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Cultural Distance as a Determinant of Bilateral Trade Flows: Do Immigrants Counter the Effect of Cultural Distance?

Roger White
Franklin & Marshall College, rwhite1@whittier.edu

Bedassa Tadesse
University of Minnesota - Duluth, btadesse@d.umn.edu

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Cultural distance as a determinant of bilateral trade flows: do immigrants counter the effect of cultural differences?

Bedassa Tadesse[a,*] and Roger White[b]

[a]*Department of Economics, University of Minnesota, Duluth, MN-55812, United States*
[b]*Department of Economics, Franklin and Marshall College, Lancaster, PA-17603, United States*

We introduce 'cultural distance' as a measure of the degree to which shared norms and values in one country differ from those in another country, and employ a modified gravity specification to examine whether such cultural differences affect the volume of trade flows. Employing data for US state-level exports to the 75 trading partners for which measures of cultural distance can be constructed, we find that greater cultural differences between the United States and a trading partner reduces state-level exports to that country. This result holds for aggregate exports, cultural and noncultural products exports as well, but with significantly different magnitudes. Immigrants are found to exert a pro-export effect that partially offsets the trade-inhibiting effects of cultural distance.

I. Introduction

Despite a voluminous literature on the immigrant-trade relationship, the effects that cultural differences between immigrants' home and host countries may have on trade flows and the extent to which immigrants may counter these effects have received little attention. Cultural difference is defined as the degree to which shared norms and values differ from one country to another (Hofstede, 2001). Pronounced cultural differences may make it difficult to understand, anticipate and predict the behavior of others (Elsass and Vieiga, 1994), and people from dissimilar cultures may have considerably different perceptions of the same situation or series of events (Doz and Hamel, 1998). As such, cultural differences can complicate interactions, hinder the development of rapport and trust and, thus, carry the potential to increase transaction costs and reduce the likelihood that international trade will occur. In examining the influence of cultural differences, we use data for the year 2000 that represents US state-level exports to 75 countries for which cultural distances can be constructed. We extend the immigrant-trade link literature by relating cultural distance, immigration and trade flows for aggregate state-level exports and, separately, for two broad product classifications: cultural and noncultural products.

Prior research documents the existence of an immigrant-trade link and reasons that immigrants influence trade via two direct channels: (i) their preferences for home country goods when desired

*Corresponding author. E-mail: btadesse@d.umn.edu

products or acceptable substitutes are not available in their host countries (*a transplanted home bias effect*), and (ii) their connections to business or social networks and/or knowledge they may possess regarding political and social obligations required to conduct business in their home countries (*the exploitation of network connections*). White (2007), Bandyopadhyay (2006) and Wagner *et al.* (2002) review the associated literature. We hypothesize that immigrants also indirectly increase trade by counteracting the trade-inhibiting influence of cultural differences (distances) between their home and host countries. We contend that the initiation and conduct of transactions between individuals in different countries depends, in part, on the extent to which shared norms and values differ across countries. To explore this notion, we estimate cultural distances between the United States and each trading partner in our data set based on two dimensions of culture: Traditional vs. Secular-Rational authority (TSR) and Survival vs. Self-Expression values (SSE). Using mean values for the TSR and SSE dimensions, the cultural distance between each home country j and the United States (country i) is calculated as $CD_{ij} = \sqrt{\left(\overline{TSR}_j - \overline{TSR}_i\right)^2 + \left(\overline{SSE}_j - \overline{SSE}_i\right)^2}$. While the TSR dimension reflects a contrast between societies in which deference to the authority of a God, the nation or to the family is considered important or an expectation (Traditional authority) and societies in which individualism and self-expression are stressed (Secular-Rational authority), the SSE dimension reflects differences between societies that emphasize hard work and self-denial (Survival values) and those that place greater emphasis on quality of life issues, such as women's emancipation and equal status for racial and sexual minorities (Self-Expression values).

II. Theoretical Framework, Empirical Model and Data

Following the lead of prior studies, we employ the gravity model of trade and derive our econometric specification by defining M_{ij}, country j's imports from state i, as a function of income, geodesic distance and several trade-inhibiting (transaction costs) and trade-facilitating factors. In its basic form, the gravity model posits that country j's imports from state $i(M_{ij}^{\sim})$ increase with the trading partners' combined economic mass, given as the product of the incomes of the exporting state (Y_i) and of the importing country (Y_j), and decrease as geodesic distance (GD_{ij}), a proxy for transportation costs, increases. We also include a vector of variables, represented by the expression $\exp(-X_1^{ij}\beta - X_2^{ij}\lambda)$, that affects the likelihood of trade being initiated and/or an increase in the volume of transactions already taking place, where $X_1^{ij}\beta$ is a vector of the ratio $(CD_{ij}/IM_{ij})^{-\beta}$ of cultural distance between the United States and country j and the stock of immigrants from country j living in state i, and $X_2^{ij}\lambda$ is all other trade inhibiting/facilitating factors described in the modified gravity model of Head and Ries (1998). Thus our theoretical model can be described as:

$$\tilde{M}_{ij} = \kappa \frac{Y_i^{\alpha_1} Y_j^{\alpha_2}}{GD_{ij}^{\alpha_3}} \exp\left(\left(\frac{CD_{ij}}{IM_{ij}}\right)^{-\beta}\left(X_2^{ij}\lambda\right)\right) \quad (1)$$

Equation 1 postulates positive and negative effects on trade for the stock of immigrants and cultural distance, respectively. It also indicates that the extent to which cultural distance affects trade may be influenced by the stock of immigrants from country j living in state i. In addition, it predicts strictly positive realizations of imports. Since trade data often contain numerous cases of zero imports and exports, following Eaton and Tamura (1994) and Head and Ries (1998), we modify Equation 1 to obtain a specification that allows for zero realization of trade values.

$$\tilde{M}_{ij} = \kappa \frac{Y_i^{\alpha_1} Y_j^{\alpha_2}}{GD_{ij}^{\alpha_3}} \exp\left(\left(\frac{CD_{ij}}{IM_{ij}}\right)^{-\beta}\left(X_2^{ij}\lambda\right) + \varepsilon_{ij} - \eta\right) \quad (2)$$

The subscript κ is the constant of proportionality, ε_{ij} is an assumed identically and independently distributed error term, and η is the fixed amount of trade that is subtracted from the level predicted by Equation 1. When the latent import value is negative, observed imports will be zero. Thus, the observed data on country j's import from state i can be described as: $M_{ij} = \max[\tilde{M}_{ij,}0]$. Substituting this identity, rearranging the resulting expression, expanding the vector $X_2^{ij}\lambda$, and taking natural logarithms where appropriate, results in our estimation equation.

$$\begin{aligned}\ln\left(M_{ij}+\eta\right) = {} & \kappa + \alpha_1 \ln Y_i + \alpha_2 \ln Y_j - \alpha_3 \ln GD_{ij} \\ & - \beta_1 \ln CD_{ij} + \beta_2 \ln IM_{ij} \\ & + \beta_3 \ln\left(CD_{ij} \times \ln IM_{ij}\right) \\ & + \lambda_1 \ln \frac{Y_i}{POP_i} + \lambda_2 \ln \frac{Y_j}{POP_j} \\ & + \lambda_3 \ln OPEN_j + \lambda_4 \Delta \ln EXRATE_{ij} \\ & + \lambda_5 FTA_{ij} + \lambda_6 LLOCK_j \\ & + \lambda_7 ENGLISH_j + \varepsilon_{ij} \end{aligned} \quad (3)$$

Table 1. Descriptive statistics

Dependent variables	Mean	(SD)
Aggregate exports	148 407 678	(1 008 056 826)
Non-cultural products exports	144 788 823	(990 537 894)
Cultural products exports	3 618 855	(29 441 546)
Geodesic distance (in miles)	8886.02	(3019.398)
Cultural distance	1.3477	(0.5112)
Stock of immigrant population	6300.71	(74 743.11)
Gross Domestic Product (GDP)	271 189 386 173	(632 845 671 676)
GDP per capita	13 028.41	(11 154.74)
State Gross Domestic Product (GSP)	191 158 901 961	(227 921 025 648)
GSP per capita	34 387.96	(11 356.62)
Δ ln exchange rate	0.113	(0.1554)
Open	0.8445	(0.4801)
English	0.3733	(0.4838)
FTA	0.04	(0.196)
Landlocked	0.20	(0.4001)
N	3825	(51 'states' $\times$ 75 home countries)

Following Eaton and Tamura (1994), we estimate our model as a tobit specification where aggregate exports and exports of cultural and noncultural products, measured at the state-level, are interchanged as dependent variables. Export data are from the World Trade Atlas (GTI, 2006), and our classification of exports into cultural and non-cultural products follows UNESCO (2005). State-level immigrant population data are from the 2000 decennial census (US Census, 2006a). Our measure of cultural distance is constructed using World Values Survey and European Values Survey data (Inglehart *et al*., 2004). Home country income and population data are from the World Bank (2006), while Gross State Product (GSP) data are from the US Bureau of Economic Analysis (2006). GSP per capita is constructed as GSP divided by state population (US Census, 2006b). Monetary values have been normalized to constant 1995 US dollars.

The remaining explanatory variables are standard in most studies that employ the gravity model. $OPEN_j$, the sum of each country's imports and exports divided by its GDP, measures a country's propensity to trade. The change in the annual US-home country exchange rate captures terms of trade effects. Expressed as foreign currency units per US dollar, an increase in this variable is expected to decrease US exports. Capturing the effects of trade agreements, FTA_{ij} is equal to one if country j is party to a trade agreement with the US during 2000. As common language has been identified as an important determinant of trade flows (Dunlevy, 2006; Hutchinson, 2002), we include a dummy variable which is equal to one if English is commonly used in country j (CIA, 2006). Finally, to represent a potentially important geographic impediment to trade, we include a dummy variable which is equal to one if country j is landlocked. Table 1 presents descriptive statistics.

III. Empirical Results

Table 2 presents the marginal effects of the explanatory variables in our empirical model. In each set of results, the first model presents the basic specification where we account only for the effect of immigrants. The second model augments the basic specification by including the cultural distance variable, and the third model includes cultural distance and an interaction term between the immigrant stock and cultural distance variables. The effects of immigrants from country j residing in state i on state-level exports are given, jointly, by the coefficients on the immigrant stock variable (IM_{ij}) and the term which interacts the immigrant stock with the measure of cultural distance ($CD_{ij} \times IM_{ij}$).

Consistent with earlier studies, results from our basic specification indicate that immigrants exert significant pro-export effects. Given that we employ the tobit estimation technique and we have the parameter η, the resulting coefficients are not true elasticities. However, as the values of η relative to median state exports levels are small, we can heuristically interpret the coefficients as elasticities.

Table 2. Estimated immigrant effect by product type

	Aggregate exports			Cultural products exports			Non-cultural products exports		
	(1.1)	(1.2)	(1.3)	(2.1)	(2.2)	(2.3)	(3.1)	(3.2)	(3.3)
$Immigrants_{ijt}$	0.0469***(0.0093)	0.0439***(0.0093)	0.0538***(0.010)	0.0325***(0.0090)	0.0256***(0.0090)	0.0508***(0.0099)	0.0457***(0.0095)	0.0429***(0.0095)	0.0530***(0.011)
$Cultural\ Distance_{ij}$		−0.286*** (0.076)	−0.0935 (0.12)		−0.494*** (0.072)	0.0781 (0.12)		−0.266*** (0.077)	−0.0692 (0.12)
$Immigrants_{ijt} \times \ln Cultural\ Distance_{ij}$			−0.0329** (0.016)			−0.0901***(0.016)			−0.0335** (0.016)
$Geodesic\ Distance_{ij}$	−1.052*** (0.065)	−0.999*** (0.066)	−0.978*** (0.067)	−0.589*** (0.060)	−0.489*** (0.062)	−0.432*** (0.062)	−1.055*** (0.066)	−1.005*** (0.067)	−0.984*** (0.068)
State Gross Domestic Product $(GSP)_{jt}$	1.335*** (0.023)	1.338*** (0.023)	1.333*** (0.023)	0.992*** (0.024)	0.998*** (0.024)	0.977*** (0.024)	1.342*** (0.024)	1.344*** (0.023)	1.340*** (0.024)
State Gross Domestic Product per $capita_{jt}$	−0.594*** (0.095)	−0.589*** (0.095)	−0.589*** (0.095)	0.361*** (0.096)	0.379*** (0.095)	0.368*** (0.094)	−0.643*** (0.096)	−0.638*** (0.096)	−0.638*** (0.096)
Gross Domestic $Product_{jt}$	0.999*** (0.025)	1.003*** (0.025)	0.998*** (0.025)	0.644*** (0.025)	0.654*** (0.025)	0.632*** (0.025)	1.003*** (0.026)	1.007*** (0.026)	1.001*** (0.026)
GDP per $capita_{jt}$	0.162*** (0.036)	0.0920** (0.040)	0.117*** (0.042)	0.339*** (0.036)	0.213*** (0.040)	0.279*** (0.041)	0.150*** (0.037)	0.0848** (0.041)	0.110*** (0.043)
Δ Exchange $Rate_{ijt}$	−1.588*** (0.16)	−1.610*** (0.16)	−1.591*** (0.16)	−1.206*** (0.21)	−1.328*** (0.21)	−1.272*** (0.21)	−1.572*** (0.16)	−1.592*** (0.16)	−1.573*** (0.16)
$Open_{jt}$	0.585*** (0.057)	0.618*** (0.058)	0.597*** (0.058)	0.216*** (0.055)	0.267*** (0.055)	0.207*** (0.056)	0.590*** (0.058)	0.621*** (0.059)	0.599*** (0.059)
$English_j$	0.782*** (0.051)	0.675*** (0.058)	0.685*** (0.058)	0.556*** (0.050)	0.362*** (0.057)	0.389*** (0.056)	0.781*** (0.052)	0.682*** (0.059)	0.692*** (0.059)
FTA_{ijt}	0.410*** (0.13)	0.306** (0.13)	0.234* (0.14)	0.523*** (0.12)	0.348*** (0.12)	0.190 (0.12)	0.411*** (0.13)	0.315** (0.14)	0.241* (0.14)
$Landlocked_{jt}$	−0.243*** (0.062)	−0.232*** (0.062)	−0.236*** (0.062)	−0.126* (0.066)	−0.108* (0.065)	−0.0904 (0.064)	−0.246*** (0.063)	−0.236*** (0.063)	−0.239*** (0.063)
Constant	−40.85*** (1.32)	−40.80*** (1.31)	−41.03*** (1.32)	−42.53*** (1.35)	−42.65*** (1.35)	−42.78*** (1.33)	−40.51*** (1.34)	−40.46*** (1.34)	−40.70*** (1.34)
Sigma	1.339*** (0.016)	1.336*** (0.016)	1.334*** (0.016)	1.177*** (0.017)	1.167*** (0.017)	1.155*** (0.017)	1.359*** (0.016)	1.357*** (0.016)	1.355*** (0.016)
Number of Observations	3825	3825	3825	3825	3825	3825	3825	3825	3825
McFadden Pseudo R^2	0.321	0.322	0.322	0.325	0.329	0.332	0.316	0.316	0.317
χ^2	5.907***	5.921***	5.925***	4.153***	4.200***	4.232***	5.805***	5.817***	5.821***
(DF)	(11)	(12)	(13)	(11)	(12)	(13)	(11)	(12)	(13)

Notes: SE in parentheses.
***$p<0.01$, **$p<0.05$, *$p<0.1$.
Values of all continuous variables are in natural logarithm.

Accordingly, a 1% increase in the immigrant stock residing in state *i* increases aggregate exports from that state to the immigrants' home countries, on average, by 0.047%. The corresponding influences of immigrants on state-level exports of cultural and noncultural products are estimated to be 0.033 and 0.046%, respectively. A Chow test (at $p<0.001$) rejects the null hypothesis of the equality of coefficients across cultural and noncultural product classifications. This indicates that the pro-export effect of immigrants on noncultural products is greater than the influence of immigrants on cultural products. Given that we are dealing with exports (rather than imports) and that non-cultural products account nearly for 97% of the average state's exports, this finding is not surprising.

Supporting our hypothesis, results obtained when estimating Model 2 (where we augment the basic gravity specification with the cultural distance variable) imply that greater cultural distance between the United States and its trading partners reduces aggregate state-level exports by 0.29%. This effect is significantly larger (0.49%) on exports of cultural products as compared to exports of non-cultural products (0.27%). The pro-export effects of immigrants, however, remain robust. Turning to the results from the third specification (Model 3), in which we examine whether immigrants can help overcome the negative effects of differences in shared norms and values on trade, differentiating the results with respect to cultural distance and multiplying the coefficients with mean of immigrant stock (in log), we find that the trade inhibiting effects of cultural distance is reduced to 0.141% on aggregate exports, and 0.386% and 0.144% on the exports of cultural and noncultural products, respectively implying that immigrants reduce the negative effects of cultural distance on trade flows; however, the effect is not sufficiently large to completely eliminate the negative effects of cultural distance.

IV. Conclusion

Our results indicate that immigrants promote US state-level exports to their home countries at the aggregate level and for both cultural and noncultural product classifications. Consideration of cultural distance as a determinant of trade flows reveals that greater cultural differences between immigrants' host and home countries inhibit international trade. While the pro-export effect of immigrants does act to offset the influence of cultural distance, it is not sufficiently large to completely counteract the export-inhibiting effects of cultural distance.

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Appendix Country Listing

Albania, Algeria, Argentina, Armenia, Australia, Austria, Azerbaijan, Bangladesh, Belarus, Belgium, Bosnia and Herzegovina, Brazil, Bulgaria, Canada, Chile, China, Colombia, Croatia, Czech Republic, Denmark, Dominican Republic, Egypt, El Salvador, Estonia, Finland, France, Georgia, Germany, Greece, Hungary, Iceland, India, Indonesia, Iran, Ireland, Israel, Italy, Japan, Jordan, Korea (South), Latvia, Lithuania, Luxembourg, Macedonia, Malta, Mexico, Moldova, Morocco, Netherlands, New Zealand, Nigeria, Norway, Pakistan, Peru, Philippines, Poland, Portugal, Romania, Russia, Singapore, Slovakia, Slovenia, South Africa, Spain, Sweden, Switzerland, Tanzania, Turkey, Uganda, Ukraine, United Kingdom, Uruguay, Venezuela, Vietnam, Zimbabwe.