Noname manuscript No.
(will be inserted by the editor)

Do High-Skill Immigrants trigger High Quality Trade?

Giorgia Giovannetti · **Mauro Lanati**

August 2014

Abstract This paper investigates the links between product quality and the pro-trade effect of ethnic networks using a large panel on bilateral stocks of immigrants with information for 19 OECD destination countries and 177 origin countries. In line with the approach of Rauch and Trindade (2002) we classify traded goods according to their quality level and separately estimate pro-trade elasticity of ethnic networks for each subgroup. We allow for heterogeneity of immigrants according to both the level of per capita income of their country of origin and their education level. The pro-trade effect of immigrants increases with the quality of traded goods. We show that this trend does not depend on the relatively high concentration of differentiated products in top quality subgroups. By comparing the trend of elasticities across samples, it emerges that immigrants from highly industrialized economies are relatively more likely to be part of networks which create more business opportunities for top-quality products. In addition, given their lower liquidity constraints and advantages in human capital, we find a greater impact in absolute value of high-skilled migrants consistent across all quality levels. Finally, regardless the quality of traded goods as we enlarge the sample by adding immigrants from low and middle income economies we find lower pro-trade elasticities.

Keywords migration · product quality · gravity model
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JEL Classification:F10, F11, F14, F22.

G. Giovannetti: Professor of Economics, Department of Economics and Management, University of Firenze and European University Institute, Robert Schuman Centre. E-mail: giorgia.giovannetti@unifi.it
M. Lanati: Phd Candidate, Department of Economics and Management, University of Pisa. E-mail: mauro.lanati@for.unipi.it
We thank participants of the 2014 ITSG Workshop (Cagliari, Italy). We are especially grateful to Ramon Marimon (EUI), Luca De Benedictis (University of Macerata) and Giuseppe De Arcangelis (University of Rome - La Sapienza) for helpful comments and suggestions.

1 Introduction

In the last decades the world economy witnessed an increase of international integration. Exports rose from 18 per cent of world GDP in 1995 to 28 per cent in 2010 (World Bank), foreign direct investment (inward-stock) from 9.7 per cent to 34,3 per cent between 1995 and 2013 (Unctad, WIR, 2014). Over the same period, also international migrants increased substantially: the total number of migrants rose by 38 per cent between 1990 and 2010 (World Bank) and nowadays around 180 million people (three percent of the world's population) are living in countries other than their countries of birth. This growth of international migration has been often related to trade flows and capital movements and some stylized facts can be put forward. Recent statistics indicate that migrants are (a) concentraded in a few OECD receiving countries, (b) born mostly in emerging economies and (c) predominatly well educated.[1]

The trade-migration link has been the object of many recent studies. Trade and migration are likely to be substitutes in a perfectly competitive world, and complement in a highly imperfect setting. Empirically the possible bi-univocal relationship triggered contrasting results and a lack of consensus on the direction of causation; however, there seems to be some agreemement on the strong and significant correlation of the stock of immigrants in the receiving country and the amount of trade with their country of origin, particularly evident for high-skilled migrants (see for instance Herander and Saavedra (2005), Felbermayr and Toubal (2012) and Felbermayr and Jung (2009)). More specifically, international migrants could enhance bilateral trade by lowering information costs and increasing demand for goods from their source countries. The existing literature assumes that both imports and exports are symmetrically affected by improved information while only imports from source country depend on migrants' preferences. Against this background, high skilled migrants tend to impact more on trade because of lower liquidity constraints and advantages in their human capital that imply lower costs.

Building on this literature, in this paper we test whether, and to what extent, the relationship between ethnic networks and trade varies with product quality. More precisely, we investigate how the pro-trade effect of immigrants varies with the quality of traded products over the period 1995-2000. To our knowledge the link between product quality and the pro-trade elasticity of ethnic networks has not yet been explored in the literature. Existing studies mainly focus on the variation of the pro-trade effect of ethnic networks due to different levels of goods' heterogeneity, following the methodology adopted by Rauch and Trindade (2002). We extend their work by classifying traded goods according to their quality level and we separately estimate pro-trade elasticity of ethnic networks for each subgroup.

The relationship between product quality and pro-trade elasticity of ethnic networks is subject to two contrasting effects and largely depends on the composition of the stock of immigrants by skill level. On the one hand, given their lower liquidity constraints and advantages in human capital, the pro-trade effect of high skilled migrants is likely to affect relatively more high quality goods. On the other hand, if the Alchian Allen Effect dominates, the opposite outcome may prevail. According to the Alchian Allen's conjecture a per unit transactions cost - such as a transportation cost or a lump-sum tax - lowers the relative price of, and raises the relative demand for, high-quality goods.[2] Therefore, being the stock of migrants an inverse proxy for transaction costs, an higher stock of bilateral migrants raises relative demand for relatively cheap low quality products. We aim at testing the resultant of these two forces.

To this aim, we follow the trade-migration literature by incorporating the stock of immigrants (whole stock and high skill) into an augmented gravity model. We include our proxy for ethnic networks in a general gravity expression derived from a supply side Ricardian model of trade à la Eaton and Kortum (2002). As in Gould (1994) we distinguish between imports and exports and we separately analyze the effect on differentiated products. In order to exploit differences between countries at different income level, we consider three samples: the first is the total number of countries for which we have data (177), the second includes the OECD countries (high income) and the third is confined to emerging and developing countries (middle and low income). Finally, similarly to Bratti et al. (2014), our specification allows for inter-ethnic spillovers based on language proximity.

Trade data are from BACI database, which provides a very large dataset with bilateral values and quantities of exports at the HS 6-digit product disaggregation since 1995. The extensive country coverage of our dataset attenuates the sample selection bias due to the specific choice of the countries entering the analysis. By following Van Biesebroeck (2011) we use export unit values as a proxy for product quality: as in Hallak

[1] Our elaboration of Brucker et al. (2013) database show that skilled migrants born in emerging economies and resident in a subset of 19 OECD countries more than doubled between 1990 and 2005 (Table 1 and 2).

[2] The Alchian Allen Effect is supposed to decrease with the level of products' heterogeneity

(2006) we assume that all cross-country variation in export unit values can be attributed to differences in quality.
Five main (innovative) results stand out: (a) in contrast with the recent findings of Ehrhart et al. (2014) and Bratti et al. (2014), as the sample expands to include emerging economies, the pro trade effect of immigrants decrease significantly; (b) for all levels of income and for any level of quality the high-skilled ethnic networks have a stronger impact on trade in absolute value; (c) the pro-export effects are always larger: this suggests that the information channel of migration is likely to dominate the preference channel; (d) the pro-trade effect of immigrants increases with the quality of traded products; (e) the stronger effect of ethnic networks on high quality products seems to not depend on the relatively high concentration of differentiated products in top quality subgroups.

2 Literature Review

Since the seminal contribution of Gould (1994), several papers using different samples, time coverage and econometric techniques have found a strong and significant empirical correlation between the stock of immigrants in the destination country and the volume of trade with their country of origin. The underlying idea is that migrants have a comparative advantage in conveying reliable information on markets which are very different from the host country. These could be the origin countries but also countries which are similar to the origin in terms of religion, culture, structure of the society. The majority of the contributions study the pro-trade effect of immigrants into a single country, while relatively few papers focus on a multi-country analysis. With the availability of more and better data on migrant stocks, more recent studies also exploit the regional distribution of immigrants and look at the bilateral trade relationship between regions (or provinces) and foreign countries.[3]
Three main stylized facts emerge from the literature: (a) the trade-migration link appears stronger for differentiated goods than for homogeneous commodities (b) the effect of immigrants on imports is typically estimated to be larger than the one on exports and (c) there's ample evidence of a stronger pro-trade effect for high skilled migrants.
The first stylized fact implies greater importance of ethnic networks in reducing information costs for more differentiated goods. In the literature this rather intuitive statement has been tested empirically mostly by dividing the spectrum of traded goods into three broad subclasses that differ with respect to the degree of differentiation according to the classification proposed by Rauch (1999).[4] By running a gravity model separately for each aggregated group, Rauch and Trindade (2002) estimate separate elasticities of trade with respect to immigrant stocks for differentiated goods, goods traded on organized exchanges, and goods that display some reference price. The same classification and the same methodology have been used by Felbermayr and Toubal (2012), Ehrhart et al. (2014) and many others.
As for the second stylized fact, the explanation of the gap between the immigrants elasticity of imports and exports is assumed to be the preference channel of migration. Despite the lack of theoretical models which enable to separately identify the two channels, Bratti et al. (2014) summarize the results of a sample of relevant contributions to the literature and find a significant difference in magnitude: as Bratti et al. (2014) argue, this gap is commonly attributed to a persistent difference in tastes between immigrants and natives.[5]
Lastly, the third stylized fact indicates that the better the ability of the ethnic networks to receive and process information on trading opportunities, the higher the pro-trade effect. By focusing on a balanced panel

[3] Genc et al. (2012) analyze the distribution of immigration elasticities of imports and exports across 48 studies that yielded 300 observations: they report the meta-modal elasticities of immigrants which are, respectively, 0.12 for exports and 0.15 for imports. Among the main contributions on a single country analysis of the pro-trade effect of immigrants we cite Dunlevy and Hutchinson (1999) for US, Head and Ries (1998) for Canada, Tai (2009) for Switzerland and Girma and Yu (2002) for UK. The most important articles on a multicountry analysis are Felbermayr and Jung (2009), Aleksynska and Peri (2013), Ehrhart et al. (2014), Egger et al. (2012) and Felbermayr and Toubal (2012). Lastly, the most influential papers that study the bilateral trade relationship between regions (or provinces) and foreign countries are Herander and Saavedra (2005) for US, Wagner et al. (2002) for Canada, Bratti et al. (2014) for Italy, Peri and Requena-Silvente (2010) for Spain, Combes et al. (2005) and Briant et al. (2014) for France.

[4] Peri and Requena-Silvente (2010) and Aleksynska and Peri (2013) use Broda and Weinstein (2006) classification to characterize the degree of differentiability of traded products according to their elasticity of substitution across varieties. Althogh Peri and Requena-Silvente (2010) and Aleksynska and Peri (2013) use a different classification of goods to characterize the degree of differentiability of products, they follow the same procedure of grouping these products into three broad categories: highly differentiated, moderately differentiated and less differentiated.

[5] As Felbermayr et al. (2012) point out, a few papers - such as Felbermayr and Toubal (2012) - attempt to disentangle the transaction cost from the preferences channel of migration. However, so far, according to Felbermayr et al. (2012) no conclusive answer to this identification problem is provided and therefore they suggest to leave this important question open.

of low-income Southern sending countries and high-income Northern receiving countries, Felbermayr and Jung (2009) find that the pro-trade elasticity of high-skilled workers is almost four times bigger than that of low-skilled workers when migration of all skill groups is accounted for. Other studies such as Ehrhart et al. (2014), Herander and Saavedra (2005) and Felbermayr and Toubal (2012) show higher pro-trade effects of high-skilled ethnic networks compared to the correspondent impact of the total stock of immigrants.

3 Model and Econometric Specification

We include our proxy for ethnic networks in a general gravity expression derived from a supply side Ricardian model of trade à la Eaton and Kortum (2002) (henceforth EK). This is in contrast with the literature where, in general, ethnic networks as economic attractors are included within structural demand side gravity equations derived from symmetric Dixit-Stiglitz-Krugman monopolistic competition models, as Combes et al. (2005), Tai (2009) and Felbermayr and Toubal (2012).[6] In those models the pro-trade effect of ethnic networks largely depends on the (proxies of) elasticity of substitution parameters: in Felbermayr and Toubal (2012), Combes et al. (2005) and Tai (2009) σ is interacted with the ethnic networks coefficient in order to estimate the actual pro-trade impact of immigrants. For our purposes this methodology is hard to implement since, to our knowledge, there are no data available in the literature for σ at different quality levels. In addition, the use of proxies for σ may create distortions in the resulting migration impact on trade.[7] For these reasons we consider the general gravity expression resulting from the Ricardian EK approach as better suited to address our research question. Contrary to the demand side gravity equations, in our model σ affects trade only through the allocation of spending across quality-types but, within types, the share of each exporter in a country's imports does not depend on the elasticity of substitution, only on technologies. Moreover, given the missing values of GDP for several countries in the CEPII database, we prefer the general EK gravity expression of the type $X_{ni} = GS_iM_n\phi_{ni}$ since it allows to utilize the whole database without the loss of any information.[8] The use of this functional form comes at no cost in terms of the unbiasedness of our ethnic networks' coefficients: the robustness checks (available upon request) show that the elasticities of migrants are substantially unaffected by the inclusion of the GDP of country i and country n in our econometric specification.
In what follows we derive an EK-type augmented gravity equation from the model of Fieler (2011) where goods of different quality may differ in demand and technology.

3.1 Extension of Fieler (2011)

The model builds on the Ricardian setup of Eaton and Kortum (2002) and follows Fieler (2011) to characterize the demand side. On the supply side the setup reduces to the Ricardian EK framework. On the demand side we depart from the standard EK model by abandoning the homothetic preferences assumption with constant elasticity of substitution as in Fieler (2011). Based on the evidence that the income elasticity of demand varies across goods and that this variation is economically significant, Fieler (2011) divides goods into two types (A and B) which may differ in demand and technology. We extend Fieler (2011) by including a higher number of types: for simplicity we assume that the number of types (and the correspondent elasticities of substitution) corresponds to the number of the subgroups of our sample. This assumption allows to treat different levels of heterogeneity across goods in the model at a sufficiently small level of aggregation. Without loss of generality we consider a multisector economy where goods of quality k of country i produces a continuum of goods $j_k \in [0,1]$ with productivity $z_i(j_k)$. All consumers in the world choose the quantities of goods $j_k, (Q(j_k))_{j_k \in [0,1]}$ to maximize the same utility function

[6] The differences between the two definitions of the gravity equation is well described in Head and Mayer (2014)

[7] Tai (2009) focuses on the case of Switzerland and it uses sector level elasticities of substitution based on the United States elasticities estimated by Broda and Weinstein (2006): the choice of US values of σ is motivated by the lack of data on the elasticities of substitution for each country and by the country's representability in the world economy. Following the discussion of available evidence in Anderson and Wincoop (2004), Felbermayr and Toubal (2012) assume that the elasticity is equal to 6 for aggregate trade, 4 for trade in differentiated goods, and 25 for goods traded on organized exchanges (i.e. homogeneous goods)

[8] CEPII gravity database doesn't contain information on GDP for Afghanistan, Cuba, Iraq, Mongolia, Sao Tome and Principe, Tuvalu, Myanmar and Somalia.

$$U_n = \sum_{k=1}^{K} \left\{ \frac{\sigma_k}{\sigma_k - 1} \left[\int_0^1 Q(j_k)^{\frac{(\sigma_k - 1)}{\sigma_k}} d j_k \right] \right\}, \tag{1}$$

where σ_k is the elasticity of substitution across goods of the same quality and the income elasticity of demand for those goods. The country i's productivity of goods of quality k is a realization of a random variable (drawn independently for each j_k) from its specific Fréchet probability distribution $F_i(j_k) = \exp^{-T_i z^{-\theta_k}}$, where $\theta_k > 1$ and $T_i > 0$. The quality specific parameter θ_k governs comparative advantage within quality categories and it is common across countries. As Fieler (2011) points out, the Fréchet distribution gives a dual role to type or quality specific trade elasticity θ_k. First, the variability of technology across commodities governs comparative advantage within quality categories. A smaller θ_k, indicating more heterogeneity across goods within quality k (hence a greater dispersion in price distribution) exerts a stronger force for trade against the resistance imposed by the geographic barriers d_{ni}. Trade is more intense where θ_k is small. Second, the variability of labor efficiencies across countries governs comparative advantage across quality groups. T_i governs the location of the distribution and it reflects country i's absolute advantage: a bigger T_i indicates that a higher efficiency draw for any good j is more likely. As in Fieler (2011) we assume that T_i does not depend on type-quality k, which implies that a country that is generally efficient at making goods of quality k is also efficient at making goods of all qualities.
Having drawn a particular productivity level, the cost of producing a unit of good j in country i of quality k is then $\frac{c_i}{z_i(j_k)}$. With the assumption of perfect competition, Samuelson iceberg trade costs and triangle inequality, the price of a good imported from country i into country n is the unit production cost multiplied by the geographic barriers:

$$p_{ni}(j_k) = \frac{d_{ni} c_i}{z_i(j_k)} \tag{2}$$

Substituting equation (2) into the distribution of efficiency $F_i(j_k)$ implies that country i presents country n with a distribution of prices $G_{ni}(p_k) = 1 - \exp^{-\left[T_i (d_{ni} c_i)^{-\theta_k}\right] p_k^{\theta_k}}$. Given these assumptions and following the standard EK passages we derive the gravity expression which is re-expressed as the imports of country n's from country i relative to its domestic consumption:

$$\frac{X_{ni}^k}{X_{nn}^k} = \frac{T_i}{T_n} \left(\frac{d_{ni} c_i}{c_n} \right)^{-\theta_k} \tag{3}$$

Equation (3) can be simplified in log term to $\ln X_{ni}^k = S_i + S_n - \theta_k \ln d_{ni}$, where S_i stands for the competitiveness of country i, which is function of technology and unit production costs.

3.2 Inserting migration into the picture

Migration enters the Ricardian EK model by affecting the distribution of prices $G_{ni}(p_k)$ that country i presents to country n. Migrants' networks mitigate the negative effect of geographic barriers by attenuating incomplete and asymmetric information in international transactions. This positive migration effect on trade is likely to vary across quality k and it is proportional to the stocks of bilateral migration between country i and country n. This is a *comparative advantage* effect since it impacts directly the level of heterogeneity across goods and countries through the parameter θ_k.[9]
In order to capture the trade cost channel of migration we divide d_{ni} into two components. The first term is the usual EK geographic barriers term which is denoted with ρ, the second one is the information costs I_{ni} which in this model will depend solely (negatively) on migrants' networks. For every $i \neq n$, d_{ni} is defined as follows:

$$\mathrm{d}_{ni} = [\rho_{ni} \mathrm{I}_{ni}] \tag{4}$$

[9] For a discussion on the effect of ethnic networks on the estimation of trade cost elasticity parameter see Lanati (2014)

As in EK geographic barriers take the following moltiplicative form $\rho_{ni} = \text{dist}_{ni} \exp^{[\text{lang}_{ni}\text{adj}_{ni}\text{RTA}_{ni}]}$, whereas informational frictions I_{ni} are only affected by migrant networks as follows: $\text{I}_{ni} = \frac{1}{[\text{mig}_{ni}]}$ [10] More precisely, m_{ni} is the total number of migrants born in country i resident in country n. By combining equation (2) and equation (4) the price of a good imported from country i into country n then becomes: $p_{ni}(j_k) = \frac{c_i \rho_{ni} \text{I}_{ni}}{z_i(j_k)}$. By substituting this expression into the distribution of efficiency $F_i(j_k)$ and by following the same procedure as in the previous section we get $\frac{X_{ni}^k}{X_{nn}^k} = \frac{T_i}{T_n}\left(\frac{c_i \rho_{ni}}{c_n \text{mig}_{ni}}\right)^{-\theta_k}$, from which we obtain the following econometric specification:[11]

$$\ln X_{ni}^k = \text{S}_i - \text{S}_n + \text{S}_t - \theta_k \ln \text{dist}_{ni} - \theta_k \text{lang}_{ni} - \theta_k \text{contig}_{ni} - \theta_k \text{RTA}_{ni} + \theta_k \ln \text{mig}_{ni} + \theta_k \delta_k \tag{5}$$

X_{ni}^k stands for imports of country n from country i of goods of quality k. S_i, S_n and S_t are exporter, importer and year fixed effects, respectively. dist_{ni} is the distance between importer and exporter; lang_{ni}, contig_{ni} and RTA_{ni} are dummies which equal 1 if country i and country n share a common language, have a common border and both belong to a Regional Trade Agreement at time t. mig_{ni} is the stock of immigrants resident in country n and born in country i at time t. $\delta_{ni(k)}$ is the error term. A detailed description of the data needed for the estimations is included in Appendix A.1.
This log-log version of the gravity equation is estimated over the whole sample and then separately for all subgroups using Pooled OLS with country and time FE.[12] The technique is similar to Rauch and Trindade (2002) who divide traded commodities into three groups and estimate the gravity model separately for each aggregated group based on the level of product differentiation. The idea is to estimate separate elasticities of trade flows with respect to the stock of immigrants according to the level of product quality.
Given the presence of zero observations in the migration database, and following the suggestion of Dunlevy (2006) among others, we set $\ln(\text{mig}_{ni} + 1)$ to avoid the loss of more than 30 thousand of information.
A major econometric issue which arises when estimating this gravity equation is the endogeneity bias that may derive from measurement errors, omitted variables or potential reverse causality between the dependent variable, imports from country i to country n and the variable of interest, the stock of immigrants from country i and resident in country n.[13] We follow Briant et al. (2014) and Combes et al. (2005) by instrumenting the stocks of immigrants with past bilateral stocks. Given the irrelevancy of other lagged stocks of immigrants that emerge in the first stage analysis, we select the 1985 stock as the only IV in our exactly identified 2SLS model.[14][15]

4 Results

Table 3 reports the OLS estimates of Equation (5) with log of imports as dependent variable for the three different samples, i.e. OECD countries, emerging and developing economies and the complete sample, separately for all the migrants and for the high skill. Table 4 shows the correspondent estimates for exports. In these preliminary estimates we aim at replicating some of the stylized facts that emerge from the literature

[10] This expression follows Combes et al. (2005). However, Combes et al. (2005) include *plant* as an additional determinant of I_{ni}.

[11] Equation (5) incorporates the trade cost channel of migration in a supply-side derivation of the gravity expression. Unlike Combes et al. (2005), Tai (2009), Felbermayr and Toubal (2012) and all the demand side gravity equations derived from symmetric Dixit-Stiglitz-Krugman monopolistic competition models, the assumptions behind the Ricardian EK model automatically rule out the preference channel of migration and any role of the elasticity of substitution in determining immigrants' trade effect.

[12] There are alternative methodologies that can be used to avoid the bias derived from the presence of the zeros in the dependent variable and to tackle at the same time the heteroskedasticity issue, see Briant et al. (2014) for a discussion. Following Head and Mayer (2014) we perform a robustness check with Poisson PML and Gamma PML: we briefly discuss the results and the methodologies in the Appendix A.1.

[13] On top of the IV approach, we tackle the issue of measurement error by following Hallak (2006) who exclude potential outliers from their database. The details on the procedure we implement are presented in the Appendix A.1.

[14] Appendix A.2 shows the relevance of the instruments for the Whole sample. The correspondent analysis for the other two samples are available upon request.

[15] Along with the lagged stocks of migrants Ehrhart et al. (2014) utilise the difference in life expectancy between importer and exporter as additional instrument. We don't include this IV for two reasons: first, this instrument is not effective for a sample of OECD countries where the differences in life expectancy are quite small and they are unlikely to be correlated with the stocks of immigrants. Second, we tested for the relevance of the differences in life expectancy for 1995 and 2000 as IV: the first stage analysis reveals that these instruments are not not statistically significant. The test for the relevance of life expectancy as instruments is available upon request.

and therefore goods are not differentiated according to the level of quality. The coefficient of dist_{ni}, contig_{ni} and RTA_{ni} have all the expected sign. Surprisingly, in the whole sample the pro-import effect of immigrants is not statistically different from zero; it becomes positive and significant only when we analyze the same effect on the subgroup of OECD exporters where a 10 percent increase in immigrant stocks leads to a 0.49 percent increase in import flows. In general the pro-trade coefficients are substantially lower in magnitude in comparison to the elasticities of several influential papers summarized in Bratti et al. (2014): this is particularly evident for imports' elasticities.[16]

Contrary to the traditional findings of the literature, in each sample the pro-export effects of immigrants are significantly higher than that of imports: therefore there is no evidence of the so called *transplanted home bias*, or more simply, this gap in favor of exports' elasticities is an indication of a marginal role of consumer preferences as determinant of the pro-trade effect of immigrants. The obvious interpretation is that the promotion of bilateral trade of ethnic networks passes mainly through the trade cost channel, i.e. the ability of immigrants in reducing transaction costs and overcoming informal trade barriers.[17]

The results showed in Table 3 and 4 contrast those of Ehrhart et al. (2014) and Bratti et al. (2014) who find larger pro-trade effects of immigrants from low-income economies. Ehrhart et al. (2014) argue that the large pro-export effect of African migrants could be partly explained by the existence of weaker institutions in Africa for which migrants' networks provide a substitute. In Ehrhart et al. (2014) the effect appears also particularly important for the exports of differentiated products, suggesting that migrants also play an important role in reducing information costs. This interpretation can harmlessly be extended to all emerging economies of our sample. Our estimates suggest that as the sample expands by including less developed countries, the elasticities of immigrants decrease dramatically.

Table 6, 7, 8 and 9 report the elasticities of trade flows with respect to the stocks of immigrants for all quality classes in the Whole, OECD and PVS sample for both imports and exports.[18] The results indicate that the pro-trade effect of immigrants increases with the quality of traded products. International migrants enhance bilateral trade by facilitating the matching of trading opportunities - through their role of trade cost mitigator - primarily for high quality products. As expected, the coefficients show a larger dispersion around the mean: given their lower liquidity constraints and advantages in human capital, the pro-trade effect of high-skilled ethnic networks is stronger for high-quality goods and lower for relatively cheap commodities.[19]

The pro trade impact of immigrants is negative or not statistically significant for low-quality products and then increases steadily as we move up in the quality ladder. Figure 1 and 3 well describe this trend which is common to all samples.[20] In addition, there seems to be a threshold right before the top-quality goods where the elasticity of immigants stop growing and remains constant or slightly decreases: the peak is always reached prior to the top quality class. For exports the highest pro-trade effect is reached earlier. In general immigrants have a stronger pro-trade effect when the quality of product traded is high, but this effect slightly declines with luxurious goods. Also, the peak of maximum effect on trade varies across samples. The highest pro-trade effect of immigrants is reached at the 8th-9th class in the OECD sample, while for the Whole and PVS samples the peak is at the 7th class for imports, even earlier in the case of exports. Given the composition of the samples, these results are not surprising. Immigrants from highly industrialized economies are relatively more likely to be part of networks which create more business opportunities for top-quality products.

Although the trend of elasticities which emerges from Figure 1 and 3 seems related to the percentage of differentiated products in each subgroup showed in Table 5, we show empirically that it's the quality of traded goods not the degree of products' heterogeneity which mainly determines the magnitude of the pro-trade effects of immigrants. We run the same regression by using in each class a reduced sample which

[16] Briant et al. (2014) found an elasticity of imports with respect to the stock of immigrants of 0.12, Girma and Yu (2002) obtained 0.10, whereas Head and Ries (1998), Dunlevy and Hutchinson (1999) and Wagner et al. (2002) obtained elasticities higher than 0.20

[17] This finding is in line with Girma and Yu (2002) and Gould (1994) who find larger pro-trade effect of immigrants for exports. Moreover, the more recent paper of Aleksynska and Peri (2013) - which utilizes the same BACI database for trade data - find some evidence of higher pro-export effects when dividing traded products according to their level of elasticity of substitution.

[18] The whole set of first stage coefficients is available upon request

[19] The same trend emerges by using four classes instead of ten composed by 1/4 of total observations according to the level of quality. A detailed description of the methodologies adopted for the robustness checks is included in Appendix A.1, the statistics are avilable upon request.

[20] The only exception is the 6th class of the PVS sample where the pro-import effect of immigrants drops considerably in comparison to the previous subgroup

includes solely the % of differentiated goods.[21] As showed in Figure 2 and 4 the trend remains unchanged: even though we are estimating the effect of immigrants on traded goods with exactly the same degree of differentiation (according to Rauch (1999) classification), the variation of the impact of ethnic networks is still determined by the quality of products traded.

Endogeneity could introduce a downward bias as suggested by Combes et al. (2005). As robustness check, we run 2SLS regressions. All 2SLS network coefficients are larger, even if slightly so in most cases, when instrumented. By comparing the 2SLS results across samples the scenario doesn't change: the elasticities are still higher when the samples reduce to the OECD exporters regardless the quality of traded goods, a result which again seems to contradict the findings of Ehrhart et al. (2014).

Lastly, Table 10 reports the pro-trade elasticities of immigrants when accounting for inter-ethnic spillover coefficients. Our functional form allows immigrants of other nationalities who speak the same language of country i, to affect trade between country n and country i. In doing so, controlling for the standard ethnic networks' effect, we check whether and to what extent language proximity among immigrants is relevant in overcoming informal trade barriers. What emerges is that regardless of the quality of goods traded, immigrants resident in country n of other nationalities who speak the same language as nationality i do not affect trade with country i; perhaps more importantly - as suggested by Bratti et al. (2014) - there is no evidence of an omitted variables bias: the coefficients $(\mathrm{mig}_{ni}+1)$ for all quality levels are largely unaffected by the inclusion of the spillover variable.

5 Conclusions

We examine the link between pro-trade effect of immigrants and product quality. To our knowledge this topic hasn't been explored before: existing works mostly focus on the variation of the pro-trade effect of immigrants according to the degree of product heterogeneity. We take a similar approach to Gould (1994) and Rauch and Trindade (2002) and we divide traded commodities according to the level of quality instead of the degree of product heterogeneity. We find that the pro-trade effect of immigrants increases with the quality of traded products. Although differentiated products are more concentrated in top quality subgroups, we show that it is the quality of traded goods not the degree of products' heterogeneity which mainly determines the magnitude of the pro-trade effects of immigrants. Regardless of the quality of commodities, pro-export coefficients are larger in magnitude than those of imports. This gap in favor of exports' elasticities could be interpreted, other things constant, as an indication of a negligible role of consumer preferences as determinant of the pro-trade effect of immigrants.

Our empirical analysis allows for heterogeneity of immigrants, both by skill and country of origin. As expected, given their lower liquidity constraints and advantages in human capital, the pro-trade effect of high-skilled ethnic networks is stronger for high-quality goods and lower for relatively cheap commodities. In general, the Alchian Allen's conjecture does not seem appropriate in explaining our findings: in fact, by attenuating informal trade barriers ethnic networks tend to facilitate the matching of trading opportunities and reduce informal trade barriers primarily for high quality products. In addition, as we enlarge the sample by adding immigrants from low and middle income economies we find lower pro-trade elasticities (regardless the quality of traded goods). Our results seem to contradict the recent findings of Ehrhart et al. (2014) and Bratti et al. (2014) and also the idea of ethnic networks as a substitute for the weaker institutions of emerging economies.

In general immigrants have a stronger pro-trade effect when the quality of traded products is high, but this effect slightly declines with luxurious goods. By comparing the trend of elasticities across samples, it emerges a threshold right before the top-quality goods where the elasticity of immigants stop growing and remains constant or slightly decreases: in each sample the peak is always reached prior to the top class. The highest pro-import effect of immigrants is reached at the 8th-9th subgroup in the OECD sample, while the peak for the Whole and PVS samples are a little early, around the 6th-7th subgroup. Given the composition of the samples, these results are not surprising. Immigrants from highly industrialized economies are relatively more likely to be part of networks which create more business opportunities for top-quality products.

[21] The results are reported in the part below of Table 6, 7, 8 and 9.

Table 1: Immigrants divided by countries of origin

Skill level / Origin	Total	Low	Medium	High
High Income	31.3%	28.4%	33.4%	33.1%
Emerging	68.7%	71.6%	66.6%	66.9%

The first row reports the % of immigrants resident in 19 OECD countries and born in high-income countries with respect to the total stock by skill level in the year 2000. The second row shows the correspondent % of immigrants born in the emerging economies. The composition of each sample is available in Table 11 and 12. Data are from Brucker et al. (2013)

Table 2: Growth rates of immigrants by skill level in the period 1990-2005

Skill level / Origin	Total	Low	Medium	High
All	74.0%	30.6%	101.0%	121.8%
High Income	13.5%	-18.1%	18.0%	59.4%
Emerging	116.4%	61.7%	170.6%	160.4%

The first row reports the growth rate of total immigrants by skill level resident in 19 OECD countries. The second and third row show the correspondent statistics by country of origin. Data are from Brucker et al. (2013).

Table 3: Pro-Import effects of immigrants - Whole Stock vs High Skilled

Sample	OECD	OECD	PVS	PVS	Whole	Whole
Product Diff.	Total	Diff.	Total	Diff.	Total	Diff.
Estimator	(OLS)	(OLS)	(OLS)	(OLS)	(OLS)	(OLS)
Whole stock						
lnmig_{ni}	**0.049***	**0.074***	0.010	**0.022***	0.001	**0.025***
	(0.019)	(0.021)	(0.006)	(0.006)	(0.007)	(0.008)
lndist_{ni}	**-0.371***	**-0.430***	**-0.286***	**-0.358***	**-0.363***	**-0.379***
	(0.070)	(0.077)	(0.026)	(0.029)	(0.031)	(0.033)
contig_{ni}	**0.566***	**0.562***	**0.523***	**0.489***	**0.664***	**0.667***
	(0.093)	(0.103)	(0.126)	(0.143)	(0.074)	(0.082)
lang_{ni}	0.114	0.156	-0.087	-0.009	**0.099***	**0.140***
	(0.069)	(0.084)	(0.045)	(0.045)	(0.046)	(0.054)
rta_{ni}	**0.522***	**0.432***	**0.149***	**0.154***	**0.290***	**0.298***
	(0.176)	(0.176)	(0.042)	(0.046)	(0.077)	(0.069)
Year FE	yes	yes	yes	yes	yes	yes
Imp/Exp FE	yes	yes	yes	yes	yes	yes
Observations	1494884	754998	988300	548296	2483184	1303294
R^2	0.161	0.195	0.092	0.135	0.158	0.193
Root MSE	2.270	2.147	2.189	2.081	2.241	2.123
High-skilled						
lnmig_{ni}	**0.058***	**0.087***	0.012	**0.025***	0.001	**0.025***
	(0.020)	(0.023)	0.007	(0.007)	(0.009)	(0.009)
lndist_{ni}	**-0.367***	**-0.425***	**-0.286***	**-0.357***	**-0.365***	**-0.381***
	(0.069)	(0.076)	(0.025)	(0.029)	(0.031)	(0.033)
contig_{ni}	**0.576***	**0.577***	**0.524***	**0.493***	**0.665***	**0.675***
	(0.092)	(0.102)	(0.127)	(0.144)	(0.073)	(0.081)
lang_{ni}	0.103	0.141	**-0.091***	-0.018	**0.102***	**0.139***
	(0.071)	(0.086)	(0.045)	(0.048)	(0.048)	(0.056)
rta_{ni}	**0.521***	**0.427***	**0.151***	**0.156***	**0.288***	**0.295***
	(0.176)	(0.176)	(0.042)	(0.046)	(0.077)	(0.068)
Year FE	yes	yes	yes	yes	yes	yes
Imp/Exp FE	yes	yes	yes	yes	yes	yes
Observations	1494884	754998	988300	548296	2483184	1303294
R^2	0.161	0.195	0.092	0.135	0.158	0.193
Root MSE	2.27	2.147	2.189	2.081	2.241	2.123

* Significant at 5% level. Standard errors in parenthesis are heteroscedasticity-robust and clustered by trading-pair.
Regressions are performed on each sample using the total number of observations *Total* and the share of differentiated products *Diff* according to Rauch (1999) *conservative* classification.

Table 4: Pro-Export effects of immigrants - Whole Stock vs High Skilled

Sample	OECD	OECD	PVS	PVS	Whole	Whole
Product Diff.	Total	Diff.	Total	Diff.	Total	Diff.
Estimator	(OLS)	(OLS)	(OLS)	(OLS)	(OLS)	(OLS)
Whole stock						
lnmig_{ni}	**0.082***	**0.108***	**0.041***	**0.047***	**0.028***	**0.038***
	(0.018)	(0.020)	(0.009)	(0.007)	(0.006)	(0.007)
lndist_{ni}	**-0.316***	**-0.342***	**-0.342***	**-0.407***	**-0.438***	**-0.492***
	(0.066)	(0.067)	(0.074)	(0.029)	(0.025)	(0.026)
contig_{ni}	**0.600***	**0.614***	**0.460***	**0.464***	**0.617***	**0.641***
	(0.086)	(0.094)	(0.147)	(0.155)	(0.081)	(0.088)
lang_{ni}	0.052	0.115	**0.081***	**0.152** *	**0.120***	**0.190***
	(0.071)	(0.083)	(0.036)	(0.038)	(0.043)	(0.049)
rta_{ni}	**0.626***	**0.566***	**0.146***	**0.185***	**0.181***	0.106
	(0.145)	(0.151)	(0.059)	(0.061)	(0.060)	(0.061)
Year FE	yes	yes	yes	yes	yes	yes
Imp/Exp FE	yes	yes	yes	yes	yes	yes
Observations	1466418	739975	2435142	1225231	3901560	1965206
R^2	0.175	0.208	0.134	0.150	0.198	0.221
Root MSE	2.257	2.120	1.912	1.821	2.05	1.947
High-skilled						
lnmig_{ni}	**0.095***	**0.126***	**0.047***	**0.055***	**0.034***	**0.045***
	(0.021)	(0.023)	(0.007)	(0.008)	(0.006)	(0.008)
lndist_{ni}	**-0.316***	**-0.343***	**-0.344***	**-0.408***	**-0.435***	**-0.488***
	(0.065)	(0.073)	(0.025)	(0.026)	(0.023)	(0.026)
contig_{ni}	**0.612***	**0.631***	**0.465***	**0.495***	**0.622***	**0.648***
	(0.144)	(0.095)	(0.158)	(0.173)	(0.081)	(0.089)
lang_{ni}	0.039	0.098	0.070	**0.136***	**0.110***	**0.177***
	(0.086)	(0.085)	(0.036)	(0.042)	(0.043)	(0.050)
rta_{ni}	**0.614***	**0.550***	**0.176***	**0.151***	**0.182***	0.107
	(0.144)	(0.148)	(0.061)	(0.063)	(0.060)	(0.061)
Year FE	yes	yes	yes	yes	yes	yes
Imp/Exp FE	yes	yes	yes	yes	yes	yes
Observations	1466418	739975	2435142	1225231	3901560	1965206
R^2	0.175	0.208	0.134	0.150	0.198	0.221
Root MSE	2.257	2.120	1.912	1.821	2.055	1.947

* Significant at 5% level. Standard errors in parenthesis are heteroscedasticity-robust and clustered by trading-pair.
Regressions are performed on each sample using the total number of observations *Total* and the share of differentiated products *Diff* according to Rauch (1999) *conservative* classification.

Table 5: Trade data divided according to Rauch (1999) *conservative* classification

Class	All(i) %	All(e) %	n(i) %	n(e) %	r(i) %	r(e) %	w(i) %	w(e) %
Whole Sample								
Whole	74,6	73,3	52,5	68,7	16,6	23,5	5,5	7,8
Class 1	70,4	71,6	26,5	36,6	37,7	54,4	6,2	8,9
Class 2	70,7	71,0	31,5	43,1	33,0	48,2	6,2	8,7
Class 3	71,3	70,7	38,3	53,7	25,4	37,2	7,6	9,1
Class 4	73,0	72,0	46,2	64,0	19,5	27,3	7,1	8,7
Class 5	75,0	74,0	54,8	72,1	14,0	19,6	6,1	8,3
Class 6	77,9	75,8	61,4	76,7	10,6	14,7	5,8	8,6
Class 7	80,3	77,1	67,1	80,6	8,0	11,2	5,2	8,1
Class 8	80,7	77,6	70,6	85,0	5,9	8,3	4,1	6,7
Class 9	77,0	74,1	69,0	87,7	4,8	6,9	3,2	5,4
Class 10	69,9	69,1	59,2	84,0	7,1	10,6	3,6	5,4
OECD Sample								
Whole	74,8	74,7	50,5	67,6	18,6	24,7	5,7	7,7
Class 1	71,9	72,0	23,5	32,1	42,2	59,2	6,2	8,6
Class 2	71,4	71,3	27,8	38,3	37,2	52,5	6,4	9,2
Class 3	71,5	71,0	35,9	49,5	28,1	39,7	7,5	10,8
Class 4	72,8	72,4	44,5	60,8	21,2	29,2	7,0	10,0
Class 5	74,8	74,7	52,5	70,6	15,7	20,7	6,6	8,6
Class 6	77,2	77,2	58,4	76,1	12,3	15,3	6,5	8,5
Class 7	79,2	79,3	64,1	81,3	9,4	11,4	5,7	7,3
Class 8	80,1	80,4	69,1	86,6	6,7	7,9	4,4	5,5
Class 9	77,3	77,2	68,9	89,4	5,2	6,4	3,2	4,2
Class 10	71,8	71,2	60,3	84,7	7,8	10,3	3,6	5,0
PVS Sample								
Whole	41,5	72,5	74,7	69,4	18,3	22,8	7,0	7,8
Class 1	38,2	71,4	44,1	39,5	46,8	51,4	9,0	9,1
Class 2	39,1	70,8	51,7	45,8	39,6	45,8	8,6	8,4
Class 3	39,4	70,5	59,5	56,1	30,3	35,6	10,2	8,2
Class 4	40,8	71,8	66,3	66,0	22,9	26,2	10,8	7,8
Class 5	41,7	73,6	77,1	72,9	15,1	18,9	7,7	8,1
Class 6	43,8	75,1	83,6	77,2	10,2	14,1	6,2	8,6
Class 7	45,8	75,8	88,2	80,2	6,7	11,2	5,1	8,6
Class 8	46,2	75,8	91,2	84,1	4,5	8,5	4,2	7,4
Class 9	43,1	72,2	91,2	86,5	4,8	7,2	4,0	6,3
Class 10	37,4	67,9	85,6	83,6	8,8	10,7	5,5	5,6

Columns *All(i)* and *All(e)* report the number of observations left in % terms after the merging with the Rauch (1999) conversion table for each class for imports and exports, respectively. Columns *n(i)* and *n(e)* report the % of differentiated products in each class with respect to the total number of observations of the whole database after the merging. Column *r(i)* and *r(e)* report the correspondent % of homogeneous products in each class. Column *w* and *w(e)* report the correspondent % of products with referenced price in each class. Details on the merging with Rauch (1999) classification are included in Appendix A.1.

Table 6: Pro-Import effects of immigrants on products of different quality

Sample	Whole	Whole	OECD	OECD	PVS	PVS
Estimator	OLS	OLS-IV	OLS	OLS-IV	OLS	OLS-IV
Class						
Class 1	**−0.070***	**−0.070***	-0.029	-0.020	**−0.029***	−0.032
	(0.012)	(0.015)	(0.022)	(0.026)	(0.012)	(0.015)
Class 2	**−0.036***	**−0.034***	0.005	0.007	−0.014	−0.009
	(0.010)	(0.013)	(0.020)	(0.023)	(0.008)	(0.012)
Class 3	**−0.022***	−0.024	0.024	0.044	−0.004	−0.012
	(0.009)	(0.013)	(0.020)	(0.025)	(0.008)	(0.012)
Class 4	−0.003	−0.002	**0.042***	**0.057***	0.013	0.005
	(0.010)	(0.013)	(0.020)	(0.024)	(0.009)	(0.014)
Class 5	0.009	0.018	**0.049***	**0.071***	**0.022***	**0.030***
	(0.009)	(0.012)	(0.021)	(0.026)	(0.009)	(0.013)
Class 6	**0.021***	**0.029***	**0.059***	**0.080***	0.013	0.015
	(0.009)	(0.012)	(0.021)	(0.026)	(0.008)	(0.015)
Class 7	**0.038***	**0.053***	**0.073***	**0.092***	**0.025***	**0.041***
	(0.009)	(0.013)	(0.022)	(0.031)	(0.010)	(0.014)
Class 8	**0.034***	**0.047***	**0.073***	**0.096***	**0.022***	**0.040***
	(0.010)	(0.015)	(0.023)	(0.031)	(0.009)	(0.017)
Class 9	**0.027***	**0.043***	**0.083***	**0.103***	**0.022***	**0.045***
	(0.010)	(0.014)	(0.022)	(0.029)	(0.008)	(0.015)
Class 10	0.018	**0.032***	**0.065***	**0.095***	0.016	0.024
	(0.010)	(0.013)	(0.023)	(0.030)	(0.010)	(0.014)
High Skilled						
Class 1	**−0.079***	**−0.087***	-0.043	-0.041	−0.024	**−0.034***
	(0.014)	(0.018)	(0.024)	(0.035)	(0.013)	(0.017)
Class 2	**−0.043***	**−0.046***	-0.001	-0.001	−0.012	−0.008
	(0.011)	(0.015)	(0.021)	(0.029)	(0.009)	(0.014)
Class 3	**−0.032***	**−0.035***	0.023	0.060	−0.008	−0.022
	(0.011)	(0.015)	(0.022)	(0.033)	(0.009)	(0.014)
Class 4	−0.006	0.007	**0.047***	**0.078***	0.019	0.004
	(0.012)	(0.014)	(0.021)	(0.030)	(0.010)	(0.016)
Class 5	0.006	0.020	**0.059***	**0.100***	0.024	**0.033***
	(0.011)	(0.015)	(0.024)	(0.033)	(0.010)	(0.016)
Class 6	0.018	0.023	**0.064***	**0.109***	0.012	0.012
	(0.010)	(0.015)	(0.024)	(0.034)	(0.009)	(0.017)
Class 7	**0.038***	**0.064***	**0.084***	**0.139***	**0.026***	0.037
	(0.011)	(0.016)	(0.026)	(0.030)	(0.012)	(0.023)
Class 8	**0.037***	**0.060***	**0.084***	**0.139***	**0.028***	**0.047***
	(0.012)	(0.018)	(0.026)	(0.030)	(0.010)	(0.020)
Class 9	**0.026***	**0.050***	**0.090***	**0.132***	**0.024***	**0.048***
	(0.012)	(0.016)	(0.026)	(0.034)	(0.009)	(0.017)
Class 10	0.022	**0.033***	**0.088***	**0.118***	0.015	0.022
	(0.012)	(0.015)	(0.026)	(0.035)	(0.012)	(0.015)
Observations	248319	248319	149489	149489	98830	98830

* Significant at 5% level.
Standard errors in parenthesis are heteroscedasticity-robust and clustered by trading-pair.
The upper part of the table shows the pro-trade effect of the total stock of bilateral immigrants whereas the lower part show the correspondent estimates for the high skill. The coefficients are obtained with OLS and 2SLS.

Table 7: Pro-Imports effects of immigrants on products of different quality - Differentiated

Sample Estimator Class	Whole OLS	Whole OLS-IV	OECD OLS	OECD OLS-IV	PVS OLS	PVS OLS-IV
Class 1	$-\mathbf{0.035}^*$	−0.030	0.026	0.043	−0.008	−0.007
	(0.012)	(0.016)	(0.026)	(0.032)	(0.012)	(0.017)
Class 2	−0.005	−0.003	0.038	0.056	0.006	0.002
	(0.010)	(0.014)	(0.022)	(0.029)	(0.010)	(0.015)
Class 3	0.001	0.002	$\mathbf{0.059}^*$	$\mathbf{0.089}^*$	0.016	0.010
	(0.010)	(0.013)	(0.021)	(0.027)	(0.011)	(0.015)
Class 4	0.012	0.009	$\mathbf{0.057}^*$	$\mathbf{0.076}^*$	$\mathbf{0.025}^*$	0.007
	(0.012)	(0.016)	(0.025)	(0.029)	(0.012)	(0.018)
Class 5	0.014	0.022	$\mathbf{0.059}^*$	$\mathbf{0.084}^*$	$\mathbf{0.024}^*$	$\mathbf{0.034}^*$
	(0.010)	(0.015)	(0.024)	(0.031)	(0.011)	(0.017)
Class 6	$\mathbf{0.035}^*$	$\mathbf{0.046}^*$	$\mathbf{0.074}^*$	$\mathbf{0.102}^*$	$\mathbf{0.023}^*$	0.022
	(0.009)	(0.013)	(0.022)	(0.029)	(0.009)	(0.017)
Class 7	$\mathbf{0.054}^*$	$\mathbf{0.070}^*$	$\mathbf{0.082}^*$	$\mathbf{0.105}^*$	$\mathbf{0.030}^*$	$\mathbf{0.049}^*$
	(0.010)	(0.014)	(0.025)	(0.031)	(0.011)	(0.015)
Class 8	$\mathbf{0.045}^*$	$\mathbf{0.058}^*$	$\mathbf{0.087}^*$	$\mathbf{0.102}^*$	$\mathbf{0.031}^*$	$\mathbf{0.048}^*$
	(0.012)	(0.017)	(0.026)	(0.034)	(0.010)	(0.018)
Class 9	$\mathbf{0.042}^*$	$\mathbf{0.059}^*$	$\mathbf{0.096}^*$	$\mathbf{0.116}^*$	$\mathbf{0.028}^*$	$\mathbf{0.054}^*$
	(0.011)	(0.016)	(0.026)	(0.032)	(0.009)	(0.016)
Class 10	$\mathbf{0.026}^*$	$\mathbf{0.043}^*$	$\mathbf{0.074}^*$	$\mathbf{0.106}^*$	$\mathbf{0.026}^*$	$\mathbf{0.038}^*$
	(0.011)	(0.014)	(0.025)	(0.032)	(0.012)	(0.016)
High Skilled						
Class 1	$-\mathbf{0.043}^*$	$-\mathbf{0.041}^*$	0.029	0.048	$-\mathbf{0.005}^*$	−0.007
	(0.014)	(0.017)	(0.026)	(0.041)	(0.014)	(0.020)
Class 2	−0.009	−0.008	0.034	0.070	0.011	0.003
	(0.012)	(0.017)	(0.025)	(0.037)	(0.011)	(0.018)
Class 3	−0.007	−0.005	$\mathbf{0.060}^*$	$\mathbf{0.114}^*$	0.011	0.002
	(0.012)	(0.017)	(0.023)	(0.036)	(0.013)	(0.018)
Class 4	0.009	0.007	$\mathbf{0.067}^*$	$\mathbf{0.102}^*$	$\mathbf{0.029}^*$	0.004
	(0.014)	(0.019)	(0.026)	(0.036)	(0.014)	(0.021)
Class 5	0.013	0.026	$\mathbf{0.073}^*$	$\mathbf{0.123}^*$	$\mathbf{0.028}^*$	$\mathbf{0.040}^*$
	(0.012)	(0.018)	(0.026)	(0.039)	(0.013)	(0.020)
Class 6	$\mathbf{0.034}^*$	$\mathbf{0.048}^*$	$\mathbf{0.075}^*$	$\mathbf{0.132}^*$	$\mathbf{0.025}^*$	0.019
	(0.011)	(0.015)	(0.025)	(0.038)	(0.010)	(0.020)
Class 7	$\mathbf{0.057}^*$	$\mathbf{0.083}^*$	$\mathbf{0.084}^*$	$\mathbf{0.138}^*$	$\mathbf{0.033}^*$	$\mathbf{0.051}^*$
	(0.011)	(0.017)	(0.028)	(0.039)	(0.013)	(0.017)
Class 8	$\mathbf{0.048}^*$	$\mathbf{0.074}^*$	$\mathbf{0.099}^*$	$\mathbf{0.168}^*$	$\mathbf{0.038}^*$	$\mathbf{0.056}^*$
	(0.013)	(0.020)	(0.030)	(0.042)	(0.011)	(0.021)
Class 9	$\mathbf{0.043}^*$	$\mathbf{0.071}^*$	$\mathbf{0.106}^*$	$\mathbf{0.154}^*$	$\mathbf{0.032}^*$	$\mathbf{0.057}^*$
	(0.013)	(0.018)	(0.029)	(0.039)	(0.010)	(0.018)
Class 10	$\mathbf{0.032}^*$	$\mathbf{0.044}^*$	$\mathbf{0.096}^*$	$\mathbf{0.126}^*$	0.026	$\mathbf{0.036}^*$
	(0.012)	(0.016)	(0.027)	(0.037)	(0.014)	(0.018)

*Significant at 5% level.
Standard errors in parenthesis are heteroscedasticity-robust and clustered by trading-pair.
The dependent variable is the share of *differentiated* products in each class. The number of observations for each regression varies by subgroup: the share of *differentiated* products is reported in Table 5. The upper part of the table shows the pro-trade effect of the total stock of bilateral immigrants whereas the lower part show the correspondent estimates for the high skill. The coefficients are obtained with OLS and 2SLS.

Table 8: Pro-Exports effects of immigrants on products of different quality

Sample	Whole	Whole	OECD	OECD	PVS	PVS
Estimator	OLS	OLS-IV	OLS	OLS-IV	OLS	OLS-IV
Class						
Class 1	**−0.021***	0.001	-0.016	0.008	0.003	**0.021***
	(0.008)	(0.010)	(0.021)	(0.026)	(0.007)	(0.009)
Class 2	0.003	**0.039***	0.033	**0.075***	**0.025***	**0.060***
	(0.006)	(0.010)	(0.021)	(0.029)	(0.006)	(0.011)
Class 3	**0.025***	**0.063***	**0.064***	**0.097***	**0.040***	**0.080***
	(0.006)	(0.010)	(0.020)	(0.025)	(0.006)	(0.011)
Class 4	**0.036***	**0.078***	**0.077***	**0.102***	**0.048***	**0.093***
	(0.006)	(0.010)	(0.018)	(0.022)	(0.007)	(0.012)
Class 5	**0.042***	**0.087***	**0.097***	**0.119***	**0.047***	**0.090***
	(0.007)	(0.012)	(0.020)	(0.025)	(0.008)	(0.013)
Class 6	**0.039***	**0.091***	**0.097***	**0.133***	**0.047***	**0.100***
	(0.007)	(0.011)	(0.020)	(0.029)	(0.008)	(0.014)
Class 7	**0.042***	**0.092***	**0.108***	**0.141***	**0.045***	**0.097***
	(0.008)	(0.012)	(0.021)	(0.029)	(0.008)	(0.015)
Class 8	**0.038***	**0.087***	**0.115***	**0.147***	**0.042***	**0.090***
	(0.007)	(0.012)	(0.022)	(0.029)	(0.008)	(0.013)
Class 9	**0.030***	**0.075***	**0.102***	**0.132***	**0.042***	**0.084***
	(0.007)	(0.011)	(0.021)	(0.030)	(0.008)	(0.013)
Class 10	**0.028***	**0.057***	**0.101***	**0.145***	**0.038***	**0.060***
	(0.008)	(0.012)	(0.025)	(0.035)	(0.009)	(0.012)
High Skilled						
Class 1	**−0.023***	−0.001	-0.034	0.001	0.005	**0.024***
	(0.009)	(0.011)	(0.025)	(0.035)	(0.007)	(0.010)
Class 2	0.003	**0.041***	0.031	**0.094***	**0.026***	**0.065***
	(0.007)	(0.011)	(0.023)	(0.035)	(0.006)	(0.013)
Class 3	**0.028***	**0.072***	**0.070***	**0.126***	**0.045***	**0.090***
	(0.006)	(0.011)	(0.022)	(0.031)	(0.007)	(0.013)
Class 4	**0.040***	**0.086***	**0.089***	**0.130***	**0.051***	**0.101***
	(0.007)	(0.011)	(0.021)	(0.028)	(0.007)	(0.014)
Class 5	**0.046***	**0.095***	**0.109***	**0.147***	**0.050***	**0.099***
	(0.008)	(0.013)	(0.023)	(0.031)	(0.008)	(0.015)
Class 6	**0.044***	**0.100***	**0.108***	**0.155***	**0.051***	**0.110***
	(0.008)	(0.013)	(0.023)	(0.036)	(0.009)	(0.016)
Class 7	**0.047***	**0.100***	**0.113***	**0.164***	**0.052***	**0.108***
	(0.008)	(0.014)	(0.025)	(0.036)	(0.009)	(0.017)
Class 8	**0.045***	**0.096***	**0.125***	**0.171***	**0.051***	**0.102***
	(0.008)	(0.013)	(0.025)	(0.036)	(0.009)	(0.016)
Class 9	**0.040***	**0.087***	**0.123***	**0.170***	**0.050***	**0.095***
	(0.008)	(0.013)	(0.025)	(0.036)	(0.009)	(0.015)
Class 10	**0.041***	**0.071***	**0.135***	**0.186***	**0.050***	**0.074***
	(0.009)	(0.014)	(0.029)	(0.041)	(0.010)	(0.015)
Observations	390156	390156	146642	146642	243515	243515

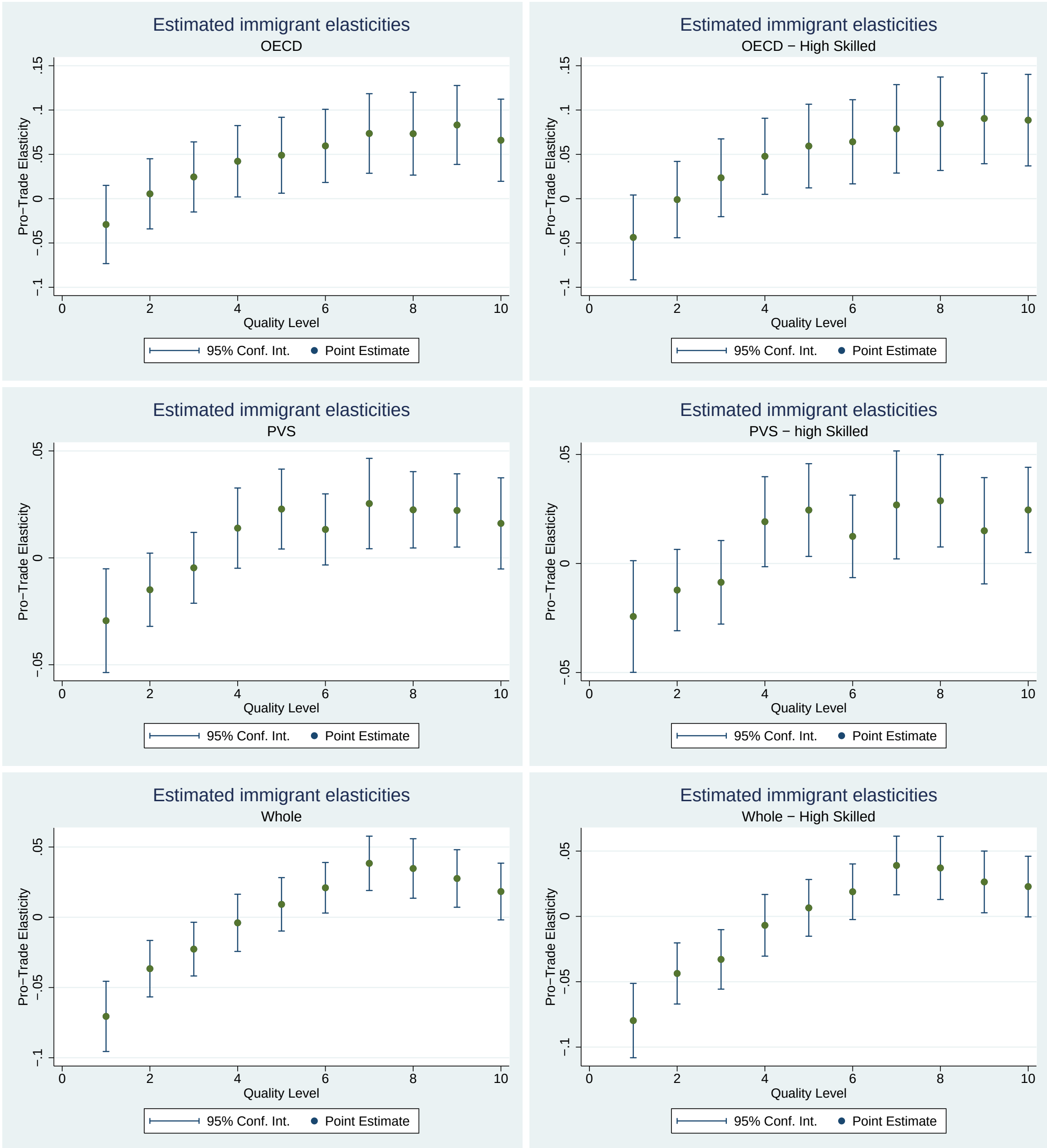
* Significant at 5% level.
Standard errors in parenthesis are heteroscedasticity-robust and clustered by trading-pair.
The upper part of the table shows the pro-trade effect of the total stock of bilateral immigrants whereas the lower part show the correspondent estimates for the high skill. The coefficients are obtained with OLS and 2SLS.

Table 9: Pro-Exports effects of immigrants on products of different quality - Differentiated

Sample	Whole	Whole	OECD	OECD	PVS	PVS
Estimator	OLS	OLS-IV	OLS	OLS-IV	OLS	OLS-IV
Class						
Class 1	−0.003	**0.034***	-0.005	0.002	**0.018***	**0.051***
	(0.008)	(0.010)	(0.024)	(0.026)	(0.007)	(0.010)
Class 2	**0.023***	**0.057***	**0.055***	**0.075***	**0.040***	**0.072***
	(0.007)	(0.010)	(0.023)	(0.033)	(0.007)	(0.011)
Class 3	**0.040***	**0.078***	**0.099***	**0.106***	**0.054***	**0.091***
	(0.007)	(0.010)	(0.021)	(0.028)	(0.007)	(0.012)
Class 4	**0.039***	**0.083***	**0.099***	**0.098***	**0.051***	**0.098***
	(0.007)	(0.011)	(0.021)	(0.025)	(0.007)	(0.013)
Class 5	**0.047***	**0.102***	**0.104***	**0.114***	**0.055***	**0.111***
	(0.008)	(0.013)	(0.022)	(0.026)	(0.009)	(0.016)
Class 6	**0.047***	**0.100***	**0.113***	**0.139***	**0.052***	**0.105***
	(0.008)	(0.013)	(0.021)	(0.030)	(0.009)	(0.015)
Class 7	**0.042***	**0.094***	**0.111***	**0.144***	**0.047***	**0.101***
	(0.008)	(0.013)	(0.023)	(0.030)	(0.009)	(0.016)
Class 8	**0.042***	**0.096***	**0.138***	**0.160***	**0.044***	**0.098***
	(0.009)	(0.013)	(0.023)	(0.031)	(0.010)	(0.015)
Class 9	**0.031***	**0.073***	**0.112***	**0.140***	**0.043***	**0.079***
	(0.008)	(0.012)	(0.024)	(0.032)	(0.009)	(0.013)
Class 10	**0.028***	**0.063***	**0.107***	**0.155***	**0.037***	**0.064***
	(0.008)	(0.012)	(0.027)	(0.035)	(0.009)	(0.013)
High Skilled						
Class 1	−0.002	**0.038***	-0.011	-0.005	**0.022***	**0.059***
	(0.009)	(0.012)	(0.027)	(0.034)	(0.007)	(0.012)
Class 2	**0.027***	**0.065***	**0.056***	**0.095***	**0.046***	**0.081***
	(0.008)	(0.011)	(0.025)	(0.040)	(0.007)	(0.013)
Class 3	**0.047***	**0.089***	**0.106***	**0.130***	**0.063***	**0.105***
	(0.007)	(0.012)	(0.024)	(0.033)	(0.008)	(0.014)
Class 4	**0.045***	**0.091***	**0.115***	**0.124***	**0.056***	**0.108***
	(0.008)	(0.013)	(0.025)	(0.030)	(0.008)	(0.015)
Class 5	**0.051***	**0.111***	**0.113***	**0.135***	**0.060***	**0.122***
	(0.009)	(0.015)	(0.026)	(0.032)	(0.010)	(0.018)
Class 6	**0.051***	**0.108***	**0.126***	**0.162***	**0.055***	**0.115***
	(0.009)	(0.015)	(0.024)	(0.037)	(0.010)	(0.018)
Class 7	**0.048***	**0.103***	**0.111***	**0.167***	**0.054***	**0.113***
	(0.009)	(0.015)	(0.023)	(0.037)	(0.010)	(0.018)
Class 8	**0.049***	**0.107***	**0.138***	**0.184***	**0.053***	**0.111***
	(0.010)	(0.015)	(0.023)	(0.037)	(0.011)	(0.017)
Class 9	**0.039***	**0.084***	**0.112***	**0.182***	**0.050***	**0.090***
	(0.009)	(0.014)	(0.024)	(0.037)	(0.010)	(0.016)
Class 10	**0.041***	**0.076***	**0.107***	**0.203***	**0.047***	**0.077***
	(0.010)	(0.014)	(0.027)	(0.041)	(0.010)	(0.015)

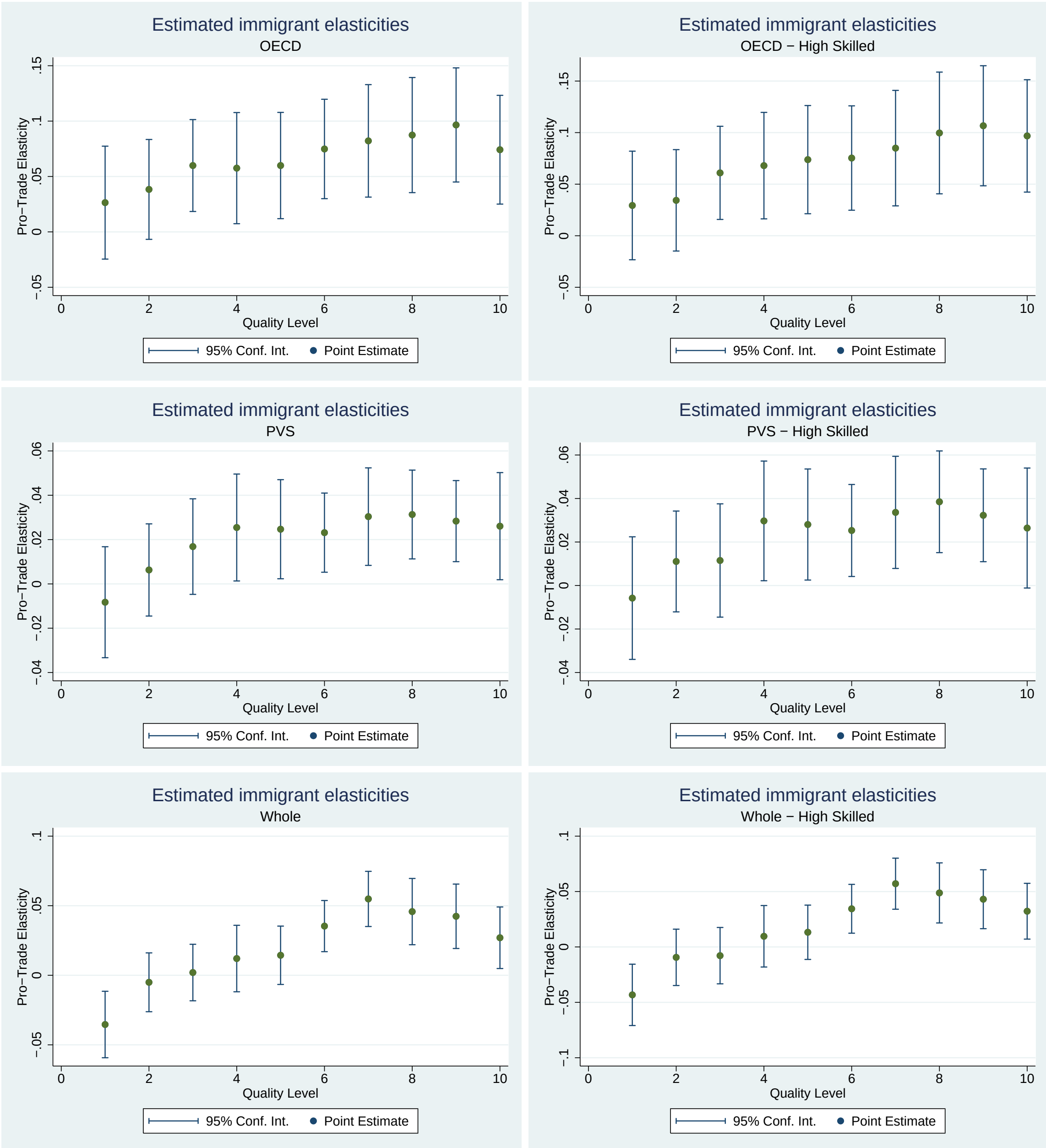
* Significant at 5% level.
Standard errors in parenthesis are heteroscedasticity-robust and clustered by trading-pair.
The dependent variable is the share of *differentiated* products in each class. The number of observations for each regression varies by subgroup: the share of *differentiated* products is reported in Table 5. The upper part of the table shows the pro-trade effect of the total stock of bilateral immigrants whereas the lower part show the correspondent estimates for the high skill. The coefficients are obtained with OLS and 2SLS.

Fig. 1: Pro-import elasticities of immigrants - Trend over product quality



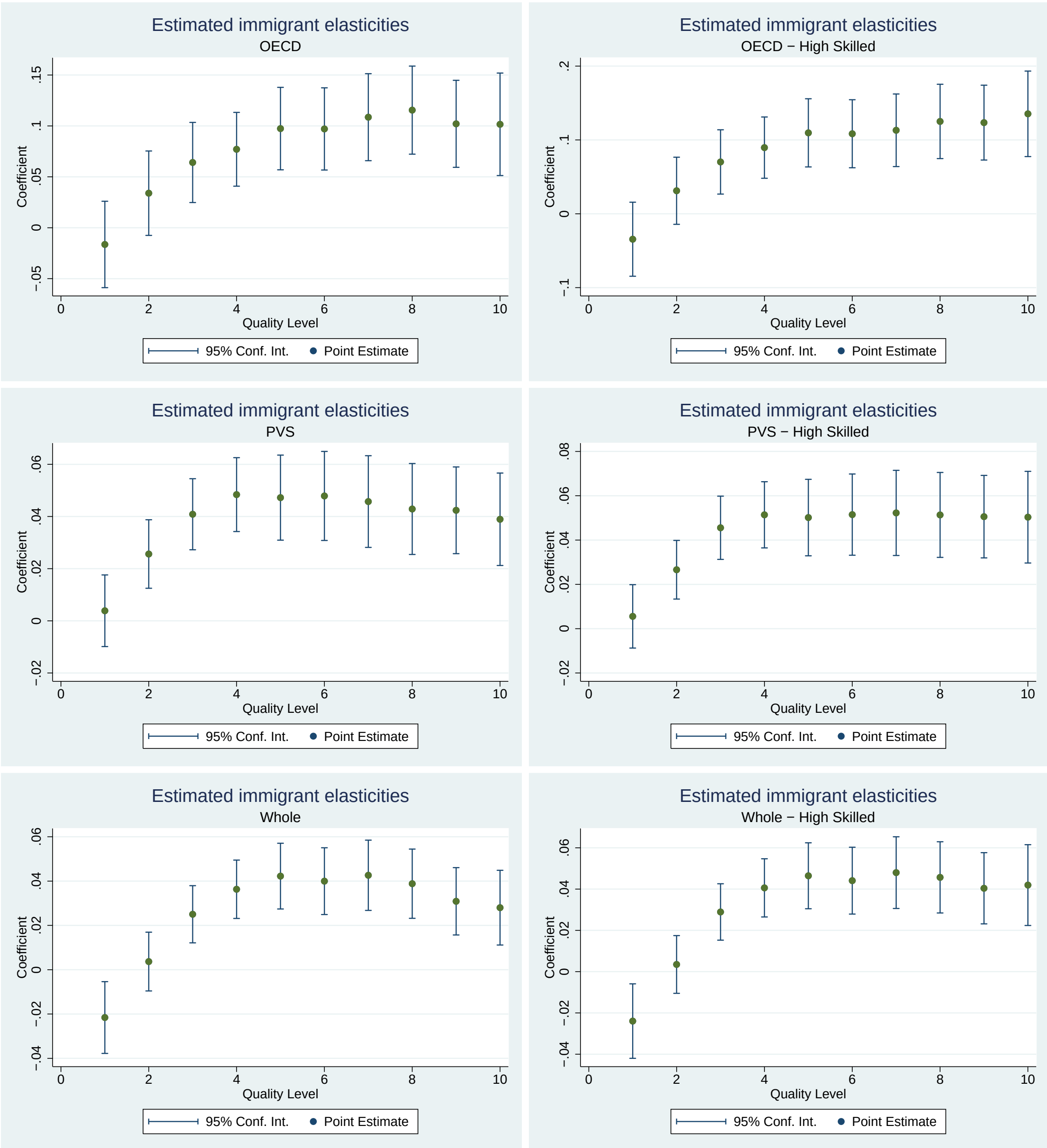
The pro-import elasticities of the OECD, PVS and the Whole sample are from the third, fifth and first column of Table 6, respectively. The graphs located on the right hand side show the trends of the elasticities of high-skilled immigrants.

Fig. 2: Pro-import elasticities of immigrants - Trend over product quality (Differentiated)



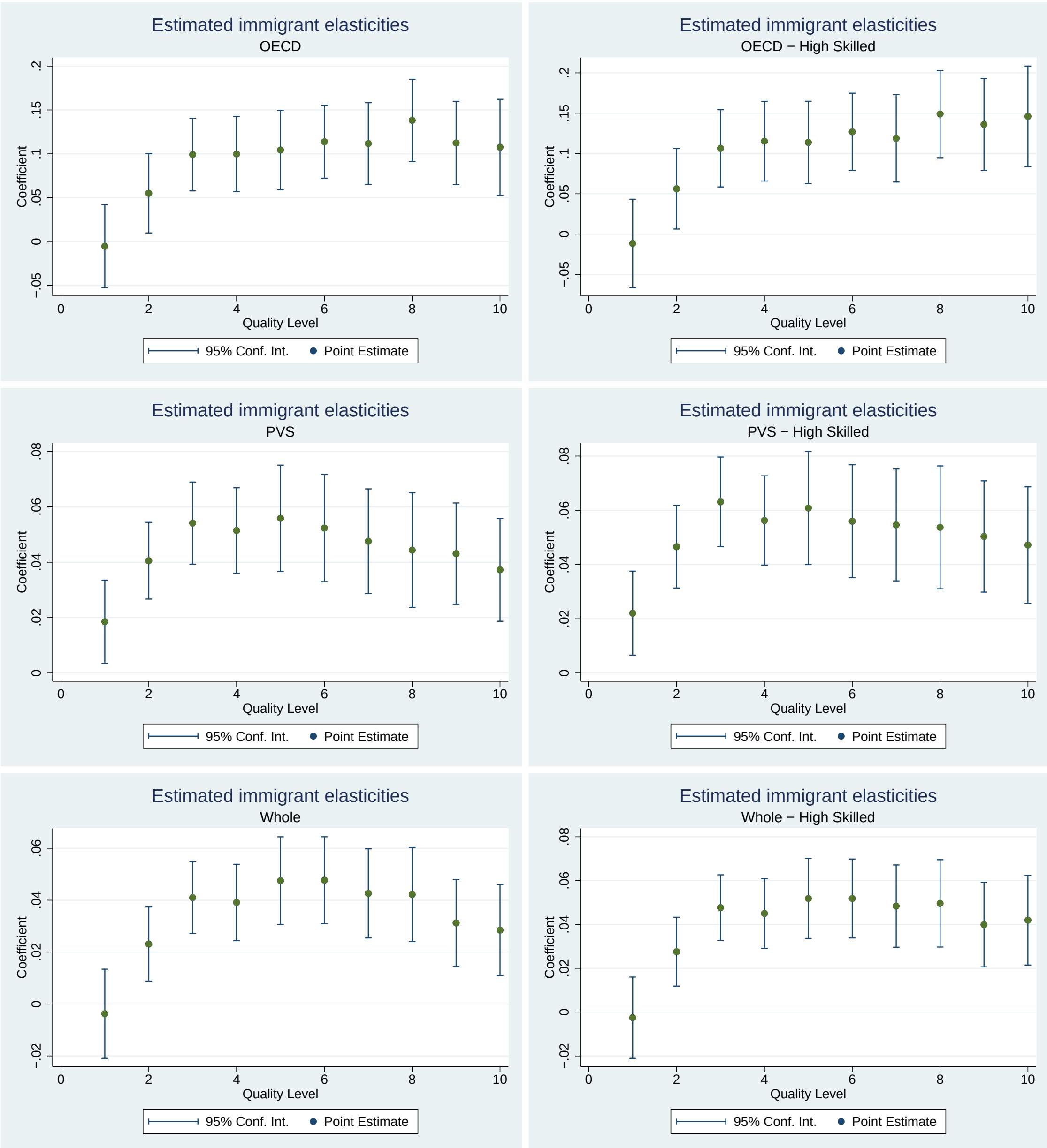
The pro-import elasticities of the OECD, PVS and the Whole sample are from the third, fifth and first column of Table 7, respectively. The graphs located on the right hand side show the trends of the elasticities of high-skilled immigrants.

Fig. 3: Pro-export elasticities of immigrants - Trend over product quality



The pro-export elasticities of the OECD, PVS and the Whole sample are from the third, fifth and first column of Table 8, respectively. The graphs located on the right hand side show the trends of the elasticities of high-skilled immigrants.

Fig. 4: Pro-export elasticities of immigrants - Trend over product quality (Differentiated)



The pro-export elasticities of the OECD, PVS and the Whole sample are from the third, fifth and first column of Table 9, respectively. The graphs located on the right hand side show the trends of the elasticities of high-skilled immigrants.

Table 10: Inter Ethnic Spillover - Whole Sample

Estimator	OLS	OLS	OLS-IV	OLS-IV	OLS-Dif	OLS-Dif
Coefficient	$\ln mig_{ni}$	$\ln spil_{ni}$	$\ln mig_{ni}$	$\ln spil_{ni}$	$\ln mig_{ni}$	$\ln spil_{ni}$
Imports						
Class 1	**−0.071***	0.005	**−0.071***	0.003	**−0.037***	0.015
	(0.013)	(0.014)	(0.016)	(0.015)	(0.012)	(0.015)
Class 2	**−0.038***	0.011	**−0.036***	0.011	-0.009	0.021
	(0.010)	(0.011)	(0.013)	(0.011)	(0.010)	(0.013)
Class 3	−0.025	0.015	**−0.027***	0.016	-0.001	0.017
	(0.009)	(0.011)	(0.012)	(0.011)	(0.010)	(0.013)
Class 4	−0.005	0.007	−0.004	0.007	0.011	0.002
	(0.010)	(0.010)	(0.013)	(0.010)	(0.012)	(0.012)
Class 5	0.008	0.004	0.018	0.001	0.013	0.006
	(0.009)	(0.011)	(0.012)	(0.011)	(0.010)	(0.013)
Class 6	**0.019***	0.008	**0.027***	0.005	**0.032***	0.019
	(0.009)	(0.011)	(0.013)	(0.011)	(0.009)	(0.011)
Class 7	**0.036***	0.016	**0.051***	0.012	**0.051***	0.023
	(0.009)	(0.012)	(0.013)	(0.012)	(0.010)	(0.013)
Class 8	**0.031***	0.024	**0.044***	0.022	**0.041***	0.030
	(0.011)	(0.015)	(0.015)	(0.015)	(0.012)	(0.016)
Class 9	**0.025***	0.011	**0.042***	0.008	**0.039***	0.018
	(0.010)	(0.012)	(0.014)	(0.012)	(0.012)	(0.014)
Class 10	0.017	0.003	**0.032***	0.000	**0.026***	0.000
	(0.010)	(0.014)	(0.014)	(0.014)	(0.011)	(0.014)
Observations	248319	248319	248319	248319		
Exports						
Class 1	**−0.021***	−0.000	0.002	-0.003	−0.003	−0.001
	(0.008)	(0.015)	(0.010)	(0.015)	(0.008)	(0.018)
Class 2	0.003	0.001	**0.040***	-0.005	**0.022***	0.006
	(0.006)	(0.012)	(0.010)	(0.012)	(0.007)	(0.013)
Class 3	**0.024***	0.006	**0.064***	-0.001	**0.039***	0.013
	(0.006)	(0.012)	(0.010)	(0.012)	(0.006)	(0.012)
Class 4	**0.034***	0.015	**0.077***	0.006	**0.037***	0.014
	(0.006)	(0.011)	(0.010)	(0.011)	(0.007)	(0.013)
Class 5	**0.040***	0.014	**0.087***	0.004	**0.045***	0.018
	(0.007)	(0.013)	(0.012)	(0.013)	(0.008)	(0.013)
Class 6	**0.038***	0.015	**0.091***	0.003	**0.046***	0.014
	(0.007)	(0.012)	(0.012)	(0.012)	(0.008)	(0.012)
Class 7	**0.040***	0.018	**0.091***	0.007	**0.040***	0.019
	(0.008)	(0.012)	(0.012)	(0.012)	(0.008)	(0.013)
Class 8	**0.037***	0.012	**0.087***	0.000	**0.040***	0.014
	(0.008)	(0.013)	(0.012)	(0.013)	(0.009)	(0.014)
Class 9	**0.028***	0.018	**0.074***	0.008	**0.028***	0.022
	(0.007)	(0.014)	(0.012)	(0.014)	(0.008)	(0.016)
Class 10	**0.028***	−0.000	**0.058***	-0.007	**0.028***	−0.001
	(0.008)	(0.014)	(0.012)	(0.014)	(0.009)	(0.016)
Observations	390156	390156	390156	390156		

* Significant at 5% level.
Standard errors in parenthesis are heteroscedasticity-robust and clustered by trading-pair.
The upper part of the table shows the pro-import effects of the total stock of bilateral immigrants along with the spillover coefficients for the whole sample; the lower part show the correspondent estimates for exports. The coefficients are obtained with OLS and 2SLS. The fifth and sixth column show the estimates with the % of differentiated products as dependent variable. The share of *differentiated* products varies by subgroup and it is reported in Table 5.

Table 11: Countries of Origin

Origin	Freq	Percent	Cum
Afghanistan	354	0.01	0.01
Albania	1595	0.06	0.08
Algeria	1720	0.07	0.15
Angola	460	0.02	0.17
Antigua and Barbuda	620	0.02	0.19
Argentina	14848	0.60	0.79
Armenia	412	0.02	0.81
Australia	**32057**	**1.29**	**2.10**
Austria	**58141**	**2.34**	**4.44**
Azerbaijan	588	0.02	4.46
Bahamas, The	1557	0.06	4.52
Bahrain	1664	0.07	4.59
Bangladesh	5695	0.23	4.82
Barbados	1276	0.05	4.87
Belarus	3881	0.16	5.03
Belgium	**100800**	**4.06**	**9.09**
Belize	850	0.03	9.12
Benin	387	0.02	9.14
Bhutan	89	0.00	9.14
Bolivia	2082	0.08	9.23
Bosnia and Herzegovina	1260	0.05	9.28
Brazil	32283	1.30	10.58
Brunei	520	0.02	10.60
Bulgaria	13942	0.56	11.16
Burkina Faso	777	0.03	11.19
Burundi	195	0.01	11.20
Cambodia	1968	0.08	11.28
Cameroon	1525	0.06	11.34
Canada	**45639**	**1.84**	**13.18**
Cape Verde	406	0.02	13.19
Central African Republic	437	0.02	13.21
Chad	102	0.00	13.21
Chile	**7696**	**0.31**	**13.52**
China	74968	3.02	16.54
China, Hong Kong SAR	41068	1.65	18.20
China, Macao SAR	5140	0.21	18.40
Colombia	8188	0.33	18.73
Comoros	216	0.01	18.74
Congo, Rep. of the	557	0.02	18.76
Costa Rica	4949	0.20	18.96
Cote d'Ivoire	3217	0.13	19.09
Croatia	9533	0.38	19.48
Cuba	1429	0.06	19.54
Cyprus	6605	0.27	19.80
Czech Republic	46576	1.88	21.68
Denmark	**69738**	**2.81**	**24.49**
Djibouti	138	0.01	24.49
Dominica	909	0.04	24.53
Dominican Republic	2869	0.12	24.64
Ecuador	4769	0.19	24.83
Egypt	9703	0.39	25.23
El Salvador	2458	0.10	25.32
Equatorial Guinea	133	0.01	25.33
Eritrea	119	0.00	25.33
Estonia	13953	0.56	25.90
Ethiopia	678	0.03	25.92
Fiji	2325	0.09	26.02
Finland	**42702**	**1.72**	**27.74**
France	**112473**	**4.53**	**32.27**
Gabon	967	0.04	32.31
Gambia	432	0.02	32.32
Georgia	1201	0.05	32.37
Germany	**113924**	**4.59**	**36.96**
Ghana	2419	0.10	37.06
Greece	**23212**	**0.93**	**37.99**

Origin	Freq	Percent	Cum
Grenada	385	0.02	38.01
Guatemala	3878	0.16	38.16
Guinea	107	0.00	38.17
Guinea-Bissau	754	0.03	38.20
Guyana	881	0.04	38.23
Haiti	829	0.03	38.27
Honduras	2347	0.09	38.36
Hungary	32867	1.32	39.68
Iceland	**6494**	**0.26**	**39.95**
India	52544	2.12	42.06
Indonesia	31965	1.29	43.35
Iran	4727	0.19	43.54
Iraq	46	0.00	43.54
Ireland	**38741**	**1.56**	**45.10**
Israel	22962	0.92	46.03
Italy	**122169**	**4.92**	**50.95**
Jamaica	2275	0.09	51.04
Japan	**74234**	**2.99**	**54.03**
Jordan	3027	0.12	54.15
Kazakhstan	1219	0.05	54.20
Kenya	2968	0.12	54.32
Kiribati	56	0.00	54.32
Korea	48953	1.97	56.29
Kuwait	1414	0.06	56.35
Kyrgyzstan	340	0.01	56.36
Laos	846	0.03	56.40
Latvia	7841	0.32	56.71
Lebanon	4241	0.17	56.88
Liberia	231	0.01	56.89
Libya	380	0.02	56.91
Lithuania	11322	0.46	57.36
Macedonia	3988	0.16	57.52
Madagascar	3362	0.14	57.66
Malawi	684	0.03	57.69
Malaysia	29255	1.18	58.86
Maldives	389	0.02	58.88
Mali	918	0.04	58.92
Malta	4978	0.20	59.12
Marshall Islands	75	0.00	59.12
Mauritania	449	0.02	59.14
Mauritius	4695	0.19	59.33
Mexico	31122	1.25	60.58
Micronesia	76	0.00	60.58
Moldova	1324	0.05	60.64
Mongolia	440	0.02	60.66
Morocco	12273	0.49	61.15
Mozambique	380	0.02	61.17
Myanmar	1527	0.06	61.23
Nepal	2693	0.11	61.34
Netherlands	**99268**	**4.00**	**65.33**
New Zealand	**18060**	**0.73**	**66.06**
Nicaragua	1407	0.06	66.12
Niger	668	0.03	66.14
Nigeria	2216	0.09	66.23
Norway	**46335**	**1.87**	**68.10**
Oman	2005	0.08	68.18
Pakistan	10857	0.44	68.62
Palau	25	0.00	68.62
Panama	2121	0.09	68.70
Papua New Guinea	816	0.03	68.74
Paraguay	1230	0.05	68.79
Peru	8673	0.35	69.13
Philippines	16370	0.66	69.79
Poland	35970	1.45	71.24
Portugal	**41004**	**1.65**	**72.89**
Qatar	1150	0.05	72.94
Russia	19575	0.79	73.73

Origin	Freq	Percent	Cum
Rwanda	105	0.00	73.73
Saint Kitts and Nevis	455	0.02	73.75
Saint Lucia	818	0.03	73.78
Saint Vincent	455	0.02	73.80
Samoa	142	0.01	73.81
San Marino	243	0.01	73.82
Sao Tome and Principe	172	0.01	73.82
Saudi Arabia	5931	0.24	74.06
Senegal	1523	0.06	74.12
Seychelles	424	0.02	74.14
Sierra Leone	1021	0.04	74.18
Slovakia	18534	0.75	74.93
Slovenia	21762	0.88	75.81
Solomon Islands	217	0.01	75.81
Somalia	125	0.01	75.82
South Africa	23438	0.94	76.76
Spain	**84803**	**3.42**	**80.18**
Sri Lanka	9652	0.39	80.57
Sudan	598	0.02	80.59
Suriname	984	0.04	80.63
Sweden	**67185**	**2.71**	**83.34**
Switzerland	**59041**	**2.38**	**85.71**
Syria	2843	0.11	85.83
Tajikistan	141	0.01	85.83
Tanzania	1335	0.05	85.89
Thailand	37171	1.50	87.39
Togo	685	0.03	87.41
Tonga	152	0.01	87.42
Trinidad and Tobago	2946	0.12	87.54
Tunisia	9159	0.37	87.91
Turkey	37781	1.52	89.43
Turkmenistan	319	0.01	89.44
Tuvalu	37	0.00	89.44
Uganda	721	0.03	89.47
Ukraine	7600	0.31	89.78
United Kingdom	**123195**	**4.96**	**94.74**
United States	**107973**	**4.35**	**99.09**
Uruguay	3258	0.13	99.22
Uzbekistan	427	0.02	99.23
Vanuatu	129	0.01	99.24
Venezuela	5457	0.22	99.46
Vietnam	8505	0.34	99.80
Yemen	331	0.01	99.82
Zambia	982	0.04	99.86
Zimbabwe	3594	0.14	100.00
Total	2483184		

The 23 countries in **bold** are the OECD sample whereas the remaining countries are the PVS sample. The second column reports the country's weight in % over total observations. Column *Cum* reports the cumulative % of observations.

Table 12: Destination countries

Destination	Freq	Percent	Cum
Australia	101317	4.08	4.08
Austria	126868	5.11	9.19
Canada	125620	5.06	14.25
Chile	75411	3.04	17.28
Denmark	117738	4.74	22.03
Finland	105448	4.25	26.27
France	199752	8.04	34.32
Germany	199295	8.03	42.34
Greece	100231	4.04	46.38
Ireland	87860	3.54	49.92
Netherlands	163918	6.60	56.52
New Zealand	75294	3.03	59.55
Norway	117852	4.75	64.30
Portugal	93854	3.78	68.08
Spain	151165	6.09	74.16
Sweden	117065	4.71	78.88
Switzerland	98156	3.95	82.83
United Kingdom	213206	8.59	91.42
United States	213134	8.58	100.00
Total	2483184		

Column *Freq* shows the number of observations for each importing country.
Column *Percent* reports the country’s weight in % terms.
Column *Cum* reports the cumulative % of observations

References

Aleksynska, M. and G. Peri (2013). Isolating the network effect of immigrants on trade. *The World Economy* ***37***(3), 434–435.

Anderson, J. and E. V. Wincoop (2004). Trade costs. *Journal of Economic Literature* ***42***(3), 691Ű751.

Baum, C. F., M. E. Schaffer, and S. Stillman (2003). Instrumental variables and gmm: Estimation and testing. *Stata Journal* ***3***(1), 1–31.

Bratti, M., L. D. Benedictis, and G. Santoni (2014). On the pro-trade effects of immigrants. *Review of World Economics (Weltwirtschaftliches Archiv)* (forthcoming).

Briant, A., P. P. Combes, and M. Lafourcade (2014). Product complexity, quality of institutions and the pro-trade effect of immigrants. *The World Economy* ***37***(1), 63–85.

Broda, C. and D. E. Weinstein (2006). Globalization and the gains from variety. *Quarterly Journal of Economics* ***121***(2), 541–585.

Brucker, H., S. Capuano, and A. Marfouk (2013). Education, gender and international migration: insights from a panel-dataset 1980-2010, mimeo.

Combes, P., P. Lafourcade, and T. Mayer (2005). The trade-creating effects of business and social networks: Evidence from france. *Journal of International Economics* ***66***(2), 1–29.

Dunlevy, J. (2006). The influence of corruption and language on the protrade effect of immigrants: Evidence from the american states. *The Review of Economics and Statistics* ***88***(1), 182Ű186.

Dunlevy, J. and W. Hutchinson (1999). The impact of immigration on american import trade in the late nineteenth and twentieth centuries. *Journal of Economic History* ***59***(4), 1043–1062.

Eaton, J. and S. Kortum (2002). Technology, geography and trade. *Econometrica* ***70***(5), 1741–1779.

Egger, P., M. V. Ehrlich, and D. Nelson (2012). Migration and trade. *The World Economy* ***35***(2), 216–241.

Ehrhart, H., M. L. Goff, E. Rocher, and R. J. Singh (2014). Does migration foster exports? *World Bank - Policy Research Working Paper* (Number 6739).

Felbermayr, G., V. Grossmann, and W. Kohler (2012). Migration, international trade and capital formation: Cause or effect? *IZA Discussion Paper* (Number 6975).

Felbermayr, G. J. and B. Jung (2009). The pro-trade effect of the brain drain: Sorting out confounding factors. *Economics Letters* ***104***(2), 72–75.

Felbermayr, G. J. and F. Toubal (2012). Revisiting the trade-migration nexus: Evidence from new oecd data. *World Development* ***40***(5), 928–937.

Fieler, A. C. (2011). Nonhomoteticity and bilateral trade: Evidence and a quantitative explanation. *Econometrica* ***79***(4), 1069Ű1101.

Genc, M., M. Gheasi, P. Nijkamp, and J. Poot (2012). *The Impact of Immigration on International Trade: A Meta-Analysis*. Northhampton (MA): Edward Elgar Publishing Limited.

Girma, S. and Z. Yu (2002). The link between immigration and trade: Evidence from the united kingdom. *Review of World Economics (Weltwirtschaftliches Archiv)* ***138***(1), 115–130.

Gould, D. M. (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.

Hallak, H. C. (2006). Product quality and the direction of trade. *Journal of International Economics* ***68***(1), 238–265.

Head, K. and T. Mayer (2002). Illusory border effects: Distance mismeasurement inflates estimates of home bias in trade. *CEPR Discussion Papers* (Number 3327).

Head, K. and T. Mayer (2014). *Gravity Equations: Workhorse,Toolkit, and Cookbook*. Handbook of International Economics Vol.4. In G. Gopinath, E. Helpman, K. Rogoff (Eds.), Amsterdam: Elsevier (forthcoming).

Head, K. and J. Ries (1998). Immigration and trade creation: Econometric evidence from canada. *Canadian Journal of Economics* ***31***(1), 47–62.

Herander, M. G. and L. A. Saavedra (2005). Exports and the structure of immigrant-based networks: The role of geographic proximity. *The Review of Economics and Statistics* ***87***(2), 323–335.

Lanati, M. (2014). The trade migration link within a ricardian model of trade. *Discussion Paper, Dipartimento di Economia & Management, University of Pisa* .

Peri, G. and F. Requena-Silvente (2010). The trade creation effect of immigrants: evidence from the remarkable case of spain. *Canadian Journal of Economics* ***43***(4), 1433–1459.

Rauch, J. E. (1999). Networks versus markets in international trade. *Journal of International Economics* ***48***(1), 7–35.

Rauch, J. E. and V. Trindade (2002). Ethnic chinese networks in international trade. *The Review of Economics and Statistics* ***84***(1), 116–130.

Santos Silva, J. and S. Tenreyro (2006). The log of gravity. *The Review of Economics and Statistics* ***88***(4), 641–658.

Staiger, D. and J. Stock (1997). Instrumental variables regression with weak instruments. *Econometrics* ***65***(3), 557 – 586.

Tai, S. (2009). Market structure and the link between migration and trade. *Review of World Economics (Weltwirtschaftliches Archiv)* ***145***(2), 225–249.

Van Biesebroeck, J. (2011). Dissecting intra-industry trade. *Economics Letters* ***110***(2), 71–75.

Wagner, D., K. Head, and J. Ries (2002). Immigration and the trade of provinces. *Scottish Journal of Political Economy* ***49***(5), 507–525.

A Appendix

A.1 Data, Methodologies and Definitions

In this analysis we use data for the years 1995 and 2000. **Countries.** The whole sample includes 177 countries of origin and 19 OECD destination countries. Table 12 lists the 19 OECD destination countries while Table 11 lists the 177 countries of origin. In Table 11 countries are divided into two subgroups based on the level of income per capita: OECD (23 countries in **bold**), and PVS (154 remaining emerging and developing countries). The OECD sample includes all highly industrialized economies: they all entered OECD prior to 1990 and they were all ranked in the highest quartile of the IMF world's list of GDP-per capita.[22]
Migration data. Migration data are from the recent IAB brain drain dabatase by Brucker et al. (2013). We use the total number of foreign-born individuals aged 25 years and older, resident in one of the 19 OECD destination countries and born in one of the 177 countries of origin. Migrants are divided in high-skilled based on their education level and total number of migrants as in Felbermayr and Toubal (2012).
Geographic barriers. Data on weighted distance and all the geographic barriers used in this paper namely common border, common language and the dummy for Regional Trade Agreement RTA are from CEPII gravity database.[23]
Trade data. Data on bilateral values and quantities of exports in thousand dollars disaggregated at HS 6-digit level are from BACI database (CEPII). Starting from bilateral trade data at the most detailed classification level comparable across countries, we determine the Export Unit Values (EUV) for each 6-digit HS category. EUV is the ratio between the value and the quantity of exports and it stands for our proxy for product quality as in Van Biesebroeck (2011). Observations with zero or no quantities reported are dropped. The samples are divided in 10 classes according to the level of product quality: each subgroup in the whole sample has 248319 information for imports, 390156 for exports. We perform the same analysis by dividing the database into 4 (instead of 10) subgroups each composed by 1/4 of total observations based on quality level. The results confirm the upward trend of the coefficients also for larger subsamples. The statistics are available upon request.
Differentiated Products. We estimate the correspondent pro-trade effect of immigrants in each class on the percentage of differentiated products according to the classification proposed by Rauch (1999). Table 5 reports the % of differentiated products with respect to the aggregate samples in all classes. Table 5 shows that, as expected, the percentage of differentiated products increases with the quality of traded goods. In the whole sample the % of *differentiated* products goes from 26,5% of the total traded goods in the first class to more than 60% for high-quality products. The differentiated products are defined according to Rauch (1999) classification. *Homogeneous Sectors* include goods that are internationally traded in organized exchanges, with a well-defined price. *Reference-Priced Sectors* include goods that are not traded in organized exchanges but have reference prices available in specialized publications. *Differentiated Sectors* are those sectors that do not satisfy either of the two previous criteria. In order to obtain the share of differentiated commodities in each class we proceed as follows. We convert the HS-6 digit classification into 5-digit SITC Rev.2 classification by using the correspondence table from UN Statistics Division. Then we assemble goods into 4-digit SITC Rev.2 classification in order to be able to merge the database with Rauch (1999) classification.
IV. The correspondent stocks for 1985 from the recent IAB brain drain dabatase are used as instruments in the 2SLS analysis. Given the presence of zero observations, in order to preserve the same number of observations in OLS and IV-OLS regressions we set $\ln\left(\text{mig}_{ni,t}+1\right)$ also for lagged stocks.
Inter-Ethnic Spillovers. As in Bratti et al. (2014) we allow for inter-ethnic spillovers, which is to say we allow for immigrants of other nationalities to affect trade between country i and country n. With respect to Bratti et al. (2014) we rule out the inter-ethnic proximity based on *affinity in trade* and we only focus on the definition of proximity based on the common language. To build the spillover variable $spil_{ni}$ for nationality i in country n we aggregate all immigrants of other nationalities who speak the same language as nationality i and located in the same country. Following the CEPII database for any country pair it takes value 1 if a language is spoken by 9% (or more) of the population in both countries and zero otherwise.

Robustness checks - Poisson PML and Gamma PML. Santos Silva and Tenreyro (2006) suggested Poisson pseudo-MLE as a valid alternative to linear-in-logs OLS for multiplicative models like the gravity equation. The Poisson PML (PPML) and Gamma PML (GPML) estimator guarantees consistent estimates regardless of the distribution of the error term, as long as:

$$E\left[X_{ni}|z_{ni}\right]=\exp\left(z_{ni}^{'}\upsilon\right).$$

where X_{ni} is bilateral trade, $z_{ni}^{'}$ is the transpose of a vector of the trade cost variables and υ is the correspondent vector of coefficients. After conducting a Monte Carlo simulation, Head and Mayer (2014) argue that Poisson PML should not replace OLS as the workhorse for gravity equation; alternatively, they suggest to use Poisson PML as part of a robustness-exploring ensemble which includes OLS and Gamma PML. Following Head and Mayer (2014) we test the reliability of the OLS estimates by contrasting OLS with Poisson and Gamma PML results. As noted by Head and Mayer (2014), if there's a significant discrepancy between OLS coefficients and the estimates from the other two methodologies, then it is reasonable to conclude that heteroskedasticity is an issue and the OLS estimates are unreliable. We obtain estimates which are reasonably close to OLS, especially for Gamma PML (GPML). More importantly for

[22] The only exceptions are the inclusion of Chile which entered in 2010 and the exclusion of Turkey. Despite Turkey was part of the OECD prior to 1990, it hasn't been included in the OECD sample since it belongs to the upper-mid quartile. As a robustness check we drop Chile from the group of importers; this exclusion does not affect our main results. We cannot conduct a similar exercise with the inclusion of Turkey among the importers, since the database of Brucker et al. (2013) doesn't include immigrants resident in Turkey.

[23] Weighted distance calculates the distance between two countries based on bilateral distances between the biggest cities of those two countries: those inter-city distances are weighted by the share of the city in the overall country's population. The CEPII gravity database includes data on distance between n and i based on the following formula from Head and Mayer (2002): $\text{dist}_{ni}=\left(\sum_{k\in n}\frac{\text{pop}_k}{\text{pop}_n}\right)*\left(\sum_{l\in i}\frac{\text{pop}_l}{\text{pop}_i}\right)*\text{dist}_{kl}$, where pop_k stands for the population of agglomeration k belonging to country n while pop_l is the population of agglomeration l belonging to country i.

our purposes, the PPML and GPML elasticities exhibit a similar trend over quality. The whole set of estimates are available upon request.
Robustness checks - Measurement Error. We address the measurement error issue in two ways. First, with an IV approach as explained in Section 3; second, we perform a robustness check by eliminating potential outliers from the whole sample similarly to the methodology applied in Hallak (2006). For each category Hallak (2006) removes observations with unit values 4 times above or below the mean; since observations with extreme unit values show disproportionately low export quantities, Hallak (2006) removes observations with quantity below the minimum of 50 units or a quarter of the average quantity for the category. We adopt a different procedure. We drop the first and last class from the whole database - both for imports and exports unit values - and we create a new reduced sample where potential outliers are excluded. Then we perform the same analysis (division of the trade data in 10 subgroups according to the level of quality of the product traded and estimates of the gravity equation for each class) on the reduced sample with a smaller variance. The results (available upon request) are very similar to the ones of the original analysis so the main conclusions stand.
Robustness checks - Rauch (1999) Liberal Classification. Rauch (1999) uses two standards to make his classification, one *liberal* and one *conservative*, with the former minimizing the number of commodities that are classified as either organized exchange or reference priced and the latter maximizing those numbers. In Table 7 and Table 9 we report the estimates obtained using the *conservative* classification; we run the same regressions using the *liberal* classification which is more stringent in the classification of goods as differentiated. As a robustness check we estimate Equation (5) using the share of differentiated products obtained the *liberal* classification. The trend and the magnitudes of the coefficients remain substantially unchanged, therefore the main conclusions stand. The statistics are available upon request.

A.2 Testing the validity of the lagged stocks of immigrants as instruments

The instrument we use in the 2SLS estimates reported in Table 6, 7, 8 and 9 are the lagged bilateral stocks of immigrants in line with many influential papers such as Briant et al. (2014), Combes et al. (2005) and others.
The following analysis for the validity of instruments refer to the whole sample for both imports and exports. The correspondent analysis for the other two samples are available upon request.
Instruments are valid if they are exogenous and relevant. Strict relevance depends on the partial correlation between the endogenous variable and the instruments, once the other exogenous regressors have been controlled for. Table 13 and Table 14 report the OLS estimates of the traditional first step of the 2-step instrumented regressions for total and high-skilled migrants, respectively. As shown by Baum et al. (2003), in the case of a single endogenous explanatory variable, the Partial R^2 and the F-test of the joint significance of excluded instruments are the sufficient statistics to assess the relevance of instruments. To further check for the relevance of instruments we also report the Anderson canonical correlations test, a likelihood ratio LR test of whether the equation is identified (i.e.) that the excluded instruments are correlated with the endogenous regressors.
Table 13 and Table 14 report the first stage statistics including initially two instruments namely the lagged bilateral stocks of immigrants for 1985 and 1980 from Brucker et al. (2013). The elasticity of 1980 immigrants is not statistically significant: as Briant et al. (2014) point out, the weakness of instruments is often worse that the endogeneity bias itself, therefore we choose to remain parsimonious, and leave this instrument out of our IV set. In the case of a single endogenous explanatory variable, a F-statistic lower than 10 is of concern according to Staiger and Stock (1997) rule of thumb. The results of Partial R^2 and F-test reported below indicate that the instrument is relevant.
Since we've proved the relevance of only one instrument our best IV model is just identified. Therefore, we cannot test for exogeneity since the number of instruments exactly corresponds to the endogenous regressors.

Table 13: Relevance of the lagged stocks of immigrants as instruments - Whole

IV: stocks of 1985 and 1980

Variable		Imp Coef	Exp Coef
Immigrants 85	$\ln(\text{mig85}_{ni})$	0.63^a	0.56^a
		(0.06)	(0.04)
Immigrants 80	$\ln(\text{mig80}_{ni})$	-0.01	0.01
		(0.17)	(0.01)
Shared border	contig_{ni}	0.07	0.01
		(0.10)	(0.13)
Shared language	lang_{ni}	0.43^a	0.63^a
		(0.12)	(0.11)
RTA	rta_{ni}	-0.17	-0.26^b
		(0.10)	(0.10)
Distance	$\ln(\text{Dist}_{ni})$	-0.32^a	-0.43^a
		(0.06)	(0.06)
Observations		248319	390156
Centered R^2		0.88	0.87
Uncentered R^2		0.99	0.99
Shea Partial R^2		0.60	0.55
F Test of Excl. Inst.(Imp)	F(2,2577)	108.6	
F Test of Excl. Inst.(Exp)	F(2,3002)		141.1
Anderson LR Stat(Imp)	Chi-sq(2)	2.3e+05	
Anderson LR Stat(Exp)	Chi-sq(2)		3.2e+05

IV: stock of 1985

Variable		Imp Coef	Exp Coef
Immigrants 85	$\ln(\text{mig85}_{ni})$	0.62^a	0.57^a
		(0.05)	(0.03)
Shared border	contig_{ni}	0.07	0.06
		(0.10)	(0.13)
Shared language	lang_{ni}	0.43^a	0.64^a
		(0.12)	(0.11)
RTA	rta_{ni}	-0.16	-0.26^b
		(0.10)	(0.10)
Distance	$\ln(\text{Dist}_{ni})$	-0.32^a	-0.43^a
		(0.06)	(0.05)
Observations		248319	390156
Centered R^2		0.88	0.89
Uncentered R^2		0.99	0.98
Shea Partial R^2		0.60	0.54
F Test of Excl. Inst.(Imp)	F(1,2577)	151.8	
F Test of Excl. Inst.(Exp)	F(1,3002)		246.0
Anderson LR Stat(Imp)	Chi-sq(1)	2.3e+05	
Anderson LR Stat(Exp)	Chi-sq(1)		3.2e+05

a, b, c denotes statistical significance at the 1%, 5%, 10% levels of significance, respectively.
Importer and Exporter fixed effects are included.
Robust country-pair clustered standard errors are in parenthesis.

Table 14: Relevance of the lagged stocks of immigrants as instruments - Whole (High Skilled)

IV: stocks of 1985 and 1980

Variable		Imp Coef	Exp Coef
Immigrants 85	$\ln(\text{mig85}_{ni})$	0.62^{a}	0.57^{a}
		(0.07)	(0.05)
Immigrants 80	$\ln(\text{mig80}_{ni})$	-0.00	0.01
		(0.01)	(0.01)
Shared border	contig_{ni}	0.01	-0.02
		(0.08)	(0.10)
Shared language	lang_{ni}	0.47^{a}	0.63^{a}
		(0.12)	(0.11)
RTA	rta_{ni}	-0.22^{b}	-0.27^{a}
		(0.10)	(0.09)
Distance	$\ln(\text{Dist}_{ni})$	-0.37^{a}	-0.41^{a}
		(0.06)	(0.11)
Observations		248319	390156
Centered R^2		0.89	0.89
Uncentered R^2		0.99	0.98
Shea Partial R^2		0.55	0.54
F Test of Excl. Inst.(Imp)	F(2,2577)	80.1	
F Test of Excl. Inst.(Exp)	F(2,3002)		112.8
Anderson LR Stat(Imp)	Chi-sq(2)	2.0e+05	
Anderson LR Stat(Exp)	Chi-sq(2)		3.2e+05

IV: stock of 1985

Variable		Imp Coef	Exp Coef
Immigrants 85	$\ln(\text{mig85}_{ni})$	0.61^{a}	0.58^{a}
		(0.05)	(0.04)
Shared border	contig_{ni}	0.01	-0.02
		(0.08)	(0.10)
Shared language	lang_{ni}	0.47^{a}	0.64^{a}
		(0.12)	(0.11)
RTA	rta_{ni}	-0.22^{b}	-0.27^{a}
		(0.10)	(0.09)
Distance	$\ln(\text{Dist}_{ni})$	-0.37^{a}	-0.41^{a}
		(0.06)	(0.05)
Observations		248319	390156
Centered R^2		0.89	0.89
Uncentered R^2		0.99	0.98
Shea Partial R^2		0.60	0.54
F Test of Excl. Inst.(Imp)	F(1,2577)	117.7	
F Test of Excl. Inst.(Exp)	F(1,3002)		192.1
Anderson LR Stat(Imp)	Chi-sq(1)	2.0e+05	
Anderson LR Stat(Exp)	Chi-sq(1)		3.0e+05

a, b, c denotes statistical significance at the 1%, 5%, 10% levels of significance, respectively.
Importer and Exporter fixed effects are included.
Robust country-pair clustered standard errors are in parenthesis.