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# SOURCE-DESTINATION CULTURAL DIFFERENCES, IMMIGRANTS' SKILL LEVELS, AND IMMIGRANT STOCKS: EVIDENCE FROM SIX OECD MEMBER COUNTRIES

## Roger White and Nicole Yamasaki*

Examining data for 79 immigrant source countries and six OECD member destination countries during the years 1975–2000, we find that source-destination cultural differences inhibit international migration. We also report that existing immigrant stocks act to offset, at least in part, the migration-inhibiting effects of cultural differences. Employing educational attainment as a proxy for skill, we find variation across low-, medium-, and high-skilled immigrant cohorts both with respect to the cultural distance-migration relationship and in terms of the extent to which existing immigrant stocks offset the influence of cultural differences. Our results appear robust to econometric techniques, sample composition, and endogeneity issues.

Keywords: Cultural distance; gravity model; migration; skill variation; zero-inflated negative binomial

JEL Classifications: C33; F22; Z13

## 1. Introduction

Although a voluminous literature examines the determinants of international migration, only recently have researchers begun to consider cultural differences between source and destination countries as a possible determinant of immigrant stock levels.[1] This is somewhat surprising since, in many countries, migration policy has been a prominent and often contentious social and political issue. Further emphasising the importance of developing a more complete understanding of the factors that determine migration and, thus, immigrant stocks is that, in 2010, more than 3 per cent of the world's population (i.e., about 215 million individuals) lived outside their countries of birth (UN, 2012). Additionally, in a great many instances, there are considerable differences between the cultures of migrants' source and destination countries. For example, at least two-thirds, and likely more, of all international migrants originate in the global South; however, a majority of all migrants reside in the North (IOM, 2013).

Cross-societal cultural differences, to the extent that they exist and are not easily overcome, represent a cost that is potentially quite large but, as noted, has largely been unaccounted for in prior empirical studies of the determinants of migration. We examine whether greater cultural differences (i.e., cultural distance) between immigrants' source and destination countries significantly affect immigrant stock levels. Incorporating cultural distance as a potential determinant of immigrant stocks, we are able to determine if international migration is influenced by source-destination country differences in religion, gender roles, political views, and social norms. We also consider whether existing immigrant stocks facilitate additional migration by offsetting any migration-inhibiting influences of cultural distance. Finally, employing education as a proxy for skill, we examine variation in the cultural distance-migration relationship across low-, medium-, and high-skilled immigrant cohorts.

A few recent studies have considered the influence of diasporas on bilateral migration. Beine *et al*. (2011), for example, examine migration from 195 source countries to 30 OECD member nations during the years 1990 and 2000. The authors find that diasporas lower migration costs and, thus, increase migration while lowering the skill/human capital composition of immigrant inflows. Beine *et al*. (2010) report similar findings, but also examine the concentration of immigrant stocks and find that larger diasporas increase the concentration of unskilled immigrants relative to skilled immigrants. Beine and Salomone (2013) stress the influence of networks (i.e., existing immigrant stocks or diasporas) as a key determinant of bilateral migration flows, noting that existing immigrant stocks explain a large share of the observed variation in stocks.

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Although little attention has been paid to the potential influence of cultural differences on bilateral migration, Belot and Ederveen (2012), Sprenger (2013), and Caragliu *et al*. (2013) are noteworthy exceptions. These studies employ multiple measures of cultural distance (e.g., linguistic distance, religious distance, institutional distance, Hofstede's cultural dimensions (1980), a measure based on World Values Surveys data, etc.). Belot and Ederveen (2012) examine flows between 22 OECD member countries during the period from 1990 to 2003 and report that cultural differences correspond with lower migration flows. Additionally, the measures of cultural distance the authors employ (i.e., religious distance, linguistic distance, and survey-based measures of cultural distance) are found to do a better job of explaining migration than do economic variables such as average incomes and unemployment rates.

Caragliu *et al*. (2013) include measures of source-destination country differences in values and institutions in an effort to represent different dimensions of cultural differences. Employing a gravity model to examine data for the years 2002–7, the authors report negative relationships between migration flows and measures of trust and both financial and institutional distances between source countries and EU member destination countries. They also find that their results are sensitive to the distance indicator used. Finally, Sprenger (2013) considers migration between 21 members of the EU and the OECD during the years 2000–9. While a positive relationship is found between common language and migration flows, the author reports that cultural proximity appears unrelated to migration flows. Thus, the disparities in findings between Belot and Ederveen (2012), Caragliu *et al*. (2013), and Sprenger (2013) suggest that the cultural distance–migration relationship remains an open empirical question.

We extend the literature, employing data from the World Values Surveys (WVS, 2014 and Inglehart *et al*., 2004) to quantify the cultural distance between each of six OECD member destination countries (i.e., Australia, Canada, France, Germany, the UK, and the US) and 79 immigrant source countries.[2] Our reference period is 1975–2000, with the frequency of our data being at five-year intervals. We follow Lewer and van den Berg (2008) and Cuaresma *et al*. (2013) by applying the gravity model of international trade to migration; however, we do deviate from these studies in terms of our estimation methodology by i) examining the potential influence of cultural distance on immigrant stocks, ii) determining whether existing immigrant stocks are effective in countering any migration-hindering influences of cultural differences, and iii) considering variation in the effects of cultural distance across immigrants' skill levels.

Results obtained using the zero-inflated negative binomial regression technique indicate that greater source-destination cultural distance inhibits international migration. Somewhat similarly, we find that existing immigrant stocks have more pronounced positive effects on subsequent immigrant stocks if the existing stock is from a more culturally-distant country. These two findings suggest that existing immigrant stocks may, at least in part, offset the migration-inhibiting effects of cultural distance. Given the potential for reverse causality bias, we undertake an additional battery of estimations using a set of instrument variables. The results support our primary finding that cultural differences between source and destination countries negatively affect corresponding bilateral migration flows. Examining potential variation across the immigrant skill cohorts in the cultural distance–migration relationship, we see that low- and medium-skilled immigrant stocks are adversely affected by cultural distance to a greater extent than are high-skilled immigrant stocks. We also find that the existing stocks of high-skilled immigrants act to offset the migration-inhibiting influences of source-destination cultural distance. Our results appear robust to econometric techniques, sample composition, and endogeneity issues.

In the following section, we introduce our measure of cultural distance and expand upon its potential relationship with international migration. In Section 3, we introduce our empirical specification and data sources and then detail the variable construction. This is followed in Section 4 by discussions of the econometric technique employed and the corresponding estimation results. Section 5 concludes.

## 2. Cultural distance and migration

Defining culture as an amalgam of a society's attitudes, values, behaviours and norms, we can say that it represents shared habits and traditions and collective learned beliefs. The measure of cultural distance we employ in our analysis is constructed using data from the first four waves of the World Value Surveys (WVS).[3,4] As the measure of cultural distance utilised here is drawn from national samples, we posit that it is representative of cross-societal differences. Thus, it can be argued that differences in the measure across countries are representative of differences in national cultures.

Application of factor analysis to a subset of WVS questions results in the categorisation of respondents along two dimensions of culture: Survival vs. Self-

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expression values (*SSE*) and Traditional vs. Secular-rational authority (*TSR*).[5] The survey questions seek participants' views on both scientific issues (e.g., economics, politics, and technological advances) and social beliefs/concerns (e.g., gender roles, religion, sexual orientation, environmental issues, and family values) (Inglehart *et al*., 2004). For example, a participant who firmly believes in the importance of God, nationalism, and respect for authority, would be categorised as having traditional values. Given that respondents are classified into the two dimensions, country-specific *SSE* and *TSR* values are then ascertained. These two dimensions explain more than 70 per cent of the cross-cultural variance on scores of more specific values/questions.

Societies characterised as being more survival-oriented commonly emphasise hard work, self-denial, and the achievement of economic and physical security. Often, individuals in these societies view foreigners and outsiders as threats and hold negative opinions of ethnic diversity and cultural change – key characteristics that may strongly discourage inward migration. This corresponds with an intolerance of homosexuals and minorities and an adherence to traditional gender roles (e.g., often, post-secondary education, jobs, and political activity are thought to be better suited for men than for women). Survival-oriented societies are also often characterised by an authoritarian political outlook. In fact, members of such societies are often proponents of increased government/state ownership of businesses and are relatively more open to structures of government besides democracy.

In relation to an individual's migration decision, the views typically held by residents of a potential destination on topics related to politics or a woman's role in society may provide considerable incentives (or disincentives). One noteworthy aspect of our measure of cultural distance is that in some cases an immigrant may select a destination country whose *SSE* value may differ greatly from that of her or his source country. For example, women in a more survival-oriented society may want to migrate to a country with a more self-expression-oriented outlook to increase their overall well-being in society. Strict interpretation of *SSE* values, however, may imply that because the distance between two societies may be large, migration might be too costly and, if so, would result in lower immigrant stocks. Nonetheless, to the extent that the gender gap has been becoming increasingly smaller, an overall increase in the cultural distance between two countries may result in lower immigrant stocks. Survival-oriented societies also tend to teach children the importance of material wealth, hard work, science (as opposed to religion), and the lack of value in trusting and interacting with others (a sort of 'survival of the fittest' approach).

Individuals in societies that place greater emphasis on self-expression values commonly hold opposing views on these issues. The rationale is that when economic security and physical security exist cultural diversity begins to be appreciated and sought out. This leads to greater tolerance for deviation from traditional gender roles and sexual norms and to greater support for equal rights.

Traditional societies tend to show greater deference to the authority of the nation, a god, or family. In fact, such deference is viewed as important or as a general expectation. It is common for individuals to adhere to family or communal obligations, to express a high degree of national pride and/or to have a nationalistic outlook, and to show obedience to religious authority. Indeed, many characteristics of more traditional societies are centred on the importance of religion. For example, members of traditional societies typically have faith in the existence of a Heaven and a Hell, are frequently present at church, believe good and evil are clearly defined, and garner strength and consolation from their faith. In many countries, religion is more than just a collection of beliefs – it is a way of life that can influence politics, social structure, and the economy. As a result, how similar a particular destination country's religion is to the immigrant's source country may play a role in the migration decision. Thus, a country's historical religion can have a large, sustaining impact on the country's current day national culture even if its inhabitants do not regularly attend religious services.

Since a large number of children is viewed as a desirable achievement, large families are also common in more traditional societies. Also, while parents are always expected to put their children's needs first, children are expected to respect and love their parents no matter what. Again, in accordance with the high emphasis placed on family, pleasing one's parents is another aspiration. Fertility rates in more traditional societies tend to be relatively high, and divorce, abortion, euthanasia, and suicide are all viewed very negatively. Societies that are more secular-rational hold opposing views on these issues and often adhere to rational-legal norms and emphasise economic accumulation and individual achievement.

## 3. Empirical specification and data

Due to push and pull factors, and associated physical and monetary costs of moving from one country to

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another, migration significantly parallels the underlying structure of international trade (Lewer and van den Berg, 2008; Cuaresma *et al*., 2013). As a result, these similarities allow for the application of the gravity model to international migration. The use of the gravity specification to examine bilateral migration is further motivated by Anderson (2011) and recent works that apply the gravity model to international factor flows (e.g., Candau, 2013; Kleinert and Toubal, 2010). The basic gravity model of international trade assumes that trade flows are positively related to the trading partners' economic masses and negatively related to the physical distance between them (a proxy for transportation costs) (Tinbergen, 1962). As noted, we follow Lewer and van den Berg (2008) by modifying this basic structure to substitute the populations of the source and destination countries for the respective economic masses.

We augment the basic gravity specification to consider economic incentives, physical distance/direct migration costs, and potential interpersonal network effects as determinants of immigrant stocks. As Lewer and van den Berg note, there exists evidence indicating that immigrant flows from a particular country are stronger, provided the destination country's culture and language are similar to that of the source. This leads to the inclusion of a language dummy variable in the baseline regression specification. The positive relationship between migrant flows and a source and destination country sharing a common language further supports our incorporation of the cultural distance variable. Accordingly, we consider the cultural distance between source and destination countries as a potential determinant of immigrant stock levels.

Equation (1) is our baseline regression model. The dependent variable is the stock of immigrants in destination country i from source country j during year t. The immigrant stock data, available for the years 1975, 1980, 1985, 1990, 1995, and 2000, are from Defoort (2008). Because the dependent variable series is available only at five-year intervals, we conduct our analysis accordingly.

$$\begin{aligned} Stock_{ijt} &= \alpha_0 + \beta_1 \ln CDIST_{ijt} + \beta_2 \ln Stock_{ijt-5} \\ &+ \beta_3 \ln POP_{it} + \beta_4 \ln POP_{jt} \\ &+ \beta_5 \ln \frac{RGDPC_{it}}{RGDPC_{jt}} + \beta_6 \ln GDIST_{ij} \\ &+ \beta_7 Colony_{ij} + \beta_8 Comlang_{ij} \\ &+ \beta_\Omega \Omega_t + \beta_\Psi \Psi_i + \beta_\Theta \Theta_j + \varepsilon_{ijt} \end{aligned} \tag{1}$$

The measure of source-destination cultural distance we use in our analysis is calculated using the Pythagorean Theorem and the *SSE* and *TSR* values of a particular destination country i and source country j as $CDIST_{ijt} = \sqrt{(SSE_{it} - SSE_{jt})^2 + (TSR_{it} - TSR_{jt})^2}$ (White, 2010). As our reference period spans the years 1975–2000, we employ *SSE* and *TSR* values for each of the first four waves of the World Values Survey.[6] Thus, our measure of cultural distance varies over time. Considering the length of our reference period, this seems not only reasonable but necessary to best represent the extent of cross-societal cultural differences over time.

As noted, we anticipate that greater cultural distance between source and destination countries has a deterring effect on migration and, thus, results in lower immigrant stock levels. We also expect that a larger existing immigrant stock (i.e., a higher number of immigrants from a given source country in a given destination country five years prior) ($Stock_{ijt-5}$) corresponds with a larger subsequent immigrant stock. This expected relationship stems from the notion that the existence of a large immigrant stock encourages immigration by facilitating assimilation for the newcomers from the same source country (Lewer and van den Berg, 2008). In other words, later immigrants can more easily adapt to societal and legal changes by learning from the experiences of earlier immigrants, since both share the same cultural backgrounds. Furthermore, later migrants can travel with more confidence, knowing they can find support among familiar faces. Additionally, we expect that existing immigrant stocks may act to offset, at least in part, the anticipated migration-inhibiting effects of cultural distance.

The remaining explanatory variables in equation (1) include the populations of both the destination and source countries ($POP_{it}$ and $POP_{jt}$, respectively). Larger populations, all else equal, are expected to be positively correlated with immigrant stocks. We also include the ratio of destination-to-source real GDP per capita values ($RGDPC_{it}/RGDPC_{jt}$). It is assumed that the higher the destination country average income value relative to the source country, the greater the associated pull factor and, thus, the larger the immigrant stock. The source for these three variables is the World Bank (2012).

To control for the anticipated migration-inhibiting influence of physical distance, and thus for direct migration costs, we include a measure of the geodesic distance ($GDIST_{ij}$) between the source and destination countries. Mayda (2010) and Pedersen *et al*. (2008) both control for common language use and a colonial link between the source and destination countries.

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Interestingly, the two studies produced differing results in terms of coefficient signs and statistical significance. Mayda reports an insignificant relationship between migration flows and common language and a negative relationship for the colonial link variable. Pedersen *et al*., however, finds the effects of sharing a language or a colonial link to be positive. To provide further comparison, both variables are included in our estimations. Specifically, we control for the influences of source-destination colonial links ($Colony_{ij}$) and common language ($Comlang_{ij}$), two factors that are believed to facilitate migration and, accordingly, result in greater immigrant stocks. The source for this second set of three variables is the CEPII (2012).

Finally, in equation (1), the vectors Ω, Ψ, and Θ control for year, destination country, and source country fixed effects, respectively. The destination and source country fixed effects terms control for time-invariant, location-specific factors such as geographic constraints on international migration and public policies governing emigration/immigration during the time period under consideration. By accounting for fixed effects, bias associated with the omission of unilateral variables

Table 1. Descriptive statistics

| Abbev. | Variable | Mean (Std dev.) | Min. | Max. |
|---|---|---|---|---|
| $CDIST_{ijt}$ | Cultural $distance_{ijt}$ | 1.3566 (0.5851) | 0.0640 | 3.1646 |
| $Stock_{ijt}$ | $Immigrants_{ijt}$ | 69,679(c) (250,506) | 0.0000 | 6,374,825 |
| $Stock_{ijt-5}$ | $Immigrants_{ijt-5}$ | 59,829 (191,343) | 0.0000 | 4,530,389 |
| (a) | Low-skilled $immigrants_{ijt}$ | 29,794 (132,797) | 0.0000 | 3,081,310 |
| (a) | Medium-skilled $immigrants_{ijt}$ | 15,993 (79,863) | 0.0000 | 2,398,000 |
| (a) | High-skilled $immigrants_{ijt}$ | 22,861 (66,210) | 0.0000 | 895,515 |
| $POP_{it}$ | $Population_{it}$ (destination) | 82,121,089 (80,813,099) | 14,692,000 | 282,162,411 |
| $POP_{jt}$ | $Population_{jt}$ (source) | 57,368,947 (160,904,614) | 228,138 | 1,262,645,000 |
| (b) | Real GDP per $capita_{it}$ (destination) | 22,009.94 (4,860.14) | 14,658.3 | 35,080.7 |
| (b) | Real GDP per $capita_{jt}$ (source) | 10,084.49 (12,208.21) | 185.73 | 82,741.2 |
| $GDIST_{ij}$ | Geodesic $distance_{ij}$ | 7,235.99 (4,801.38) | 377.74 | 18,894.3 |
| $Colony_{ij}$ | $Colony_{ij}$ | 0.0725 (0.2594) | 0.0000 | 1.0000 |
| $Comlang_{ij}$ | Common $language_{ij}$ | 0.1736 (0.3789) | 0.0000 | 1.0000 |
| (d) | Genetic $distance_{ij}$ | 91.8815 (96.2446) | 0.9896 | 463.465 |
| (d) | Difference (destination-to-source) in Economic complexity $index_{ijt}$ | 3.4268 (1.1886) | 0.1982 | 6.8689 |
| (d) | Difference (destination-to-source) in Political globalisation $index_{ijt}$ | 19.2448 (23.1547) | –44.5885 | 84.5753 |

Notes: N = 1,682 for all variables except instruments: N = 1,670 for Genetic $distance_{ij}$, N = 1,378 for Difference in Economic complexity $index_{ijt}$, and N = 1,595 for Difference in Political globalisation $index_{ijt}$.
(a) Dummy variables are employed to identify immigrant stock values by skill classification.
(b) Destination and source GDP per capita values are combined to form a single variable that measures relative GDP per capita (destination-to-source) that is used in the analysis.
(c) The average immigrant stock is greater than the sum of the average low-, medium-, and high-skilled immigrant stock values due to an inability to categorise some immigrants by education level.
(d) Instrument variables. See text (Section 4.3) for a discussion.

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(i.e., those pertaining only to country i or country j), as opposed to bilateral variables, can be removed (Lewer and van den Berg, 2008). Similarly, the time fixed effects term controls for any factors that facilitate (or hinder) migration and which are variable during the reference period but are source and destination country-invariant.

To address the question of potential variation in the influence of source-destination cultural distance on immigrant stock levels, we extend equation (1) to include dummy variables that identify immigrant stocks by skill level and then interact each of these dummy variables separately with the cultural distance variable. Years of educational attainment are used to identify immigrants as low-skilled (0–8 years of education), medium-skilled (8–12 years), or high-skilled (more than 12 years) (Defoort, 2008). We also interact the cultural distance, lagged immigrant stock, and skill level dummy variables to address our research questions further. Table 1 presents descriptive statistics.

The average cultural distance between the typical pair of source and destination countries is approximately 1.36, and they are located roughly 7,236 miles apart. Furthermore, about 7.25 per cent of the source and destination country pairs share a colonial heritage, while about 17.4 per cent share a common language. The typical destination country has a population of slightly more than 80.7 million persons and a real GDP per capita of $22,010. On the other hand, the typical source country has a population of roughly 57.7 million and a real GDP per capita of only $10,084. Additionally, the average immigrant stock is 69,679, a plurality of which (42.8 per cent), on average, are classified as part of the low-skilled cohort.

Equation (1) posits a causal influence of cultural distance on the level of the immigrant stock; however, the cultural distance variable is based on responses to nationally representative surveys that include immigrants. If the survey responses of immigrants affect the cultural distance variable ($CDIST_{ijt}$), our empirical specification may suffer a reverse causality bias. To address this possibility, we employ instrument variables as part of our analysis. The final three variables presented in table 1 are the instruments that we employ for our cultural distance variable.[7] Genetic distance ($\rho = 0.44$), differences in economic complexity ($\rho = 0.35$), and differences in political globalisation ($\rho = 0.27$) are all positively correlated with the cultural distance measure; however, the instrument variables do not enter the main estimation equation. Specifically, the correlation coefficients between the immigrant stock series and instrument variables are near zero: genetic distance ($\rho = 0.02$), differences in economic complexity ($\rho = -0.02$), and differences in political globalisation ($\rho = 0.09$). Thus, each instrument explains the level of the immigrant stock through the instrumented variable (i.e., cultural distance).

## 4. Estimation results

We employ the zero-inflated negative binomial (ZINB) technique to estimate equation (1) and the variants that allow us to address our hypotheses: i) greater cultural differences (i.e., cultural distance) between a source and a destination country correspond with reduced migration and, thus, lower immigrant stocks; ii) the existence of a larger existing immigrant stock corresponds with increased migration which leads to greater subsequent immigrant stocks; iii) existing immigrant stocks may act to offset, in part or in whole, the migration-inhibiting influences of cultural distance; and iv) variation exists across immigrant skill levels in terms of the influences of cultural distance and the effects of existing immigrant stocks.

The ZINB technique generates two separate models and then combines them. First, a logit model is estimated for the 'certain zero' cases. Then, a negative binomial model is estimated to predict the counts for those observations that are not certain zeros. Our choice of the ZINB technique is based on our dependent variable being count data and the results of Vuong and Zip tests. The test statistics are noted for the estimations presented in tables 2 and 3. For all estimations, the Vuong test indicates that the ZINB technique is preferable to the ordinary negative binomial technique, and the Zip test statistics indicate the appropriateness of the ZINB technique rather than the zero-inflated Poisson technique.

### *4.1 Does source-destination cultural distance affect immigrant stock levels?*

Results obtained from the estimation of equation (1) are presented in column (a) of table 2. We see that the estimated negative binomial coefficient on the cultural distance variable is –0.3269. Exponentiation of the coefficient produces the corresponding incidence rate ratio (IRR) which is equal to 0.7212. More precisely, all else constant, a 1 per cent increase in source-destination cultural distance is estimated to decrease the rate for the immigrant stock variable by a factor of 0.72. Likewise, the negative binomial coefficient on the cultural distance variable reported in column (b) suggests that if the source-destination cultural distance is 1 per cent greater, then the rate of the immigrant stock variable

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would decrease by a factor of 0.72. Thus, we can say that greater cultural differences hinder migration and, therefore, result in lower immigrant stocks.

All other negative binomial coefficients presented in table 2 are of the anticipated signs and are significantly different from zero with the exception of the coefficients for the destination country population variable. Larger lagged immigrant stock and source country population values correspond with larger immigrant stocks in the present period. Likewise, higher destination-to-source GDP per capita ratios correlate with larger immigrant stocks. Greater geodesic distance between the source and destination countries is negatively related with immigrant stocks. The existence of source-destination colonial links is positively related with higher immigrant stocks, as is whether source and destination countries share a common language. The coefficient on the destination country population variable, while not significantly different from zero, is of the expected sign. For each of our six destination countries, the variable is constant across all source countries in each time period that we examine. This lack of variation may explain why the coefficient on the destination country population variable lacks statistical significance.

The logit coefficients reported in column (a) of table 2 reveal that source-destination cultural distance, existing immigrant stocks in a given destination country, and relative destination-to-source GDP per capita values are significant determinants of whether there are zero immigrants from a typical source country in a given destination country. More specifically, all else equal, if the source-destination cultural distance were to increase by 1 per cent, the odds that there will be no immigrants from the corresponding source country in the destination country increase by a factor of 1.7215. Likewise, a 1 per cent increase in the existing immigrant stock from the source country residing in the destination country or in the difference between destination country GDP per

Table 2. Estimation results

| | Neg. Bin. (a) | Logit (a) | Neg. Bin. (b) | Logit (b) |
|---|---|---|---|---|
| ln Cultural distance$_{ijt}$ | –0.3269*** | 0.5432* | –0.3283** | 0.0557 |
| | (0.0582) | (0.3078) | (0.1112) | (0.3325) |
| ln Cultural distance$_{ijt}$ x ln Immigrants$_{ijt-5}$ | | | 0.0002 | –0.4253*** |
| | | | (0.0113) | (0.1275) |
| ln Immigrants$_{ijt-5}$ | 0.3959*** | –0.5616*** | 0.3959*** | –0.7676*** |
| | (0.0144) | (0.0466) | (0.0147) | (0.0933) |
| ln Population$_{it}$ (destination) | 0.3406 | 0.1976 | 0.3409 | 0.1811 |
| | (0.7449) | (0.1872) | (0.7451) | (0.1858) |
| ln Population$_{jt}$ (source) | 1.9345*** | 0.0924 | 1.9344*** | 0.1042 |
| | (0.3767) | (0.0943) | (0.3767) | (0.0939) |
| ln Relative GDP per capita$_{ijt}$ | 0.8378*** | –0.3531*** | 0.8378*** | –0.4236*** |
| | (0.1753) | (0.1339) | (0.1753) | (0.1337) |
| ln Geodesic distance$_{ij}$ | –0.4300*** | –0.0649 | –0.4300*** | 0.0116 |
| | (0.0328) | (0.1671) | (0.0328) | (0.1792) |
| Colony$_{ij}$ | 1.2107*** | –21.0919 | 1.2107*** | –29.4683 |
| | (0.0978) | (71,134.15) | (0.0979) | (5,430,911) |
| Common language$_{ij}$ | 0.6073*** | –21.3651 | 0.6075*** | –29.8507 |
| | (0.0857) | (43,632.1) | (0.0863) | (3,864,441) |
| Constant | –28.0543** | –3.9407 | –28.0577** | –4.1506 |
| | (13.8764) | (4.2292) | (13.8778) | (4.2525) |
| ln Alpha | –0.7453 | | –0.7453 | |
| Alpha | 0.4746 | | 0.4746 | |
| Vuong test (ZINB versus NB) | 15.47*** | | 15.38*** | |
| LR test of alpha = 0 (ZINB versus ZIP) | 2.2E+07*** | | 2.2E+07*** | |
| N | 1,682 | | 1,682 | |
| Immigrant stock > 0 | 1,577 | | 1,577 | |
| LR $\chi^2$ | 3,624*** | | 3,637*** | |

Notes: Robust standard errors in parentheses. All estimations include controls for year, destination country, and source country fixed effects. Corresponding coefficients not reported due to space limitations. ***, **, and * denote significance from zero at the 1%, 5%, and 10% levels, respectively.

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capita and source country GDP per capita decreases the odds that the current immigrant stock will be zero by factors of 0.5703 and 0.7025, respectively.

The results reported in column (a) confirm our expectation that, all else equal, greater cultural distance between source countries and destination countries negatively influences immigration and, thus, results in lower immigrant stock values. We also find that a larger existing immigrant stock from a given source country corresponds with a higher subsequent immigrant stock. This may be a result of earlier immigrant arrivals acting to encourage additional migration either by reducing explicit migration costs (e.g., sponsoring new arrivals, providing housing upon arrival, providing assistance finding employment, etc.) or implicit migration costs such as cultural differences. To test this proposition, we estimate a modified version of equation (1) where the existing immigrant stock variable is interacted with the measure of cultural distance. Results are presented in column (b) of table 2.

Beginning with the negative binomial coefficients, we again find that greater cultural distance and existing immigrant stocks have negative and positive effects, respectively, on the level of the predicted immigrant stock. The coefficient on the term which interacts the cultural distance variable with the lagged immigrant stock variable is not significantly different from zero. This suggests that existing immigrant stocks act to offset the migration-inhibiting influences of cultural differences but the effect is not more pronounced if the immigrants are from source countries that are relatively more culturally-distant.

Turning to the logit coefficients, we again see that a larger existing immigrant stock from a given source country corresponds with a decreased likelihood that zero immigrants will currently reside in the destination country. While the logit coefficient on the cultural distance variable is not significantly different from zero, the coefficient on the term which interacts the cultural distance and lagged immigrant stock variables is negative and significant. This suggests that, holding the existing stock of immigrants constant, greater source-destination cultural distance corresponds with a larger decrease in the odds that there will be zero source country immigrants currently in the destination country.

### *4.2 Does the influence of cultural distance vary across migrant skill cohorts?*

To determine if the effect of cultural differences varies across immigrant skill cohorts, we estimate a modified version of equation (1) in which the cultural distance variable is interacted with three dummy variables that identify immigrant stock values as representing low-, medium-, or high-skilled immigrants. Results are presented in table 3.

Focusing first on the results presented in column (a), we see that the estimated negative binomial coefficients for the terms which interact the cultural distance variable and the dummy variables that identify the immigrants' skill levels are all negative and significantly different from zero. Hausman tests indicate that the coefficients for the low- and medium-skilled cohorts (–0.3130 and –0.3481, respectively) are not significantly different from each other (p = 0.5056); however, the coefficient for the high-skilled immigrant cohort (–0.1357) is significantly different from the coefficients for the low-skilled (p = 0.0006) and the medium-skilled cohorts (p = 0.0000). Thus, the corresponding IRR values indicate that a 1 per cent increase in source-destination cultural distance decreases the rate of the high-skilled immigrant stock variable by a factor of 0.8731 and the rates of the low- and medium-skilled immigrant stock variables by factors of 0.7313 and 0.7060, respectively.

Considering the results presented in column (b), we see the sum of the negative binomial coefficients on the term which interacts the low-skilled cohort dummy variable with the cultural distance variable and the term which interacts the low-skilled cohort dummy variable with the cultural distance variable and the lagged immigrant stock variable is significantly different from the corresponding summations for the medium- (p = 0.0797) and high-skilled (p = 0.0000) cohorts. Likewise, the summation of coefficients for the medium-skilled cohort is significantly different from that of the high-skilled cohort (p = 0.0000). Thus, we can state that the influence of cultural distance varies significantly across skill cohorts. For example, a 1 per cent increase in source-destination cultural distance is estimated to decrease the predicted low-, medium-, and high-skilled immigrant stock variables by factors of 0.7902, 0.6556, and 0.8465, respectively.

Perhaps the observed variation can be explained, in part, by low-skilled immigrants already being at a disadvantage when it comes to certain costs of immigration – many of which are correlated with their low income levels. For instance, high-skilled immigrants are more likely to have had better access to education which, in turn, means they have likely been more exposed to foreign languages and political structures (Belot and Ederveen, 2012). Accordingly, high-skilled immigrants can more

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Table 3. Potential variation across immigrant skill classifications

| | Neg. Bin. | Logit | Neg. Bin. | Logit |
|---|---|---|---|---|
| | (a) | | (b) | |
| ln Cultural distance$_{ijt}$ x Low-skilled$_j$ | –0.3130*** | 0.4021* | –0.2236** | –0.1733 |
| | (0.0495) | (0.2391) | (0.0946) | (0.2975) |
| ln Cultural distance$_{ijt}$ x Medium-skilled$_j$ | –0.3481*** | 0.3933* | –0.4318*** | 0.0556 |
| | (0.0509) | (0.2216) | (0.1022) | (0.2810) |
| ln Cultural distance$_{ijt}$ x High-skilled$_j$ | –0.1357*** | 0.2141*** | –0.2155** | 0.0594 |
| | (0.0490) | (0.0710) | (0.0899) | (0.2907) |
| ln Cultural distance$_{ijt}$ x Low-skilled$_j$ | | | –0.0119 | 0.6138*** |
| x ln Immigrants$_{ijt-5}$ | | | (0.0105) | (0.1015) |
| ln Cultural distance$_{ijt}$ x Medium-skilled$_j$ | | | 0.0102 | 0.3910*** |
| x ln Immigrants$_{ijt-5}$ | | | (0.0126) | (0.1239) |
| ln Cultural distance$_{ijt}$ x High–skilled$_j$ | | | 0.0488** | 0.4917*** |
| x ln Immigrants$_{ijt-5}$ | | | (0.0111) | (0.1096) |
| ln Immigrants$_{ijt-5}$ | 0.4508*** | –0.7189*** | 0.4567*** | –0.9600*** |
| | (0.0087) | (0.0330) | (0.0088) | (0.0652) |
| ln Population$_{it}$ (destination) | 1.7986*** | 0.3727*** | 1.7669*** | 0.3543*** |
| | (0.5256) | (0.0958) | (0.5250) | (0.0955) |
| ln Population$_{jt}$ (source) | 0.7875*** | 0.1076** | 0.8206*** | 0.1014** |
| | (0.2644) | (0.0507) | (0.2649) | (0.0513) |
| ln Relative GDP per capita$_{ijt}$ | 0.6978*** | –0.3681*** | 0.7073* | –0.4142*** |
| | (0.1142) | (0.0703) | (0.1141) | (0.0706) |
| ln Geodesic distance$_{ij}$ | –0.3486*** | 0.1328 | –0.3484*** | 0.2098** |
| | (0.0219) | (0.0892) | (0.0219) | (0.0953) |
| Colony$_{ij}$ | 1.1002*** | −18.4845 | 1.0965*** | −17.4509 |
| | (0.0657) | (10,365.2) | (0.0656) | (7,323.9) |
| Common language$_{ij}$ | 0.5630*** | −19.0310 | 0.5437*** | −16.9519 |
| | (0.0578) | (7,321.4) | (0.0581) | (3,063.4) |
| Low-skilled$_j$ | –0.0996*** | –0.1718 | –0.0939*** | –0.2367 |
| | (0.0318) | (0.2209) | (0.0318) | (0.2364) |
| Medium-skilled$_j$ | –0.4085*** | –0.1705 | –0.3868*** | –0.1557 |
| | (0.0317) | (0.2082) | (0.0320) | (0.2254) |
| Constant | –36.355*** | –8.6198*** | –36.392*** | –8.5691*** |
| | (9.7632) | (2.1605) | (9.7426) | (2.1822) |
| ln Alpha | –0.4110 | | –0.4150 | |
| Alpha | 0.6630 | | 0.6604 | |
| Vuong test (ZINB versus NB) | 20.39*** | | 20.69*** | |
| LR test of alpha = 0 (ZINB versus ZIP) | 3.8E+07*** | | 3.7E+07*** | |
| N | 5,046 | | 5,046 | |
| Immigrant stock > 0 | 4,662 | | 4,662 | |
| LR $\chi^2$ | 9,563*** | | 9,626*** | |

Notes: See table 2.

easily overcome costs associated with greater cultural distance because they have the means to learn about and familiarise themselves with new cultures. High-skilled workers of a particular country's immigrant stock may also be better able to spread information back to their source country.

Considering the logit coefficients reported in column (a), we see that cultural distance significantly increases the likelihood that the predicted immigrant stock is equal to zero for all three immigrant skill cohorts. Specifically, a 1 per cent increase in the cultural distance variable increases the odds that the predicted immigrant stock will equal zero by a factor of 1.495 for low-skilled immigrants and by a factor of 1.4819 for medium-skilled immigrants. For the high-skilled immigrant cohort, however, a 1 per cent increase in the cultural distance variable increases the odds that the predicted immigrant stock will equal zero by a factor of only 1.2387.

The logit coefficients in column (b) tell a similar story. Holding the lagged immigrant stock value constant, we see that given a 1 per cent increase in cultural distance the odds that the predicted low-skilled immigrant stock

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will equal zero increase by a factor of 1.8474. Again, the high-skill immigrant cohort is affected the least. A similar increase in cultural distance would increase the odds that the predicted high-skill immigrant stock will equal zero by a factor of only 1.4785.

### *4.3 Reverse causality: instrument variable estimations*

The results presented thus far support a causal relationship between source-destination cultural distance and immigrant stocks; however, the cultural distance variable is based on responses to nationally representative surveys that include immigrants. If the survey responses of immigrants reflect the values and cultures of their source countries then they may reduce the value of the cultural distance variable, which introduces a reverse causality bias. Several studies support this possibility, finding that diasporas influence interactions between their source and destination countries through channels such as trade in cultural goods (e.g., movies, books, and newspapers), return migration, communication with relatives, tourism, etc. For example, White and Tadesse (2008) find that US immigrants overcome asymmetric information and exert positive influences on US exports of cultural products to their source countries, Beine *et al*. (2013) show that migration leads to the diffusion of the fertility norms of their destination countries to their source countries, and Tadesse and White (2012) report that immigrants, through their interpersonal relationships, enhance US exports of tourism services to their source countries.

To address the potential reverse causality bias, we utilise a two-stage instrument variable process. The instruments we employ are i) the genetic distance between source and destination countries, ii) the difference in the complexity of the source and destination countries' economies, and iii) differences in the extent to which the source and destination countries are politically globalised. In the first stage of our estimation process, we produce predicted values for the cultural distance series (i.e., the potentially endogenous variable) by regressing the variable on the exogenous variables from equation (1) and each of the three instrument variables in turn. The Ordinary Least Squares technique is used to complete the first stage. In our second stage, we employ the predicted values from our first stage estimation as our measure of cultural distance and estimate the resulting variant of equation (1) using the ZINB technique.[8] The Vuong and Zip statistics reported in table 4 indicate that the ZINB technique is appropriate.

Spolaore and Wacziarg (2009) and Guiso *et al*. (2009) propose genetic distance as an instrument for cultural distance. We follow this suggestion and employ a measure of source-destination weighted genetic distance from Spolaore and Wacziarg (2009) that is constructed following Nei (1972). The genetic distance variable represents the heterozygosity between two populations and is based on differences in the frequency-weighted mean values of repeats over allele pairs (Nei, 1972). The logic that underlies the use of genetic distance as an instrument for cultural differences is that just as genetic traits are transmitted from parents to children so too are cultural traits. Genetic distance has been found to correlate with linguistic distance and differences, across societies, in average responses to WVS questions (Spolaore and Wacziarg, 2009, and Desmet *et al*., 2011). Thus, to the extent that genetic distance is representative of divergence in intergenerationally-transmitted characteristics, which include cultural norms and values, greater genetic distance between populations also reflects cultural distance.

Our second instrument, the difference in the complexity of the source and destination countries' economies, is constructed as the difference in the ubiquity and diversity of production in destination countries relative to source countries (Hausmann *et al*., 2013). Production ubiquity is indicated by the number of countries that make a product, and production diversity is represented by the breadth of products made in a given country. It follows that the knowledge a society possesses is reflected by the ubiquity and diversity of its production. Generally speaking, higher levels of economic complexity correspond with higher levels of income per capita and of external trade. Higher income per capita and greater trade flows may afford greater opportunities to members of such societies, relative to residents of less complex economies, to gain exposure to other societies either directly through travel/tourism, for example, or indirectly through greater media access or via the consumption of products that embody foreign cultures (e.g., TV, music, books/magazines, or film). This implies that societies characterised by greater economic complexity may typically be less culturally distant as compared to residents of less complex economies. If so, greater cross-societal differences in economic complexity would correspond with greater source-destination cultural differences.

The third instrument variable that we employ is a measure of differences in the degree to which source and destination countries are politically globalised. Measured by the total number of embassies in a country, the country's memberships in international organisations and participation in UN Security Council missions,

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and the number of international treaties to which it belongs, political globalisation may translate to increased exposure to, and greater understanding of, foreign cultures (Dreher *et al.*, 2008; Dreher, 2006). Thus, greater differences in political globalisation across countries may correspond with cross-societal differences in the extent to which individuals are exposed to (or are open to differences in) other cultures. If so, then greater differences in the degree to which the source and destination countries in our data set are politically globalised may correlate with greater cross-societal cultural differences.

Table 4. Instrument variable estimations

| Instrument variable: | Genetic distance (a) | Econ. complexity (b) | Pol. globalisation (c) |
|---|---|---|---|
| *Neg. Bin.* | | | |
| Instrument for ln Cultural distance$_{ijt}$ | –6.1527*** | –2.2108*** | –5.026*** |
| | (1.4587) | (0.6457) | (0.8647) |
| ln Immigrants$_{ijt-5}$ | 0.3880*** | 0.3626*** | 0.3882*** |
| | (0.0165) | (0.0168) | (0.0168) |
| ln Population$_{it}$ (destination) | 0.2540 | 1.1581 | –0.0712 |
| | (0.7355) | (0.8519) | (0.7371) |
| ln Population$_{jt}$ (source) | 2.6227*** | 2.3874*** | 2.4046*** |
| | (0.3897) | (0.4087) | (0.3791) |
| ln Relative GDP per capita$_{ijt}$ | 1.0723*** | 1.1069*** | 1.2768*** |
| | (0.2279) | (0.2140) | (0.1956) |
| ln Geodesic distance$_{ij}$ | 0.3291* | –0.2522*** | –0.0873 |
| | (0.1867) | (0.0789) | (0.0965) |
| Colony$_{ij}$ | 1.4126*** | 1.4673*** | 1.4591*** |
| | (0.1151) | (0.1166) | (0.1133) |
| Common language$_{ij}$ | –1.3710*** | 0.0108 | 0.9473*** |
| | (0.0165) | (0.2358) | (0.2917) |
| Constant | –40.2092*** | –49.1208*** | –30.76** |
| | (13.9311) | (15.617) | (13.648) |
| *Logit* | | | |
| Instrument for ln Cultural distance$_{ijt}$ | 0.6004 | 131.7639 | 2.0006*** |
| | (0.3782) | (111,218.3) | (0.6629) |
| ln Immigrants$_{ijt-5}$ | –0.5571*** | –8.7473 | –0.4905*** |
| | (0.0463) | (61,784.7) | (0.0674) |
| ln Population$_{it}$ (destination) | 0.1948 | –3.1828 | 0.2075 |
| | (0.1889) | (22,030.5) | (0.2769) |
| ln Population$_{jt}$ (source) | 0.0684 | –3.4569 | 0.187 |
| | (0.0972) | (16,245.9) | (0.1222) |
| ln Relative GDP per capita$_{ijt}$ | –0.312** | 23.1980 | –0.5055*** |
| | (0.1441) | (46,360.1) | (0.1885) |
| ln Geodesic distance$_{ij}$ | –0.0205 | –12.6708 | 0.0236 |
| | (0.1601) | (46,431.4) | (0.2663) |
| Colony$_{ij}$ | –18.0222 | 16.8349 | –17.569 |
| | (15,469.8) | (8.1E+07) | (18,897.3) |
| Common language$_{ij}$ | –18.3566 | 37.7342 | –15.8097 |
| | (9,738.5) | (1.5E+07) | (4,855.1) |
| Constant | –3.9665 | 29.4072 | –7.5901 |
| | (4.2711) | (421,907) | (6.2647) |
| ln Alpha | –0.7703 | –0.7313 | –0.78 |
| Alpha | 0.4629 | 0.4813 | 0.4584 |
| Vuong test (ZINB v. NB) | 15.60*** | 1.42* | 7.88*** |
| LR test of alpha = 0 (ZINB v. ZIP) | 1.7E+07*** | 2.0E+07*** | 2.1E+07*** |
| N | 1,670 | 1,378 | 1,595 |
| Immigrant stock > 0 | 1,565 | 1,376 | 1,561 |
| LR $\chi^2$ | 3,651*** | 3,125*** | 3,671*** |

Notes: See table 2. See also Section 4.3 of the text for a discussion of the instrument variables.

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As noted, we estimate equation (1) using each of the three instrument variables discussed here. Results are presented in table 4. The correlations between the instruments and the measure of cultural distance and the immigrant stock series are presented with the descriptive statistics in Section 3. We argue that the three instruments are valid and that they explain the level of the immigrant stock variable through the instrumented variable (i.e., cultural distance) since i) each instrument is significantly correlated with our measure of cultural distance, ii) they are robust/consistent in terms of statistical significance from zero and coefficient sign, and iii) it is unlikely that any of the three instrument variables would be determined by the immigrant stock variable. Even so, the difficulty in finding appropriate instrument variables for cross-societal cultural differences should be stressed and the results presented here should be considered with this in mind.

## 4.4 Robustness checks

To consider the robustness of our finding that cultural distance is negatively related to the immigrant stock variable, we have undertaken a series of alternative estimations. Coefficient estimates for the cultural distance variable are presented in table 5.[9]

We begin by considering whether our results are robust to different estimation techniques. Even as, for all estimations presented in tables 2 and 3, the test statistics indicate that the zero-inflated negative binomial technique is most appropriate, we have also estimated our baseline specification using i) the Tobit technique (while also performing the McDonald and Moffitt, 1980, coefficient decomposition), ii) Ordinary Least Squares, iii) Poisson pseudo-maximum likelihood, iv) Zero-inflated Poisson, and v) the Negative binomial techniques. Panel A of table 5 presents the coefficients. The consistency of results, in terms of statistical significance from zero and coefficient signs, supports the notion that the general relationship between cultural distance and immigrant stocks is robust to changes in the estimation technique.

To test the robustness of our results to changes in sample composition, we exclude each destination country, in turn, from the data set. The resulting coefficients on the cultural distance variable are presented in Panel B of table 5. In no instance did the exclusion of a single destination country result in a change of the coefficient on the cultural distance variable that was so large as to be outside the 95 per cent confidence interval (–0.4411, –0.2128) for the cultural distance coefficient reported in column (a) of table 2. Similarly, Panel C of table 5 reports the coefficients on the cultural distance variable when individual years are dropped, again in turn, from our data set. Here, we do see – when observations for the year 1995 or for the year 2000 are excluded from the sample – estimated coefficients that are outside the confidence interval. Even so, the estimated coefficients are, in terms of sign, statistical significance and, generally, magnitude, consistent with what is reported in column (a) of table 2.

To test the robustness of our sample further, we have estimated a final series of regressions in which each

Table 5. Robustness checks – estimated coefficients on cultural distance variable

| Panel A: Alternative estimation techniques | | Panel B: Excluding destination countries[(a)] | | | Panel C: Excluding years[(a)] | | |
|---|---|---|---|---|---|---|---|
| Technique: | Coef. | Excluded: | Neg. Bin. | Logit | Excluded: | Neg. Bin. | Logit |
| Tobit | –41,107.62*** | Australia | –0.2857*** | 0.5042 | 1980 | –0.3565*** | 0.5606* |
| | (12,987.22) | | (0.0592) | (0.3357) | | (0.0631) | (0.3080) |
| Conditional on being uncensored | –17,038.55*** | Canada | –0.3675*** | 0.5014 | 1985 | –0.3831*** | 0.4155 |
| | (5,383.03) | | (0.0627) | (0.3129) | | (0.0637) | (0.3079) |
| Probability uncensored | –0.0681*** | France | –0.3673*** | 0.5175 | 1990 | –0.3250*** | 2.0358** |
| | (0.0215) | | (0.0691) | (0.3314) | | (0.0680) | (1.0179) |
| Ordinary Least Squares | –47,546.4*** | Germany | –0.3303*** | 0.8916** | 1995 | –0.1827*** | 3.394 |
| | (17,053.87) | | (0.0730) | (0.4086) | | (0.0551) | (7.0200) |
| Poisson pseudo-maximum likelihood | –0.1052* | UK | –0.2702*** | 0.5765* | 2000 | –0.1568*** | 0.5900* |
| | (0.0551) | | (0.0653) | (0.3412) | | (0.0466) | (0.3127) |
| Zero-inflated Poisson (Neg. Bin. Coef.) | –0.1055* | US | –0.3150*** | 0.3010 | | | |
| | (0.0552) | | (0.0618) | (0.3806) | | | |
| Zero-inflated Poisson (Logit Coef.) | 0.5433* | | | | | | |
| | (0.3022) | | | | | | |
| Negative Binomial | –0.3498*** | | | | | | |
| | (0.0742) | | | | | | |

Notes: See table 2. (a) Zero-inflated Negative Binomial regression technique employed.

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source country is excluded in turn. There is no single source country for which its exclusion resulted in a change of the coefficient on the cultural distance variable that was so large as to be outside the confidence interval for the cultural distance coefficient reported in column (a) of table 2. In fact, the lowest coefficient was found when Turkey was excluded from the sample (–0.3644) and the highest coefficient was found when Luxembourg was excluded (–0.2946). Thus, we can say that our findings appear robust to i) estimation technique and that no one ii) destination country, iii) time period, or iv) source country is driving the result found when the full data set is examined.

## 5. Conclusions

Examining data for 79 immigrant source countries and six OECD member destination countries during the period from 1975–2000, we have employed the zero-inflated negative binomial technique to consider whether i) greater cultural differences (i.e., cultural distance) between a source and a destination country correspond with reduced migration and, thus, lower immigrant stocks; ii) the existence of a larger existing immigrant stock corresponds with increased migration which leads to greater subsequent immigrant stocks; iii) existing immigrant stocks may act to offset, in part or in whole, the migration-inhibiting influences of cultural distance; and iv) variation exists across immigrant skill levels in terms of the influences of cultural distance and the effects of existing immigrant stocks. Additionally, due to potential reverse causality between our dependent variable and our measure of cultural distance, we have employed instrument variable techniques, and we have also estimated a series of robustness checks.

Our findings indicate that greater source-destination cultural distance corresponds with lower immigrant stock values. Results from our instrument variable analysis and our series of robustness checks suggest that this finding is robust to changes in econometric techniques and sample composition and to endogeneity issues. We also find that, generally speaking, existing immigrant stocks exert positive influences on migration flows and, thus, on subsequent immigrant stocks. Additionally, the influence of existing immigrant stocks is more pronounced if the existing stock is from a more culturally-distant country. Thus, we find evidence consistent with the notion that existing immigrant stocks act to offset, in part or in whole, the migration-inhibiting effects of cultural distance. Considering variation in the influence of cultural distance across immigrant skill cohorts, we see that low- and medium-skill immigrants are adversely affected by source-destination cultural distance to a greater extent than are high-skill immigrants. Similar variation is found, across immigrant skill cohorts, in terms of the influences of existing immigrant stocks on migration flows and subsequent immigrant stocks.

In closing, we wish to note that the analysis presented in this paper employs country-level data to focus on the potential relationship between international migration flows and source-destination country cultural differences. A potentially more thorough analysis of the relationship between cultural differences and migration would consider migrant-specific attributes and would consider regional variation in culture and, perhaps, internal as well as international migration. While the data needed to pursue such detailed analysis are, at present, unavailable, we hope that future research will be able to examine this topic in greater detail.

## NOTES

1 Ruyssen (2013), Grogger and Hanson (2011), Bodvarsson and van den Berg (2009), and Hatton and Williamson (2002) provide surveys of the literature.

2 See Appendix A for a list of the source countries in our data set.

3 The WVS has been used in numerous studies to quantify cross-societal cultural differences. The WVS and Hofstede's (1980) cultural dimensions research are, generally, the 'industry standards' for this type of research. Considering our reference period is more recent than the period during which Hofstede collected the data that underlies his cultural dimensions (i.e., the 1970s), our analysis uses the WVS-based measure of cultural distance.

4 Unless otherwise noted, descriptive information in this section is from Inglehart and Baker (2000).

5 Examples of the WVS questions used to produce the SSE and TSR values are provided in Appendix B.

6 The 1981–4 period is considered the first wave of the WVS. Wave 2 is the period from 1990–4, wave 3 includes the years 1995–8, and wave 4 extends from 1999 to 2004.

7 The instrument variables, along with the corresponding estimation results, are discussed in detail in Section 4.3.

8 The first stage estimation equation is given as $\ln CDIST_{ijt} = \alpha_0 + \beta_{IV} IV + \beta_X X_{ijt} + v_{ijt}$, where $IV$ is the corresponding instrument variable and $X$ is the vector of exogenous variables from equation (1). The second stage estimation equation is then given as $IM_{ijt} = \alpha_0 + \beta_1 \ln \widehat{CDIST}_{ijt} + \beta_X X_{ijt} + \varepsilon_{ijt}$, where $\ln \widehat{CDIST}_{ijt}$ is the predicted series that is obtained from the first stage estimation.

9 Full estimation results are available, upon request, from the authors.

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# Appendix A: *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; Ghana; Greece; Guatemala; Hungary; Iceland; India; Indonesia; Iran; Ireland; Israel; Italy; Japan; Jordan; Korea, Rep. of; Kyrgyzstan; Latvia; Lithuania; Luxembourg; Macedonia; Malta; Mexico; Moldova; Morocco; Netherlands; New Zealand; Nigeria; Norway; Pakistan; Peru; Philippines; Poland; Portugal; Romania; Russia; Saudi Arabia; Slovakia; Slovenia; South Africa; Spain; Sweden; Switzerland; Tanzania; Turkey; Uganda; Ukraine; United Kingdom; United States; Uruguay; Venezuela; Vietnam; Zimbabwe.

# Appendix B: *Questions used to construct SSE and TSR dimensions of culture* (Held *et al*., 2009)

### *I. WVS questions used to construct the Survival vs. Self-expression Values (SSE) dimension:*

1. Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people?
2. Some people feel they have completely free choice and control over their lives, while other people feel that what they do has no real effect on what happens to them. Please use this scale where 1 means "no choice at all" and 10 means "a great deal of choice" to indicate how much freedom of choice and control you feel you have over the way your life turns out.
3. People sometimes talk about what the aims of this country should be for the next ten years. On this card are listed some of the goals which different people would give top priority. Would you please say which one of these you, yourself, consider the most important? And which would be next most important? *The list included several goals. The response/goal used to construct the SSE dimension is: "Seeing that people have more say about how things are done at their jobs and in their communities"*.
4. If you had to choose, which one of the things on this card would you say is most important? And which would be next most important? *Several things were listed on the card. The responses used to construct the SSE dimension are: "Giving people more say in important government decisions" and "Protecting freedom of speech"*.
5. Now I'd like you to look at this card. I'm going to read out some forms of political action that people can take, and I'd like you to tell me, for each one, whether you have done any of these things, whether you might do it or would never under any circumstances do it. *Several actions were listed on the card. The response/action used to construct the SSE dimension is: "Signing a petition"*.
6. Please tell me for each of the following actions whether you think it can always be justified, never be justified, or something in between, using this card. *Several actions were included on the card. The response/action used to construct the SSE dimension is: "Homosexuality"*.

### *II. WVS questions used to construct the Traditional vs. Secular-rational authority (TSR) dimension:*

1 Here is a list of qualities that children can be encouraged to learn at home. Which, if any, do you consider to be especially important? *The list included several qualities. The responses/qualities used to construct the TSR dimension are "Independence" and "Obedience"*.
2. I'm going to read out a list of various changes in our way of life that might take place in the near future. Please tell me for each one, if it were to happen, whether you think it would be a good thing, a bad thing, or don't you mind? *The list included several changes. The response/change used to construct the TSR dimension is: "Greater respect for authority"*.
3. Please tell me for each of the following actions whether you think it can always be justified, never be justified, or something in between, using this card. *Several actions were included on the card. The response/action used to construct the TSR dimension is: "Divorce"*.
4. Independently of whether you attend religious services or not, would you say you are: A religious person, not a religious person, or an atheist?
5. How proud are you to be [insert nationality]? *Respondents are prompted to indicate whether they are "Very proud", "Quite proud", "Not very proud", "Not at all proud", or to indicate "I am not [insert nationality]"*.

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