ON THE PRO-TRADE EFFECT OF IMMIGRANTS

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February 15, 2011

Abstract

There is a great evidence that immigrant networks are associated with larger trade flows from the country where they settle to their countries of origin, owing to superior knowledge of, or preferential access to, market opportunities. We test this proposition using data on trade flows from Italian provinces between 2003 and 2009, and micro data on average firm size, along with data on the stock of immigrants located in those provinces by country of origin. Our findings can be interpreted, in the light of the Chaney (2008) gravity model, as consistent with the idea that immigrants reduce the fixed costs of trade. In an augmented gravity equation, we find that a 10 per cent increase in immigrants is associated with a 3 per cent increase in both province imports and exports to the immigrant's home country.

Keywords: Migration, trade, gravity model, social interactions

JEL Classification: F10, F14, F22, R10.

PRELIMINARY

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The paper started in Berkeley, CA, where Massimiliano Bratti and Luca De Benedictis temporarily migrated as visitors. Luca De Benedictis wish to thank the ARE Department for the hospitality. We thank Elena Mazzeo and Antonella Ciccarese for their generous help with the data.

1 Introduction

According to recent OECD estimates, at the turn of the century, 4.6% of world population was born in a different country from the one where it currently lived. In the OECD countries this share rise to 8.9% (Jean-Christophe Dumont and Widmaier, 2010). 31.4 million of immigrants were living in the USA; 7.8 million in Germany; 5.6 million in France; 5.3 million in Canada; 2 million in Italy. Several non-OECD countries also had very large foreign-born populations.[1] In relative terms, high shares of immigrants were recorded in several OECD countries (Luxembourg: 37%; Australia: 27%), but also among non-OECD countries (Singapore: 23%, Estonia: 22%, Belize: 21%, and Latvia: 21%). The highest share of immigrants in OECD countries was for Israel, which reported a 40% of immigrants in the population. In Italy it was a little bit more than one tenth of it: 4.1% of the population was born abroad.[2]

Those were estimates for the year 2000, but in ten years immigration in Italy has further increased in a substantial manner, becoming a highly debated issue not only in academic circles but also among politicians and in the press. Between 2000 and 2009, the number of foreign-born residents rose to 4.2 million, which means that 7% of the total number of Italian residents were born in a different country (ISTAT, 2010).

During the same years Italian participation to world trade decreased in terms of trade shares, but increased in nominal terms both in exports and imports. The issue of the decline of the Italian market's share also became a debated issue.

This paper explores the link between these two occurrences. The Italian case is of interest in itself because it encompasses several elements that taken together offer a very promising setup to the study of the mechanisms that foster the trade openness of a country through the economic and social influence of immigrants. For Italy we have trade and immigration data on very disaggregated geographical and administrative units (province, i.e., NUTS3). These elements share the same aspect that in one word we can label two-sided heterogeneity.

[1] 11 million live in Russia; 6 million in India; 1.8 million in Israel.

[2] Some countries, however, have a very low share of foreign-born in their population (below 1%), such as Indonesia, Sri Lanka, Cuba, Colombia, Laos, Peru, Mongolia, Bulgaria and Thailand. Among OECD countries, the lowest shares of immigrants are observed in Mexico (0.4%) and Japan (1.1%).

In Italy, the phenomenon of massive immigration is quite recent. Italy was a land of emigrants at least until the 1960s. It is only in the 1970s that the migration balance started showing a positive sign. To the traditional ethnic groups coming from North Africa, often on a temporary basis, a new diaspora of permanent (essentially domestic assistant) workers entered Italy from the Philippines, Capo Verde and Sri Lanka. In the 1980s, immigrants coming from Central Africa (Senegal, Nigeria, Cote d'Ivoire, Burkina Faso), South America (Peru, Dominican Republic), the Indian sub-continent (India, Pakistan and Sri Lanka again) and Asia (China) established 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's wall and the entering of Poland, first, and Romania, afterwards, in the European Union. Italy is now characterized by what sociologists call "super-diversity," a notion intended to emphasize the level and kind of complexity in immigrants' social and economic participation to national everyday life, way above anything the country had previously experienced. The relevant ingredients of a super-diverse immigration are "...the increased number of new, small and scattered, multiple-origin, transnationally connected, socio-economically differentiated and legally stratified immigrants who have arrived over the last decade." (Vertovec, 2006)

The second side of the Italian heterogeneity we are going to deal with comes from the profound diversity in the socio-economic characteristics of Italian regions, ranging from a rich and industrialized North-west very well connected to the core of Europe, to a largely poor and underdeveloped South. This offers a nice setting to investigate the effect of immigrants on geographical entities which experience very different levels of economic development.

In our empirical analysis, we turn this Italian two-sided heterogeneity to our advantage. As emphasized by Briant *et al.* (2009), in country-level analyses of the effect of immigrants on trade flows (see Wagner *et al.* (2002) and Peri and Requena-Silvente (2010) for a review of the issue) there are very good reasons to suspect that the link between these two occurrences, i.e. the correlation between trade and immigration, might depend on one or more omitted common determinants (such as colonial ties, common language or cultural proximity) or might be spoiled by the reverse causality inherent to the fact that immigrants generally migrate to countries where formal or informal links were already established and where trade with their homeland was already present. In the Italian case, differently from other cases such

as the UK (and the London area in particular) or France and the US (and the New York area in particular), the super-diversity of the more than 180 ethnicities now living in Italy is largely unrelated to colonial heritage, linguistic proximity or institution similarity. This characteristic of the Italian case is therefore particularly convenient in the empirical strategy to pursue the identification of the effect that immigrants have on trade flows in and out of Italy. Colonial origins and linguistic proximity can both influence trade — and so they do in the traditional analyses of bilateral trade based on the gravity model (Head *et al.*, 2010, Helliwell, 1999) — and immigration and, therefore, they can confound the relationship between the immigrants and trade flows.

Moreover, we will also take advantage of the Italian regional economic diversity. Following some recent contributions (Wagner *et al.*, 2002, Dunlevy, 2006, Bandyopadhyay *et al.*, 2008, Briant *et al.*, 2009, Peri and Requena-Silvente, 2010), we will test the relationship between trade and immigration at the scale of Italian provinces, including country-year fixed effects to control for the common determinants of trade and immigration at the national level. At the same time, the variability in trade and immigration at the provincial level, after including province-year fixed effects to account for time-variant demand-pull factors will allow us to precisely isolate the pro-trade effect of immigrants. Relying on an instrumental-variable approach, we identify the causal effect of immigrants on exports and imports of Italian provinces. The effect is positive and significant.

We think that our analysis has at least three merits. First, the risk of a spurious correlation between trade and immigration is minimized due to the very fine geographical scale of the analysis. We run a regression on 103 Italian provinces, the finest scale of now available comparable Italian trade data. Second, to further rule out the possibility of an endogeneity bias that could inflate our coefficient of interest, we controlled for omitted common determinants and reverse causality including time-varying country-specific and province-specific fixed-effects in the regressions, and as in Briant *et al.* (2009), Peri and Requena-Silvente (2010) we make use of an instrumental variables approach, where stocks of foreign-born Italian residents in 2002 (one year before the lower limit of our time-span) serve as instruments. Third, we exploit a nice feature of our dataset showing that the pro-trade effect of immigrants is higher for small italian firms and increases with trading-pair distance.

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

the literature on the pro-trade effects of immigrants and highlights the mechanisms behind this positive effect. Section 3 describes Italian super-diversity in immigration and presents the data used in the analysis (which is also fully described in the Appendix). Section 4 presents the benchmark empirical results, the robustness checks, and the strategy used to tackle the endogeneity issue. Section 5 concludes.

2 The pro-trade effects of immigrants

The international trade literature based on the estimate of a gravity equation (De Benedictis and Taglioni, 2011) - where trade flows between a regional entity i and its international counterpart j are positively associated with economic attractors, such as the GDPs of i and j, and negatively associated with obstacles to international trade, such as distance, – has generally found a strong association between immigration and trade. The presence in i of immigrants from j can be considered an attracting force, fostering the international trade between i and j.

Different studies (Head and Ries, 1998, Dunlevy and Hutchinson, 1999, Rauch and Trinidate, 2002, Girma and Yu, 2002, Briant *et al.*, 2009, Peri and Requena-Silvente, 2010), for different samples, different periods and different estimation techniques have generally confirmed a strong effect of immigrants on trade.

In figure 1 we summarized the results of a sample of relevant contributions to the literature in terms of estimated elasticity of trade (imports, in blue, and exports, in white) to immigrants. The vertical lines indicate the simple meta-average elasticity, which is 0.18 for exports and 0.28 for imports. As it is evident the estimates show a high degree of variability, at least since the publication of the paper by Wagner *et al.* (2002) that set the standard in the literature, underlying the essential role of country-fixed effects to control for omitted variable bias, the advantages of exploiting cross-sectional information on trade and immigration using provincial data (for Canada, in their analysis), and the to deal with the endogeneity problem we discussed before. Since Wagner *et al.* (2002) the variability in the estimates reduces substantially.

One first important evidence of the literature is that the elasticity of imports to immigrants is higher than the one of exports, and that both are positive and generally significantly different from zero. Why?

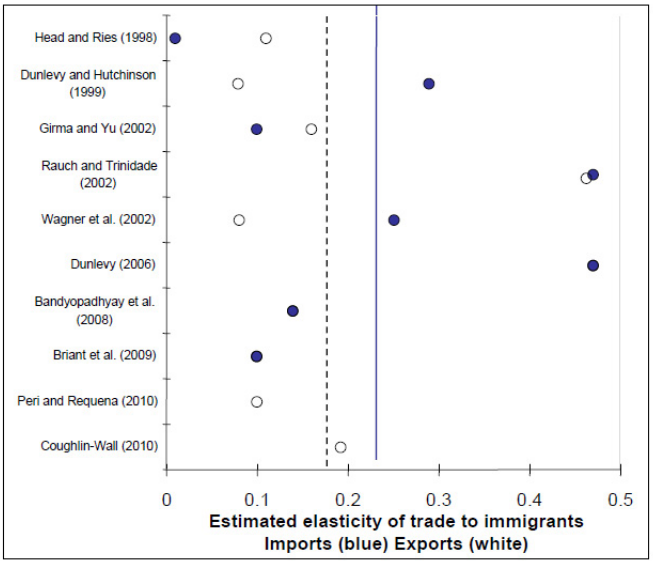


Figure 1: Literature summary. Estimated elasticity of trade to immigrants: Imports (blue) Exports (white)).

The figure plots data obtained from several contributions to the literature on the migration effect on trade. Blue dots indicate the elasticity of imports to immigrants, white dots the one of exports. The complete list of papers is in included in the references.

The mechanisms at the basis of the common explanations of what usually drives the pro-trade effect of immigrants are threefold. The main explanation is rooted in the idea that information costs plays a major role in the fixed cost that firms have to pay to enter foreign markets. In the seminal contribution of Rauch (2001), ethnic networks related to migration flows are likely to reduce some of these information cost. Cross-border networks of people sharing the same country of origin can substitute or integrate organized markets in matching international demand and supply. Several studies have explored the role of ethnic networks in international trade (Rauch and Trinidate, 2002).

The second explanation is still related to the characteristics of immigrants and how these characteristics can reduce the fixed cost of exporting. Language, specific knowledge of homeland institutions and norms, familiarity with homeland (excess) demand, can bridge the home-country and the host-country, if these assets are positively valued and acquired by firms producing in the country were immigrants settled (Wagner *et al.*, 2002, Peri and Requena-Silvente, 2010). Morover, "immigrant networks may provide contract enforcement through sanctions and exclusions, which substitutes for weak institutional rules and reduces trade costs." (Briant *et al.*, 2009)

The third, less explored explanation is that immigrants are characterized by different habits in consumption. Since homeland goods are more costly in the host-country immigrants have an incentive to buy those goods from the home-country itself.

The first two arguments foster both imports and exports, the third one just imports. If one adds the three effects the result is what is shown in figure 1: the the elasticity of imports to immigrants is higher than the one of exports. We will verify this reasoning in the following empirical analysis.

3 Italy as super-diversity

3.1 Data and descriptive statistics

Our data are obtained using mainly two datasets publicly available from the Italian National Statistical Institute (ISTAT). Trade flow data refer to the value of imports and exports of 103 Italian Provinces (NUTS-3) with around 200 trading partners around the world, over the period 2002-2009.[3]

[3]Note that at this stage, we consider only the first 54 countries of immigration, which cover almost 80 percent of Italian trade flows and over 93 percent of the foreign-born

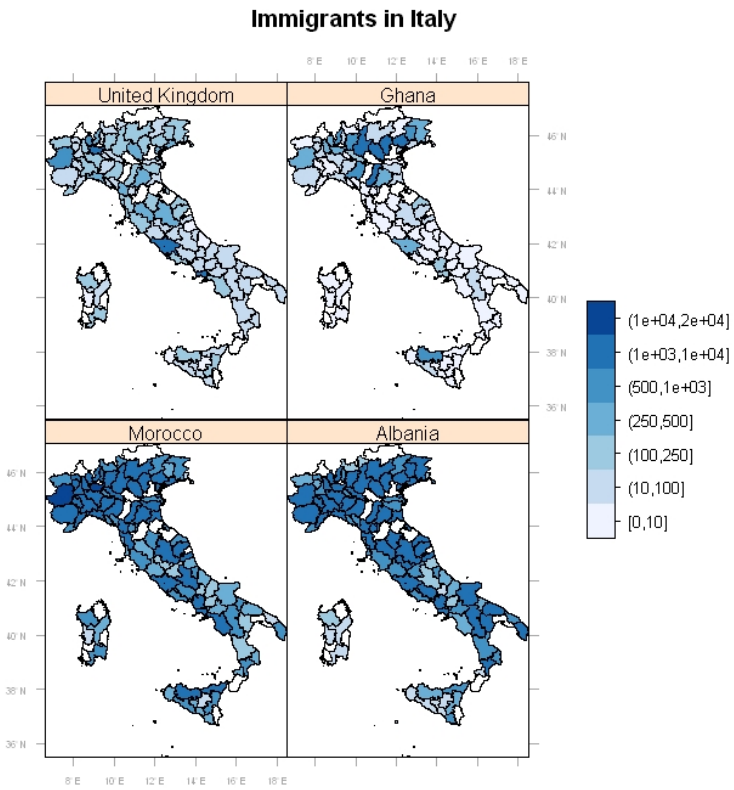


Figure 2: Immigrants in Italy at the provincial level, 2001 (the intensity of blue grows in the number of immigrants).

The figure plots data of immigrants from four of the 20 largest foreign communities in Italy including people coming from Morocco, Albania, Romania, Philippine, China, Tunisia, US, Sri Lanka, Senegal, Germany, Poland, India, Egypt, Peru, France, Macedonia, UK, Bangladesh, Nigeria, Ghana. The data is at the provincial level (103 provinces in 2010, and does not include data on the seven new Italian Provinces established after 2001). Data come from the Italian National Statistical Institute.

Values are originally reported in current euros, which we converted in current US dollars using the nominal exchange rate from the *World Development Indicators* (WDI on-line database) to make them consistent with GDP data used in gravity equations.

The information on the number of foreign born residents by province and country of origin is obtained from ISTAT as well, and cover the same time period[4]. Our explanatory variable of interest is the stock of immigrants by country of origin and province of destination. We define immigrants as residents born abroad with a foreign nationality. Immigration in Italy has increased very fast in the last few years. In the 2009 the foreign born residents represented about 7.2 percent of total population while they were only 2.7 percent in 2002. Foreign population grew steadily at an average of 15.5 percent per year, from 1.5 millions in 2002 to over 4 millions in 2009.

Table 1 shows the top 20 countries of origin of immigrants in 2009. The top five countries by the number of foreign-born population were Romania, Albania, Morocco, China and Ukraine, accounting for 50 percent of the total foreign population. Comparing the rank of these top 20 countries of origin, and especially the average growth rate over the period, gives an idea of the change in the composition of immigrants by the country of origin. In 2009, the majority of the foreign-born population came from Eastern Europe (Romania, Ukraine, Rep. of Moldova, Poland), which experienced also the highest growth rate over the period. The change in the ranking between 2002 and 2009 is reported in Figure 3 which shows some big movers. Moldova and Ukraine, for instance, gain 32 and 23 positions, respectively, while Senegal looses 9 positions.

An interesting feature of the immigration pattern in Italy is the uneven distribution of immigrants across Italian provinces. Figure 4 shows the map of Italy where provinces are colored according to the share of foreign-born population in the total population, with 'darker' provinces having a higher share of immigrants. While in 2002 none of the 103 provinces registered a share higher than 10 percent, in 2009, 23 provinces had over 10 percent of foreign born residents, mainly in the Centre and North of the country.

Even if the distribution across the country of foreign residents is con-

population. This is mainly due to a time constraint in data collection .

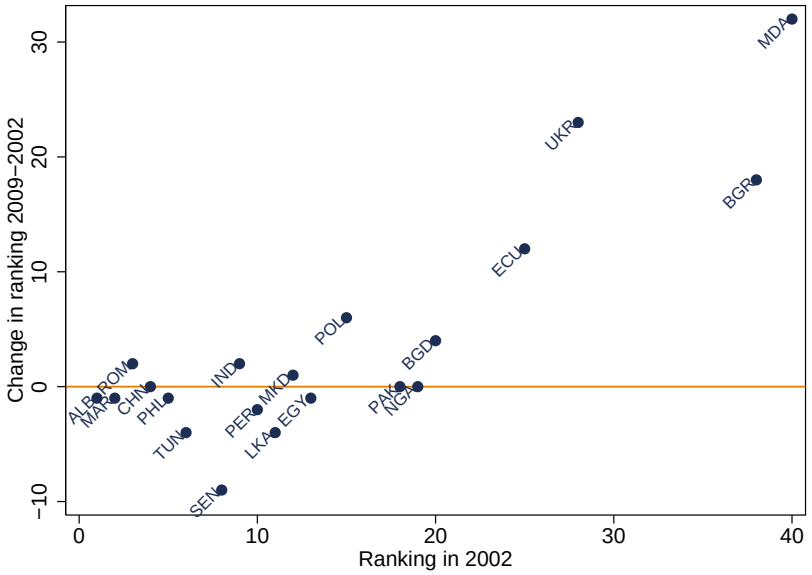
[4]All the estimation are done using one lag on covariates with respect to trade flows.

Table 1: Immigrants by country of origin

Ranking in 2009	Country of origin	Number of immigrants in 2009	% of total immigrants in 2009	Annual growth rate, 2002/2009 (%)	Ranking in 2002
(1)	Romania	883,379	20.9	40.3	(3)
(2)	Albania	466,449	11.0	11.8	(1)
(3)	Morocco	430,072	10.2	10.5	(2)
(4)	China	187,816	4.4	15.5	(4)
(5)	Ukraine	173,827	4.1	69.0	(27)
(6)	Philippines	123,554	2.9	9.7	(5)
(7)	India	105,829	2.5	17.0	(8)
(8)	Moldova	105,546	2.5	60.2	(39)
(9)	Polonia	105,039	2.5	20.0	(14)
(10)	Tunisia	103,534	2.5	8.3	(6)
(11)	Macedonia	92,769	2.2	16.2	(11)
(12)	Peru	87,702	2.1	14.6	(9)
(13)	Ecuador	85,876	2.0	32.7	(24)
(14)	Egypt	82,031	1.9	13.8	(12)
(15)	Sri Lanka	75,335	1.8	12.0	(10)
(16)	Bangladesh	73,934	1.8	20.3	(19)
(17)	Senegal	72,118	1.7	10.1	(7)
(18)	Pakistan	64,616	1.5	16.7	(17)
(19)	Nigeria	48,625	1.2	13.0	(18)
(20)	Bulgaria	45,977	1.1	31.6	(37)
	Top 20 countries	3,414,028	80.8	22.1	
	TOTAL	4,223,154	100	15.5	

Source: ISTAT

Figure 3: Ranking of immigrants by country of origin



centrated in Northern Italy, the number of provinces with zero immigrants from a particular country of origin is rather small. Table 2 reports the mean number of nationalities registered in each province at the beginning and at the end of the period we are studying. Looking at the summary statistics, the mean value of nationalities found in a province is around 51 in year 2002, and about 53 in 2009, with the few provinces with not all nationalities represented, concentrated, as we may expect looking at Figure 4, in Southern provinces.

Focusing the attention on the data, we have to note that a significant portion of the variation comes from the cross-country dimension of the dataset. For instance, the regression of trade flows on country-specific dummies returns an R^2 of 40% for exports, 47% for imports and 42% for immigration. As we will explain later, we deal with this cross-country variation using a full set of country fixed-effects. We also include province dummies to control for the common observable or unobservable determinants of trade and immigration inside Italy. Table 3 depicts the within-country, within-province, and within-time correlations between (ln)exports, (ln)imports, (ln)distance and

Figure 4: Percentage of foreign-born population across Italian provinces. Year 2002 (panel a) and year 2009 (panel b)

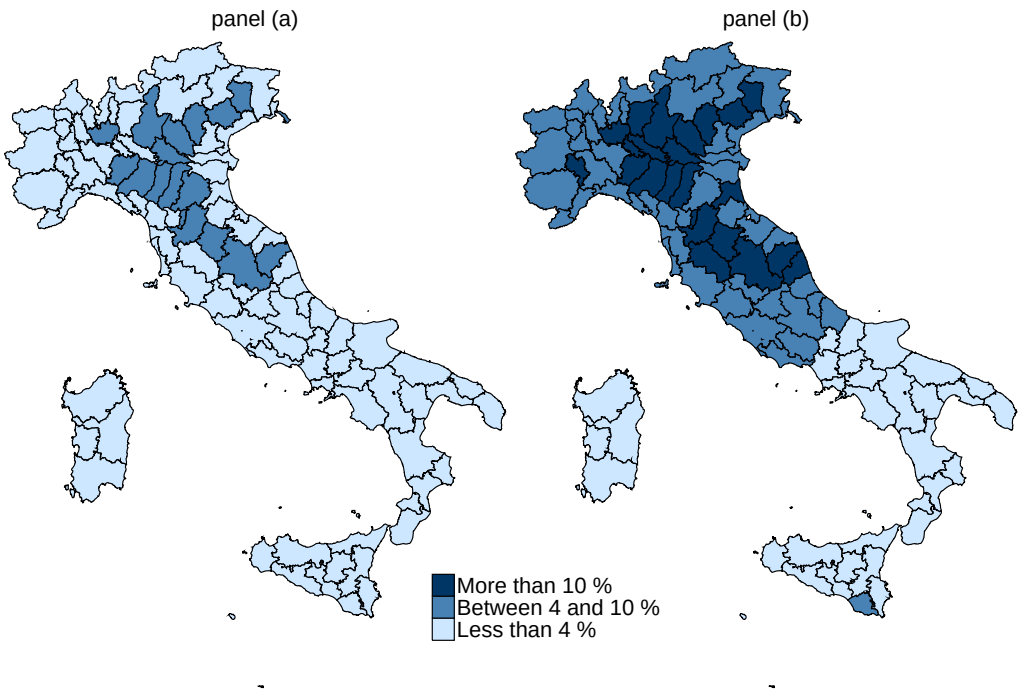


Table 2: Migrants' location by province and country of origin

	Mean	Std. Dev	Min	P25	Median	P75	Max
Year 2002							
Nationalities per province	51.3	3.91	37	50	53	54	54
Provinces per country	97.99	7.96	60	97	102	103	103
Year 2009							
Nationalities per province	53.05	2.03	42	53	54	54	54
Provinces per country	101.18	3.82	82	101	103	103	103

Note: The total number of Italian provinces is 103, while the total number of foreign nationalities is 54.

immigration. Formally, this is the correlation between the residuals of the regression of each dependent variable on country-specific, province-specific and year-specific dummies. As expected, distance is negatively correlated with exports and imports, the correlation being stronger for imports. By way of contrast, immigration is significantly and positively correlated with both exports and imports. Distance and immigration are also negatively correlated, as it is well known that immigration flows also share a gravity pattern.

Table 4 reports the summary statistics for trade flows, as well as the average immigrant stock and distance of import and export flows by province. The average distance of trade flows is quite high, over 4,000 km, which is in part due to the selection of the first 54 countries of origin of immigrants, in terms of share of foreign-born residents. Interestingly enough, the average number of foreign-born residents is around 500, but with a significant variation across provinces and nationalities. The most widely represented country of origin (Romania), in facts, records over 139,000 residents just in the Rome province.

As a preliminary check on the correlation between trade and migration flows, we report in Figure 5 the kernel density of the log value of imports and exports for the provinces with a positive value of migrants against those without foreign-born population from a particular country.[5]) As we can see, the two distributions are quite different: provinces tend to trade more with the countries of origin of their immigrants.

Table 3: Within-country, within-year correlations

	Exports	Imports	Distance	Immigrants
Exports	1.0000			
Imports	0.1822	1.0000		
Distance	-0.0822	-0.1394	1.0000	
Immigrants	0.1062	0.0782	-0.0164	1.0000

Note: correlations are significant at 1% level

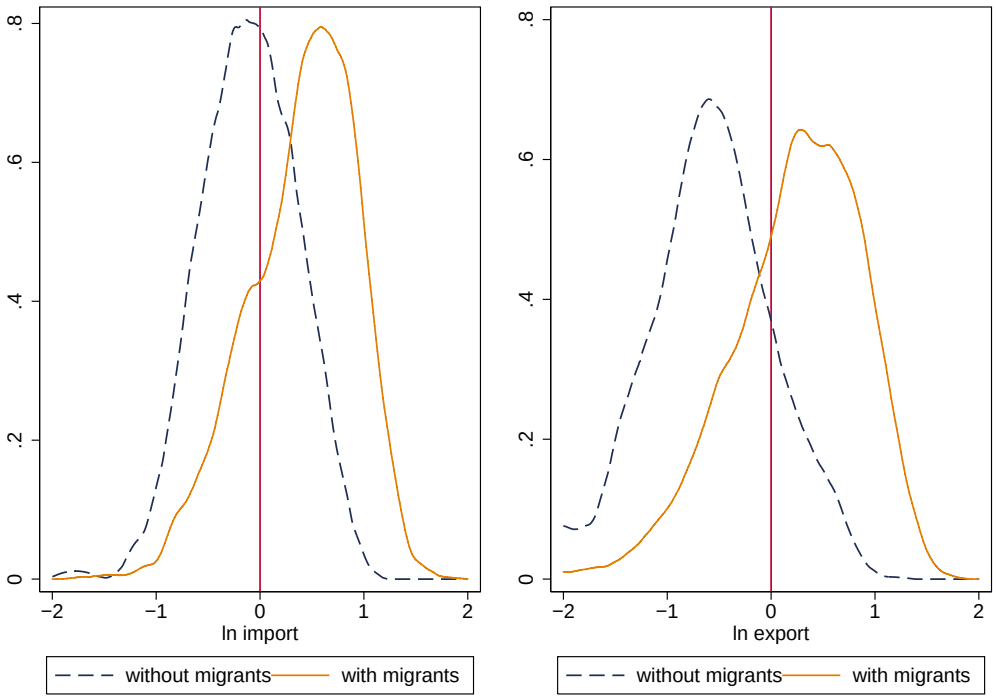
[5]The figure reports the standardized values of both imports and exports.

Table 4: Summary Statistics (2002-2009)

	Mean	Std. Dev	Min	P25	Median	P75	Max
Strictly positive exports 41215 / 44496							
Exports	47197.98	177309.6	.001	313.919	3224.552	24053.51	4968820
Distance	4193.214	3519.037	168.9458	1119.763	2482.888	7811.996	11483.53
Immigrants	521.8925	2177.238	0	21	72	272	139821
All exports 44496							
Exports	43717.74	171092.4	0	141.106	2385.934	20426.6	4968820
Distance	4335.829	3539.966	168.9458	1161.07	3487.209	7918.081	11483.53
Immigrants	485.6268	2099.733	0	16	62	241	139821
Strictly positive imports 36953/ 44496							
Imports	52034.46	354118.5	.001	221.243	2836.794	20596.28	19228701
Distance	4064.493	3533.017	168.9458	1076.475	2111.576	7594.279	11483.53
Immigrants	570.2864	2292.185	0	25	83	311	139821
All imports 44496							
Imports	43213.53	323299.7	0	20.012	1217.287	13711.16	19228701
Distance	4335.829	3539.966	168.9458	1161.07	3487.209	7918.081	11483.53
Immigrants	485.6268	2099.733	0	16	62	241	139821

Note: Exports and imports are in thousands of euros, immigrants in number of foreign-born Italian residents. Distance is the average number of kilometers between provinces' centroids and foreign capital cities.

Figure 5: Kernel distribution of trade flows for provinces with and without immigrants



4 Empirical results

4.1 Empirical specification and OLS results

Chaney (2008) gives in a setting of international trade with heterogenous firms a sound theoretical foundation to the well known gravity equation. In particular, he obtains the following equation describing the determinants of exports X_{ijt}

$$ln(X_{ijt}) = const + ln(w_{it}^{-\gamma} Y_{it}) + ln(Y_{jt}\theta_{jt}^{\gamma}) - \gamma\, ln(\tau_{ijt}) - (\frac{\gamma}{\sigma - 1} - 1)\, ln(f_{ijt}) \quad (1)$$

where i, j and t are province (in our setting), country and time subscripts, respectively. The term $ln(w_{it}^{-\gamma} Y_{it})$ includes the effect of the exporting country wages (w_{it}) and nominal income (Y_{it}); $ln(Y_{jt}\theta_{jt}^{\gamma})$ captures the effect of the importing country nominal income (Y_{jt}) and its remotness from the rest of the world (θ_{jt}); τ_{ijt} captures iceberg transport costs per unit of export and f_{ijt} the fixed costs for firms in province i to export in country j. σ and γ are the elasticity of substitution of traded goods and the shape parameter of the Pareto distribution of firm productivity, respectively.

As described in Peri and Requena-Silvente (2010), equation (1) can be made operational in studies of the effect of immigration on trade by simply imposing some structure on the fixed costs term $ln(f_{ijt})$. In particular, they assume that $ln(f_{ijt}) = ln\ f(ln(IMM_{ijt}))$. The estimable equation then becomes

$$ln(X_{ijt}) = \boldsymbol{\delta}_{ij} + \boldsymbol{\theta}_{jt} + \boldsymbol{\phi}_t + \ln(Y_{it}\, Y_{jt}) + \alpha\, ln(IMM_{ijt}) + \beta ln(DIST_{ij}) + \epsilon_{ijt} \quad (2)$$

where, as in Peri and Requena-Silvente (2010), assuming that bilateral variable costs, τ_{ijt} are relatively constant over time (namely in the short time period we consider), we can absorb the term $\gamma ln(\tau_{ijt})$ into a set of *region*-country dummies $\boldsymbol{\delta}_{ij}$ and the effect of geodesic distance ($DIST_{ij}$).[6] We can also absorb the effect of remoteness $\gamma ln(\theta_{jt})$ into the country by time effects $\boldsymbol{\theta}_{jt}$, and the term $-\gamma ln(w_{it})$, assumed common to all provinces, is captured by the time effect $\boldsymbol{\phi}_t$.[7] ϵ_{ijt} is a stochastic error term capturing the determinants of trade omitted from the model. Gross regional output and GDP are

[6] Due to the high number of provinces and countries considered we could not include province-country fixed effects, which would have produced around 20,000 variables, and include instead region-country fixed effects. In Italy there are 20 regions (NUTS2).

[7] In reality, after including country by time fixed effects, the time dummies drop from the model due to multicollinearity.

used to measure the variables Y_{it} and Y_{jt}, respectively. GDP is obtained from WDI and gross province output is reported in Province Accounts (ISTAT). Provinces' values have been scaled to match Italian GDP in WDI. Peri and Requena-Silvente (2010) assume that $\partial lnf/\partial ln(IMM) < 0$, i.e. immigration reduces fixed costs of exporting, which gives in equation (2) a positive coefficient on $ln(IMM)$ ($\alpha \equiv -(\frac{\gamma}{\sigma-1} - 1)\frac{\partial lnf}{\partial ln(IMM)} > 0$).[8]

Table 5 shows the OLS results. We report various specifications, including different fixed effects. Columns (1) and (2) report the estimates of the immigration elasticities of exports and imports, respectively, when including separate fixed effects for time, countries and provinces. The estimated elasticities are 0.25 for exports and 0.48 for imports, respectively, in line with those obtained by Dunlevy (2006) and Rauch and Trinidate (2002), which do not include trading-pair fixed effects. Columns (3) and (4) include trading pair and province-year fixed effects. The estimated elasticities fall to 0.11 for exports and 0.34 for imports, respectively. Columns (5) and (6) report estimates from the same specifications used in Peri and Requena-Silvente (2010) including trading-pair and country-year fixed effects (the *benchmark specification*, hereafter), and are very close (and sometimes equal) to those in the previous two columns. Table 5 shows the importance of including trading-pair fixed effects to account for potential unobserved time-invariant factors affecting both immigration and trade flows between trading partners, while the choice between country-year fixed effects and province-year fixed effects appears of relatively less importance. When trading-pair dummies are not included, we obtain larger elasticities.

4.2 Endogeneity and two-stages least squares (2SLS)

This first set of results confirms the evidence in the raw data and suggests that immigrants *may* have an effect on imports and exports. However, a potential pitfall with our OLS estimates is that, even after controlling for province-year fixed effects, immigrant inflows may be endogenous with respect to export or import flows. The endogeneity problem may be determined by trading-pair *time-variant* unobservables which simulatenously affect immigrant's flows and trade. We seek to address this issue with an IV (2SLS) strategy using an instrument based on supply-push factors, in line

[8] We omit from the IMM variable the subscripts to simplify the notation, although the variable varies by province, time and country.

with Peri and Requena-Silvente (2010) and motivated by the presence of historical immigrant enclaves (Card, 2001). The presence of a community of immigrants from a given country in a certain province is likely to decrease immigration costs and increase returns to migration for new immigrants of the same nationality that settle in the same province. Indeed, co-nationals already present in a province may offer hospitaly, financial support or help new migrants to find a job locally. For these reasons, we expect the stock of immigrants to be highly correlated with the inflow of new immigrants. Accordingly, we adopt the following procedure to build an instrumental variable. We compute the total number of immigrants by country for Italy as a whole in each year, and we allocate them to each province according to the distribution of immigrants by nationality across provinces in 2002, restricting the analysis to the period 2004-2009.[9] In this way, we compute an *imputed stock of immigrants*, which is used as an instrument for the observed stock.

The main threat to identification comes from time-varying trading-pair unobserved factors *during the period observed* which simultaneously affect provinces' trade with a given country and the stock of immigrants from that country. In this respect, the main determinants of the imputed stock of immigrants described above should be exogenous, i.e. uncorrelated with such unobservables. The net immigration flows by country to overall Italy in each year, referring to the entire country, should not be affected by trading-pair *shocks*, especially when shocks are related to very small geographical units, such as Italian provinces. As for the remaining two components, the distribution of immigrants by nationality across provinces and the stock of immigrants by nationality in each province, being both measured in 2002 and conditional on trading-pair fixed effects, they should not be theoretically correlated with any trading-pair shock taking place during the estimation period. It is worth noting that conditional on the trading-pair fixed effects, identification mostly comes from within-countries differences in the annual net inflows of immigrants in Italy as a whole, and that factors operating at the origin country level on all potential immigrant destinations, such as the effect of macro-economic or political crisis, are purged out using country-year dummies.

We report in Table 6 the results of 2SLS. The first column shows that the instrument turns out to be very strong. Also the partial R^2 is very

[9] As all controls enter with a one-year lag, trade in 2004 is regressed on the stock of immigrants in 2003.

high, 60 percent. The trade elasticities in columns (3) and (4) are very precisely estimated and turn out to be 0.20 for exports and 0.51 for imports, a bit larger than those obtained with OLS on the same sample, which are reported in the first two columns. Differences between OLS and 2SLS may also stem from the fact that with OLS we are also using varitions in the stock of immigrants by province caused by inter-province migrations of foreign immigrants. It is difficult to say in advance the direction of the OLS bias that these geographical movements may cause. For instance, it may happen that where immigrant communities are large and flows of trade with the origin countries already well established, some immigrants tend to move to neighbouring provinces where their nationality is less represented and where there is less competition between immigrants for finding a job or starting a business, causing a negative bias to OLS.

5 Explaining the effect and investigating heterogeneity

In the previous sections, we have shown that the positive association between trade and immigrants can be qualified as causal, and that the Chaney's model of trade offers a way of interpreting this effect as immigrants lowering the fixed costs of exporting (and importing). This is not the only possible explanation of course, and it could be important to provide in this section other pieces of evidence that are consistent with this interpretation.

For this reason, we try to enrich the specification in equation (2) with some interaction terms whose inclusion is theoretically grounded. Peri and Requena-Silvente (2010) exploits a nice feature of Chaney's model which predicts different impacts of fixed costs on differentiated and homogeneous goods. We exploit here a different — but equally interesting — prediction of that model. Indeed, Chaney (2008) predicts that the impact of fixed costs on export increases with the shape parameter of the Pareto distribution (γ), according to which firm heterogeneous productivity is distributed. To put it in other words, as firm productivity is likely to map into firm size, the larger is the shape parameter, the lower is average firm size, and the larger is the expected effect of the stock of immigrants on exports. The intuition is straightforward: larger firms are likely to export irrespective of the presence in the province of immigrants, and given that a reduction of

fixed costs has an effect on the extensive margin only, an increase in the province stock of migrants is likely to have a positive effect especially on smaller firms which, thanks to the reduction of fixed costs, are allowed to enter foreign markets. Hence, starting from this theoretical prediction, we assume that the distribution of productivity is province-specific (γ_i), and we include in the estimating equation (2) an interaction term between the stock of immigrants and the average size of Manufacturing firms in the province, on which we expect a negative sign. The estimates are included in column (1)-(2) of Table 7. The interaction term is indeed negative, and significant in both the export and the import equations, as predicted by Chaney's model. A one standard deviation (0.48 in the dataset) increase in the average firm size (measured in ln) reduces the elasticity of exports by -0.11 and the one of imports by -0.03.[10] This evidence is consistent with the idea that immigrants reduce the fixed costs of exporting, and that this effect is more relevant for smaller firms.

Consistent with the interpretation of immigrants reducing fixed costs is also the idea that their role should be more important for countries in which these fixed costs are relatively higher due to less complete markets and weaker contracting and enforcement mechanisms. According to this argument, we may expect the effect to be higher in less developed countries. In columns (3) and (4) of table 7, we include in the regressions the (nominal) countries' percapita GDP in U.S. dollars (in logs), and its interaction with the stock of immigrants. The interactions turn out to be statistically significant and negative for both imports and exports, confirming that immigrants may be important for spurring Italian trade especially with low-income countries. The same finding is obtained for instance by **?** on his analysis on U.S. trade. A one standard deviation increase in log percapita GDP (1.64) reduces the immigrant elasticity of exports by 0.23 and of imports by 0.08. In columns (5) and (6) we interact the stock of immigrants with (log) average percapita GDP of provinces. The trade-creating effect of immigrants appear to be significantly lower in richer provinces, but only for exports.

The same hypothesis is assessed in table 8, in which following Briant *et al.* (2009) we include in the bechmark specification some proxies of the quality of institutions for foreign countries and their interaction with the stock of immigrants. In the period studied, our provinces appear to trade

[10]In specifications with interaction terms, the interacted variables are always centered (zero mean).

especially with countries characterized by weaker institutions (see the Appendix for a detailed description of the different indicator). The interaction term between institutions and immigrants is negative, as expected, that is immigrants reduce the fixed cost of exporting (importing) especially with countries characterized by poor institutions as they may substitute the market in matching demand and supply, or provide contract enforcement through sanctions and exclusions. The only exception to this general pattern is the indicator of political stability, which acts to increase trade and the elasticity of trade to immigrants. These results are in line with Dunlevy (2006) and Briant *et al.* (2009). Just to have a rough idea of the effect of institutions, *reducing* by one standard deviation the rule of law (e.g., the average difference in the period between France and Buthan), which is one unit, raises the elasticity of exports to immigrants by 0.19 and of imports by 0.17.[11]

In table 9, we investigate a further explanation for the pro-trade effect of immigrants. Until now, we have considered immigrants as individual and unorganized units. However, it may be the case that are especially firms set up by immigrants which promote trade with their home country. As a proxy of the stock of immigrant firms (or immigrant entrepreneurs) we include the number of limited companies (*societa' di capitali*, as this is the only data available to us. This is likely to be an underestimate of the stock of immigrant enrepreneurs. We estimate specifications replacing the stock of immigrants with the stock of immigrants firms (columns (1) and (2)), and including both variables (columns (3) and (4)). Immigrant firms are stastistically *negatively* associated with exports only when they are joinly included with the stock of immigrants, while they are always statistically positively associated with imports. Different interpretations could be given to the negative correlation between the stock of immigrant firms and exports. A possible explanation is that immigrant firms act as sub-constractors for domestic firms, reducing the latter's needs of sending abroad raw materials or intermediate goods for transformation and subsequent reimportation. The asymmetry in the effect of immigrant firms is surely interesting, and would deserve further attention.

An empirical regularity, in most regressions we estimated until now, is that the elasticity of imports to immigrants is much higher than the one of

[11]Briant *et al.* (2009) observe that the quality of institutions may be endogenous with respect to trade. For istance, trade openess may contribute to improving institutions. However, they claim that considering one single country, Italy in our case, is likely to make this problem less severe. In this respect, we have an advantage with respect to their study as Italy's colonial experience was very limited, both geographically and temporally.

exports. As highlighted by Rauch (2001), the difference may be accounted for by the effect of differences in preferences and tastes between immigrants and natives, which are likely to affect imports but not exports. In one word, the gap between the two elasticities may be due to the *transplanted home-bias*. This bias may be justified both by culture, tradition, habit formation, or by the lower prices of the goods typically consumed by low-income immigrants in their home countries. Another interpretation is that elasticites are good-specific (Briant *et al.*, 2009, Peri and Requena-Silvente, 2010), and as a result the different elasticies may reflect the different good-mix typically exported and imported by Italian provinces. To test this hypothesis, we estimated the benchmark specification only on the food sector. The results are reported in table 10. When focusing on a single sector, the import and the export elasticites appear to be very close (columns (1) and (2)). Incidentally, the elasticities for imports is also very close to the one measured on the imports for all sectors, suggesting that immigrants may increase especially food imports. In columns (3) and (4), following the observation that immigrant entrepreneurs are especially active in the provision of ethnic goods, among which ethnic food has certainly a key importance, we include the stock of immigrant firms. The estimates show that although immigrant firms increase both import and export of foods, they may explain a great deal of the positive association between the presence of immigrants in Italian provinces and food imports from their homeland.

6 Concluding remarks

This paper uses the large increase of immigrants from several countries into Italian provinces that took place in the years between 2002 and 2009, to estimate the causal effect of immigrants on import and export flows. Using a panel of bilateral trade flows for 103 Italian provinces and 54 countries and corresponding data for immigrant stocks in Italian Provinces and country of origin, we find a large and robust elasticity of import and export flows to migrants. Our coefficient estimates indicate that a 10 percent increase in immigrant stocks leads to a 3 per cent increase in both export and import flows. Instrumenting observed immigration flows with theoretical flows based on immigrant enclaves constructed using the distribution of immigrants in 2001, we also find a very significant elasticity, closer to 0.3 for exports and 0.36 for exports, using two-stage least squares. These findings are consistent

with the hypothesis that immigrants' knowledge and connections to the home country lower the transaction costs associated with international trade. The result that immigrants increase imports more than exports suggests that preferences for home country goods may also play a significant role.

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Table 5: OLS estimates

	Export (1)	Import (2)	Export (3)	Import (4)	Export (5)	Import (6)
ln(Y_i Y_j)	0.639***	0.072	0.757***	0.116	2.102***	2.097***
	(0.070)	(0.085)	(0.068)	(0.084)	(0.038)	(0.047)
ln IMM	0.251***	0.482***	0.112***	0.344***	0.107***	0.344***
	(0.024)	(0.029)	(0.022)	(0.031)	(0.024)	(0.031)
ln distance	-0.346	-1.600***	-2.042***	-2.680***	-1.939***	-2.932***
	(0.229)	(0.185)	(0.427)	(0.641)	(0.414)	(0.648)
contiguity	1.837***	5.101***				
	(0.468)	(0.567)				
EU, EFTA	-0.235***	-0.256**				
	(0.063)	(0.106)				
country, province, year FE	yes	yes				
trading-pair, province-year FE			yes	yes		
trading-pair, country-year FE					yes	yes
N. observations	133,698	133,698	133,698	133,698	133,698	133,698
R squared	0.77	0.73	0.81	0.77	0.80	0.77

*, **, *** statistically significant at the 10, 5 and 1 percent level, respectively.

$^{(a)}$ In regressions with interaction terms, the interacted variables are centered to have zero mean.

Note. The dependent variables are ln(1 + exports) and ln(1 + imports), in the the export and import equations, respectively. Standard errors are clustered by trading-pair and robust to heteroskedasticity.

Table 6: Two-stage least squares estimates

	OLS		2SLS			
	Export	Import	Export		Import	
			1st stage	2nd stage	1st stage	2nd stage
	(1)	(2)	(3)	(4)	(5)	(6)
Imputed ln IMM			0.713***		0.713***	
			(0.008)		(0.008)	
Partial R2			0.60		0.60	
ln IMM	0.117***	0.353***		0.190***		0.507***
	(0.025)	(0.033)		(0.036)		(0.045)
N. obs.	114,849	114,849	114,849	114,849	114,849	114,849

*, **, *** statistically significant at the 10, 5 and 1 percent level, respectively.
Note. All estimates include ln(Y_i Y_j), ln distance, and trading-pair and country-year FE. Standard errors are clustered by trading-pair and robust to heteroskedasticity.

Table 7: Heterogeneity: firm size and percapita GDP (GDP/P)

	Firm size		Country GDP/P		Province GDP/P	
	Export	Import	Export	Import	Export	Import
	(1)	(2)	(3)	(4)	(5)	(6)
ln(Y_i Y_j)	2.070***	2.051***	2.138***	2.112***	2.118***	2.016***
	(0.038)	(0.048)	(0.037)	(0.047)	(0.043)	(0.052)
ln IMM (c)	0.089***	0.317***	0.053**	0.323***	0.135***	0.331***
	(0.024)	(0.032)	(0.024)	(0.031)	(0.024)	(0.032)
ln distance	-1.635***	-2.866***	-2.040***	-2.971***	-1.747***	-2.872***
	(0.413)	(0.625)	(0.411)	(0.647)	(0.419)	(0.642)
ln average firm size (c)	0.376***	0.463***				
	(0.051)	(0.068)				
ln IMM * ln average firm size (c)	-0.239***	-0.071***				
	(0.019)	(0.025)				
ln country GDP/P (c)			-2.314***	-2.954***		
			(0.294)	(0.228)		
ln province GPD/P (c)					0.252	1.078***
					(0.199)	(0.240)
ln country GDP/P × ln IMM (c)			-0.142***	-0.054***		
			(0.012)	(0.015)		
ln province GDP/P × ln IMM (c)					-0.510***	-0.047
					(0.037)	(0.046)
N. observations	130,810	130,810	133,595	133,595	132,966	132,966
R squared	0.80	0.77	0.80	0.77	0.80	0.77

*, **, *** statistically significant at the 10, 5 and 1 percent level, respectively.
Note. All estimates include trading-pair and country-year FE. Standard errors are clustered by trading-pair and robust to heteroskedasticity. In all specifications with interaction terms variables are mean centered (zero mean) before computing the interactions.

Table 8: Heterogeneity: quality of institutions

	Rule of law		Regulatory quality		Gov. efficiency		Political stability		Control of corruption	
	Export	Import	Export	Import	Export	Import	Export	Import	Export	Import
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
ln(Y_i Y_j)	2.125***	2.118***	2.144***	2.132***	2.144***	2.135***	2.127***	2.125***	2.138***	2.133***
	(0.037)	(0.047)	(0.037)	(0.047)	(0.037)	(0.047)	(0.037)	(0.047)	(0.037)	(0.047)
ln IMM (c)	0.072***	0.313***	0.074***	0.318***	0.073***	0.315***	0.063**	0.297***	0.073***	0.310***
	(0.025)	(0.031)	(0.024)	(0.031)	(0.024)	(0.031)	(0.025)	(0.032)	(0.024)	(0.031)
Quality of institutions (c)	-2.932***	-4.706***	-0.473*	-0.640***	-0.452**	-0.628***	1.139***	0.933***	-0.417	-0.702***
	(0.521)	(0.628)	(0.253)	(0.099)	(0.230)	(0.090)	(0.315)	(0.333)	(0.283)	(0.108)
Quality of institutions × ln IMM (c)	-0.192***	-0.172***	-0.222***	-0.166***	-0.216***	-0.180***	-0.114***	-0.120***	-0.178***	-0.175***
	(0.020)	(0.023)	(0.021)	(0.026)	(0.020)	(0.023)	(0.019)	(0.023)	(0.019)	(0.023)
ln distance	-2.013***	-2.999***	-2.018***	-2.994***	-2.042***	-3.020***	-1.995***	-2.994***	-2.023***	-3.016***
	(0.412)	(0.643)	(0.412)	(0.642)	(0.410)	(0.644)	(0.411)	(0.646)	(0.411)	(0.644)
N. observations	133,595	133,595	133,068	133,068	133,068	133,068	133,080	133,080	133,068	133,068
R squared	0.80	0.77	0.80	0.77	0.80	0.77	0.80	0.77	0.80	0.77

*, **, *** statistically significant at the 10, 5 and 1 percent level, respectively.

Note. All estimates include trading-pair and country-year FE. Standard errors are clustered by trading-pair and robust to heteroskedasticity. In all specifications with interaction terms variables are mean centered (zero mean) before computing the interactions.

Table 9: Immigrant firms

	Export (1)	Import (2)	Export (3)	Import (4)
ln(Y_i Y_j)	2.208***	2.165***	2.136***	2.050***
	(0.037)	(0.046)	(0.039)	(0.048)
ln IMM firms	-0.045	0.358***	-0.146***	0.196***
	(0.034)	(0.038)	(0.037)	(0.041)
ln IMM			0.165***	0.264***
			(0.026)	(0.034)
ln distance	-2.048***	-2.945***	-1.994***	-2.859***
	(0.413)	(0.650)	(0.414)	(0.650)
N. observations	133,698	133,698	133,698	133,698
R squared	0.80	0.77	0.80	0.77

*, **, *** statistically significant at the 10, 5 and 1 percent level, respectively.
Note. All estimates include trading-pair and country-year FE. Standard errors are clustered by trading-pair and robust to heteroskedasticity.

Table 10: Food sector

	Export (1)	Import (2)	Export (3)	Import (4)
ln(Y_i Y_j)	1.703***	1.111***	1.606***	0.957***
	(0.048)	(0.045)	(0.050)	(0.044)
ln IMM	0.384***	0.374***	0.220***	0.113***
	(0.031)	(0.032)	(0.034)	(0.031)
ln IMM firms			0.406***	0.648***
			(0.046)	(0.047)
ln distance	-0.585	0.119	-0.432	0.362
	(0.970)	(0.989)	(0.966)	(0.996)
N. observations	133,698	133,698	133,698	133,698
R squared	0.67	0.65	0.67	0.65

*, **, *** statistically significant at the 10, 5 and 1 percent level, respectively.
Note. All estimates include trading-pair and country-year FE and refer to the food sector only. Standard errors are clustered by trading-pair and robust to heteroskedasticity.