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Immigrants, Cultural Distance and US State-Level Exports of Cultural Products

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ABSTRACT

We examine the relationships between immigrants, cultural distance and state-level exports, employing state-specific immigrant stocks and total US immigrant stocks, separately, and a measure of cultural distance recently introduced by [Tadesse, B., & White, R. (2008b). Cultural distance as a determinant of bilateral trade flows: Do immigrants counter the effect of cultural distance? Applied Economic Letters]. A positive link between immigrants and aggregate exports is reported and, while cultural distance is found to reduce exports, immigrants partially offset the effects of cultural distance by increasing both the intensity of existing exports and the likelihood that exporting occurs. However, heterogeneity in immigrant effects is observed across cultural product sub-classifications, suggesting variation in the ability of immigrants to influence trade by overcoming information asymmetries.

1. Introduction

We examine the effects of immigrants and cultural distance on state-level exports, placing emphasis on several categories of cultural products, and dispense potential implications of variation in immigrants' abilities to influence trade between their home and host countries. Cultural products are goods and services that convey ideas, symbols and ways of life. Examples include books, magazines, multimedia products, software, recordings, films, videos, audiovisual programs, crafts and fashion design (Cano,

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del Corral, & Poussin, 2000). While exports of cultural products comprise a minor share – roughly 2.4 percent – of total state-level exports, international trade in such products has grown rapidly in recent decades. Between 1980 and 1998 alone, global imports of all commodities increased by 189 percent while imports of cultural products increased 347 percent (UNESCO, 2005). Such growth has added an impetus for related multilateral trade negotiations and, thus, further liberalization of trade in cultural products. Tadesse and White (2008a) indicate that, by fully or partially countering the negative effects of cultural differences on trade, immigrants enhance host country exports of both cultural and non-cultural products. We extend their findings by considering differences in product characteristics while examining whether immigrants' knowledge of home country markets and customs yields variation in the extent to which immigrants influence their host state's exports to their home countries, particularly for products that embed culture.

Prior studies of the immigrant-trade link indicate that immigrants enhance host country exports to their home countries in several ways. First, immigrants' knowledge of their country of origin may make it easier for them to acquire information about profitable international trading opportunities and to reduce informal barriers to trade. An example would be an immigrant knowing consumer preferences in her home country and, as a result, being able to inform exporters in her host country of whether their products can be successfully marketed or if modifications are needed to suit importers' preferences. The implication is that by helping to ameliorate demand and supply matching costs, immigrants may enhance trade between their home and host countries. Second, as they might have connections with local business networks, immigrants may aid in reducing network search costs by helping producers to find distributors, assemblers to find component suppliers, and investors to find joint-venture partners or other investment opportunities. Third, since delivery and payment may occur at different times and places, international transactions are traditionally based on confidence. Through their knowledge of local business law and practices, immigrants may reduce uncertainties related to transactions by facilitating stronger enforcement of international contracts.

Studies of the immigrant-trade relationship that focus on aggregate trade flows and/or on trade in various types of goods (e.g., differentiated and homogenous goods, manufactured and non-manufactured goods, and 1-digit SITC sector classifications) have paid only indirect attention to the influence of immigrants on trade in cultural products and related product sub-classifications. Due to their ability to embed exporting countries' cultures, trade in cultural products may involve higher search/networking costs than trade in non-cultural products. Hence, the estimated effects of immigrants on trade in non-cultural products may not be representative of immigrants' influences on trade in cultural products. Since immigrants' influences on trade are sensitive to differences in product characteristics, we posit that the extent to which immigrants affect host-home country trade (by reducing network search costs, ameliorating demand and supply matching costs, and/or facilitating enforcement of international contracts) may vary across product (e.g., cultural and non-cultural products) and sub-product classifications (e.g., products embedded with different cultural components).

In addition to providing greater insights into immigrants' abilities to influence trade in both cultural and non-cultural products, our study contributes to the literature in two specific ways. First, we differentiate the effects exerted by immigrants who reside in a given state from the influence of the total stock of immigrants residing in the US on state-specific exports to the immigrants' respective home countries. In doing so, we discern the importance of network effects as a means by which immigrants facilitate trade. Second, by employing cross-sectional data for 51 US states and 75 trading partners for the year 2000, we compare the effects of immigrants on trade across export categories and products that embed the exporting country's culture to differing degrees.[2] Our use of state-level export data is essential as failure to find an immigrant-export link using state-level data may call into question the findings of previous studies that employ aggregate data (Dunlevy, 2006). The use of state-level export data also permits examination of the possibility that immigrants enhance the probability of exports to take place (from very low or non-existent levels to an observable threshold

[2] The "51 states" are the 50 individual states plus Washington, DC. A list of the home countries included in the data set is presented in Table 1.

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(export-initiation)) and the extent to which immigrants increase the volume of the existing level of exports (export-intensification).[3]

Confirming the findings of Tadesse and White (2008a, 2008b), our results suggest that, generally speaking, immigrants exert pro-export effects while cultural distance inhibits state-level exports of both cultural and non-cultural products. While the pro-export effects of immigrants on cultural products and related sub-classifications can largely be attributed to their collective ability to increase the intensity of the existing level of exports, we also find that immigrants exert positive export-initiation effects, the magnitude of which are not as widely observed relative to their intensification effects across cultural products sub-classifications. We take this to be an indication of the extent to which differences in product characteristics, that arise from variation in the amount and manner in which host country culture is embedded in the products, affect immigrants' abilities to influence host-home country trade. In addition to the positive effects that immigrants who reside in given state have on their host's exports, we find that immigrants residing elsewhere in the US also positively affect the levels of exports from other states—evidence of the extent to which immigrants' business and/or social network connections are utilized to increase host-home country trade. Our results also reveal the existence of heterogeneity in immigrant effects across cultural product classifications, suggesting variation in the abilities of immigrants to influence trade by overcoming asymmetric information that may arise from differences in the degrees to which various products are embedded with the exporting country's culture.

We proceed as follows. Section 2 reviews the literature relating to immigrant-trade links. Section 3 introduces the theoretical framework, econometric specification, our measure of cultural distance and the different estimators employed in the analysis. Section 4 provides a discussion of our empirical findings, while Section 5 concludes.

2. The literature

The pro-trade effect of immigrants is well-established in the literature. Gould (1994), examining the US, first documents an immigrant-trade link and subsequent studies report positive links for a number of other host countries. For example, Helliwell (1997), Head and Ries (1998) and Wagner, Head, and Ries (2002) document links for Canada, while Ching and Chen (2000) report a positive link between immigrants and Canada–Taiwan trade. Blanes (2003, 2004, 2006) and Blanes and Martín-Montaner (2006), Piperakis, Milner, and Wright (2003), Bryant, Genc, and Law (2004), Hong and Santhapparaj (2006) and White (2007a) report links for Spain, Greece, New Zealand, Malaysia and Denmark, respectively. Combes, Lafourcade, and Mayer (2005) even report an intra-France migrant-trade relationship. Using US data, Dunlevy and Hutchison (1999) find variation across product classifications in the pro-import influence of immigrants, and White (2007b) reports that immigrants from lower income countries drive the US immigrant-trade link. Hutchinson (2002) and Mundra (2005) also report pro-trade influences of immigrants on US-home country trade flows. With the exception of Co, Euzent, and Martin (2004) who considers differences in the influence of immigrants from developed and developing home countries on state-level exports, the several studies that have examined a link between immigrants and US state-level exports generally fail to consider variation across home countries (see, for example, Bandyopadhyay, Coughlin, & Wall, 2006; Bardhan & Guhathakurta, 2005; Dunlevy, 2006).

In addition to the research mentioned above, our work is motivated by three studies in particular: Girma and Yu (2002), White and Tadesse (2007) and Herander and Saavedra (2005). Girma and Yu examine the UK immigrant-trade link using data for 48 nations that span the years 1981–1993. Stratifying their sample of home countries into two groups, "Commonwealth" and "non-Commonwealth" nations, the authors report a positive influence of immigrants on trade only for the latter classification. The authors assume that personal contacts and connections to business and/or social networks apply to all immigrants, regardless of home country. As a result, commonality of legal norms and judicial

[3] We acknowledge that trade in cultural products may influence cultural practices and, if so, a portion of the causality may run opposite to the hypothesized direction. Unfortunately, the cross-sectional nature of the current data inhibits more complete analysis.

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systems, formal and informal contracting structures, and communications systems between the UK and Commonwealth-affiliated home countries diminish immigrants' abilities to affect trade.

White and Tadesse (2007) examine the Australian immigrant-trade relationship using data for 101 trading partners that span the years 1989–2000. To determine whether increased cultural pluralism, fostered when, in 1973, the White Australia policy was abandoned, generated variation in immigrant-trade links across home countries, the authors classify immigrants' home countries based on whether or not preferential treatment (in terms of immigrant entry, assisted migration, etc.) was afforded under the policy. The authors report that immigrants from nations not afforded preference under the policy exert stronger proportional influences on Australian imports from their home countries, and immigrants from nations that were afforded preference exert stronger influences on Australian exports to their home countries. The resulting variation in the influence of immigrants on Australian-home country trade flows is attributed to cultural (dis)similarities between Australia and immigrants' home countries.

Finally, Herander and Saavedra (2005) consider the influences of immigrants from 36 home countries on US state-level exports during the 1993–1996 period. Placing particular emphasis on two relationships – the influence of "in-state" immigrants (i.e., those immigrants who reside in a given state) on the exports of their states of residence and the influence of "out-of-state" immigrants (i.e., those immigrants who reside in other states) on exports from the given state – the authors report that both immigrant cohorts exert pro-export influences, with the effect of the former being of greater proportional magnitude than that of the latter. The authors take these dual immigrant-export effects as evidence of intra-national ethnic networks being utilized to facilitate host-home country trade.

The findings of these studies suggest that greater dissimilarity between immigrant's home and host countries produces conditions conducive for immigrants to exert different influences on trade flows and that the presence of intra-national ethnic networks allows the influence of immigrants on trade to extend beyond their states of residence. By examining the trade-inhibiting influences of cultural distance jointly with both the trade-facilitating influences of both "in-state" immigrants and the total stock of immigrants residing throughout the US, we provide greater insights into the immigrant-trade link. In doing so, we discern the importance of intra-national networks as a means by which immigrants facilitate trade and compare immigrants' effects across products that embed the host country's culture to differing degrees. Lastly, by examining the degrees to which both immigrants and cultural distance affect trade, we also separate the extent to which immigrants increase state-level exports to their home countries by raising the likelihood of exports taking place (i.e., an export-initiation effect) and by increasing existing levels of exports (i.e., an export-intensification effect).

3. Theoretical framework, data and variable construction

Prior studies of the immigrant-trade relationship have frequently used augmented variations of the standard gravity model. Tinbergen (1962) first applies the gravity specification to trade flows. Several recent papers have established theoretical foundations for the model (Anderson, 1979; Anderson & van Wincoop, 2003; Bergstrand, 1985; Davis, 1995; Deardorff, 1998; Eaton & Kortum, 2002; Feenstra, Markusen, & Rose, 2001; Helpman & Krugman, 1985). The basic model posits that exports from state i to nation j during year t (EXP_{ijt}) increase with the trading partners' combined economic mass, given as the product of Gross State Product (GSP_{it}) and Gross Domestic Product (GSP_{jt}) and decrease as the geodesic distance (GSP_{ij}) between trading partners increases. Higher home country GDP implies greater potential export markets and higher GSP signals an increased capacity to export. The distance between state capitals and the capital city of nation j, measured in kilometers via the great circle method, is a proxy for transport costs. Λ is the constant of proportionality. Eq. (1) summarizes the basic model:

$$EXP_{ijt} = \Lambda(GSP_{it}GDP_{jt}GDST_{ij}^{-1}) \quad (1)$$

To consider the influences of immigrants and cultural distance on state-level exports, we use a variant of the theoretical gravity model provided by Anderson and van Wincoop (2003) that includes the immigrant stock from country j residing in state i at time t (IMM_{ijt}) and a measure of the cultural

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distance between the US and the immigrants' home countries ($CDST_{ijt}$). As the influence of immigrants on state-level exports may vary with the cultural distance between their home country and their host state, we also include an interaction term between the immigrant stock and cultural distance variables.[4] Appending a vector of other trade-facilitating and trade-inhibiting variables that are often discussed in the literature and an independently and identically distributed multiplicative error term, ε_{ijt}, to Eq. (1) and taking natural logarithms of variables on both sides of the resulting equation yields Eq. (2):

$$\ln \mathrm{EXP}_{ijt} = \alpha_0 + \lambda_X X + \beta_i \ln \mathrm{IMM}_{ijt} + \beta_2 \mathrm{CDST}_{ijt} + \beta_3 (\ln \mathrm{IMM}_{ijt} \times \mathrm{CDST}_{ijt}) + \varepsilon_{ijt} \quad (2)$$

where X is a vector that includes standard variables, to be discussed below, frequently included in augmented gravity models.[5] Specifically, the vector contains variables representing several factors thought to inhibit trade (geodesic distance; the change in the US-home country exchange rate; and a dummy variable identifying landlocked home countries) and those that may facilitate trade (the 1-year lagged first-difference of the dependent variable; GSP and GSP per capita; home country GDP and GDP per capita; trade openness; economic remoteness; and dummy variables indicating whether English is commonly used in the home country and if the home country is party to a trade agreement with the US).

The proportional influence of immigrants on state-level exports (at a given time period t), holding cultural distance constant at the mean values, is given as the sum of the coefficients on the immigrant stock variable and the product of the coefficient on the interaction term evaluated at the mean value of the cultural distance variable: $\hat{\beta}_1 + \hat{\beta}_3 \times \overline{\mathrm{CDST}}_{ijt}$. Similarly, the effect of cultural distance on state-level exports, holding the immigrant stock constant, is given by the sum of the coefficient on the cultural distance variable and the product of the coefficient on the interaction term evaluated at the mean value of the immigrant stock variable: $\hat{\beta}_2 + \hat{\beta}_3 \times \overline{\mathrm{IMM}}_{ijt}$.

3.1. Measuring cultural distance

We use data from the World Values Surveys (WVS) and the European Values Surveys (EVS) (Hagenaars, Halman, & Moors, 2003; Inglehart, Basanez, Diez-Medrano, Halman, & Luijkx, 2004) and adopt the methodology introduced in Tadesse and White (2008b) to quantify the cultural distance between the US and each home country.[6] The surveys, conducted between 1998 and 2001, provide data from representative national samples that permit construction of standardized measures of culture based on answers to a broad set of questions that span topics such as economics, politics, religion, sexual behavior, gender roles, family values, communal identities, civic engagement, ethical concerns, environmental protection, and scientific and technological progress (Inglehart et al., 2004). Based on survey responses, Inglehart et al. (2004) employ factor analysis and classify respondents along two broad dimensions of culture: (1) Traditional authority vs. Secular-Rational authority (TSR), and (2) Survival values vs. Self-Expression values (SSE).[7]

The TSR dimension of culture reflects the contrast between societies in which deference to the authority of a God or the nation is viewed as important or as expected and those societies in which the individual and self-expression are stressed. Traditional societies tend to place emphasis on national pride and respect for authority, and thus are characterized by emphasis on obedience to

[4] Our model allows the effects of both immigrants and cultural distance to vary over time.

[5] We do not take the natural logarithm of the cultural distance variable as, in many instance, the variable takes a value between zero and one. Opting to not take natural logarithms allows us to avoid problems involving interpretation of estimated marginal effects.

[6] The WVS/EVS data does not permit construction of state-level measures of culture. As a result, we employ values of culture representing the entire US population. A state-level measure of culture, constructed by applying national culture measures to native-born and immigrant population shares, was used in an alternative set of regressions. The results do not vary significantly from those presented here. Data and results are available from the authors.

[7] Inglehart and Baker (2000) describe the methodology employed when conducting the WVS and EVS, comment on the construction of the variables representing the TSR and SSE dimensions of culture and discuss the characteristics pertinent to culture captured by the TSR and SSE variables. We direct readers to Inglehart and Baker (2000) and to www.worldvaluessurveys.org as each provides more complete information than can be communicated here.

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traditional/religious authority, adherence to family/communal obligations, and norms of sharing. It is common for members of such societies to view large families and large numbers of children as positive, or desirable, achievements. Divorce, abortion, euthanasia, and suicide are viewed in a very negative light. Members of Secular-Rational societies, on the other hand, tend to hold opposing views on these topics. They adhere to rational-legal norms and emphasize economic accumulation and individual achievement. On the other hand, the SSE dimension of culture reflects differences between societies that emphasize hard work and self-denial (Survival values) and those that stress quality of life issues, such as women's emancipation and equal status for racial and sexual minorities (Self-Expression values). Societies which focus more on survival tend to emphasize economic and physical security more than autonomy. Generally speaking, members of these societies find foreigners/outsiders, ethnic diversity and cultural change to be threatening. This corresponds with intolerance towards homosexuals and minorities, adherence to traditional gender roles, and an authoritarian political outlook. Members of societies in which Self-Expression values are emphasized tend to hold opposing preferences on these issues.

While we employ data from the 1998 to 2001 WVS/EVS, Inglehart and Baker (2000) examine relative TSR and SSE values across countries using the first three waves of the WVS/EVS (1981–1982; 1990–1991; 1995–1998) and finds striking similarities in country-specific values across survey periods. The authors observe that societies, over time, are much more likely to move from left to right (i.e., from Survival values to Self-Expression values) in their "cultural map" than to move vertically. This path of movement is attributed to what the authors dub a "persistence of traditional values." The observed consistency of relative TSR and SSE values across nations and time periods speaks to the consistency of measurement across surveys.

Table 1 presents average TSR and SSE values along with corresponding cultural distances from the US that are calculated following Tadesse and White (2008b). The table reveals that Canada, Australia, Ireland, the UK and Austria are the nations in our data that are most culturally-similar to the US, while Macedonia, Russia, China, Morocco and Moldova are the most culturally-distant nations. Not surprisingly, many European nations, along with Canada, Australia and Mexico, are estimated as culturally-nearest the US. At the other end of the spectrum, we see that 14 of the 20 most distant nations are former Soviet states and Soviet satellites in Eastern Europe. Although the rankings generally conform to expectations that can be based on casual observation of cultural similarities/dissimilarities between people in different nations, it is important to bear in mind that the values are estimates and that strict ordinal interpretation of the rankings may prove problematic.

3.2. The empirical model

Expanding the list of explanatory variables included in the vector X in Eq. (2), we obtain the following estimable empirical specification:

$$\begin{aligned}\ln \mathrm{EXP}_{ijt} = {} & \alpha_0 + \beta_1 \ln \mathrm{IMM}_{ijt} + \beta_2 \mathrm{CDST}_{ijt} + \beta_3(\ln \mathrm{IMM}_{ijt} \times \mathrm{CDST}_{ijt}) + \lambda_1 \Delta \ln \mathrm{EXP}_{ijt-1} \\ & + \lambda_2 \mathrm{GDST}_{ij} + \lambda_3 \mathrm{GDP}_{jt} + \lambda_4 \mathrm{GDP\ per\ capita}_{jt} + \lambda_5 \ln \mathrm{GSP}_{it} + \lambda_6 \ln \mathrm{GSP\ per\ capita}_{it} \\ & + \lambda_7 \ln(\mathrm{EXP}_{ijt}/\mathrm{EXP}_{ijt-1}) + \lambda_8 \mathrm{OPEN}_{jt} + \lambda_9 \ln \mathrm{REM}_{jt} + \lambda_{10} \mathrm{ENGL}_j + \lambda_{11} \mathrm{FTA}_{ijt} \\ & + \lambda_{12} \mathrm{LLOCK}_j + \varepsilon_{ijt} \end{aligned} \quad (3)$$

To control for the effects of trade inertia, we include the lagged first-difference of the dependent variable, $\Delta \ln \mathrm{EXP}_{ijt-1}$. The immigrant stock, cultural distance and geodesic distance variables are as described in Section 2. GDP and GDP per capita data are from the World Bank (2006), while GSP data are from the US Bureau of Economic Analysis (2008). GSP per capita is constructed as GSP divided by state population (US Census, 2006a). We include GDP per capita and GSP per capita as they represent accumulated human and physical capital in the home country and the host state, respectively, and serve as a proxy for the effect that the general standards of living in the home country and host state, respectively, may have on trade between immigrants' home and host countries (Hufbauer & Rahardja, 2007). The annual change in the US-country j exchange rate (EXR) is included to capture potential terms of trade

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Table 1
Cultural distance from the United States, ranked by distance

Rank	Home country	TSR	SSE	Cultural distance	Rank	Home country	TSR	SSE	Cultural distance
1	Canada	−0.15	1.07	0.25	38	Slovenia	0.70	0.13	1.35
2	Australia	0.01	1.04	0.39	39	Egypt	−1.01	−0.24	1.36
3	Ireland	−0.62	0.65	0.40	40	Slovakia	0.47	−0.14	1.38
4	United Kingdom	0.20	1.11	0.59	41	Tanzania	−1.25	−0.11	1.38
5	Austria	0.24	0.79	0.63	42	Indonesia	−0.66	−0.40	1.39
6	Iceland	0.31	1.01	0.69	43	Uganda	−0.85	−0.39	1.43
7	New Zealand	0.33	1.03	0.71	44	Bosnia/Herzegovina	0.17	−0.40	1.46
8	Italy	0.10	0.40	0.73	45	Colombia	−1.65	0.22	1.48
9	Mexico	−0.86	0.39	0.75	46	Germany	0.93	0.25	1.48
10	Uruguay	−0.02	0.18	0.85	47	Albania	−0.02	−0.54	1.54
11	Argentina	−0.60	0.13	0.85	48	Czech Republic	0.97	0.20	1.54
12	Belgium	0.40	0.54	0.88	49	Turkey	−0.50	−0.61	1.57
13	France	0.33	0.41	0.89	50	Bangladesh	−0.84	−0.55	1.58
14	Israel	0.21	0.27	0.90	51	Korea (South)	0.45	−0.44	1.62
15	Spain	0.18	0.25	0.90	52	Algeria	−0.99	−0.56	1.64
16	Venezuela	−1.03	0.34	0.90	53	Sweden	1.19	1.45	1.64
17	Finland	0.51	0.71	0.91	54	Iran	−1.30	−0.42	1.66
18	Switzerland	0.53	0.75	0.93	55	Japan	1.21	0.40	1.67
19	Luxembourg	0.51	0.64	0.93	56	Pakistan	−0.97	−0.63	1.70
20	Greece	0.32	0.30	0.95	57	Hungary	0.27	−0.63	1.71
21	Dominican Republic	−0.73	0.07	0.96	58	Georgia	−0.15	−0.75	1.72
22	India	−0.28	−0.01	0.97	59	Jordan	−1.09	−0.63	1.74
23	Chile	−0.64	0.03	0.97	60	Lithuania	0.53	−0.55	1.76
24	Croatia	0.05	0.04	1.01	61	Azerbaijan	−0.21	−0.82	1.79
25	Netherlands	0.67	1.15	1.06	62	Armenia	0.27	−0.71	1.79
26	Portugal	−0.37	−0.11	1.06	63	Belarus	0.46	−0.65	1.81
27	South Africa	−0.69	−0.08	1.09	64	Zimbabwe	−0.95	−0.79	1.84
28	Vietnam	−0.62	−0.11	1.09	65	Latvia	0.43	−0.76	1.90
29	Norway	0.75	1.01	1.12	66	El Salvador	−2.23	0.42	1.94
30	Brazil	−0.81	−0.12	1.16	67	Estonia	0.75	−0.65	1.96
31	Singapore	−0.46	−0.20	1.16	68	Romania	−0.12	−1.00	1.97
32	Philippines	−0.67	−0.17	1.16	69	Bulgaria	0.66	−0.78	2.01
33	Peru	−0.78	−0.16	1.19	70	Ukraine	0.51	−0.98	2.13
34	Malta	−0.98	−0.08	1.21	71	Macedonia	0.21	−1.15	2.18
35	Poland	−0.40	−0.30	1.26	72	Russia	0.62	−1.04	2.23
36	Denmark	0.92	1.25	1.32	73	China	1.13	−0.70	2.23
37	Nigeria	−1.27	−0.02	1.33	74	Morocco	−1.75	−1.20	2.56
					75	Moldova	0.26	−1.80	2.83
	Group average								1.3477

Corresponding TSR and SSE values for the United States are TSR = −0.37 and SSE = 0.96. Values used for Russia are WVS EVS values classified as "Russian Federation".

effects (IMF, 2008). Expressed as foreign currency units per US dollar, an increase indicates depreciation of home country *j*'s currency against the dollar and, thus, is expected to decrease state-level exports. To control for each home country's lack of non-US trading opportunities, we follow Wagner et al. (2002) and include a measure of economic remoteness, given as $\mathrm{REM}_{jt} = 1/\sum_{k=1}^{K}\left[\left(\mathrm{GDP}_{kt}/\mathrm{GDP}_{wt}\right)/\mathrm{GDST}_{jk}\right]$ where GDP_{wt} represents gross global product and *k* identifies potential trading partners for country *j* other than the US.[8] OPEN_{jt}, the sum of country *j*'s total imports and exports divided by its GDP, represents each home country's general propensity to trade (Head & Ries, 1998). State-level export data are from the World Trade Atlas (GTI, 2006), and state-level immigrant population stocks are from the 2000 census (US Census, 2006b). All values, where necessary, have been normalized to 1995 US dollars.

Several dummy variables are also included in Eq. (3). Capturing the effects of trade agreements, FTA_{ij} is equal to one if country *j* is party to an agreement with the US during 2000. Following Dunlevy (2006) and Hutchinson (2002), who indicate common language as a determinant of trade flows in

[8] Internal distance, when $k = j$, is calculated as 0.4 times the square root of the nation's land mass (Head & Mayer, 2000).

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Table 2
Descriptive statistics

Variables	Mean	Variables	Mean
Total exports	148,407,678 (1,008,056,826)	Immigrants (state-specific, number)	6,300.71 (74,743.11)
Non-cultural products	144,788,823 (990,537,894)	Immigrants (total US, number)	357,440.3 (1,077,810)
Cultural products	3,618,855 (29,441,546)	Cultural distance	1.3477 (0.5112)
Cultural heritage	10,829 (186,612)	Geodesic distance (in km)	8,886.02 (3,019.398)
Printed matter	719,832 (7,372,390)	GDP	271,189,386,173 (632,845,671,676)
Music and the performing arts	217,440 (1,750,605)	GDP per capita	13,028.41 (11,154.74)
Visual arts	602,636 (13,080,989)	GSP	191,158,901,961 (227,921,025,648)
Audio and audiovisual media	96,525 (1,541,973)	GSP per capita	34,387.96 (11,356.62)
Δln exchange rate	0.113 (0.1554)	English (dummy variable)	0.3733 (0.4838)
Open	0.8445 (0.4801)	FTA (dummy variable)	0.04 (0.196)
Remote	33,527.12 (59,711)	Landlocked (dummy variable)	0.2 (0.4001)

Standard errors in parentheses. Sample is equal to 3,825 (51 "states" $\times$ 75 home countries) for all variables. See text for variable definitions. All monetary values are in 1995 US Dollars.

gravity specifications, we include a dummy variable ($ENGL_j$) that is equal to one if English is the official language or is in common use in country j (CIA, 2006). Finally, a dummy variable ($LLOCK_j$) that is equal to one if country j is landlocked is included to capture related geographic effects on trade. Table 2 presents descriptive statistics.

The values presented in the table indicate that during the year 2000, the typical state hosted about 6,301 immigrants from the typical home country in our data. As mentioned in the introduction, exports of non-cultural products comprise the overwhelming majority (97.6%) of total state-level exports, with exports of cultural products accounting for only 2.4 percent of total exports. Although greatly variable, the average home country is located about 8,886 km from the capital city of the typical state. While Table 1 reports US-home country cultural distance for each trading partner in our data sample, the average cultural distance from the US is equal to 1.35. The typical home country has a per capita income of $13,028 and a value of 0.845 for our measure of trade openness. English is commonly used in 28 of the 75 home countries, and 60 home countries have access to international waters. Finally, while a small number of the countries (4%: Canada, Israel and Mexico) are parties to free trade agreements with the US, most home countries are not. Thus, the typical immigrant home country can be described as a middle- to upper-income country that is generally open to trade yet does not have a trade agreement in place with the US, is not landlocked, and in which English is generally not commonly used.

3.3. Estimation of the empirical model

We estimate Eq. (3) first using aggregate exports and then exports of cultural and non-cultural products separately as our dependent variables. To place greater emphasis on cultural products, we consider five cultural product sub-classifications as our dependent variables. In each case, we consider three different estimators: (i) Ordinary Least Squares (OLS), (ii) Tobit, and (iii) Poisson models. Silva and Tenreyro (2006) show that estimation of gravity models using OLS may produce biased and inefficient coefficients and suggest the use of the Pseudo Poisson Maximum Likelihood Estimator (PPMLE) technique. Following Silva and Tenreyro, we reject the use of OLS particularly as our disaggregated trade data have numerous zero values. Silva and Tenreyro indicate instances where Poisson may provide a better alternative to Tobit, especially in handling zero outcomes; however, while we estimate our model using Tobit and Poisson, we report results from the Tobit estima-

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tions for empirical and flexibility reasons.[9,10] The rationale is threefold. First, the chi-square values (i.e., Poisson goodness of fit statistics) indicate that Poisson generally fails to adequately represent our data. Second, numerous studies also employ the Tobit procedure (see, for example, Eaton & Tamura, 1994; Head & Ries, 1998; Ranjan & Tobias, 2005) to estimate gravity models. Finally, we use the Tobit technique as it offers the flexibility to handle our additional research interest: the separation of the effects of immigrants on trade into export-initiation and export-intensification effects. While the export-intensification effect of immigrants represents the change in the level of the respective export measures that are already above the censoring threshold, the export-initiation effect represents the likelihood that the dependent variable increases from zero to a positive value.[11]

In Section 4, we first discuss the effects of changes in the variables representing the total and state-specific immigrant stocks, cultural distance and the associated interaction term on state-level exports, and then turn to the corresponding trade-initiation and trade-intensification effects garnered via decomposition of the Tobit coefficients (Table 5).

4. Estimated effects of immigrants and cultural distance

Although we employ a double-log functional form, the unconditional Tobit marginal effects that result from the estimation of Eq. (3) cannot be interpreted as elasticities. The signs of the marginal effects, however, do provide insights into the relationships between immigrants and state-level exports. As a result, we initially restrict our comments to only the signs of the estimated marginal effects and reserve discussion of estimated proportional changes in state-level exports until later in this section. We begin our discussion by commenting on the sign of the coefficients obtained when estimating our model with the total US immigrant stock included, while excluding the lagged dependent variable, the cultural distance variable and the term which interacts the immigrant stock variable with the cultural distance variable. We then discuss results obtained when estimating Eq. (3) after adding each excluded variable in turn (columns (a) through (d) of Table 3 .) We follow this same procedure when employing the state-specific immigrant stock variable in place of the total US immigrant stock variable (columns (e) through (h) of Table 3).

4.1. Estimated relationships between immigrants, cultural distance and state-level exports

Focusing first on the results presented in columns (a) through (d), we find the estimated marginal effects of the total US immigrant stock variable are positive and significant in each of the specifications. In column (b), where we include the cultural distance measure, we find the corresponding estimated marginal effect is negative but not different from zero. Inclusion of the term which interacts the total US immigrant stock variable with the cultural distance variable (column (c)) results in a positive sign on the cultural distance variable and a negative sign on the interaction term. Addition of the 1-year lagged change in the dependent variable (column (d)) yields significant positive effects of the lagged dependent variable and the total US immigrant stock variable, with the marginal effect on the interaction term being negative and significant while the marginal effect of the cultural distance variable is positive but no longer significant.

Similar evaluation of the effects of state-specific immigrant stocks, based on results presented in columns (e) through (h), indicate positive and significant effects. The estimated coefficients on the immigrant stock variables that are presented in columns (a) through (h) are consistent with the findings of Herander and Saavedra (2005) in the sense that intra-national networks are found to influence

[9] Questioning the superiority of PPMLE over OLS as suggested by Silva and Tenreyro (2006), Martinez-Zarzoso et al. (2007) indicate that the Feasible Generalized Least Squares estimator performs better than PPMLE.

[10] Estimation results obtained using PPMLE are available upon request.

[11] We use the McDonald and Moffit (1980) method of decomposing the estimated Tobit coefficients. See Greene (1989) and Roncek (1992) for examples of the McDonald-Moffit decomposition procedure.

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Table 3
Immigrants, cultural distance and aggregate, non-cultural and cultural exports

Dependent variables	ln Exports$_{ij}$ (a)	ln Exports$_{ij}$ (b)	ln Exports$_{ij}$ (c)	ln Exports$_{ij}$ (d)	ln Exports$_{ij}$ (e)
ln State-level Immigrant Stock$_{ijt}$	–	–	–	–	0.0506 (0.0092)***
ln Total US Immigrant Stock$_{jt}$	0.0402 (0.005)***	0.0393 (0.005)***	0.084 (0.012)***	0.0804 (0.012)***	–
Cultural Distance$_{ijt}$	–	−0.0896 (0.0622)	0.1574 (0.0864)*	0.1318 (0.0861)	–
ln Immigrants$_{ijt}$ × Cultural Distance$_{ijt}$	–	–	−0.031 (0.0076)***	−0.028 (0.0075)***	–
Δ Lagged Dependent Variable	–	–	–	0.1811 (0.0299)***	–
ln Geodesic Distance$_{ij}$	−1.0012 (0.0653)***	−0.9928 (0.0655)***	−0.973 (0.0655)***	−0.9789 (0.0652)***	−0.9997 (0.0663)***
ln GDP$_{jt}$	1.1358 (0.0425)***	1.1334 (0.0425)***	1.1086 (0.0428)***	1.1118 (0.0426)***	1.1545 (0.0436)***
ln GDP per capita$_{jt}$	0.2524 (0.0362)***	0.2241 (0.0411)***	0.2474 (0.0414)***	0.2446 (0.0412)***	0.2205 (0.0368)***
ln GSP$_{it}$	1.3772 (0.0215)***	1.3773 (0.0215)***	1.3757 (0.0215)***	1.38 (0.0214)***	1.3316 (0.023)***
ln GSP per capita$_{it}$	−0.5645 (0.0941)***	−0.5639 (0.0941)***	−0.5624 (0.0938)***	−0.574 (0.0934)***	−0.5925 (0.0945)***
Δ ln Exchange Rate$_{ijt}$	−1.3983 (0.1572)***	−1.4011 (0.1572)***	−1.3777 (0.157)***	−1.3373 (0.1561)***	−1.3856 (0.1585)***
Open$_{jt}$	0.6173 (0.0596)***	0.6306 (0.0602)***	0.6092 (0.0603)***	0.5971 (0.0601)***	0.614 (0.0603)***
ln Remote$_{jt}$	0.198 (0.0414)***	0.1934 (0.0415)***	0.1742 (0.0417)***	0.1802 (0.0415)***	0.2029 (0.0416)***
English$_j$	0.7363 (0.0511)***	0.6993 (0.0572)***	0.7153 (0.0572)***	0.7116 (0.0569)***	0.7131 (0.0513)***
FTA$_{ijt}$	0.526 (0.1294)***	0.5049 (0.1302)***	0.3786 (0.1335)***	0.3709 (0.1328)***	0.5559 (0.1298)***
Landlocked$_j$	−0.2296 (0.0627)***	−0.2226 (0.0628)***	−0.2207 (0.0627)***	−0.2293 (0.0624)***	−0.2627 (0.0626)***
Constant	−49.5389 (1.9649)***	−49.1344 (1.9841)***	−49.0681 (1.979)***	−49.0602 (1.969)***	−48.2035 (1.9984)***
N	3,825	3,825	3,825	3,825	3,825
McFadden Pseudo R^2	0.32	0.32	0.33	0.33	0.32
Adjusted R^2	0.78	0.78	0.79	0.79	0.78
Likelihood ratio (Chi-squared)	5,967***	5,969***	5,986***	6,022***	5,933***
Log likelihood	−6,219	−6,218	−6,210	−6,192	−6,236

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Table 3 (*Continued*)

Dependent variables	ln $Exports_{ij}$ (f)	ln $Exports_{ij}$ (g)	ln $Exports_{ij}$ (h)
ln State-level Immigrant $Stock_{ijt}$	0.0492 (0.0092)***	0.1257 (0.0194)***	0.1192 (0.0194)***
ln Total US Immigrant $Stock_{jt}$	–	–	–
Cultural $Distance_{ijt}$	−0.1249 (0.0621)**	0.1227 (0.083)	0.0984 (0.0828)
ln $Immigrants_{ijt}$ × Cultural $Distance_{ijt}$	–	−0.0548 (0.0123)***	−0.05 (0.0122)***
Δ Lagged Dependent variable	–	–	0.175 (0.03)***
ln Geodesic $Distance_{ij}$	−0.9877 (0.0666)***	−0.9586 (0.0666)***	−0.9659 (0.0663)***
ln GDP_{jt}	1.1503 (0.0436)***	1.1339 (0.0436)***	1.1375 (0.0434)***
ln GDP per $capita_{jt}$	0.1824 (0.0413)***	0.2064 (0.0416)***	0.2018 (0.0414)***
ln GSP_{it}	1.333 (0.023)***	1.3258 (0.023)***	1.3302 (0.0229)***
ln GSP per $capita_{it}$	−0.5908 (0.0944)***	−0.5908 (0.0941)***	−0.6021 (0.0937)***
Δ ln Exchange $Rate_{ijt}$	−1.3904 (0.1584)***	−1.3662 (0.1578)***	−1.3257 (0.157)***
$Open_{jt}$	0.6324 (0.0609)***	0.6109 (0.0609)***	0.5999 (0.0606)***
ln $Remote_{jt}$	0.1962 (0.0417)***	0.1804 (0.0417)***	0.1858 (0.0415)***
$English_{j}$	0.6623 (0.0571)***	0.6722 (0.057)***	0.6686 (0.0567)***
FTA_{ijt}	0.5253 (0.1306)***	0.3784 (0.1343)***	0.373 (0.1337)***
$Landlocked_{j}$	−0.2518 (0.0628)***	−0.2497(0.0625)***	−0.2588 (0.0623)***
Constant	−47.6757 (2.0143)***	−47.7688 (2.0073)***	−47.7427 (1.9979)***
N	3,825	3,825	3,825
McFadden Pseudo R^2	0.32	0.32	0.33
Adjusted R^2	0.78	0.79	0.79
Likelihood ratio (Chi-squared)	5,937***	5,957***	5,990***
Log likelihood	−6,234	−6,224	−6,207

Marginal effects (unconditional expected values) from Tobit estimations reported. Summary statistics correspond to Tobit estimations. Standard errors in parentheses. "***", "**" and "*" denote statistical significance from zero at the 1%, 5%, and 10% levels, respectively.

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state-level exports and, more generally, are in line with the existing literature that finds immigrants generally exert pro-trade influences. Inclusion of the cultural distance variable (column (f)) yields a corresponding marginal effect that is both negative and significant, while addition of a term that interacts the state-specific immigrant stock and cultural distance variables (column (g)) results in a negative and significant marginal effect of the interaction term, with the significance of the marginal effect on the cultural distance variable disappearing. Inclusion of the 1-year lagged change in the dependent variable (column (h)) yields a positive and significant effect of the lagged dependent variable, with the effects of the stock of immigrants and the interaction term remaining significant. Taken collectively, these results indicate that immigrants exert a positive influence on state-level exports while cultural distance inhibits state-level exports.

The effects of the remaining variables in Table 3 conform to *a priori* expectations. Greater geodesic distances between home countries and states, which carry the implication of higher transport costs, reduce exports. Higher home country GDP and GDP per capita correspond with greater exports as do higher levels of GSP. Thus, we can say that while larger economies import more from US states, states that produce more output also tend to export more. While a higher standard of living in the immigrants' home countries, as reflected by the positive and significant coefficients on the GDP per capita variable, is found to enhance state-level exports, we find a consistent decline in the level of exports coinciding with a rise in the value of GSP per capita, perhaps evidence of a negative correlation between exports and a rise in wealth. As expected, we find that the influence of changes in the home country *j*-US dollar exchange rate on exports are negative and significant, suggesting that depreciation of the home country's currency vis-à-vis the dollar corresponds with a fall in state-level exports to that country. Nations that are more open to trade and those that suffer a relative lack of non-US trading opportunities tend to import more from US states. Home countries in which English is commonly used import relatively more from US states. Likewise, the effects of being a party to a free trade agreement with the US are positive and significant, while landlocked countries tend to import less from the US.

To explore the effects of immigrants on state-level exports to their respective home countries in greater depth, we disaggregate total state-level exports into non-cultural products, cultural products and five cultural product sub-classifications. Results are presented in Table 4. Marginal effects presented in columns (a) and (b) are generated when exports of non-cultural products and cultural products, respectively, are employed as the dependent variable. The results generally indicate that values presented for state-level exports of non-cultural products are quite similar to those reported for total state-level exports (column (h) of Table 3). For example, focusing on the influences of immigrants and cultural distance on state-level exports of cultural products (column (b)), we find that the export-inhibiting effect of cultural distance is partially offset by the pro-export influence of immigrants. To the contrary, however, we observe significant variation in the extent to which both immigrants and cultural distance affect a number of cultural product sub-classifications.

When examining the influences of the immigrant stock variable, the cultural distance variable and the associated interaction term on exports of cultural products, we see that, while immigrants exert significant and positive effects on state-level exports for several cultural product sub-classifications, greater cultural distance poses a negative and significant influence. This confirms the findings presented in Tadesse and White (2008a, 2008b). However, as mentioned, noticeable variation exists in the extent of the effects across different categories of cultural products. For two of the five cultural product sub-classifications considered, Printed Matter (column (d)) and Audio and Audiovisual Media (column (g)), we find that the corresponding individual effects of the cultural distance variables are negative and significant. For two other cultural product classifications, Music and Performing Arts and Visual Arts (columns (e) and (f), respectively), the estimated effects of the interaction terms are negative and significant. The marginal effects of the immigrant stock variable are positive and significant for all classifications except those in which exports of Cultural Heritage Products (column (c)) and Audio and Audiovisual Media (column (g)) are considered. As Table 2 indicates, the Cultural Heritage Products and Audio and Audiovisual Media classifications are traded less-intensively relative to products in the remaining classifications during the reference period. Comparison of the corresponding standard deviations to those of other export measures also reveals a relative lack of variation in associated export levels across home countries. Thus, finding no immigrant-export effect for these two sub-classifications is not surprising.

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Table 4
Immigrants, cultural distance and exports by cultural product classification

Dependent variables	ln Non-Cultural Exports$_{ij}$ (a)	ln Cultural Exports$_{ij}$ (b)	ln Cultural Heritage Products$_{ijt}$ (c)	ln Printed Matter$_{ijt}$ (d)	ln Music and Performing Arts$_{ijt}$ (e)	ln Visual Arts$_{ijt}$ (f)	ln Audio and Audiovisual Media$_{ijt}$ (g)
ln State-level Immigrant Stock$_{ijt}$	0.1171 (0.0197)***	0.1267 (0.0192)***	0.0292 (0.0527)	0.0443 (0.0207)**	0.0969 (0.0179)***	0.1095 (0.0311)***	−0.0055 (0.0375)
Cultural Distance$_{ijt}$	0.1074 (0.084)	0.0548 (0.0902)	0.08 (0.3623)	−0.2174 (0.1088)**	0.1345 (0.0937)	0.086 (0.1817)	−0.5561 (0.2424)**
ln Immigrants$_{ijt}$ × Cultural Distance$_{ijt}$	−0.0489 (0.0124)***	−0.0725 (0.0125)***	−0.0307 (0.0436)	−0.0217 (0.0142)	−0.0405 (0.0122)***	−0.0678 (0.0225)***	0.0302 (0.0289)
Δ Lagged Dependent Variable	0.1942 (0.0298)***	0.2052 (0.0382)***	−0.1007 (0.0986)	0.2131 (0.052)***	0.2964 (0.0439)***	0.0515 (0.0551)	0.3382 (0.0936)***
ln Geodesic Distance$_{ij}$	−0.9717 (0.0674)***	−0.4931 (0.0613)***	−0.0079 (0.1137)	−0.6465 (0.0601)***	−0.2533 (0.0518)***	−0.3278 (0.0851)***	−0.3017 (0.0862)***
ln GDP$_{jt}$	1.1355 (0.0441)***	0.7275 (0.0409)***	0.4567 (0.0977)***	0.6339 (0.0429)***	0.364 (0.036)***	0.5444 (0.063)***	0.5302 (0.0717)***
ln GDP per capita$_{jt}$	0.1945 (0.042)***	0.2821 (0.0408)***	0.4828 (0.1215)***	0.0663 (0.0417)	0.3007 (0.0395)***	0.5598 (0.0749)***	0.256 (0.0769)***
ln GSP$_{it}$	1.3372 (0.0232)***	0.9835 (0.0236)***	0.6161 (0.0598)***	0.8476 (0.026)***	0.7034 (0.0227)***	0.9635 (0.0395)***	0.9241 (0.048)***
ln GSP per capita$_{it}$	−0.6534 (0.0952)***	0.3634 (0.0935)***	0.3756 (0.2299)	0.3444 (0.0998)***	0.4891 (0.089)***	1.1948 (0.1432)***	0.1741 (0.1929)
Δ ln Exchange Rate$_{ijt}$	−1.3036 (0.1594)***	−1.0665 (0.2043)***	0.3257 (0.7281)	−0.5942 (0.2501)**	−1.0372 (0.2526)***	−0.3001 (0.4147)	−1.6122 (0.5886)***
Open$_{jt}$	0.5967 (0.0616)***	0.2913 (0.058)***	0.095 (0.1313)	0.4088 (0.0586)***	0.1258 (0.0525)**	0.1594 (0.0901)*	0.4094 (0.093)***
ln Remote$_{jt}$	0.1813 (0.0421)***	0.0936 (0.0387)**	−0.0226 (0.0861)	0.1005 (0.0403)**	−0.022 (0.034)	−0.0745 (0.0577)	0.0924 (0.066)
English$_{j}$	0.6727 (0.0576)***	0.4154 (0.0548)***	0.3974 (0.1196)***	0.6545 (0.0561)***	0.264 (0.0492)***	0.2292 (0.0822)***	0.1959 (0.0899)**
FTA$_{ijt}$	0.3807 (0.1357)***	0.3253 (0.1203)***	0.4236 (0.2234)*	0.2823 (0.1159)**	0.0854 (0.1003)	0.0922 (0.1618)	0.4424 (0.1693)***
Landlocked$_{j}$	−0.264 (0.0633)***	−0.0927 (0.0651)	0.0881 (0.1686)	−0.2128 (0.0723)***	−0.1427 (0.0642)**	0.2402 (0.1063)**	−0.4647 (0.1395)***
Constant	−47.2149 (2.0283)***	−45.9764 (1.9241)***	−38.2851 (4.8279)***	−37.5318 (2.0187)***	−33.4528 (1.751)***	−54.4048 (3.0738)***	−40.9032 (3.5381)***
N	3,825	3,825	3,825	3,825	3,825	3,825	3,825
McFadden Pseudo R^2	0.32	0.33	0.36	0.35	0.38	0.37	0.37
Adjusted R^2	0.78	0.57	0.06	0.38	0.36	0.23	0.13
Likelihood ratio (Chi-squared)	5,892***	4,261***	606***	3,133***	2,933***	2,167***	1,371***
Log likelihood	−6,250	−4,250	−549	−2,909	−2,378	−1,829	−1,159

See Table 3 notes.

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4.2. Immigrants and export-initiation and/or increased export-intensification

Table 5 presents the decomposed export-intensification and export-initiation effects that correspond to the estimated marginal effects presented in column (h) of Table 3 and in Table 4.[12] As mentioned earlier, the export-intensification effects represent, subject to the existence of exports, the extent to which a rise in the immigrant stock variable affects the volume of state-level exports. The export-initiation effects, on the other hand, are estimates of the extent to which immigrants contribute to the likelihood that exporting will occur when exporting is not taking place or is occurring at a sufficiently low level as to be below a reportable threshold.

Columns (a) through (c) present the corresponding export-intensification effects attributable to changes in the state-specific immigrant stock variable and the cultural distance variable. The associated export-initiation effects are presented in columns (d) through (f). The export-intensification effects reported from the estimations wherein aggregate exports and non-cultural exports are employed as dependent variables are nearly identical to the marginal effects reported in column (h) of Table 3 and column (a) of Table 4. This is due to a lack of zero-valued observations for these dependent variables. The results indicate that, for both aggregate exports and exports of non-cultural products, immigrants exert positive and significant export-initiation effects.

The intensification and initiation effects relating to state-level exports of cultural products and associated product sub-classifications provide further interesting information. Although we see positive and significant intensification and initiation effects with respect to cultural products, comparison of the estimated effects of immigrants on state-level exports of cultural and non-cultural products reveals that immigrants exert stronger proportional influences on the intensification of non-cultural products while also being more likely to initiate trade in cultural products. While this may result from a relative lack of trade in cultural products, it nonetheless illustrates the trade-generating effects of immigrants. Similarly, we see a similar pattern when considering the influence of cultural distance on the likelihood that cultural product exports will occur and/or the existing level of exports will rise. While cultural distance acts to inhibit existing exports to a lesser degree than it inhibits existing exports of non-cultural products, it hinders the initiation of cultural products exports to a greater extent than the initiation of non-cultural products. Significant variation is also found, across cultural products sub-classifications, with respect to initiation and intensification effects.

Given such differences, we attempt to quantify the corresponding effects by computing the proportional influence of immigrants and cultural distance on exports as indicated in Section 3. Based on the mean values and standard deviations presented in Table 2 and the estimated intensification and initiation effects reported in Table 5, a one standard deviation increase in the immigrant stock variable relative to its mean value both increases the likelihood that cultural products will be exported and the existing level of such products by 0.02 percent and 0.03 percent, respectively. In response to an assumed one standard deviation increase in the cultural distance variable, the intensity of the existing cultural products exports would decrease by 0.13 percent and the likelihood that exports of such products to occur would decrease by approximately 0.10 percent.

When examining the relative effects of immigrants and cultural distance across cultural product sub-classifications, we find considerable variation in the export-intensification and export-initiation effects. Focusing first on the influences of immigrants on state-level exports, we see that Music and Performing Arts is the most-affected sub-classification. Moreover, a one standard deviation increase in the immigrant stock variable yields intensity and initiation effects of 0.02 percent and 0.03 percent, respectively. Printed Matter and Audio and Audiovisual Media products account for the next most-affected classifications. Accordingly, given a one standard deviation increase in the immigrant stock variable, both are estimated to realize export-intensity increases of 0.01 percent while the likelihood of export-initiation for Printed Matter is estimated to increase by 0.012 percent. Estimated effects for the remaining sub-classifications are weaker, with those corresponding to exports of Cultural Heritage products being negligible. Performing similar calculations to determine the estimated initiation and intensification effects attributable to one standard deviation increases in cultural distance, we find

[12] The complete set of estimation results is available upon request from the authors.

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Table 5
Marginal effects of immigrants and cultual distance on export-intensity and export-initiation

Dependent variables	Export-intensity		Export-initiation		Cultural Distance$_{ijt}$ (e)	ln Immigrants$_{ijt}$ × Cultural Distance$_{ijt}$ (f)
	ln Immigrants$_{ijt}$ (a)	Cultural Distance$_{ijt}$ (b)	ln Immigrants$_{ijt}$ × Cultural Distance$_{ijt}$(c)	ln Immigrants$_{ijt}$ (d)		
ln Exports$_{ijt}$	0.1171 (0.0191)***	0.0967 (0.0813)	−0.0491 (0.012)***	0.0005 (0.0001)***	0.0004 (0.0004)	−0.0002 (0.0001)***
ln Non-Cultural Exports$_{ijt}$	0.1147 (0.0193)***	0.1052 (0.0823)	−0.0479 (0.0122)***	0.0006 (0.0001)***	0.0006 (0.0005)	−0.0003 (0.0001)***
ln Cultural Exports$_{ijt}$	0.0554 (0.0084)***	0.024 (0.0394)	−0.0317 (0.0055)***	0.0418 (0.0063)***	0.0181 (0.0298)	−0.0239 (0.0041)***
ln Cultural Heritage Products$_{ijt}$	0.0023 (0.0042)	0.0063 (0.0287)	−0.0024 (0.0055)	0.0003 (0.0005)	0.0007 (0.0032)	−0.0003 (0.0004)
ln Printed Matter$_{ijt}$	0.0109 (0.0051)**	−0.0532 (0.0266)**	−0.0053 (0.0035)	0.0138 (0.0064)**	−0.0676 (0.0338)**	−0.0067 (0.0044)
ln Music and Performing Arts$_{ijt}$	0.021 (0.0039)***	0.0291 (0.0203)	−0.0088 (0.0026)***	0.0308 (0.0057)***	0.0427 (0.0298)	−0.0129 (0.0039)***
ln Visual Arts$_{ijt}$	0.015 (0.0042)***	0.0118 (0.0249)	−0.0093 (0.0031)***	0.009 (0.0025)***	0.007 (0.0149)	−0.0055 (0.0018)***
ln Audio and Audiovisual Media$_{ijt}$	−0.0006 (0.0039)	−0.0582 (0.0254)**	0.0032 (0.003)	−0.0002 (0.0013)	−0.0188 (0.0082)**	0.001 (0.001)

Standard errors in parentheses. "***", "**" and "*" denotes statistical significance at the 1%, 5%, and 10% levels, respectively. Estimated effects correspond to results presented in column (h) of Table 3 and columns (a) through (g) of Table 4.

that Printed Matter is the most affected cultural product sub-classification, with export-intensification effects expected to diminish by 0.05 percent and export-initiation effects decreased by 0.06 percent. Again, estimated effects for the Cultural Heritage products sub-classification are negligible. For the remaining three sub-classifications, export-intensification is estimated to diminish by margins that range from as little as 0.015 percent (for Audio and Audiovisual Media) to as much as 0.036 percent (for Visual Arts). Likewise, export-initiation is estimated to be reduced by 0.014 percent (for Audio and Audiovisual Media) to 0.036 percent (for Music and Performing Arts).

5. Conclusion

Using US state-level export data to 75 countries, and placing emphasis on exports of cultural and non-cultural products as well as several cultural product sub-classifications, we have examined a potential relationship between immigrants and cultural distance as determinants of state-level exports. By decomposing the estimated marginal effects of these variables, we explored the possibility that immigrants not only increase exports when exporting is already occurring (an intensification effect) but also generate exports when, initially, no products are being exported (an initiation effect). In doing so, we have addressed, indirectly, the ability of immigrants to reduce trade-related transactions costs through possession of information specific to the home country and/or through connections to social or business networks. Echoing the findings of Herander and Saavedra (2005), we report evidence of intra-national immigrant networks that act to increase state-level exports. Further, in line with the immigrant-trade literature, our findings indicate that while immigrants have pro-export effects when considering aggregate, cultural and non-cultural products exports, we confirm the expectations, formulated based on the results presented in Girma and Yu (2002) and Tadesse and White (2008a, 2008b), that greater cultural distance also reduces exports of cultural products more so than that of non-cultural products. Specifically, we find that immigrants tend to counteract the trade-inhibiting effect of cultural distance, yet in no instance was the estimated influence of immigrants of sufficiently great to ameliorate the trade-inhibiting effects of cultural distance.

Extending the literature, we compare the effects of immigrants on trade across export categories and products that embed the exporting country's culture to differing degrees. More specifically, disaggregating cultural products into five sub-classifications, we find variation in the pro-export effects of immigrants across the cultural product sub-classifications. Such variation can be attributed to differences in immigrants' collective ability to increase both the intensity of the existing level of state-level exports. However, the observation that the export-initiation effects of immigrants are not as widely observed as are their intensification effects, across cultural products sub-classifications, is taken as an indication of the extent to which differences in product characteristics, which may arise from variation in the amount and manner in which host country culture is embedded in different products, affect immigrants' abilities to influence host-home country trade. Overall, our findings shed light on an aspect of the immigrant-trade link that has, thus far, been neglected in the literature—that the ability of immigrants to influence trade flows depends, in part, on the extent to which their host and home countries are dissimilar.

It is important to acknowledge that, because our results are based on a single year's data, we must remain agnostic on the issue of an optimal immigration policy. Nonetheless, we believe that the findings presented here may inform the related public debate and yield a more fruitful policy outcome. While the results presented in this paper may be externally valid in the sense that the general effect of immigrants in promoting trade may be common across host countries, that the magnitudes of the influences of immigrants on trade may well vary across home countries and time periods suggests a need for additional research. For example, similar studies of the topic, employing data for other host countries and/or that span several years would be interesting extensions to consider. Likewise, future research that uses more disaggregated trade data may provide more detailed results regarding the varying facets of the immigrant-trade relationship and, thus, more informative results that may further illuminate the extent to which immigrants influence trade. Finally, immigrant-specific characteristics such as levels of educational attainment, occupations, duration of stay in the host country, maintenance and intensity of ties to the home country, etc., are generally absent in studies of the immigrant-trade

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relationship. Controlling for such characteristics may result in greater clarity of results and generally provide new and/or additional information.

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Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at doi:10.1016/j.najef.2008.08.001.

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