



Contents lists available at ScienceDirect

European Journal of Political Economy

journal homepage: www.elsevier.com/locate/ejpe

Want freedom, will travel: Emigrant self-selection according to institutional quality[☆]

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ARTICLE INFO

Article history:

Received 1 July 2015

Received in revised form 23 March 2016

Accepted 1 June 2016

Available online 4 June 2016

JEL classification:

O43

F22

P51

Keywords:

Emigration

Institutions

Democracy

Economic freedom,

Brain drain

ABSTRACT

We investigate emigrant self-selection according to institutional quality using up to 3566 observations on bilateral migration flows from 77 countries over the 1990–2000 period. We relate these flows to differences in political and economic institutions. We improve and expand upon previous studies by (i) examining decade-long migration flows that (ii) include flows not only to OECD countries but also to non-OECD countries, also (iii) utilizing an estimation method that takes into account the information in zero value migration flows and (iv) examining not only total migration flows but also college-educated and non-college-educated subsamples separately. We find that economic freedoms are a significant pull factor for potential migrants. Once economic freedoms are controlled for, measures of political institutions do not always enter significantly into our estimations. Results are similar for college- and non-college-educated subsamples. Improvements in legal systems and property rights appear to be the strongest pull factor for potential migrants.

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Give me your tired, your poor, Your huddled masses yearning to breathe free, [...]

Emma Lazarus, "The New Colossus," 1883

1. Introduction

Engraved within the pedestal of the Statue of Liberty in New York Harbor, Emma Lazarus' sonnet expresses both the idea that conventional economic "pull" factors (e.g., income per capita) determine migration flows into a country as also the more romantic notion that potential emigrants are "yearning to breathe free"; that they will leave their homelands in search of liberty. Economists are not known to be particularly romantic. They are more likely to express Lazarus' notion in terms of emigrant self-selection according to institutional preferences.

Only a handful of studies explore the role of self-selection according to institutional quality in determining international migration (e.g., Karemara et al., 2000; Vogler and Rotte, 2000; Melkumian, 2006; Bertocchi and Strozzi, 2008; Ariu et al., 2014; Poprawe, 2015). However, there are good reasons to think that improvements in institutional quality are an important pull factor.

[☆] We thank the participants at the Arnoldshain seminar, the economic seminar of American University of Beirut, the 2015 Public Choice Society meetings, and the 2014 Southern Economic Association meetings for their valuable comments. We thank Randy Holcombe in particular for his comments at the 2015 PCS meetings.

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Freedoms may be intrinsically valued as an input to subjective well-being, and studies have documented that they are positively associated with individuals' self-reported happiness even after controlling for income (Ovaska and Takashima, 2006; Gehring, 2013; Nikolaev, 2014; Nikolova and Graham, 2015).

In this paper, we ask whether economic and political freedoms of potential destinations relative to origins are significant determinants of migration decisions. We employ cross-country data on up to 3566 bilateral migration flows from 77 countries during the 1990–2000 period. We relate these flows to measures of institutional quality in potential destinations relative to origin countries. We use the Polity IV (Marshall and Jaggers, 2010) and checks and balances (Keefer and Stasavage, 2003) measures of political institutions, and the Fraser Institute's Economic Freedom of the World (EFW) index as a measure of economic institutions (Gwartney et al., 2014).¹

Ashby (2010) examines a cross-section of bilateral migration stocks for 58 countries and also migration flows to OECD countries between 2001 and 2006. He reports that economic freedom differentials are positively associated with bilateral migrations. Political freedom, alternatively, does not enter Ashby's regressions positively when economic freedom is controlled for.

Our results regarding economic freedom are consistent with those of Ashby (2010). Furthermore, they are based on a substantially larger sample that includes migration flows from non-OECD countries to other non-OECD countries. The larger sample allows us to report separate effects for destination-origin differentials in each of the EFW index's constituent areas. We report that migrants are attracted to destinations with sounder currencies, less burdensome regulations, and stronger property rights and legal systems. The estimated effect on the latter EFW area (property rights and legal systems) is particularly large. Unlike Ashby, however, we report that whether or not political freedoms are significant determinants of migration decisions depends critically on the specification of the destination-origin institutional gaps.

We also report results for college-educated and non-college-educated subsamples. In doing so, we ask whether differentials in institutional quality contribute importantly to “brain drain” vis-à-vis more conventional pull factors such as income differentials. Outflows of human capital can directly lead to lower productivity in an origin country; also indirectly if the economy's ability to innovate and adopt new technologies is decreased (Marchiori et al., 2013).² However, we report that greater economic freedom appears to be equally attractive to non-college-educated and college-educated migrants. Furthermore, controlling for economic freedom, the destination-origin income differential has a considerably larger estimated effect on college-educated migration.

This paper is organized as follows. In Section 2, we discuss our contribution in relation to existing literature. We discuss our empirical model and the data that we employ to estimate it in Section 3. In Section 4, we report our results and then concluding comments are the stuff of Section 5.

2. Our contribution and the existing literature

Only a handful of previous papers empirically examine emigrant self-selection according to institutional preferences. Karemara et al. (2000) and Melkumian (2006) report that measures of civil and economic freedom, respectively, in an origin country negatively predict emigration to the US. Vogler and Rotte (2000) report a similar result based on a measure of political freedom and migration from 86 Asian and African countries to Germany.³ Ariu et al. (2014) and Poprawe (2015) examine differences in the quality of governance and corruption in relation to migration flows. Finally, papers by Bang and Mitra (2011), Baudassé and Bazillier (2014), Naghsh Nejad (2013), Ferrant and Tuccio (2013), and Naghsh Nejad and Young (2015) assess the role of women's rights provisions in determining, specifically, female migration flows.

The paper closest to the present study is Ashby (2010) who examines a cross-section of bilateral migration stocks for 58 countries, and also annual migration flows to OECD countries between 2001 and 2006. He employs the Fraser Institute's Economic Freedom of the World (EFW) scores and Freedom House's political freedom scores as institutional measures. He reports that economic freedom differentials between destination and origin countries positively predict bilateral migrations. Alternatively, political freedom is not a significant correlate once either income or economic freedom differentials are controlled for.⁴

We extend and improve upon Ashby's study in a number of ways. First, we examine a cross-section of bilateral migration flows for up to 77 countries over a 10-year period (1990–2000). This is a larger sample of countries and, more importantly, examining migration flows is preferable. We would like to know how relative institutional qualities relate to migrant choices during a corresponding time period. Ashby acknowledges this and examines flows in his panel analysis. However, Ashby's panel has a less-than-ideal annual frequency. In addition to cyclical variation in migration flows, annual variation in institutional measures is likely to have a large noise component. (At least in any meaningful sense, the “rules of the game” – North, 1990, p. 3 – evolve a bit more slowly.)

Second, our data include not only migration flows to OECD countries but also OECD to non-OECD flows as well as intra-non-OECD flows. OECD countries tend to have relatively high scores on measures of both economic and political institutions. Focusing

¹ To check robustness and make the results comparable to some previous studies, we also employ the Freedom House political freedoms and civil liberties scores.

² See Docquier and Rapoport (2012) for a review of the literature on brain drain.

³ Bang and Mitra (2011) report that, for emigrants to the US, the extent of corruption in the origin (measured by the International Country Risk Group (ICRG) index) negatively predicts migration. Bertocchi and Strozzi (2008) assemble a panel of migration flows to 14 countries (today in the OECD) during 1870–1910 and present evidence that high-quality political institutions served to attract migrants.

⁴ Ashby (2007) provides a similar study based on migration flows across the contiguous US states and employing the Economic Freedom of North America (EFNA) index (Karabegovic et al., 2005).

Table 1

Summary statistics for variables included in estimations.

| Variable | Minimum | Maximum | Mean | Std. deviation | Observations |
|--------------------------------------|---------|-------------|---------|----------------|--------------|
| Total migration | 0.000 | 366,608.812 | 371.361 | 6232.187 | 3812 |
| College migration | 0.000 | 56,608.801 | 158.604 | 1461.266 | 3812 |
| Non-college migration | 0.000 | 310,000.000 | 236.665 | 5144.910 | 3812 |
| Economic freedom gap | 0.320 | 3.124 | 1.086 | 0.406 | 3812 |
| Democracy gap | 0.091 | 11.000 | 2.274 | 3.177 | 3812 |
| Checks and balances gap | 0.111 | 9.000 | 1.557 | 1.415 | 3812 |
| Income gap | 0.587 | 1.703 | 1.024 | 0.191 | 3812 |
| Log distances | 5.153 | 9.892 | 8.764 | 0.870 | 3812 |
| Colonial link | 0.000 | 1.000 | 0.027 | 0.162 | 3812 |
| Common language | 0.000 | 1.000 | 0.168 | 0.374 | 3812 |
| Common second language | 0.000 | 1.000 | 0.192 | 0.394 | 3812 |
| Contiguity | 0.000 | 1.000 | 0.032 | 0.175 | 3812 |
| Total migrant stock 1990 (in 10,000) | 0.000 | 2.653 | 0.009 | 0.065 | 3812 |
| Size of government gap | 0.267 | 5.032 | 1.155 | 0.568 | 3812 |
| Property rights gap | 0.224 | 4.465 | 1.181 | 0.743 | 3812 |
| Sound money gap | 0.093 | 10.800 | 1.345 | 1.452 | 3812 |
| Trade gap | 0.116 | 8.607 | 1.290 | 1.046 | 3812 |
| Regulation gap | 0.275 | 3.904 | 1.111 | 0.486 | 3812 |

Notes: observation numbers are based on observations of a variable that are included in any estimation. This is why the maximum number of observations associated with any estimation is 3566 but all observations in this table all 3812.

on migration flows to OECD countries put a large emphasis on relatively large institutional quality differentials. Our data allow us to explore whether Ashby's reported correlations are robust to including more variation from relatively finer cross-country differences in economic and political institutions.

Third, in addition to OLS estimates, we report Poisson pseudo-maximum likelihood (PPML) estimations as suggested by [Silva and Tenreyro \(2006\)](#). This approach has been employed by recent studies to utilize bilateral migration observations that have zero values.⁵ These zero value observations are meaningful. For example, during 1990–2000, there was zero net migration from the US to the Central African Republic. Without utilizing PPML (or some other alternative estimation method), this observation must be discarded. However, the fact that no US citizen chose to move to the DRC certainly has the potential to inform us about how people value institutional quality. Also, during 1990–2000, there was no net migration from India to Kenya. That zero value observation may tell us something about how factors *other than* relative institutional qualities affect migration decisions. In either case, getting an accurate picture of emigrant self-selection according to institutional quality involves taking that variation into account.

Fourth, in all of our estimations, we control for “multilateral resistance,” i.e., the influence of alternative destinations on migration to a particular destination ([Bertoli and Hernández-Huertas Moraga, 2012](#); [Bertoli and Fernández-Huertas Moraga, 2013](#)). When the influence of alternative destinations is ignored, the result can be to overestimate the importance of other observable characteristics ([Bertoli and Fernández-Huertas Moraga, 2013](#); [Bertoli et al., 2013](#)). For example, migration from Nicaragua to Mauritius is rare. The 1990 EFW scores of Nicaragua and Mauritius are, respectively, 2.75 and 6.06. It would likely be wrong to conclude that few individuals move from Nicaragua to Mauritius because they do not care, all else equal, about the fact that they are relatively lacking in economic freedom. Controlling for multilateral resistance amounts to specifying certain groups, or *nets*, of countries and interacting origin country and nest fixed effects in the estimations. Intuitively, we account for the fact that, all else equal, intra-Latin American migration is simply more likely to occur than migration from Latin America to Sub-Saharan Africa.⁶

Finally, we estimate the effects of economic and political freedom on, separately, college-educated and non-college-educated migration flows. Positive selection of high-skilled emigrants is well documented and questions regarding the determinants of “brain drain” are critical for developing economies. Brain drain negatively impacts an economy's ability to innovate and adopt new technologies ([Marchiori et al., 2013](#)).⁷ Selection of high-skilled migrants may be based on factors such as distance from origin, former colonial relationships, inequality in the origin, and cultural and linguistic proximity ([Docquier, 2006](#); [Brückner and Deffort, 2009](#); [Belot and Hatton, 2012](#)). Importantly, high-skilled, more educated individuals may have better information about the institutional quality of potential destinations. They also may be better able to reckon *ex ante* the value that they will place on them *ex post*.

While we study the effect of institutional quality on migration decisions, those decisions may have important effects on the likelihood of institutional change in the origins ([Docquier et al., 2014](#)). When an origin's institutions are misaligned with its

⁵ [Beine et al. \(2011\)](#), [Bertoli and Fernández-Huertas Moraga \(2013\)](#), [Ortega and Peri \(2013\)](#), and [Beine and Parsons \(2012\)](#) are some of the papers that have adopted a similar technique.

⁶ Multilateral resistance refers to the influence of alternative destinations on migration to a particular destination. In the Nicaragua–Mauritius example, we are controlling for the fact that if someone from Nicaragua is thinking of moving to Mauritius because it has more economic freedom, their choice will likely be (negatively) influenced by the fact that comparable gains in economic freedom are available by migration to alternative destinations in Latin America, e.g., Costa Rica (1990 EFW score = 6.64).

⁷ [Docquier and Rapoport \(2012\)](#) provide review of the literature on brain drain.

Table 2

Countries included in the analysis; grouped by “nests”.

| Asia | MENA | Latin America | Sub-Saharan Africa | Western Democracies | Eastern European |
|-------------|---------|--------------------|----------------------|---------------------|------------------|
| China | Algeria | Argentina | Angola | Australia | Hungary |
| Indonesia | Egypt | Bahamas | Cote d'Ivoire | Austria | Poland |
| India | Morocco | Barbados | Central African Rep. | Belgium | Romania |
| Japan | Tunisia | Belize | Ghana | Canada | Russia |
| Malaysia | Turkey | Bolivia | Kenya | Denmark | |
| Philippines | | Brazil | Mauritius | Finland | |
| Singapore | | Chile | Nigeria | France | |
| Sri Lanka | | Colombia | Zambia | Germany | |
| South Korea | | Costa Rica | Zimbabwe | Greece | |
| Thailand | | Cuba | | Iceland | |
| | | Dominican Republic | | Ireland | |
| | | Ecuador | | Italy | |
| | | El Salvador | | Netherlands | |
| | | Guatemala | | New Zealand | |
| | | Guyana | | Norway | |
| | | Haiti | | Portugal | |
| | | Honduras | | Spain | |
| | | Jamaica | | Sweden | |
| | | Jamaica | | Switzerland | |
| | | Mexico | | UK | |
| | | Nicaragua | | US | |
| | | Panama | | | |
| | | Paraguay | | | |
| | | Peru | | | |
| | | Suriname | | | |
| | | Trinidad & Tobago | | | |
| | | Uruguay | | | |
| | | Venezuela | | | |

citizens' preferences, those individuals can choose to exercise either their voice or their exit option (Hirschman, 1970, 1993). In the case of the former, individuals seek to affect institutional change in their origins. Alternatively, individuals can exit and migrate to a different country with institutions aligned more closely to their preferences. On the one hand, exiting is a substitute for institutional change in the home country. On the other hand, exiting may also put individuals in an institutional setting where they are more able to express their dissatisfaction with origin institutions and lobby for change. Docquier et al. (2014) and Lodigiani and Salomone (2012) present evidence in this vein.⁸

The above-cited studies are interesting in their own right and also raise concerns for endogeneity in our own study. To alleviate endogeneity concerns in general, we control for three types of fixed effects (origin, destination, and origin interacted with nest). In regards to reverse causation in particular, the above-cited studies suggest that migration positively affects origin institutional quality. Furthermore, other researchers have suggested that migration negatively affects destination institutional quality, especially when migration comes from lower institutional quality origins (e.g., Borjas, 2014, forthcoming; Collier, 2013).⁹ If these suggestions are accurate, then they will bias our results *against* finding that destination relative institutional quality is a positive determinant of migration.

3. Empirical model and data

We estimate gravity models of the forms,

$$\ln(Migration_{ijs}) = \beta_i + \beta_j + \beta_{i,n} + \beta_1(Institions_Gap_{ij}) + \beta_2 Z_{ij} + \varepsilon_{ij}. \quad (1)$$

$Migration_{ijs}$ is the bilateral migration flow from origin i to destination j of individuals of education level s . In the context of our data, s will correspond to all (or *total*), *college-educated*, or *non-college-educated*. β_i , β_j , and $\beta_{i,n}$ are origin, country, and origin–nest interaction fixed effects. (The “nests” will be defined below.) The error term is ε_{ij} .

⁸ Spilimbergo (2009) finds that returning emigrants who obtain education while in democratic destinations tend to promote democratic reforms in their origins. Docquier et al. (2014) indeed find that emigration is associated with increases in the political and economic freedoms available in the origin country. Relatedly, Lodigiani and Salomone (2012) report that total immigration to destinations with greater political empowerment of women is associated with greater political participation of women in the origin country.

⁹ Clark et al. (2015), alternatively, present evidence from cross-country data that migration is associated with, at best, positive impacts on destination economic freedom and, at worst, no negative impacts.

Table 3
OLS fixed effects regressions of migration flows on institutional variables.

| | (1) | (2) | (3) |
|---------------------------|----------------------|----------------------|-----------------------|
| | Total migration | College migration | Non-college migration |
| Economic freedom gap | 1.309** (0.634) | 1.791*** (0.547) | 0.368 (0.820) |
| Checks and balances gap | 0.150** (0.065) | 0.144*** (0.054) | 0.224*** (0.076) |
| Democracy gap | −0.102** (0.040) | −0.070** (0.035) | −0.185*** (0.050) |
| Income gap | 4.009 (4.190) | 2.977 (3.218) | 16.566*** (5.445) |
| Log distances | −1.212*** (0.063) | −0.938*** (0.051) | −1.137*** (0.076) |
| Colonial link | 0.974*** (0.187) | 1.096*** (0.152) | 1.362*** (0.234) |
| Common language | 0.455** (0.214) | 0.604*** (0.170) | −0.200 (0.258) |
| Common second language | 0.498** (0.205) | 0.498*** (0.161) | 1.057*** (0.248) |
| Contiguity | 0.324* (0.169) | 0.181 (0.133) | 0.815*** (0.198) |
| Total migrant stock 1990 | 0.022*** (0.004) | 0.015*** (0.003) | 0.027*** (0.004) |
| Origin fixed effects | Y | Y | Y |
| Destination fixed effects | Y | Y | Y |
| Origin*nest fixed effects | Y | Y | Y |
| Observations | 2246 | 2197 | 1926 |
| R ² | 0.840 | 0.875 | 0.804 |

Clustered standard errors are in parentheses.

* Statistical significance at the 10% level.

** Statistical significance at the 5% level.

*** Statistical significance at the 1% level.

Table 4
PPML fixed effects regressions of migration flows on institutional variables.

| | (1) | (2) | (3) |
|---------------------------|----------------------|----------------------|-----------------------|
| | Total migration | College migration | Non-college migration |
| Economic freedom gap | 7.035*** (1.413) | 8.647*** (1.723) | 7.208*** (1.613) |
| Checks and balances gap | −0.003 (0.091) | 0.011 (0.090) | 0.063 (0.117) |
| Democracy gap | 0.002 (0.080) | −0.090 (0.069) | 0.033 (0.091) |
| Income gap | 9.122 (8.138) | 28.236* (14.412) | 13.746 (8.906) |
| Log distances | −1.223*** (0.095) | −0.748*** (0.115) | −1.308*** (0.122) |
| Colonial link | 0.517** (0.240) | 0.560** (0.233) | 0.642** (0.258) |
| Common language | 0.014 (0.255) | 0.552** (0.218) | −0.642** (0.290) |
| Common second language | 1.352*** (0.198) | 0.932*** (0.197) | 1.816*** (0.261) |
| Contiguity | −0.384 (0.243) | −0.231 (0.218) | −0.097 (0.277) |
| Total migrant stock 1990 | 1.909*** (0.209) | 1.737*** (0.411) | 2.321*** (0.313) |
| Origin fixed effects | Y | Y | Y |
| Destination fixed effects | Y | Y | Y |
| Origin*nest fixed effects | Y | Y | Y |
| Observations | 3566 | 3531 | 3506 |
| R ² | 0.990 | 0.926 | 0.995 |

Clustered standard errors are in parentheses.

* Statistical significance at the 10% level.

** Statistical significance at the 5% level.

*** Statistical significance at the 1% level.

Table 5
PPML fixed effects regressions of migration flows on alternative (difference-based) institutional gap measures.

| | (1) | (2) | (3) |
|---------------------------|----------------------|-----------------------|-----------------------|
| | Total migration | College migration | Non-college migration |
| Economic freedom gap | 29.175*** (6.430) | 36.910*** (9.236) | 34.665*** (7.686) |
| Democracy gap | 1.387*** (0.266) | 1.431*** (0.434) | 1.562*** (0.311) |
| Checks and balances gap | 17.710*** (3.803) | 22.866*** (5.647) | 21.016*** (4.601) |
| Income gap | 21.964*** (7.625) | 49.485*** (16.845) | 25.801*** (9.004) |
| Log distances | -1.201*** (0.101) | -0.714*** (0.128) | -1.284*** (0.131) |
| Colonial link | 0.489** (0.239) | 0.483** (0.232) | 0.661** (0.264) |
| Common official language | -0.076 (0.266) | 0.399* (0.240) | -0.746** (0.314) |
| Common second language | 1.391*** (0.210) | 1.027*** (0.219) | 1.868*** (0.291) |
| Contiguity | -0.268 (0.258) | -0.110 (0.230) | 0.013 (0.295) |
| Total migrant stock 1990 | 1.842*** (0.236) | 1.705*** (0.491) | 2.281*** (0.344) |
| Origin fixed effects | Y | Y | Y |
| Destination fixed effects | Y | Y | Y |
| Origin*nest fixed effects | Y | Y | Y |
| Observations | 3566.000 | 3531.000 | 3506.000 |
| R ² | 0.989 | 0.922 | 0.995 |

Clustered standard errors in parentheses, The institution variables are calculated based on the differences between destination and origin. Origin, destination and origin*nest fixed effects are included.

* $p < 0.10$.

** $p < 0.05$.

*** $p < 0.01$.

A bilateral migration flow is measured as

$$Migration_{ijs} = Stock_of_Migrants_{ijs,2000} - Stock_of_Migrants_{ijs,1990}. \quad (2)$$

These observations are net flows over the 1990–2000 period. All migration data come from the data set described by [Docquier et al. \(2009\)](#). Note that we do not scale migration flows by origin population. This is standard in the literature; fixed effects capture the population effects. Recent examples include [Beine et al. \(2011\)](#), [McKenzie et al. \(2013\)](#), and [Ortega and Peri \(2013\)](#).

Migration flows are related to a vector of gaps in measured institutional quality between destinations and origins, $Institutions_Gap_{ij}$, where an element of this vector is constructed as

$$Institution_Gap_{ij} = \frac{Institution_Measure_{j,1990}}{Institution_Measure_{i,1992}}. \quad (3)$$

In defining the gap as a ratio, we follow the practice of [Ashby \(2010\)](#). Since our dependent variable enters in natural log form, defining the gap as a ratio allows for the interpretation of the coefficient estimate as an approximate elasticity. For example, if an origin and destination start from identical levels of institutional quality ($Institutions_Gap_{ij} = 1$), the estimated coefficient implies the corresponding percentage change in the migration flow that is associated with a 1% increase in destination institutional quality.¹⁰

Our institutional measures are (a) Polity IV democracy scores ([Marshall and Jaggers, 2010](#)), (b) checks and balances measures from [Keefer and Stasavage \(2003\)](#), and (c) the Fraser Institute's Economic Freedom of the World scores ([Gwartney et al., 2014](#)). The Polity IV *democracy* and *checks and balances* measures are based on dimensions of political institutional quality. *Democracy* places particular emphasis on the recruitment of and the constraints placed on the executive branch of a government. It is based on a scale of 0–10, with 10 representing the highest quality of political institutions.¹¹ *Checks and balances*, alternatively,

¹⁰ While we follow the [Ashby's \(2010\)](#) prior study in defining the institutional gap as a ratio, we recognize that there are other reasonable ways to define the gap. A straightforward alternative is to simply use the difference between destination and origin institutional measures. We also ran estimations based on this alternative definition of the institutional gap. How those results differ from those based on institutional gaps defined by (3) is discussed in [Section 4](#) below.

¹¹ We adjust the scale to 1–11 to avoid undefined values of the institutional gap (3).

Table 6
PPML fixed effects regressions of migration flows on institutional variables.

| | (1) | (2) | (3) |
|---------------------------|----------------------|-----------------------|-----------------------|
| | Total migration | College migration | Non-college migration |
| Size of government gap | 0.439 (0.341) | 0.147 (0.334) | 0.240 (0.445) |
| Property rights gap | 1.550** (0.664) | 1.592* (0.899) | 1.809** (0.786) |
| Sound money gap | 0.322** (0.126) | 0.411*** (0.142) | 0.387*** (0.135) |
| Trade gap | −0.419 (0.294) | −0.214 (0.385) | −0.211 (0.356) |
| Regulation gap | 0.997* (0.536) | 1.281** (0.539) | 0.990* (0.560) |
| Checks and balances gap | −0.029 (0.093) | −0.036 (0.086) | 0.044 (0.119) |
| Democracy gap | 0.037 (0.087) | −0.086 (0.071) | 0.074 (0.098) |
| Income gap | 16.367* (8.808) | 42.498*** (15.867) | 16.772* (9.398) |
| Log distances | −1.221*** (0.101) | −0.732*** (0.127) | −1.299*** (0.129) |
| Colonial link | 0.581** (0.254) | 0.592** (0.251) | 0.750*** (0.277) |
| Common language | −0.058 (0.262) | 0.468** (0.231) | −0.700** (0.292) |
| Common second language | 1.455*** (0.206) | 1.035*** (0.209) | 1.893*** (0.272) |
| Contiguity | 0.439 (0.341) | 0.147 (0.334) | 0.240 (0.445) |
| Total migrant stock 1990 | 1.550** (0.664) | 1.592* (0.899) | 1.809** (0.786) |
| Origin fixed effects | Y | Y | Y |
| Destination fixed effects | Y | Y | Y |
| Origin*nest fixed effects | Y | Y | Y |
| Observations | 3517 | 3491 | 3473 |
| R ² | 0.989 | 0.922 | 0.995 |

Clustered standard errors are in parentheses.

* Statistical significance at the 10% level.

** Statistical significance at the 5% level.

*** Statistical significance at the 1% level.

is based on data from the Database of Political Institutions (DPI) (Beck et al., 2010) on the number of “veto players” (i.e., decision makers whose agreement is necessary for a policy change to occur) that exist in a country's political system. A higher *checks and balances* score corresponds, like Polity IV, to greater restraint on government.¹²

Greater representation in the choice of, and subsequent restraints on, the executive (as measured by Polity IV) is an uncontroversial measure of political freedom. However, the use of the checks and balances score deserves a bit more comment. On the one hand, a greater number of veto players checks government tendencies toward authoritarian policies. On the other hand, a greater number of veto players can also be associated with political deadlock and lack of responsiveness to citizen preferences. While a higher checks and balances score may indicate political freedom from intrusive government policies, it may also represent less effective representation in government policies. We admit, then, that its interpretation as a measure of political freedom is subject to interpretation. However, including this variable in our analysis at least has the virtue of introducing a control for certain dimensions of political institutions that are not measured by the Polity IV measure. Furthermore, knowing how those other dimensions of political institutions are associated with migration flows may, in and of itself, be interesting.

The *Economic Freedom of the World* index is constructed on five equally weighted components: (i) government size, (ii) legal structure and property rights, (iii) access to sound money, (iv) the freedom to trade internationally, and (v) the regulation of markets. This measure is a comprehensive indicator of the quality of economic institutions and policies. Numerous studies have documented a positive correlation between *economic freedom* and economic growth in cross-country data (e.g., Ayal and Karras, 1998; Dawson, 1998; Gwartney et al., 1999; de Haan and Sturm, 2000; Heckelman and Stroup, 2000; Young and Sheehan,

¹² There are alternative measures of institutional quality that we could explore—for example, the World Bank's World Governance Indicators (which are employed in the studies by Ariu et al. (2014) and Poprawe (2015)). However, in this study, we are interested in the role of freedoms – economic and political; rather than the quality of governance – in determining migration decisions.

Table 7

Pairwise correlations of institutional gaps.

| | Economic freedom gap | Checks and balances gap | Democracy gap |
|-------------------------|----------------------|-------------------------|---------------|
| Economic freedom gap | 1 | | |
| Checks and balances gap | 0.4619 | 1 | |
| Democracy gap | 0.3679 | 0.6277 | 1 |

Table 8

PPML fixed effect estimation of migration flows on each institutional variable separately.

| | (1) | (2) | (3) |
|---------------------------|---------------------|---------------------|-----------------------|
| | Total migration | College migration | Non-college migration |
| Economic freedom gap | 7.077*** (1.404) | 8.886*** (1.684) | 7.185*** (1.611) |
| Observations | 3680* | 3649** | 3620 |
| R ² | 0.990 | 0.925 | 0.995 |
| Checks and balances gap | −0.049 (0.097) | −0.071 (0.083) | 0.007 (0.127) |
| Observations | 3802 | 3768 | 3742 |
| R ² | 0.989 | 0.922 | 0.995 |
| Democracy gap | −0.024 (0.085) | −0.156 (0.167) | 0.013 (0.096) |
| Observations | 3686 | 3649 | 3626 |
| R ² | 0.989 | 0.922 | 0.995 |
| Origin fixed effects | Y | Y | Y |
| Destination fixed effects | Y | Y | Y |
| Origin*nest fixed effects | Y | Y | Y |

In all the regressions, the control variables similar to those in Table 4 are included. The complete estimation tables are presented in the [Appendix A](#). Clustered standard errors are in parentheses.

* Statistical significance at the 10% level.

** Statistical significance at the 5% level.

*** Statistical significance at the 1% level.

2014).¹³ *Economic freedom* is scored, for each country, on a scale of 0–10, with 10 indicating institutions that are most conducive to individual choice, competitive markets with free entry, and security in one's private property and person.

The vector Z_{ij} in (1) contains our other group of origin–destination specific controls, and also various fixed effects (discussed below). Regarding origin–destination specific controls, we follow Mayer and Zignago (2011) and include a *contiguity* dummy to capture the effect of being geographic neighbors. We also control for the bilateral (log) *distance* between country pairs.¹⁴ We also include a *colonial link* dummy that takes the value of 1 for country pairs that have a past colonial relationship. Colonial relationships can imply similar cultures and other institutions, which may be associated with lower migration costs. Empirically, former colonizers tend to have particularly high migrant stocks from their former colonies. In a similar spirit, we include a *common language* dummy that takes a value of 1 if 20% or more of the origin and destination populations speak the same language; also a *common second language* dummy that takes the value of 1 if more than 9% but less than 20% of the populations speak the same language. Additionally, we control for the initial *total stock of migrants* from i who are in j are the start of the migration flow period. This stock is included to control for the positive effect that a pre-existing network of migrants from an origin can have on subsequent migration decisions of individuals from that origin. Lastly, we include the per capita *income gap* between a destination and an origin country as a control, defined in similar fashion to (4) above. These data are collected from the World Bank. We use 1990 values for these control variables. Table 1 contains summary statistics for all variables included in our analysis.

3.1. Estimation methods

The use of two gravity model specifications is motivated by the occurrence of zero value observations for some country pairs. We apply OLS to the gravity model (1). However, when observed migration flows are zero, the natural log cannot be taken. This decreases our observations from a maximum of 3566 to a maximum of 2246. And zero value observations can be informative. When they are discarded, the researcher is implicitly claiming that, for example, the fact that no one from Norway chose to migrate to the Democratic Republic of Congo tells us nothing about the determinants of migration decisions, generally and in regards to institutional quality in particular. We therefore also employ the Poisson pseudo-maximum likelihood method

¹³ See de Haan et al. (2006) for a comprehensive survey of the literature. The Fraser Institute's index has also been related positively to health outcomes (Stroup, 2007), political freedoms (Lawson and Clark, 2010), the extent of trust within a population (Berggren and Jordahl, 2006), labor shares (Young and Lawson, 2014), and measures of subjective well-being (Ovaska and Takashima (2006), Gehring (2013), and Nikolaev (2014). For a comprehensive review of the empirical literature utilizing the Fraser Institute's EFW index as a control variable see Hall and Lawson (2013).

¹⁴ We use the geodesic distances between major cities for this variable.

suggested by Silva and Tenreyro (2006). PPML estimates directly the nonlinear form of a gravity model, incorporating the information contained in the dependent variable observations of zero.¹⁵ Because the PPML method is the nonlinear form, the dependent migration flow variable is not logged (unlike the case of OLS). Silva and Tenreyro (2011) argue that the Poisson pseudo-maximum likelihood estimation is robust to the presence of a large number of zeroes in the data. Moreover, they argue that while the traditional gravity model is biased in the presence of heteroskedasticity and while log linearization leads to inconsistent estimates, the Poisson pseudo-maximum likelihood estimation is consistent with the assumptions of the underlying RUM model.

All of our estimations contain both origin and destination fixed effects. Additionally, we also control for the influence of *multilateral resistance*. Multilateral resistance refers to a situation where individuals from a particular origin country have migration preferences for a particular group (or *nest*) of destination countries (Bertoli and Hernández-Huertas Moraga, 2012; Bertoli and Fernández-Huertas Moraga, 2013). In the presence of multilateral resistance, the cross-section dependence can lead to biased estimates based on either OLS or PPML.

We control for multilateral resistance by following Bertoli and Hernández-Huertas Moraga (2012). They suggest including, in addition to origin and destination fixed effects, *origin–nest* fixed effects. The inclusion of these origin nest dummies satisfies the cross dependence requirement for PPML estimation. Intuitively, when we observe migration to a particular destination from a particular origin, we want to control for the fact that individuals in that origin may have, all else equal, a preference for migrating to a group of destination that includes that particular one. We define a group of six “nests”: (i) Asia, (ii) Middle East, (iii) Latin America, (iv) Sub-Saharan Africa, (v) Western Democracies, and (vi) Eastern Europe.¹⁶ The list of countries included in each of these nests is reported in Table 2. Based on these definitions, we report both OLS and PPML results when destination, origin, and origin–nest fixed effects are all included.

4. Results

Table 3 reports the OLS estimation results for (1) total migration, (2) college migration, and (3) non-college migration. *Economic freedom* differentials are a statistically significant correlate with bilateral total migration flows. However, breaking down the sample, the effect is only statistically significant for college-educated migration flows. The OLS estimated effects for political institutions are puzzling. The *checks and balances* gap is significantly and positively associated with total, college, and non-college migration flows. Alternatively, the *democracy* gap is negatively associated with all of those migration flow samples.¹⁷

Table 4 reports PPML results for the total, college, and non-college samples. (Recall that with PPML estimation the dependent variable is not logged.) Taking into account zero value migration observations makes a substantial difference. (And these observations constitute a substantial number of observations: column 1 of Table 3 is based on 2246 observations while the analog for Table 4 is 3566.) *Economic freedom* now enters positively and significantly (1% level) across the board. The point estimates for total, college, and non-college samples are remarkably similar (7.035, 8.647, and 7.208, respectively). Neither political institutions gap enters significantly in any of the Table 4 estimations.

To put these estimated *economic freedom* gap effects quantitatively in perspective, note that since the gap is a ratio, the coefficient estimate is essentially an elasticity.¹⁸ Starting from identical economic freedom levels in an origin and potential destination, if the EFW score of the destination increases by 10% then, all else equal, we expect that the bilateral migration flow from that origin to that destination increases by somewhere between 70% and 80%. Using the mean bilateral migration flow (about 371) as a benchmark, that amounts to between 259 and 297 additional migrants. This is a large effect.

We also note that the per capita *income gap* appears to be more important for college migrants than their non-college counterparts. In the OLS results (Table 3), the *income gap* only enters significantly for non-college and the point estimate is much larger than that for college (16.566 versus 2.977). Once we take into account the information contained in the zero flow observations, the point estimate for college is more than twice that as for non-college (28.236 versus 13.746). This result is consistent with destination–origin income differentials being based in large part on the returns to human capital. College-educated individuals are more drawn by a given income differential because by migrating they are more likely to experience an increase in their own income that is commensurate with (or greater than) that differential.¹⁹

Other control variables seem to have coefficients in line with the previous literature. Log distance is negative a significant in all three columns of Table 3. When the distance between countries is larger, we expect that, all else equal, the cost of migration is higher. The magnitude of these effects is the largest for non-college-educated individuals. This is in line with the expectation, as the returns are higher for the high-skilled migrants, they are, all else equal, more willing to bear higher costs associated

¹⁵ Moreover, Silva and Tenreyro (2006) argue that the log linearization of the traditional gravity model is likely to introduce heteroscedasticity and lead to bias estimates. PPML estimation of Eq. (1) is more consistent with the assumptions of the underlying random utility maximization model (Borjas, 1987) and less likely to introduce heteroscedasticity and bias.

¹⁶ In principle, it would be desirable to employ a finer definition of nests. However, a basic issue with the Bertoli and Hernández-Huertas Moraga (2012) approach is the degrees of freedom that one loses by employing such a large number of dummy variables (up to 472, to be exact).

¹⁷ The point estimates on both political institutions gaps are an order of magnitude smaller than those associated with the *economic freedom* gap. However, the sample standard deviations for the political institutions gaps are an order of magnitude larger than that of the *economic freedom* gap. (See Table 1.)

¹⁸ Even though PPML estimation does not use the log of the migration flow as the dependent variable (so that observations with value of zero can be utilized), the coefficients can be interpreted similarly to those of the OLS estimation because PPML is based on the nonlinear form of the gravity model.

¹⁹ Income gaps and economic freedom gaps are correlated with one another. (The simple correlation between the two variables in our sample is 0.3938.) This creates a collinearity concern in our estimations. However, while this might inflate the standard error on the income gap estimate, it is unclear as to why this would be a particular problem in the non-college migration estimations relative to the college migration estimations.

with long-distance moves. The colonial link variable enters positively and significantly as expected. This variable captures the formal and informal cultural proximities between origin and destination countries created by their colonial links. These links have been associated with higher migration flows. For this variable, we also find that the effects are larger for non-college-educated migrants. The common language dummy and the common second language dummy positively affect migration flows. A common language lowers the costs of migration and these results are in line with what has previously been reported. A contiguity dummy variable enters positively and significantly, but only for non-college migrants. This may be due largely to seasonal migration across neighboring countries. The total migration stock in 1990, as a measure of previous network of migrants, enters positively and significantly as we would expect, with larger effects for non-college-educated migrants.

We also ran the Table 4 estimations using the difference between destination and origin institutional scores rather than their ratio. The results are reported in Table 5 and the main difference is that the *democracy* and *checks and balances* gaps now enter positively and significantly (1% level in all cases, as is also the case for the *economic freedom* gaps). Our benchmark (ratio-based) measure of institutional gaps is consistent with Ashby's (2010) previous study of economic freedom and migration, and it allows us to interpret the coefficient estimates as elasticities. However, there is no clear reason for preferring the ratio to the difference. Determining relative political freedoms factor significantly into migration decisions appears to depend critically on the specification of the institutional gaps. Alternatively, the same is not true for the *economic freedom* gap, which enters positively and significantly regardless of that choice of specification.

Table 4 suggests that for migrants of all education levels, destination–origin differentials in *economic freedom* are significant determinants of bilateral migration flows.²⁰ The EFW index has 5 constituent areas: *size of government*, legal system and *property rights*, access to *sound money*, freedom to *trade* internationally, and *regulation* of business, credit, and labor markets. Table 6 reports results for PPML estimations that are analogous to those of Table 4 except that the 5 EFW areas are included in the estimations individually. Overall, economic freedom is still significant while the political institutions gaps are not. However, we specifically see that three EFW areas enter significantly into the total, college, and non-college estimations: *property*, *sound money*, and *regulation*. Furthermore, the largest effects are associated with the legal system and property rights area, and those effects are remarkably similar across the total, college, and non-college subsamples (point estimates of 1.550, 1.592, and 1.809, respectively).

We also note that *income gap* results reported in Table 6 are consistent with those from Table 4. The point estimate for college is again much larger than that for non-college (42.498 versus 16.772). Again, this is consistent with destination–origin income differentials based largely on returns to human capital.

When employing our benchmark (ratio-based) measures of institutional gaps, political freedoms never enter the estimations significantly. One might suspect that collinearity among the *economic freedom*, *democracy*, and *checks and balances* gaps factor into this being the case. Indeed, the institutional gaps are positively correlated (Table 7; in particular, the correlation between the *democracy* and *checks and balances* gap is about 0.628). To check on this, Table 8 reports the results of estimations that include each of the three gaps individually. The main result holds: while *economic freedom* always enters positively and significantly, the political freedom gaps always enter with small and statistically insignificant coefficient estimates. As we have seen above (Table 5), this is not the case when employing the alternative (difference-based) institutional gaps. Again, determining whether or not political freedom gaps factor significantly into migration decisions depends critically on how those gaps are specified.

5. Concluding discussion

In this paper, we employ data from 77 countries during the 1990–2000 time period to explore emigrant self-selection according to institutional quality. In particular, we ask whether destination–origin differentials in measures of political and/or economic institutional quality are determinants of bilateral migration flows.

Our tentative answer is in line with Ashby's (2010) earlier study. Relative increases in economic freedom are significantly attractive to potential migrants. Although we echo Ashby's conclusion along these lines, we demonstrate that the result is robust to a larger sample of countries and examining migration flows over a substantially long (10-year; 1990–2000) period. Alternatively, we find that relative political freedoms do not always enter the estimations significantly once economic freedom is controlled for. In particular, whether or not political freedoms enter significantly depends critically on the specification of the institutional gaps between destination and origin countries.

We also ask whether the effects are different for college-educated versus non-college-educated migrants. In regards to economic freedom, it appears that the answer is no. Economic freedom differentials are associated with increased migration in regards to both relatively low- and high-skilled individuals.

While we do not find different effects across educational attainment types, we *do* find them across the different dimensions of economic freedom. In particular, environments of sound money, low regulation, and property rights secured under the rule-of-law are, all else equal, attractive to potential migrants. The estimated effect of strong property rights is particularly large.

Emma Lazarus famously wrote: "*Give me your tired, your poor, Your huddled masses yearning to breathe free[.]*" If the Statue of Liberty is selling, our results suggest that the potential migrants of the world are buying. All else equal, our results suggest that migrants look to exit their origins toward destination where they breathe more economically free.

²⁰ As a robustness check, we include two more tables in the Appendix A of this manuscript. Table A1, presents the PPML estimations analogous to Table 4 with only including non-zero observations (i.e., the same observations as the OLS estimations in Table 3). Table A2, shows the result excluding the flows to the United States.

Appendix A

Table A1

PPML fixed effects regressions of migration flows on institutional variables using only non-zero observations.

| | (1) | (2) | (3) |
|-----------------------------|----------------------|----------------------|-----------------------|
| | Total migration | College migration | Non-college migration |
| Economic freedom gap | 5.027*** (1.334) | 7.520*** (1.494) | 4.063*** (1.331) |
| Checks and balances gap | -0.014 (0.088) | 0.011 (0.090) | -0.005 (0.109) |
| Democracy gap | -0.034 (0.094) | -0.073 (0.067) | 0.157 (0.126) |
| Income gap | 7.806 (8.158) | 21.765* (12.661) | 6.385 (9.532) |
| Log distances | -1.201*** (0.103) | -0.666*** (0.103) | -1.062*** (0.113) |
| Colonial link | 0.369 (0.240) | 0.521** (0.243) | 0.975*** (0.249) |
| Common language | 0.298 (0.258) | 0.562** (0.221) | -0.774*** (0.287) |
| Common second language | 0.980*** (0.201) | 0.809*** (0.193) | 1.685*** (0.252) |
| Contiguity | -0.137 (0.235) | -0.262 (0.209) | 0.090 (0.235) |
| Total migrant stock 1990 | 2.349*** (0.314) | 1.975*** (0.430) | 2.949*** (0.419) |
| Origin fixed effects | Y | Y | Y |
| Destination fixed effects | Y | Y | Y |
| Origin * nest fixed effects | Y | Y | Y |
| Observations | 2246 | 2197 | 1926 |
| R squared | 0.992 | 0.932 | 0.997 |

Clustered standard errors are in parentheses.

* Statistical significance at the 10% level.

** Statistical significance at the 5% level.

*** Statistical significance at the 1% level.

Table A2

PPML fixed effects regressions of migration flows on institutional variables excluding flow to the US.

| | (1) | (2) | (3) |
|-----------------------------|----------------------|----------------------|-----------------------|
| | Total migration | College migration | Non-college migration |
| Economic freedom gap | 4.817*** (1.585) | 6.431*** (1.827) | 5.579*** (1.692) |
| Checks and balances gap | -0.027* (0.092) | -0.022** (0.072) | 0.000 (0.118) |
| Democracy gap | 0.029 (0.073) | -0.070 (0.057) | 0.019 (0.082) |
| Income gap | 1.197 (6.318) | 12.369 (7.898) | 7.631 (7.617) |
| Log distances | -1.109*** (0.104) | -0.746*** (0.080) | -1.107*** (0.128) |
| Colonial link | 0.927*** (0.238) | 0.874*** (0.203) | 0.902*** (0.274) |
| Common language | -0.005 (0.318) | 0.708*** (0.267) | -0.159 (0.359) |
| Common second language | 1.053*** (0.322) | 0.413 (0.268) | 1.163*** (0.369) |
| Contiguity | -0.207 (0.232) | -0.162 (0.185) | 0.074 (0.271) |
| Total migrant stock 1990 | 2.122*** (0.366) | 2.462*** (0.385) | 2.589*** (0.441) |
| Origin fixed effects | Y | Y | Y |
| Destination fixed effects | Y | Y | Y |
| Origin * nest fixed effects | Y | Y | Y |
| Observations | 3502 | 3467 | 3442 |
| R squared | 0.807 | 0.684 | 0.874 |

Clustered standard errors are in parentheses.

* Statistical significance at the 10% level.

** Statistical significance at the 5% level.

*** Statistical significance at the 1% level.

Table A3PPML fixed effects regressions of migration flows on *economic freedom gap* variables.

| | (1) | (2) | (3) |
|---------------------------|----------------------|----------------------|-----------------------|
| | Total migration | College migration | Non-college migration |
| Economic freedom gap | 7.077*** (1.404) | 8.886*** (1.684) | 7.185*** (1.611) |
| Income gap | 8.963 (6.752) | 25.135* (14.208) | 14.304* (8.011) |
| Log distances | -1.223*** (0.095) | -0.747*** (0.113) | -1.310*** (0.122) |
| Colonial link | 0.520** (0.235) | 0.561** (0.229) | 0.668*** (0.253) |
| Common official language | 0.012 (0.253) | 0.563*** (0.218) | -0.637** (0.290) |
| Common second language | 1.353*** (0.198) | 0.941*** (0.197) | 1.817*** (0.261) |
| Contiguity | -0.387 (0.240) | -0.246 (0.214) | -0.106 (0.278) |
| Total migrant stock 1990 | 1.909*** (0.208) | 1.745*** (0.409) | 2.326*** (0.313) |
| Origin fixed effects | Y | Y | Y |
| Destination fixed effects | Y | Y | Y |
| Origin*nest fixed effects | Y | Y | Y |
| Observations | 3680 | 3649 | 3620 |
| R squared | 0.990 | 0.925 | 0.995 |

Clustered standard errors are in parentheses.

* Statistical significance at the 10% level.

** Statistical significance at the 5% level.

*** Statistical significance at the 1% level.

Table A4PPML fixed effects regressions of migration flows on *checks and balances gap* variables.

| | (1) | (2) | (3) |
|---------------------------|----------------------|-----------------------|-----------------------|
| | Total migration | College migration | Non-college migration |
| Checks and balances gap | -0.049 (0.097) | -0.071 (0.083) | 0.007 (0.127) |
| Income gap | 21.047*** (7.346) | 48.103*** (16.307) | 24.257*** (8.385) |
| Log distances | -1.208*** (0.102) | -0.722*** (0.130) | -1.291*** (0.132) |
| Colonial link | 0.524** (0.245) | 0.499** (0.237) | 0.704*** (0.270) |
| Common official language | -0.067 (0.269) | 0.417* (0.244) | -0.754** (0.317) |
| Common second language | 1.416*** (0.210) | 1.033*** (0.219) | 1.901*** (0.293) |
| Contiguity | -0.286 (0.260) | -0.139 (0.237) | 0.002 (0.295) |
| Total migrant stock 1990 | 1.840*** (0.234) | 1.719*** (0.493) | 2.269*** (0.340) |
| Origin fixed effects | Y | Y | Y |
| Destination fixed effects | Y | Y | Y |
| Origin*nest fixed effects | Y | Y | Y |
| Observations | 3802 | 3768 | 3742 |
| R squared | 0.989 | 0.922 | 0.995 |

Clustered standard errors are in parentheses.

* Statistical significance at the 10% level.

** Statistical significance at the 5% level.

*** Statistical significance at the 1% level.

Table A5

PPML fixed effects regressions of migration flows on *democracy gap* variables.

| | (1) Total migration | (2) College migration | (3) Non-college migration |
|---------------------------|------------------------|--------------------------|------------------------------|
| Democracy gap | −0.024* (0.085) | −0.156 (0.167) | 0.013 (0.096) |
| Income gap | 22.039** (8.872) | 52.011*** (15.776) | 24.140** (9.553) |
| Log distances | −1.205*** (0.102) | −0.720*** (0.128) | −1.291*** (0.132) |
| Colonial link | 0.506** (0.239) | 0.490** (0.232) | 0.701*** (0.263) |
| Common official language | −0.069 (0.265) | 0.393 (0.239) | −0.753** (0.313) |
| Common second language | 1.404*** (0.210) | 1.014*** (0.218) | 1.904*** (0.293) |
| Contiguity | −0.271 (0.259) | −0.101 (0.228) | 0.004 (0.295) |
| Total migrant stock 1990 | 1.836*** (0.235) | 1.698*** (0.492) | 2.269*** (0.341) |
| Origin fixed effects | Y | Y | Y |
| Destination fixed effects | Y | Y | Y |
| Origin*nest fixed effects | Y | Y | Y |
| Observations | 3686 | 3649 | 3626 |
| R squared | 0.989 | 0.922 | 0.995 |

Clustered standard errors are in parentheses.

* Statistical significance at the 10% level.

** Statistical significance at the 5% level.

*** Statistical significance at the 1% level.

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