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Sorting Out Confounding Factors

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The Pro-Trade Effect Of the Brain Drain: Sorting Out Confounding Factors*

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Abstract

We sort out confounding factors in the empirical link between bilateral migration and trade. Using newly available panel data on developing countries' diaspora to rich OECD nations in a theory-grounded gravity model, we uncover a robust, causal pro-trade effect. Moreover, we do not find evidence in favor of strong differences across education groups.

Keywords: International trade, gravity model, brain drain.

JEL-Codes: F22, F12

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1 Introduction

In the perfect-competition aggregate production function framework emigration triggers a static welfare loss for remaining individuals as the marginal productivity of immobile complementary factors declines. Skill-biased emigration (a brain drain) may add a dynamic loss if the source country's average human capital falls.

Docquier and Marfouk (2006) show that the *total* stock of migrants from poor Southern countries in the rich OECD has grown from about 19 million people in 1990 to 31 million in 2000. Moreover, the average rate of *high-skilled emigration* has been 6.6 percent in 1990 and 7.2 in 2000, with higher numbers for least-developed countries.

Theory papers discuss channels which may mitigate this brain drain. Besides remittances, migration prospects may increase the incentives for higher education, so that average human capital in the non-migrant population may actually rise. Moreover, a diaspora may improve access to foreign markets, thereby encouraging international trade or investment. However, Lucas (2006) concludes that "*the empirical evidence on each of these ... channels remains highly controversial. The most systematic portion of this evidence looks at the links between migration and trade, though difficulties eliminating spurious associations remain*" (p. 373).

Spurious association arises due to confounding factors that determine both, the volume of bilateral trade and the bilateral stock of migrants. For example, cultural proximity matters for bilateral trade volumes, but may also affect emigration rates. Similar considerations apply for the ease of geographical mobility. If *unobserved* components of cultural and geographical proximity positively affect migration, OLS estimates would suffer from endogeneity bias and overestimate the true effect of migration on trade.

We include the bilateral stock of migrants into a theory-grounded gravity equation. Recent data on the stock of emigrants from poor sending countries comes from Docquier and Marfouk. The data has a time dimension and distinguishes between three different educational classes. The panel nature of the data allows to account for unobserved heterogeneity by differencing out unobserved country-pair specific characteristics. Baier and Bergstrand (2007) have recently shown the advantages of this approach in a comparable gravity context. Moreover, we can

perform a regression-based test for strict exogeneity (Wooldridge, 2002).

We report three major results. First, failing to control for unobserved heterogeneity indeed leads to *overestimation*. Second, there is, nevertheless, a statistically and economically significant *causal* effect of migration on trade. Third, low- and high-skilled migrants strongly boost bilateral trade by comparable quantities while medium-skilled migration does not seem to matter.

So far, empirical gravity studies have typically focused on a single anchor country, see the survey of Wagner *et al.* (2002). Dunlevy (2006) and Bandyopadhyay *et al.* (2008) document a pro-trade effect of migration on the exports of US states. Kugler and Rapoport (2007) analyze how emigration into the US fosters capital formation; Docquier and Lodigiani (2006) extend this exercise to a cross-section of host countries. The two latter papers use the same data than ours; however, we seem to be the first to exploit the *temporal and bilateral* dimensions of the data in a theory-grounded South-North gravity model.

2 Econometric specification

We augment the theory-based gravity framework described in Feenstra (2004) with the bilateral stocks of migrants. We strive to explain the volume of trade T_{snt} between a (poor) Southern sending country, s, and a (rich) Northern receiving country, n, at time $t \in \{1990, 2000\}$. We investigate the effect of MIG^k_{snt}, the stock of foreign-born residents from s in n by education k ($k \in \{l, m, h\}$, l: low-skilled, m: medium-skilled, and h: high-skilled).

Our gravity equation is

$$\ln T_{snt} = \sum_{k \in \{l,m,h\}} \beta^k \ln MIG^k_{snt} + \gamma \mathbf{PROX'_{sn}} + \delta \mathbf{POL'_{snt}} + \nu_{st} + \nu_{nt} + \varepsilon_{snt}, \qquad (1)$$

where the vector $\mathbf{PROX_{sn}}$ collects indicators of cultural and geographical proximity, and $\mathbf{POL_{snt}}$ measures time-variant bilateral trade policy. We include a comprehensive set of country-and-time effects ν_{st} and ν_{nt} to control for all source and destination specific determinants, in particular for multilateral resistance terms.[1]

[1] Baltagi *et al.* (2003) explain the importance of country-and-time interactions in panel gravity equations.

We impose the error structure $\varepsilon_{snt} = c_{sn} + u_{snt}$, where c_{sn} is a dyad-effect and u_{snt} the usual idiosyncratic error term. In the presence of unobserved confounding factors explanatory variables will be correlated with the error term u_{snt} so that OLS is invalid. Following Baier and Bergstrand, we difference equation (1) to eliminate c_{sn}. As suggested by Wooldridge (p. 285), in a two-period framework we can test whether the differenced version of (1) satisfies the assumption of strict exogeneity $E(\Delta u_{sn}|\mathbf{\Delta X_{sn}}) = 0$, where $\mathbf{\Delta X_{sn}}$ is the vector of first differences of all explanatory variables. We include the *stocks* of foreign-born residents in the differenced version of equation (1) and perform an F-test for joint significance. Failing to reject the null would signal that differencing has indeed solved the endogeneity concern.

3 Data and empirical results

We use bilateral data on international migration by education for the years 1990 and 2000 collected by Docquier and Marfouk. The trade data has been assembled and provided by Feenstra *et al.* (2005).[2] We focus on a balanced panel of low-income Southern sending countries and high-income Northern receiving countries.[3] Our sample covers more than 92 percent of total South-North migration.

Geographical (distance, contiguity) and cultural covariates (common language, colonial ties) are taken from the CEPII data base. We include dummies for non-reciprocal preferential trade arrangements (NR_PTA_{snt}), preferential trade arrangements (PTA_{snt}), free trade agreements, and customs unions (FTA_{snt}), and the Euro-zone ($EURO_{snt}$). This data comes from Baier and Bergstrand.

Table 1 presents pooled OLS estimations of equation (1). Odd numbered columns present the most parsimonious model; even numbered columns include covariates related to cultural

[2]The dependent variable is the *geometric* average of trade flows between the two countries; see Baldwin and Taglioni (2006).

[3]A country with per capita GDP above the 80th quantile is classified North and South else. This strategy yields the same classification for 1990 and 2000, except for Greece. There is no data for countries from the former USSR, Yugoslavia, and Czechoslovakia. The obtained sample is similar to that used by Beine *et al.* (2008).
We average the bilateral trade data over the periods 1988-1990 and 1998-2000 to reduce measurement error and increase data availability. This has no importance for our results.
The Feenstra *et al.* data does not distinguish between missing and zero trade flows. Hence, we cannot empirically distinguish between the intensive and the extensive margin of trade.

proximity. Columns (1) and (2) disallow for elasticities to vary across educational classes. Columns (3) to (8) estimate the pro-trade effect of single educational groups in isolation, while columns (9) and (10) report the unconstrained version of (1).

Across all specifications, the elasticity of trade volumes with respect to distance is close to unity. While non-reciprocal trade agreements seem to matter, preferential trade arrangements and free trade agreements fail to show statistical significance. These are standard results which nicely replicate Baier and Bergstrand.

Concerning the link between migration and trade we find the following: First, there is a strong positive association between the *total* bilateral stock of migrants and bilateral trade. The effect remains when considering migrants at different educational levels, see columns (3), (5), and (7). Second, in column (9), where migration of all skill groups is accounted for, we find that the pro-trade elasticity of high-skilled workers is almost four times bigger than that of low-skilled workers. Surprisingly, conditional on the emigration of other skill classes, medium-skilled individuals seem to reduce bilateral trade volumes. Third, including controls for cultural proximity almost reduces the effects by half; compare odd and even numbered columns. Hence, ignoring cultural proximity as a common determinant of both trade and migration leads to upward biases estimates. However, the unexpected negative effect of medium-skilled migrants remains, see Column (10). While these results go beyond the literature in showing the effect of skill structure in a fairly comprehensive sample of North-South trade relations, they may still suffer from endogeneity bias.

Table 2 presents our preferred specification where confounding factors are differenced out. It also presents the outcome of a regression-based F-test on strict exogeneity. Since all p-values are above 0.1, we cannot reject strict exogeneity in all specifications at conventional levels of significance. Hence, we interpret our estimates as the *causal effect* of migration on trade.

The following results stand out. First, the positive link between migration and trade remains intact for the total stock of migrants as well as for low- and high-skilled migrants, but turns insignificant for medium-skilled migrants; see columns (1) to (4). Second, comparing even numbered columns of Table 1 (which include additional measures of cultural proximity) and results presented in Table 2, we find that OLS *always* overestimates the effect of migration on

trade, signaling the presence of endogeneity bias. However, that bias is much smaller when the OLS model includes measures of cultural proximity than when it does not. Third, column (5) shows that the partial effect of medium-skilled migrants on trade is now statistically insignificant compared to the corresponding OLS estimates in column (9)-(10) of Table 1. Here, OLS actually seems to underestimate the true effect. While the results in column (5) suggest that the skill-composition of migration does matter – since medium-skilled migrants do not appear to promote trade – we cannot formally reject the hypothesis that the pro-trade elasticity of low-skilled migrants equals the one of high-skilled.

We conclude with three remarks. First, the pro-trade effect of migration is quantitatively important. A one-percent increase of the bilateral stock of migrants raises bilateral trade by 0.11 percent (column (1), Table 2). Since the mean bilateral migrant population in our sample is 27,000 persons and the mean North-South trade volume is 665 mio dollar in year 2000, our estimate implies that one additional migrant creates about 2,700 dollar in additional trade.[4] Hence, the pro-trade effect of emigration is a powerful driver in overturning welfare losses from emigration. Second, medium-skilled migrants do not foster trade. This may have to do with the low overlap between educational classes and occupational groups: medium-skilled workers may be predominantly employed in the non-tradeable sector. Moreover, the skill-distribution of migrants is often bi-modular, with relatively little mass on medium-skilled workers. Third, there are two interesting avenues for further research. Our empirical strategy provides consistent estimates of the *average* elasticity of migration on trade (see Feenstra), leaving the analysis of potential systematic differences across country pairs to future work. Moreover, one would have to establish that a diaspora creates trade not exclusively through its effect on the preferences of the representative consumer in the receiving country, but also through lower trade costs. This would complete the case that the pro-trade effect of a diaspora can mitigate or even overturn the emigration loss.

[4] $0.11\times\ 1/27,000 \times 665$ mio dollar $\approx 2,700$ dollar.

Table 1: The pro-trade effect of migrants – pooled OLS

Dependent variable: Geometric average of bilateral trade flows										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Stock of migrants from South in North										
Total	0.220***	0.120***								
	(0.015)	(0.017)								
Low-skilled			0.173***	0.091***					0.089***	0.063**
			(0.013)	(0.014)					(0.032)	(0.032)
Medium-skilled					0.204***	0.106***			−0.176***	−0.138**
					(0.015)	(0.016)			(0.057)	(0.057)
High-skilled							0.251***	0.151***	0.336***	0.226***
							(0.016)	(0.019)	(0.044)	(0.046)
Geographical and cultural proximity										
Distance	−0.984***	−1.057***	−1.041***	−1.091***	−1.007***	−1.074***	−0.959***	−1.030***	−0.964***	−1.033***
	(0.052)	(0.054)	(0.052)	(0.053)	(0.052)	(0.053)	(0.051)	(0.054)	(0.051)	(0.054)
Contiguity		0.493		0.466		0.499		0.521		0.511
		(0.336)		(0.341)		(0.343)		(0.332)		(0.330)
Common language		0.189***		0.246***		0.209***		0.139**		0.140**
		(0.068)		(0.067)		(0.068)		(0.070)		(0.071)
Colonial ties		0.875***		0.911***		0.915***		0.834***		0.815***
		(0.092)		(0.091)		(0.091)		(0.091)		(0.091)
Trade policy										
NR_PTA	0.340***	0.417***	0.311***	0.414***	0.327***	0.416***	0.355***	0.412***	0.358***	0.416***
	(0.076)	(0.077)	(0.077)	(0.077)	(0.077)	(0.078)	(0.076)	(0.077)	(0.076)	(0.077)
PTA	0.075	0.091	0.076	0.088	0.074	0.090	0.096	0.104	0.105	0.112
	(0.095)	(0.094)	(0.096)	(0.094)	(0.095)	(0.094)	(0.094)	(0.093)	(0.094)	(0.093)
FTA	−0.002	0.049	0.015	0.057	0.002	0.053	0.019	0.062	0.032	0.071
	(0.161)	(0.150)	(0.163)	(0.150)	(0.160)	(0.149)	(0.154)	(0.147)	(0.154)	(0.147)
EURO	−0.417	−0.357	−0.372	−0.325	−0.346	−0.315	−0.415	−0.370	−0.450	−0.399
	(0.346)	(0.283)	(0.335)	(0.276)	(0.331)	(0.275)	(0.314)	(0.273)	(0.309)	(0.270)
RMSE	0.793	0.767	0.801	0.769	0.798	0.769	0.786	0.764	0.784	0.763
R^2	0.892	0.899	0.890	0.899	0.890	0.899	0.894	0.900	0.895	0.900

Notes: *NR_PTA*: non-reciprocal preferential trade arrangements, *PTA*: preferential trade arrangements, *FTA*: free trade agreements, customs unions, *EURO*: common use of the Euro. All variables in logs, except for dummies. Balanced sample of 1195 dyads. Robust standard errors in parentheses. *, **, and *** indicate significance at 10%, 5%, and 1%, respectively. All regressions include country-and-time effects, and a constant.

Table 2: The pro-trade effect of migrants – differenced model

Dependent variable: Geometric average of bilateral trade flows					
	(1)	(2)	(3)	(4)	(5)
Stock of migrants from South in North					
Total	0.112***				
	(0.043)				
Low-skilled		0.076**			0.078**
		(0.032)			(0.040)
Medium-skilled			0.042		−0.095
			(0.037)		(0.065)
High-skilled				0.098***	0.131**
				(0.036)	(0.056)
Trade policy					
NR_PTA	−0.262	−0.254	−0.253	−0.266	−0.273
	(0.303)	(0.302)	(0.301)	(0.301)	(0.303)
PTA	0.210**	0.200**	0.218**	0.215**	0.203**
	(0.099)	(0.099)	(0.100)	(0.100)	(0.100)
FTA	0.500***	0.499***	0.501***	0.500***	0.499***
	(0.134)	(0.134)	(0.134)	(0.136)	(0.136)
EURO	0.377***	0.395***	0.380***	0.363***	0.391***
	(0.106)	(0.102)	(0.110)	(0.109)	(0.102)
Regression-based F-test for strict exogeneity					
p-value	0.425	0.557	0.373	0.197	0.201
Wald test for equality of $\hat{\beta}^h$ and $\hat{\beta}^l$					
p-value					0.400
RMSE	0.615	0.615	0.616	0.614	0.613
R^2	0.559	0.558	0.557	0.559	0.562

Notes: We cannot reject strict exogeneity of migration, and equality of $\hat{\beta}^h$ and $\hat{\beta}^l$. See Table 1 for further notes.

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A Appendix

The appendix contains a detailed description of the data sources, along with a complete list of countries included, summary statistics, and results from regressions where we restrict our sample to countries which classify migrations by the foreign-born concept.

Data sources

Stock of foreign-born residents by educational level: Docquier and Marfouk (2006)
`siteresources.worldbank.org/INTRES/Resources/Dataset_BD_DocquierMarfouk.xls`
Bilateral trade flows: NBER-United Nations trade data, Feenstra et al. (2005)
`www.internationaldata.org/data/undata/undata.html`
Geographical and cultural proximity: CEPII Institute, Paris
`www.cepii.fr/anglaisgraph/bdd/distances.htm`
Trade policy dummies: Baier and Bergstrand (2007)
`web.mac.com/baier_family/iWeb/Site%202/Data.html`

Summary statistics

	1990			2000		
	Mean	Median	Std. Dev.	Mean	Median	Std. Dev.
Geometric average of trade flows*	281	33	1215	666	50	4107
Stock of migrants from S in N	16552	1084	95364	27245	1960	201778
- Low-skilled	7167	233	54149	9748	394	96125
- Medium-skilled	3729	207	25522	7638	513	72350
- High-skilled	4999	280	24555	9397	593	48470
NR_PTA	0.13	0	0.34	0.14	0	0.35
PTA	0.03	0	0.18	0.11	0	0.32
FTA	0.23	0	0.42	0.25	0	0.43
$EURO$	0	0	0	0.01	0	0.08

Trade flows in millions of dollar. NR_PTA: non-reciprocal preferential trade arrangements, PTA: preferential trade arrangements, FTA: free trade agreements, customs unions, and common markets, $EURO$: common use of the Euro.

Countries included – North

ISO	Country	ISO	Country	ISO	Country
AUS	Australia	ESP	Spain	ITA	Italy
AUT	Austria	FIN	Finland	JPN	Japan
BEL	Belgium/Luxembourg	FRA	France	NLD	Netherlands
CAN	Canada	GBR	United Kingdom	NOR	Norway
CHE	Switzerland	GRC	Greece	NZL	New Zealand
DEU	Germany	IRL	Ireland	SWE	Sweden
DNK	Denmark	ISL	Iceland	USA	United States

Countries included – South

ISO	Country	ISO	Country	ISO	Country
AFG	Afghanistan	GTM	Guatemala	OMN	Oman
AGO	Angola	GUY	Guyana	PAK	Pakistan
ALB	Albania	HND	Honduras	PAN	Panama
ARG	Argentina	HTI	Haiti	PER	Peru
BDI	Burundi	HUN	Hungary	PHL	Philippines
BEN	Benin	IDN	Indonesia	PNG	Papua New Guinea
BFA	Burkina Faso	IND	India	POL	Poland
BGD	Bangladesh	IRN	Iran	PRT	Portugal
BGR	Bulgaria	IRQ	Iraq	PRY	Paraguay
BHR	Bahrain	JAM	Jamaica	ROM	Romania
BLZ	Belize	JOR	Jordan	RWA	Rwanda
BOL	Bolivia	KEN	Kenya	SAU	Saudi Arabia
BRA	Brazil	KHM	Cambodia	SDN	Sudan
BRB	Barbados	KIR	Kiribati	SEN	Senegal
CAF	Centr. Afr. Rep.	KNA	Saint Kitts and Nevis	SLE	Sierra Leone
CHL	Chile	KOR	Korea	SLV	El Salvador
CHN	China	LAO	Laos	SOM	Somalia
CIV	Cote d'Ivoire	LBN	Lebanon	SUR	Suriname
CMR	Cameroon	LBR	Liberia	SYC	Seychelles
COG	Congo Rep. of the	LBY	Libya	SYR	Syria
COL	Colombia	LKA	Sri Lanka	TCD	Chad
COM	Comoros	MAC	China Macao SAR	TGO	Togo
CRI	Costa Rica	MAR	Morocco	THA	Thailand
CUB	Cuba	MDG	Madagascar	TTO	Trinidad and Tobago
CYP	Cyprus	MEX	Mexico	TUN	Tunisia
DJI	Djibouti	MLI	Mali	TUR	Turkey
DOM	Dominican Republic	MLT	Malta	TWN	Taiwan
DZA	Algeria	MMR	Burma (Myanmar)	TZA	Tanzania
ECU	Ecuador	MNG	Mongolia	UGA	Uganda
EGY	Egypt	MOZ	Mozambique	URY	Uruguay
ETH	Ethiopia	MRT	Mauritania	VEN	Venezuela
FJI	Fiji	MUS	Mauritius	VNM	Vietnam
GAB	Gabon	MWI	Malawi	WSM	Samoa
GHA	Ghana	MYS	Malaysia	YEM	Yemen
GIN	Guinea	NER	Niger	ZAF	South Africa
GMB	Gambia The	NGA	Nigeria	ZAR	Congo, Dem. Rep.
GNB	Guinea-Bissau	NIC	Nicaragua	ZMB	Zambia
GNQ	Equatorial Guinea	NPL	Nepal	ZWE	Zimbabwe

Results from our restricted sample

The classification of immigrants is not harmonized across OECD countries. Germany, Greece, Italy, and Japan report migrants by the concept of citizenship rather than by country of birth. Thus, the respective naturalization policies may influence our results. Our destination-and-time effects perfectly control for non-discriminatory naturalization policies. However, they do not suffice to capture discriminatory policies.

We restrict our sample to countries which employ the foreign-born concept, and repeat our empirical exercise. Tables A and B respond to Tables 1 and 2 in the paper, and present the results of the pooled OLS regressions and our differenced model, respectively. The results are qualitatively and quantitatively similar, though the negative elasticity of medium-skilled migrants remains in our preferred specification, see column (5) of Table B.

Table A: The pro-trade effect of migrants – pooled OLS (Restricted sample)

Dependent variable: Geometric average of bilateral trade flows										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Stock of migrants from South in North										
Total	0.237***	0.120***								
	(0.016)	(0.020)								
Low-skilled			0.185***	0.088***					0.086**	0.058*
			(0.014)	(0.015)					(0.036)	(0.035)
Medium-skilled					0.219***	0.103***			−0.189***	−0.157**
					(0.016)	(0.019)			(0.062)	(0.061)
High-skilled							0.275***	0.160***	0.374***	0.259***
							(0.017)	(0.023)	(0.048)	(0.052)
Geographical and cultural proximity										
Distance	−0.925***	−1.043***	−0.986***	−1.079***	−0.952***	−1.064***	−0.902***	−1.008***	−0.909***	−1.011***
	(0.057)	(0.058)	(0.057)	(0.056)	(0.057)	(0.057)	(0.056)	(0.058)	(0.056)	(0.058)
Contiguity		0.634**		0.597**		0.657**		0.716***		0.740***
		(0.264)		(0.255)		(0.256)		(0.256)		(0.273)
Common language		0.128*		0.188***		0.153**		0.073		0.070
		(0.073)		(0.070)		(0.072)		(0.074)		(0.076)
Colonial ties		0.960***		1.007***		1.014***		0.898***		0.880***
		(0.093)		(0.090)		(0.091)		(0.093)		(0.093)
Trade policy										
NR_PTA	0.425***	0.479***	0.400***	0.478***	0.410***	0.479***	0.435***	0.469***	0.446***	0.482***
	(0.081)	(0.081)	(0.082)	(0.081)	(0.083)	(0.082)	(0.081)	(0.081)	(0.080)	(0.081)
PTA	0.065	0.082	0.071	0.081	0.067	0.083	0.083	0.093	0.093	0.105
	(0.097)	(0.095)	(0.098)	(0.096)	(0.097)	(0.095)	(0.095)	(0.094)	(0.095)	(0.094)
FTA	0.052	0.053	0.063	0.055	0.063	0.057	0.086	0.075	0.096	0.084
	(0.181)	(0.164)	(0.184)	(0.165)	(0.178)	(0.162)	(0.170)	(0.160)	(0.169)	(0.158)
EURO	−0.519	−0.460	−0.439	−0.405	−0.418	−0.405	−0.514	−0.490	−0.557	−0.535
	(0.447)	(0.352)	(0.427)	(0.337)	(0.423)	(0.340)	(0.404)	(0.345)	(0.393)	(0.334)
RMSE	0.813	0.787	0.822	0.789	0.821	0.789	0.805	0.783	0.802	0.781
R^2	0.885	0.892	0.882	0.892	0.883	0.892	0.887	0.894	0.888	0.894

NR_PTA: non-reciprocal preferential trade arrangements, *PTA*: preferential trade arrangements, *FTA*: free trade agreements, customs unions, and common markets, *EURO*: common use of the Euro. All variables in logs, except for dummies. Sample restricted to countries which classify migrants by country of birth. Balanced sample of 1102 country pairs. Robust standard errors in parentheses. *, **, and *** denote significance at 10, 5, and 1 percent levels, respectively. All regressions include comprehensive sets of country-and-time effects for source and destination, and a constant (all not shown).

Table B: The pro-trade effect of migrants – differenced model (Restricted sample)

Dependent variable: Geometric average of bilateral trade flows					
	(1)	(2)	(3)	(4)	(5)
Stock of migrants from South in North					
Total	0.099**				
	(0.050)				
Low-skilled		0.070*			0.083*
		(0.037)			(0.045)
Medium-skilled			0.007		−0.124*
			(0.045)		(0.071)
High-skilled				0.099**	0.144**
				(0.047)	(0.068)
Trade policy					
NR_PTA	−0.202	−0.194	−0.198	−0.212	−0.224
	(0.307)	(0.306)	(0.306)	(0.306)	(0.308)
PTA	0.222**	0.211**	0.231**	0.226**	0.213**
	(0.101)	(0.101)	(0.102)	(0.101)	(0.101)
FTA	0.553***	0.550***	0.552***	0.551***	0.551***
	(0.145)	(0.144)	(0.145)	(0.147)	(0.147)
EURO	0.366***	0.401***	0.388***	0.338***	0.428***
	(0.113)	(0.115)	(0.117)	(0.114)	(0.128)
Regression-based F-test for strict exogeneity					
p-value	0.227	0.403	0.210	0.0781	0.108
Wald test for equality of $\hat{\beta}^h$ and $\hat{\beta}^l$					
p-value					0.430
RMSE	0.635	0.635	0.636	0.635	0.633
R^2	0.535	0.535	0.533	0.536	0.539

NR_PTA: non-reciprocal preferential trade arrangements, PTA: preferential trade arrangements, FTA: free trade agreements, customs unions, and common markets, EURO: common use of the Euro. All variables in logs, except for dummies. Sample restricted to countries which classify migrants by country of birth. Balanced sample of 1102 country pairs. Robust standard errors in parentheses. *, **, and *** denote significance at 10, 5, and 1 percent levels, respectively. All regressions include comprehensive sets of country effects for source and destination, and a constant (all not shown). In all specifications, we cannot reject strict exogeneity of the included migration variables at 5 percent level of significance; see Wooldridge (2002, p. 285) for a detailed discussion of the test, and Baier and Bergstrand (2007) for a recent application. According to the Wald test, $\hat{\beta}^h$ and $\hat{\beta}^l$ are not statistically different.

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