NBER WORKING PAPER SERIES

THE TRADE CREATION EFFECT OF IMMIGRANTS: EVIDENCE FROM THE REMARKABLE CASE OF SPAIN

Giovanni Peri
Francisco Requena

Working Paper 15625
http://www.nber.org/papers/w15625

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
December 2009

We are very thankful to Miklos Koren for very useful comments. Requena acknowledges financial support from the Spanish Ministry of Science and Innovation (project number ECO 2008-04059/ECON), Generalitat Valenciana (program PROMETEO/2009/098) and Jose Castillejo Schoolarship, which sponsored his stay at University of California Davis during the academic year 2008-2009. The views expressed herein are those of the author(s) and do not necessarily reflect the views of the National Bureau of Economic Research.

The Trade Creation Effect of Immigrants: ¸Evidence from the Remarkable Case of Spain
Giovanni Peri and Francisco Requena
NBER Working Paper No. 15625
December 2009
JEL No. F10,F22,R12

ABSTRACT

There is abundant evidence that immigrant networks are associated with larger exports from the country where they settle to their countries of origin. The direction of causality of this association is less clearly established. Also, we do not know to what extent these increased exports are due to an increase in the number of exporting firms (i.e. the extensive margin of trade) or due to larger values exported by existing firm (i.e. the intensive margin). Using micro data on individual trade transactions from Spanish provinces between 1995 and 2008 and data on the stock of immigrants in those provinces by country of origin we can make progress on both fronts. The richness of our data allows us to control for a large set of fixed effects and to use an instrumental variable strategy to isolate the export creation effect of new immigrants. We are also able to quantify the impact of immigrants on the intensive and extensive margin of trade and how it varies between homogeneous, moderately differentiated and differentiated goods. 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. As implied by a decrease in fixed trade costs in that model we find that immigrants significantly increase exports (elasticity of 0.10), that the effect is almost entirely due to an increase in the extensive margin and that the effect is somewhat stronger for differentiated goods.

Giovanni Peri
Department of Economics
University of California, Davis
One Shields Avenue
Davis, CA 95616
and NBER
gperi@ucdavis.edu

Francisco Requena
Universidad de Valencia, Spain
francisco.requena@uv.es

1 Introduction

Since the pioneering work of Gould (1994) and Head and Reis (1998) economists have found empirical evidence that, controlling for bilateral transport costs, larger bilateral migration networks are associated with larger trade flows. Immigration networks, by providing channels of knowledge diffusion, and enforcement mechanisms, reduce the information, communication and set-up costs between locations (Rauch and Trindale, 2002). Gravity-type regressions uncover a significant correlation between immigrant networks and trade, suggesting immigrants create trade by reducing trade costs.

Our paper goes beyond the existing literature in several important ways. First, as we can use micro-data on individual trade transactions for 50 Spanish provinces and 77 foreign countries over 14 years (1995-2008), we can decompose the effects of immigrants on the extensive margin of trade (i.e. the number of transactions in this study) and on the intensive margin of trade (i.e. the average amount per transaction). Second, as in Rauch and Trindale (2002), we are able to use trade data for different types of goods, classifying them according to their elasticity of substitution across varieties. This allows us to identify the importance of networks in reducing information costs which should be more relevant for more differentiated rather than for homogeneous goods. Third, as we can include province-country bilateral fixed effects (which, for example, control for bilateral trade costs, geography and cultural similarity) and for country-time effects we can identify the export creation effect on the within-pair change in trade as consequence of changes in the stock of immigrants. To reinforce our causal interpretation, we use historical immigrant enclaves as an instrument for current immigration. The tendency of people from the same country to settle in the same areas over time provides supply-driven variation in the inflow of immigrants (see for instance Card 2001, 2007; Ottaviano and Peri 2006) that should be uncorrelated with other sources of changes in exports. Finally, we analyze whether the elasticity of export creation to immigrants varies with the size of the immigrant community. By splitting the sample across provinces and then over time we can test whether the elasticity is significantly larger in provinces with larger shares of immigrants and/or in periods of increased immigration.

We have three main findings. First, we find an average effect of immigrants on exports that is statistically and economically significant. An increase by 10% of the immigrant community from a country in a Spanish province increases the exports to that country between 0.5 and 1%. Second, in most cases the largest part of the export creation effect is due to an increase in the number of trade transactions (i.e. the extensive margin) with little to no effect on the volume of the average transaction (i.e. the intensive margin). Third, there is a pattern of larger export creation for highly differentiated goods than for homogeneous goods towards most countries. However, there is some heterogeneity in this result. For regions likely to have large fixed trade costs, such as Africa, the export creation effect is the same across all good categories. While for countries culturally similar to Spain, such as those in Latin America, immigrants do not have a special role to play in reducing fixed trade

costs. Finally, we also find the elasticity of export to new immigrants is large in provinces with high density of immigrants and it increased during the most recent period (2002-2008) when the immigrate population grew substantially relative to the native population.

Chaney's (2008) theory provides a foundation for our empirical gravity equation and a theory of the relation between trade costs and the margins of trade thus rationalizing our findings. In that model, a reduction in the fixed bilateral costs of trade (e.g. start-up costs) should only act to increase trade on the extensive margin (i.e. by increasing the number of exporting firms) and not on the intensive margin (i.e. by increasing the volume of trade within firms). A decrease in the variable trade cost (e.g. ad valorem duties), however, increases trade on both margins. Moreover, a decrease in the fixed trade costs has a larger effect on the trade volume of more differentiated goods (those with low elasticity of substitution) because the contribution to exports of new entrants is larger for these goods while a decrease in variable costs will affect all goods equally. Hence, the empirical findings that immigrants mainly affect the extensive margin of export and that they have a larger effect on differentiated goods can be consistently interpreted, within the context of the Chaney (2008) model, as evidence that a larger community of immigrants reduces the fixed costs (rather than the variable costs) of exporting to their countries of origin.

Several studies, since Gould (1994), have analyzed the correlation between trade flows and the stock of immigrants in the context of a gravity regression. Recently new data on trade between sub-national units (e.g. US states and Canadian provinces) and foreign countries as well as on the stock of immigrants by nationality have become available. These new data and a more solid theoretical foundation for the gravity equation of trade flows[1], have spurred a series of analyses that explore connections between local agglomerations of migrants and exports from the area to the countries of origin of immigrants. Those studies, whose sample, method of estimation and main estimates are summarized in Table 1, have generally found a robust correlation between stock of immigrants and exports. The estimated elasticities, reported in Column 2 of Table 1, range between 0.01 and 0.40 with most estimates in the interval 0.1-0.2, which contain our main estimate of 0.11 [2]. Most of the studies reported in Table 1 use national trade data (rather than provincial data), and a cross-sectional approach (rather than panel). Notice that some of the cross-sectional regressions (Dunlevy 2006 and Rauch and Trindale 2002) find elasticities much larger than ours (between 0.2 and 0.4). Most of the estimates, however, are closer to our estimated range (around 0.10). Bandyopadhyay et al. (2008), the only study we found using sub-national units in a panel (as we do), finds a coefficient of immigrants on exports of 0.14 and Briant et al. (2009), the only study we found using sub-national units in a European country (but in a cross section),

[1] Anderson and Van Wincoop (2001), Helpman et al. (2008) and Chaney (2008).

[2] Other studies of the impact of immigrants on trade (not reported in Table 1) include Co et al. (2004), Herander and Saavedra (2005), for the U.S. Bryant and Law (2004) for New-Zealand, White and Tedesse (2007) for Australia. These studies usually find complementarity between immigration and trade. For Spain, Blanes (2005) and Blanes and Martin-Muntaner (2006) investigate the impact of immigration on intra-industry trade during the nineties, showing that the trade-immigration link is stronger among highly differentiated products. Other studies such as, Combes, Lafourcade, and Mayer (2005) for France and Millimet and Osang (2007) for the US have analyzed the connections between regional migration and regional trade within countries.

instrumenting for immigration flows find a coefficient of immigrants on exports between 0.07 and 0.10, very close to our range. Finally, Dunlevy and Hutchinson (1999) using historical data (1870-1910) from the US, Girma and Yu (2002) using data from the UK and Wagner et al. (2002) using data from Canada find effects not far from 0.10 (elasticities of 0.08, 0.09 and 0.16 in order).

The rest of the paper is organized as follows. Section 2 presents the data on exports and immigration in Spain. Section 3 provides a theoretical foundation for our augmented-gravity equation specification as well as a framework to interpret the differential effects of immigrants on the intensive and extensive margin and on goods with different degrees of differentiation. Section 4 presents the benchmark empirical results, discusses several econometric issues and shows the decomposition of the export creation effects between the intensive and extensive margins. In that section, we also show the differential impact of immigrants on differentiated and undifferentiated goods. In Section 5 we explore some additional issues in the pro-trade effect of immigration: Did pro-trade effects of new immigrants change over time? Do they vary systematically with the countries of origin? Is the elasticity of trade to immigration changing with the size of immigrant network? Section 6 provides some concluding remarks.

2 Data

Our dataset is obtained by merging two publicly available data sources. The trade data originate from the ADUANAS-AEAT dataset provided by Ministerio de Economía y Hacienda. The information on the number of foreign-born residents by province and country of origin is obtained from the Statistical Yearbook published annually by the Spanish Statistical Office (INE). We define immigrants as residents born abroad with a foreign nationality.[3]

The trade dataset reports all the individual transactions (shipments) with detailed information on the direction of trade (imports and exports), product, value (in thousands of Euros), weight, invoice currency, type of product at the 8-digit Combined Nomenclature level between 52 Spanish provinces (Eurostat NUTS III definition) and 190 trading partners since 1993. The data are measured in such a way that exports are associated with the province of original shipment.[4] The selection of trading partners limited to match the available immigration data. There are 77 trading partners included in our analysis, which accounts for around 94 percent of total Spanish exports (and close to 100% of immigration) over the period analyzed. Table A1 in the Appendix, lists the 77 countries of origin, grouped into 7 regions.[5]

[3] The trade data is publicly available at www.aeat.es/aeat/aeat.jsp?pg=aduanas/es_ES. The immigration stock data is publicly available at www.ine.es/prodyser/pubweb/anuarios_mnu.htm

[4] Although the original database reports all the firm-level shipments, it is not possible to identify the firms. For that reason we use the custom address of the transaction, that is, the province where the transaction was registered in order to aggregate the number of shipments and the value of shipments at the 8-digit Combined Nomenclature level and at the province level.

[5] Table TA1 in the Technical Appendix reports the share of total Spanish trade with and the share of immigrants from each of those seven world areas.

We decompose total exports into the *number of transactions*, that we call the "extensive" margin, and the *average value per transaction*, that we call the "intensive" margin. Each export transaction is invoiced by an exporting firm to one foreign firm. Hence an increase in the number of export transactions captures either new exporting firms or firms exporting a new product or new trading relations of existing firms with a new country or higher frequency in transactions between existing trading partners. The first three elements constitute the extensive margin of export at the firm-product level while the last one is part of the intensive margin considering the firm-product as the unit. The correspondence between new exporting relations, considering the firm-product as the relevant unit, and exporting transactions as we measure them is not perfect. Still we define the number of transactions as our indicator of the extensive margin of exports, aware that it may produce a slight over-estimate of such margin.

Trade flows in our dataset are originally available at a very disaggregated product level (8-digit Combined Nomenclature classification). We match this classification with the one proposed by Broda and Weinstein (2006) to characterize the degree of differentiability of products. More specifically, they have calculated the import demand elasticities for 2715 goods of the 5-digit SITC (rev. 3) system for the period 1990 and 2001. We first use the correspondence table between 8-digit Combined Nomenclature (CN8) and the 5-digit SITC provided by the European Statistical office (EUROSTAT).[6] We then group the products into three broad categories according to their elasticity of substitution as calculated by Broda and Weinstein (2006). Sectors with an elasticity below 2 across varieties are classified as highly differentiated; sectors with an elasticity between 2 and 3.5 are classified as moderately differentiated and sectors with an elasticity above 3.5 are classified as less differentiated. Sectors with low (high) elasticities of substitution correspond to goods that are more (less) differentiated.[7] Table 2 reports the summary statistics for exports in each category of goods as well as for the average number of transactions and the average value per transaction in representative years[8]. Over the period 1995-2008 the total value of exports has doubled between a typical Spanish province and a country of destination. While the number of transactions by province-country pair has increased steady and has almost double at the end of the period, the average value per transaction has decreased between 1995 and 2004 and then has increased strongly over the period 2004-2008. By type of product, the number of transactions per province-country pair is larger and the average value per transaction is smaller for highly differentiated products than for moderately and less differentiated products.

Our explanatory variable of interest is the stock of immigrants by country of origin and province of destination. Immigration is a recent phenomenon in Spain and it has increased very fast in recent years. In 2007, the foreign-born represented about 10 percent of total population up from only 1 percent in 1993. The foreign

[6] Available at http://ec.europa.eu/eurostat/ramon.

[7] Broda and Weinstein (2006) examine how well their estimates correspond to the classification proposed by Rauch (1999) to characterize the degree of product differentiability of products: commodities, reference priced goods and differentiated goods. They observe that the median elasticities of substitution are higher for commodities than for differentiated and reference priced goods.

[8] Table TA2 in the technical appendix reports the same figures relative to imports.

population grew steadily at an average rate of 17 percent per year from 0.4 million in 1993 to 4 million in 2007. The average yearly growth rate was 13 percent over the period 1993-2001 and accelerated to 23 percent over the period 2002-2007. Table 3 shows the top 30 countries of origin of the immigrants in 2007 and (in the last column) their ranking among top immigration countries in 1993. The comparison of the ranks gives an idea of the change in composition of immigrants by country of origin. In 2007 the top five immigrant countries measured by the number of foreign-born population were Morocco, Romania, Ecuador, Colombia and United Kingdom. These five countries accounted for 53 percent of the total foreign population. The United Kingdom was the most important country of origin in 1993 (13.6%) but British immigrants (and those from other EU countries in general) have decreased in relative terms in the last fifteen years. In 2007 the UK was only the fifth most important country of origin with a share of 5% of the total immigrant population. Other Non-EU countries have also gained positions in the 2007 ranking: a number of countries from Central and Eastern Europe (Poland, Ukraine and Russia) and from South America (Ecuador, Peru and Bolivia) have also contributed in large numbers to the growing number of immigrants in Spain. Another interesting feature of the immigration in Spain is the uneven distribution of immigrants across Spanish provinces. Figure 1 shows the map of Spain where provinces are colored according to their share of foreign-born in total population in 2007. While all but three provinces in 1995 had a share of foreign-born in the population below 4 percent, in 2007 there were 17 provinces with shares above 10 percent.[9]

An interesting example of the evolution over time of immigration and trade is illustrated in Figure 2. Before 2000, trade with Western Europe had been constant or growing and very large and similarly immigrants from Western Europe were the most important group in relative terms. However, beginning in 1998 the stock of immigrants from Western Europe decreased in relative importance. Figure 2, panel A, shows that immigrants from Western Europe, as a share of total foreign-born, decreased beginning from 1998 to 2008 to only 40% of its 1998 value. Following this trend with a short lag, Figure 2 panel A also shows that Western Europe become a relatively less important trade partner. Its share in total trade decreased by 13 percentage points over the 1998-2008 period. Conversely, panel B of Figure 2 shows that immigration from Eastern Europe picked up dramatically between 1999 and 2008, increasing ten fold and trade with Eastern Europe also increased in relative importance. Its share relative to total trade increased by 170 percentage points over the same period. While this example is only suggestive, it reveals a correlation and implies a rough estimate for the elasticity of export to new immigrants: associated with a 1% increase in the total share of immigrants, the share of trade increased by around 0.2%. Obviously many other factors may have contributed to the joint shift of trade and migration from Western to Eastern Europe and the role of migration on trade is not the only explanation for the observed correlation. In the rest of the paper, we carefully analyze the trade creation effect of immigrants.

[9] Table TA3 in the Technical Appendix shows the names of the Spanish provinces and whether their share of immigrants was above 10%, between 4 and 10% of below 4% in 2007.

3 Foundations of the Empirical Model

The basic gravity-equation that we estimate to identify the impact of immigrants on exports describes the logarithm of aggregate export X_{ijt} from province i to country j for period t as follows:

$$\ln(X_{ijt}) = \phi_{jt} + \theta_t + \delta_{ij} + \beta \ln(Y_{it}Y_{jt}) + \alpha \ln(IMM_{ijt}). \tag{1}$$

The term ϕ_{jt} represents a set of importing country by time effects, θ_t is a set of year dummies[10], δ_{ij} are province-country pair dummies, Y_{it} and Y_{jt} are, respectively, the country and province gross output [11] and IMM_{ijt} is the total stock of immigrants from country j in province i in year t. While this specification is quite demanding as it controls for a very large set of fixed effects, its advantage is that it is derived from the recent model of Chaney (2008). For each sector, that model[12] delivers the following equation describing the determinant of exports X_{ijt}:

$$\ln(X_{ijt}) = Const + \ln(w_{it}^{-\gamma}Y_{it}) + \ln(Y_{jt}\theta_{jt}^{\gamma}) - \gamma \ln(\tau_{ijt}) - \left(\frac{\gamma}{\sigma - 1} - 1\right) \ln(f_{ijt}) \tag{2}$$

The term $\ln(w_{it}^{-\gamma}Y_{it})$ captures the exporting province wages (w_{it}) and the exporting province income Y_{it}. It captures the competitiveness and the domestic market size for the exporting province. The term $\ln(Y_{jt}\theta_j^{\gamma})$ captures the importing country aggregate income (Y_{jt}) and its remoteness from the rest of the world, (θ_{jt}^{γ}).[13] The term τ_{ijt} captures iceberg (proportional) transport costs (per unit of export) and f_{ijt} captures the fixed costs for firms of province i to export in country j. This equation is derived by aggregating the exports of firms with heterogeneous productivity. By assuming that the bilateral variable costs, τ_{ijt}, are relatively constant over time we can absorb the term $\gamma \ln(\tau_{ijt})$ into a set of province-country dummies δ_{ij}. We can also absorb the effect of remoteness $\ln(\theta_{jt}^{\gamma})$ into the country by time effects ϕ_{jt} and the term $\ln(w_{it}^{-\gamma})$, assumed common to all provinces will be captured by the time effect θ_t. Hence the first four terms of equation (2) reduce to the corresponding four terms of equation (1). Once we account for these factors, the last term of equation (2), $\left(\frac{\gamma}{\sigma-1} - 1\right) \ln(f_{ijt})$ is the channel through which immigrants affect trade. The presence of immigrants from country j in province i allows firms in province i to know about rules and opportunities in country j and may reduce the information costs and the costs of setting up business there. Immigrants may themselves become exporters and face much lower set-up costs in exporting to their countries of origin. Hence an effect of immigrants on fixed costs f_{ijt} is likely. On the other hand variable costs τ_{ij} , proportional to the value of export, are usually associated

[10] Notice that when we will estimate equation 1 the pure time fixed effect θ_t will be absorbed by the country-year pair effect ϕ_{jt}.

[11] Gross regional output and Gross Domestic Output are used to measure the variables Y_{it} and Y_{jt}, respectively. Gross domestic output is obtained from World Development Indicators (WDI 2008 on-line database) and gross regional output is reported in Regional Accounts (INE). Regional values have been scaled to match Spanish GDP in WDI.

[12] See page 1714 of Chaney (2008).

[13] Remoteness is defined as a weighted average of the bilateral distances of a source country and its trading partners with weight equal to the GDP of the trading partners.

with transport and tariff-costs which are less susceptible of being affected by immigrants. We can represent the relation between fixed costs and stock of immigrants as follows: $ln(f_{ijt}) = \ln f(\ln(Immigrants_{ijt}))$ with $\partial \ln f / \partial \ln(\text{Immigrants}) < 0$. Hence the coefficient $\alpha = -\left(\frac{\gamma}{\sigma-1} - 1\right) \partial \ln f / \partial \ln(\text{Immigrants}) > 0$ in equation (1), is predicted by the model to be larger than zero and captures the effect of immigrants on total exports through a reduction of fixed costs. While the model is attractive because its natural to think immigrant networks reduce the fixed (set-up) costs of trade, f_{ijt}, rather than the variable (proportional) costs, τ_{ijt}, the advantage of using the Chaney (2008) model is that it allows us to test two further implication of reducing fixed costs that would differ from those of reducing variable costs. First, the model predicts that the elasticity of total trade to fixed bilateral costs depend inversely on σ, the elasticity of substitution across goods. Second, the elasticity to variable costs depends only on γ, a measure of the dispersion of productivity across firms. Hence if we separate trade flows into *differentiated* and *homogeneous* goods, the above equation would imply a larger coefficient on $\ln(f_{ijt})$ in the first case, while the coefficient on $\ln(\tau_{ij})$ would be the same in the two cases. Third, the model predicts that if we decompose the total effect of fixed costs f_{ijt} on total exports X_{ijt}, between the effect on the intensive margin of trade and on the extensive margin of trade we obtain no effect on the first and the full effect is on the second margin[14]. Change in variable costs, on the other hand, increase both the intensive and the extensive margin of trade. In his notation (page 1717 of Chaney 2008):

$$-\frac{d \ln X_{ijt}}{d \ln f_{ijt}} = \underbrace{0}_{\substack{\text{Intensive margin} \\ \text{Elasticity}}} + \underbrace{\frac{\gamma}{\sigma - 1} - 1}_{\substack{\text{Extensive margin} \\ \text{Elasticity}}} = \frac{\gamma}{\sigma - 1} - 1$$

The intuitive rationale for the decomposition is as follows. The amount sold by each exporting firm in each country j (that is optimal in monopolistic competition) depends on its own productivity and on the demand of the good in country j that in turn depends on that country income Y_j, its remoteness θ_j^{γ} and the variable trade costs τ_{ij}. However, as in any model with CES utility (and constant elasticity demand) the optimal price and quantity produced by a firm does not depend on the fixed trade costs. However, the productivity threshold for the exporting firm does depend on the fixed trade costs, hence changing those will affect only the extensive margin (number of exporting firms) and not the amount exported by each individual firm.[15]

[14] The intensive margin in the Chaney model is defined as the increase in average product per firm for the existing trading firms (rather than for all firms). The extensive margin is the increase in total export due to new firms. These are similar but not identical to our definition of intensive margin as the change in average value per export transaction ($\overline{x}_{ijt}$) and extensive margin as the change in number of export transactions (N_{ijt}).

[15] The decomposition of the effect of *variable costs* on the two margins (page 1716 of Chaney 2008) is as follows:

$$-\frac{d \ln X_{ijt}}{d \ln \tau_{ijt}} = \underbrace{\sigma - 1}_{\substack{\text{Intensive margin} \\ \text{Elasticity}}} + \underbrace{\gamma - \sigma - 1}_{\substack{\text{Extensive margin} \\ \text{Elasticity}}} = \gamma$$

Hence its variation would affect both the extensive and intensive margin of trade.

In sections 4 and 5 we estimate equation (1) separately on highly, medium and less differentiated goods and we also separate the effect of immigrants on the extensive and on the intensive margin of exports estimating two separate equations with the same right hand side as 1 but with $\ln(N_{ijt})$ and $\ln(\overline{x}_{ijt})$ as dependent variables. The first regression, respectively, identifies the effect on the number of exporting relations N_{ijt} (extensive margin) and the second identifies the effect on the average value of an existing export relation $\overline{x}_{ijt}$ (intensive margin). Recall that $\ln(X_{ijt}) = \ln(N_{ijt}) + \ln(\overline{x}_{ijt})$. As measure of immigrants, IMM_{ijt}, we use the total number of foreign-born individuals residing in province i at time $t-1$ and born in country j.[16] These estimates, besides their empirical relevance, would allow us to discriminate, within the context of the Chaney (2008) model, whether the immigrant network operates through reducing fixed or variable trade costs.

4 Main Results

Table 4 shows the results of estimating equation (1) and two less demanding alternative specifications. The preferred specification (1) accounts for a full set of 2800 trading partners-pair effects (which capture bilateral time-invariant transport costs due to distance, geography, culture and national and local institutions) and 988 country-year effects (accounting for all importing-country aggregate shocks) over the period 1995-2008. Estimates for this specification are shown in column (1) of table 4. In this specification the estimated effect of immigration on trade is identified only by the variation within a trading-pair over time. The estimated elasticity is very significant and equal to 11%. As some of the cells have either no immigrants or no trade we add one unit to the dependent variable X_{ijt} and to the explanatory variable IMM_{ijt} before taking logs. To account explicitly for a different baseline level of exports in cells with no immigrants in column (2) we include a dummy variable, NID_{ijt}, that takes value of 1 if $IMM_{ijt} = 0$ and a value of 0 otherwise. The estimated coefficient on NID_{ijt} is not statistically significant and the change in the coefficient of $\ln(IMM_{ijt})$ relative to column (1) is small (-0.02) and not statistically significant. This implies that there is no discontinuous change in the impact of immigrants on exports going from no immigrants to some of them or increasing their number when some are already present. Quantitatively the estimate of column (1) implies that doubling the number of immigrants from a country in a province would increase the exports of the province to that country by around 8% ($2^{0.110} \approx 1.079$). In columns (3) and (4) of table 4 we omit country-by-year effects ϕ_{jt} in equation (1) (with or without the zero-immigration dummy). This would be equivalent to assuming that the "remoteness" measure of the importing country ($\ln(\theta_j^{\gamma})$ in equation (2)) does not change much over time. We still allow trade-pair specific costs and include year effects. The estimates of the coefficient on $\ln(IMM_{ijt})$ are significantly higher compared to those in our preferred specification, which suggests that some time-varying characteristics of the countries of origin have an impact on trade and are correlated with $\ln(IMM_{ijt})$ and, if not controlled for,

[16] Similarly, to reduce simultaneity issues we use total income at time $t-1$ to measure the variable $\ln(Y_{it}Y_{jt})$.

can bias the estimated effect up. In columns (5) and (6) we eliminate trading-pair fixed effects and explicitly include a set of time-invariant bilateral cost variables (log of distance, a contiguity dummy, a common language dummy and a EU-EFTA dummy) as well as province plus country fixed effects.[17] This specification is similar to those used to estimate gravity regressions in the cross-sectional regressions (e.g. Head and Ries 1998, Rauch and Trindale 2002). While such specifications (with or without the no immigrant dummy) omit many fixed effects (that should be included according to Chaney's model) they produce estimates on the variable of interest ($\ln(IMM_{ijt})$) not too different from those in columns (1) and (2).

In table A2 of the Appendix we explore how sensitive is the estimated coefficient on $\ln(IMM_{ijt})$ to the exclusion of zero-trade observations using several alternative estimation methods. While in our main specification we add one euro to all exports and hence include all observations, it is common practice to estimate gravity equations using only non-zero observations (Bandyopadhyay et al, 2008). Column (1) in table A2 shows the estimates obtained from the basic specification (Table 4, column 1) including and excluding zero export pairs (row one and two, respectively), column (2) shows the estimates from the alternative specification (table 4, column 3), column (3) uses a Tobit estimator censored at 0 to estimate the coefficients and column (4) shows the results using a Poisson estimator (to be preferred according to Santos-Silva and Tenreyro, 2006). The results shown in table A2 imply that the estimated effect with or without the inclusion of zero observations are close, with slightly larger estimates when including the zeros. For instance, in the basic specification the effect of immigration on exports is estimated to be 0.11 when including the zero-export cells, and 0.068 when excluding them. The Tobit specification, truncated at 0 and the Poisson specification (that estimates the dependent variable in levels rather than in logarithm) estimate elasticity between 0.10 and 0.14.

While our basic approach, based on a panel regression with a large set of dummies, is already much more demanding relative to the one usually implemented in the literature, we take another step to ascertain that we are identifying the causal export creation effect of immigrants: we implement an instrumental variable approach. While never applied to the trade and migration literature this approach is common in the literature that analyzes the wage and employment impact of immigrants (e.g. Card 2001, Ottaviano and Peri 2006, Card 2009). In particular, in order to instrument the changes in immigrants in a particular province we use the imputed net inflow of immigrants calculated as follows. Using the distribution of immigrants by nationality, across provinces in 1993, (well before the extraordinary expansion of immigration flows) we attribute to each group in each province the net growth of immigrants from that nationality to Spain. If immigrants tend to settle, at least initially, where other persons of the same nationality are already settled, then this constructed inflow of immigrants will be correlated to the actual one. On the other hand, as it is based on the distribution of immigrants across provinces as of 1993, the constructed flows are not affected by any province-specific demand

[17] Geodesic distance between Spanish provinces and countries have been constructed following the same methodology proposed by www.cepii.fr. See Technical Appendix for details.

shock during the considered period.[18] Column (1) of table 5 presents the results of the first stage of the two-step least square estimation, using the described instrument. In our preferred specification including country-year dummies in the first stage we obtained a coefficient on the constructed immigration (instrument) of 0.554 with an standard error of 0.003. The instrument has an F-statistics of more than 300 and hence is very strong. In the second stage (Column 2) of table 5, the estimated coefficient for immigrants on exports is about 0.05, significantly different from 0. As would be implied by the presence of endogeneity (and omitted variable) bias the 2SLS estimate is smaller than the OLS one. It is, however, still significant and precisely estimated. An exogenous change in the stock of immigrants by 1% would produce an increase in trade from the province to the country of origin of those immigrants by 0.05%. In column (3) of Table 5 we also include among the controls the lagged value of trade flows. Due to autocorrelation of bilateral trade flows such specification would identify the effect on new immigrants only on the change in trade flows from one year to the other. The effects on exports are estimated to be still significant with an elasticity close to 0.06.[19]

Table 4 and 5 provide robust and consistent evidence that a causal effect from immigrants to export flows exists for Spanish provinces and its elasticity is between 0.05 and 0.11.[20] We now decompose the effect of immigration on exports by estimating specification (1) but using $\ln N_{ijt}$ (the number of export transactions between province j and country i) and $\ln \overline{x}_{ijt}$ (the average value in Euros of each transaction between province j and country i) as dependent variables. We consider the part of trade due to changes in $\ln N_{ijt}$ as the effect on the extensive margin of trade and the part due to changes in $\ln \overline{x}_{ijt}$ as the effect on the intensive margin of trade.

Table 6, panel A shows the effects of immigrants on exports (estimated using OLS in column 1 and 2SLS in column 4) and its decomposition on the extensive margin (reported in column 2 for OLS and 5 for 2SLS) and on the intensive margin (reported in columns 3 and 6). In columns 1-3 we estimate the model using the OLS estimator. In columns 4-6 we use 2SLS method with imputed immigrants as instrument. The sum of the estimated coefficients on the intensive and extensive margin of trade must be equal to the estimated coefficient on total value of trade in each specification (Bernard et al, 2007). Considering all traded goods together (panel A of table 6), we find that immigrants affect mostly the extensive margin of exports and very little, if at all, the intensive margin. Immigrants in Spanish provinces increases the number of transactions from that province to their home country. This is consistent with the interpretation that migration networks decrease the fixed

[18] For some countries of origin of the immigrants the initial year is 1996 or 1997. See Table A1 for the list of countries.

[19] As we have included trading-partner fixed effects in our estimation and a lagged dependent variable we are aware of the potential Nickell bias that may arise. We rely on the length of the time dimension of the panel (T=14 years) to reduce such bias that depend inversely on T (Nickell, 1981).

[20] The structural model described in the previous chapter produces an estimating equation relative to exports from Spanish provinces. This is what we estimate and present in the paper. We also estimated similar specifications for Spanish imports. Those estimates are shown in Tables TA4-TA9 in the Technical Appendix. In general, we find that the effect of migrant networks on imports is usually smaller and less precisely estimated than on exports. On the one hand, immigrants may be crucial to reduce information costs of exporting to less developed countries but not importing from them, as exporters from those countries already know Spain well. On the other hand, it is more difficult to identify the province of actual final use of the imported goods so that the data on import may be affected by larger measurement error that would produce an attenuation bias on the coefficient.

bilateral trade costs. Considering both the OLS and the 2SLS estimates, 82-100% of the positive total effect is explained by the effect on the extensive margin. Also, in both the OLS and 2SLS estimates, the effects are estimated precisely so that we can reject any effect on the intensive margin that is larger than 0.03.

Panels B, C and D of Table 6 separate the estimates between non-differentiated, moderately differentiated and highly differentiated goods.[21] Again the largest effect of immigration on exports in each category of goods takes place through the extensive margin. The effect on the extensive margin is always significant and quantitatively larger than the effect on the intensive margin that is significantly different from 0 only in three out of six cases. Hence, independently of the type of traded goods, immigrant networks seem to operate by extending the number of new trade relations with the country of origin of immigrants.

By separating goods according to their degree of differentiation, the estimates of Table 6 can also be used to test another implication of immigration affecting fixed trade costs: its effect should be larger for more differentiated goods. Panel B through D of Table 6 show the elasticity of trade to immigration for those three types of goods. Our point estimates support only in part this implication. When ranked by magnitudes, the 2SLS estimates conform to predictions: the elasticity of exports to immigration equal to 0.13 for highly differentiated export goods, to 0.115 for medium differentiated goods and to 0.113 for less differentiated goods. The differences, however, are not too large and not statistically significant. On the other hand the OLS estimates show that the effect of immigration is larger for moderately than for highly and less differentiated exports. Taken together the estimates by type of good do not contradict, (but do not provide strong support either) for the model predictions. Closer inspection (described in the next section), however, reveals that these effects, especially those obtained with OLS method, can be explained when we allow the effect of immigrants on trade to be heterogeneous across region of origin.

5 Extensions

In this section we examine other dimensions of our data that may affect the export-immigration nexus. Two issues are of particular interest to us. First we test if the export creation effect of immigrants is particularly large for countries of origin whose level of development is lower or whose cultural distance from Spain is larger. Both instances would contribute to increase the initial fixed costs of trade so that immigrants may have a larger impact in reducing it. Second we would like to know if the elasticity of export creation to immigrants is roughly constant or if it depends on the size of the specific immigrant community or on the overall density of immigrants in the province or on the period considered.

Dunlevy (2006) shows that immigrates effect on US exports is less important when Spanish or English is the language of the origin country. Girma and Yu (2002), Dunlevy (2006) and Briant et al. (2009) have noticed

[21] The definition follows Broda and Weinstein (2006) and is specified in Section 2.

that the largest trade-creation effect of immigrants in the UK, US and France, respectively, tend to be towards those countries whose institutions are less developed and whose cultural and development distance is larger. These findings suggest heterogeneity of the export creation effect of immigrants across origin countries and regions. Our expectation is that in trading with countries where there are severe problems of inefficiency of institutions, lack of contract enforcement as well as differences in habits and cultural norms relative to Spanish ones (e.g. African countries), the fixed trade costs are very high. Hence the presence of immigrant networks could decrease fixed trade costs and this would increase trade no matter how differentiated is the good. On the other hand, when trading with developed or culturally similar countries (e.g. European countries), fixed costs of trade are not large and the presence of a network of immigrants would be expected to predominantly affect the transmission of complex information that is likely to be more relevant in the trade of complex and differentiated goods.[22] Finally when trading with countries with similar language and norms (such as Latin American countries), fixed costs of trade may be low to begin with and so the effect of immigrants on those cost may be minimal. This suggests immigrants impact on exports will be small for these countries.

In table 7, therefore, we estimate the effects of immigration on exports (still using specification 1) separately across regions of immigration (and trade), across types of goods and across the intensive and extensive margins.[23] The results reveal a pattern that for the most relevant regions is very consistent with our priors and with the interpretation of migrants reducing fixed trade costs. For trade between Spanish provinces and European countries reported in the first two rows of table 7 (Western and Eastern/Southern Europe that together account for more than 70% of Spanish exports) the pattern of the coefficients is exactly as predicted by a reduction of fixed costs. Considering the total effect of immigrants, the coefficient is largest on export of highly differentiated goods, it is intermediate on the export of moderately differentiated goods and it is the smallest on the export of less differentiated goods. The differences, especially between the coefficients in column (1) and (7) are very significant. Moreover the estimated coefficients are statistically significant only for highly differentiated goods. Also, in most estimates of the first two rows the effect on the extensive margin is larger and more statistically significant than the effect on the intensive one. The impact of immigration on exports to the other OECD and Asian Countries (that together cover another 10% of total Spanish exports) is also broadly consistent with an effect on fixed costs: the impact of immigrants is greater on exports of moderately and highly differentiated products than for less differentiated products, however moderately (rather than highly) differentiated seem to experience the strongest effect. Also the estimated effect through the extensive margin is usually larger than the effect on the intensive margin and significantly so. The effect for Africa and Latin America are different but

[22] Bandyopadhyay et al. (2008) investigates the individual immigration effect of 29 foreign countries on US exports and find that it is important only for a subset of 6 foreign countries. However they do not explain why the immigration-trade nexus works for some countries and not for others.

[23] In table 7 we only report the OLS estimates. For several regions (e.g Europe and the OECD) the immigration instrument is quite weak and we obtain very large standard errors. We also obtain some negative estimates which are hard to interpret and probably reflect noise.

confirm our idea that larger (smaller) effects for all types of goods should be found for countries with initially very high (very low) trade costs. For Latin America (about 3% of Spanish exports) none of the estimated coefficients are statistically significant, suggesting that exports do not benefit much from ethnic networks of these immigrants. The importance of historical links between Spain and its former colonies as well as the common language and culture could justify low initial fixed trade costs and no significant cost-reducing effect of immigrants. To confirm this idea we also run (not reported in the tables) a specification like (1) in table 4 with an extra term that interacts a Spanish language dummy with $\ln(IMM_{ijt})$. The coefficient on this variable identifies the differential effect on total trade creation of immigrants from Spanish-speaking countries relative to other countries. The estimate of the coefficient on this interaction is -0.106 (standard error 0.026) while the estimate of the coefficient on $\ln(IMM_{ijt})$ remains almost unchanged at 0.125 (standard error 0.013). This means that the export creation effect of immigrants from Spanish speaking countries is essentially zero (0.125-0.106) consistent with the idea that the common language/culture is associated with low initial trade costs and no cost-reducing effect of immigrants. For Africa, the region with the largest cultural differences with Spain and the lowest level of development, however, the networks of immigrants have the largest effect in reducing fixed trade costs, not only for trade of differentiated products but for all types of trades. This is why we observe a positive and similar effect of immigrants on trade of all types of goods. Still, confirming that this effect is mostly on fixed costs, the export creation effect is always larger on the extensive margin.

Combining the estimates in table 7, there are ten significantly positive estimates of the effects of immigrants on export of highly differentiated goods, nine significant effect on export of moderately differentiated goods and only five significant effects for the less differentiated goods. The decomposition of immigrants and trade by region helps us to correctly interpret the effects of immigration on exports and how they may depend on the initial level of country-specific fixed costs so that larger reductions (due to immigrants) are likely associated with countries with initially large fixed costs. The estimated magnitudes from table 7 also suggest that the rise in immigration from Eastern Europe and the decline of immigration from western Europe (shown in figure 2) can explain about half of the increase and half of the decrease of trade with those two regions, respectively. Immigration, therefore, acted causally on exports from Spain and this effect was quantitatively significant.

Another aspect that is interesting to explore is whether the elasticity of export creation to immigrant networks varies with the immigrant density in the province or with the size of the specific immigrant community or with the time period or the length of stay of the immigrants. Equation (1) assumes that there is a simple log-linear relation between the volume of exports X_{ijt} and the size of the immigrant's network IMM_{ijt}. However the cost-reducing role played by the community of immigrants may need a minimum scale or a minimum density in the province to be effective, or the community may need some time to establish itself in order to act as trade mediator. On the other hand, it may be possible that the best opportunities for trade-creation are the first to

be exploited by new immigrants and as the size of the community increases, the density of immigrants grow and time passes there are decreasing beneficial effects of immigration on trade. Empirically such issue could be addressed in several ways. In panel A of table 8, we look at the export creation effect of immigrants in earlier years (when the immigrant communities were very small in Spain) versus later years. In panel B we also look at that effect splitting the sample between provinces with low (<4%), intermediate (between 4 and 10%) or high (>10%) percentage of immigrants.[24] The results show that the elasticities tend to be larger in provinces with higher immigrant density and in the later period. In particular, notice that the effect of immigrants on total exports and on the extensive margin was significantly larger in the period 2002-2008 (elasticity of total effect of 0.20) than earlier (elasticity of total effect of 0.085). Similarly the export creating effect of immigrants in provinces with a very small presence of immigrants (less than 4% of the population) is quite small and insignificant, while in communities where immigrants account for 10% or more of the population the effect on export is 0.12 (before 2002) and 0.26 (after 2002). These results suggest that the export creation effect of immigrants increases (and certainly does not decrease) with larger immigration density and as immigrant communities establish themselves over time.[25] We conducted two further checks of these hypotheses. First, to inquire if the elasticity of export creation with respect to immigrants changes with the size of the country-specific community in the province (rather than with the overall immigrant density in the province) we rank immigrant communities (defined by country of origin and province) by size and estimate an elasticity of trade creation specific to each quartile of the distribution. These OLS estimated coefficients for specification (1), similar to those in table 4, (not reported) are all between 0.11 and 0.13 and not significantly different from each other. Second, to distinguish the role of long-term and new immigrants in trade creation we separate the stock of immigrant in each community (country of origin by year) in year t into the stock at $t-4$ (4 years earlier) and the net flow in the last 4 years. We then estimate a specific elasticity of export to each of the two variables. The correspondence between these two variables and long-term and new immigrants is imperfect as immigrants move inside Spain (so net inflow in a province does not correspond to inflow in the country). However as we do not know the composition of immigrants by date of entry (within a province and country of origin) this is the best we can do. The OLS estimates of the basic specification produce a coefficient on the stock at $(t-4)$ of 0.125 (standard error 0.015) and on the new flow over the last four years of 0.044 (standard error of 0.013). These estimates are consistent with the presence of a stronger effect on trade from the more established community of immigrants. In conclusion the increase in size of the specific immigrant communities does not seem to affect the impact of immigration on trade, while the larger density in the province and the increased length of stay seem to encourage the export creation.

[24] Table 8 shows the estimates using OLS method. The 2SLS estimates, not reported and available upon request, are quite consistent with those, showing a pattern of increase coefficient in the second sub-period and significantly positive coefficient only for provinces with immigrants above 4% of the population.

[25] This is consistent with previous studies such as Herander and Saveedra (2005) who found that the effect of migrants on trade requires a minimal size of the network in order to produce a measurable effect on the volume of trade

6 Conclusions

This paper uses the rapid and large increase of immigrants from several countries into Spanish provinces that took place in the years between 1995 and 2008, and especially after 2002, to estimate the causal effect of immigrants on exports, separating the intensive and extensive margin and differentiating between types of goods. The estimates of those effects on total export, export margins and export by type of good can be used to verify if the presence of immigrants is consistent with trade creation due to a reduction in fixed trade costs. Using a panel of bilateral trade flows for 50 Spanish provinces and 77 countries and corresponding data for immigrant stocks by Spanish province and country of origin we find a very strong and robust elasticity of export to immigrants close to 0.10. Instrumenting immigration flows with flows constructed using the distribution of immigrants in 1993, we also find a very significant elasticity, closer to 0.05. The decomposition of the export-creating effect of immigrants between increased number of export transactions and average value of export per transaction shows that most of the effect is due to an increase in the number of transactions.[26] Finally the analysis of export creation effects across categories of goods, once we allow different effects for different regions, shows that in most of the cases and particularly in the relation with developed countries (e.g. Europe and OECD), the network of immigrants affects mostly the trade of differentiated goods. On the other hand, the effects of immigrants applies rather uniformly to the export of all types of goods to less developed countries (e.g. Africa), suggesting that in trading with those countries, the most important effect is that of decreasing the high initial fixed costs of trade independently of the nature of traded goods. As the surge of immigrants came to a halt and reversed in 2009, due to the economic and financial crisis in Spain, it is possible that some of these export creation effects will be reversed. As immigrants go back to their countries this may reduce the volume of trade between Spain and the rest of the world. In a proper calculation of costs and benefits of immigration this export creating effect should certainly be accounted for.

[26] While our data allowed us to identify number of transactions and value per transaction defining in this way an extensive and intensive margin of export, it would be very interesting (but so far impossible with the Spanish data) to do the exercise decomposing the margins at the firm-product rather than transaction level.

References

Anderson, James, and Eric van Wincoop (2003) "Gravity with Gravitas: A Solution to the Border Puzzle," *American Economic Review*, 93(1), 170–192.

Bandyopadhyay, Subhayu, Cletus. C. Coughlin, and Howard J. Wall (2008) "Ethnic Networks and US Exports," *Review of International Economics*, 16(1), 199–213.

Bernard, Andrew, Jensen, Bradford, Redding, Stephen, and Schott, Peter (2007) "Firms in International Trade", *Journal of Economic Perspectives,* 21(3), 105-130.

Blanes, Jose V. (2005) "Does immigration help to explain intra-industry trade? Evidence for Spain," *Weltwirtschaftliches Archiv/Review of World Economics*, 141, 244-270.

Blanes, Jose V., and Joan Martin-Muntaner (2006) "Migration Flows and Intra-Industry Trade Adjustments," *Weltwirtschaftliches Archiv/Review of World Economics*, 142(3), 567-584.

Briant, Anthony, Pierre-Philippe Combes, and Miren Lafourcade (2009) "Product Complexity, Quality of Institutions and the Pro-Trade Effect of Immigrants,", Working paper 2009/06, Paris School of Economics.

Broda, Christian, David Weinstein (2006) "Globalization and the Gains from Variety," *Quarterly Journal of Economics*, 121(2).

Bryant, John, David Law (2004) "Trade and Migration to New Zealand," New Zealand Treasury Working Paper 04.

Card, David (2001) "Immigrant Inflows, Native Outflows, and the Local Labor Market Impacts of Higher Immigration". *Journal of Labor Economics* 19 (1), 22-64.

Card, David (2007) "How Immigration Affects U.S. Cities," CReAM Discussion Paper, no. 11/07.

Card, David (2009) "Immigration and Inequality", *American Economic Review*, 99(2): 1–21.

Chaney, Thomas (2008) "Distorted Gravity – Heterogeneous firms, market structure and the geography of international trade," *American Economic Review*, Vol. 98, No. 4. pp 1707-1721.

Co, Catherine, Patricia Euzent, Thomas Martin (2004) "The Export Effect of Immigration into the USA," *Applied Economics* 36, 573–83.

Combes, Pierre-Philipppe, Miren Lafourcade, and Thierry Mayer (2005) "The Trade-Creating Effects of Business and Social Networks: Evidence from France," *Journal of International Economics*, 66(1), 1–29.

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

Dunlevy , James, and William Hutchinson (1999) "The impact of immigration on American import trade in the late nineteenth and twentieth centuries," *Journal of Economic History* 59: 1043-62.

Girma, Sourafel, and Zhihao Yu (2002) "The Link between Immigration and Trade: Evidence from the United Kingdom," *Weltwirtschaftliches Archiv*, 138(1), 115–130.

Gould, David (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.

Head, Keith, and John Ries (1998) "Immigration and trade creation: econometric evidence from Canada," *Canadian Journal of Economics*, 31(1), 47–62.

Helpman, Elhanan, Marc Melitz, and Yona Rubinstein (2008) "Trading Partners and Trading Volumes," *Quarterly Journal of Economics*, 123, 441-487.

Herander, Mark, and Luz 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.

Nickell, Stephen (1981) "Biases in Dynamic Models with Fixed Effects," *Econometrica* 49, 1417–1426

Millimet, Daniel, and Thomas Osang (2007) "Does State Borders Matter for U.S. Intranational Trade? The Role of History and Internal Migration," *Canadian Journal of Economics*, 40(1), 93–126.

Ottaviano Gianmarco, and Giovanni Peri (2006) "The Economic Value of Cultural Diversity: Evidence from U.S. cities", *Journal of Economic Geography*, Vol. 6, Issue 1, Pages 9-44.

Rauch, James R. (1999) "Networks versus Markets in International Trade," *Journal of International Economics*, 48, 7-35.

Rauch, James R., and Vitor Trindale (2002) "Ethnic Chinese Networks In International Trade," *The Review of Economics and Statistics*, 84(1), 116–130.

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

Wagner, Don, Keith Head, and John Ries (2002) "Immigration and the Trade of Provinces," *Scottish Journal of Political Economy*, 49(5), 507–25.

White, Roger, and Bedassa Tedesse (2007) "Immigration Policy, Cultural Pluralism and Trade: Evidence from the White Australia Policy," *Pacific Economic Review*, 14(2), 489-509.

Figures and Tables

Figure 1:
Percentage of foreign-born in total population
Spanish Provinces, 2007

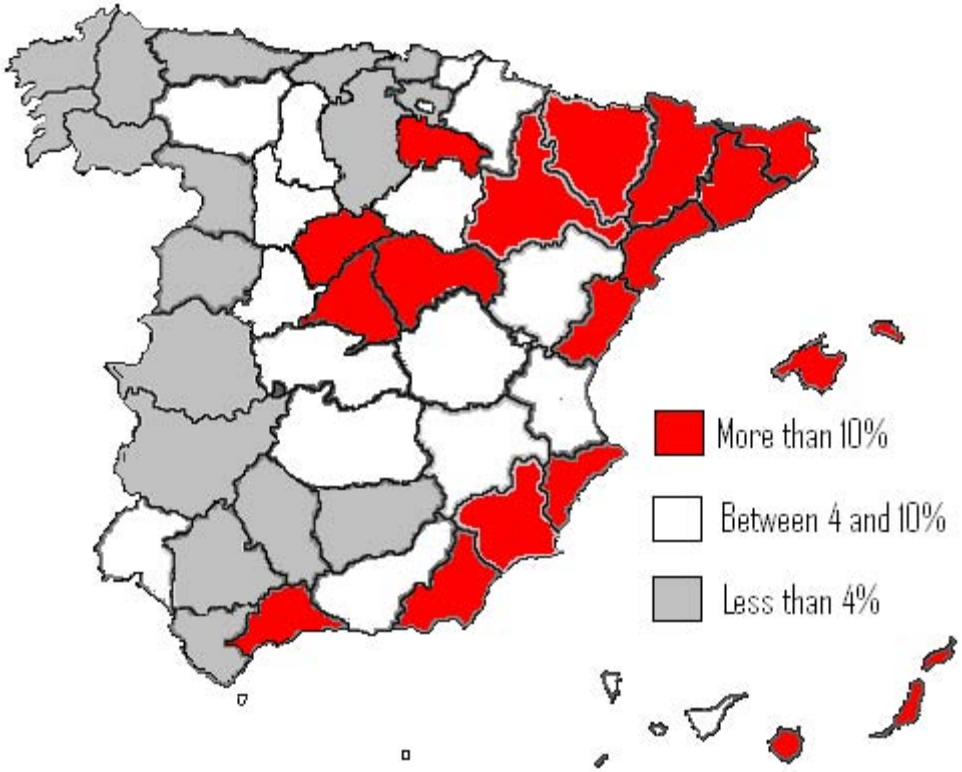
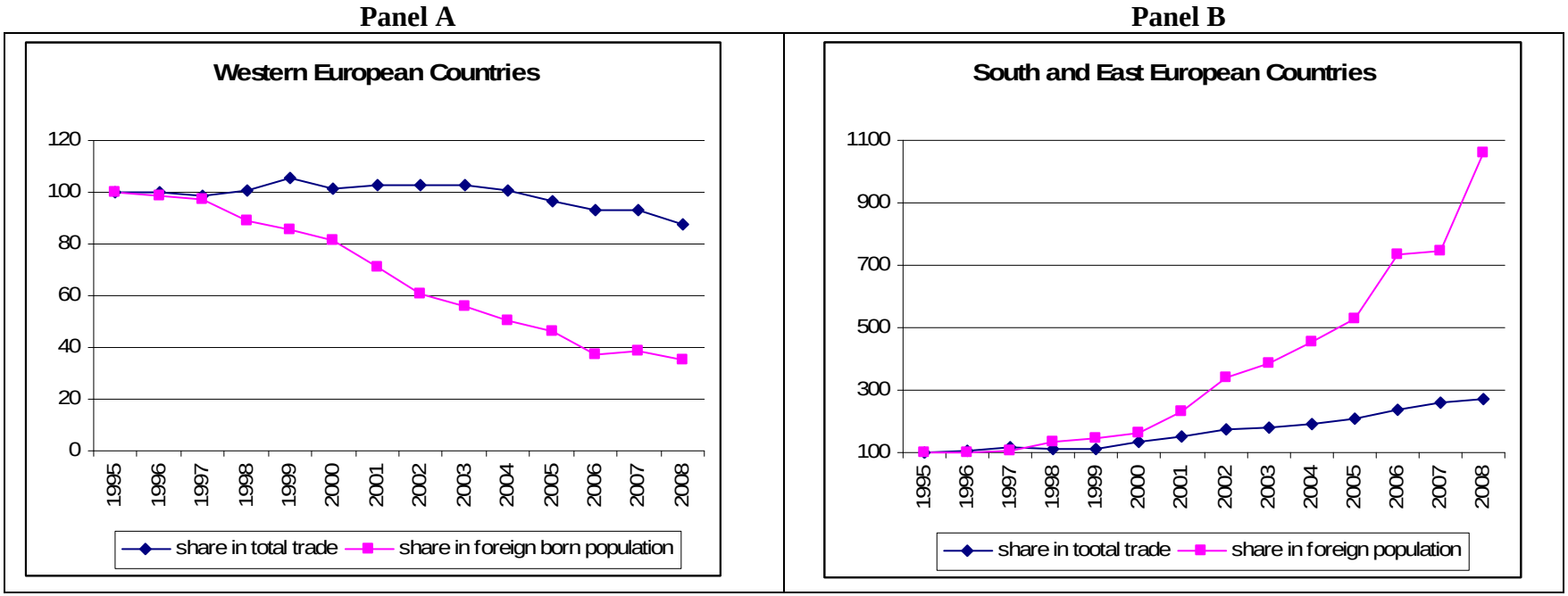


Figure 2:
Trade with and Immigration from Western Europe and South/Eastern Europe (1995=100)



Note: Total trade is the sum of imports and exports. Immigration is lagged one period. Each of the two measures is measured as share of total (trade volume or immigration) and is standardized so that the level in 1995 is equal to 100.

Table 1
Estimated elasticity of Export to Immigrants:
Summarizing some influential contributions from the Literature

Authors	**Estimated elasticity of Export to immigrants**	**Sample**	**Specification-Method**
Bandyopadhyay, Coughlin and Wall. (2008)	0.14	Panel: 50 US states, 29 Countries, 1990, 2000	Panel, OLS with country-time and trading partner pairs FE
Briant, Combes and M. Lafourcade (2009)	0.07-0.10	93 French Departments, 1999-2001	Pooled cross section, 2SLS, country and Department FE
Dunlevy (2006)	0.24-0.47	50 US states, 87 Countries, 1990-1992	Pooled cross-section, OLS with country and state FE
Dunlevy and Hutchinson (1999)	0.08	US, with 17 countries, 1870-1910	Pooled cross-section, simple gravity specification
Head and Ries (1998)	0.10	Canada and 136 trading partners, 1980-1992	Pooled Cross section, simple gravity specification
Girma and Yu (2002)	0.16	UK and 48 trading partners	Pooled Cross section, simple gravity specification
Rauch and Trindale (2002)	0.22-0.47	Ethnic Chinese in 120 countries	Pooled Cross section, simple gravity specification
Wagner, Head and Reis (2002)	0.09	5 Canadian provinces, 160 countries, 1992-1995	Pooled Cross-section, OLS with country FE

Table 2:
Export Values by year, type of product and extensive/intensive margin.

Year	All products	Highly differentiated products	Moderately differentiated products	Less differentiated products
	Total value by province-country pair (Thousands of current Euros)			
1995	21107	1863	5907	6760
1999	24931	2218	6527	8072
2004	34399	2840	9675	11235
2008	45427	3956	12235	14792
	Number of transactions by province-country pair			
1995	300	101	84	76
1999	326	107	92	84
2004	476	153	141	118
2008	563	177	170	140
	Average value per transaction by province-country pair (thousands of current Euros)			
1995	83	30	52	81
1999	96	29	48	69
2004	75	30	43	68
2008	137	47	118	130

Note: Own elaboration using Spanish Custom detailed international transaction data for a selection of 77 destination countries (93 percent of total exports in 2008).

Table 3: Immigrants by country of origin

Ranking in 2007	Country of origin	Number of immigrants in 2007	% on total immigrants in 2007	Annual growth rate 1993-2007 (%)	Ranking in 1993
(1)	Morocco	648735	16.3	18.9	(2)
(2)	Romania	603889	15.2	59.5	(46)
(3)	Ecuador	395808	9.9	49.5	(40)
(4)	Colombia	254301	6.4	30.2	(16)
(5)	United Kingdom	198638	5.0	8.9	(1)
(6)	Bulgaria	127058	3.2	43.7	(49)
(7)	Italy	124936	3.1	16.1	(7)
(8)	China	119859	3.0	21.7	(14)
(9)	Peru	116202	2.9	18.8	(10)
(10)	Portugal	101818	2.6	8.9	(4)
(11)	Argentina	96055	2.4	11.3	(6)
(12)	Germany	91670	2.3	7.0	(3)
(13)	Poland	70850	1.8	21.3	(21)
(14)	Dominican Rep.	70775	1.8	15.4	(11)
(15)	Bolivia	69109	1.7	37.0	(48)
(16)	France	68377	1.7	7.1	(5)
(17)	Ukraine	62409	1.6	48.9	(70)
(18)	Algeria	45825	1.2	21.2	(30)
(19)	Cuba	45068	1.1	19.1	(25)
(20)	Brazil	39170	1.0	16.8	(23)
(21)	Pakistan	36384	0.9	35.6	(58)
(22)	Venezuela	33262	0.8	12.0	(15)
(23)	Senegal	33217	0.8	17.1	(27)
(24)	Uruguay	31092	0.8	15.9	(24)
(25)	Netherlands	30055	0.8	7.0	(9)
(26)	Russia	29297	0.7	27.7	(44)
(27)	Philippines	25051	0.6	7.7	(12)
(28)	Chile	24841	0.6	10.8	(19)
(29)	Nigeria	23524	0.6	32.1	(60)
(30)	India	20776	0.5	9.1	(17)
	Top 30 countries	3638051	91.4		
	TOTAL	3979014	100	17.0	

Source: Statistical Yearbook (Anuario Estadístico), various issues, published by INE

Table 4:
Trade-Creation Effect of Immigrants on Export flows
50 Spanish provinces, 77 Countries, 1995-2008

	Trading partner pair & country-year dummies		Trading partner pair & year dummies		Origin, destination & year dummies and geography	
	(1)	(2)	(3)	(4)	(5)	(6)
ln IMM	**0.110***	**0.102***	**0.275***	**0.254***	**0.132***	**0.122***
	(0.012)	(0.015)	(0.008)	(0.010)	(0.016)	(0.017)
ln ($Y_i Y_j$)	**0.316***	**0.330***	**1.165***	**1.170***	**0.839***	**0.840***
	(0.141)	(0.142)	(0.009)	(0.009)	(0.090)	(0.090)
NID		0.015		-0.040		-0.061
		(0.036)		(0.036)		(0.051)
ln distance					**-0.254***	**-0.252***
					(0.110)	(0.110)
Contiguity					**0.911***	**0.921***
					(0.299)	(0.299)
EU/EFTA					0.085	0.089
					(0.258)	(0.258)
Language/colonial ties					**-1.588***	**-1.593***
					(0.392)	(0.392)
Trading pair dummies	Yes	Yes	Yes	Yes		
Country-year dummies	Yes	Yes				
Year dummies			Yes	Yes	Yes	Yes
Country and province dummies					Yes	Yes
Adjusted R^2	0.848	0.848	0.808	0.808	0.783	0.783
Observations	51600	51600	51600	51600	51600	51600

Note: The dependent variable in each regression is the logarithm of exports in Euros plus one between province i and country j. Specifications (1) and (2) include 2800 trading-pair dummies and 988 country-year dummies. Specification (3) and (4) include 2800 trading-pair dummies and 13 year dummies. Specifications (5) and (6) include 77 country dummies, 50 province dummies and 13 year dummies. *=significant at 5%.

Table 5:
Instrumental Variables estimation

	First Stage of the IV	Second stage of IV (instrumented ln IMM)	Including lagged dependent variable
	(1)	(2)	(3)
ln $(Y_i Y_j)$	**0.403***	**0.367***	0.184
	(0.005)	(0.146)	(0.118)
ln $(Trade)_{t-1}$			**0.475***
			(0.007)
ln IMM		**0.049***	**0.063***
		(0.016)	(0.010)
Imputed IMM (instrument)	**0.554***		
	(0.003)		
Trading pair dummies		Yes	Yes
Country-year dummies	Yes	Yes	Yes
F test	302.04		
Prob>F	0.00		
Adjusted R^2	0.848	0.853	0.883
Observations	51600	51600	51600

Note: The dependent variable in each specification is equal to the logarithm of the total value of exports in Euros plus one between province i and country j. The Instrument used in specification (1) for the variable ln (IMM) is the imputed presence of immigrants of a certain nationality in the province. This is obtained by allocating the total immigration to Spain by nationality of origin, for each year, proportionally to the initial size of each nationality in the province. The standard errors are heteroskedasticity-robust and clustered by province-country pair.
*=significant at 5%.

Table 6:
Decomposition of the Effects of Immigrants on Exports;
The Extensive and Intensive Margin and The Extent of Product Differentiation

	OLS estimates			IV estimates		
	Total Value	**Extensive Margin**	**Intensive Margin**	**Total value**	**Extensive Margin**	**Intensive Margin**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
			Panel A:			
			All Goods			
Ln (IMM)	**0.110***	**0.082***	**0.028***	**0.049***	**0.083***	-0.034
	(0.011)	(0.005)	(0.009)	(0.023)	(0.010)	(0.018)
			Panel B:			
			Highly differentiated products (elasticity of substitution less than 2)			
Ln (IMM)	**0.097***	**0.073***	**0.023***	**0.130***	**0.113***	0.017
	(0.011)	(0.005)	(0.008)	(0.023)	(0.010)	(0.018)
			Panel C			
			Medium differentiated products (elasticity of substitution between 2 and 3.5)			
Ln (IMM)	**0.122***	**0.088***	**0.034***	**0.115***	**0.061***	**0.054***
	(0.013)	(0.006)	(0.009)	(0.030)	(0.014)	(0.020)
			Panel D:			
			Low differentiated products (elasticity of substitution above 3.5)			
Ln (IMM)	**0.098***	**0.080***	0.018	**0.113***	**0.095***	0.019
	(0.012)	(0.005)	(0.010)	(0.025)	(0.012)	(0.018)

Note: Each cell reports the estimates of the coefficient on the variable ln(Imm) from equation (1) in the text. All regressions include trading-pair dummies and country-year dummies. Specification (1) and (4) use as dependent variable the total value of export from the Spanish province to the country, specification (2) and (5) use as dependent variable the number of transactions between province j and country i –whose variation we call the extensive margin- and specification (3) and (6) use as dependent variable the average value per transaction between province j and country I –whose variation we call the intensive margin. Standard errors are heteroskedasticity-robust and clustered by trading-pair. *= significant at 5% level.

Table 7:
Effect of Immigration on Exports by Region

	Highly Differentiated			Moderately Differentiated			Less Differentiated		
	Total	Extensive	Intensive	Total	Extensive	Intensive	Total	Extensive	Intensive
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
EU/EFTA	**0.094***	**0.045***	0.049	0.089	**0.052***	0.037	0.025	**0.055***	-0.030
	(0.041)	(0.015)	(0.033)	(0.052)	(0.023)	(0.037)	(0.041)	(0.018)	(0.030)
East Europe	**0.110***	**0.055***	**0.055***	0.031	0.024	0.006	-0.001	-0.008	-0.009
	(0.033)	(0.015)	(0.024)	(0.033)	(0.020)	(0.024)	(0.032)	(0.015)	(0.023)
Africa	**0.174***	**0.118***	**0.056***	**0.165***	**0.094***	**0.079***	**0.182***	**0.128***	**0.054***
	(0.023)	(0.011)	(0.016)	(0.027)	(0.014)	(0.017)	(0.027)	(0.011)	(0.020)
Latin America	-0.008	0.009	-0.017	0.005	0.005	0.001	0.033	-0.002	-0.031
	(0.029)	(0.011)	(0.022)	(0.031)	(0.012)	(0.024)	(0.030)	(0.012)	(0.023)
Asia	0.038	**0.045***	-0.007	-0.047	0.011	-0.058	-0.059	0.002	-0.061
	(0.053)	(0.020)	(0.039)	(0.054)	(0.020)	(0.041)	(0.054)	(0.021)	(0.036)
Rest OECD	0.016	**0.041***	-0.024	**0.111***	**0.043***	0.068	0.016	**0.041***	-0.024
	(0.056)	(0.021)	(0.030)	(0.047)	(0.019)	(0.038)	(0.056)	(0.021)	(0.043)
Middle East	0.046	0.011	0.036	**0.204***	**0.072***	**0.132***	-0.025	-0.007	-0.018
	(0.074)	(0.028)	(0.056)	(0.073)	(0.027)	(0.058)	(0.073)	(0.029)	(0.053)

Note: Each cell reports the elasticity of export to immigrants estimated using specification (2) with total exports or number of transaction or value per transaction as dependent variable. All regressions include trading-pair dummies and country-year dummies. The sample is restricted, for each row, to countries in the region only. Specifications (1)-(3) include only trade in highly differentiated goods; (4)-(6) include trade in moderately differentiated goods and (7)-(9) include only less differentiated goods. The Method of estimation is OLS,. The Standard errors are heteroskedasticity robust and clustered by trading-pair. *= significant at 5% level.

Table 8
Effects of immigrants on Exports:
Separating periods and initial province-density of immigrants

	Total value	Extensive	Intensive
	(1)	(2)	(3)
	Panel A:		
	Time dimension: Before and after 2002		
period 1995-2001	**0.085***	**0.069***	0.016
	(0.019)	(0.008)	(0.014)
period 2002-2008	**0.197***	**0.131***	**0.066***
	(0.017)	(0.008)	(0.012)
	Panel B:		
	By provinces: grouped by immigrants as % of the total population in 2007		
	period 1995-2001		
<4%	0.023	**0.048***	-0.025
	(0.034)	(0.013)	(0.026)
[4-10%]	0.067	**0.055***	0.012
	(0.036)	(0.015)	(0.027)
>10%	**0.122***	**0.083***	0.039
	(0.031)	(0.014)	(0.023)
	period 2002-2008		
<4%	0.055	**0.076***	-0.022
	(0.034)	(0.016)	(0.025)
[4-10%]	**0.146***	**0.093***	**0.054***
	(0.034)	(0.015)	(0.025)
>10%	**0.260***	**0.168***	**0.112***
	(0.026)	(0.014)	(0.018)

Note: Each cell reports the elasticity of export to immigrants estimated using specification (2) with total exports (column 1), number of transaction (column 2) or value per transaction (column 3) as dependent variable. All regressions include trading-pair dummies and country-year dummies. The sample is split by years in the upper part of the Table and two regressions are run separately for each period. In the lower part the sample is split by year and province according to the density of immigrants in 2007. Method of estimation is OLS. Standard errors are heteroskedasticity robust and clustered by trading-pair. *= significant at 5% level.

Table Appendix

Table A1
Countries included in the study (77 countries and 7 regional groups)

Western Europe	South-East Europe	Africa	Latin America	Asia	Rest of OECD	Middle East
Austria	Bosnia*	Angola*	Argentina	Bangladesh	Australia	Egypt*
Belgium	Bulgaria	Algeria	Bolivia	China	Canada	Iran*
Denmark	Croatia *	Cape Verde	Brazil	Pakistan	Japan	Israel*
Finland	Czech*	Gambia	Chile	India	Korea	Jordan
France	Hungary	Ghana**	Colombia	Philippines	Mexico	Lebanon*
Germany	Poland	Guinea**	Costa Rica	Thailand*	N. Zealand	Syria
Greece	Serbia*	Guinea-B*	Dom. Rep.		Turkey*	
Ireland	Romania	Guinea Eq.	Ecuador		USA	
Italy	Russia*	Mali **	El Salvador			
Netherlands	Ukraine*	Morocco	Guatemala			
Norway		Mauritania	Honduras			
Portugal		Nigeria	Nicaragua			
Sweden		Senegal	Panama			
Switzerland		Sierra Leone**	Peru			
UK		Tunisia*	Paraguay			
			Uruguay			
			Venezuela			
N=15	N=10	N=15	N=17	N=6	N=8	N=6

Note: We included only those countries for which we could reconstruct a consistent and uninterrupted series of observations on the stock of immigrants in each Spanish province between 1993 and 2007. * Series starts in 1996 and ** series starts in 1997.

Table A2
Robustness Checks: Dealing with 0-trade observations.

	Basic Specification log (y+1)	Origin & destination fixed effects log (y+1)	Tobit log (y+1)	Poisson (y)	Number of observations
	(1)	(3)	(4)	(5)	(6)
Exports>=0	**0.110***	**0.132***	**0.146***	**0.105***	51600
	(0.012)	(0.016)	(0.008)	(0.008)	
Exports >0	**0.068***	**0.119***	**0.120***	**0.104***	46133
	(0.013)	(0.014)	(0.007)	(0.007)	

Note: The dependent variable is the logarithm of exports plus one. The first row indicates whether we include all observations in the estimation or only those strictly positive. Standard errors are heteroskedasticity robust and clustered by trading-pair. *= significant at 5% level.

Technical Appendix.

Table TA1
Shares of exports, imports and Immigrants by Regions of the World.

	Share of exports (%)			Share of imports (%)			Share of immigrants (%)		
	1993	**2002**	**2008**	**1993**	**2002**	**2008**	**1993**	**2002**	**2008**
Western Europe	74.10	73.05	67.47	67.77	65.80	53.13	49.24	29.99	17.45
Eastern and Southern Europe	1.71	3.65	5.92	2.46	3.88	5.92	1.81	6.13	22.89
Africa	2.70	2.72	4.29	3.00	4.21	6.46	16.77	27.02	20.85
Latin America	4.01	2.67	2.78	3.02	2.86	3.71	17.07	23.16	29.08
Asia	1.68	1.16	1.97	3.16	4.66	8.84	5.54	6.94	5.27
Rest OECD	8.27	9.32	9.67	12.56	10.26	10.05	6.04	2.94	1.31
Middle East	1.49	1.31	1.35	1.40	1.03	2.00	1.02	0.44	0.19
Rest of the World	6.05	6.12	6.55	6.64	7.30	9.89	2.50	3.38	2.97
World	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Note: See Table A1 for list of countries included in each geographic area.

Table TA2
Description of Imports by year, type of product and extensive/intensive margin

Year	All products	Highly differentiated products	Moderately differentiated Products	Less differentiated products
		Imports		
	Total value by province- country pair (Thousands Euros)			
1995	26491	6388	8750	9257
1999	30582	7582	9783	10759
2004	43009	10402	13699	14563
2008	56750	13305	16683	18334
	Number of transactions by province-country pair			
1995	432	148	131	111
1999	483	158	134	112
2004	670	228	215	164
2008	807	270	250	193
	Average value per transaction by province-country pair (thousands Euros)			
1995	117	48	77	160
1999	169	56	81	252
2004	110	43	59	152
2008	179	60	97	178

Note: Authors´ calculations using trade data for 50 provinces and 77 countries. Exports and imports flows include zeros. Products are classified into three broad categories: High differentiated products (elasticity of substitution below 2), medium differentiated products (elasticity of substitution between 2 and 3.5) and low differentiated products (elasticity of substitution above 3.5).

Table TA3
Spanish Provinces divided between high, intermediate and low presence of immigrants in 2007

High Immigration Provinces IMMIGRANTS/POPULATION >10%	Intermediate Immigration Provinces IMMIGRANTS/POPULATION Between 4% and 10%	Low Immigration Provinces IMMIGRANTS/POPULATION <4%
Alicante	Álava	Badajoz
Almería	Albacete	Cáceres
Balears	Ávila	Cádiz
Barcelona	Burgos	Córdoba
Castellón	Ciudad	Coruña
Girona	Cuenca	Guipúzcoa
Guadalajara	Granada	Jaén
Huesca	Huelva	Lugo
Lleida	León	Ourense
Rioja	Navarra	Asturias
Madrid	Tenerife	Palencia
Málaga	Soria	Pontevedra
Murcia	Teruel	Salamanca
Las Palmas	Toledo	Cantabria
Segovia	Valencia	Sevilla
Tarragona	Valladolid	Vizcaya
Zaragoza		Zamora

Table TA4: Imports
Trade-Creation Effect of Immigrants
50 Spanish provinces, 77 Countries, 1995-2008

	Pair FE & country-year dummies		Trading partner pair effects		Origin & destination effects	
	(1)	(2)	(3)	(4)	(5)	(6)
ln (Y_iY_j)	0.066	-0.063	**1.248***	**1.244***	-0.142	-0.146
	(0.179)	(0.181)	(0.011)	(0.011)	(0.110)	(0.110)
ln IMM	**0.050***	**0.101***	**0.237***	**0.272***	**0.087***	**0.082***
	(0.014)	(0.018)	(0.009)	(0.012)	(0.019)	(0.021)
NID		**0.200***		**0.381***		0.006
		(0.050)		(0.044)		(0.076)
ln distance					**-0.685***	**-0.686***
					(0.204)	(0.204)
Contiguity					**1.358***	**1.361***
					(0.291)	(0.291)
EU/EFTA					**5.646***	**5.650***
					(0.431)	(0.431)
Language/colonial ties					**4.787***	**4.794***
					(0.733)	(0.733)
Trading pair dummies	Yes	Yes	Yes	Yes		
Country-year dummies	Yes	Yes				
Year dummies			Yes	Yes	Yes	Yes
Country and province dummies					Yes	Yes
Adjusted R^2	0.856	0.856	0.827	0.827	0.771	0.771
Observations	51600	51600	51600	51600	51600	51600

Note: The dependent variable in each regression is the logarithm of imports in Euros plus one between province i and country j. The explanatory variables are lagged one period. Specifications (1) and (2) include 2800 trading-pair dummies and 988 country-year dummies. Specification (3) and (4) include 2800 trading-pair dummies and 13 year dummies. Specifications (5) and (6) include 77 country dummies, 50 province dummies and 13 year dummies. *=significant at 5%.

Table TA5. Import flows.
Trade-Creation Effect of Immigrants: IV estimation and controlling for Lagged trade

	2SLS (stage 1) (1)	2SLS (instrumented ln IMM) (2)	Including lagged dependent variable (3)
ln $(Y_i Y_j)$	**0.403***	**0.367***	-0.099
	(0.005)	(0.146)	(0.151)
ln $(Trade)_{t-1}$			**0.521***
			(0.007)
ln IMM		**0.056***	**0.021***
		(0.028)	(0.011)
Imputed IMM (instrument)	**0.554***		
	(0.003)		
Trading pair dummies		Yes	Yes
Country-year dummies	Yes	Yes	Yes
F test	302.04		
Prob>F	0.00		
Adjusted R^2	0.848	0.859	0.895
Observations	51600	51600	51600

Note: The dependent variable in each specification is equal to the logarithm of the total value of imports in Euros plus one between province i and country j. The Instrument used in specification (1) and (2) for the variable ln(IMM) is the imputed presence of immigrants of a certain nationality in the province. This is obtained by allocating the total immigration to Spain by nationality of origin, for each year, proportionally to the initial size of each nationality in the province. The standard errors are heteroskedasticity-robust and clustered by province-country pair. *=significant at 5%.

Table TA6. Imports
Robustness Checks: Dealing with 0-Import observations.

	Basic Specification log (y+1)	Origin & destination fixed effects log (y+1)	Tobit log (y+1)	Poisson (y)	Number of observations
	(1)	(3)	(4)	(5)	(6)
Imports>=0	**0.050***	**0.087***	**0.044***	**0.141***	51600
	(0.014)	(0.019)	(0.010)	(0.013)	
Imports >0	0.021	**0.040***	**0.038***	**0.141***	40271
	(0.017)	(0.020)	(0.010)	(0.013)	

Note: The dependent variable is the logarithm of trade flows (imports or exports) plus one. The first row indicates whether we include all observations in the estimation or only those strictly positive. Standard errors are heteroskedasticity robust and clustered by trading-pair. *= significant at 5% level.

Table TA7
Decomposition of the Effects of Immigrants on Imports;
Extensive and Intensive Margin; The Extent of Product Differentiation

	Imports					
	OLS estimates			**IV estimates**		
	Total Value	**Extensive Margin**	**Intensive Margin**	**Total value**	**Extensive Margin**	**Intensive Margin**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
	Imports					
	Panel A: All Goods					
Ln (IMM)	**0.050***	**0.050***	0.001*	**0.056***	**0.071***	-0.014
	(0.014)	(0.006)	(0.010)	(0.028)	(0.011)	(0.023)
	Panel B: Highly differentiated products (elasticity of substitution less than 2)					
Ln (IMM)	**0.079***	**0.052***	**0.027***	**0.161***	**0.101***	**0.060***
	(0.012)	(0.005)	(0.009)	(0.027)	(0.011)	(0.021)
	Panel C Medium differentiated products (elasticity of substitution between 2 and 3.5)					
Ln (IMM)	**0.043***	**0.040***	0.003	0.032	**0.066***	-0.034
	(0.012)	(0.005)	(0.009)	(0.029)	(0.011)	(0.023)
	Panel D: Low differentiated products (elasticity of substitution above 3.5)					
Ln (IMM)	**0.081***	**0.044***	**0.038***	**0.140***	**0.074***	0.046
	(0.012)	(0.005)	(0.010)	(0.031)	(0.011)	(0.026)

Note: Each cell report the estimates of the coefficient on the variable $\ln(Imm_{jt})$ from equation (2) in the text. All regressions include 3500 trading-pair dummies and 1001 country-year dummies. Specification (1) and (4) use as dependent variable the total value of export from the Spanish province to the country, specification (2) and (5) use as dependent variable the number of transactions between province j and country i –that we call the extensive margin- and specification (3) and (6) use as dependent variable the average value per transaction between province j and country I –that we call the intensive margin. Standard errors are heteroskedasticity-robust and clustered by trading-pair. *= significant at 5% level.

Table TA8:
Effect of Immigration on Imports by Region of Origin of Immigrants

	Highly Differentiated			**Moderately Differentiated**			**Less Differentiated**		
	Total	Extensive	Intensive	Total	Extensive	Intensive	Total	Extensive	Intensive
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
EU/EFTA	0.006	0.004	0.002	0.074	**0.072***	0.002	**0.078***	**0.061***	0.017
	(0.040)	(0.018)	(0.030)	(0.039)	(0.018)	(0.030)	(0.039)	(0.017)	(0.030)
East Europe	0.032	-0.007	**0.039***	**0.104***	0.022	**0.082***	**0.162***	0.021	**0.141***
	(0.036)	(0.015)	(0.008)	(0.040)	(0.017)	(0.031)	(0.042)	(0.015)	(0.033)
Africa	**0.197***	**0.102***	**0.095***	**0.226***	**0.111***	**0.116***	**0.213***	**0.097***	**0.116***
	(0.024)	(0.011)	(0.017)	(0.026)	(0.013)	(0.017)	(0.030)	(0.013)	(0.021)
Latin America	-0.020	**0.046***	**-0.065***	-0.024	**0.043***	**-0.067***	0.023	**0.032***	-0.010
	(0.031)	(0.021)	(0.023)	(0.028)	(0.011)	(0.021)	(0.030)	(0.011)	(0.023)
Asia	**0.113***	0.032	**0.081***	**-0.175**	**-0.087***	**-0.089***	-0.073	**-0.074***	0.001
	(0.039)	(0.023)	(0.034)	(0.049)	(0.026)	(0.037)	(0.047)	(0.023)	(0.036)
Rest OECD	0.004	0.024	-0.020	-0.032	0.002	-0.033	**0.115***	**0.056***	0.059
	(0.052)	(0.021)	(0.041)	(0.050	(0.021)	(0.041)	(0.056)	(0.020)	(0.044)
Middle East	-0.026	-0.001	-0.025	0.018	-0.003	0.021	0.052	-0.012	0.064
	(0.066)	(0.021)	(0.054)	(0.055)	(0.024)	(0.041)	(0.076)	(0.023)	(0.061)

Note: Each cell reports the elasticity of export to immigrants estimated using specification (2) with total imports or number of transaction or average value per transaction as dependent variable. All regressions include trading-pair dummies and country-year dummies. The sample is restricted, for each row, to countries in the region only. Specifications (1)-(3) include only trade in highly differentiated goods; (4)-(6) include trade in moderately differentiated goods and (7)-(9) include only less differentiated goods. The Method of estimation is OLS, with Standard errors are heteroskedasticity robust and clustered by trading-pair. *= significant at 5% level.

Table TA9
Effects of immigrants on Imports:
Separating periods and initial province-density of immigrants

	Imports		
	Total value	Extensive	Intensive
	(1)	(2)	(3)
Before and after 2002			
period 1995-2001	0.026	**0.045***	-0.019
	(0.021)	(0.009)	(0.015)
period 2002-2008	**0.152***	**0.079***	**0.073***
	(0.021)	(0.009)	(0.016)
Provinces grouped by percentage of immigrants in the total population in 2007			
period 1995-2001			
<4%	-0.018	**0.042***	**-0.060***
	(0.037)	(0.016)	(0.028)
[4-10%]	**0.091***	**0.057***	0.034
	(0.035)	(0.014)	(0.026)
>10%	0.017	**0.039***	-0.022
	(0.036)	(0.015)	(0.017)
period 2002-2008			
<4%	**0.180***	**0.114***	**0.066***
	(0.042)	(0.019)	(0.032)
[4-10%]	**0.178***	**0.076***	**0.102***
	(0.036)	(0.016)	(0.027)
>10%	**0.123***	**0.070***	**0.058***
	(0.037)	(0.017)	(0.028)

Note: Each cell reports the elasticity of export to immigrants estimated using specification (2) with total imports (column 1), number of transaction (column 2) or value per transaction (column 3) as dependent variable. All regressions include trading-pair dummies and country-year dummies. The sample is split by years in the upper part of the Table and two regressions are run separately for each period. In the lower part the sample is split by year and province according to the density of immigrants in 2007. Method of estimation is OLS. Standard errors are heteroskedasticity robust and clustered by trading-pair. *= significant at 5% level.