Interpersonal Networks in International Trade:

Evidence on the Role of Immigrants in Promoting Exports from the American States*

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Abstract

The effect of immigrants on the export performance of the 50 American states and the District of Columbia to 87 foreign countries is studied. Mark Granovetter's (1973) discussion of weak and strong ties is used to motivate the proposition that immigrants are well situtated with their knowledge of two societies and their strong ties to their countrymen to lower the transactions costs for prospective exporters, and, hence, that immigrants have a pro-trade effect on exports between their host and origin countries. This proposition (which has been confirmed in several studies at the national level and for the Canadian provinces) and its several corollaries are tested using state-level trade data averaged over the 1990 – 1992 period. The proposition and its corollaries, that the immigrants' ties are more important when the export destination economy and legal system are less transparent and that the ties are less important when the skills and information held by the immigrants are less unique, are confirmed. The results are robust over a variety of specifications, including the use of state and destination country fixed effects.
Keywords: strong ties, weak ties, immigrant networks, state level exports, transactions costs
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1. Introduction

The importance of channels through which individuals are made aware of opportunities for advantageous exchange and the evolution of institutions that provide assurance that agreements will be honored have been the focus of a number of papers by Avner Greif, James Rauch, and others.[1] The needed institutions may evolve specifically to provide the required information and trust, or institutions that evolved for other purposes may be extended to do so.

Presumably, information, trust, and commitment are more difficult to obtain when exchange is to occur at a distance or when exchange is to cross linguistic or cultural boundaries, as is the case with much of international trade. Since established trading firms likely already have their own proprietary networks, the difficulty then will be especially acute in the case of a new or infrequent trader or of an established firm entering new areas. How can a prospective exporter be reasonably assured that a market for his good exists, how can he be sure his overseas partners will not cheat him, how can he be sure that he does not incur extraordinary costs in bribes and other payments to distribute his wares in the destination country?

International migrant networks have been recognized as just such an institution capable of providing the information on opportunities and reputations of potential trading partners and of providing a credible threat of sanctions sufficient to deter, or at least to reduce, opportunistic cheating on trading agreements. Earlier studies that emphasized the relationship between shared

[1] See Greif (2000) for reference to many of these papers. This literature seems to have exploded in recent years. Examples includeZXZXZ.

ethnicity and trust include Landa (1994).[2] More recently, the role of these interpersonal migrant networks in international trade has been investigated both theoretically and empirically by Rauch (1999, 2001) and by Rauch and others (2001, 2002). Within this genre special interest has been shown in the role of immigrants in promoting bilateral trade between their host and origin countries. Since Gould (1994), which found an important pro-trade role of the foreign-born in both the import and export trade of the United States with the immigrants' countries of origin, the pro-trade effect of immigrants has been confirmed for Canada by Head and Ries (1998), for the United Kingdom by Girma and Yu (2002), and for the United States in the historical, 1870 – 1910 period, by Dunlevy and Hutchinson (1999) and Hutchinson and Dunlevy (2001).[3]

Wagner, Head, and Ries (2002) have extended the study of the immigrant-trade link to the sub-national level by using the Canadian province as the unit of domestic observation. Extension of study to the sub-national level is important insofar as the immigrant-trade link relies on networks of individuals and families,[4] and the empirical models to date, strictly, have been largely applied to heavily aggregated national data. If the pro-trade effect of immigrants cannot be observed at the sub-national level, then the credibility of its operating at the national level should be cast into doubt, and the empirical results to date perhaps attributed to spurious correlation.

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[2] In a recent study Alesina and La Ferrara (2002) find that ethnic origin does not significantly affect a person's level of trust. This result, however, appears to relate to a person's trust vis-à-vis the population in general, not to the person's differential trust between co-ethnics and the general population.

[3] A parallel literature on the positive impact of already settled immigrants on the settlement choices of their later arriving compatriots is well established in the migration literature. See Nelson (1959), Greenwood (1969, 1975), Dunlevy and Gemery (1977), and Massey (1990). Palloni, et al. (2001) test the hypothesis of social capital in the form of family networks having a positive effect on international migration and find in favor of it.

[4] This assumes that the immigrant is relatively stationary in the host country so that he can be identified with a particular subdivision of the larger state.

Here we parallel the approach of Wagner, Head, and Ries by focusing on the pro-trade effect of the foreign born, "migrant stock," living in the American states on the bilateral exports of those states to the immigrants' countries of origin.[5,6] Data, available from the Massachusetts Institute for Social and Economic Research (MISER), on average annual exports over the 1990 – 1992 period, by state and by country of destination, of manufactured goods are combined with data on the number of foreign born, by state of residence in 1990 and by country of birth, in an augmented gravity model to test the hypothesis of a pro-trade immigrant effect. The resulting data set comprises 51 states (including the District of Columbia) and 87 foreign countries, selected from all continents.

We estimate the relationship in two general ways. First, we utilize a standard gravity model augmented to account for the posited immigrant effect. The model is then modified to test several specific conjectures offered below. Second, the gravity model is estimated with state fixed effects, destination country fixed effects, and with both sets of fixed effects. Because exports from some states to given destination countries are zero in our sample we use the tobit procedure to estimate the model. Regardless of the specification of the estimating equation, a remarkably consistent, robust pro-trade effect for migrant stock is found.

Our approach suggests certain situations in which interpersonal networks are likely to be of special importance. Among these is the hypothesis that the mediation of immigrants is especially useful when trade with their countries of origin is particularly subject to risk and corruption. We test this and other corollaries of the basic hypothesis, that are developed below,

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[5] For the purpose of this study no distinction will be made between "immigrant" and "foreign born." Our data strictly are on the foreign born, regardless of their immigrant status under American law.

[6] Studies of American exports at the subnational level have been conducted by Coughlin and Fabel (1988), Coughlin and Pollard (2001), Erickson and Hayward (1991), and Gazel and Schwer (1998), among others. Coughlin and Wall (2003) provide a good survey of the work that has been done to date on state level exports.

and find strong support for our approach. In the next section we review the mechanisms by which immigrants might promote trade. In section 3 we discuss the basic and augmented gravity models that are estimated. We also consider the strengths and weaknesses of the export data employed. Section 4 presents and discusses the empirical findings. Section 5 concludes.

2. The Importance of Trust and the Origin of Information: The Immigrant-Trade Link

A seminal paper, germane to the current argument, is Granovetter (1973) in which network links, put on a continuum from "weak" to "strong," are analyzed. Strong links require time to develop, and they involve greater emotional intensity, confiding, and reciprocity; these are ties that we would characterize as embodying a high degree of mutual confidence and trust. Granovetter argues that if a person, A, has strong ties to two persons, B and C, then over time (or in an equilibrium state), it is highly likely that B and C will also be joined by a strong tie. Hence, a group characterized by strong ties is likely to be "closed." We observe that strong ties require commitment; hence, they are costly, and the typical person will have strong ties at most to no more than a few dozen other persons (see Granovetter, p. 1375). Weak ties, on the other hand, are characterized by more casual, and low cost, recognition. Granovetter argues that weak ties are important because they provide links to those outside the otherwise closed group, "those to whom we are weakly tied are more likely to move in circles different from our own and will thus have access to information different from that which we receive." (p. 1371)

I argue that strong ties provide mutual trust; however, information new to the members of the group is unlikely to originate within the group, itself. It is the weak ties that provide information that is new, and, hence, scarce and, therefore, valuable. For trade to occur both trust and information are necessary. Trust can be provided impersonally through the state or other institutions by a well understood system of contracting and enforcement; even here, however, the

usefulness of institutionally provided trust will diminish as the degree of standardization of the items traded decreases (see Rauch 1999, p. 7), and the importance of personal, strong ties will increase. Where stable or well understood institutions do not exist, the role of personal, strong ties is central regardless of what is to be exchanged. International trade is trade at a distance and often across cultural and legal systems. Especially for new participants, international trade significantly confronts potential traders both with less well-understood institutions and with greater difficulty in obtaining information of operational significance.

Much of the empirical work stimulated by Granovetter has considered the differential effectiveness of weak versus strong ties on the labor market outcomes of those seeking employment.[7] Unlike this literature which portrays weak and strong ties as substitutes, I argue that for the pro-trade nature of immigrant networks weak and strong ties are complementary. My argument, then, is that immigrants are almost uniquely situated to have access in their host countries to useful information both through personal observation and experience and via weak ties and to have the necessary strong ties to their family and co-ethnic friends both in their host country and in their origin countries. Family and friends in the origin country, in turn, have access to information in that country again through personal experience and through weak ties to others. Weak ties and personal experience provide information; strong ties provide trust.

In the specific case of manufactured goods exported from the U.S., the potential domestic supplier requires confidence that the goods will sell at a profit in the foreign market. The foreign buyer needs assurance that the merchandise is as claimed. The domestic supplier likewise must be confident in receiving the agreed on payment for his exported merchandise.[8] Finally, for

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[7] See Montgomery (1991, 1994) for a summary and evaluation of these studies.

[8] In many cases the banking system will provide sufficient guarantee for the agreed upon payment. In cases of trade with some developing countries or what were the centrally planned states of Eastern Europe, barter or other forms of

trade to be profitable, the merchandise must move through the distribution channels in a timely fashion, and the costs, including bribes, needed to move the merchandise must be known with some certainty.

Pro-trade links between immigrants and bilateral trade flows have been observed and discussed in the literature. These links have been categorized as working by reducing transactions costs in three ways. First, immigrants because of their familiarity with the economies of two different societies are in a better position to recognize opportunities for trade due to product differentiation or due to cost differentials between their host and origin countries. This may be referred to as the "information bridge." Second, immigrants may have a significant advantage, due to mutually understood culture and trust, in reducing the likelihood of miscommunication and other risks in dealing with those who reside in the origin country. This broadly includes both legal and extra-legal aspects of doing business in their country of origin, and it may be referred to as the "cultural bridge." Third, the immigrant community is capable of providing security and guarantees that the participants in the transaction will honor their agreements in spirit as well as in word. This may be referred to the "enforcement bridge."[9]

These three bridges see immigrants serving to increase the opportunity for trustworthy communication between their host and origin countries. Migrants therefore can serve to improve the exporter's (and importer's) knowledge and to mitigate the risks involved. From these follow the following proposition and three corollaries:

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countertrade often provided payment in kind. The American exporter in such a case then faced the risk of substandard goods being offered as payment. See Caves and Marin (1992) for a general presentation of countertrade; see Hogendorn (1999) for a discussion of the risks of barter trade in the historical case of European – African trade in the precolonial period. Hennart (1989) makes a stong case that countertrade, by building self-enforcing mechanisms into an agreement, can serve to reduce transactions cost. See also Marcouiller (2001) and Anderson and Marcouiler (2002) for further development of this argument.

[9] A fourth link, that of immigrant tastes, may promote imports from the country of origin to the immigrants' host country.

Proposition: Immigrants in the host country share ethnic strong ties with those in their particular origin communities; this form of social capital promotes economic contracting and, hence, trade. In the context of the present paper, we expect exports to be greater, *ceteris paribus*, between U.S. states and destination countries when those countries are the source for larger numbers of immigrants in the particular states. This, of course, is what has been found in the studies cited earlier, and is sought for here at the subnational level.

Network links are more important when it is otherwise more costly to obtain quality information about the potential trading partner and where it is more difficult to "navigate" the bureaucratic and commercial environment of the potential partner. This gives rise to three related corollaries:

Corollary 1: The role of ethnic networks is more valuable when destination markets and societies are less transparent, more complex, or more variable. In such environments bribes, extortion, and other aspects of corruption are likely to be more prevalent. If corruption is more prevalent in the export destination country, then ignorance of how to deal with business partners, government officials, and organized criminal groups can be devastating. Thus, the specific knowledge of norms and people needed to reduce the likelihood of being a victim of fraud and corruption that is possessed within the strong-tie immigrant network can be of great value.[10] In the present context, we expect the role of immigrants to be greater in promoting bilateral trade when the business or political environment in their origin country is less transparent or more corrupt. We also expect overall trade with such countries otherwise to be below "normal."

[10] Corruption is non trivial in international markets. Anderson and Marcouiller (2002, p. 342) cites a World Bank survey that lists corruption as the second most important obstacle to business worldwide, with crime and theft not far behind.

Corollary 2: The role of ethnic networks is more valuable when the native population in the host country is less able to master the language of the potential trading partner. In the present context, we assume that members of the immigrant community are more likely than the native born in the host country to be competent in both English and the language of their home country.[11]

Corollary 3: Related to the above, Girma and Yu have proposed that immigrants can possess either "individual-specific" or "nonindividual-specific" information. Individual-specific information is by their definition always useful in promoting trade. Nonindividual-specific information, however, may be of little use if the immigrants are from a country whose institutions are similar to those of the host country. In such a case information from nonimmigrant sources easily substitutes for what the immigrant can provide, driving the marginal value of the immigrant's network capital toward zero. Therefore, we assume that the more similar the institutions of the immigrant source (export destination) country are to those of the United States, the lower will be the pro-trade effect of the immigrants. Given our sample of countries, it may be empirically difficult to separate this effect from that of Corollary 2.

3. Model and Data

In this section we present the basic gravity model and the state-level data used to estimate the impact of immigrants on state-level exports, and we discuss the data, especially the export data, in some detail.

[11] Chiswick and Miller (1998) studied the effect of "language distance" on immigrant assimilation. Hutchinson (2002) applies Chiswick and Miller's "language distance" variable to international trade but does not incorporate the role of immigrants in promoting trade. "Distance," as such, does not play a role in the present paper.

The basic gravity equation relates exports between *i* and *j* as a positive function of the incomes and populations of the two trading entities and as a negative function of the distance between them; factors that alter the costs and benefits of trade are then added to the list of regressors either in an ad hoc manner or on the basis of any of a variety of possible underlying theoretical derivations.[12] In this study, to facilitate interpretation of the results, we use per capita incomes and population, and we enter *MIGRANT STOCK* into the model to reflect the information and cultural network effects discussed above. The gravity model is generally estimated as linear in the logarithms; we follow that practice; all non-dummy variables are transformed into their logarithms prior to estimation. The coefficients, therefore, are interpreted as elasticities. The model to be estimated is:

(1) $\ln EXPORTS_{ij} = f(\ln MIGRANT\ STOCK_{ij}, \ln PCINC_i, \ln POP_i, \ln PCINC_j, \ln POP_j, \ln DISTANCE_{ij}, Z_{ij}, FE_i, FE_j)$

where $\ln EXPORTS_{ij}$ denotes (the natural logarithm of) the dollar value of exports of manufactures from state *i* to country *j* averaged over the years 1990 through 1992,

$MIGRANT\ STOCK_{ij}$ denotes the number of persons born in country *j* residing in state *i* as enumerated in the 1990 Census,

$PCINC_i$ and $PCINCF_j$ denote, respectively, the per capita income, in U.S. dollars, of state *i* and of country *j* in 1990,

POP_i and $POPF_j$ denote, respectively, the populations of state *i* and country *j* in 1990,

[12] The theoretical literature on the gravity model as applied to international trade is extensive. Basic references include Bergstrand (1985, 1989); Frankel (1997) provides a good overview of gravity models. Gould (1994) develops a model relating bilateral trade to the size of the migrant stock in the host country. The particular form of the gravity equation employed here can be straightforwardly derived, with a few obvious modifications, following the approach of Rauch and Trindade (2002). Since our model offers no innovations we do not repeat its derivation.

$DISTANCE_{ij}$ denotes the distance from the principal or most central city of state i to the capital or major city of country j.

Z_{ij} denotes other variables used to augment this standard form that allow us to test the propositions advanced in the previous section,

FE_i and FE_j denote fixed effects dummy variables for the American states and for the destination countries, respectively.

Given the geographically disaggregated nature of our data, the exports from a number of states to given foreign destinations are zero in value. This requires two adjustments: first, the logarithm of $EXPORTS_{ij}$ is defined as $\ln(EXPORTS_{ij} + 1)$; second, since the resulting value of $\ln EXPORTS_{ij}$ is zero in those cases where $EXPORTS_{ij}$ is zero, the model is estimated using the tobit procedure.

The appendix gives the sources for the data used in this study. Since the sources are relatively standard, we will discuss further only the export data. These are from the origin of movement (OM) series collected by the U.S. Census Bureau and modified and released by the Massachusetts Institute of Social and Economic Research (MISER).[13] These data are reported at the two-digit SIC level. They seek to determine the "point of origin" from which exports begin their journey to the port of export. "Point of origin" can refer to the state in which the factory that produced the item is located, or the location of a distributor, warehouse, or cargo processing facility. The "point of origin" can also be the state that contributes the greatest dollar value to a multi-product shipment, or the state of consolidation in which a multi-product export order is readied for shipment.

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[13] The following is taken from the U.S. Department of Commerce, International Trade Administration, "State Exports."

Although the state origin of movement and the state of production are not always identical, in many cases they are. The inconsistencies occur mainly in the case of nonmanufactured goods. Three quarters of U.S. manufactured exports are produced by firms that do their own exporting and for these shipments the state of production is correctly identified. For manufactured goods the data are regarded as the best available. In this study we limit ourselves to exports of goods in the SIC classes 20 – 39, namely, manufactures.

Our trade data comprise exports of the fifty U.S. states and the District of Columbia, referred to here as "states," to eighty-seven foreign countries. As a result the data set has 4437 observations; of these, 239 observations have an export value of zero. Table 1 presents the means and standard deviations of state exports to each of the 87 destination countries. Also presented in Table 1 are the means and standard deviations of the number of foreign born, by country of birth, across the states. Note that the sample of destination countries spans all continents and all ranges of economic development; some countries are major contributors of immigrants to the U.S., others contribute few immigrants; likewise, some countries are major markets for U.S. exports, others are minor trading partners.

4. Empirical Findings

All models are estimated using the tobit technique. The coefficients reported are the estimated marginal effect on observed exports, unconditional on whether the observation on exports is censored, of the explanatory variable in question.[14] Estimation of the basic gravity model with *MIGRANT STOCK* as a regressor is reported in column 1 of Table 2. This serves as

[14] The dtobit routine of the Stata statistical package is used to obtain the estimated coefficients. It reports, inter alia, both the marginal effects on the latent variable and the marginal effects on the unconditional expected value. It should be noted that estimated coefficients are identical whether the tobit results are based on the response of the latent variable to variation in the explanatory variable or if the results are the unconditional [on censoring] expected effect. See McDonald and Moffit (1980) for a discussion of the issues involved.

the base line regression. All variables obtain statistically significant coefficients of the expected sign. The estimated elasticity of *MIGRANT STOCK* on *EXPORTS* is a highly statistically and economically significant 0.29; this is some two times as large as the effect reported by Head and Ries, by Girma and Yu, and by Wagner, Head and Ries. The estimated impact of migrant stock on state exports stays in the neighborhood of 0.30 to 0.50 regardless of the modifications we make to the model, as reported below. Clearly, there is strong support at the level of the U.S. states for the immigrant pro-trade effect, and the Proposition offered above in section 2, is affirmed.

The standard gravity variables' estimated impacts on trade are generally as expected.[15] All coefficients have the expected algebraic sign, and each is statistically significantly different from zero. The high income elasticity, 3.06, of foreign demand for the exports of the states reflects that most manufactures exports from the U.S. are superior goods that enter the foreign purchasers' budgets in a discretionary manner. The elasticity of distance is –1.25, a quite standard finding.

The gravity model is now modified to address the various Corollaries of the basic Proposition. This is done first by considering the impact of low transparency or prevalent corruption in the export destination country on the role of immigrants in promoting trade. Second, the roles of both English and Spanish languages are considered within the model that controls for the effect of corruption on state exports.

Column 2 of Table 2 reports the findings when the model includes (the negative of) the World Bank's index of "control of corruption" for 1997 – 1998. This is the date of observation closest to our observation period of 1990 – 1992. We assume that the level of corruption in a

[15] This assertion is subject to dispute and will be further discussed in later revision of the manuscript.

given country is slow to change barring some significant shock to the system. "*CORRUPTION*" is added to the regression in two ways. First the negative of the index is interacted with the logarithm of migrant stock in order to determine if the pro-trade effect of migrant stock is greater when the export destination country has a higher level of corruption as asserted by Corollary 1. Second, the logarithm of the corruption variable is added as a regressor to capture any intercept-shift effects of corruption on trade flows. [16] [17]

The estimated coefficient on the interaction variable *CORRUPTION*ln MIGRANT STOCK* is a statistically significant 0.083, implying, as hypothesized, that the pro-trade role for immigrants does increase if their home country environment is more corrupt. For instance, when combined with the estimated migrant stock elasticity of 0.41, we find that the implicit pro-trade elasticity of immigrants from Guatemala, whose modified corruption index equals 0.819, is 0.47 while the elasticity for immigrants from Hong Kong, whose modified corruption index is – 1.313, is 0.29. Hence, the hypothesis that immigrants from countries with less transparent business environments will have a greater pro-trade effect is confirmed with our sample. The estimated coefficient on our intercept shift variable, the logarithm of *CORRUPTION* is a statistically significant – 0.83, which supports the second part of Corollary 1 that, ceteris paribus, trade is deterred by corruption. While this latter result is well grounded in the literature, we believe that the former finding, regarding the interaction of the role of immigrant networks and corruption on trade, is novel.

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[16] Observations on the corruption variable do not exist for Cape Verde Islands, Grenada, Laos, or Western Samoa. As a result 204 observations are lost in those estimations which have *CORRUPTION* among their explanatory variables. For this subset of observations 174 of the 4233 observations have a value of 0 for the dependent variable.

[17] The World Bank reports their index as ranging more or less between –2.5 and +2.5. Their index is of "control of corruption." We therefore use its negative to measure "corruption" which is interacted with the logarithm of MIGRANT STOCK. In order to obtain the intercept shift variable we add 2.5 to the negative of the reported value to ensure that logarithms of the values can be obtained.

The remaining gravity variables have statistically significant, although smaller, estimated coefficients than in the reference case of column 1.

Similarity of language between two countries has been found to be trade creating.[18] Corollary 2, however, asserts that similarity of language should reduce the value that immigrants contribute to trade promotion. We consider the effect of language on the pro-trade effects of immigrants by entering a variable that is the interaction of an English language (or Spanish language) dummy variable with the logarithm of migrant stock. If English (Spanish) is the native language of the export destination country then immigrants from that country do not possess an advantage over native-born Americans insofar as language fluency is concerned. Immigrants from such countries presumably still have pro-trade effects, but effects that are smaller than those of immigrants with language-specific skills. We also expect, ceteris paribus, that trade with English (Spanish) speaking countries will, in general, involve lower transactions costs, and, hence, that trade flows with them will be greater. This second effect is tested using an intercept shift dummy variable.

Column 3 of Table 2 reports the results of controlling for corruption, English language and Spanish language.[19] The estimated coefficient on the English language-Migrant Stock interacted variable is negative, as hypothesized, and statistically significant. This suggests that the pro-trade effect of immigrants for English speaking countries is approximately one-third weaker compared to the reference group. Immigrants from Spanish speaking countries, are

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[18] E.g., see Frankel (1997), Hutchinson (2002).

[19] In our sample the English speaking countries are: Canada, Belize, Jamaica, Trinidad, Grenada, Guyana, the United Kingdom, Ireland, Singapore, the Philippines, Hong Kong, Australia, New Zealand, Western Samoa, Cameroon, Ghana, Nigeria, Uganda, Kenya, South Africa, Zambia, and Zimbabwe. The Spanish-speaking countries are: Mexico, Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica, Panama, Dominican Republic, Colombia, Venezuela, Ecuador, Peru, Bolivia, Chile, Paraguay, Uruguay, Argentina, and Spain. These groupings are based on the language in question being reported by the CIA Factbook as either the principal or, in the case of Hong Kong, second language of the particular country.

estimated to have an even weaker pro-trade effect, about one-fourth that of the reference group. It appears that immigrants from English and Spanish-speaking countries bring language skills to the U.S. that are already in sufficiently ample supply such that the value of those skills is noticeably less than the language skills of our reference group of immigrants. The coefficients of the intercept shift variables are 1.77 for English speaking countries and a large 3.35 for Spanish speaking countries, and both are statistically significant. This suggests that exports to English speaking countries and to Spanish speaking countries, after controlling for size, distance, corruption, and migrant stock are well above the norm. In practical terms, this seems to suggest a "bias" for trade with Western Hemisphere countries.[20] Corollary 2 therefore receives strong support.

In this estimation both the (non-interacted) migrant stock and corruption variables obtain statistically significant estimated coefficients somewhat larger (in absolute value) than what was obtained in the earlier specification. The robustness of our basic migrant stock and corruption findings is confirmed. The estimated coefficients on the standard gravity variables are little affected by the inclusion of the language variables.

Corollary 3, that immigrants from countries with similar legal and commercial institutions as the United States bring with them human and social capital of less usefulness at the margin than immigrants from other countries (Girma and Yu's contention), is closely intertwined with both issues of corruption and of language. Hence, support for Corollary 3 is

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[20] We next test for the effect of "institutional similarity." This establishes that the greater volume of exports to English speaking countries is not due to the large volume of American trade with Canada. It is often observed that sub-Saharan African countries are less involved in the world economy than other nations. Our sample includes a number of these countries, many of which are English speaking. In order to determine whether these countries affected our empirical findings in a systematic manner, an intercept shift dummy variable equal to unity if the export destination country of observation is located in sub-Saharan Africa was added to the previous specification. In unreported results it was found that the Africa dummy variable had a very small, statistically insignificant effect on the trade of the states; inclusion of this dummy in no appreciable way affected the estimated coefficients on any of the other variables.

implicit in the results just reported. Any attempt to further identify a Girma-Yu effect is subject to charges of arbitrariness. Nevertheless, we identified Canada, the United Kingdom, Australia, Ireland, and New Zealand as having the operationally effective legal and commercial systems (the "British System") closest to the United States. We define a dummy variable as equal to unity for these countries and equal to zero otherwise, and we redefine the English Language dummy to include only those English speaking countries for which the similarity dummy is zero. This is done since the countries in the similarity group are a subset of the English speaking group. This construction of the dummy variables facilitates interpretation of the results. We interact the institutional similarity dummy with the logarithm of migrant stock to capture the differential effect of immigrants from these countries on American exports. As was the practice with the measures of corruption and language we add both this interaction variable and the institutional similarity dummy variable as an intercept shift variable to the regression.

Column 4 of Table 2 presents the results obtained when the institutional similarity variable is included in the regression. The coefficient on the interaction of Migrant Stock and Institutional Similarity is a strong, statistically significant – 0.32. The overall impact of English speaking immigrants from institutionally similar countries, therefore, is some 70 per cent less than the effect of immigrants in general, and it is not statistically different from zero.[21] The coefficient on the redefined English language dummy interacted with the (log of the) migrant stock variable is here an insignificant 0.057. We infer from these results that the impact English speaking immigrants from non-institutionally similar countries is essentially the same as, or, perhaps, slightly greater than, the effect of immigrants overall. The estimated effects and statistical significance of migrant stock, corruption, and Spanish language are little changed, again confirming the robustness of these estimated effects. Likewise, the estimated roles of the

[21] The relevant F-statistic is 1.80, significant at the 18 % level of significance.

standard gravity variables are unchanged. Insofar as the Institutional Similarity shift variable is concerned, a large, and statistically significant pro-trade effect is obtained.

A skeptic might argue that the modified gravity model fails to control for a great deal of unobserved heterogeneity across the American states and across the foreign countries that are the destinations for the states' exports. No allowance is made, for instance, for whether a state is home to old line, "rust belt" industries or to "sun belt" industries, or whether the state borders an ocean; similarly no attempt is made to control for the barriers to trade that a destination country may have erected. In order to correct for such heterogeneity we re-estimate the model first using state-specific dummy variables, then using destination country-specific dummy variables, and then both sets of fixed effects.[22] We do this for the basic gravity model and then for the model that incorporates all of the modifications introduced above.

Table 3 column 1 presents the results of estimating the basic gravity model with state fixed effects. State-specific variables are excluded from this model and in the interest of brevity the coefficients on the state dummy variables are not reported.[23] The first result to notice is that the estimated effect of migrant stock on exports remains virtually unchanged at a strong and statistically greater than zero 0.35. Whatever the heterogeneity that exists among the states, it plays no discernable role in the immigrant-export nexus. Similarly, the estimated effects of destination country income and population, and of distance are of the same orders of magnitude as the basic model without fixed effects reported in column 1 of Table 2.

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[22] Matyas (1997) argues for the use of fixed effects in estimating gravity models. Since our observations are all for a single time period we cannot follow the stronger advice of Cheng and Wall (2002) to use trading pair specific bilateral fixed effects.

[23] Compared with the basic model of Table 2, the state specific dummy variables are found to have significant explanatory power.

Column 2 reports the results of estimating the full model with state fixed effects. Comparing these results with the full model reported in column 4 of Table 2, we again find that the majority of the variables of interest are statistically significant with virtually unchanged estimated coefficients: Migrant Stock continues to be estimated to have a strong pro-trade effect and the roles of Corruption and Spanish language are again confirmed. Inclusion of state specific effects reduces (in absolute value) the estimated roles of Institutional Similarity, but the coefficients on the Institutional Similarity terms remain statistically significant. Clearly, state-specific heterogeneity, although it does exist, does not significantly alter the link between immigrant stock and state exports. The confirmation of the basic proposition and its corollaries remains intact.

Next we consider destination country heterogeneity. The tobit estimation is modified to include dummy variables representing the 87 export destination countries. Because of collinearity all variables representing characteristics of the destination countries are omitted from the estimated equation; hence, the country-specific fixed effects model is the analog of any of the models reported in Table 2. Column 3 of Table 3 reports the results of this tobit estimation. We observe that inclusion of the country-specific dummies has little effect on the estimated pro-trade elasticity of immigrants on exports; the pro-trade elasticity of migrant stock remains a highly statistically and economically meaningful 0.35. Our basic proposition remains confirmed.

Inclusion of both the state-specific and country-specific dummy variables yields the tobit results reported in column 4 of Table 3. The only coefficient that can be estimated in this form is the one of greatest interest, the coefficient on migrant stock. The point estimate here is 0.47, the same order of magnitude that we obtained in the earlier specifications, and again it is highly statistically significant. The basic proposition receives strong support in every case.

5. Conclusions

Our results confirm the basic proposition that immigrants, a group with the appropriate mix of weak ties with native Americans and strong intra-cultural ties with their countrymen, have a pro-trade effect on exports from the American states. We find a remarkably consistent estimate of the elasticity of immigrants on exports across a wide variety of specifications of the model. The basic result is undiminished by inclusion of state fixed effects, country fixed effects, or both state and country fixed effects.

We also go beyond the basic proposition and test three corollaries to the basic proposition. These corollaries and their tests are, insofar as confirming that corruption and language affect trade flows by working through the migrants, new to the literature. The role of institutional similarity found by Girma and Yu for the United Kingdom is confirmed for the case of the American states. A more basic conclusion is that the links between immigrants and exports uncovered here are consistent with an important role being played by both of Granovetter's strong and weak ties.

Data

The data set comprises 51 states and 87 foreign countries. There are non zero migrant stock values for every country. Some state-country pairs have zero exports (239 out of 4437 total observations.). The foreign countries are listed in Table 1.

$EXPORTS_{ij}$: The average current dollar value of exports of manufactures (SIC 20 – 39) from state *i* to country *j* for the years 1990, 1991, and 1992. The data are from the MISER Origin of Movement series and are available at the level of the individual American state.

MS_{ij}: Migrant Stock. The number of people born in country *j* residing in state *i* as recorded in the 1990 Census. From Lapham [n.d.]

$PCINC_i$: Gross State Product of state *i* in 1990. The data are from the U.S. Department of Commerce, Bureau of Economic Analysis.

POP_i: Population of state *i*. From the 1990 U.S. Census.

$PCINCF_j$: Real Per Capita Income of export destination country *j* in 1990. From Penn World Table, Series GRIP: Real GDP per capita in constant dollars (1985 international prices).

$POPF_j$: Population of destination country *j* in 1990. From International Monetary Fund, International Financial Statistics database.

$CORRUPTION_j$: Equals the (negative of) the index for country *j* of "Control of Corruption, 1997/98" taken from Kaufman, Kraay, and Zoido-Lobatan, "Governance Matters, II: Updated Indicators for 2001 – 02," World Bank.

$ENGLISH_j$: English Language. Equals 1 if the country of export destination is significantly English speaking. The list of countries so identified is given in the text.

$SPANISH_j$: Spanish Language. Equals 1 if the country of export destination is significantly Spanish speaking. The list of countries so identified is given in the text.

FE_i: State specific dummy variables; FE_i equals 1 if the observation is for state *i*, otherwise it equals 0.

FEj: Destination country specific dummies, *FEj* equals 1 if the observation is for country *j*, otherwise it equals 0.

$DISTANCE_{ij}$: Distance is the great circle distance in miles available from "Bali Online" [www.indo.com/distance]. It is measured between the principal, or central, city of each U.S. state and each of the 87 trading partner countries.

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Table 1: Means and Standard Deviations of Variables

Immigrant Source Country (Export Destination Country)	Foreign Born (in persons)		Exports (in millions of dollars)	
	Mean	St. Dev.	Mean	St. Dev.
Argentina	1815.0	4746	39.9	86.1
Australia	828.4	1773	161.5	299
Austria	1719.1	3346	19.5	37
Bangladesh	429.4	1317	1.6	3.4
Belgium	673.7	1202	179.9	268
Belize	587.4	2101	2.1	8.2
Bolivia	613.8	1422	3.2	8.5
Brazil	1618.0	3249	98.1	164
Bulgaria	275.7	867	1.1	4.1
Canada	14606.3	25211	1566.6	2419
Chile	1019.8	2633	37.1	61
China	10389.0	33581	105	221
Colombia	5610.3	15726	44.5	128
Costa Rica	853.5	2273	20.1	49
Cameroon	62.0	123	.85	2.6
Cape Verde	281.7	1360	.05	.17
Cyprus	197.3	548	2.3	4.3
Czechoslovakia	1706.3	3212	3.8	8.1
Denmark	685.9	1426	23.4	52
Dominican Republic	6820.8	33854	28.5	97
Ecuador	2810.1	10270	15.6	45
Egypt	1300.3	3279	39.6	70
El Salvador	9126.1	39495	10.5	26
Fiji	312.5	1852	.60	1.7
Finland	432.6	766	16.9	42
France	2337.5	4430	256.7	388
Germany	13959.4	20733	365.8	600
Ghana	409.6	974	2.2	6.7
Greece	3478.4	7324	15.3	24
Grenada	347.6	1735	.50	1.9
Guatemala	4426.3	18947	17.2	50
Guyana	2366.6	11329	1.7	8.3
Hong Kong	2884.9	9809	144.3	296
Honduras	2135.8	5509	11.7	35
Hungary	2159.5	4434	4.2	9.3
Iceland	99.4	145	3.2	8.8
India	8831.5	16951	36.6	68
Indonesia	963.3	3415	36.4	75
Iran	4136.1	15998	9.1	20
Ireland	3329.9	8463	47.9	86
Israel	1687.2	4781	65.5	142

Means and Standard Deviations of Variables (cont.)

Immigrant Source Country (Export Destination Country)	Foreign Born (in persons) Mean	St. Dev.	Exports (in millions of dollars) Mean	St. Dev.
Italy	11403.8	29398	138.9	240
Jamaica	6551.6	22671	16.9	46
Japan	5688.8	13987	756.4	1443
Jordan	624.9	1378	2.9	5.0
Kenya	281.8	505	1.7	3.2
Korea	11145.0	29272	243.4	506
Laos	3363.8	10137	.01	.03
Luxembourg	40.3	61	4.0	8.5
Malaysia	663.4	1322	73.5	192
Mexico	84274.8	362472	620.2	2173
Morocco	304.7	688	6.6	13
Netherlands	1885.9	3790	228.0	350
New Zealand	303.3	781	21.6	44
Nicaragua	3307.0	12684	2.2	8.1
Nigeria	1095.2	1859	15.0	61
Norway	828.3	1379	24.3	55
Pakistan	1801.8	3864	15.0	27
Panama	1684.4	4461	17.7	50
Paraguay	118.8	290	7.0	34
Peru	2827.4	7342	15.1	40
Philippines	17895.6	67288	41.9	108
Poland	7614.3	17588	7.3	13
Portugal	4120.0	12329	13.0	20
Senegal	44.8	155	1.1	2.4
Singapore	252.7	663	168.9	428
Sierra Leone	140.9	286	.42	1.1
South Africa	680.5	1456	37.0	50
Spain	1498.3	3310	83.5	148
Sri Lanka	274.9	558	1.4	2.2
Sudan	86.7	160	.72	1.3
Sweden	1052.5	1877	57.7	109
Switzerland	767.3	1646	82.8	230
Syria	720.8	1979	3.0	12
Taiwan	4786.3	14915	218.8	516
Thailand	2096.5	5700	64.4	143
Trinidad	2268.8	8823	7.4	22
Tunisia	80.4	171	2.4	5.2
Turkey	1081.1	2528	38.2	68
Uganda	131.1	203	.27	.62
United Kingdom	12551.9	22188	411.3	641

Means and Standard Deviations of Variables (cont.)

Immigrant Source Country (Export Destination Country)	Foreign Born (in persons)		Exports (in millions of dollars)	
	Mean	St. Dev.	Mean	St. Dev.
Uruguay	403.6	1053	3.7	9.8
Venezuela	825.9	2168	79.5	217
Western Samoa	223.7	898	.54	2.1
Yugoslavia	2774.8	5968	5.2	7.8
Zambia	59.0	104	.78	2.4
Zimbabwe	93.3	177	1.6	3.9

Table 2: Tobit estimation with corruption and language measures
Unconditional Expected Marginal Effects

	(1)	(2)	(3)	(4)
ln MIGRANT STOCK$_{ij}$	0.29 (9.56)	0.41 (13.89)	0.49 (14.81)	0.46 (13.51)
CORRUPTION$_j$ * ln MS$_{ij}$		0.083 (5.30)	0.12 (7.39)	0.097 (5.58)
ln CORRUPTION$_j$		-0.83 (5.33)	-1.19 (7.60)	-1.13 (6.97)
ENGLISH$_j$ *ln MS$_{ij}$			-0.14 (3.56)	0.057 (1.29)
ENGLISH$_j$			1.77 (7.56)	1.59 (6.53)
SPANISH$_j$ *ln MS$_{ij}$			-0.37 (8.32)	-0.35 (7.83)
SPANISH$_j$			3.35 (12.74)	3.29 (12.45)
INSTITUTIONAL SIMILARITY$_J$*ln MS$_{ij}$				-0.32 (3.49)
INSTITUTIONAL SIMILARITY$_J$				2.51 (3.80)
ln POP$_i$	1.75 (29.59)	1.57 (27.60)	1.63 (29.39)	1.65 (29.67)
ln PCINC$_i$	0.82 (4.60)	0.55 (3.24)	0.70 (4.23)	0.72 (4.36)
ln POPF$_j$	3.06 (46.20)	2.57 (31.16)	2.96 (31.88)	3.03 (31.92)
ln PCINCF$_j$	2.12 (43.31)	1.86 (25.22)	2.07 (26.39)	2.10 (26.46)
DISTANCE$_j$	-1.25 (13.75)	-0.92 (10.53)	-0.68 (6.75)	-0.76 (7.46)
Log likelihood	-9935	-9180	-9058	-9049
Pseudo R^2	0.18	0.18	0.19	0.19

Note: absolute t-values in parentheses.

Table 3: Tobit estimation, state, country fixed effects
Unconditional Expected Marginal Effects

	(1) State F.E.	(2) State F.E.	(3) Country F.E.	(4) State & Country F.E.
ln MIGRANT STOCK$_{ijj}$	0.35 (11.46)	0.55 (16.38)	0.35 (9.88)	0.47 (13.50)
CORRUPTION$_j$ * ln MS$_{ij}$		0.088 (5.44)		
ln CORRUPTION$_j$		-1.08 (7.19)		
ENGLISH$_j$ *ln MS$_{ij}$		-0.073 (1.80)		
ENGLISH$_j$		1.58 (6.96)		
SPANISH$_j$ *ln MS$_{ij}$		-0.33 (7.85)		
SPANISH$_j$		3.29 (13.38)		
INSTITUTIONAL SIMILARITY$_j$*ln MS$_{ij}$		-0..22 (2.55)		
INSTITUTIONAL SIMILARITY$_j$		1.82 (2.95)		
ln POP$_i$			1.76 (28.60)	
ln PCINC$_i$			0.35 (2.10)	
ln POPF$_j$	2.97 (46.11)	2.81 (30.82)		
ln PCINCF$_j$	2.08 (44.52)	2.01 (26.38)		
DISTANCE$_j$	-1.08 (12.16)	-0.55 (5.59)		
Log likelihood	-9706	-8755	-10109	-9575
Pseudo R^2	0.20	0.22	0.22	0.26

Note: absolute t-values are in parentheses.