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ABSTRACT

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Within the migration-trade nexus literature, this paper proposes a more carefully defined measure of migration business networks, and quantifies its impact on bilateral trade. Using cross-sectional data and controlling for the overall bilateral stock of migrants, the share of migrants employed in managerial/business-related occupations has a strong additional effect on trade, and especially on exports. Those immigrants should be the ones directly involved in the diffusion and transmission of information relevant for companies trading with other countries. Their presence is found to increase the volume of trade beyond the already known effect of immigrants or highly educated immigrants. When we control for the presence of highly educated immigrants, the share of immigrants in business network occupations shows a particularly large effect on trade in differentiated goods. Specifically, we find that highly educated individuals in business-related occupations are those contributing to export by the largest margin. Business network effects seem particularly important in stimulating exports to culturally different countries, such as those with different legal origin.

JEL Classification: F14, F16, F22

Keywords: migration, international trade, business networks, differentiated goods

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1. Introduction

Beginning with the seminal contributions of Gould (1994) and Head and Ries (1998), several recent papers have found a strong, stable and significant empirical correlation between the stock of immigrants in the receiving country and the amount of trade with their country of origin[1]. In several refinements these studies have analyzed the impact of immigration on differentiated versus homogeneous exports, on imports and exports, and on exports of final and intermediate goods. Combining these studies, the overall evidence shows larger effects for exports than for imports, for differentiated than for homogeneous goods, and between culturally distant countries. All these results have been taken as evidence that the positive immigration-trade correlation is driven by network effects: immigrants make it easier for domestic firms to export as they lower information barriers and therefore the fixed cost of accessing new markets characterized by different culture and business practices.

This literature, however, has always equated the total number of bilateral migrants with the size of the business network that enhances bilateral trade. What has been lacking is an effort to measure more precisely the size of the business network established by immigrants, isolating its specific effects on trade. To do this, one needs to identify how large is the group of immigrants that may facilitate the commercial relations between the host and the origin countries. There are three reasons to believe that total immigrant population is a rather poor and noisy measure of the business networks established by immigrants and it may correlate with other spurious variables. First, many immigrants into OECD countries are employed in non-tradable service sectors such as construction, household, hospitality or food services. In contrast, firms in the manufacturing sector are responsible for most of the trade. There is no clear connection between those immigrants and the export activity of manufacturing firms. Second, large aggregate immigration flows from a country may imply some preference in the bilateral relationship or some cultural connection that may also affect trade. These special bilateral relationships may be hard to measure and hence may bias the estimated coefficient of immigration on trade upwards. Finally, while some recent studies have considered special sub-groups of immigrants (such as highly educated ones in Felbermayr and Jung, 2009) as more relevant for trade, they have not effectively identified those immigrants as actually participating to the trade-business network. If immigrants suffer

[1] A partial list includes Dunlevy and Hutchinson (1999), Girma and Yu (2002), Wagner et al. (2002), Rauch and Trindale (2002), Combes et al. (2005), Dunlevy (2006), Bandyopadhyay et al. (2008), Felbermayr and Toubal (2012).

from poor skill transferability and skill downgrading (Chiswick and Miller, 2009), their occupation in the destination country, rather than their schooling, is a better measure of their productive contribution and it may contain more information about their role in enhancing trade.

This paper proposes a more precise measure of the trade business network of immigrants. Using the newly released data on immigrant occupations from OECD (2010), the DIOC-E database, we consider in each country those immigrants in managerial/sales jobs that are pivotal to establishing important business connections. We analyze how this group affects trade, once we control for total immigrant flows. The estimated coefficient is a more precise measure of the direct information-diffusion effect on trade channeled by business networks of international migrants. Granted that the whole community of immigrants can play a role in establishing the network, these individuals should be particularly important and most actively involved into export-promoting international linkages.

A first look at the data and at some stylized statistics suggests that capturing the intensity of bilateral business network with the number (or share) of bilateral migrants can introduce measurement error in the analysis. Table 1 shows (in column 1) the share of immigrants in the population for all European countries. It also shows, in column 2, the percentage of immigrants in occupations as business directors or managers (classified as ISCO-1) that are directly responsible for creating international business relations and export opportunities. We will call this group the "business network immigrants". Columns 3 and 4 show also the share of immigrants in occupations less directly related to international business networks but still linked to marketing and sales (market salespersons, ISCO-5, and door-to-door and telephone salespersons, ISCO-9). It is easy to notice that countries with similar overall share of immigrants, such as for instance, Belgium and Germany, have a very different percentage of them involved in the "business network" as represented by the most relevant occupations of "business manager and directors". In Belgium, 20% of immigrants are employed in those occupations while in Germany essentially no immigrant is.

Even more interesting as stylized fact are Figures 1a and 1b. These figures report the correlation between openness to trade and migration shares for four selected representative EU countries (Portugal, UK, Spain and France) and their main migration-origin countries. Figure 1a reports clear positive correlation in each of those countries between business network immigrants from a country (as share of total immigrant stock from this country) and

the trade towards that specific country. For instance, France exports a lot to Germany, the UK exports a lot to the US, and Portugal to Spain. Correspondingly, migrants from those countries involved in business networks occupations are large fractions of the migrant population. In contrast, Figure 1b shows that the same positive correlation does not hold between the stock of migrants from top destination countries (as share of total migrant population in a receiving country) and trade: Germany, US and Spain do not provide, in relative terms, large migrants flow to France, the UK and Portugal. Furthermore, trade between largest immigrant-partner countries, such as Morocco and Spain, or Angola and Portugal, is relatively limited.

Our findings are reasonably strong and robust. Importantly, even controlling for the bilateral stock of migrants, which can be correlated with several unobserved bilateral variables, the share of migrants in business network occupations has a large and significant effect on export (and much less on imports). Specifically, each business network immigrant generates over ten times the value of trade than a non-business network immigrant does. The share of business network immigrants works better than the share of highly educated immigrants in predicting trade and it shows a particularly large effect on trade in differentiated goods (although it has also a significant effect on trade of homogeneous goods). When we use the occupational and education categories together, we find that only highly educated immigrants in business network occupations enhance trade.

Interacting the presence of business network immigrants with specific bilateral characteristics, we also identify what type of bilateral trade relations are particularly boosted by business network migrants. For instance, if business networks are catalysts of informational exchange and conductors of norms and rules (as argued in Rauch, 1999) they should be particularly important in facilitating trade between more culturally distant countries. We show that business networks are especially trade-enhancing between countries with different legal origin. At the same time, cultural similarities (linguistic, colonial origin, but not religion) attenuate the effect of business networks on trade.

A limitation of this paper is that the data set it employs is available only for a single year. We are therefore unable to control, in our regressions, for country-pair fixed effects that may capture specific heterogeneity affecting a particular trade relation. However, as we control for the total stock of immigrants we are likely to absorb the effects of common factors

that influence bilateral trade and migration, isolating only the extra effect of business networks in the coefficient of interest.

The rest of the paper is organized as follows. Section 2 describes the data. Section 3 outlines the empirical strategy and discusses the results. Section 4 concludes.

2. Data

2.1 Data Sources

The data on bilateral stocks of migrants are obtained from the newly released OECD DIOC-E database, which covers 89 destination countries and 233 countries of origin[2]. It includes information on 110 million migrants who are at least 15 years old, which represents around 72% of all world migrants (Dumont, Spielvogel, Widmaier, 2010). Immigrants are distinguished by age, gender, schooling level, labor market status and, most importantly, occupation, using the 1-digit level ISCO classification. These data are compiled using numerous national sources, mainly censuses and population surveys. They are available for a cross-section of countries in the sense that each country has information for only one year. Most of the data collected are relative to the years 2000-2002. A few countries are included for which the reference year is a bit earlier (1996 for Uruguay) or somewhat later (2005 for Nicaragua). A few countries, namely USA, Argentina, Turkey, and Japan, use an occupational classification very different from ISCO. They are thus excluded from the analysis.

Data on bilateral trade flows come from two sources. First, the total value of imports and exports is from the CEPII "square" gravity dataset compiled by Head, Mayer and Ries (2010). This database also contains the set of all other standard gravity variables, such as geographical distance between countries, information on contiguity, common language, past colonial ties, and a dummy RTA for having a Regional Trade Agreement in place. The bilateral trade data are merged with the bilateral migration data using the year in which the migration data are observed. Trade data are unavailable for some origin countries, such as the Democratic Republic of Congo, or Serbia and Montenegro, as well as for some country-pairs. Thus, the final dataset used for the empirical analysis contains 4923 non-zero observations for

[2] The database is not "square", however. In some countries, like Greece, information on up to 206 origin sources is available, in others, like the Netherlands, only the four largest countries of origin are known. On average, there are 96 migrant origin countries per destination.

exports, and 4806 non-zero observations for imports (5230 observations for both imports and exports, if zero trade flows are included). The description of the variables and the summary statistics for each one of them are reported in Table A1 of the Appendix.

Second, to distinguish trade between homogeneous, moderately differentiated, and highly differentiated goods, we use CEPII-BACI data disaggregated at 6-digit product level (Gaulier and Zignago, 2007). These data are matched with the estimated elasticities of Broda and Weinstein (2006) that characterize the degree of differentiation of products within sector. We first use the correspondence table between 6-digit Harmonized Commodity Description and Coding System (HS-6) and the 5-digit SITC Revision 3 nomenclature. The products are further aggregated into three categories according to their elasticity of substitution into homogeneous goods (elasticity above 3.5), moderately differentiated goods (elasticity between 2 and 3.5), and highly differentiated products (elasticity below 2).

2.2 Business Network Immigrants: Definitions

Using the OECD DIOC-E database, we measure the size of a bilateral business network as the number of immigrants who work in the destination country in business network occupations. As we mentioned in the Introduction, occupations classified under Group 1 of the one-digit occupational ISCO classification are those likely to be most relevant to establish international business relations and networks. They include jobs such as senior government officials in special interest organizations, and managers of enterprises (see Appendix 2 for the full list of occupations under this Group). Government officials may promote trade between countries through their capability to establish long-lasting contacts, initiate bilateral and multilateral relations and influence specific trade policies. Top-level managers are the key decision makers on international activities of their companies, and they are directly involved in their realization. These professionals have a direct role in channeling relevant information and knowledge of potential export markets, and in facilitating the understanding of cultural and business practice differences.

We have also examined other occupations which may be important in promoting trading networks. Specifically, individuals employed in occupations within Group 5 (shop, stall and market salespersons and demonstrators) may also perform some of the business-related functions, although at a lower level of responsibility. Finally, occupations in Group 9

(sales and services elementary occupations, street vendors, and door-to-door and telephone salespersons – see Appendix 3) may likewise play a role in creating trade connections, especially in trade in heterogeneous and cultural goods. However, as Groups 5 and 9 also contain numerous other occupations that are not related to trade in a direct way, immigrants in those groups are likely to be significantly less relevant for trade. Immigrants employed in any other occupation are defined as non-business network immigrants[3].

It is interesting to note that the geographical distribution of business migrants (based on Group 1 definition) is significantly different from the distribution of the total emigrant stock from any given country. We report in Table A4 of the Appendix countries with the largest stock of emigrants and those with the largest network of business emigrants. The top four countries of origin are the same in the two tables. However, starting from the fifth position, this is not any longer the case. The countries of origin with large stock of emigrants are no longer home of large business network migrants. Moreover, Azerbaijan, USA, Colombia, Georgia, France, China and Algeria appear on the list of top origin countries for business migrants, while none of them is among top overall migrant origin countries. For some big sending countries, such as Ukraine, Kazakhstan, India or Portugal, top destinations for any migrant and for a business migrant differ as well. This once again suggests the importance of properly capturing both the numbers and the location choices of what one wants to call a business migrant network.

In several countries business networks as defined above are empty: they are zero or missing, even if there is a non-zero bilateral stock of immigrants. For example, this is the case of Kazakhstan: its migrants are present in 34 countries, while business migrants are only in 24 of them (Appendix 4). In such cases, empty business network cells represent a genuine absence of business network individuals for some country-pairs, rather than missing or incorrect data. They hence carry precious information, and it is important to incorporate them into the analysis. We thus include these countries into the main analysis, and in the linear-in-logs specifications we add one to business migration networks. We also check whether including these zero business networks biases the results. In total, there are 77% non-zero

[3] Some individuals are coded as belonging to the 99th occupation group while there is no such ISCO classification code. These individuals are treated as belonging to non-business networks. Alternatively, we also aggregated them into the Group 9 of 1-digit ISCO aggregation, and this did not affect the estimation results.

business network observations. The average number of economically active immigrants in a given country-pair is 5118, while the average number of business migrants is 631.

3. Empirical Strategy and Results

3.1 Empirical Specification

In our empirical specification we follow the literature that estimates the effect of migration on bilateral trade, using theory-based gravity-type estimations (Feenstra, 2004). As we have only a cross-section available to us, we follow Anderson and Van Wincoop (2003) in the choice of controls and fixed effects. In our main empirical specification, we consider the (log of the) number of the business network immigrants as the relevant variable affecting trade. The rest of the specification is fairly standard:

$$\ln(\mathrm{T_{sdt}}) = \alpha_0 + \alpha_1 \ln(\mathrm{share}^{\mathrm{k}}_{\mathrm{sdt}}) + \alpha_2 \ln(\mathrm{IMMIGRANT_{sdt}}) + \alpha_3 \ln\mathrm{Distance_{sd}} + \alpha_4 \mathrm{Contig_{sd}} + \alpha_5 \mathrm{ComLang_{sd}} + \alpha_6 \mathrm{Colony_{sd}} + \alpha_7 \mathrm{RTA_{sdt}} + \mathrm{s_s} + \mathrm{d_d} + \mathrm{t_t} + \mathrm{u_{sdt}} \qquad (1)$$

In specification (1) the variable $ln(T_{sdt})$ measures the logarithm of bilateral value of trade between sending (s) and destination countries *(d)* at time *t*. The specific measure of trade could be, depending on the specifications, total export or total import, or disaggregated exports or imports by less-, moderately-, or highly differentiated goods. The variable $ln(IMMIGRANT_{sdt})$ is the logarithm of total bilateral stock of active immigrants aged 15+, born in country *s* and resident of country *d*, at time *t*. The variable $ln(share^{k}_{sdt})$ is the count of immigrants in a specific occupation group k (that proxies for the business network), as share of total immigrants, also in logs. In particular, the superscript k can take the value "b1" that corresponds to ISCO occupation Group 1 or value "b59" that corresponds to ISCO occupation Groups 5 and 9.

In equation (1) we use the fact that the total size of the immigrant business network, call it *(Immigrant Bus. Network)*$_{sdt}$, is equal to total immigrants multiplied by the share of those in business network occupations. Specifically, $(Immigrant\ Bus.Network)_{sdt} = (share^{k}_{sdt} * IMMIGRANT_{sdt})$. Hence, by taking logs and using log properties, we can

separate the effect into two terms: $ln(share^{k}_{sdt})$ and $ln(IMMIGRANT_{sdt})$. We prefer this specification, as it directly builds on the previous studies examining the migration-trade nexus. In addition, in our cross-sectional setting, aggregate migration term also absorbs omitted variables that affect both trade and total migration, allowing us to single out the extra effect of the share of business immigrants on trade.

In some specifications, we include, as falsification test, the $share^{nbus}_{sdt}$ where the superscript "*nbus*" indicates all other ISCO occupation-groups, or non-business migrants. The rest of the equation includes standard gravity controls, such as the logarithm of the distance, dummies to capture the contiguity between two countries, common language, colonial past, and the presence of regional trade agreements. They all contribute to control for bilateral trade costs. Furthermore, we also include the full set of host-country d_d and sending-country s_s fixed effects to control for the multilateral resistance terms, as prescribed in Anderson and Van Wincoop (2003) and Baldwin and Taglioni (2006). While the data is a cross-section and hence each county-pair is observed only once, we include dummies $\mathrm{t_t}$ for the exact year of data collection (as it varies from 1996 to 2005).

3.2 Aggregate Business Networks and Aggregate Trade

Table 2 shows the main results of the basic specifications. In columns 1-10, the dependent variable is the logarithm of the total value of bilateral imports or exports in US dollars. This linear-in-logs specification converts the zero trade flows into missing, and thus the sample is restricted to observations with non-zero trade flows. In columns 1 and 2 of Table 2 we include only the logarithm of the total number of immigrants employed in occupations of Group 1, the business networks, $ln(Immigrant\ Bus.Network)_{sdt}$, as the explanatory variable of interest. The coefficient on this variable is positive and statistically significant for both exports and imports. These regressions, however, combine in one coefficient the direct network effects and the possibly indirect effects of all immigrants as total stock of migrants is not controlled for.

In columns 3-4, we implement our preferred specification. In these regressions, we control for the logarithm of the total number of immigrants and in addition, we include the log of the share of the business network immigrants in the same bilateral relationship. The coefficient on the log of total migrants is positive and significant in both regressions on

imports and exports, and its magnitude is around 0.25 which is within the range of values reported in similar studies[4]. In addition to this, the coefficient on the share of immigrants in business networks occupations is positive, large and statistically significant at 5% for exports and for imports. This suggests that individuals in business networks have an impact above and beyond that of the total number of migrants. An increase by 1% in the share of immigrants employed in the business network occupations increases exports by about 0.40%, and imports by about 0.64%, given the same total stock of immigrants and holding all other country-pair variables constant.

In the remaining columns of Table 2 we check for the robustness of this result. We begin by checking alternative definitions of business networks. When we include the share of immigrants in occupations within Groups 5 and 9, we do not find any effects on trade (columns 5 and 6). The share of immigrant workers in other, non-business, occupations (columns 7-8) similarly does not have a statistically significant effect on trade either (and the point estimate is negative) once the total number of migrants is controlled for.

The specifications in columns 3-8 of Table 2 include the share of business migrant and the total number of immigrants both in logs. One may be concerned that taking a log of a share is not recommendable, and possibly that this induces distortions when adding a value of one to the numerator (immigrants in the business sector) before taking the share. Concerns about the inclusion of zero observations in the log-transformation of explanatory variables rather than dependent variables are less frequent in the literature. Nevertheless, they may be valid, as adding a number, such as one, to a variable before log-transformation can bias the results as the variance in the left hand side of the distribution of such variable is inflated. Therefore we also performed two regressions in which we include linearly the share of migrants in business occupations. The results of these regressions are reported in Table 2, columns 9-10. They confirm that an increase in the share of immigrants in the business sector by 1% of the immigrant population increase import and export by 0.3%. The effects are significant at 5% level.

One of the problems with the linear-in-logs specification adopted in columns 1-10 of Table 2 is that the conversion of the zero trade flows into missing values may introduce selection bias and it causes the loss of valuable information. The gravity literature offers

[4] See Peri and Requena (2010), Table 1, for a survey of recent findings in the literature. Most of the estimates of the elasticity of trade to total migration found in the literature range between 0.1 and 0.25.

several ways of dealing with this problem. First, it is possible to add a small number (usually one) to the actual value of the dependent variable (trade flows). We can then perform an OLS estimation using this new variable[5]. We have augmented the total value of trade by one, and by ten dollars, and found that the magnitude of the coefficient on the share of business immigrants almost doubles in the export regressions and remains statistically significant, while it changes only slightly, in the import regression. In both cases immigrants in the business network remain a significant determinant of imports and exports. These results - not reported in the tables - are available on request. Alternatively, the literature (Santos Silva and Tenreyro, 2009) suggests employing Poisson maximum likelihood (PMLE) method of estimation, so that the dependent variable can be included in levels rather than in logs, and we can include the zero values of trade as they are. We check the robustness of our results to this estimation method. It produces consistent estimates only if the error terms satisfy the log normality and homoskedasticity conditions, which are indeed very strong assumptions. PLME may even produce serious bias if the number of zeros is large (Martin and Pham, 2009). In our sample, about 25% of the observations for imports and 22% of observations for exports have zero values, which is relatively low. The results of PMLE estimation are shown in columns 11-12 of Table 2. For exports, these results are similar to the OLS estimates. For imports, the coefficient on the logarithm of the share of business network immigrants almost doubles in magnitude. Both coefficients remain highly statistically significant. We can conclude that the simpler and more robust least square estimation performs relatively well. Hence, in what follows, we use the more standard OLS technique based on non-zero trade flows.

Finally, a concern with the cross-sectional type of estimation is the potential joint determination of migration and trade. In fact, in our case, this concern is mitigated by several considerations. First, our migration variable is a stock, rather than a flow. This means that it includes migrants with a long-term residence, and not the new-comers, thus mitigating the possible reverse causality channel. Second, as we control for the stock of immigrants and we focus on the effect of immigrant business networks, it is likely that omitted variables affecting migration and trade are controlled for by the total stock of immigrants. Some authors emphasize that, in a panel setting, accounting for unobserved pair-specific heterogeneity either by differencing (Felbermayr and Jung, 2009) or by including pairwise country effects (Parsons, 2011), is important to correctly identify the migration-trade relationship. Our data,

[5] There is little guidance in the literature as to the choice of this small number, and several authors have stressed high sensitivity of the results to the chosen number (see for instance Head et al., 2010).

being cross-sectional, do not allow us to include these very demanding bilateral fixed effects. We still include a destination and sending country fixed effects to control, at least for unobservable country-specific factors and for the multilateral resistance terms. Also, the fact that we control for aggregate migration implies that omitted variables affecting trade and total migration are absorbed by that term and the additional effect of the share of business immigrants on trade cannot be driven by a generic omitted variable affecting total migration. And lastly, to address the issue further, we use the trade data in period t+2. By so doing, the stock of immigrants is further predetermined with respect to trade[6]. The effect of business networks is robust to this correction for exports (Table 3, columns 1-2). The effect of immigrant business networks on import however declines and becomes insignificant.

Overall, the effect of business network immigrants on exports is always significant, robust and stable across specifications. In contrast, the effect on imports is more unstable and less precisely estimated. This is preliminary evidence that the specific business network variable is more significant in determining exports, as the theory of information diffusion would suggest. Before moving to more detailed analysis, let us provide the reader with an idea of the magnitude of this effect. Consider a 10% increase in the average country-pair stock of active migrants. This would amount to an increase from 5118 to 5630 immigrants, or 512 individuals per country-pair. Without taking into account the occupational differences, this increase would lead to a 2.51% rise in total exports (coefficient on *ln(IMMIGRANTS)* from Table 3, column 2). Given that the average value of exports in the sample is $507.63 million, such an increase would equal $12.74 million. This means that one additional average immigrant generates an extra $24,895 value of exports.[7] However, if the same additional 10% of immigrants were to be all employed in business network occupations, this would raise the average business share of migrants from 0.137 to 0.216, a fifty-seven percent increase. Using the coefficient on $ln(share^{bus1})$ reported in Table 3, column 2, such an increase would raise

[6] We also included values of trade at t+5, and the results remained relatively robust to this (they are available on request). At the same time, our trade data are only available until 2006; thus in such regressions we are losing some of the migration data: our migration sample drops to years 1995-2001, which means dropping 21 out of 89 destination countries.

[7] These numbers are comparable with those obtained by Head and Ries (1998), who found that an extra migrant in Canada generated $8,000 of imports almost two decades earlier. Given that the value of imports in the world has increase by about a half since the 1992, their projection year, while the world stock of migrants has increased by about 20% (the World Bank, 2010); and given that our coefficient on *LIMM IGRANT* is also almost twice as high as the one obtained by Heand and Ries (1998), our aggregate result is very similar to theirs. In contrast, our result is almost ten times higher than the one obtained by Felbermayr and Jung (2009), who found that an additional migrant creates about $2,700 dollar in additional trade in 2000. The discrepancy is due to 1) a different coefficient on *LIMMIGRANT*, which is twice as low in their study; 2) a different average number of migrants per country pair (27000 persons in their sample of OECD receiving countries, versus 5118 persons in our sample), 3) the fact that our measure of migrant stock is comprised of the active immigrant population, while they use total migrant stock, including inactive and out of the labor force individuals; and 4) different methodology used: Felbermayr and Jung (2009) use first-differences approach.

total exports by 31.3%. This is ten times more than a simple increase in the total number of immigrants. Thus, an extra "business" migrant would generate $310,259 extra value of exports, or over ten times more than an average migrant.

3.3 Business networks and Trade of Homogeneous and Differentiated Goods

Table 3, Columns 3 to 8 show the trade-creating effect of business networks when trade is disaggregated into different categories of goods according to their elasticity of substitution. This disaggregation allows testing a specific implication of the Chaney (2008) model. If migration reduces the fixed costs of doing business with a foreign country and hence the fixed cost of exporting there, this model suggests that highly differentiated goods should benefit more from cost reduction as compared to other goods. The reduction of fixed costs, in fact, would allow entry of more firms into those markets.

We look separately at the effect on imports (columns 3-5), and exports (columns 6-8), continuing to proxy business networks with the share of immigrants employed in occupations of Group 1. Business networks based on occupations in Group 1 have the strongest impact on exports and no significant effect on import. This is in line with the information theory. However, the most significant export effect of business network immigrants is achieved for homogeneous goods. This is in contrast with the theory. The impact of the total number of migrants is intact. Using these coefficients from column 8 of Table 3, a 10% increase in the total stock of migrants, ceteris paribus, would raise exports in homogeneous goods by 2.76%. If the same number of extra migrants is employed in business-related occupations, ceteris paribus, exports in homogeneous goods would go up by 51%[8]. These results are somewhat in disagreement with the theory that business networks should encourage especially trade of differentiated goods as in those cases information barriers may be particularly costly. We will come back to this issue when we consider the specific effect of immigrant-network by education, in section 3.4.

3.4 Business Networks: Occupational or Educational Effect?

[8] We used also the Rauch (1999) classification into referenced, intermediate and differentiated goods. The results (not reported) are similar to those of Table 4, except that the most significant effect of business networks is on the intermediate group of goods (rather than on the homogeneous).

Is it possible that our measure of business networks simply captures the effect of highly educated individuals on trade? Felbermayr and Jung (2009) have argued that highly educated immigrants are those most conducive to trade flows. To distinguish between the effect of the specific business network occupations and the effect of highly educated immigrants we proceed as follows. First, using the information on the number of individuals with different levels of education, we control for the shares of individuals with secondary and tertiary education in addition to the business network share (Table 4, columns 1-2)[9]. The estimates reveal that once we control for the share of immigrants in business network occupations, the share of highly educated immigrants is not significant any longer. In columns 3-4 of Table 4, we show a variation of the previous approach. Following the specification of Felbermayr and Jung (2009), we include as explanatory variables the stocks of immigrants disaggregated into three education categories: basic schooling, secondary schooling, and tertiary schooling. We also include the share of immigrants in business network occupations. Similarly to these authors, we find a significant trade-creating effect of the highest education group, although no effect for other education groups; we also still find a strong effect of the business network shares on exports as well as on imports.

To explore this issue further, we use the occupation and education definitions jointly. We group immigrant workers into business networks and education cells. We include the log of the share of business network immigrants with low, intermediate and high education level (Table 4, columns 5-8). In columns 5-6, the omitted group is the share of all non-business networks. Interestingly, we find that only the share of immigrants who are both in business network occupations and highly-educated has an additional trade-creation effect beyond that of the overall number of immigrants. On the other hand, consistently with the information theory, this group has no effect on imports. Even more interesting is the contrast of the effect of highly educated individuals in business network occupations relative to the effect of poorly educated in non-business network educations (the omitted category in Table 4, columns 7 and 8). Both for imports and exports, only highly educated in business network occupations have a positive and significant effect, while poorly educated in business occupations have insignificant effect.

[9] Immigrants' education is reported under 4 categories: 1 - no education, completed primary, uncompleted secondary; 2 - completed secondary; 3 - completed tertiary; 99 - unknown. Individuals with unknown education are treated as if they were in category 1.

Finally, Table 5 analyzes the impact of the immigrant business networks on trade of homogeneous, moderately differentiated and differentiated goods when controlling also for immigrants by schooling (and hence extending the specification of Felbermayr and Jung, 2009, to differentiated trade). Once the stocks of migrants by education level are controlled for, we find that business networks have a positive and significant effect on imports of differentiated goods and on exports of differentiated and homogeneous goods. This is partly consistent with the predictions of Chaney (2008). This implies that controlling for the schooling of immigrants is important to account for their skills and their trade effect, especially when analyzing differentiated goods. It may be the case that highly educated immigrants even in other occupations (e.g. doctors, engineers, professors, scientists) can help generating the kind of networks that induce trade. In fact, we find that highly educated individuals stimulate trade in almost all types of goods (in imports of differentiated and homogeneous goods and in exports of moderately differentiated and homogeneous goods). However, even when we control for those, differentiated trade can still benefit from specific business networks.

3.5 Interactions of Business Networks with Common Factors

Do business networks of migrants help to create trade between all country-pairs equally? To quantify which type of bilateral relationship may be affected the most, we further analyze the interactions of business networks with country-pair factors. Specifically, we look at interactions with common language[10], common colonial past, common religion, and common legal origin. In Table 6, these interactions are included one at a time.

The main business network effects on imports and exports are, with some exceptions, still significant. At the same time, common language, colonial past, and common legal origin reduce the importance of the business networks (although not always in a significant way). This is because if countries already have commonalities, the presence of business networks is less relevant. In these countries, there are fewer cultural barriers to trade to overcome, and the role of business networks as conductors of culture, norms, and common values, is less important. Conversely, in countries with different legal origin the effect of business networks

[10] For the language variable, instead of the "common official language" variable, we also explored the "aggregate index of linguistic indices" proposed in Melitz and Toubal (2012). This is as a newly built richer measure of language commonalities between countries. In the regressions available on request, we found a similarly insignificant effect of the interaction of business share with language, and a significant effect of common language on trade flows.

is more important. These countries differ in the way legal systems are organized. Such differences imply significant variations in the protection of outsider investors' rights, in writing and enforcing contracts, including the ones related to shipment and supply, judicial procedures and settling disputes (La Porta et al., 2008). Bridging these differences with information acquired through the business networks, and the experience of individuals, is thus especially relevant for stimulating trade.

Common religion seems to be the only "cultural variable" that works to strengthen the effects of business networks. This may be because religion would not establish ex-ante trade ties, but once immigrants establish their networks, religion may reinforce them. This may be consistent with historical examples from some religions which were functional to establishing trade relations between some countries[11]. It is also in line with the idea that certain religions can be more conducive than others for forming international trade networks (Lewer and Van den Berg, 2007). The fact of belonging to the same religion may create additional reputation mechanisms that are vital for coordinating and reinforcing expectations between trading partners (Greif, 1989; 1993).

4. Conclusions

In this paper, we have proposed a new estimation of migration networks' impact on trade based on new, more precise measures of migration networks. We have shown that, controlling for the overall size of bilateral stock of migrants, individuals employed directly in business network occupations produce a large and significant additional effect on trade, and especially on exports from their home countries. They generate over ten times the value of trade than average migrants. Moreover, this occupation-based measure works better than a schooling-based one in explaining bilateral trade. When controlling for the bilateral stock of migrants, the share of educated individuals does not increase trade, while the share of business-related migrants does. When controlling for schooling, we also find a particularly large effect of business networks on trade in differentiated goods.

Our findings also suggest that the business network effect is especially important for culturally distant countries, such as countries with different legal origin. In such setting, business networks are particularly effective in fulfilling their function of information sharing,

[11] Cowen (1997) reproduced in Felbermayr, Jung, and Toubal (2011), says: "… the Spanish Jews were indispensable for international commerce in the Middle Ages. […] Lebanese Christians developed trade between various parts of the Ottoman empire" (p.170).

of helping overcome problems related to differences in legal enforcement, of providing legal advice and experience. As the international legal systems remain weak, and trade disputes are settled mainly in national courts using national legislations, migrant business networks play the key role of informational intermediaries. If receiving countries are to expand trade-related benefits from migration, clearly, promoting entrepreneurship and facilitating establishment of businesses by migrants can be valuable. For example, policies such as the European blue card, which favors the free movement and work of highly-skilled individuals in highly-paid positions (business network migrants among them) and provisions that allow immigration of any person who invests a certain amount and hires local workers should be expanded.

References

Anderson, J., E., Wincoop, V., 2003. Gravity with Gravitas: A Solution to the Border Puzzle. *American Economic Review*, 93(1), 170-192.

Bandyopadhyay, S., C. C., Coughlin, H. J. Wall, 2008. Ethnic Networks and US Exports. *Review of International Economics*, 16 (1), 199-213.

Baldwin, R., Taglioni, D., 2006. Gravity *for Dummies* and D*ummies* for Gravity Equations, NBER Working Paper No. 12516.

Broda, C., Weinstein, D., 2006. Globalization and the Gains from Variety. *Quarterly Journal of Economics*, 121(2), 541-585.

CEPII Gravity Dataset, 2010. Available at: http://www.cepii.fr/anglaisgraph/bdd/gravity.htm

Chaney, T., 2008. Distorted Gravity – Heterogeneous Firms, Market Structure and the Geography of International Trade. *American Economic Review*, 98(4), 1707-1721.

Chiswick, B, and W.P.Miller, 2009. The International Transferability of Immigrants' Human Capital Skills. *Economics of Education Review,* 28(2), pp. 152-169.

Combes, P.P., Lafourcade, M., Mayer,T., 2005. The Trade-Creating Effects of Business and Social Networks: Evidence from France. *Journal of International Economics*, 66 (2): 1-29.

Dumont, J.-C., Spielvogel, G., Widmaier, S., 2010. International Migrants in Developed, Emerging and Developing Countries: An Extended Profile. OECD Social, Employment and Migration Working Papers No.114. Available at: www.oecd.org/els/workingpapers. Accessed: March 2011.

Dunlevy, J., 2006. The Influence of Corruption and Language on the Pro-trade Effect of Immigrants: Evidence from the American States. *The Review of Economics and Statistics*, 88 (1), 182-186.

Dunlevy , J., Hutchinson, W., 1999. The Impact of Immigration on American Import Trade in the Late Nineteenth and Twentieth Centuries. *Journal of Economic History,* 59, 1043-62.

Feenstra, R.C., 2004. Advanced International Trade: Theory and Evidence. Princeton: Princeton University Press.

Felbermayr, G. J., Jung, B., 2009. The Pro-Trade Effect of the Brain Drain: Sorting out Confounding Factors, *Economics Letters,* 104(2), 72-75.

Felbermayr, G. J., Jung B., Toubal, F., 2011. Ethnic Networks, Information and International Trade : Revisiting the Evidence. *Annales d'Economie et de Statistique*. 97/98 (4).

Felbermayr, G. J., Toubal, F., 2012. Revisiting the Trade-Migration Nexus: Evidence from New OECD data. *World Development*. 40(5), 928–937.

Gaulier, G., Zignago, S., 2010. BACI: International Trade Database at the Product-level. The 1994-2007 Version. Working Paper 2010-23. CEPII Research Center.

Girma, S., Yu, Z., 2002. The Link between Immigration and Trade: Evidence from the United Kingdom. *Weltwirtschaftliches Archiv*, 138, 115-130.

Gould, D., 1994. Immigrant Links to the Home Country: Empirical Implications for U.S. Bilateral Trade Flows. *The Review of Economics and Statistics,* 76(2), 302-316.

Greif, A., 1989. Reputation and Coalitions in Medieval Trade: Evidence on the Maghribi Traders. *The Journal of Economic History,* 49(4), 857-882.

Greif, A., 1993. Contract Enforceability and Economic Institutions in Early Trade: The Maghribi Traders' Coalition. *The American Economic Review,* 83(3), 525-548.

Head, K., Mayer, T., Ries, J., 2010. The Erosion of Colonial Trade Linkages after Independence. *Journal of International Economics,* 81(1), 1-14.

Head, K., Ries, J., 1998. Immigration and Trade Creation: Econometric Evidence from Canada. *Canadian Journal of Economics,* 31(1), 47-62.

Martin, W., Pham, C., 2009. Estimating the Gravity Model When Zero Trade Flows are Frequent. World Bank manuscript.

Melitz, J., Toubal, F. 2012. Native Language, Spoken Language, Translation and Trade. CEPR DP. 8984.

La Porta, R., Lopez-de-Silanes F., Shleifer A., 2008. The Economic Consequences of Legal Origins. *Journal of Economic Literature,* 46 (2), 285-332.

Lewer, J. J., Van den Berg, H., 2007. Religion and International Trade. *American Journal of Economics and Sociology*, 66(4), 765-794.

OECD, 2010. *DIOC-E Database* (Paris: OECD). Available at: http://www.oecd.org/document/33/0,3746,en_2649_37415_46561249_1_1_1_37415,00.html . Accessed: October 2010.

Parsons, C., 2011. Do Migrants Really Foster Trade? The Trade-Migration Nexus, a Panel Approach 1960-2000. GEP Research Paper 11/10.

Peri, G., Requena, F., 2010. The Trade Creation Effect of Immigrants: Evidence from the Remarkable Case of Spain. *Canadian Journal of Economics*, 49, 1433-1459.

Rauch, J. E., 1999. Networks versus Markets in International Trade. *Journal of International Economics*, 48, 116-130.

Rauch, J. E., 2001. Business and Social Networks in International Trade. *Journal of Economic Literature*, 39, 1177-1203.

Rauch, J. E. and Trindale, V., 2002. Ethnic Chinese Networks in International Trade. *The Review of Economics and Statistics,* 84(1), 116-130.

Santos Silva J., Tenreyro, S., 2006. The Log of Gravity. *The Review of Economics and Statistics*, 88(4), 641-658.

Wagner, D., Head, K., Ries, J., 2002. Immigration and the Trade of Provinces. *Scottish Journal of Political Economy*, 49, 507-25.

World Bank, 2010. International Migrant Stock, Total. Database, available at: http://data.worldbank.org/indicator/SM.POP.TOTL/countries?display=default.

Table 1: Summary statistics of the shares of foreign-born, share of immigrants in business networks and openness to trade, OECD countries, circa 2000

Country ISO Code	Share of immigrants in population (1)	Share ISCO 1 among immigrants (2)	Share ISCO.5 among immigrants (3)	Share ISCO.9 among immigrants (4)	Export + import as percent of GDP (5)
AUS	0.245	0.082	0.128	0.071	22.515
AUT	0.138	0.090	0.172	0.109	89.205
BEL	0.095	0.209	0.088	0.102	87.472
CAN	0.206	0.101	0.140	0.047	39.173
CHE	0.253	0.062	0.121	0.026	43.542
CHL	0.017	0.215	0.103	0.000	33.832
CZE	0.040	0.152	0.115	0.025	66.865
DEU	0.118	0.001	0.121	0.000	83.430
DNK	0.058	0.010	0.158	0.108	35.596
ESP	0.068	0.103	0.173	0.164	40.487
EST	0.195	0.248	0.091	0.047	24.840
FIN	0.022	0.016	0.180	0.150	58.455
FRA	0.092	0.137	0.110	0.091	25.389
GBR	0.088	0.158	0.179	0.083	27.333
HUN	0.029	0.142	0.174	0.030	91.634
IRL	0.121	0.137	0.154	0.030	78.988
ISR	0.373	0.081	0.208	0.072	51.849
ITA	0.050	0.099	0.145	0.000	23.479
LUX	0.426	0.100	0.102	0.054	92.100
MEX	0.004	0.193	0.132	0.026	39.231
NLD	0.098	0.042	0.108	0.139	29.028
NZL	0.197	0.117	0.159	0.049	43.876
POL	0.008	0.127	0.103	0.020	36.151
PRT	0.085	0.118	0.140	0.067	37.313
SVK	0.026	0.129	0.061	0.023	12.323
SWE	0.109	0.027	0.234	0.118	39.271
Average	0.115	0.114	0.147	0.065	44.700

Sources: Authors' computations based on OECD DIOC-E migration data and Head, Mayer and Ries (2010) trade data.

Table 2. The Effect of Business Networks on Trade: Basic Specifications

	OLS										PMLE	
	LImports	LExports	LImports	LExports	LImports	LExports	LImports	LExports	LImports	LExports	Imports	Exports
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
ln (Immigrant Bus. Network)	0.255**	0.253**										
	(0.019)	(0.019)										
ln(share^{bus1})			0.675*	0.396*							1.070**	0.462*
			(0.297)	(0.221)							(0.363)	(0.249)
ln(share^{bus59})					0.253	0.276						
					(0.215)	(0.167)						
ln(share^{nbus})							-0.573	-0.194				
							(0.378)	(0.261)				
share^{bus1}									0.350*	0.297**		
									(0.145)	(0.112)		
ln(IMMIGRANT)			0.268**	0.262**	0.262**	0.256**	0.268**	0.261**			0.175**	0.162**
			(0.018)	(0.015)	-0.018	(0.014)	(0.018)	(0.015)			(0.016)	(0.016)
ln(Distance)	-1.241**	-1.303**	-1.167**	-1.287**	-1.164**	-1.285**	-1.168**	-1.287**	-1.451**	-1.565**	-0.782**	-0.830**
	(0.049)	(0.049)	(0.050)	(0.044)	(0.050)	(0.044)	(0.050)	(0.044)	(0.048)	(0.041)	(0.044)	(0.049)
Contiguity	0.0695	0.228*	0.000449	0.113	-0.0095	0.109	-0.0089	0.106	0.419**	0.528**	0.220**	0.245**
	(0.142)	(0.121)	(0.143)	(0.120)	(0.142)	(0.120)	(0.142)	(0.120)	(0.152)	(0.135)	(0.053)	(0.061)
Comm language	0.290**	0.131	0.274**	0.194*	0.289**	0.206**	0.281**	0.198*	0.531**	0.441**	0.083	0.026
	(0.100)	(0.084)	(0.099)	(0.078)	(0.099)	(0.078)	(0.099)	(0.078)	(0.101)	(0.082)	(0.061)	(0.073)
Colony	0.698**	0.593**	0.652**	0.561**	0.663**	0.571**	0.652**	0.563**	1.281**	1.176**	0.181*	0.108
	(0.130)	(0.111)	(0.129)	(0.105)	(0.129)	(0.105)	(0.129)	(0.105)	(0.138)	(0.113)	(0.081)	(0.098)
RTA	-0.083	-0.0826	-0.0646	-0.159*	-0.0661	-0.159*	-0.0682	-0.161*	-0.0347	-0.126	0.457**	0.462**
	(0.085)	(0.078)	(0.085)	(0.074)	(0.085)	(0.074)	(0.085)	(0.074)	(0.089)	(0.079)	(0.075)	(0.079)
Observations	4,806	4,923	4,806	4,923	4,806	4,923	4,806	4,923	4978	5097	5230	5230
R-squared	0.794	0.826	0.796	0.831	0.795	0.831	0.795	0.831	0.786	0.820		

Note : Dependent variable in columns 1-10 is the log of total value of trade in US dollars (import or export). Estimation method: OLS. Dependent variable in columns 11-12 is the level of total value of trade in US dollars, including zero trade flows. Estimation method: PMLE. All regressions include time, receiving and sending country fixed effects; robust standard errors are clustered on country pairs. ** - significant at 1%, * - significant at 5%.

Table 3. Business Networks and Trade in Homogeneous and Heterogeneous Goods

	Imports	Exports	Imports			Exports		
	Total	Total	Diff	Moder. Diff	Homo	Diff	Moder. Diff	Homo
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ln(share^{bus1})	0.014	0.551*	0.194	0.435	0.340	0.235	0.329	0.878**
	(0.290)	(0.243)	(0.276)	(0.297)	(0.365)	(0.267)	(0.258)	(0.274)
ln(IMMIGRANT)	0.262**	0.251**	0.257**	0.260**	0.258**	0.260**	0.284**	0.276**
	(0.018)	(0.017)	(0.019)	(0.016)	(0.021)	(0.016)	(0.017)	(0.018)
ln(Distance)	-1.152*	-1.311**	-1.148**	-1.116**	-1.302**	-1.331**	-1.337**	-1.401**
	(0.052)	(0.048)	(0.051)	(0.049)	(0.058)	(0.045)	(0.044)	(0.048)
Contiguity	0.004	0.078	-0.022	0.021	0.059	-0.136	-0.265*	-0.033
	(0.126)	(0.129)	(0.138)	(0.134)	(0.141)	(0.128)	(0.124)	(0.132)
Comm language	0.345**	0.358**	0.354**	0.293**	0.340**	0.308**	0.284**	0.185*
	(0.098)	(0.081)	(0.104)	(0.098)	(0.112)	(0.082)	(0.081)	(0.088)
Colony	0.492**	0.446**	0.675**	0.523**	0.444**	0.592**	0.560**	0.441**
	(0.132)	(0.110)	(0.139)	(0.127)	(0.126)	(0.115)	(0.112)	(0.113)
RTA	0.081	-0.121	0.059	0.090	0.253**	0.039	0.037	0.119
	(0.084)	(0.083)	(0.087)	(0.083)	(0.091)	(0.078)	(0.074)	(0.082)
Observations	4,757	4,874	4,317	4,390	4,324	4,646	4,649	4,610
R-squared	0.766	0.745	0.833	0.831	0.792	0.824	0.831	0.796

Note : Dependent variable: the logarithm of the value of trade in US dollars (import or export), measured in year t+2. Estimation method: OLS. All regressions include the full set of time, receiving and sending country effects; robust standard errors are clustered on country pairs. ** - significant at 1%, * - significant at 5%.

Table 4. Business Networks and Education of Immigrants

	LImports (1)	LExports (2)	LImports (3)	LExports (4)	LImports (5)	LExports (6)	LImports (7)	LExports (8)
$\ln(share^{bus1})$	0.606	0.811*	0.911*	0.950*				
	(0.393)	(0.348)	(0.460)	(0.477)				
$\ln(share^{edu2})$	0.0881	0.0184						
	(0.380)	(0.326)						
$\ln(share^{edu3})$	0.118	0.342						
	(0.334)	(0.276)						
$\ln(tot^{edu1})$			0.042	0.032				
			(0.039)	(0.035)				
$\ln(tot^{edu2})$			0.079	0.028				
			(0.060)	(0.051)				
$\ln(tot^{edu3})$			0.121*	0.210**				
			(0.052)	(0.042)				
$\ln(share^{bus1\_edu1})$					-1.734	-1.000	-1.095	-1.535
					(0.957)	(0.876)	(1.176)	(1.351)
$\ln(share^{bus1\_edu2})$					-0.357	0.754	-0.280	0.553
					(0.562)	(0.425)	(0.629)	(0.702)
$\ln(share^{bus1\_edu3})$					0.309	0.701*	1.455**	1.429**
					(0.404)	(0.303)	(0.504)	(0.451)
$\ln(share^{nbus\_edu2})$							0.316	0.0158
							(0.392)	(0.329)
$\ln(share^{nbus\_edu3})$							-0.0574	0.113
							(0.336)	(0.284)
ln(IMMIGRANT)	0.256**	0.267**			0.265**	0.255**	0.260**	0.269**
	(0.022)	(0.018)			(0.019)	(0.016)	(0.022)	(0.018)
Observations	3,976	4,023	3,444	3,479	4,752	4,870	3,976	4,023
R-squared	0.808	0.825	0.819	0.835	0.800	0.826	0.808	0.825

Note : Dependent variable: the logarithm of the total value of trade in US dollars (import or export), measured in year t+2. Estimation method: OLS. All regressions include the full set of time, sending and receiving country effects, as well as distance, contiguity, common language, colonial past, and RTA controls. Robust standard errors are clustered on country pairs. ** - significant at 1%, * - significant at 5%.

Table 5. Business Networks and Education of Immigrants: Trade in Differentiated and Homogeneous Goods

	Imports			Exports		
	Differentiated	Intermediate	Homogeneous	Differentiated	Intermediate	Homogeneous
	(1)	(2)	(3)	(4)	(5)	(6)
ln(share^{bus1})	1.123*	0.814	0.631	0.865*	0.035	1.546**
	(0.468)	(0.417)	(0.482)	(0.440)	(0.483)	(0.518)
ln(total ^{edu1})	0.041	-0.010	0.041	0.082*	-0.003	0.042
	(0.037)	(0.037)	(0.041)	(0.036)	(0.037)	(0.039)
ln(total ^{edu2})	0.118*	0.239**	0.101	-0.053	-0.004	0.073
	(0.058)	(0.055)	(0.062)	(0.056)	(0.055)	(0.059)
ln(total ^{edu3})	0.113*	0.036	0.112*	0.272**	0.324**	0.187**
	(0.052)	(0.051)	(0.053)	(0.046)	(0.044)	(0.048)
Observations	3,259	3,282	3,255	3,386	3,397	3,387
R-squared	0.841	0.847	0.808	0.843	0.836	0.809

Note: Dependent variable: the logarithm of the value of trade in US dollars, in t+2. Estimation method: OLS. All regressions include the full set of time, host, and home fixed effects, as well as distance, contiguity, common language, colonial past, and RTA controls. Robust standard errors are clustered on country pairs. ** - significant at 1%, * - significant at 5%.

Table 6. Interactions of Business Networks with Bilateral Features

	LImports	LExports	LImports	LExports	LImports	LExports	LImports	LExports
	Language		Colony		Religion		Legal origin	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ln(share^{bus1})	0.611	0.521*	0.645*	0.498*	0.385	0.109	0.842*	0.735**
	(0.312)	(0.234)	(0.308)	(0.225)	(0.375)	(0.259)	(0.337)	(0.244)
Interaction	-0.285	-0.286	-1.203	-0.038	0.674	1.023**	-0.991	-1.042*
	(0.901)	(0.672)	(1.328)	(1.344)	(0.492)	(0.383)	(0.617)	(0.486)
ln (IMMIGRANT)	0.270**	0.264**	0.270**	0.264**	0.270**	0.264**	0.269**	0.263**
	(0.018)	(0.014)	(0.018)	(0.014)	(0.018)	(0.014)	(0.018)	(0.014)
Colony	0.572**	0.494**	0.728**	0.496*	0.576**	0.492**	0.572**	0.488**
	(0.134)	(0.107)	(0.226)	(0.205)	(0.134)	(0.107)	(0.134)	(0.107)
Religion	-0.011	0.190**	-0.009	0.190**	-0.089	0.072	-0.013	0.188**
	(0.066)	(0.052)	(0.066)	(0.052)	(0.089)	(0.068)	(0.066)	(0.052)
Legal	0.074	-0.037	0.076	-0.039	0.076	-0.038	0.211	0.103
	(0.067)	(0.057)	(0.066)	(0.057)	(0.067)	(0.057)	(0.108)	(0.085)
ln(Distance)	-1.182**	-1.286**	-1.183**	-1.286**	-1.180**	-1.283**	-1.173**	-1.277**
	(0.068)	(0.056)	(0.068)	(0.056)	(0.068)	(0.056)	(0.069)	(0.056)
Contiguity	0.004	0.127	0.001	0.131	0.0118	0.148	-0.007	0.124
	(0.147)	(0.121)	(0.146)	(0.121)	(0.146)	(0.120)	(0.146)	(0.121)
RTA	-0.055	-0.155*	-0.057	-0.153*	-0.052	-0.147*	-0.062	-0.158*
	(0.085)	(0.074)	(0.085)	(0.074)	(0.085)	(0.074)	(0.085)	(0.075)
Comlang	0.250	0.232*	0.284**	0.198*	0.274*	0.185*	0.288**	0.201*
	(0.157)	(0.115)	(0.109)	(0.085)	(0.108)	(0.084)	(0.109)	(0.085)
Observations	4,757	4,874	4,757	4,874	4,757	4,874	4,757	4,874
R-squared	0.797	0.837	0.797	0.837	0.797	0.837	0.797	0.837

Note: Dependent variable is the log of total value of trade in US dollars (import or export). Estimation method: OLS. First column heading indicates the dependent variable. Second column heading indicates the variable that is interacted with the variable Lsharebus1 (i.e., language, colony, religion, legal origin). All regressions include time, host, and home fixed effects; robust standard errors are clustered on country pairs. ** - significant at 1%, * - significant at 5%.

Appendix

Table A1. Variables Description and Sample Statistics

Variable	Description	Obs	Mean	St. D.	Min	Max
ln(Exports)	Log of total value of exports in US dollars	4923	16,48	3,22	2,78	26,25
ln(Imports)	Log of total value of imports in US dollars	4806	16,15	3,66	2,56	25,92
ln (Immigrant Bus. Network)	Log of total number of immigrants in occupations of ISCO Group 1, in a given country pair	4923	2,84	2,48	0,00	12,84
ln(share^{bus1})	Log of the ratio of total number of immigrants in occupations of ISCO Group 1, over the total number of active immigrant population in a given country pair	4923	-2,07	1,00	-8,52	0,00
ln(share^{bus59})	Same, for ISCO Groups 5 and 9	4923	-1,73	0,75	-5,72	0,00
ln(share^{nbus})	Same, for all other ISCO groups	4923	-1,15	0,19	-2,08	0,00
ln(IMMIGRANT)	Log of total number of active immigrant population, aged 15+ in a given country pair	4923	4,96	2,75	0,69	14,54
ln(Distance)	Log of population-weighted distance between countries, km	4923	8,50	0,91	5,08	9,89
Contiguity	1 for countries sharing a border	4923	0,04	0,19	0,00	1,00
Comlang	1 for countries sharing a common official or primary language	4923	0,15	0,36	0,00	1,00
Colony	1 for countries ever having a colonial relationship	4923	0,04	0,20	0,00	1,00
RTA	1 for countries having a regional trading agreements in force	4923	0,16	0,36	0,00	1,00
ln(share^{edu2})	Log of the ratio of immigrants with secondary education over the total number of migrants in a given country pair plus one	4442	-1,08	0,58	-0,52	0,00
ln(share^{edu3})	Same for tertiary education	4691	-0,91	0,72	-8,10	0,00
ln(tot^{edu1})	Log of the total number of immigrants with primary education in a given country pair plus one	3911	4,01	2,70	0,00	13,01
ln(tot ^{edu2})	Same for secondary education	4442	4,21	2,63	0,00	14,09
ln(tot ^{edu3})	Same for tertiary education	4691	4,17	2,55	0,00	13,30
ln(share^{bus1_edu1})	Log of the ratio of immigrants in ISCO Group 1 and having primary education, over the total number of immigrants in a given country pair plus one	4923	-4,21	1,27	-10,1	0,00
ln(share^{bus1_edu2})	Same for secondary education	4923	-3,26	1,08	-8,69	0,00
ln(share^{bus1_edu3})	Same for tertiary education	4923	-2,66	1,12	-8,99	0,00
ln(share^{nbus_edu2})	Same for non-business network, secondary	4442	-1,21	0,59	-5,19	0,00
ln(share^{nbus_edu3})	Same for non-business network, tertiary	4691	-1,10	0,73	-8,11	0,00

Table A2. Occupations under Group 1 of ISCO-88 Classification

11	Legislators and senior officials
111	Legislators and senior government officials
114	Senior officials of special-interest organizations
1141	Senior officials of political party organizations
1142	Senior officials of employers', workers' and other economic-interest organizations
1143	Senior officials of humanitarian and other special-interest organizations
12	Corporate managers
121	Directors and chief executives
122	Production and operations managers
1221	Production and operations managers in agriculture, hunting, forestry and fishing
1222	Production and operations managers in manufacturing
1223	Production and operations managers in construction
1224	Production and operations managers in wholesale and retail trade
1225	Production and operations managers in restaurants and hotels
1226	Production and operations managers in transport, storage and communications
1227	Production and operations managers in business services enterprises
1228	Production and operations managers in personal care, cleaning and related services
1229	Production and operations managers not elsewhere classified
123	Other specialist managers
1231	Finance and administration managers
1232	Personnel and industrial relations managers
1233	Sales and marketing managers
1234	Advertising and public relations managers
1235	Supply and distribution managers
1236	Computing services managers
1237	Research and development managers
1239	Other specialist managers not elsewhere classified
13	Managers of small enterprises
131	Managers of small enterprises
1311	Managers of small enterprises in agriculture, hunting, forestry and fishing
1312	Managers of small enterprises in manufacturing
1313	Managers of small enterprises in construction
1314	Managers of small enterprises in wholesale and retail trade
1315	Managers of small enterprises of restaurants and hotels
1316	Managers of small enterprises in transport, storage and communications
1317	Managers of small enterprises of business services enterprises
1318	Managers of small enterprises in personal care, cleaning and related services
1319	Managers of small enterprises not elsewhere classified

Table A3. Other Occupations with Business-Oriented Potential

52	Models, salespersons and demonstrators
522	Shop, stall and market salespersons and demonstrators
5220	Shop, stall and market salespersons and demonstrators
91	Sales and services elementary occupations
911	Street vendors and related workers
9111	Street vendors
9113	Door-to-door and telephone salespersons

Table A4, Panel A. Top 15 Origin Countries for *All Migrants* in the Sample

Country of origin	Total stock (number) of emigrants	Present in this number of destination countries	Top 1 destination country	Top 2 destination country
Ukraine	2367370	48	Russia	Israel
Kazakhstan	1643157	34	Russia	Germany
Great Britain	1346297	57	Australia	Canada
Germany	966422	59	Great Britain	Switzerland
Russia	916444	53	Germany	Israel
India	828163	52	Great Britain	Nepal
Turkey	812900	49	Germany	Austria
Poland	782453	48	Germany	Canada
Italy	777299	53	Switzerland	Canada
Bosnia and Herzegovina	754986	42	Croatia	Switzerland
Morocco	697622	44	France	Spain
Portugal	613659	46	France	Canada
Belorussia	556140	42	Russia	Lithuania
Indonesia	546504	41	Malaysia	The Netherlands
Uzbekistan	546114	34	Russia	Kyrgyzstan

Table A4, Panel B. Top 15 Origin Countries for *Business Migrants* in the Sample

Country of origin	Total stock (number) of business emigrants	Present in this number of destination countries	Top 1 destination country	Top 2 destination country
Ukraine	391991	44	Russia	Poland
Kazakhstan	201429	24	Russia	Kyrgyzstan
Great Britain	199109	55	Australia	Canada
Germany	138250	57	Great Britain	Russia
Azerbaijan	89248	18	Russia	Armenia
Italy	87183	52	Canada	France
USA	82121	56	Great Britain	Canada
India	77558	49	Great Britain	Canada
Uzbekistan	70187	20	Russia	Kyrgyzstan
Georgia	67253	25	Russia	Armenia
Portugal	61193	37	Brazil	Venezuela
Colombia	60427	38	Venezuela	Spain
France	58899	53	Great Britain	Spain
China	57749	56	Canada	Australia
Algeria	53768	34	France	Canada

Sources: Authors' calculations based on OECD DIOC-E database