Reforms That Keep You at Home: The Effects of Economic Transition on Migration[1]

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Abstract

Theory asserts that individuals' migration decisions depend more on their expectations about future income levels than on their current income levels. We find that the implementation of market-oriented reforms in post-communist countries, by forming positive economic prospects, has reduced emigration as predicted by theory. Our estimates show that migration flows are highly responsive to reforms supporting private enterprises and financial services, which provide individuals with strong signals about their future prospects. We show that reforms that improve the management of infrastructure services have no link with migration patterns, which may be an important lesson for government policy.

Keywords: EBRD, transition, reform, emigration, migration, post-communist, multilateral resistance

JEL codes: F22, J61, O15

1 Introduction

Migration theories assert that a lack of economic opportunities and job prospects at home is one of the main push factors that encourages people to seek a better future elsewhere and thus contribute to higher emigration rates. Positive expectations about future economic developments, by contrast, may keep people in the country and reduce emigration. This paper studies the migration flows in post-communist countries during their transition from centrally-planned economies to open markets. Post-communist countries can be seen to provide a quasi-experimental framework for studying the impact of market-oriented reforms on emigration thanks to their diverging paths of transition to market-oriented economies (Havrylyshyn 2007). Previous studies have shown that reforms in post-communist countries significantly contributed to economic growth and job creation (see Babecky and Campos [2011] for an overview). The transition countries moved from a centrally-determined wage grid with small wage differentials to a market wage-setting process that resulted in a major increase in the rates of return to education (Fleisher et al. 2005, Münich et al. 2005). The larger skill-related differences in earnings attract more emigrants from countries with low returns to skills (Grogger and Hanson 2011). We therefore expect that the implementation of market reforms not only reduces emigration but leads to higher immigration. In this paper, we first illustrate how a given country's transition progress from a centrally-planned economy to a market economy contributed to individuals' prospective assessments of their financial situation in that country. We then test whether market-oriented reforms, by forming good economic prospects, have reduced emigration as predicted by theory.

Our emphasis on the role of individuals' expectations about future economic developments on their migration decisions is inspired by two recent papers. Czaika (2015) shows that fluctuations in migration flows to Germany during 2001-2010 correlate with data on general economic and unemployment prospects obtained from Consumer Surveys by the

2

European Commission. Using the same migration data, Bertoli, Bruckner, and Moraga (2016) show that negative expectations of future economic development in other European countries significantly influence the size of migration flows from those countries to Germany. These authors use the yields on 10-year government bonds as an indicator of macroeconomic conditions. In our research, we extend these results by asking whether market reforms in post-communist countries, as an indicator of the future attractiveness of the home country, predict the scale of emigration from these countries.

Our research therefore contributes to the literature on the determinants of international migration, emphasizing the importance of policies and institutional factors (Bertocchi and Strozzi 2008, Docquier et al. 2014, Giulietti et al. 2013, Guzi et al. 2018, Kahanec and Guzi 2017, Nguyen and Anh Tran 2020, Palmer and Pytlikova 2015). To study migration patterns in post-communist countries, we employ migration data published by Abel (2018). The availability of this global data on migration flows is crucial because a substantial share of migration from post-communist countries is to other post-communist countries.

The issue of how market-oriented reform in sending countries is associated with emigration, which is the focus of this study, has been rather under-explored to date. Poprawe (2015) and Cooray and Schneider (2016) show that high levels of corruption persuade people to move to countries with lower levels of corruption, while Bergh et al. (2015) show that low quality governance (as measured by Worldwide Governance Indicators) is also a push factor for migration. Huber and Nowotny (2020) show that migration intentions in transition countries are related to security risk assessments in sending countries. Ariu et al. (2016) find that institutional quality is more important for high-skilled migration flows than for low-skilled migration. The negative implications of skilled migration, which include lower technological development and growth performance, therefore fall disproportionally on developing countries (Di Maria and Lazarova 2012). The transformation of a country's centrally-planned economy

to a market-oriented economy provides a unique opportunity to examine the link between structural and institutional reforms and migration. Throughout our analysis, we use a set of indicators to track each country's transition progress in four broad areas of the market economy – enterprises, markets and trade, financial institutions, and infrastructure – and we evaluate the relevance of reforms in these areas to reducing emigration.

The paper is organized as follows. Section 2 presents the migration model and estimation strategy. Section 3 introduces the migration data and transition indicators. Section 4 shows the connection between the implementation of market-oriented reforms and evaluation of individuals' future financial situations. In Section 5, we present the baseline estimates and discuss the connection between the reform progress and emigration from post-communist countries. In Section 6, we introduce different approaches to deal with multilateral resistance and show that our interpretations hold. Section 7 presents a robustness analysis of our results. Section 8 sums up the main findings and highlights the potential of pro-business reforms in developing economies to reduce emigration.

2 Migration Model and Estimation Strategy

Our model relates to the standard neoclassical theory of migration, which predicts that migration decisions are responsive to economic disparities between countries (Massey et al. 1993). We assume an agent who makes an optimal decision, across multiple destinations, as to whether to migrate or to stay by comparing the expected benefits from migrating to the expected benefits of staying (Sjaastad 1962). The set of all possible destinations is given by J and the utility is assumed to be log-linear and depends on income and country-specific characteristics. Utility U_{ijt} related to migrating is given by

$$U_{ijt} = \ln(w_{jt}) + A_{jt}(\cdot) - C_{ijt}(\cdot) + \epsilon_{jt}, \tag{1}$$

where $A_{jt}(\cdot)$ denotes country j's specific characteristics at time t and $C_{ijt}(\cdot)$ gives the cost of migrating from i to j at time t. The utility includes a stochastic component ϵ_{jt}. Similarly, the utility of staying is given by:

$$U_{iit} = \ln(w_{it}) + A_{it}(\cdot) + \epsilon_{it}. \tag{2}$$

Assuming that the error term is identically and independently distributed and that it follows an extreme-value distribution, we can apply results from McFadden (1984) (see also their application in Beine and Parsons [2015]) to show that the bilateral migration rate between countries i and j is written as

$$\frac{M_{ijt}}{M_{iit}} = \frac{\exp(U_{ijt})}{\sum_k \exp(U_{ikt})}, \tag{3}$$

where M_{ijt} denotes the bilateral migration flow from country i to j. Rewriting (3) using (1) and (2) and taking logs yields an equation for bilateral migration flow:

$$ln(M_{ijt}) = ln(M_{iit}) + ln(w_{jt}) + ln(w_{it}) + A_{jt}(\cdot) - A_{it}(\cdot) - C_{ijt}(\cdot) + \epsilon_{ijt},$$

where ϵ_{ijt} is the error term. This equation establishes the pull and push factors of migration: the wage differentials, the country-specific characteristics at destination and origin and the costs of migration. In line with the literature on the determinants of migration (Beine et al. 2019, Gorinas and Pytlikova 2015, Mayda 2010) we estimate an equation similar to the gravity model:

$$\frac{M_{ijt}}{P_{it}} = \alpha + \beta_0 EBRD_{it} + \beta_1 ln(GDP_{jt}) + \beta_2 ln(GDP_{it}) + \beta_3 U_{jt} + \beta_4 U_{it} +$$

$$\beta_5 ln(S_{ijt}/P_{it}) + \beta_6 ln(dist_{ij}) + \beta_7 border_{ij} + \beta_8 lang_{ij} + \beta_9 EU_{ijt} + \beta_{10} war_{it} +$$

$$\beta_{11} ln(\frac{P_{jt}}{P_{it}}) + \beta_{12} FH_{it} + \theta_i + \theta_j + \tau_t + \varepsilon_{ijt} . \tag{4}$$

The dependent variable is the propensity to emigrate from i to j at t relative to the sending country population. M_{ijt} is the emigration rate calculated as the gross flow of migrants from

country i to country j at t and P_{it} is the population in i at the beginning of period t. The key variables of interest are the $EBRD_{it}$ indicators tracking each country's progress from a centrally-planned economy to a market economy. We hypothesize that migration decisions depend on future income levels, for which indicators of reform progress might serve as good proxies. In equation (4) we take into account the push and pull factors of migration used in the literature. Economic differences between the country of origin and destination are proxied by GDP per capita and their unemployment rates. The ethnic network, S_{ijt}/P_{it}, captured by the relative size of the migrant community born in country i and living in country j at t, can facilitate integration at the destination and lower the migration costs, thus increasing emigration (Beine et al. 2011, Bertoli and Ruyssen 2018, Huber and Mikula 2019, Pedersen et al. 2008). The relative population sizes of the receiving and sending countries (P_{jt}/P_{it}) account for demographic developments. Migration costs are approximated by the distance between the countries' capital cities measured in kilometers ($dist_{ij}$), shared spoken languages ($lang_{ij}$) and shared borders ($border_{ij}$) between the two countries. EU enlargements in 2004 and 2007 triggered migration from post-communist countries to western countries (Ortega and Peri 2013, Kahanec et al. 2016) and thus we introduce a dummy variable EU_{ijt} that identifies country pairs that are EU members in the period t. The escalation of ethnic tension has led to armed conflicts in seven post-communist countries over the studied period 1990-2010.[2] Political violence and armed conflicts trigger out-migration (Aksoy and Poutvaara 2019) and therefore we control for the severity of armed conflict in our migration model. The variable war_{it} is defined as the number of fatalities over the period per 1,000 inhabitants (for an armed conflict with more than 10 deaths per year). In parallel with their economic transformation, post-

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[2] Based on Pettersson and Öberg (2020), armed conflicts with fatalities were present in Azerbaijan (1991-1995, 1997-8, 2005, 2008), Bosnia and Herzegovina (1992-1995), Croatia (1992-1993, 1995), Georgia (1991-1993, 2004, 2008), Russia (Chechnya independence war 1994-2007), Tajikistan (1992-1998, 2000, 2010) and Uzbekistan (1999-2000, 2004).

communist countries also experienced changes in the political sphere that may potentially have influenced individuals' migration decisions. To capture the process of political liberalization in the sending country, we include two indices (FH_{it}) for political rights and civil liberties obtained from the Freedom House database.

The model also includes country of origin (θ_i) and country of destination (θ_j) fixed effects to control for country unobserved characteristics. We add period dummies τ to account for period-specific changes.

One problem with the use of global migration data is the large proportion of zeros (65 percent in our data). Silva and Tenreyro (2006) show that the Poisson pseudo-maximum likelihood (PPML) estimator consistently estimates the gravity equation and is robust to different patterns of heteroskedasticity and measurement error, which makes it preferable to OLS. We use the PPML estimator also because it performs well in the presence of a large proportion of zeros in the sample (Silva and Tenreyro 2011).

3 Data

The migration data used in this paper come from *global database of bilateral migration* flows by Abel (2018), and *EBRD transition indicators* are obtained from EBRD (2012). The description and summary statistics of all variables are presented in Table A1 in the Appendix.

3.1 Migration Flows in Post-Communist Countries

Prior to 1989, any movement of citizens across borders in the post-communist countries was severely restricted. The collapse of communism, which led to a significant increase in political and social tensions, also resulted in substantial population movement (Kaczmarczyk and Okólski 2005, Ganguli 2018). East-West migration flows were driven by economic, political and ethnic reasons. The flow of people belonging to minority ethnic groups particularly

intensified immediately after the fall of the Iron Curtain. Germany took the largest portion of these flows (approximately 1.5 million people between 1990 and 1995) originating from Poland, Romania and the former Soviet Union (OECD 2001). The flow of ethnic Germans was encouraged by legal guarantees within the German constitution, and therefore in the robustness analysis we show that our findings are robust to omitting migration flows directed to Germany from the sample.

Data on migration flows are taken from Abel (2018) for 28 post-communist countries for each five-year period between 1990 and 2010.[3] Emigration from post-communist countries surged in the years immediately following the fall of the Iron Curtain but declined again as transition progressed (see Figure 1). In total, eight million people emigrated from post-communist countries between 1990 and 1995, but this flow then dropped to less than three million between 2005 and 2010. The average annual emigration rate, calculated as the number of emigrants over the total population in post-communist countries, reached 2 percent between 1990 and 1995, before decreasing to 1.5 percent, 1 percent and 0.7 percent in the five-year periods that followed.

The nature of migration in post-communist countries exhibits some specific patterns. First, most migration occurs between post-communist countries (see Figure 1). In part this may be due to a common language, as Russian is the lingua franca in many post-communist countries. Second, migration has mostly been short-term, with a significant level of return migration (Ledesma and Piracha 2004). The substantial economic disparities between post-communist countries may thus play an important role in determining the direction of these

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[3] We include the following post-communist countries in our analysis: Albania, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Czechia, Estonia, Georgia, Hungary, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Macedonia, Moldova, Mongolia, Poland, Romania, Russia, Serbia and Montenegro, Slovakia, Slovenia, Tajikistan, Turkmenistan, Ukraine, and Uzbekistan.

migration flows.[4] Third, migration patterns during the transition period were little affected by inward immigration from outside post-communist countries. Between 1990 and 2000, less than a quarter of a million people immigrated from countries that were not in the post-communist group (see Figure 2). The number of immigrants to post-communist countries only increased during the 2005-2010 period, when the total inflow from outside post-communist countries reached 1.8 million. These immigrants mostly originated from Western Europe and Northern America.

3.2 Indicators of the Transition from Plan to Market

Post-communist countries' transformation processes from planned to market economies took different pathways in terms of the speed and sequencing of reforms. To measure the progress of their economic transition, much of the literature relies on *the EBRD transition indicators, which are available for all post-communist countries for the peri*od from 1991 to 2010 at yearly frequency (EBRD 2012). As an alternative, several studies employ the *Cumulative Liberalization Index* (available for the years 1989–1997) published by the World Bank. Babecky and Havranek (2014) confirm a high correspondence (the correlation is greater than 0.9) between the World Bank and EBRD indicators. The main advantage of the EBRD indicators is that they cover four broad areas of the market economy – enterprises, markets and trade, financial institutions, and infrastructure. Reform in enterprises indicates progress in privatization and enterprise restructuring. Reforms in markets and trade include price liberalisation and policies promoting market competition. For financial institutions, the indicators measure the development of the banking sector and the quality of financial regulation. Infrastructure reform measures progress in commercialization and the quality of the

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[4] For example, Tajikistan attained only 14 percent of the Russian Federation's GDP in the early 1990s (World Bank 2020).

regulatory framework for electricity, railways, telecommunications, and water. All indicators provide an 11-point scale from 1 to 4.33 (in increments of 1/3), with 1 representing no change from a centrally-planned economy and 4.33 representing the full implementation of market-based principles.[5]

Figure 1 Destinations of Migration Flows Originating from Post-Communist Countries
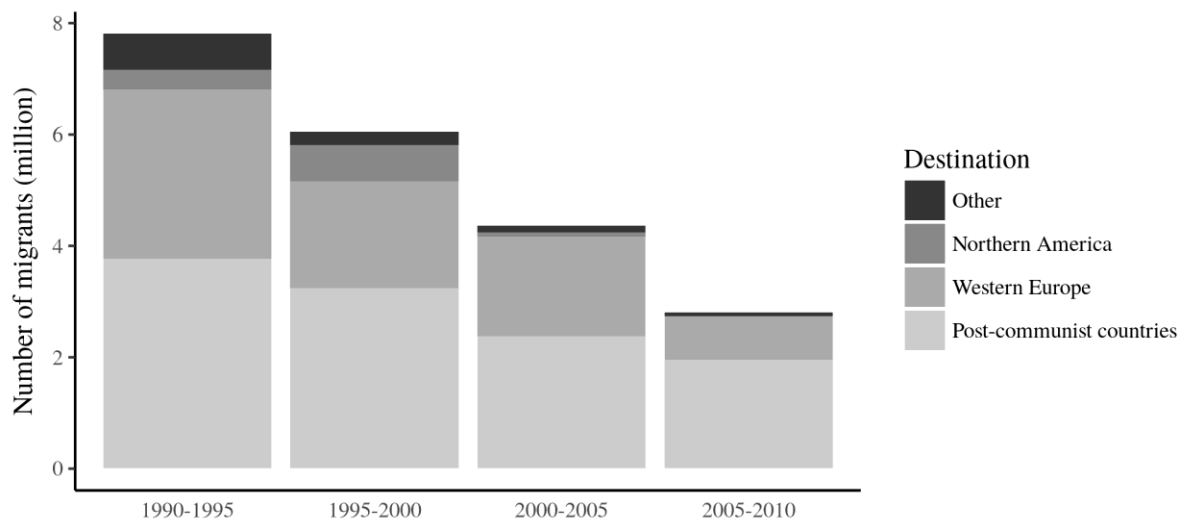
Source: Own calculations based on data by Abel (2018)

Figure 2 Origins of Migration Flows to Post-Communist Countries
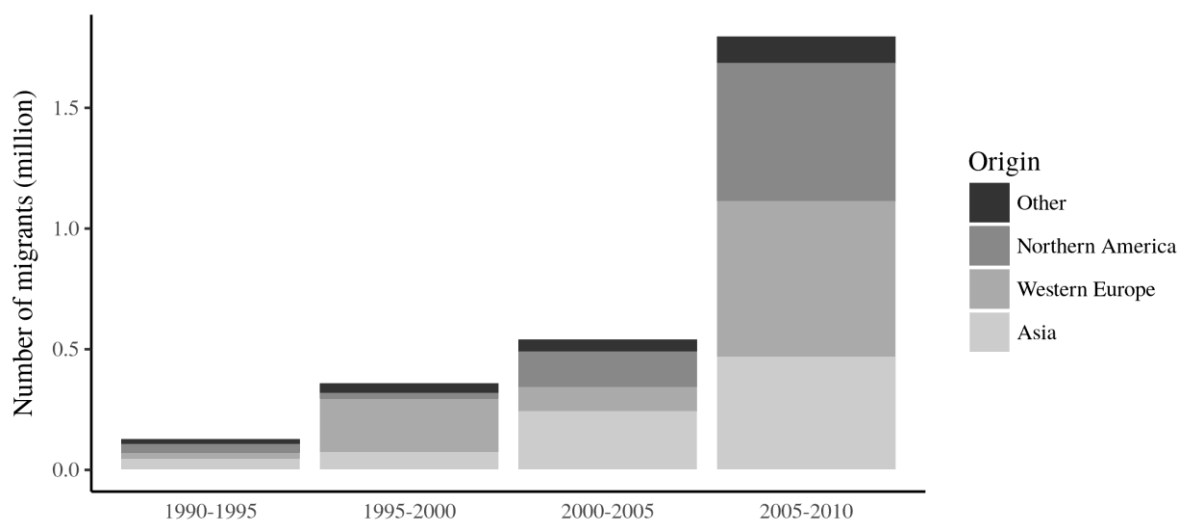
Source: Own calculations based on data by Abel (2018)

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[5] Several authors admit that an improvement from value 1 to value 2 may actually be easier than a move from value 2 to value 3. Despite this limitation, the EBRD indicators are commonly used in the literature.

Note: Figure depicts immigration flows from outside the post-communist countries into post-communist countries.

Figure 3 depicts the diversity in the post-communist countries' reform progress using the EBRD overall indicator, obtained as the unweighted average of the EBRD indicators pertinent to specific areas. The countries can be clustered into groups based on similarities in their path to economic transformation (for details see Aristei and Perugini 2015). The progress in transition was fastest and most well-balanced in the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, and Slovakia. Bulgaria, Croatia, Macedonia, Romania, and Slovenia made notable transition progress, although some reforms were postponed to later stages. The countries of the former Soviet Union (Albania, Armenia, Georgia, Kazakhstan, Kyrgyz Republic, Moldova, Mongolia, Russia, and Ukraine) implemented reforms focused on price liberalisation and privatisation but only registered weak progress in other areas. Azerbaijan, Bosnia and Herzegovina, Serbia, Montenegro, and Tajikistan implemented reforms in the later stages of their transition. Finally, Belarus, Turkmenistan, and Uzbekistan made only minimal progress towards a market economic system. The transition to a market-oriented economy was steady overall but uneven across the countries that we exploit in the analysis.

Figure 3 Reform Progress in Post-Communist Countries
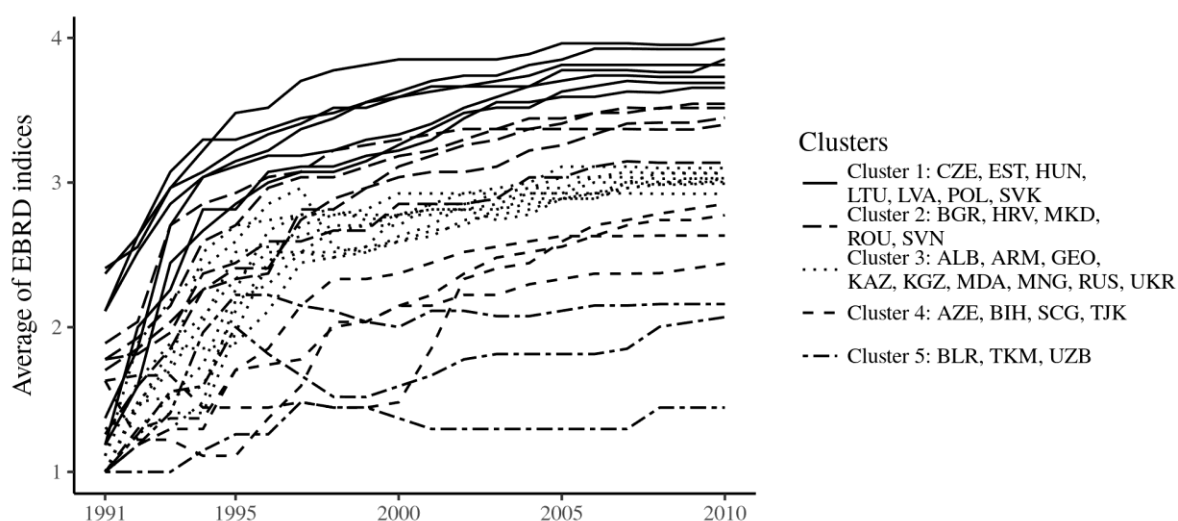
Source: EBRD (2012)
Note: The overall EBRD indicator is plotted. 28 countries are grouped into five clusters based on similarities in the timing and balance of their reforms (Aristei and Perugini 2015).

4 Assessment of Financial Situation vis-à-vis the Reform Progress in Transition Countries

Our empirical strategy hinges on the assumption that the implementation of market-oriented reforms in post-communist countries has contributed to people's expectations about their economic prospects in those countries. To test this hypothesis, we employ data from eight waves of the Central and Eastern Eurobarometer studies collected in 18 countries during the 1990-1997 period (Reif et al. 1997).[6] In each of these surveys, respondents were asked to evaluate their households' financial situations in the previous twelve months and in the following twelve months on a scale from 1 to 5.[7] To focus on the population most prone to migration, the sample consists of working-age individuals (N= 54,146). Table 1 reports our results. In the model we relate the individuals' assessments of their personal (household) financial situations in the year ahead (dependent variable) to the country's progress from a centrally-planned economy to a market economy in different areas. The specification includes controls for gender, level of education (primary or less, secondary uncompleted, secondary completed, and tertiary), age (15–29 years, 30–44 years, 45–59 years), and the retrospective assessment of their financial situation over the previous year). At the country level, we take the country's GDP and unemployment from the World Bank (2020). We include fixed effects to control for any unobserved country or year-specific effects, and errors are clustered at country level. The estimates presented in Column 1 confirm the hypothesis that reform progress (as measured by the overall EBRD indicator) is positively correlated with respondents' prospective

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[6] Surveys were organized in Albania, Armenia, Belarus, Bulgaria, Croatia, Czech Republic, Estonia, Georgia, Hungary, Kazakhstan, Latvia, Macedonia, Poland, Romania, Russia, Slovakia, Slovenia, and Ukraine.
[7] We reverse the scale so that higher values imply an improvement in financial situation. Possible answers are 1 "Get a lot worse", 2 "Get a little worse", 3 "Stay the same", 4 "Get a little better", and 5 "Get a lot better". The survey also asked respondents to assess the overall economic situation in their country, but that question was only asked in the first three waves (1990-1992) and therefore we do not use it here.

assessments of their future financial situation. Columns 2-5 show that reforms conducive to entrepreneurial activity (Column 2) and financial services (Column 4) are particularly positively correlated with individuals' expectations regarding their households' financial situations. On the other hand, reforms related to the country's infrastructure (Column 5) and markets and trade (Column 3) are not related to respondents' assessments of their financial situations. These estimates further indicate that individuals who expressed more positive views about their past financial situations are also more positive about their future situations. Interestingly, the respondents' levels of education and macroeconomic conditions tend not to be related to their evaluations of their future financial situations. A possible explanation is the small variation in the education levels between individuals. The former communist countries had a universal compulsory education system under which most of the population attained secondary education. Wages under the communist regime were centrally determined by a wage grid, and returns to education were extremely low. Fleisher et al. (2005) show that returns to education largely increased in the early phase of transition and that the speed of reforms was positively associated with the increase in the rate of return. As expected, young individuals (in the 15-29 age group) are shown to make more optimistic assessments of economic prospects relative to older cohorts.

Estimates presented in Table 1 provide tentative confirmation that the implementation of market-oriented reforms contributed to more positive evaluations of individuals' future financial situations. Next, we test whether those positive expectations induced by the reform progress led to lower rates of emigration.

13

Table 1 OLS Results for Prospective Assessment of Financial Situation

	(1)	(2)	(3)	(4)	(5)
Financial situation during the past year	0.433***	0.432***	0.432***	0.435***	0.434***
	(0.020)	(0.020)	(0.019)	(0.021)	(0.020)
GDP per capita (log)	0.040	0.023	0.084	-0.049	0.033
	(0.118)	(0.150)	(0.158)	(0.098)	(0.143)
Unemployment rate	-0.010	-0.008	-0.006	-0.008	-0.001
	(0.015)	(0.014)	(0.014)	(0.019)	(0.019)
Male	0.044***	0.044***	0.044***	0.043***	0.043***
	(0.012)	(0.013)	(0.012)	(0.012)	(0.013)
Education: Secondary uncompleted	-0.017	-0.013	-0.019	-0.022	-0.021
	(0.016)	(0.014)	(0.016)	(0.015)	(0.013)
Education: Secondary completed	-0.003	0.002	-0.003	-0.006	-0.004
	(0.022)	(0.019)	(0.021)	(0.023)	(0.020)
Education: Higher Education	0.010	0.016	0.009	0.008	0.009
	(0.023)	(0.019)	(0.022)	(0.023)	(0.020)
Age: 30–44	-0.146***	-0.145***	-0.146***	-0.145***	-0.146***
	(0.013)	(0.014)	(0.014)	(0.014)	(0.014)
Age: 45 or above	-0.237***	-0.236***	-0.238***	-0.237***	-0.238***
	(0.022)	(0.022)	(0.022)	(0.022)	(0.022)
EBRD overall indicator	0.391*				
	(0.205)				
EBRD Enterprise		0.294***			
		(0.108)			
EBRD Market			0.116		
			(0.104)		
EBRD Financial institutions				0.172**	
				(0.073)	
EBRD Infrastructure					-0.197
					(0.134)
Constant	1.833	2.050	1.633	2.822***	2.346*
	(1.116)	(1.302)	(1.572)	(0.802)	(1.199)
Countries	18	18	18	18	18
Observations	54,146	54,146	54,146	54,146	54,146
Adjusted R2	0.313	0.314	0.312	0.312	0.312

Source: Central and Eastern Eurobarometer 1990-1997

Note: Estimation was carried out using OLS with country clustered White-Huber standard errors reported in brackets. Reference categories are as follows: primary education, female, and age 15-29. All specifications include the country and year fixed effects. The dependent variable corresponds to answers to the question "And over the next 12 months, do you expect that the financial situation of your household will …?" Possible answers are 1 "Get a lot worse", 2 "Get a little worse", 3 "Stay the same", 4 "Get a little better", and 5 "Get a lot better". *p = 0.1; **p = 0.05; ***p = 0.01

5 Results

Table 2 reports our main results from estimating equation (4) using the PPML estimator. The dependent variable in all models is the emigration rate; that is, the total number of people who left the country over the given five-year period per 1,000 of the population. The explanatory variables are calculated at their mean values over each five-year period.[8] All specifications include 28 origin country dummies, 163 destination country dummies and period fixed effects that absorb country and time specific differences.[9]

The signs and significance of the variables are in line with the literature. Emigrants are significantly more likely to choose destinations with high income per capita and lower unemployment. An increase in income per capita in the country of origin significantly reduces emigration. We find that networks in the destination country attract immigrants from the same origin and that people emigrate significantly more over shorter distances and to neighbouring states. Migration is a costly and risky endeavour. The liquidity constraint may limit long-distance moves for some migrants, while migrant networks lower the moving costs and facilitate migration via family reunification programs (Beine et al. 2011). Political changes, as captured by political and civil rights indices, are not significant. One possible explanation for this is that migration decisions are primarily economically motivated and country-to-country differences in individuals' freedoms are less important. The presence of armed conflict triggers out-migration from the affected country. Sharing an official language, or having EU membership are not identified as significant drivers of emigration.

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[8] Our results remain unchanged when the values from the middle year are used instead of means.
[9] We have checked that our estimates retain the significance and change only by little when we estimate the specification with destination-origin pair fixed effects.

Table 2 Drivers of Migration Flows: Baseline Results

	(1)	(2)	(3)	(4)	(5)
GDP per capita destination	0.930***	0.967***	0.909***	0.955***	0.951***
	(0.337)	(0.336)	(0.345)	(0.327)	(0.344)
GDP per capita origin	-0.978***	-1.011***	-1.122***	-0.686**	-1.053***
	(0.319)	(0.309)	(0.308)	(0.340)	(0.313)
Unemployment rate destination	-1.414***	-1.440***	-1.405***	-1.417***	-1.401***
	(0.269)	(0.273)	(0.274)	(0.264)	(0.277)
Unemployment rate origin	-0.153	-0.141	-0.172	-0.238	-0.314
	(0.350)	(0.350)	(0.354)	(0.315)	(0.360)
Migration stock destination	0.496***	0.497***	0.497***	0.494***	0.496***
	(0.029)	(0.029)	(0.029)	(0.029)	(0.029)
Distance (log)	-0.500***	-0.502***	-0.498***	-0.499***	-0.496***
	(0.097)	(0.097)	(0.097)	(0.097)	(0.097)
Border sharing	0.308**	0.302**	0.304**	0.309**	0.301**
	(0.123)	(0.122)	(0.122)	(0.122)	(0.121)
Official language sharing	0.068	0.064	0.065	0.094	0.071
	(0.274)	(0.269)	(0.271)	(0.274)	(0.267)
EU membership	0.032	0.023	-0.012	0.102	0.025
	(0.192)	(0.197)	(0.192)	(0.185)	(0.199)
War casualties per 1,000	0.953***	0.970***	0.854***	0.990***	0.856***
	(0.183)	(0.182)	(0.177)	(0.192)	(0.185)
Population ratio (dest./origin)	0.867	0.461	0.224	0.668	-0.118
	(0.806)	(0.773)	(0.889)	(0.755)	(0.842)
Political rights origin	-0.021	-0.037	0.001	-0.042	-0.035
	(0.096)	(0.102)	(0.095)	(0.090)	(0.103)
Civil liberties origin	-0.202	-0.183	-0.186	-0.199	-0.161
	(0.126)	(0.129)	(0.134)	(0.123)	(0.136)
EBRD overall indicator	-0.907***				
	(0.269)				
EBRD Enterprises		-0.648***			
		(0.218)			
EBRD Markets and trade			-0.397*		
			(0.216)		
EBRD Financial institutions				-1.164***	
				(0.287)	
EBRD Infrastructure					-0.218
					(0.293)
Constant	1.520	2.260	2.118	2.208	3.037
	(2.143)	(2.158)	(2.232)	(2.121)	(2.203)
R2	0.8	0.8	0.8	0.81	0.8
Observations	17,577	17,577	17,577	17,577	17,577

Note: Estimation was carried out using pseudo-Poisson maximum likelihood, with country-pair clustered White-Huber standard errors reported in brackets. Dependent variable is the log emigration rate. All specifications include 28 origin country dummies, 163 destination country dummies and period fixed effects. *$p = 0.1$; **$p = 0.05$; ***$p = 0.01$

The EBRD overall indicator is negatively associated with emigration at the 0.01 significance level. To understand the link between reform and emigration, Columns 2-5 include the four EBRD sub-indices measuring reform progress in different areas. Of these four indicators, the coefficient on reforms supporting the development of financial institutions is the largest in magnitude. Reforms supporting enterprises and market and trade are also identified as significant, while infrastructure reforms are insignificant. In section 3, we noted that reform in enterprises and financial institutions contributed to individuals' assessments of their future economic prospects. Our migration model confirms that the implementation of reforms in these two areas also significantly reduces emigration. This result supports our hypothesis that positive expectations about one's future situation, induced by reform progress in the home country, diminish incentives for emigration. This finding is consistent with migration prospect theory (Czaika 2015), which asserts that short-term bilateral migration flows are driven by expectations about the future economic situations in the home and potential destination countries.

To put the effect of the reform progress shown in Table 2 into perspective, we calculate the standardized beta coefficients for selected variables in Table 3. Beta coefficients make the estimates of our reform indicators directly comparable to the estimates of other pull and push factors. The results show that one standard deviation change in the overall EBRD indicator (in Column 2) is associated with a 0.36 standard deviation change in emigration. Taking the descriptive statistics in Table A1, an increase in overall reform progress by 0.78 (one standard deviation) is thus associated with a decrease in emigration by 0.76 person per 1,000 population. Noteworthy, besides statistical significance, is the economic significance of reform progress. For example, the magnitude of overall reform progress (0.34) is similar to that of the GDP per capita in the country of origin (0.36). It is larger than the magnitude of distance (0.21) but less than a magnitude of the GDP per capita in the destination (0.58). According to the standardized

coefficients in Column 2-5, reforms supporting private companies and financial institutions exhibit the largest effect in decreasing emigration, 0.27 and 0.45, respectively. Reforms in these areas were also, as we have discussed, found to convey strong signals to individuals about their future economic prospects.

Table 3 Drivers of Migration Flows: Standardized Coefficients

	(1)	(2)	(3)	(4)	(5)
GDP per capita destination	0.575***	0.598***	0.562***	0.591***	0.589***
GDP per capita origin	-0.362***	-0.374***	-0.415***	-0.254**	-0.389***
Unemployment rate destination	-0.487***	-0.496***	-0.484***	-0.488***	-0.483***
Unemployment rate origin	-0.033	-0.031	-0.038	-0.052	-0.069
Migration stock destination	0.811***	0.811***	0.813***	0.807***	0.811***
Distance (log)	-0.209***	-0.210***	-0.208***	-0.209***	-0.207***
Border sharing	0.025**	0.024**	0.024**	0.025**	0.024**
Official language sharing	0.002	0.002	0.002	0.003	0.002
EU membership	0.002	0.002	-0.001	0.008	0.002
War casualties per 1,000	0.183***	0.186***	0.164***	0.190***	0.164***
Population ratio (dest./origin)	0.822	0.437	0.212	0.634	-0.112
Political rights origin	-0.020	-0.036	0.001	-0.040	-0.033
Civil liberties origin	-0.159	-0.144	-0.146	-0.156	-0.126
EBRD overall indicator	-0.342***				
EBRD Enterprises		-0.267***			
EBRD Markets and trade			-0.151*		
EBRD Financial institutions				-0.449***	
EBRD Infrastructure					-0.080

Note: Standardized coefficients refer to models estimated in Table 2. *p = 0.1; **p = 0.05; ***p = 0.01

6 Multilateral Resistance

Recent papers by Bertoli and Moraga (2013) and Bertoli et al. (2016) show that the presence of multilateral resistance to migration (MRM) violates the independence of the irrelevant alternatives assumption and distorts the coefficients estimated from bilateral migration flows.[10] This applies to our case because transition reforms were implemented simultaneously in all the

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[10] The term *multilateral resistance to migration* was coined by Bertoli and Moraga (2013), but the concept is commonly used in the analysis of bilateral trade flows.

post-communist countries. Bilateral migration rates depend on opportunities to migrate to other countries, and therefore our identification of the impacts of those reforms on emigration may be confounded by the influence of transition progress in other countries.

A number of alternatives have been proposed that we follow in order to address the challenge posed by MRM. First, we follow Mayda (2010) and extend the baseline regression model by including a multilateral pull (MP) effect to the model specification that captures the additional wage gain per kilometre from moving to another destination. This is calculated for all destinations as an average of per capita GDP weighted by the inverse of distance from the origin country:

$$MP_{ijt} = \frac{1}{n}\sum_c ln\frac{GDP_{ct}}{dist_{ic}}$$

where C is a set of n destinations alternative to j. The second column in Table 4 reports these estimates with the MP term included, which remain essentially unchanged compared to the baseline estimates in the first column.[11] Second, we follow Beine and Parsons (2015) and include destination-time fixed effects in the baseline model to control for multilateral resistance of the destination countries. The coefficients of the reform indicators are larger than in the baseline model (compare Columns 1 and 3) and highly significant. This is the only specification in which the estimate for the indicator measuring progress in infrastructure reforms is marginally significant at the 0.1 level. Third, following Gröschl (2012), and Czaika and Parsons (2017), we add two terms to our baseline model based on distance ($MRMD_{ijt}$) and common borders ($MRMB_{ijt}$) to account for MRM. These terms are defined as follows:

$$MRMD_{ijt} = \sum_{k=1} \theta_{kt}dist_{ik} + \sum_{m=1} \theta_{mt}dist_{mj} - \sum_{k=1}\sum_{m=1} \theta_{mt}\theta_{kt}dist_{km}$$

$$MRMB_{ijt} = \sum_{k=1} \theta_{kt}b_{ik} + \sum_{m=1} \theta_{mt}b_{mj} - \sum_{k=1}\sum_{m=1} \theta_{mt}\theta_{kt}b_{km}$$

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[11] Full results are available from the authors upon request.

where θ_{kt} is the population of the given country as a share of the world population, b_{ij} is a border dummy and $dist_{ij}$ is the bilateral distance between the origin and destination.[12]

Table 4 Drivers of Migration Flows: Dealing with Multilateral Resistance

	Baseline	Multilateral pull term	Destination-time fixed effects	Multilateral resistance to migration
	(1)	(2)	(3)	(4)
EBRD overall indicator	-0.907***	-0.916***	-1.261***	-1.061***
	(0.269)	(0.269)	(0.278)	(0.270)
EBRD Enterprises	-0.648***	-0.700***	-0.899***	-0.721***
	(0.218)	(0.224)	(0.212)	(0.218)
EBRD Markets and trade	-0.397*	-0.394*	-0.618***	-0.497***
	(0.216)	(0.217)	(0.209)	(0.214)
EBRD Financial institutions	-1.164***	-1.177***	-1.207***	-1.240***
	(0.287)	(0.279)	(0.253)	(0.275)
EBRD Infrastructure	-0.218	-0.200	-0.545*	-0.349
	(0.293)	(0.307)	(0.312)	(0.294)

Note: Each coefficient is obtained from a separate estimation. Baseline estimates from Table 2 are presented in Column 1. The alternative methods of dealing with multilateral resistance are motivated by the literature: Mayda (2010) in Column 2, Beine and Parsons (2015) in Column 3 and Gröschl (2012) in Column 4. *p = 0.1; **p = 0.05; ***p = 0.01

Column 4 confirms that our baseline results (in Column 1) are robust to controlling for multilateral resistance. Reform progress in all areas except infrastructure is identified as reducing emigration. The downward bias in the baseline model is explained by the fact that the implementation of transition reforms occurs simultaneously in countries that most migrants

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[12] There are other approaches proposed in the literature that we cannot apply to our situation. First, the Common Correlated Effects estimator developed by Pesaran (2006) is proposed by Bertoli and Moraga (2013). This approach is based on OLS estimation and therefore it is not suitable in our case because our dependent variable includes a large proportion of zeros. Second, origin-time fixed effects are included to capture the multilateral resistance (Ortega and Peri 2013, Beine et al. 2019). This method is not suitable in our case since we have the variables of interest (EBRD indicators) defined along origin-time dimensions. Third, the inclusion of origin-nest dummies based on Pesaran's (2006) Cross-section Dependence (CD) test is used to remove location specific unobserved components (Bertoli and Moraga 2015). The optimal partition of destination countries into nests is decided by CD-test so that the loss of identification power is benefited by the lower risk of incorrect specification. The CD-test does not converge, so we fail to identify the optimal origin-nest structure in our analysis.

consider close substitutes. The reform progress in their country of origin is thus correlated with the reform progress in their potential migration destinations, and if this is not controlled for, then the estimated effect of the reform indicators in the sending country also captures reduction in migration flows that is due to the increased attractiveness of the destination countries. Importantly, the interpretations obtained from the baseline model hold, and the effect of economic prospects induced by reform progress on emigration is slightly larger when the attractiveness of alternative destinations is controlled for.

7 Robustness Analyses

We perform a series of robustness tests of the baseline model specification. First, we use the approach suggested by Oster (2019) to explore whether unobserved selection might bias our point estimates.[13] Oster's values for unbiased coefficients (not shown here) are slightly higher (in absolute values) but very close to our estimates. The results indicate that any remaining omitted variables bias in our model is relatively small and our point estimates might be conservative. Second, we estimate models in Table 2 using Worldwide Governance Indicators (Kaufmann et al. 2010) instead of EBRD indicators.[14] Estimates confirm that dimensions of governance related to political stability, government effectiveness and regulatory quality are associated with lower emigration rates (see Table A2 in the Appendix). Overall findings suggest that countries with strong economic and political institutions also experience less emigration, but the evidence cannot be interpreted as causal.

Third, we show that the baseline results are robust to removing all migration flows directed to Germany. This is motivated by the fact that German law granted the possibility of obtaining citizenship to ethnic Germans residing abroad (OECD 2001). Migration moves motivated by

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[13] We use the robomit (version 1.0.5) R package to calculate bounding values for unbiased coefficients based on OLS estimates as the procedure does not work with the PPML model.

[14] As indicators are available from 1996, we use 1996 values in the first period, and average values over years 1997-2000, 2001-2005, and 2006-2010 in the following periods.

the benefits of this regulation are unrelated to the transition process and may therefore contaminate our results. Column 2 in Table 5 shows that the estimates of the EBRD indicators measuring reform progress in relation to enterprises and financial institutions are slightly smaller in comparison with the baseline results in Column 1. The reform indicators associated with markets and trade and infrastructure are insignificant.

Next, in Columns 3 and 4, we show that our baseline results are robust to dropping migration flows from and to Russia, respectively. Russia is considered the hegemon of the post-communist group and it is important to establish that our results are not driven by any single country. These robustness tests confirm the strong link between the implementation of market-oriented reforms, specifically in the areas identified above, and migration patterns.

Finally, we estimate equation (4) with the immigration rate as the dependent variable (defined as the number of immigrants as a share of the population in the sending country). The central hypothesis in this paper is that positive economic prospects lower emigration. Estimates on reform indicators in Column 5 are positive and indicate that the positive economic prospects formed by reform progress also stimulate immigration from other countries. This finding confirms that the implementation of market reforms contributes to positive economic assessments and also makes a country more attractive to immigrants.

Table 5 Drivers of Migration Flows: Robustness Checks

	Baseline	Omitting flows to Germany	Omitting flows to Russia	Omitting flows from Russia	Immigration rate
	(1)	(2)	(3)	(4)	(5)
EBRD overall indicator	-0.907***	-0.620**	-0.817***	-0.907***	0.706**
	(0.269)	(0.276)	(0.263)	(0.269)	(0.310)
EBRD Enterprises	-0.648***	-0.435*	-0.589***	-0.649***	0.532**
	(0.218)	(0.229)	(0.224)	(0.218)	(0.258)
EBRD Markets and trade	-0.397*	-0.175	-0.446**	-0.397*	0.378*
	(0.216)	(0.217)	(0.208)	(0.216)	(0.198)
EBRD Financial institutions	-1.164***	-1.007***	-1.174***	-1.164***	0.611**
	(0.287)	(0.307)	(0.338)	(0.287)	(0.309)
EBRD Infrastructure	-0.218	-0.151	-0.177	-0.218	1.028**
	(0.293)	(0.315)	(0.248)	(0.294)	(0.459)

Note: Each coefficient is obtained from a separate estimation. Baseline estimates from Table 2 are presented in Column 1. The estimation sample excludes migration flows to Germany (Column 2), to Russia (Column 3), and from Russia (Column 4). The dependent variable in Column 5 is the immigration rate. *$p = 0.1$; **$p = 0.05$; ***$p = 0.01$

8 Conclusion

This paper confirms, in line with migration theory, that positive expectations about economic development and job market prospects diminish incentives for emigration. Our research builds on the literature on transition economies, which has found that reform progress has positive effects on economic growth, job prospects and returns to education in the long-run. Using data from Eurobarometer surveys, we first show that the implementation of market-oriented reforms in post-communist countries has contributed to positive assessments of individuals' financial situations. We identify that reforms conducive to private business and financial services generate particularly high economic prospects. In the second step, we show that the positive expectations of future economic development formed by market-oriented reforms reduce people's motivation to leave their country. Our identification strategy exploits variation in the transformation processes from planned to market economies in 28 post-communist countries. We identify that reforms supporting private enterprises and the

development of financial institutions, which also provided individuals with the strongest signals about their future prospects, are associated with lower emigration. Examples of such reforms may include privatization, removal of state subsidies, and the gradual liberalisation of interest rates and supervision of the financial sector. Progress in infrastructure reforms, on the other hand, does not generate such positive signals and is not found to be linked with emigration. We confirm that our conclusions are robust to the potential bias induced by multilateral resistance to migration or by selection on unobservables. Our analysis does not necessarily establish a causal relationship, as the quality of economic and political institutions is strongly positively correlated and they continuously reinforce one another.

Our results point towards several conclusions. The migration prospects theory by Czaika (2015) asserts that temporary migration flows are more driven by future prospects whereas permanent migration is driven by absolute economic disparities. Given the temporary nature of migration in post-communist countries (Ledesma and Piracha 2004), our research confirms that these migration intentions are responsive to people's expectations of economic development. The implementation of market reforms largely increased the returns to education in transition countries (Fleisher et al. 2005). Literature shows that emigrants moving from a source with low returns to skills to a destination with high returns to skill are positively selected (Grogger and Hanson 2011, Ganguli 2018). Although migration data in post-communist countries are not available by education level, we show that the realization of economic reforms is associated with lower emigration flows and higher immigration in the aggregate levels. Migration flows on a shorter distance and between neighbouring countries are larger, which points to a liquidity constraint preventing some migration flows. With newly available migration data, researchers document the selectivity of migration flows along cultural traits (Docquier et al. 2020) and personal characteristic (Aksoy and Poutvaara 2019).

Recent research by Ariu et al. (2016) finds that migration flows of high-skilled individuals are more sensitive to differences in governance quality than flows of low-skilled migrants. Poor governance and delayed economic reforms thus create an economic burden not only by reducing the country's growth performance, but also through brain drain (Di Maria and Lazarova, 2012). According to our research, reforms that open a country's markets to private activities and improve credit accessibility reduce emigration the most. Reforms that improve the management of infrastructure services are not confirmed to be associated with migration decisions, and this may be an important lesson for government policy. The conclusions from our research suggest that pro-business reforms should be implemented in developing economies as a priority in order to reduce emigration and mitigate the negative consequences of brain drain.

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Appendix A

Table A1 Definition, Sources and Descriptive Statistics of Main Variables Used in the Analysis

Description	Variable	Source	Mean	St. Dev.	Minimum	Median	Maximum
Migration flow relative to population at origin (per 1,000)	M_{ijt}/P_{ijt}	Abel (2018), UN (2013b)	0.186	2.075	0.000	0.000	101.259
Non-zero migration flows			0.537	3.496	0.000	0.007	101.259
GDP per capita at destination (1,000 USD, log)	$\log(GDP_{jt})$	World Bank (2020)	2.029	1.284	-1.410	2.104	4.837
GDP per capita at origin (1,000 USD, log)	$\log(GDP_{it})$	World Bank (2020)	2.084	0.768	0.089	2.170	3.370
Unemployment rate at destination (%)	U_{jt}	World Bank (2020)	8.732	6.117	0.380	7.280	36.180
Unemployment rate at origin (%)	U_{it}	World Bank (2020)	11.993	6.470	3.640	10.780	34.720
Migration stock at destination relative to population at origin (per 1,000)	$\log(S_{ijt}+1/P_{it})$	UN (2013a)	-6.702	3.390	-11.908	-8.064	5.156
Physical distance (km, log)	$\log(dist_{it})$	Mayer and Zignago (2011)	8.400	0.867	4.088	8.595	9.824
Common border	$border_{ij}$	Mayer and Zignago (2011)	0.029	0.167	0.000	0.000	1.000
Same country in 1980s	$onestate_{ij}$		0.033	0.177	0.000	0.000	1.000
Common language	$lang_{ij}$	Mayer and Zignago (2011)	0.009	0.097	0.000	0.000	1.000
EU membership	EU_{ijt}		0.026	0.158	0.000	0.000	1.000
War casualties relative to population (per 1,000)	war_{it}	Pettersson and Öberg (2020)	0.065	0.398	0.000	0.000	4.034
Share of pop. in destination and origin (log)	$\log(P_{jt}/P_{it})$	UN (2013b)	0.114	1.968	-6.623	0.175	6.928
Political rights	PR_{it}	Freedom House	3.544	1.984	1.000	3.250	7.000
Civil liberties	CL_{it}	Freedom House	3.572	1.632	1.000	3.600	7.000
EBRD overall indicator	$EBRD_{it}$	EBRD (2012)	2.564	0.782	1.030	2.675	3.962
EBRD Enterprises	$EBRD_{it}$	EBRD (2012)	2,644	0,855	1,000	2,777	4,000
EBRD Markets and trade	$EBRD_{it}$	EBRD (2012)	2,975	0,788	1,089	3,179	4,087
EBRD Financial institutions	$EBRD_{it}$	EBRD (2012)	2,129	0,800	1,000	2,066	4,000
EBRD Infrastructure	$EBRD_{it}$	EBRD (2012)	1.961	0.765	1.000	1.934	3.670

Table A2 Drivers of Migration Flows and Worldwide Governance Indicators

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
GDP per capita destination	0.936*** (0.357)	0.935*** (0.344)	0.920*** (0.354)	0.930*** (0.349)	0.994*** (0.353)	0.947*** (0.348)	0.962*** (0.349)
GDP per capita origin	-1.095*** (0.293)	-1.097*** (0.301)	-1.119*** (0.292)	-1.023*** (0.294)	-1.092*** (0.291)	-1.119*** (0.302)	-1.133*** (0.301)
Unemployment rate destination	-1.402*** (0.278)	-1.406*** (0.281)	-1.412*** (0.277)	-1.393*** (0.277)	-1.387*** (0.279)	-1.417*** (0.282)	-1.417*** (0.281)
Unemployment rate origin	-0.125 (0.347)	-0.254 (0.339)	-0.200 (0.335)	-0.119 (0.349)	-0.081 (0.351)	-0.245 (0.345)	-0.190 (0.353)
Migration stock destination	0.497*** (0.030)	0.497*** (0.030)	0.497*** (0.030)	0.496*** (0.030)	0.496*** (0.029)	0.496*** (0.030)	0.497*** (0.030)
Distance (log)	-0.494*** (0.099)	-0.496*** (0.099)	-0.496*** (0.098)	-0.497*** (0.098)	-0.493*** (0.099)	-0.497*** (0.098)	-0.496*** (0.098)
Border sharing	0.309** (0.123)	0.299** (0.122)	0.304** (0.123)	0.305** (0.123)	0.308** (0.123)	0.303** (0.123)	0.307** (0.124)
Official language sharing	0.076 (0.270)	0.073 (0.267)	0.073 (0.272)	0.070 (0.269)	0.070 (0.268)	0.075 (0.267)	0.074 (0.268)
EU membership	-0.019 (0.192)	-0.010 (0.192)	-0.039 (0.195)	-0.001 (0.192)	0.025 (0.200)	0.001 (0.193)	-0.016 (0.193)
War casualties per 1,000	0.827*** (0.172)	0.847*** (0.178)	0.775*** (0.167)	0.827*** (0.176)	0.818*** (0.168)	0.838*** (0.176)	0.824*** (0.177)
Population ratio (dest./origin)	-0.264 (0.831)	-0.540 (0.858)	-0.244 (0.812)	-0.549 (0.837)	-0.180 (0.833)	-0.361 (0.877)	-0.268 (0.871)
Political rights origin	-0.037 (0.097)	-0.022 (0.100)	-0.022 (0.096)	-0.029 (0.097)	-0.064 (0.098)	-0.013 (0.100)	-0.055 (0.100)
Civil liberties origin	-0.230 (0.142)	-0.180 (0.149)	-0.202 (0.138)	-0.187 (0.140)	-0.176 (0.135)	-0.192 (0.144)	-0.170 (0.138)
WGI overall indicator	-0.628** (0.295)						
WGI Voice and Accountability		-0.086 (0.308)					
WGI Political Stability			-0.385** (0.158)				
WGI Government Effectiveness				-0.419* (0.246)			
WGI Regulatory Quality					-0.594** (0.267)		
WGI Rule of Law						-0.189 (0.244)	
WGI Control of Corruption							-0.260 (0.213)
Observations	16531	16531	16531	16531	16531	16531	16531
R2	0.8	0.8	0.8	0.8	0.81	0.8	0.8

Note: Estimation was carried out using pseudo-Poisson maximum likelihood, with country-pair clustered White-Huber standard errors reported in brackets. Dependent variable is the log emigration rate. All specifications include 28 origin country dummies, 163 destination country dummies and period fixed effects. *$p = 0.1$; **$p = 0.05$; ***$p = 0.01$