs associated with the negotiation of trade contracts and their enforcement; information costs represent an important component of the fixed costs a firm has to face to enter foreign markets. The author finds that the presence of immigrants has a larger impact on exports than on imports. This result could imply that the information immigrants bring regarding home markets is more able to function as a trade promoter (export promoter) than is their preference for their home country’s products (import promoter). Moreover, Gould, in order to deeply analyse the migration-trade link, distinguishes between consumer and producer goods. This distinction leads him to conclude that the presence of immigrants has a larger effect on the trade of consumer goods, probably because, as the author himself explains, these goods are more differentiated from producer goods, thus confirming the presumption that the importance of information increases with the degree of the product’s differentiation.

Starting from Gould’s insight, several empirical studies have been realised with the aim of verifying the existence of a factor movement’s positive effect on trade. The bulk of these studies, apart from having the same theme, present a similar structure of analysis: most of them focus only on immigration, although the networks theory clearly suggests that both immigration and emigration may affect trade; moreover, they distinguish between differentiated and homogeneous goods and between import and export trade flows. Among these empirical contributions, most scholars have centred upon a single country and on the effects immigration has on trade between the analysed country and its trading partners. Several works belong to this group: Head and Ries (1998) and Partridge and Furtan (2008) focus on Canada; Dunlevy and Hutchinson (1999), Mundra (2005) and Jansen and Piermartini (2009) concentrate on the United States; Bruder (2004) focusses on Germany; Bryant et al. (2004) concentrate on New Zealand; Canavire-Bacarreza and Ehrlich (2006) discuss Bolivia; White (2007) analyses Denmark; Girma and Yu (2002) and Ghatak et al. (2009) focus on the United Kingdom; White and Tadesse (2007) concentrate on Australia; Tai (2009) discusses Switzerland; Murat and Pistoresi (2009) analyse Italy; and Hatzigeorgiou (2010a) focusses on Sweden.

In this regard, the works of Murat and Pistoresi (2009) and Parsons (2012) represent an exception. Indeed, these authors investigate simultaneously the effects of both immigration and emigration on trade, pointing out that the absence of one of them leads to overestimate the relevance of the other.

It is needed to observe that the analysis’ restriction to the only phenomenon of immigration often is due to the paucity of the available emigration data.

The present work, focussing on the migration-trade nexus in the case of a single country, Italy, shares the same methodological approach of the contributions referred above. However, for the sake completeness, it is worthwhile to note that the literature on the subject is also moving in other directions. For example, a recent strand of empirical literature on the issue employs a more fine geographical scale of analysis: the regional level. These works, thanks to the availability of more disaggregated data, take into account the regional distribution of immigrants and analyse how they affect the trade flows between destination regions and immigrants’ home countries (see, inter alia, Bratti et al., 2012, for Italian
In general, the empirical literature finds a pro-trade effect of migration, and this effect is statistically significant. In particular, an interesting finding is that immigrants, thanks to the information they naturally embody about their home country, have the capacity for increasing trade in differentiated goods more than trade in homogeneous goods. This result implicitly derives from the fact that a positive link between migration and trade has been statistically verified. Indeed, as ascertained by theory, immigrants’ prerogatives differ from those of natives due to immigrants’ more extensive information on their own home countries. Both these prerogatives facilitate trade in differentiated goods (since the importance of information is positively associated with the degree of a product’s differentiation), hence supporting the underlying idea of the present work: migration flows affect IIT more than they affect inter-industry trade.

Although existing empirical studies largely are in favour of the insight of a positive relationship between migration and IIT, encouraging exploration of it directly in the data, to the best of our knowledge, only few works have been realised so far. A first attempt at investigating the migration-IIT link was made by Blanes (2005), who finds that immigrants in Spain, in the period 1991-1998, contributed to the increase of IIT between Spain and its partner countries. Moreover, Blanes, by separating manufactured and non-manufactured products, finds that the former (which are more differentiated) are more affected by the presence of immigrants; this confirms migration’s greater impact on IIT than on inter-industry trade. In a later study that again used Spanish data, Blanes and Montaner (2006) find a positive relationship between immigration and marginal IIT. Other researchers have instead focussed on immigration in Portugal and its effect on Portuguese IIT (Faustino and Leitão, 2008; Faustino and Proença, 2011; Leitão, 2013). These studies have shown that a positive link exists between immigration and IIT. Finally, White (2008) and Leitão (2011) have investigated immigration’s role in United States IIT. In this case, the prediction of a positive correlation between migration and IIT is supported by the data. Although some of the reviewed studies have separately estimated the effects of immigration on IIT and its two components – vertical and horizontal (Faustino and Proença, 2011; Leitão, 2013; White, 2008) – and found a positive link with all IIT indices, they have not properly explained the obtained results, especially in terms of the differences in the mechanism underlying the impact on migration on the two forms of IIT. We think that these differences deserve to be mentioned more clearly. While the effects of migration on HIIT could be interpreted as the result of immigrants’ knowledge of home-country markets and available products that should enhance variety trade (as in standard literature on the migration-trade nexus), how can the impact of migration on VIIT be explained?

In general, we can assume that the positive link between migration and VIIT is more prevalent in North-South trade because income disparities between partner countries – due, for example, to differences in technology or in relative factor endowments – imply that immigrants coming from a less developed country cause an increase in demand for goods from their homeland in the host (more developed) country, leading to a rise in imports of low-quality goods. If you want, this general mechanism – beyond any considerations about the channels through which migration could affect trade – concerns comparative advantages; the migrants’ origin country, being less developed, exports low-quality goods; the host country, being more developed, provinces). In addition, another strand of literature investigates the relationship migration-trade between many home and host countries in order to capture all of those unobserved bilateral factors which could drive the causal effect of migration on trade flows (see, among others, the study of Egger et al., 2012). Finally, it is worthwhile to mention another branch of literature, although small, that deals with those effects known as indirect trade effects of ethnic networks. It is about the effects that ethnic networks may exert on trade of two countries in which they do not live (see, for example, the contribution of Rauch and Trindade, 2002, in which the effect of the huge Chinese ethnic network on bilateral trade is investigated).
exports high-quality goods. However, besides this general mechanism, a twofold assumption lies behind the idea of the pro-VIIT role of immigration: 1) immigrants (especially those coming from developing countries) have lower incomes than natives, and 2) demand for quality-differentiated goods is mostly determined by income. In effect, with reference to the first point, we can observe that income disparities between immigrants and natives have been largely confirmed in literature, through both empirical evidence and theoretical explanations based on negative self-selection hypotheses in the migration process (Borjas, 1987). Specifically, in the case of Italy as host country, the negative self-selection of immigrants is confirmed in various studies. Dell’Aringa et al. (2015), for example, explore earning differentials between immigrants and Italian natives and show that returns to human capital are significantly lower for immigrants than for natives and that the pre-immigration accumulation of human capital does not contribute to access to high-paying jobs. Accetturo and Infante (2010) find similar results, and Lombardy and Battisti (2013) document a large and growing wage gap between immigrants and natives in the case of Veneto (Lombardy and Veneto are two large northern-Italian regions). Venturini and Villosio (2008), focussing again on the national dimension of the phenomenon, found that earnings profiles of immigrants and Italian natives diverge over time. Overall, in the case of Italy as destination country, the hypothesis of an income divide between immigrants and natives seems to be largely corroborated by the empirical evidence. As regards the second point mentioned above, the relationship between income and demand for quality-differentiated goods is a fundamental ingredient in theoretical explanations of VIIT. Both in Heckscher-Ohlin-style models (like Falvey and Kierzkowski, 1987) and in R&D-based oligopolistic models of VIIT (such as Shaked and Sutton, 1984), though the supply side is differently developed, there is a common emphasis on the idea that the demand for each quality, given relative prices, depends on an individual’s income: a higher (lower) level of income is associated with demand for a higher-quality (lower-quality) product. On the reasonable assumption of an uneven distribution of aggregate income among consumers, demand for different qualities of product will emerge in the economy, and the range of qualities demanded will depend on income distribution. In an open economy, and specifically in the context of North-South trade, the extent and character of quality differentiation in trade flows (VIIT) will depend on the relative influence of the three sources of country differences: factor endowments, technology and income distribution.

In the end, combining all the assumptions mentioned in the previous discussion – income disparities between trade partners and between immigrants and natives, plus product-quality differentiation depending on income – it is quite reasonable to imagine that immigrants arriving in Italy from less developed countries could activate VIIT.

Finally, none of the works mentioned here has investigated the potential positive effect of emigration, as they have only concentrated on the role of immigration on IIT, thus running the risk of overestimating its effect. Indeed, emigration can also positively affect IIT – and with a different magnitude with respect to immigrants, as differences in human capital exist between them. Therefore, a comprehensive investigation of the effect of migration on IIT cannot overlook the simultaneous relevance of both flows (inward and outward).

The present work belongs to the group focussing on a single country and on migration’s effects on trade between the country under study and its trading partners. In particular, our paper provides an empirical analysis of the impact of both immigration and emigration on Italian bilateral IIT by carrying out separate econometric tests for HIIT and VIIT. The element of novelty of our study is an investigation conducted by crossing the two dimensions of migration (immigration and emigration) with the two dimensions of IIT (vertical and horizontal). As the following sections will show, the empirical strategy followed in this paper provides a richer set of information leading to a better interpretation of empirical results.
2. Migration Flows and Intra-Industry Trade Trends in Italy

2.1 The Measure of Intra-Industry Trade

In order to explore the IIT-migration nexus in the country under study (Italy), we use an empirical model where IIT’s share of Italy’s total bilateral trade with each partner country is explained by a set of country-specific characteristic variables, indicated by Vit (which the theoretical literature on the determinants of IIT has identified) and by measures for the stocks of immigrants living in Italy, labelled as immiit, and the Italian emigrants to partner counties labelled as emiit:

\[
IIT_{it} = f(\text{Vit}_{it}, \text{immiit}_{it}, \text{emiit}_{it})
\]

where subscripts i and t indicate the Italian partner country and time, respectively.

As dependent variable, we use a static measure of IIT, the unadjusted Grubel and Lloyd index (GL index, henceforth), which is the most widely employed index for measuring IIT. It represents IIT’s share of total trade.

The index (1) has been calculated at the 8-digit level of Combined Nomenclature (CN) trade classification, a very deep level of data disaggregation in order to avoid the categorical aggregation problem. The unadjusted G-L index (Grubel and Lloyd, 1975) is as follows:

\[
IIT^*_{jt} = \frac{\sum_{j} (X_{jt}^i + M_{jt}^i) - \sum_{j} \left| X_{jt}^i - M_{jt}^i \right|}{\sum_{j} (X_{jt}^i - M_{jt}^i)}
\]

where \(X_{jt}^i\) and \(M_{jt}^i\) are, respectively the values of Italian exports and imports of commodity j in a specific year t to and from country i. The IIT index can take any value between 0 (complete inter-industry trade) and 1 (symmetric intra-industry trade). In addition, in order to discriminate between the two components of IIT (vertical and horizontal) in our empirical data, we have followed the methodology proposed by Greenaway, Hine and Milner (1994, 1995). Assuming that differences in prices reflect quality differences and that prices can be proxied by unit values, we have calculated the unit values of imports and exports for Italy’s trade with 68 countries over the period 2005-2010. Then, trade goods are considered to be vertically differentiated if:


10 Alternative measures of IIT exist. For example Blanes (2005) uses in the analysis of immigration effects on the IIT in Spain the Fontagné and Freudenberg index and the Brülhart index for marginal IIT, which is a dynamic measure of IIT, but he obtains the same results estimating with the FF and B indexes as dependent variables.

11 Stiglitz (1987) states that the price is the variable that reflects better than others the relative quality of a product. Caves and Greene (1996) find a positive correlation between price and quality which grows as the production vertical differentiation increases.

12 We have calculated unit values as the ratio between the value of the trade flow (import or export of the 8-digit commodity) and its weight.

13 We have included in the sample only those countries with a number of migrants higher than 1000 units in each observed year. We have restricted our analysis to the period 2005-2010 due to the lack of emigrants’ data by destination countries before 2005. It is worthwhile to highlight that 57% of the resulted sample is composed of non-OECD countries. The reason for the choice of a threshold (1000 units) is that we think that only a substantial critical mass of migrants can activate a network effect leading to significant impact on bilateral trade. In effect, in the case of Italy as destination country, immigrants coming from a specific source country are largely scattered in the Italian territory and this circumstance doesn’t help to create network effects. Therefore, with tiny numbers of immigrants belonging to a specific nationality who are even spatially dispersed throughout Italian regions, the underlying migration-trade


\[ \left| \frac{UVM_i^{ij}}{UVX_i^{ij}} \right| > 1 + \alpha \]  

(3)

where \( UVX_i^{ij} \) is the unit value of exports, while \( UVM_i^{ij} \) is the unit value of imports and \( \alpha \) represents a dispersion factor, which we arbitrarily have fixed at \( \pm 20\% \).  

Trade goods are considered to be horizontally differentiated when the ratio lies within the range:

\[ 1 - \alpha \leq \frac{UVX_i^{ij}}{UVM_i^{ij}} \leq 1 + \alpha \]  

(4)

Therefore, by using information derived from unit values calculated at the 8-digit level (according to CN), we have decomposed the GL index into vertical and horizontal IIT (VIIT and HIIT). We obtain vertical (horizontal) IIT's share of total trade when, in the numerator of the GL index, we only consider the trade flows of those product categories whose unit value of exports relative to the unit value of imports is outside (within) the range of variation arbitrarily fixed at \( \pm 20\% \).

2.2 History and Characteristics of the Italian Migration Flows

Among the industrialised countries, Italy is the nation which has historically contributed the most international flows of people, with almost 30 million expatriates (people living in a foreign country) since the Unity of Italy until today. Of these 30 million, 14 million emigrated from 1876 to 1915. In 1913, around 900,000 Italians emigrated, crossing the ocean in boats or going throughout Europe by train or on foot. The exodus from Italy has also characterised the period after the Second World War, which was a time of exchange policies (emigrants against raw materials) in order to decongest, in Italy, the mass of unemployed people and to ease the social and political tensions in a difficult phase of recovery. At the time, emigration was considered a collective effort to remedy the structured evils of the country. Initially, the existing flows were annually over 300,000 individuals, and after having contributed to the Italian wellbeing of the fifties and sixties, emigration began to decrease in the seventies and returned to normal in the following decades.

In 1973, the prevalence of people coming back to their native country is recorded as the effect of a heavy economic slump on a European level, with the slowing of emigration and the nexus becomes irrelevant. The adoption of a threshold of 1000 individuals belonging to a specific nationality (a quite low number, indeed) represents a device to keep the data sample clean from low outliers of scarce interest for the investigation of migration-trade link.

In general, empirical literature fixed this parameter equal to either 15% or 25%. Following Celi (1999, 2010), we fixed it to 20%, which is a %age between those usually employed in empirical studies. It is worthwhile to note that it has been largely demonstrated that econometric results are robust to alternative values of alpha (15%, 20%, 25%) (Celi 1999; Greenway et al. 1994, 1995, 1996). Our sensitivity analysis is supplied in the appendix (see Table 4A). It clearly shows that our estimates are insensitive to the dispersion criterion adopted to disentangle HIIT and VIIT (15%, 20%, 25%), indeed our findings remain substantially unchanged, consistent with the literature mentioned above.

Although Greenaway, Hine and Milner (1994, 1995) used data at 5 digit level according to SITC, in this work, following Celi (1999), we have decided to use a more disaggregated level of data since we believe that allows us to better discriminate the "quality" trade (VIIT) from the "variety" trade (HIIT). The underlying idea is that the unit value calculated at the 8-digit level in respect to the one at the 5-digit level is an unbiased proxy of price, able to better differentiate products by quality. Moreover, as Celi (1999) suggests, with such a level of disaggregation it would be more appropriate to speak of 'intra-product trade' rather than 'intra-industry trade', but we keep the usual terminology.
beginning of foreign immigration to Italy. Along with the traditional ethnic groups coming from North Africa, often on a temporary basis, a new migration of permanent (essentially housemaid) workers entered Italy from the Philippines, Capo Verde and Sri Lanka. In the 1980s, immigrants coming from Central Africa, South America, the Indian subcontinent and Asia settled permanently in Italy. The more recent wave of immigration took place in the 1990s. It started in 1991 with the dramatic outflow from Albania and became even more numerically relevant with the fall of the Berlin Wall and the entering of Poland, first, and Romania, afterwards, into the European Union. Hence, in the early 2000s, the situation turned out to be changed: “the big phase of immigration” began in Italy. In 2010, Italians out of the country numbered 4,115,235, and the foreigners who regularly remained numbered 4,570,317 (the foreigners amounted to 7.5% of the population, namely, 52 times more than in 1861)\(^\text{17}\).

The number of immigrants and emigrants is not the only thing that has changed over time. The destination and origin countries of migration flows changed as well. The Italian emigration to the Americas has been the first and one of the biggest mass emigrations of Italians. Emigration to the Americas took place from the nineteenth century to the mid-twentieth century and is a migratory phenomenon that involved entire family units. After the Second World War, the destination of Italians was no more the Americas but Europe. Italy left the conflict destroyed, with many of its youth mutilated or killed, and those who remained were left without work. The economy slowly advanced, and the south remained further behind. In the rest of Europe, however, the situation was different. France, Belgium, Austria and Switzerland were continually making progress, and Germany had a large desire to redeem itself. In this way, the German industry continued to accelerate, requiring more and more manpower, which resulted in hundreds of young people leaving their countries in search of fortune to improve living conditions and escape poverty.

This increasing emigration to European countries has kept persisting until the present day. In 2010, the top three destination countries of Italian emigrants, out of a list of ten, were Argentina, Germany and Switzerland followed by France, Brazil, Belgium, the United States, the United Kingdom, Canada and Australia (Graph 1).

\(^{17}\) One should consider that irregular inward flows in the UE yearly amount to half million. In Italy, in 2005, 10% of immigrants cross the sea; 15% cross the border, whereas the remaining ¾ come in Italy with a regular entry visa and remain beyond the expiration date (Caritas and Migrantes, 2005).
With reference to the OECD status, OECD countries are the chosen destination from 69% of emigrants, whereas only the 31% of Italians move to non-OECD countries (Graph 2).
On the side of immigration, the great majority of immigrants - 87% - comes from non-OECD countries (such as Romania, Albania and Morocco followed by China, Ukraine, Philippines, India, Poland and Tunisia). Therefore Italy is receiving intense flows of immigrants from poorer countries compared to those that in the past were reached by Italian migrants (graph 3 and 4).
In order to better understand how the country’s entering and exiting flows may affect bilateral trade between the sending and receiving countries, it also becomes relevant to analyse how the flows themselves have changed over time. Regarding the characteristics of immigrants, it is necessary to note that they are far from ignorant. On average, they are, in fact, more educated than Italian residents. This comes from the census of 2001 (ISTAT). The foreign residents with a college degree amount to 12.1% of immigrants, while only 7.5% of Italians have a degree. 27.8% of foreigners have a high school diploma compared to Italy’s 25.9%. Those with a junior high school level amount to 32.9% versus Italy’s 30.1%. This fact probably astounds since, in almost all of the cases, immigrants dedicate themselves to jobs such as caretakers, janitors and other jobs that sometimes are far from their educational and professional background. This trend is known as “brain waste” and is widespread in Italy.

As far as emigration is regarded, a new type of emigrant has taken form. The traditional emigrant, who was generally poor and low in culture, who was satisfied with humble working conditions and being underpaid, has been placed side by side with different types in the last 15-20 years. In this regard, we mention the professional emigrant who moves not necessarily in order to find a job but to enrich his or her own amount of experience, or the student who, after a period of time spent abroad, decides to remain in that country, or lastly, “the Brain”, which is a searcher who cannot get the desired opportunity in an Italian university and is forced to move abroad. All of them are qualified, capable and generally obtain professional success that perhaps in Italy would have been impossible. Therefore, new emigrants are often qualified people employed by research centres abroad, multinational companies or in transfer for their firms. In 2001-2006, there was an increment of college graduates subscribed to AIRE\(^\text{18}\) of 53.2%.

Effectively, one can positively conjugate emigration with globalisation by proposing it as an innovative force. There are about 14 thousand firms abroad founded by Italian entrepreneurs who represent a resource for their country of origin: precious consultants, able to supply valid support in terms of information\(^\text{19}\). In addition, it is worth noting that the Italians who have a permanent and stable residence abroad continue to maintain a strong bond with their culture, which, in turn, may assure the benefits of a return emigration (not necessarily in the physical meaning). In this sense, emigration constitutes an opportunity for Italy, and the actions promoted by the Italian government to facilitate and strengthen contacts between Italians and their compatriots are noteworthy\(^\text{20}\). The ties with the Italians abroad can help to boost IIT between Italy and the destination countries of migration.

In this regard, the next section describes the main characteristics of the Italian IIT (e.g., what type of product differentiation predominates and its trend over the last years).

2.3 A Glance at Italy’s Intra-Industry Trade Pattern

In the years 1990-2010, the share of Italy’s IIT in its total trade with 68 partner countries grew from 40% to 47%; this growth particularly occurred in the share of VIIT\(^\text{21}\). Graph 5 shows the trend in the aggregate indices of the Italian IIT with the countries in the sample for the period 1990-2010. What we can infer is that Italy’s IIT with the considered countries is mainly trade in goods differentiated by quality (VIIT): on average, it accounts for more than 60% of total IIT in the period 1990-2010. Specifically, high-quality vertical trade (HQVIIT) increased up to 57% relative to total VIIT in 2010\(^\text{22}\).

\(^{18}\) AIRE is the Register of Italians Residing Abroad which contains the data of Italian citizens residing abroad for a period exceeding twelve months.

\(^{19}\) Fondazione Migrantes, Rapporto italiani nel mondo, 2006.

\(^{20}\) For instance, in the month of April 2012 the Italian ministry of foreign affairs planned to create a web platform (crowdsourcing) that involves 22 adept scientists who serve ambassadors and consulates who, in the end, will allow the ex-patriot talents to stay in contact with Italy. This has been thought as a way to contribute to the overcoming of the crisis and to the economic growth of the country.

\(^{21}\) The list of countries in the sample is supplied in the Appendix (Table 5A).

\(^{22}\) Vertical IIT is assumed to consist of two components, high-quality (HQVIIT) and low-quality (LOVIIT). When the share of HQVIIT is high it implies that a country is specialising into relatively high-price (high-
As far as OECD countries are concerned (graph 6), from 2005-2010, Italian IIT, on average, took values between 3% (New Zealand) and 41% (Germany) with concentrations in the intervals from 10%-20% (Ireland, Greece, Finland, Japan, Denmark, Portugal, Hungary, Sweden, Turkey) and 23%-30% (Czech Republic, Netherlands, Poland, United States, Austria, Belgium, Spain, Switzerland).

quality) export goods in the vertically differentiated sectors. On the contrary, a high share of LQVIIT means that a country is exporting relatively low-price (low-quality) goods. In particular, if the relative unit value of a good is below (over) the limit of $1-\alpha (1+\alpha)$ (where $\alpha$ is a factor of dispersion arbitrarily fixed), it is considered as a low (high) quality export.
Graph 7 shows the IIT indices between Italy and non-OECD countries (average for 2005-2010). As predicted by the theoretical literature on IIT, with the more dissimilar countries, IIT’s share of total trade is lower. The IIT mainly is in the interval 0.5%-5%. With countries such as China, Croatia, India, Israel, Malta, Romania, Serbia, Slovenia, Thailand and Tunisia, a higher IIT is registered, as the trade flows between Italy and these countries incorporate exchanges in intermediate goods.

23 The index used for the calculation of the share of intra-industry trade is the Grubel Lloyd index which is the most used measure of IIT. It will be described in the section 4.1.
Graph 7. Italian intra-industry trade with the non-OECD countries (average 2005-2010)

Source: Author's calculations based on EUROSTAT data.
3. An Econometric Model of Intra-Industry Trade with Both Immigration and Emigration

3.1 Hypotheses and Specifications

In our empirical model, which tests for the potential positive effects of immigration and emigration on IIT, the key variables are obviously immigrants (imm) and emigrants (emi), but we also need to take into account other variables which the theoretical and empirical literature suggest to be determinants of IIT to make the model as explanatory as possible. As for the framework explaining IIT, we start from the empirical work of Helpman (1987), who tested some hypotheses that came out of the international trade theory based on monopolistic competition in differentiated products. Specifically, he tested three hypotheses. One of them is that the larger the similarity in factor composition (or proportion), the larger the share of IIT. To test this hypothesis, he used per capita income as a proxy for factor composition. Hence, we include in the model a variable capturing factor composition differences, but, like Blanes (2005), we follow Hummels and Levinsohn’s (1995) procedure employing direct measures for factor endowments differences – namely, capital-to-labour ratio differences instead of per capita income – since, as Hummels and Levinshon (1995) have pointed out, the use of per capita income as a proxy for factor composition could be an inappropriate technique. It is a valid proxy if only two factors are employed in production and all goods are traded, and the empirical literature generally interprets differences in per capita income as a proxy for consumer tastes, as posited by Linder (1961). In addition, market size and market proximity are suggested to be positive determinants of IIT; therefore, we augment the empirical specification with variables that, respectively, control for size and geographical distance between trading countries – the latter as a trade-friction variable. Then, since our reference country is Italy, we also include in the model a dummy variable for countries which are members of the European Union (EU) as a trade-facilitating variable. Finally, we add to the basic model our key variables: the stock of immigrants and the stock of emigrants. The former refers to the number of immigrants living in Italy by origin country and the latter indicates the number of Italians living abroad by destination country.

Thus, our first empirical model is

\[ \text{IIT}_{it} = \alpha_0 + \alpha_1 \text{emi}_{it} + \alpha_2 \text{imm}_{it} + \alpha_3 \text{KLdiff}_{it} + \alpha_4 \text{size}_{it} + \alpha_5 \text{dist}_{i} + \alpha_6 \text{eu}_{it} + \mu_{it} \]  

where

- IIT\(_{it}\) indicates IIT’s share of total trade between Italy and the partner i at time t (measured by GL index);
- emi\(_{it}\) is the natural logarithm of the stock of Italian emigrants living in the partner country i at time t;

---

**24** The other two hypotheses he tested and that find support in the data are the following: as the factor composition of a group of countries becomes more similar over time then the share of IIT within the group will increase; the rising trade-income ratio can be explained by changes in relative country size.

**25** This variable is employed in order to take into account the important role of geography. Geographical closeness and common border (contiguity) have been recognised to be positive drivers of IIT, even though different explanations are posited. According to Balassa (1986b), “it can be assumed that the availability of information decreases, and its costs increase, with distance”; whereas Venables et al. (2003) find that geographical distance contribute to increase differences in country characteristics, which, in turn, negatively affect IIT. Hummels and Levinsohn (1995) state that “if the elasticity of substitution between varieties of a differentiated product is greater than the elasticity of substitution between homogeneous goods, a decline in distance will have a larger (positive) effect on the volume of IIT than it does on the volume of inter-industry trade.” They find that country-pair-specific effects (such as distance) explain the IIT behaviour much more than time-varying factor measures.
imm\_i\_t is the natural logarithm of the stock of immigrants from the partner country i living in Italy at time t;

KLdiff\_i\_t measures the differences in relative factor endowments using the logarithm of the absolute value of the difference in the K/L ratios between Italy and the partner country i at time t, that is:

\[
\log \frac{K_{Italy}\_t}{L_{Italy}\_t} - \frac{K_i\_t}{L_i\_t};
\]

size\_i\_t is a market-size control variable included to capture the importance of combined size, measured as the logarithm of the mean value between Italy’s and the partner country i’s GDPs at time t: log mean (GDP\_Italy\_t, GDP\_i\_t)

dist\_i\_t, as said before, is a proxy for trade transaction costs (such as transport costs and information costs about characteristics of the product), measured as the logarithm of the geographical distance between Italy and the partner country i;

eu\_i\_t is a dummy variable which takes the value of 1 if a country in the sample is a member of the European Union in year t and is 0 otherwise\(^{26}\).

\(\mu_{i\_t}\) is the stochastic disturbance term that we assume to be independently distributed.

We assume that the direction of causality is from migration to trade. This assumption is justified by several arguments. Firstly, the existing literature does not identify trade as a determinant of migration; it instead stresses the role of other factors. In general, the empirical literature focussed primarily on wage differences between destination and origin countries, the rate of unemployment, and distance as drivers of migration (see Borjas, 2010; Jandová and Paleta, 2015)\(^{27}\). Another strand of the research found some evidence confirming the significance of labour force characteristics, such as skills, risk aversion (World Bank, 2007), ownership of houses (Oswald, 1996, 1997), age, sex and family status (Dennett and Stillwell, 2010). Secondly, next to these predictions of migration’s determinants, the bulk of the empirical literature examining the migration-trade link found evidence that migration causes trade. For instance, Gould (1994) and Dunley and Hutchinson (1999) performed Granger causality tests, finding that immigration precedes trade for most of the United States’ trading partners. We cannot perform this analysis because of the short span of our data. In addition, Bettin and Lo Turco (2009) investigated endogeneity using the test developed by Wooldrige (2002), finding that migration is strictly exogenous. Moreover, several attempts to address the potential endogeneity of migration have been made using the lagged stock of immigrants (see Briant et al. 2009, and Combes et al. 2005, regarding France and Murat and Pistoresi, 2009 regarding Italy). We followed this procedure (see the Appendix, Table 3A). Consistent with previous studies, our results reveal that migration precedes trade and not vice-versa, as both immigrants’ and emigrant’s trade impacts do not change with the predetermined variables.

In order to check the existence of a different qualitative effect of migration flows on vertical and horizontal trade, we have to estimate separate specifications for each type of IIT. These two models will be identical to the first except for a different dependent variable; the VIIT and HIIT equations are, respectively:

\(^{26}\) The eu explanatory variable has the subscript t, since our sample includes countries that become members of the EU in different years.

\(^{27}\) The oldest neoclassical macroeconomic theories predicted that migration is caused by geographic differences in the labour supply and demand (Massey et al., 1993). Broadly speaking, literature identified push and pull factors determining migration. In accordance with neoclassical theory, Price (1951) stated that what pushes people to move is the wish to improve their standards of living, both economic and social. From this point of view, people who have decided to migrate choose a region associated with the maximum net benefit from migration (Greenwood, 1974). Commonly, in empirical literature push factors were represented by a high rate of unemployment in a source region and/or a job loss of a migrant (Fidrmuc, 2004). Among the pull factors, a high wage level is one of the most important (e.g. Massey et al., 1993, Liu and Shen, 2014).
3.2 Data Sources and Variables

With regard to the data source used for building our database, data on bilateral imports and exports at the 8-digit level of disaggregation were obtained from the EUROSTAT Comext database; K, L and GDP come from World Bank Development Indicators; the dist variable comes from the great-circle distance in kilometres between capital cities: the stock of immigrants in Italy is from ISTAT; migration trends and foreign population come from the online ISTAT annuals; and the stock of Italians living abroad is from the AIRE database.

What do we expect about parameter signs when the equation (I) is estimated? Geographical distance should have a negative sign, as it negatively affects trade. Indeed, trade transaction costs, given by formal and informal barriers to trade and transport costs, generally go up with distance, discouraging trade. Moreover, as Blanes and Martín (2000) state, “We consider that distance will affect IIT more than inter-industry trade, since differentiated products will have more national substitutes (different in quality or any other characteristic) than homogeneous products” (p. 434). The dummy variable, eu, which was placed in the model to control for the common-market effect, should be positive, as being a member of the European Union facilitates trade. The sign of KLdif cannot be defined for certain a priori. According to Krugman (1979, 1981) and Helpman (1987), who developed a model of monopolistic competition generating IIIT, differences in factor endowments negatively affect IIIT. Hummels and Levinsohn (1995), using two alternative proxies for differences in factor composition, reached the same conclusion as Helpman (1987). On the other hand, Falvey and Kierzkowsky (1987) developed a model which explains VIIT and argued that IIT could be positively affected by differences in factor endowments when goods are vertically differentiated. Moreover,

\[ \text{VIIT}_{it} = \alpha_0 + \alpha_1 \text{emi}_{it} + \alpha_2 \text{imm}_{it} + \alpha_3 \text{KLdif}_{it} + \alpha_4 \text{size}_{it} + \alpha_5 \text{dist}_{it} + \alpha_6 \text{eu}_{it} + \mu_{it} \]  

\[ \text{HIIT}_{it} = \alpha_0 + \alpha_1 \text{emi}_{it} + \alpha_2 \text{imm}_{it} + \alpha_3 \text{KLdif}_{it} + \alpha_4 \text{size}_{it} + \alpha_5 \text{dist}_{it} + \alpha_6 \text{eu}_{it} + \mu_{it} \]

28 http://www.wcrl.ars.usda.gov/cec/java/lat-long.htm  
29 It is worth underlining that the data from AIRE managed by the Home Office in collaboration with Commons present some restrictions. On one hand, the AIRE’s Statistics are rounded down, because to register all those who keep emigrating is not possible. It is a formal bureaucratic procedure that it is not always done by those who leave the country. For example, many young people go abroad (sometimes with repeated moves and without a definitive plan) pivoting on families and, therefore, they do not register themselves on the above-mentioned civil registry. At the end of May 2000 the results showed 2,756,000 Italians signed up to go abroad, with an underestimate of more than one million people in respect to what was observed by consulates. On the other hand, the 28% of those signed up with AIRE are registered as “son of Italian citizen born abroad” and 2.6% for achieving citizenship. This means that an emigrant and someone registered with AIRE are not necessarily the same thing. Besides, it has to be taken into account that the expression “Italians abroad” indicates several categories: those who emigrated but remained Italian citizens; those who emigrated and have achieved citizenship of the place where they have gone to; the emigrants’ sons, who can be Italian citizens or citizens of the foreign place or can have both citizenships; descendants (grandchildren or great-grandchildren) of one or both Italian parents, which maintain the foreign citizenship but are also interested in the origins of their families, or together with a cultural interest, want to achieve the Italian citizenship. In light of this, there are 4 million Italian citizens, of which about half is physically migrated, and 60 million (estimated by Foreign Ministry) as community of Italian origin spread all over the world. Nevertheless, AIRE is full of detailed data about, for example, the regional origin of the Italians abroad. Therefore, using these breakdowns one can have a more articulated overview.  
30 A negative effect of distance on IIT has been found by several empirical studies such as: Balassa and Bauwens (1987), Stone and Lee (1995), Blanes and Martín (2000), Crespo and Fontoura (2004), Reganati and Pittiglio (2005).  
31 A positive sign has been found by Crespo and Fontoura (2004) and Pittiglio (2009) for HIIT; Gullstrand (2001), Crespo and Fontoura (2004), Reganati and Pittiglio (2005) and Pittiglio (2009) for VIIT.  
32 The basic idea is the following: when two countries have different factor endowments (capital and labour), then the higher quality variety of the differentiated good is produced using relatively capital intensive techniques. It follows that the country with a higher income, relatively capital abundant, will specialise in relatively high quality goods, while the one with a lower income, relatively labour abundant, will specialise in low quality goods.
empirical studies, such as Greenaway et al. (1994) for the United Kingdom and Blanes and Martin (2000) for Spain, showed that if total IIT is disentangled into its vertical and horizontal components, VIIT increases with differences in factor endowments, bringing out a positive relation between them. In light of this, we know that, to better identify the sign of the effect of factor endowment differences on IIT, we should break IIT down into vertical and horizontal components and estimate them separately – equations (II) and (III) – which is what we do, as our goal is to test the hypothesis that emigration and immigration have different effects on the two types of IIT.

According to Lancaster (1980), Loertscher and Wolter (1980), Falvey and Kierzkowski (1987) and Markusen and Venables (2000) the IIT’s share of total trade is positively correlated with the market size of the two trading partner countries; thus, we expect the coefficient of the size variable, α₄, to be positive. Finally, the coefficients of the emi and imm variables are expected to both be positive, as emigrants and immigrants are able to reduce the costs related to imperfect contract enforcement, imperfect information and uncertainty, all of which characterise international transactions; consequently, they can positively affect IIT. However, when the vertical and horizontal components of IIT are separately tested – equation (II) and equation (III), respectively – we should expect an impact of migration flows that is virtually different for the two forms of IIT. On the one hand, the standard pro-trade role of immigration in terms of transaction-cost reduction seems more appropriate when HIIT is involved, as the immigrants' knowledge of the home-country markets and available products should enhance variety more than quality. On the other hand, the likely emergence of income differentials between immigrants and natives should activate more VIIT. However, if we assume diversity in human capital between immigrants and emigrants, it is reasonable to expect differences between emigration and immigration in their effects on the two forms of IIT. In Italy’s case, emigrants seem to actually be endowed with more human capital than immigrants, and they move especially towards countries that are more advanced than the immigrants’ homelands. Under these circumstances, it would not be strange to expect a stronger impact of emigrants on variety trade (HIIT).

3.3 Methodology

Since the IIT index varies between 0 and 1, the ordinary least squares (OLS) method is not appropriate, and it cannot be directly used for the model’s estimate (as the estimated coefficients would not be efficient). Caves (1981) noted that the OLS method has the disadvantage of not ensuring that the predicted values of the dependent variable will be within its feasible range, from 0 to 1. In order to overcome this problem, we follow the methodology adopted in literature by Loertscher and Wolter (1980), Caves (1981), Bergstrand (1983), Stone and Lee (1995) and Reganati and Pittiglio (2005). We use a logit transformation of the GL index and estimate the model by OLS:

$$\log\left(\frac{\text{IIT}_{it}}{1-\text{IIT}_{it}}\right) = \beta' X_{it} + \mu_{it}$$  \hspace{1cm} (5)

where β and X are the vectors of parameters and explanatory variables, respectively.

It is necessary to point out that the logit transformation rules out all observations where the IIT index takes the values 0 or 1. Hence, some authors estimate a logistic function, using non-linear least squares (Greenaway and Milner, 1984; Balassa, 1986a; Balassa and Bauwens, 1987; Aturupane et al., 1999; Blanes and Martin, 2000; Gullstrand, 2002; Reganati and Pittiglio, 2009); on VIIT, among others: Greenaway et al. (1994), Crespo and Fontoura (2004), Pittiglio (2009); on VII, among others: Greenaway et al. (1994), Stone and Lee (1995), Greenaway et al. (1999), Gullstrand (2001), Crespo and Fontoura (2004), Reganati and Pittiglio (2005), Pittiglio (2009).

Pittiglio, 2005; Pittiglio, 2009). We do not apply this methodology, as our database does not contain values exactly equal to 0 or 1 for the dependent variable. Finally, other authors use a Tobit model (Veeramani, 2002; Sharma, 2002; Byun and Lee, 2005; Pittiglio, 2009). We apply the Tobit estimation as a robustness check (see Appendix, Table 2A).

4. The Estimation Results

4.1 Main Results

The results of the estimation, as carried out for all product categories (CN 1-97) and all 68 countries in the sample, are reported in Table 1. Straightaway, we can note the model fits very well with the data since the explanatory power of the regressions is quite high. All of the coefficients have the expected signs, and all except the emigration variable are statistically significant. The effect of emigration becomes highly significant (at the 1% level) only in reference to the HIIT (column III), confirming the intuition expressed above.

Controlling for the economic masses and the transportation costs (the latter proxied by bilateral distance), Italy has a relatively high propensity to trade with European Union countries, as the positive and significant coefficient of the EU dummy variable suggests. The negative coefficient of KLDiff means that the IITs of similarly endowed countries have higher shares of total trade. When equation (II) is estimated, the negative sign in front of the KLDiff coefficient remains; this result is not what we would expect for VIIT regression. However, the inverse relationship between VIIT and the relative capital endowment variable is not surprising if we look at the countries' characteristics; the data reveals that the most capital-intensive industries are those with less scope of product differentiation (chemicals, food processing, etc.). Indeed, to capture quality differentiation in trade in a proper way, a proxy for relative human capital endowment would be more appropriate than the K/L ratio. Actually, studies on the industry-specific determinants of VIIT found a positive relationship between the human capital intensity variable and IIT in vertically differentiated products. Although these are valid arguments, in the spirit of studies focussing on country-specific determinants of IIT, we have preferred to maintain the usual specification for the relative factor endowment variable.

As we predicted, a strong positive linkage between immigration and Italy's IIT with its partners is found over the period 2005-2010. This result is line with Blanes (2005), Faustino and Leitão (2008), Faustino and Proença (2011) and Leitão (2013). The effect of emigration on the IIT index is also positive, but it is not statistically significant. These findings regarding the effects of immigration and emigration on the share of Italian total IIT support the underlying idea that migration flows are able to trigger IIT through what immigrants bring: both knowledge about foreign markets and social institutions and their own business/personal contacts in their home countries.

Observing in detail the predicted values of the immigration and emigration parameters, it appears evident that emigration has a lower effect on the share of IIT than does immigration. Thinking of the network effect, this result could astound us if we agree with the notion of a positive correlation between skill level and trade. Indeed, this finding would seem to be out of line with what we said about the peculiar characteristics of Italian migration flows. Recently, Italian emigrants have mostly been skilled migrants, and the immigrants, for the most part, have had a lower educational level than the emigrants. Because of this peculiarity of Italian migration flows, we would expect results opposite to those we obtained. As immigrants are

34 Greenaway et al. (1995) found a positive sign when VIIT is regressed on the share of non-manual employment in total employment. Celi (1999, 2010) found a positive relationship between up-market VIIT and the ratio of non-manual to manual workers. It is worth noting that both contributions are studies focussing on industry specific determinants of IIT. In other words, regressions are carried out across industries and not across countries, as we do in the present work.
35 For an analysis of the relationship between skilled migration and trade see, among others, Felbermayr and Jung (2009).
mostly lower-skilled individuals, they have fewer abilities to create new trade than emigrants do, as what encourages them to leave their country, above all, is the economic aspect (earning and saving money). On the other hand, most emigrants are highly skilled and are moved by different reasons, such as increased vocational training, more occupational possibilities and better work conditions (usually at bigger firms). Emigrants also try to do business and benefit from the potential of the host country, which increases the possibilities for creating trade. Actually, the results do not really contrast with what we said if we consider that in Italy, emigration is surely an ancient phenomenon but skilled emigration is only a recent phenomenon that will produce results in the long run.

It is worth noting that the basic idea of the different effects of the inward and outward migration flows on the share of IIT finds validation in the data.

<table>
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<th>HIIT</th>
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Table 1 The impact of immigration and emigration on the Italian IIT (logistic transformation of GL index – pooled OLS)

Notes: ***, **, * indicate significance at the 1, 5, and 10 percent level respectively. All estimations include time dummy variables. t-values are given in parentheses.

With regard to the VIIT and the HIIT (columns II-III), we find the results equally interesting, and above all, in line with the conception that migration flows have different effects on the two types of IIT. Indeed, the estimated coefficients vary between them, and their impacts on VIIT and HIIT are different. In particular, one can note that the emigration’s and immigration’s effects grow with reference to the variety trade: the Italian inward and outward migration flows help to increase HIIT more than VIIT. As far as emigration is concerned, this finding should not amaze us if we take into account that Italian emigrants mostly go to developed countries, where HIIT prevails. The immigrants’ coefficient shows that the effect on VIIT is similar to the effect on IIT; that is to say, almost all of the IIT is VIIT, and the HIIT is what changes. Moreover, while immigrants also have a positive effect on the quality trade (VIIT), activated by income differentials between immigrants and natives, emigrants trigger only the variety trade (HIIT); indeed, the coefficient of the emi variable for VIIT is not statistically significant.

The larger effect of both emigration and immigration on HIIT is exactly what should explain the preference effect next to the network effect: the migrants’ natural knowledge about their home countries affect, as expected, trade for goods that are differentiated by attributes. Then, if we only refer to the IIT without distinguishing between its two components, we underestimate the potential effect of migration (both emigration and immigration) on IIT because the biggest effect is the network one, as captured by the HIIT.
4.2 Robustness Check

Since the theory does not dictate the appropriate specification and only informs about a few variables that ought to enter the specification (Hummels and Lenvinsohn, 1995), we have to check our results’ robustness by estimating reasonable alternative specifications. We perform a sensitivity analysis for the set of explanatory variables. In Tables 2, 3 and 4, we first investigate whether the migration flows’ effect on IIT, VIIT and HIIT is sensitive to the set of transaction cost variables included in the specification of the model, dist and eu (columns II, III and IV); secondly we must investigate the inclusion or exclusion of the variable that measures differences in relative factor endowments, KLdif (columns from V to VIII). This check is followed by a deeper analysis of the effect of migration flows on the IIT indices by distinguishing origin/destination countries in two groups: OECD and non-OECD (Table 5).

In Table 2, one can note immediately that, if we do not include variables such as dist and eu and do not control for the countries’ factor endowments, the explanatory power of regressions that rule out these variables is much lower than the power of the estimates that do. In particular, when the variable eu is omitted, the value of the emi variable’s coefficient grows and becomes statistically significant. However, when we exclude the variable dist, the effect of emigration falls and is no longer significant. The effect on the immigration coefficient is exactly the opposite, even if it continues to be positive and significant: it reduces when eu is excluded from the model and increases when we do not consider dist.

Therefore, excluding the variables relating to transaction costs and regional integration agreements would lead us to overestimate the effects of both immigration and emigration, which would capture the other country-specific effects. This would be a case of omitted variable bias.

The columns VI to VIII correspond to the columns II to IV but without the KLdif variable. In this case, the only effect is an increase in the coefficients; the sign of the relation remains the same.

<table>
<thead>
<tr>
<th></th>
<th>II</th>
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Table 2 Sensitivity analysis for IIT

Notes: ***, **, * indicate significance at the 1, 5, and 10 percent level respectively. All estimations include time dummy variables. t-values are given in parentheses.

Tables 3 and 4 show the results of the sensitivity analysis for VIIT and HIIT. Again, looking at the coefficients of our key variables, we reach the conclusion that the first specification of the model (in Table 1) is the best, as it has the highest explanatory power and does not suffer from omitted variable bias.
An additional test for a deeper investigation of the relationship between migration flows and IIT is strictly related to the fact that the home and host country migration flows differ. Italy stands out because of its own migration flows. Immigration and emigration seem to be South-to-North and North-to-North matters, respectively. Furthermore, empirical and theoretical literature about IIT suggests that IIT occurs mainly between developed countries. By estimating all of the countries together, one might think that the effect of immigration on the IIT index is underestimated. For this reason we estimate the IIT effects of immigrants coming from

### Table 3  Sensitivity analysis for VIIT

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**Notes**: *, **, *** indicate significance at the 10, 5, and 1 percent level respectively. All estimations include time dummy variables. Heteroscedasticity-robust t-statistics are given in parentheses.

### Table 4  Sensitivity analysis for HIIT

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<tr>
<td></td>
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<td>-0.24***</td>
<td>-0.71***</td>
<td>-</td>
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</tr>
<tr>
<td></td>
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**Notes**: *, **, *** indicate significance at the 10, 5, and 1 percent level respectively. All estimations include time dummy variables. Heteroscedasticity-robust t-statistics are given in parentheses.
developed countries separately from those of immigrants coming from developing countries; we do the same for emigrants. We consider developed countries to be those that are members of the OECD and developing countries to be all others. To better identify the effects of the different kinds of migrants (those coming from and moving to OECD countries and those coming from and moving to non-OECD countries), we let the elasticity of trade for immigration and emigration vary among the two groups of countries. Let us define a dummy variable which is 1 if the country is a member of the OECD and 0 otherwise. On the contrary, the dummy-named non-OECD takes the value 1 if the country is not a member of the OECD and 0 otherwise. Finally, we introduce four interaction variables, two of which derive from the products of the OECD dummy and the emigration and immigration variables; the other two are the products of the non-OECD dummy and the emigration and immigration variables. These last four variables replace the stock of immigrants and emigrants in the regression.

What we expect depends on the degree of similarity of trading countries. If we assume that Italy is a developed country, as the literature on the migration-trade link suggests, there are reasons to expect that migration flows to and from developing countries will have greater effects on IIT’s share of total trade than will migration flows to and from developed countries. This consideration is due to the fact that larger dissimilarities between host and home countries lead to greater reductions in transaction costs caused by immigrants and emigrants. Because Italy is a developed country, we expect the information about the political, sociological and economic contexts of immigrant and emigrants coming from and moving to developing countries to be more valuable; therefore, these migrants will contribute to increasing IIT’s share of total trade.36

Conversely, from the theoretical and empirical literature on the determinants of IIT, we know that when countries are more dissimilar, their IIT makes up a lower share of the total trade. In effect, it seems that there is an apparent contradiction: on the one hand, according to the previous literature, North-South trade should reveal positive effects of immigrations on trade flows because the countries of origin and destination are dissimilar; on the other hand, in this same case, IIT’s share of total trade is more modest. How can we deal with this noticeable dissonance? Reflecting on the different impacts of migration on the two components of IIT (vertical and horizontal) helps to solve the puzzle. For example, if we look at North-South trade (and migration) flows, the hypothesis of a positive link between migration and VIIT is plausible, as it is based on the assumption that income disparities between trade partners (and between immigrants and natives) could generate trade flows differentiated by quality (e.g., quality trade); in addition, this positive link between migration and VIIT is coherent with the idea that VIIT is more prevalent between dissimilar countries (as explained in HO-style models of VIIT). Alternatively, if we look at North-North trade (and migration) flows, the hypothesis of a positive link between migration and HIIT is coherent with the idea that, in the presence of more modest income disparities between trade partners (and between immigrants and natives), trade flows generated by immigrants concern mostly variety trade – which takes place between similar countries according to a Linder-Krugman-style hypothesis. Overall, disentangling the trade effects of migration in terms of its different impact on the two components of IIT (vertical and horizontal) contributes to solving the apparent contradiction mentioned above.

Finally, if, after controlling for the economic development of migrants’ origin countries – OECD vs non-OECD, as we do in our econometric tests – the positive and significant link between migration and IIT remains. This means that the composition effect, because North-North trade incorporates a disproportionately higher share of IIT than North-South trade, does not hide the migration-IIT nexus; on the contrary, its importance is emphasised.

Table 5 reports results in line with expectations. Specifically, immigrants from non-OECD countries, with respect to immigrants from OECD countries, have a larger and more statistically significant impact on VIIT, whereas immigrants from OECD countries, as expected, have a

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36 Girma and Yu (2002) support an argument similar to that we have just exposed. They state, also finding validation in the data, that in the UK immigrants coming from Commonwealth countries, which have institutions much similar to those of the UK, bring with themselves less additional information than immigrants who come from non-Commonwealth countries. Therefore these contribute less to create trade.
statistically significant impact only on IIT and HIIT and do not affect the quality trade. Moreover, we can also note that immigrants from non-OECD countries are found to significantly promote HIIT. This finding is exactly explained by the network effect. Therefore, we find that immigrants from non-OECD countries activate both types of IIT: qualitative differentiation (VIIT) because of income differences between immigrants and natives and product differentiation (HIIT) due to the network effect.

As far as emigration is concerned, we find a positive and statistically significant impact, specifically on HIIT, only for emigrants who go to non-OECD countries. The positive impact of emigration on HIIT is the same finding shown in Table 1, but in this case, the distinction between emigrants going to OECD and non-OECD countries allows us to better interpret the result. Indeed, based on the previous findings, one could think that those who triggered trade were emigrants going to OECD countries, as their trade is in goods that are differentiated by attributes (but that have the same quality). Separating OECD and non-OECD emigrants, instead, permits us to understand that there is a consumption effect; moreover, this makes it possible to reflect on the kind of emigrant who goes towards non-OECD countries. Actually, the greater positive effect on the HIIT could be explained by the fact that the Italian who moves to a developing country is usually an entrepreneur who is able to activate trade thanks to his or her professional background and knowledge about his or her home country. The information he or she brings affects variety trade instead of quality trade, so there is not a consumption effect (as one would think) but also a “business effect”. This is only a possible explanation, and it needs to be empirically tested.

To sum up, immigrants coming from non-OECD countries activate VIIT, which we had expected because of income differences, but they also foster HIIT thanks to preference and information channels. Immigrants from OECD countries, instead, affect only HIIT and not VIIT, since they are assumed to have similar income distributions. Moreover, the existence of a consumption effect could justify the positive impact of immigrants from OECD countries on the variety trade. In the particular case of emigrants to non-OECD countries, we find that they have a positive and significant effect on the variety trade. This outcome is exactly in line with the prediction that the positive effect of migration flows on IIT will be higher when countries are more dissimilar.

It is worthy to underline that both migration flows (immigration and emigration) activate HIIT more than VIIT but that the explanation behind each effect is different. With regard to immigrants from OECD/non-OECD countries, the driving force is the consumption (preference) effect (perhaps together with an information effect in the case of non-OECD immigrants); however, in the case of emigrants going to non-OECD countries, the business effect, based on the relevance of information in different contexts (OECD/non-OECD), is the main force. In Italy’s case, the different effects of business and preferences depend on differences in human capital between non-OECD immigrants and emigrants.

\[\text{37 Data on the educational level and on the work of emigrants by destination country, at the moment of writing is, unfortunately, not available. Therefore, it remains an issue to be explored.}\]
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</tr>
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<td>(3.04)</td>
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<td>(-5.42)</td>
<td>(-6.41)</td>
</tr>
<tr>
<td>Eu</td>
<td>0.62***</td>
<td>0.62***</td>
<td>0.48**</td>
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<tr>
<td></td>
<td>(3.92)</td>
<td>(3.99)</td>
<td>(2.26)</td>
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<tr>
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<td>1.80***</td>
<td>2.38***</td>
<td>2.97***</td>
</tr>
<tr>
<td></td>
<td>(2.95)</td>
<td>(3.83)</td>
<td>(2.64)</td>
</tr>
<tr>
<td>KLdif</td>
<td>-0.10***</td>
<td>-0.11***</td>
<td>-0.14**</td>
</tr>
<tr>
<td></td>
<td>(-2.81)</td>
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<td>(-2.19)</td>
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<tr>
<td>constant</td>
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<td>-37.27***</td>
<td>-32.72***</td>
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<tr>
<td></td>
<td>(-8.08)</td>
<td>(-8.38)</td>
<td>(-5.39)</td>
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<td>R²</td>
<td>0.6366</td>
<td>0.6168</td>
<td>0.3883</td>
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<tr>
<td>Obs</td>
<td>385</td>
<td>385</td>
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</tr>
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</table>

**Table 5** The effects of immigration and emigration on IIT, VIIT and HIIT by OECD Status

**Notes** ***, **, * indicate significance at the 1, 5, and 10 percent level respectively. All estimations include time dummy variables. Heteroscedasticity-robust t-statistics are given in parentheses.

5. **Concluding Remarks**

In this work we have tested the hypothesis that the stock of migrants helps to explain IIT’s share of total trade. Following Blanes (2005), we have linked the literature about migration and trade to the literature about the determinants of IIT. The former suggests that migration flows enhance trade mainly by reducing trade transaction costs; the latter states that trade transaction costs are a negative determinant in IIT more than in inter-industry trade. In effect, differentiated sectors are shown to be the most affected by trade barriers, and the elasticity of aggregate trade with respect to trade barriers (both variable and fixed) is inversely related to the elasticity of substitution (Chaney, 2008)\(^{38}\). For these reasons emerging from the studies on IIT, it makes sense to focus on the migration-IIT relationship that the literature on migration-trade has overlooked.

The present empirical work pioneers the assessment of the IIT enhancing effect of migration using Italy as a testing ground, and it extends the existing literature by examining the pro-IIT

\(^{38}\) Krugman (1980) developed a model with identical firms showing that a higher elasticity of substitution between goods magnifies the impact of trade barriers on trade flows. Due to consumers’ ‘love for variety’ in presence of less substitutable goods consumers are willing to buy foreign varieties even when they have a higher cost, and so, in this case, trade barriers have little impact on bilateral trade flows. Unlike Krugman (1980), Chaney (2008) finds that “the impact of trade barriers on trade flows is dampened by the elasticity of substitution, and not magnified”. In particular, the author develops a model, thanks to which, by introducing firm heterogeneity in productivity as well as fixed costs of exporting, it is possible to predict the elasticity of aggregate trade flows with respect to trade barriers to be inversely related to the elasticity of substitution.
effects of both immigrants and emigrants. Moreover, a further innovative element in our study is its separate estimation of migration’s effects on VIIT and HIIT – in analogy with the prescriptions of IIT literature, according to which theoretical explanations of VIIT differ significantly from Krugman-style models of HIIT. Consequently, empirical tests on the industry-specific determinants of IIT should be carried out separately for VIIT and HIIT (Greenaway, Hine and Milner, 1995). In the particular case of international migration, the pro-trade role of immigration in terms of transaction costs reduction seems more appropriate when HIIT is involved, as the immigrants’ knowledge of their home-country markets and available products should enhance variety trade more than quality trade. On the other hand, growing income differentials between immigrants and natives should activate VIIT more than HIIT.

In order to carry out this empirical test, we used country-level data that combines the Italian IIT indices with the stocks of immigrants and emigrants. Data cover the period 2005-2010. Then, assuming price is a valid indicator of a product’s quality, IIT has been divided in its two components, horizontal and vertical, in order to determine which is more affected by migration. The empirical model we have employed was developed starting from models by Helpman (1987) and Hummels and Levinsohn (1995) and added our key variables: the stock of immigrants and the stock of emigrants.

The estimation’s results suggest that our hypotheses are consistent with the data: both emigration and immigration exert a positive and robust influence on the share of IIT between Italy and its partner countries. We also find that the pro-IIT effect of immigrant networks is greater than that of emigrant networks.

With regard to VIIT and the HIIT, we find that the discrimination between these two components of IIT leads one to deeply investigate the migration-IIT link and improves the interpretation of empirical outcomes. The results allow us to conclude that migration flows, as predicted, have different effects on the two types of IIT. Indeed, the estimated coefficients are very different, as are the flows’ impacts on VIIT and HIIT. In particular, immigration’s and emigration’s effects grow with reference to the variety trade; put another way, the impact of immigration and emigration on international trade is more relevant when the variety trade (HIIT) is explicitly considered. This finding is in line with the prediction that migrants’ knowledge of their home-country markets and available products should enhance variety trade more than quality trade. Moreover, only immigrants have a positive and significant effect on VIIT. This result, which is due to income differentials between immigrants and natives, has been better explored through the separation of migration flows into different kind of countries (OECD and non-OECD), which has clearly shown that immigrants from developing countries affect VIIT more than that of emigrants.

Moreover, this separation between OECD and non-OECD migration flows has also allowed us to better interpret the results related to emigration’s effect. This study determined that emigrants to non-OECD countries activate HIIT, but those going to OECD countries do not. This particular finding has led us to both reflect on the Italian emigrants who go to developing countries and make qualitative considerations of emigration. Although, for Italy, there is no official data on the educational level of emigrants, we can maintain that unskilled emigration from the past has been combined with more recent, skilled emigration; anyone who heads for a non-OECD country is likely to be an entrepreneur who is able to activate trade thanks to his or her professional background and knowledge about his or her home country. Therefore, the distinction between OECD and non-OECD countries has emphasised the importance of disentangling the two components of IIT in order to reach a more careful interpretation of empirical evidence.

These results seem encouraging, in particular in light of the fact that we have used very disaggregated data and that, unlike other studies, our calculations are based on a dataset in which both manufacturing and non-manufacturing industries are included. However, it is worth underlining that, due to the lack of detailed (quality) data on migrants to and from Italy, several interesting facets of the migration-IIT link remain to be explored. One particularly interesting issue is to understand how much of the pro-IIT effect of migration is related to the educational level of the migrants. Furthermore, a deeper analysis would better reveal policy implications. Based on our results, emigration and immigration seem to be a necessary support for Italy’s future in a globalised world; Italians living abroad and immigrants to Italy who have relatives, connections and knowledge in the home countries can be valued as out-and-out networks that are able to help Italian trade and economic development. Hence,
from this point of view, migration flows should not be discouraged. Nevertheless, an analysis of
the relationship between migration and other forms of internationalisation could lead to different
policy implications. For instance, if from the empirical analysis, a link of substitutability between
migration flows and foreign direct investments (FDI), policies boosting outward FDI would
contribute to containing excessive inward migration flows. Clearly, in this case, we are not
talking about trade, but FDI, and the direction of the link is opposite: from FDI to migration
flows. This is only one example of the importance of analysing the link between migration and
other forms of internationalisation in terms of the richness of policy implications.
References


CEPII (1995), The Development of Intra-versus Inter-industry Trade Flows Inside the EU Due to the Internal Market Programme, Interim report, Paris, 19 September.


### Table 1A Descriptive statistics for sample

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean Value</th>
<th>Standard Deviation</th>
<th>Minimum Value</th>
<th>Maximum Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOGIMM</td>
<td>8.80</td>
<td>1.96</td>
<td>2.83</td>
<td>13.38</td>
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<tr>
<td>LOGEMI</td>
<td>8.85</td>
<td>1.95</td>
<td>6.24</td>
<td>13.38</td>
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<tr>
<td>LOGKLDIF</td>
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<td>1.11</td>
<td>3.36</td>
<td>10.46</td>
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<tr>
<td>LOGDIST</td>
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<td>1.07</td>
<td>6.21</td>
<td>9.83</td>
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<td>0.36</td>
<td>27.52</td>
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<tr>
<td>IIT</td>
<td>0.11</td>
<td>0.10</td>
<td>0.0002</td>
<td>0.42</td>
</tr>
<tr>
<td>HIIT</td>
<td>0.03</td>
<td>0.03</td>
<td>1.00e-17</td>
<td>0.15</td>
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<tr>
<td>VIIT</td>
<td>0.08</td>
<td>0.08</td>
<td>0.0002</td>
<td>0.33</td>
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</tbody>
</table>

#### Table 2A The impact of immigration and emigration on the Italian IIT (Tobit estimation)

<table>
<thead>
<tr>
<th>(Tobit estimation)</th>
<th>IIT</th>
<th>VIIT</th>
<th>HIIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emi</td>
<td>0.01***</td>
<td>0.01***</td>
<td>0.02***</td>
</tr>
<tr>
<td></td>
<td>(6.04)</td>
<td>(4.65)</td>
<td>(6.52)</td>
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<tr>
<td>Imm</td>
<td>0.01***</td>
<td>0.01***</td>
<td>0.02***</td>
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<tr>
<td></td>
<td>(5.72)</td>
<td>(5.16)</td>
<td>(4.59)</td>
</tr>
<tr>
<td>Dist</td>
<td>-0.04***</td>
<td>-0.02***</td>
<td>-0.01***</td>
</tr>
<tr>
<td></td>
<td>(-11.21)</td>
<td>(-8.91)</td>
<td>(-11.52)</td>
</tr>
<tr>
<td>Eu</td>
<td>0.08***</td>
<td>0.06***</td>
<td>0.02***</td>
</tr>
<tr>
<td></td>
<td>(9.97)</td>
<td>(10.07)</td>
<td>(5.70)</td>
</tr>
<tr>
<td>KLdif</td>
<td>-0.01***</td>
<td>-0.01***</td>
<td>-0.00</td>
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<tr>
<td></td>
<td>(-3.31)</td>
<td>(-3.49)</td>
<td>(-1.58)</td>
</tr>
<tr>
<td>Size</td>
<td>0.10***</td>
<td>0.08***</td>
<td>0.02***</td>
</tr>
<tr>
<td></td>
<td>(11.17)</td>
<td>(11.98)</td>
<td>(5.70)</td>
</tr>
<tr>
<td>Constant</td>
<td>-2.50***</td>
<td>-2.15***</td>
<td>-0.36***</td>
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<tr>
<td></td>
<td>(-9.81)</td>
<td>(-10.75)</td>
<td>(-3.79)</td>
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<tr>
<td>Log Likelihood</td>
<td>611.928</td>
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<td>996.668</td>
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<td>LR Chi(2)</td>
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<td>385</td>
<td>385</td>
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</tbody>
</table>

**Notes**: *** , **, * indicate significance at the 1, 5, and 10 percent level respectively. All estimations include time dummy variable. Heteroscedasticity-robust t- statistics are given in parentheses.

The positive effect of immigration and emigration on the intra-industry trade between Italy and its trading partners in the sample also comes out when we use a tobit estimation.
Table 3A  The impact of immigration and emigration on the Italian IIT (lagged variables)

Notes  ***, **,* indicate significance at the 1, 5, and 10 percent level respectively. All estimations include time dummy variables. Heteroscedasticity-robust t- statistics are given in parentheses.

In order to control the direction of causality, we have estimated a model where emigrants and immigrants have been replaced by their lagged. Results have revealed that the IIT impacts of both immigrants and emigrants do not change with the predetermined variables; hence we can conclude that the direction of causality we assumed in this work (from migration to IIT) is correct.

Table 4A  The impact of immigration and emigration on the Italian IIT (Sensitivity analysis)

Notes  ***, **,* indicate significance at the 1, 5, and 10 percent level respectively. All estimations include time dummy variable. Heteroscedasticity-robust t- statistics are given in parentheses.

§ these results are those shown in table 1.
<table>
<thead>
<tr>
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<td>Mexico</td>
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<td>Bolivia</td>
<td>Morocco</td>
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<td>China</td>
<td>Norway</td>
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<td>Costa Rica</td>
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<td>Peru</td>
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<tr>
<td>Cuba</td>
<td>Philippines</td>
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<td>Poland</td>
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<td>Denmark</td>
<td>Portugal</td>
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<td>Turkey</td>
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<td>United States of America</td>
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<td>Israel</td>
<td>Uruguay</td>
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<td>Venezuela</td>
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<td>Jordan</td>
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<tr>
<td>Kenya</td>
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</tr>
</tbody>
</table>

*Table 5A  List of the countries in the sample*
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