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**Working Paper**

## Stymied ambition: Does a lack of economic freedom lead to migration?

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# Wilfried-Guth- Stiftungsprofessur für Ordnungs- und Wettbewerbspolitik



## Diskussionsbeiträge / Discussion Paper Series

No. 2016-05

Stymied Ambition: Does a Lack of Economic Freedom  
Lead to Migration?

Daniel Meierrieks and Laura Renner

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# Stymied Ambition: Does a Lack of Economic Freedom Lead to Migration?

Daniel Meierrieks\* and Laura Renner†

## Abstract

This contribution investigates the relationship between economic freedom and international migration. We argue that higher levels of economic freedom in the source countries of migration may discourage migration by generating more economic security, providing more economic opportunities and stimulating overall economic activity. Using a panel dataset on migration from 91 developing and emerging to the 20 most attractive OECD destination countries for the 1980-2010 period, we find that more economic freedom at home discourages high-skilled migration but does not matter to low-skilled migration. The negative association between economic freedom and high-skilled emigration also holds when we estimate (dynamic) panel models that allow for endogeneity in the economic freedom-migration nexus. Our findings suggest that high-skilled individuals are especially responsive to the economic incentives arising from economic freedom. This is especially true for those components of economic freedom associated with the provision of economic security in the form of well-protected property rights, sound money and limited government involvement in the economic life.

*JEL Classification:* F22, J61

*Keywords:* economic freedom; international migration; low-skilled and high-skilled migration

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## 1. Introduction

A 2009 Gallup survey found that about 16 percent of the world's adult population would like to migrate to another country if they had the chance, which translates to approximately 700 million potential migrants (Esipova and Ray, 2009). These figures suggest that international migration is likely to produce far-reaching socio-economic and political consequences in both the sending and target countries of migration, potentially affecting, e.g., labor markets, demographic conditions and political stability. At the same time, these figures also raise interest in the question as to why so many individuals are eager to leave their home country.

In this contribution we analyze whether a *lack of economic freedom*<sup>1</sup> in the migrants' country of origin leads to more migration. Our main argument is that cross-country differences in economic freedom explain—in addition to other migration drivers such as economic hardship—why some countries see more out-migration than others. For instance, our argument finds support in a 2007 Gallup poll conducted in 20 Latin American countries (Rios and Crabtree, 2008). This survey finds that dire economic conditions (poverty, unemployment etc.) alone cannot explain why 24 percent of the inhabitants of the Latin American region say they would like to migrate to another country. Rather, the poll's findings suggest that a lack of economic freedom—i.e., the inability to convert, due to weak institutions, individual talent into economic success—also drives the respondents' desire to migrate:

“[S]tymied ambition is a common motivator among Latin Americans wishing to emigrate [...] Why might [the more ambitious Latin Americans] be particularly likely to want to emigrate? One factor may be the commonly held belief in the region that governments do not promote business success. Majorities of residents in 14 of the 20 countries studied say

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<sup>1</sup> Throughout this contribution, we employ the definition of economic freedom by Gwartney et al. (2014: 1):

“Economic freedom is present when individuals are permitted to choose for themselves and engage in voluntary transactions as long as they do not harm the person or property of others. [...] The cornerstones of economic freedom are (1) personal choice, (2) voluntary exchange coordinated by markets, (3) freedom to enter and compete in markets, and (4) protection of persons and their property from aggression by others.”

they do not have confidence in the stability of commercial rules and laws in their country. In 15 of the 20 countries examined, majorities say business owners in their country can't trust the government to let their businesses make a lot of money.” (Rios and Crabtree, 2008: Para 3, 6).

In this contribution we analyze whether there exists a general relationship between a lack of economic freedom and stronger out-migration, focusing on the role of economic freedom in the *source country*, i.e., its role in the individual's decision to leave or not to leave. We build on earlier research on this relationship, which suggests that—in line with our main argument—economic freedom is indeed associated with the decision to migrate. Evidence from the United States indicates that domestic migrants prefer states with higher levels of economic freedom (Ashby, 2007; Cebula and Clark, 2011; Mulholland and Hernández-Julián, 2013; Cebula et al., 2016). For the case of Albania, Papapanagos and Sanfey (2001) find that individuals with preferences for free markets are more likely to migrate. On an international scale, medical professionals tend to be attracted by higher levels of economic liberty (Yakovlev and Steinkopf, 2014). Most closely related to our study, Ashby (2010) uses cross-sectional data and finds that differences in economic freedom between destination and source countries lead to more migration; when the destination country enjoys higher levels of economic freedom, migration to it becomes more likely.<sup>2</sup>

Our analysis adds to this small body of research in the following ways. First, while previous research on the economic freedom-migration nexus has either used migration data for specific countries (most prominently, the United States) or only employed cross-sectional data for international migration, we use a rich panel data for migration from 91 developing and emerging (non-OECD) countries to the 20 most attractive (OECD) destination countries for the 1980-2010 period. Second, by making use of adequate estimation techniques, we carefully consider certain econometric issues (endogeneity and cross-sectional dependence) that have been previously

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<sup>2</sup> Adjacent to our study are previous empirical efforts that analyze the interaction between migration and political (rather than economic) freedom in the context of migration and asylum-seeking (e.g., Neumayer, 2005, Hatton, 2009; Docquier et al., 2016). In our subsequent empirical analysis, we thus control for the effect of political variables when studying the economic freedom-migration nexus.

disregarded in analyses of the economic freedom-migration nexus but may very well influence estimation results. Third, to the best of our knowledge our study is the first to consider separately the impact of economic freedom on low- and high-skilled migration. That is, we analyze whether different education profiles are differently affected by the incentives economic freedom creates. Finally, as a further addition to the existing body of empirical evidence, we also differentiate between the effects of different dimensions of economic freedom on migration.

To preview our main results, we find that a lack of economic liberty is indeed an important driver of out-migration. However, it is only relevant for the high-skilled and especially matters to those dimensions of economic freedom safeguarding economic security (e.g., secure property rights). Our interpretation is that the high-skilled value economic freedom more strongly than the low-skilled, consequently being more responsive to the economic incentives it entails. The negative association between economic freedom and skilled migration also holds when we consider endogeneity in the economic freedom-migration nexus. Our results imply that sending countries interested in discouraging skilled migration may reduce it by lowering institutional barriers that come in form of low levels of economic freedom.

The remainder of this paper is organized as follows. In Section 2 we discuss in more detail how a lack of economic freedom may contribute to emigration. In Section 3 we introduce the data and methodology to test the hypotheses developed in Section 2. We then discuss our empirical findings in Section 4. Section 5 concludes.

## **2. Literature Review and Hypotheses**

There exists a multitude of economic theories that model migration choices as economic decisions.<sup>3</sup> As put by Borjas (1989: 457), all of these models are “based on the behavioral assumption that individuals migrate because it is in their benefit (either in terms of psychic satisfaction or income) to do so.” What matters to migration decisions are thus (i) *pull factors*, i.e., conditions in the destination country of migration (usually expressed in terms of expected income

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<sup>3</sup> For overviews of the economic theory of migration, see, e.g., Borjas (1989), Bauer and Zimmermann (1998), Van Dalen et al. (2005: 744-749) and Bodvarsson and Van den Berg (2009: 27-57).

as a main benefit of migration), (ii) *push factors* prevailing in the migrants' home country (e.g., poor macroeconomic conditions), which are related to the opportunity costs of migration (e.g., expressed in terms of foregone income in the home country in case migration actually takes place) and (iii) the *direct and indirect costs of migration* (associated with, e.g., travelling expenses or psychological adaptation costs in the destination country). Within this framework, a rational-economic individual is more likely to migrate when—*ceteris paribus*—the benefits of migration increase (e.g., as the expected income in the destination country grows), the opportunity costs of migration decrease (e.g., as economic conditions in the home country deteriorate) or the (direct and indirect) costs of migration decline (e.g., as travelling becomes less expensive).

In this contribution we are interested in conditions in the source countries of migration, particularly with respect to economic freedom. We argue that economic freedom is negatively related to migration rates. First, we expect economic freedom to be associated with more *economic security* (in terms of low levels of taxation and inflation and more secure property rights), thereby disincentivizing migration by increasing its opportunity costs. Second, we anticipate economic freedom to create additional *economic opportunities* (related to, e.g., greater access to domestic and international markets), which also ought to make migration a less attractive option. Finally, economic freedom is expected to *stimulate economic growth*, furthermore raising the opportunity costs of migration. These transmission channels from (more) economic freedom to (less) migration are visualized in Figure 1 and will be discussed in more detail below (Sections 2.1 to 2.3). Furthermore, in Section 2.4 the issue of the *selectivity of migrants* and its role in the economic freedom-migration nexus is discussed. Here, we account for the idea that there may be differences in the extent and determinants of high- and low-skilled labor migration (Borjas, 1987). With respect to the economic freedom-migration nexus, we expect a lack of economic freedom to be especially important for the high-skilled.

—Figure 1 here—

## 2.1 Economic Security and Migration

Economic freedom coincides with *economic security*. Gwartney et al. (2014: 1) argue that “[in order to be considered economically free], a country must provide secure protection of privately owned property, even-handed enforcement of contracts, and a stable monetary environment. It also must keep taxes low [...]”. First, this suggests that government intrusion into the economic life



has to be limited. By definition this means that property is better protected from the government's grasp, be it from taxation (e.g., income taxation), currency depreciation (inflation) or other forms of redistribution. Second, the main function of the government is primarily related to ensuring a healthy protection of property rights. Or, as put by Gwartney et al. (2014: 1): "In an economically free society, the primary role of government is to protect individuals and their property from aggression by others."

Providing economic security ought to produce outcomes that raise the opportunity costs of migration and thus disincentivize it. Conversely, lower levels of economic freedom are expected to coincide with less economic security and thus more migration.

First, lower levels of economic freedom mean that the level of taxation is higher. Taxes in turn matter to the wage differential between the source and destination country of migration. *Ceteris paribus*, higher taxes in the source country make out-migration more attractive. Indeed, Grogger and Hanson (2011) show that income taxes enter the calculus of migrants. Similarly, Egger and Radulsecu (2009) show that migrants prefer low tax environments. Second, lower levels of economic freedom also coincide with currency instability. Inflation can be thought of as another form of taxation, punishing those holding property in monetary instruments (De Haan et al., 2006). Thus, inflation also matters to the wage differential between source and destination countries of migration. Lower real wages in the source country due to inflation result in a higher real wage differential, thus incentivizing out-migration. For instance, Gallardo-Sejas et al. (2006) show that migration increases with a higher inflation differential between home and destination countries. Third, a weak rule of law and weakly protected property rights also ought to encourage migration by negatively influencing expected income in the source country. For instance, if entrepreneurs have to hand out bribes to successfully make business, this means that their ultimate income from business activity is diminished. Indeed, Dimant et al. (2013) and Cooray and Schneider (2016) show that migration is influenced by corruption in sending countries.

## **2.2 Economic Opportunities and Migration**

Gwartney et al. (2014) argue that more economic freedom also means the provision of more economic opportunities by relying on markets rather than interventionist economic policies. As put by Gwartney et al. (2014: 1), in order to be considered an economically free society, the governments of these societies must "[...] refrain from creating barriers to both domestic and

international trade, and rely more fully on markets rather than government spending and regulation to allocate goods and resources.” A greater emphasis on markets thus means, inter alia, easier access to foreign goods markets (e.g., due to lower tariffs) and credit (e.g., due to fewer capital controls) and less competition by government-owned enterprises.

Providing economic opportunities ought to result in less migration by creating incentives for entrepreneurship. For instance, eased access to credit makes it more likely that prospective entrepreneurs receive sufficient resources to finance start-up activities, ultimately leading to more (innovative) entrepreneurial activity (King and Levine, 1993). Intuitively, being able to engage in entrepreneurial activity in one’s home country may lower the expected utility differential between the source and destination countries of migration for a prospective entrepreneur.<sup>4</sup> When economic opportunities do not open up at home, migration becomes more likely. Indeed, many immigrants create businesses in their destination countries, e.g., numerous high-tech companies in the U.S. (Hart and Acs, 2011). Nathan (2014) reviews studies that consider, inter alia, the entrepreneurial activity of migrants in their target countries, finding that such activity may be due to institutions in the destination country offering more opportunities for self-employment and entrepreneurship.<sup>5</sup> This again suggests that the absence of economic freedom—a lack of economic opportunities—makes it more likely for potential entrepreneurs to migrate.

Furthermore, there is some evidence that entrepreneurship creates collateral effects that also benefit non-entrepreneurs. For instance, entrepreneurship creates additional employment (Van Praag and Versloot, 2007) that can be expected to improve overall economic conditions. This may

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<sup>4</sup> For one, being able to be entrepreneurially active is likely to increase personal income. For another, mental satisfaction from entrepreneurship may also affect a migrant’s utility considerations. There may be cases of “lifestyle migration”, meaning that migration decisions are made to follow a certain lifestyle centering on opening up a business. For instance, Stone and Stubbs (2007) in their field study in France and Spain find that lifestyle considerations indeed matter to the decision of immigrants to become entrepreneurs.

<sup>5</sup> Migrations may also become self-employed out of necessity, e.g., due to discrimination in the labor market (e.g., Constant and Zimmermann, 2006).

affect the calculus of potential migrations not directly interested in engaging in entrepreneurial activity in ways that make out-migration a less likely option.

### **2.3 Economic Activity and Migration**

Finally, economic freedom may also matter to migration patterns by influencing a country's overall economic performance. Indeed, a large body of empirical research suggests that economic freedom is conducive to economic growth (e.g., Gwartney et al., 1999; De Haan and Sturm, 2000; Justesen, 2008; for a review, see De Haan et al., 2006). For instance, more economic freedom may promote economic activity by facilitating innovation and (private) investment (e.g., Gwartney et al., 1999; De Haan et al., 2006).

More favorable short-run economic conditions—induced by economic freedom—ought to make migration a less attractive option. For instance, strong economic growth in the source countries of migration is expected to positively affect wages and employment prospects, which in turn ought to help reduce the differential in expected wages between source and destination countries, making it less likely that an income-maximizing individual migrates. Indeed, there is some evidence that favorable macroeconomic conditions in sending countries lead to less migration. For example, Hatton and Williamson (2003) find that poor economic performance (i.e., slow economic growth) in Sub-Saharan Africa has contributed to increases in out-migration. Studying a sample of annual gross migration flows between 30 developed origin and destination countries over the 1980-2010 period, Beine et al. (2013) similarly find that business cycle fluctuations and employment prospects matter to migration decisions, where more favorable macroeconomic conditions in sending countries decrease migratory activity.

### **2.4 The Role of Economic Freedom in Low-Skilled and High-Skilled Migration**

So far, we have discussed the relationship between a sending country's level of economic freedom and level of out-migration, while disregarding the *type of migration*. In reality, however, migrants differ with respect to certain characteristics, most importantly their level of education. A country may see different levels of out-migration by the less educated (*low-skilled migration*) and the more educated (*high-skilled migration*). Indeed, it is a stylized fact in migration studies that more educated individuals are more likely to migrate (*positive selection*) (Grogger and Hanson, 2011; Docquier and Rapoport, 2012).

The idea of the selectivity of migrants, i.e., differences in the calculus of high- and low-skilled individuals, has been popularized by Borjas (1987) who combines the migration-investment model from Sjaastad (1962) with Roy's (1951) model of selection and income maximization. The consequence of migrant selectivity is that certain migration determinants are more likely to matter to specific migrant groups with specific education status. For instance, the returns to skill are a more important factor for high-skilled migrants, given that they have invested more heavily in human capital. As another example, the direct costs of migration may be lower for the high-skilled, e.g., as adaption costs in the destination country (learning a new language, adapting to new values etc.) should be lower.

The Borjas model or derivations from it are applied by, e.g., Mayda (2010), Grogger and Hanson (2011), Belot and Hatton (2012), Bertoli et al. (2013) and Krieger et al. (2015). Indeed, these studies find differences in the determinants of low- and high-skilled migration. For instance, Mayda (2010), Grogger and Hanson (2011) and Bertoli et al. (2013) find that income differentials are more important pull factors for high-skilled than low-skilled individuals. As another example, Beine et al. (2011) find that existing networks in destination countries (diasporas) lower migration costs substantially, having stronger effects for the low-skilled, thereby reducing the positive selection of migrants.

With respect to the research topic of this contribution, economic freedom may also matter differently to the calculus of the low- and high-skilled. We anticipate high-skilled migration to be more responsive to the level of economic freedom in the source countries of migration.

First, high-skilled labor is more likely to make use of economic opportunities created by economic freedom. For instance, their skill level should make business success more likely. Also, we can expect high-skilled labor to be more strongly associated with industries that benefit from economic freedom (e.g., innovative firms with R&D activity). Thus, when there is a lack of economic opportunities—correlating with low levels of economic freedom—, this should particularly incentivize migration by the better educated in order to be able to work in innovative industries.

Second, high-skilled labor also ought to be more interested in the economic security provided by economic liberty. Lower foregone earnings in the source country (due to, e.g., taxation or inflation) make it more likely for an income-maximizing individual to migrate. More education usually

translates into higher wages. Consequently, any redistributive effort by the government—be it through taxation, inflation or other means of redistribution—can be expected to disproportionately hurt the better educated. For instance, Abramitzky (2009) finds that stronger redistribution leads to a higher share of more productive workers leaving from an Israeli kibbutz.

Finally, while the high-skilled are expected to be net-losers from any redistributive effort by the government, the low-skilled are more likely to benefit from it. For instance, if tax income predominantly generated by the high-skilled is used to produce public goods, the low-skilled may be net-winners of such a process. This creates incentives for the low-skilled to favor lower levels of economic security (e.g., higher levels of taxation), consequently making it less likely that the low-skilled respond in the same way—namely, with migration—as the high-skilled to given levels of economic freedom in their home countries.

## **2.5 Hypotheses**

Economic theory of migration suggests that migration decisions are influenced by the (opportunity) costs and benefits of migration. Above, we discussed a number of theoretical pathways through which more economic freedom ought to result in less out-migration. We argued that for a rational income-maximizing individual, higher levels of economic freedom reduce—*ceteris paribus*—the incentives to migrate. In particular, more economic freedom creates economic security (e.g., with respect to property rights protection), additional economic opportunities (e.g., with respect to entrepreneurship) and stimulates macroeconomic activity, all of which is expected to raise the opportunity costs of migration. Thus, when empirically analyzing the relationship between economic freedom and migration, from economic theory we expect support for the following hypothesis:

*H1: Higher levels of economic freedom are associated with lower migration rates.*

In addition, we discussed that low- and high-skilled migrants may be differently impacted by economic freedom. We argued that the calculus of high-skilled migrants may be more responsive to the incentives created by economic freedom. For instance, the creation of more economic opportunities through higher levels of economic freedom (e.g., by giving access to external and credit markets) should especially benefit the high-skilled. Similarly, the high-skilled ought to be more likely to profit from increased economic security (e.g., due to more secure property rights)

that characterizes higher levels of economic freedom. Accounting for skill-differences, migration theory predicts economic freedom in the source country to be negatively related especially to out-migration by the high-skilled, leading us to expect support for the following hypothesis in our subsequent empirical analysis:

*H2: The effect of economic freedom on migration is more relevant for high-skilled than low-skilled migration.*

### **3. Data and Methodology**

To study the relationship between economic freedom and migration, we collect data for 91 source countries of migration for the 1976-2010 period. They are developing, emerging and (non-OECD) developed countries.<sup>6</sup> As the data on migration and economic freedom is only available for 5-year intervals, we average the remaining control variables accordingly. The summary statistics are reported in Table 1.

—Table 1 here—

#### **3.1 Dependent Variable**

The data on migration are drawn from the *IAB Brain Drain Dataset*, published by the German *Institute for Employment Research* (IAB) and described in more detail in Brücker et al. (2013). This dataset provides country-level data on international migration from the aforementioned 91 source countries to 20 OECD destination countries: Australia, Austria, Canada, Chile, Denmark, Finland, France, Germany, Greece, Ireland, Luxembourg, the Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, the United Kingdom and the United States.<sup>7</sup>

From this dataset we extract our two main dependent variables, the *low-skilled* and *high-skilled migration rates*. Migration rates are “indicators that compare the total number of immigrants living in all considered OECD countries with the total number of individuals coming from a given source

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<sup>6</sup> A list of all source countries is provided in the appendix.

<sup>7</sup> Chile has been an OECD member only since 2010. OECD countries receive the majority of high-skilled migrants and about half of total international migration (Docquier and Rapoport, 2012: 684).

country (i.e., residents and migrants) and belonging to the same educational category” (Brücker et al., 2013: 5). In other words, the migration rates are the proportion of migrants from a source country over the pre-migration population (i.e., residents and migrants) with the same skill level. More information on the construction of the dependent variables is given in the appendix.

Low-skilled migration refers to migration by individuals with only lower secondary, primary and no schooling, while high-skilled migration refers to migration by individuals with an educational attainment higher than a high-school leaving certificate or equivalent (Brücker et al., 2013: 4). We are interested in low-skilled and high-skilled migration rates, given that we expect economic freedom to impact differently these different types of migration (*H2*). As shown in Table 1 and visualized in Figure 2, the high-skilled migration rates are during the period of observation—on average—far higher than the low-skilled migration rates. This is consistent with the notion of positive selection.

—Figure 2 here—

### 3.2 Main Explanatory Variable

Our data on the level of economic freedom in the source countries of migration are drawn from the *Economic Freedom of the World Dataset* published by the *Fraser Institute* (Gwartney et al., 2014). As already defined in the introduction, the cornerstones of economic freedom are (i) personal choice, (ii) the voluntary exchange on markets with free competition and (iii) the protection of persons and property from aggression by others (Gwartney et al., 2014: 1). Accordingly, the *Fraser Institute index of economic freedom* is a composite index that measures economic freedom related to five major areas: (i) the size of the government, (ii) the functioning of the legal system and the security of property rights, (iii) sound money, (iv) the freedom to trade internationally and (v) market and business regulation. The composite economic freedom index takes on values between 0 (no economic freedom) to 10 (total economic freedom). As advised in Gwartney et al. (2014: 9), we use the chain-linked summary index to assure comparability across time. The construction of the index is discussed in more detail in the appendix as well as in De Haan et al. (2006) and Gwartney et al. (2014).

Table 2 provides an overview how the 20 OECD destination countries considered in the IAB Dataset differ from the 91 sending countries in our sample between 1980 and 2010. The level of

economic freedom is always higher in the destination countries of migration, where the difference to the level of economic freedom in the sending countries is also always statistically significant. Implicitly, this is in line with our hypothesis *H1* as well as the gravity model evidence by Ashby (2010).<sup>8</sup> Individuals appear to migrate from countries with lower levels of economic freedom to (OECD) countries with substantially higher levels of economic freedom.

—Table 2 here—

### 3.3 Control Variables

We control for a variety of demographic, economic and political factors in the countries of origin of migration. In detail, we consider the effects of population size, economic development (per capita income), political development (lack of political rights) as well as education (years of schooling) and political violence.<sup>9</sup>

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<sup>8</sup> The analytical approach taken in our study, where only conditions in sending countries are considered, has previously been taken in, e.g., Docquier et al. (2007), Dreher et al. (2011), Dimant et al. (2013) and Cooray and Schneider (2016). Future research, however, may explicitly analyze the relationship between economic freedom and migration in a gravity model using dyadic data. As pointed out by a referee, it may not only be interesting to understand whether low levels of economic freedom in the source country predict migration but also whether relative differences in economic freedom between source and target countries play a role. The IAB Dataset, however, only provides data on a limited set of 20 OECD target countries that are very similar with respect to their level of economic freedom, making a gravity approach unpromising.

<sup>9</sup> Time-invariant variables (colonial ties, common languages etc.) are also often used to explain migration (e.g., Mayda, 2010). We account for these variables via a fixed-effect approach. Furthermore, a number of further potential migration determinants have been named in the literature, e.g., demographic pressures such as rapid population growth (Hatton and Williamson, 2003). As a robustness check, we amend our baseline model with additional variables for trade openness, economic structure (measured by the value added in agriculture), population density and population growth. Adding these variables does not change the main findings of our study concerning the relationship between economic freedom and migration (results available upon request).



Data on *population size* come from the *PENN World Tables* (Heston et al., 2012). We expect population size to be negatively related to out-migration. The negative correlation between population size and migration is well-established in the literature (e.g., Docquier et al., 2012). For one, the possibilities of internal migration are obviously limited in small-sized countries. For another, migration in smaller countries is more likely to react to changes in (internal and external) push factors, e.g., as governments of smaller states may have less resources available to counter negative economic shocks that incentivize migration.

Data on *per capita income* are also drawn from the *PENN World Tables*. A number of empirical studies find that low levels of economic development are conducive to out-migration (e.g., Van Dalen et al., 2005; Ashby, 2010; Mayda, 2010; Grogger and Hanson, 2011; Belot and Hatton, 2012, Beine et al., 2013). In line with the empirical mainstream, we also expect out-migration to decrease with economic development. First, per capita income ought to proxy poor macroeconomic conditions (poverty), where poorer conditions intuitively encourage migration. Second, lower per capita income levels are also expected to coincide with a larger wage differential between the respective sending country and the 20 rich (OECD) countries that are the targets of migration in our sample. In line with economic migration theory, a large wage differential between the source and destination countries of migration ought to be conducive to migration. For our sample, the average per capita income in the sending countries for the 1980-2010 period was approximately 1,800 US-\$, while it was approximately 25,500 US-\$ in the target countries, indeed indicating a large wage differential.<sup>10</sup>

A country's level of political development is measured by a variable indicating the *lack of political rights*. The data come from the Freedom in the World Dataset published by Freedom House (2016).<sup>11</sup> Countries are assigned between 0 and 4 points on a number of indicators (e.g., concerning

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<sup>10</sup> Economic freedom and per capita income are moderately strongly correlated for our sample ( $r=0.46$ ). Consequently, as a robustness check we drop per capita income from our regression models. This does not change our main findings concerning the effect of economic freedom on migration (results available upon request).

<sup>11</sup> The Freedom House dataset also provides information on the lack of civil liberties (concerning, e.g., the prevalence of religious discrimination, infringements of free speech, poor rule of law).

the fairness of elections), where the score is ultimately normalized to range between 1 (most free, democratic) to 7 (least free, undemocratic) (Freedom House, 2016: 2). For one, a lack of political rights may create incentives to migrate, e.g., because political grievances are not adequately accommodated by local governments. For another, however, non-democratic institutions may also lead to less migration by increasing migration costs (Docquier et al., 2016: 209). For instance, while democracies usually guarantee their citizens freedom of movement, this freedom may be severely restricted in autocracies (e.g., in Eritrea). Also, the only limited access to information and communication that characterizes autocracies (e.g., due to control of the media and means of communication by the government) may make it more costly to migrate. Given these lines of reasoning, we remain agnostic about the expected effect of democratic development on migration.

Furthermore, in some specifications we control for a country's level of education and political violence. First, *education* is measured by years of schooling, with the data being drawn from Barro and Lee (2013). As discussed in, e.g., Grogger and Hanson (2011), more educated individuals are more likely to migrate (positive selection). We also expect to see a positive relationship between migration and education at the country-level. For instance, higher levels of education may make migration less costly as, e.g., adaption costs associated with learning a new language are lower. Second, *political violence* is measured by the average magnitude of violence associated with revolutionary and ethnic wars, adverse regime changes as well as politicides and genocides, ranging from 1 (no political violence ) to 18 (highest level of political violence in all possible categories). The data come from the Political Instability Task Force (2015). We expect political violence to lead to more out-migration. For instance, Dreher et al. (2011) show that more terrorist

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Substituting the variable measuring the lack of political freedom with one indicating the lack of civil liberties as a robustness check, however, delivers results virtually identical to the ones reported in the main text. This is unsurprising given the very high correlation between both indicators ( $r=0.91$ ). As another robustness check, we replace the political rights variable with the *Polity2* score from the *Polity4 Dataset* (Marshall et al., 2014), which is an alternative measurement of political development more strongly focusing on key constitutional elements. Here, we again detect a high correlation between this measure and our political rights variable ( $r=-0.84$ ) and find that our main results also remain robust to interchanging the indicators (all robustness checks available upon request).

activity (another indicator of political violence) is associated with more out-migration; they argue that this is due to decreasing returns to education and deteriorating socio-economic conditions that result from political violence.

### 3.4 Methodology

To examine the effect of economic freedom and the other controls on migration, we estimate the following regressions:

$$\ln(MIG)_{it} = \alpha_0 + \beta_1 \ln(EF)_{it} + \beta_2 \ln(GDP)_{it} + \beta_3 \ln(POP)_{it} + \beta_4 \ln(PR)_{it} + \tau_t + \eta_i + v_i \quad (1)$$

$$\begin{aligned} \ln(MIG)_{it} = \alpha_0 + \beta_1 \ln(EF)_{it} + \beta_2 \ln(GDP)_{it} + \beta_3 \ln(POP)_{it} + \beta_4 \ln(PR)_{it} + \\ \beta_5 \ln(EDUC)_{it} + \beta_6 \ln(VIOL)_{it} + \tau_t + \eta_i + v_i \quad (2) \end{aligned}$$

*MIG* refers to the emigration rate (low-skilled or high-skilled migration rate) from source country *i* in 5-year interval *t*, which is explained by economic freedom (*EF*), per capita income (*GDP*), population size (*POP*), the lack of political rights (*PR*) as well as period dummies  $\tau_t$  to consider the influence of common shocks, unobserved country-specific effects ( $\eta_i$ ) and the error term ( $v_i$ ). In equation (2), we also control for years of schooling (*EDUC*) and the level of political violence (*VIOL*). All time-varying variables are expressed in natural logarithms. Table 1 provides an overview of the expected signs of the  $\beta$ -coefficients associated with each explanatory variable.

**Fixed-Effects Estimation.** First, we estimate equations (1) and (2) using the fixed-effects estimator. Besides its well-known properties and straightforward interpretability, the main advantage of the fixed-effects approach is that it allow us to implicitly consider a host of time-invariant factors ( $\eta_i$ ) that potentially influence the migrants' calculus. For instance, Docquier et al. (2007) and Mayda (2010) note that time-invariant variables such as distance between countries, religious fractionalization and colonial, linguistic and cultural ties between source and destination countries explain cross-country variation in migration. Running a test for cross-sectional dependence following Frees (1995) suggests that our models exhibit cross-sectional dependence in the errors even when time dummies are included. To account for this remaining cross-sectional dependence, we use Driscoll-Kraay standard errors (Driscoll and Kraay, 1998). These standard errors are not only robust to heteroskedasticity and autocorrelation but also to general forms of cross-sectional dependence (Driscoll and Kraay, 1998).

***Instrumental-Variable Model with Fixed Effects.*** A drawback of the simple fixed-effects approach is that endogeneity concerns are not taken into account. *Endogeneity* may have multiple sources such as measurement error (which is potentially an issue when measuring migration rates) as well as feedback. Considering our main independent variable of interest, it may, e.g., be possible that out-migration also induces institutional change in the source country of migration. Norms and ideas in the destination countries (where economic freedom is high) may be transferred to the source countries through, e.g., return migration and the creation of business and trade networks (Beine and Sekkat, 2013).<sup>12</sup>

To overcome endogeneity concerns, we employ the instrumental-variable (*IV*) approach proposed by Lewbel (2012). In this method, “identification comes from observing a vector of variables *Z* [...] that are uncorrelated with the covariance of heteroscedastic errors” (Lewbel, 2012: 77). In other words, identification is achieved by having regressors that are uncorrelated with the product of heteroskedastic errors, which is a feature of many models where error correlations are due to an unobserved common factor (Lewbel, 2012: 67). Lewbel’s method is particularly appropriate when external instruments are weak or non-available. In our analysis, our (potentially weak) instrument is the second-lag of the economic freedom index. This instrument is supplemented by the instruments constructed as a simple function of the model’s data, which improves the efficiency of the *IV*-estimates that would otherwise only be based on the weak instrument (Lewbel, 2012). Given the resulting issue of over-identification, we report the results of the Hansen test for instrument validity (over-identification restrictions); not rejecting the null hypothesis of joint validity of the instruments suggests that the selected instrument set is exogenous (Roodman, 2009). Note that in Lewbel’s *IV*-approach, fixed- and period-specific effects are still controlled for.

***System-GMM Estimation.*** Finally, we consider the effect of economic freedom and the controls in the context of a dynamic-panel model that also includes lagged values of the dependent variable as an additional regressor. A dynamic specification with a lagged dependent variable may account

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<sup>12</sup> A similar argument is made by Docquier et al. (2016) concerning feedback between migration and political freedom. Docquier and Rapoport (2012) offer an overview of economic channels through which migration may affect sending countries, e.g., remittances, return migration, diaspora effects and the transfer of knowledge and institutions.

for other important aspects of migration. For one, a lagged dependent variable may ameliorate omitted variable bias. For another, we can expect migration to be strongly dependent upon its past realizations. For instance, networks of earlier migrants in the destination countries may facilitate migration (e.g. Beine et al., 2011; Belot and Ederveen, 2012). Here, we estimate the following regressions:

$$\ln(MIG)_{it} = \alpha_0 + \beta_0 \ln(MIG)_{it-1} + \beta_1 \ln(EF)_{it} + \beta_2 \ln(GDP)_{it} + \beta_3 \ln(POP)_{it} + \beta_4 \ln(PR)_{it} + \tau_t + \eta_i + v_i \quad (3)$$

$$\ln(MIG)_{it} = \alpha_0 + \beta_0 \ln(MIG)_{it-1} + \beta_1 \ln(EF)_{it} + \beta_2 \ln(GDP)_{it} + \beta_3 \ln(POP)_{it} + \beta_4 \ln(PR)_{it} + \beta_5 \ln(EDUC)_{it} + \beta_6 \ln(VIOL)_{it} + \tau_t + \eta_i + v_i \quad (4)$$

Models (3) and (4) are estimated using the system-GMM estimator. One advantage of this estimator is that it is specifically designed for panels with many units (in our case, countries,  $N$ ) and small  $T$ , with the left-hand-side variable being dynamic (i.e., depending on its own past realizations), the independent variables not being strictly exogenous (i.e., being correlated with past and possibly current realizations of the error) and the model including period and country-fixed effects<sup>13</sup> (Bond, 2002; Roodman, 2009). Thus, the system-GMM approach also allows us to consider the role of endogeneity not only in the main independent variable of interest (economic freedom) but also with respect to the controls. All control variables (population size, per capita income, education, political freedom and violence and) may plausibly be endogenous. For example, higher levels of education cannot only be expected to lead to more migration, but the prospect of migration may also lead to more investments into human capital (e.g., Docquier et al., 2007).

The system-GMM estimator uses “internal” instruments (based on lagged values of the instrumented variables) to overcome aforementioned sources of endogeneity, using both lagged

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<sup>13</sup> The system-GMM estimator does not directly eliminate country-specific effects but uses appropriate instruments (lagged differences of the explanatory variables) to control for them. These instruments are valid under the assumption that the correlation between the error term and the levels of the explanatory variables is constant over time, so there is no correlation between the differences of the explanatory variables and the country-specific effects.

levels and lagged first-differences to construct an appropriate instrument set.<sup>14</sup> For our system-GMM analysis, we routinely use the second lag of the levels and first-differences of the dependent variable (migration) as well as the first lag of the levels and first-differences of all control variables to construct the instrument set.

The major disadvantage of the system-GMM estimator is its instability<sup>15</sup> and the strong assumptions associated with it. First, the selected instrument set needs to be the exogenous (Roodman, 2009). As with Lewbel's IV-approach, we thus report the results of the Hansen test for over-identification restrictions. Second, Roodman (2009: 128) suggests to limit the instrument count to not exceed  $N$ , as "instrument proliferation can overfit endogenous variables and fail to expunge their endogenous components", while at the same time weakening the power of the Hansen test designed to detect a non-valid instrument set. Therefore, we always report the instrument count and restrict the number of instruments accordingly. Third, some lags of the instrumented variables are rendered invalid as instruments when there is autocorrelation in the idiosyncratic disturbances (Arellano and Bond, 1991). Thus, we also report whether there is higher-order serial correlation (AR(2) behavior) in the idiosyncratic disturbances (Arellano/Bond test for serial correlation).

## 4. Empirical Results

### 4.1. Main Results

***Low-Skilled Migration.*** The empirical results considering the effect of economic freedom on low-skilled migration are reported in Table 3. Irrespective of the econometric technique we employ, there is no evidence that economic freedom is associated with low-skilled migration in a

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<sup>14</sup> The system-GMM estimator is described in more detail in Bond (2002) and Roodman (2009).

<sup>15</sup> As pointed out by a referee, system-GMM estimates may depend upon the employed instrument set. We consequently experimented with different instrument sets to assess the robustness of the system-GMM estimates to such changes; the results of these experiments are in line with those reported in the main text (results available upon request).

statistically significant way. This runs counter to *H1*. There is no evidence for a general relationship between economic freedom and migration.<sup>16</sup>

—Table 3 here—

***High-Skilled Migration.*** In Table 4 we report our findings when high-skilled migration is explained by economic freedom and further covariates. In contrast to the findings reported in Table 3, we now find evidence—robust to various econometric techniques—that more economic freedom is associated with less out-migration by high-skilled workers. This finding speaks to *H2*.<sup>17</sup> Combining the findings of Tables 3 and 4, there is evidence that low-skilled migration is less responsive to the incentives created by economic freedom than high-skilled migration.

The results reported in Table 4 suggest that increasing the economic freedom index by 1% leads to a 0.42% (OLS), 1.37% (IV-OLS) or 0.8% (System-GMM) reduction in high-skilled migration. An increase in economic freedom by one standard deviation (1.176) is equivalent to an increase of economic freedom by 18%, which is associated with a decrease in high-skilled migration by 7.52% (OLS), 24.66% (IV-OLS) or 14.35% (System-GMM). These are economically substantive effects. One illustration is the evaluation of the change of the skill-mix of emigrants at the mean: The ratio of the high- and low-skilled emigration rate can be interpreted as the skill mix of emigrants, as defined by Grogger and Hanson (2011: 44). At the mean, the skill-mix is 4.6 which implies that for one low-skilled emigrant, 4.6 high-skilled individuals leave the country.<sup>18</sup> With an

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<sup>16</sup> In addition to low- and high-skilled migration, we also run analyses with the total and medium-skilled migration rates as dependent variables. As shown in the appendix, these two migration rates also share no consistent association with economic freedom, a finding mirroring our results for the effect of economic liberty on low-skilled migration.

<sup>17</sup> In the appendix, we show that the migration-dampening effect of economic freedom is also present when we differentiate between high-skilled migration rates by gender. That is, both high-skilled male and female migration are negatively associated with economic freedom, where the size of the respective effects is comparable.

<sup>18</sup> In our case, the mean skill-mix can be derived as the mean high-skilled emigration rate (0.156) divided by the mean low-skilled emigration rate (0.034). The change is derived by keeping the

18% increase of economic freedom, the skill-mix decreases (using the System-GMM result) to 3.9, implying that now only 3.9 high-skilled leave for one low-skilled, almost one high-skilled individual less than before.

As another example, a change of 18% in economic freedom corresponds approximately to the development of Singapore. Here, economic freedom between 1980 and 2012 improved by 13.5%, while high-skilled emigration declined by 45.24%. Another example is the average difference in economic freedom between El Salvador and Estonia, where Estonia has on average a 17% higher economic freedom index and a 7% lower high-skilled emigration rate than El Salvador.<sup>19</sup> Of course, the changes in the emigration rates in these examples are only illustrative and may contain other demographic, political and economic effects as well.

—Table 4 here—

**Controls.** The findings for the control variables are largely similar for Tables 3 and 4. First, regardless of which migration rate we consider as the dependent variable, per capita income is negatively related to migration. This suggests that poor macroeconomic conditions at home incentivize migration. Second, population size is also robustly negatively associated with both types of migration. For instance, this may be due to the fact that small country size limits the possibilities of internal migration. Third, in the dynamic-panel models past migration rates are positively and robustly associated with more present migration. This finding suggests that factors such as network effects create strong path-dependence. Fourth, lack of political rights shares no consistent relationship with both low- and high-skilled migration. In the light of our main finding, this suggests that it is a lack of economic rather than political freedom that motivates migration especially by the high-skilled. Fifth, there is also no clear-cut evidence that political violence deters

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low-skilled emigration rate constant, while diminishing the high-skilled emigration rate by 14.35 % (which is the System-GMM result).

<sup>19</sup> A more extreme example is the average difference in economic freedom between Uruguay and Zambia: Economic freedom is 23.8% higher and high-skilled emigration is 70.5 % lower in Uruguay. Comparing the countries with the highest (Trinidad and Tobago) and second-lowest (Oman) high-skilled emigration rate also fits in this picture: Economic freedom in Trinidad and Tobago is 6.13, while in Oman it is 7.07.



low- or high-skilled migration. Finally, education is not robustly associated with migration rates. This runs counter to some earlier evidence that suggests that emigration rates and education ought to be positively related (e.g., Docquier et al., 2007). However, Docquier et al. (2007) also find that the schooling gap between emigrants and residents decreases with more education and relate this to the fact that with an increase in education among residents, the educational level of emigrants increases less strongly. In a similar vein, Belot and Ederveen (2012) find that higher education in the origin country is associated with lower migration flows.

#### **4.2 High-Skilled Migration and Economic Freedom**

So far, our estimation results suggest that only high-skilled migration is responsive to economic liberty. In this sub-section, we want to study these linkages in more detail.

As discussed in the literature review, we argue that economic freedom may predominantly discourage migration by (i) increasing economic security and/or (ii) providing additional economic opportunities. To study which transmission channel matters more strongly to the effect of economic liberty on migration, we disaggregate the original economic freedom index from the *Economic Freedom of the World Dataset* into two distinct variables. First, we average the information on the sub-components “government size”, “sound money” and “property rights protection” to create an *economic security index*. Second, we average the information on the sub-components “freedom of international trade” and “business regulation” to create the *economic opportunity index*. This approach is similar to De Haan and Sturm (2000) and De Haan et al. (2006), who also advocate disaggregating the composite economic freedom index into meaningful components.

The empirical results are reported in Table 5. Irrespective of the econometric method we employ, we find that the economic security index is negatively and statistically significantly associated with out-migration, while the economic opportunity index is not. With respect to the controls, we find—consistent with earlier results—that population size and per capita income negatively predict high-skilled migration, past information on migration positively predicts it, while lack of political rights does not matter.

—Table 5 here—

Table 5 provides us with an important insight into which dimensions of economic freedom truly matter to the migration decisions of the high-skilled. It is not so much the lack of economic opportunities (e.g., with respect to doing business and being entrepreneurially active) but rather the protection of the benefits from education (e.g., in the form of secure property rights and limited redistribution) that matters for eventual migration decisions. Our finding suggests that when low levels of economic freedom in the form of lacking economic security (e.g., via weak property rights or high inflation and taxation) threaten these returns, high-skilled workers may choose out-migration. On the one hand, this fits the theoretical predictions drawn from the Borjas model, where the protection of low-income workers combined with the taxation of high-income workers leads to a positive selection of migrants (Borjas, 1997: 534), i.e., there is more migration by the high- relative to the low-skilled. On the other hand, our finding is also in line with empirical findings regarding the importance of the skill premium for the selectivity of emigrants regarding education (Belot and Hatton, 2012) as well as of post-tax wages being decisive for migration decisions of high-skilled individuals (Grogger and Hanson, 2011).

## **5. Conclusion**

In this contribution we empirically study whether economic freedom was a push factor of migration from 91 developing and emerging countries to 20 main target (OECD) countries between 1980 and 2010. We find evidence that more economic freedom translates into less out-migration by the high-skilled (individuals with tertiary education), whereas the low-skilled do not respond to different levels of economic freedom. This finding suggest that the high-skilled are especially responsive to the incentives created by economic freedom, especially in the form of more economic security (e.g., as property is better protected from taxation, inflation and government redistribution). By contrast, more economic freedom in the form of more economic opportunities (e.g., as fewer market barriers facilitate self-employment and entrepreneurship) is not robustly associated with out-migration by the high-skilled.

In sum, our empirical results indicate that economic freedom matters to the economic calculus of (prospective) high-skilled migrants. This finding has implications for both the target and sending countries of migration. First, our findings implicitly suggest that in order to remain attractive for high-skilled labor—especially in the light of aging populations and shrinking workforces—the receiving OECD countries ought to continue to offer high levels of economic freedom, most

importantly, the protection of property and income. Second, sending countries interested in discouraging the out-migration of high-skilled labor are well-advised to remove institutional barriers that limit economic freedom, particularly with respect to the provision of economic security. For instance, related policies may include reforms to strengthen judicial independence and integrity to better protect property rights, sound monetary policies that promote price stability and counter currency devaluation as well as reduced intrusion of the government into the economic life (e.g., by limiting government consumption and redistributive efforts). Such efforts ought to be especially appropriate for sending countries when the costs of high-skilled migration (due to, e.g., skill and labor shortages, reduced agglomeration benefits or “wasted” public investments from training of high-skilled migrants) outweigh its potential benefits (from, e.g., remittances or knowledge spill-overs).<sup>20</sup>

### **Compliance with Ethical Standards**

The authors declare that they have no conflict of interest.

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<sup>20</sup> For a further discussion of the potential economic costs (“brain drain”) and benefits (“brain gain”) of high-skilled migration, see, e.g., Docquier and Rapoport (2012).

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Figures and Tables

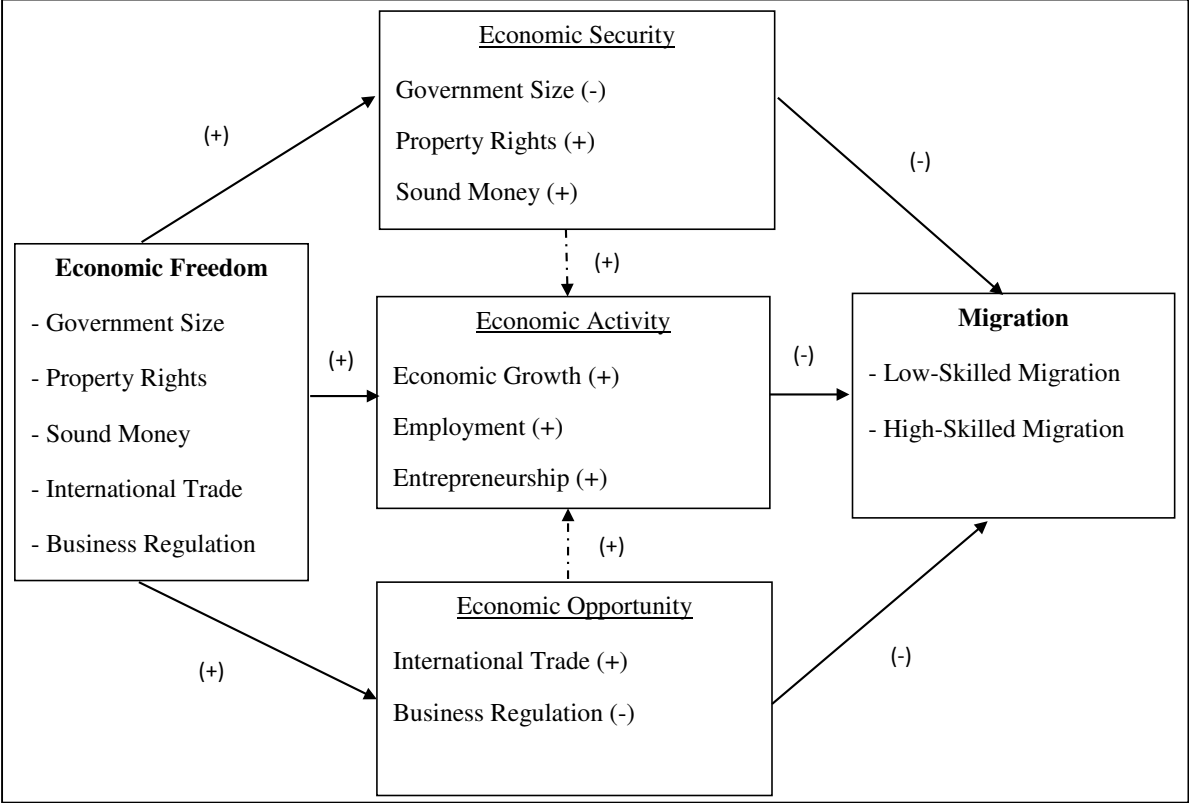
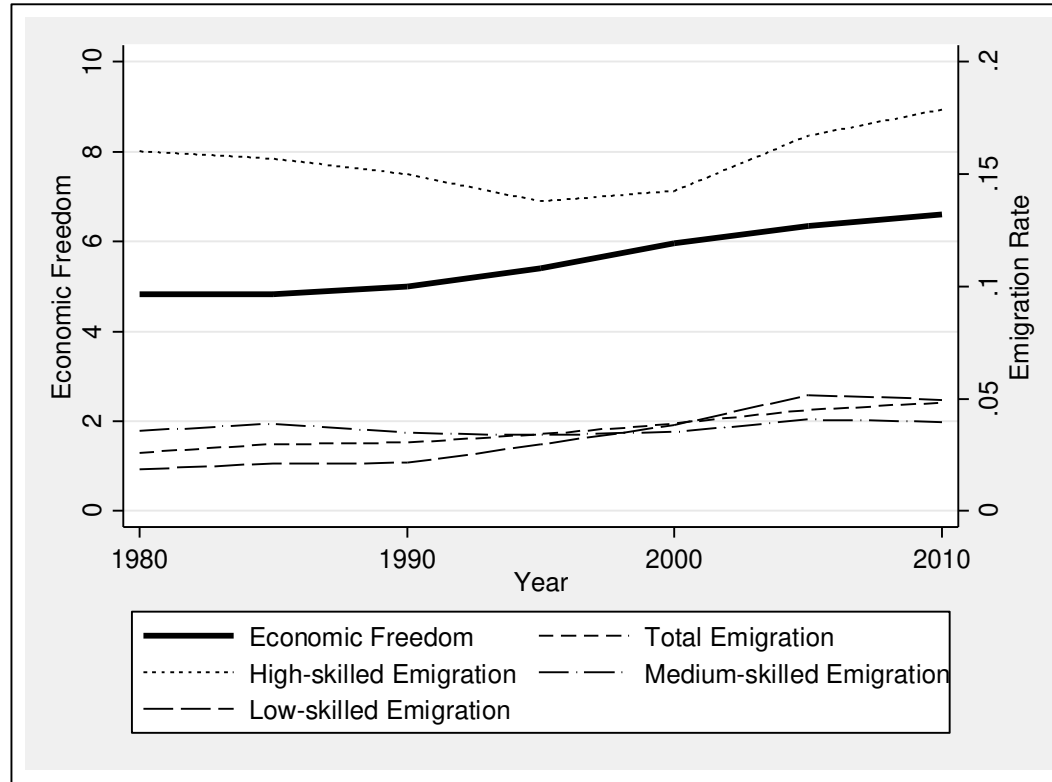


Figure 1: Economic Freedom and Migration





**Figure 2: Average Economic Freedom and Migration Rates (1980-2010)**

Variable	N*T	Mean	Std. Dev.	Min.	Max.	Expected Sign
Low-Skilled Migration Rate	592	0.034	0.072	0.001	0.795	
High-Skilled Migration Rate	592	0.156	0.157	0.001	0.849	
Economic Freedom Index	590	6.521	1.176	2.268	8.755	(-)
Per Capita Income	580	4,101	6,293	147	45,427	(-)
Population Size	592	47,900,000	162,000,000	310,583	1,320,000,000	(-)
Lack of Political Freedom	586	3.992	1.892	1	7	(+)/(-)
Years of Schooling	561	5.756	2.967	0.376	13.162	(+)
Political Violence Index	592	1.867	1.763	1	14	(-)
<i>Dimensions of Economic Freedom Index</i>						
Economic Security	563	5.682	1.202	1.876	8.725	(-)
Economic Opportunity	543	5.597	1.439	1.878	9.057	(-)

**Table 1: Summary Statistics**

	Mean Economic Freedom Index: Sending Countries	Mean Economic Freedom Index: Target Countries	Difference Target vs. Sending Countries	Mean-comparison <i>t</i> -test ( <i>p</i> -value)
1976-1980	4.821	6.316	1.495	6.312 (0.00)***
1981-1985	4.828	6.660	1.832	8.456 (0.00)***
1986-1990	4.994	7.039	2.045	10.078 (0.00)***
1991-1995	5.410	7.529	2.119	12.858 (0.00)***
1996-2000	5.967	7.804	1.837	11.917 (0.00)***
2001-2005	6.341	7.862	1.520	11.898 (0.00)***
2006-2010	6.595	7.773	1.178	10.285 (0.00)***

*Notes:* Number of sending countries varies with time period. Target countries as defined in the main text. Two-sample *t*-test statistics with unequal variances reported.  $H_0$  of *t*-test: equal means. Table may contain rounding errors. \*\*\*  $p < 0.01$  (i.e., rejection of null hypothesis of equal means).

**Table 2: Economic Freedom in Sending and Target Countries of Migration, 1976-2010**

	(1)	(2)	(3)	(4)	(5)	(6)
Economic Freedom	-0.259 (0.189)	-0.209 (0.179)	-0.427 (0.371)	-0.298 (0.379)	-0.097 (0.157)	-0.102 (0.143)
Per Capita Income	-0.148 (0.017)***	-0.133 (0.019)***	-0.122 (0.059)**	-0.123 (0.060)**	-0.089 (0.045)**	-0.083 (0.046)*
Population Size	-0.540 (0.073)***	-0.524 (0.075)***	-0.306 (0.108)***	-0.319 (0.133)***	-0.250 (0.092)***	-0.350 (0.100)***
Lack of Political Rights	0.076 (0.019)***	0.070 (0.022)**	0.084 (0.077)	0.091 (0.076)	0.075 (0.062)	0.093 (0.071)
Years of Schooling		-0.002 (0.114)		0.079 (0.263)		0.312 (0.154)*
Political Violence		0.048 (0.005)***		0.019 (0.030)		0.033 (0.025)
Lagged Low-Skilled Migration Rate					0.449 (0.086)***	0.557 (0.070)***
Estimation Technique	DK-OLS	DK-OLS	IV-OLS	IV-OLS	SYS-GMM	SYS-GMM
Within $R^2$	0.425	0.427	0.421	0.428		
Hansen Test $\chi^2$ -Statistic (Pr.> $\chi^2$ )			12.23 (0.10)	16.35 (0.06)	81.34 (0.24)	68.25 (0.27)
AB AR(1)/AR(2) z-statistic (Pr.>z)					-1.61/-2.69 (0.10)/(0.01)	-.1.67/-3.03 (0.09)/(0.00)
Number of Instruments			16	20	84	75
Number of Countries	90	85	90	85	90	85
Number of Observations	571	540	400	379	488	462

*Notes:* DK-OLS=Fixed-Effects OLS (Driscoll-Kraay standard errors in parentheses). IV-OLS=Fixed-Effects OLS with Lewbel's IV approach (cluster-robust standard errors in parentheses). SYS-GMM=System-GMM estimation (Windmeijer-corrected standard errors in parentheses). Hansen test=Test of instrument over-identification restrictions. AR(1)/AR(2)=Arrelano-Bond test for first- and second-order serial correlation. Period dummies included in all specifications (results not reported). Constant not reported. \* $p < 0.1$ , \*\* $p < 0.05$ , \*\*\*  $p < 0.01$ .

**Table 3: Low-Skilled Migration and Economic Freedom**

	(1)	(2)	(3)	(4)	(5)	(6)
Economic Freedom	-0.415 (0.102)***	-0.467 (0.135)**	-1.368 (0.455)***	-1.363 (0.461)***	-0.797 (0.210)***	-0.772 (0.220)***
Per Capita Income	-0.218 (0.020)***	-0.209 (0.025)***	-0.133 (0.060)**	-0.139 (0.069)**	-0.135 (0.038)***	-0.105 (0.044)**
Population Size	-0.508 (0.057)***	-0.430 (0.044)***	-0.269 (0.104)**	-0.194 (0.107)*	-0.272 (0.083)***	-0.221 (0.082)***
Lack of Political Rights	-0.047 (0.036)	-0.035 (0.037)	-0.058 (0.084)	-0.042 (0.085)	0.046 (0.066)	0.004 (0.063)
Years of Schooling		-0.474 (0.104)***		-0.382 (0.216)*		-0.118 (0.184)
Political Violence		0.007 (0.008)		-0.017 (0.031)		0.006 (0.030)
Lagged High-Skilled Migration Rate					0.543 (0.081)***	0.506 (0.090)***
Estimation Technique	DK-OLS	DK-OLS	IV-OLS	IV-OLS	SYS-GMM	SYS-GMM
Within $R^2$	0.245	0.262	0.156	0.179		
Hansen Test $\chi^2$ -Statistic (Pr.> $\chi^2$ )			8.04 (0.33)	8.29 (0.50)	58.29 (0.13)	66.58 (0.29)
AB AR(1)/AR(2) z-statistic (Pr.>z)					-2.63/-0.50 (0.00)/(0.61)	-2.31/-0.30 (0.02)/(0.76)
Number of Instruments			16	20	58	74
Number of Countries	90	85	90	85	90	85
Number of Observations	571	540	400	379	488	462

*Notes:* DK-OLS=Fixed-Effects OLS (Driscoll-Kraay standard errors in parentheses). IV-OLS=Fixed-Effects OLS with Lewbel's IV approach (cluster-robust standard errors in parentheses). SYS-GMM=System-GMM estimation (Windmeijer-corrected standard errors in parentheses). Hansen test=Test of instrument over-identification restrictions. AR(1)/AR(2)=Arrelano-Bond test for first- and second-order serial correlation. Period dummies included in all specifications (results not reported). Constant not reported. \* $p < 0.1$ , \*\* $p < 0.05$ , \*\*\*  $p < 0.01$ .

**Table 4: High-Skilled Migration and Economic Freedom**

	(1)	(2)	(3)	(4)	(5)	(6)
Economic Security	-0.317 (0.078)***		-1.170 (0.346)***		-0.356 (0.122)***	
Economic Opportunity		0.032 (0.028)		-0.188 (0.312)		-0.131 (0.149)
Per Capita Income	-0.224 (0.028)***	-0.234 (0.020)***	-0.121 (0.062)*	-0.191 (0.066)***	-0.110 (0.037)***	-0.186 (0.055)***
Population Size	-0.509 (0.046)***	-0.350 (0.052)***	-0.292 (0.100)***	-0.274 (0.101)***	-0.224 (0.078)***	-0.286 (0.076)***
Lack of Political Rights	-0.066 (0.045)	-0.014 (0.035)	-0.099 (0.083)	0.040 (0.074)	0.016 (0.071)	0.094 (0.073)
Lagged High-Skilled Migration Rate					0.556 (0.115)***	0.584 (0.093)***
Estimation Technique	DK-OLS	DK-OLS	IV-OLS	IV-OLS	SYS-GMM	SYS-GMM
Within $R^2$	0.256	0.245	0.167	0.255		
Hansen Test $\chi^2$ -Statistic (Pr.> $\chi^2$ )			7.03 (0.43)	5.47 (0.60)	60.31 (0.10)	58.71 (0.12)
AB AR(1)/AR(2) z-statistic (Pr.>z)					-2.61/0.03 (0.00)/(0.98)	-2.68/0.35 (0.00)/(0.73)
Number of Instruments			16	16	58	58
Number of Countries	90	89	90	89	90	89
Number of Observations	529	525	357	354	465	462

*Notes:* DK-OLS=Fixed-Effects OLS (Driscoll-Kraay standard errors in parentheses). IV-OLS=Fixed-Effects OLS with Lewbel's IV approach (cluster-robust standard errors in parentheses). SYS-GMM=System-GMM estimation (Windmeijer-corrected standard errors in parentheses). Hansen test=Test of instrument over-identification restrictions. AR(1)/AR(2)=Arrelano-Bond test for first- and second-order serial correlation. Period dummies included in all specifications (results not reported). Constant not reported. \* $p < 0.1$ , \*\* $p < 0.05$ , \*\*\*  $p < 0.01$ .

**Table 5: High-Skilled Migration and the Components of Economic Freedom**

## Appendix A. Additional Estimates

Dependent Variable → (Migration Rate)	(1) Total	(2) Total	(3) Total	(4) Medium- Skilled	(5) Medium- Skilled	(6) Medium- Skilled
Economic Freedom	-0.210 (0.152)	-0.343 (0.266)	-0.185 (0.100)*	-0.273 (0.176)	-0.742 (0.516)	-0.405 (0.155)***
Per Capita Income	-0.203 (0.012)***	-0.135 (0.055)**	-0.079 (0.035)**	-0.248 (0.023)***	-0.153 (0.077)**	-0.150 (0.060)**
Population Size	-0.413 (0.056)***	-0.083 (0.095)	-0.104 (0.071)	-0.709 (0.169)***	-0.347 (0.157)**	-0.256 (0.142)*
Lack of Political Rights	0.038 (0.023)	0.071 (0.065)	0.078 (0.038)**	-0.032 (0.038)	-0.010 (0.111)	0.038 (0.071)
Lagged Migration Rate			0.594 (0.061)***			0.621 (0.092)***
Estimation Technique	DK-OLS	IV-OLS	SYS-GMM	DK-OLS	IV-OLS	SYS-GMM
Within $R^2$	0.554	0.513		0.150	0.081	
Hansen Test $\chi^2$ -Statistic (Pr.> $\chi^2$ )		9.39 (0.23)	73.66 (0.27)		7.92 (0.34)	80.35 (0.13)
AB AR(1)/AR(2) z-statistic (Pr.>z)			-2.55/-2.04 (0.01)/(0.04)			-2.84/1.56 (0.00)/(0.12)
Number of Instruments		16	78		16	78
Number of Countries	90	90	90	90	90	90
Number of Observations	571	400	488	571	400	488

*Notes:* DK-OLS=Fixed-Effects OLS (Driscoll-Kraay standard errors in parentheses). IV-OLS=Fixed-Effects OLS with Lewbel's IV approach (cluster-robust standard errors in parentheses). SYS-GMM=System-GMM estimation (Windmeijer-corrected standard errors in parentheses). Hansen test=Test of instrument over-identification restrictions. AR(1)/AR(2)=Arrelano-Bond test for first- and second-order serial correlation. Period dummies included in all specifications (results not reported). Constant not reported. \* $p < 0.1$ , \*\* $p < 0.05$ , \*\*\*  $p < 0.01$ .

**Supplementary Table 1: Other Migration Variables and Economic Freedom**

Dependent Variable → (Migration Rate)	(1) Male High-Skilled	(2) Male High-Skilled	(3) Male High-Skilled	(4) Female High-Skilled	(5) Female High-Skilled	(6) Female High-Skilled
Economic Freedom	-0.364 (0.085)***	-1.236 (0.453)***	-0.797 (0.122)***	-0.585 (0.142)***	-1.713 (0.513)***	-0.773 (0.216)***
Per Capita Income	-0.222 (0.022)***	-0.133 (0.064)**	-0.132 (0.043)***	-0.216 (0.018)***	-0.134 (0.062)**	-0.140 (0.037)***
Population Size	-0.591 (0.053)***	-0.334 (0.106)***	-0.291 (0.104)***	-0.452 (0.057)***	-0.244 (0.126)*	-0.226 (0.099)**
Lack of Political Rights	-0.021 (0.030)	-0.045 (0.081)	0.042 (0.073)	-0.099 (0.051)*	-0.096 (0.096)	0.091 (0.090)
Lagged Migration Rate			0.570 (0.082)***			0.522 (0.092)***
Estimation Technique	DK-OLS	IV-OLS	SYS-GMM	DK-OLS	IV-OLS	SYS-GMM
Within $R^2$	0.236	0.170		0.193	0.071	
Hansen Test $\chi^2$ -Statistic (Pr.> $\chi^2$ )		7.72 (0.36)	56.41 (0.16)		11.66 (0.11)	57.55 (0.14)
AB AR(1)/AR(2) z-statistic (Pr.>z)			-2.69/0.26 (0.00)/(0.80)			-2.84/-1.27 (0.00)/(0.20)
Number of Instruments		16	58		16	58
Number of Countries	90	90	90	90	90	90
Number of Observations	571	400	488	571	400	488

*Notes:* DK-OLS=Fixed-Effects OLS (Driscoll-Kraay standard errors in parentheses). IV-OLS=Fixed-Effects OLS with Lewbel's IV approach (cluster-robust standard errors in parentheses). SYS-GMM=System-GMM estimation (Windmeijer-corrected standard errors in parentheses). Hansen test=Test of instrument over-identification restrictions. AR(1)/AR(2)=Arrelano-Bond test for first- and second-order serial correlation. Period dummies included in all specifications (results not reported). Constant not reported. \* $p < 0.1$ , \*\* $p < 0.05$ , \*\*\*  $p < 0.01$ .

**Supplementary Table 2: High-Skilled Migration by Males and Females and Economic Freedom**

## Appendix B. List of Source Countries

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Albania	El Salvador	Mexico	Tanzania
Algeria	Estonia	Morocco	Thailand
Argentina	Fiji	Namibia	Togo
Bahrain	Gabon	Nepal	Trinidad and Tobago
Bangladesh	Ghana	Nicaragua	Tunisia
Benin	Guatemala	Niger	Turkey
Bolivia	Guinea-Bissau	Nigeria	Uganda
Botswana	Haiti	Oman	Ukraine
Brazil	Honduras	Pakistan	United Arab Emirates
Bulgaria	Hungary	Panama	Uruguay
Burundi	India	Papua New Guinea	Venezuela
Cameroon	Indonesia	Paraguay	Zambia
Central African Republic	Iran	Peru	Zimbabwe
Chad	Israel	Philippines	
China	Jordan	Poland	
Colombia	Kenya	Romania	
Congo (Republic)	Korea (South)	Russia	
Congo (Democratic Republic)	Kuwait	Rwanda	
Costa Rica	Latvia	Senegal	
Cote d'Ivoire	Lithuania	Sierra Leone	
Croatia	Madagascar	Singapore	
Cyprus	Malawi	Slovakia	
Czech Republic	Malaysia	Slovenia	
Dominican Republic	Mali	South Africa	
Ecuador	Malta	Sri Lanka	
Egypt	Mauritius	Syria	

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## Appendix C. Main Variables

### Migration Rates

The emigration rates in the IAB brain drain dataset are measures for the share of immigrants from one source country living in the 20 OECD countries relative to the sum of residents and emigrants from the source country with the same level of education (Brücker et al., 2013: 5).

Formally, Brücker et al. (2013: 6) define the emigration rate for skill level  $e$  with gender  $s$  from source country  $i$  in period  $t$  as:

$$m_{i,t,e,s} = \frac{M_{OECD20,s,e,t}^i}{R_{s,e,t}^i + M_{OECD20,s,e,t}^i} \quad (A1)$$

$R_{s,e,t}^i$  denotes the total number of residents in source country  $i$ ,  $M_{OECD20,s,e,t}^i$  measures the stock of immigrants from  $i$  summed over all 20 destination countries.

Data on migrant population is obtained from the respective National Statistics Offices or the IPUMS (Integrated Public Use Microdata Series) website (a detailed overview is given in Brücker et al. (2013:7-11)). Considered are persons born abroad and aged 25 years or older. The imputation method in case of missing data is in detail explained by Brücker et al. (2013:4). For the calculation of  $R_{s,e,t}^i$ , the population shares of high, medium and low skilled individuals from Barro and Lee (2013) are applied (Brücker et al., 2013: 5).

Data and educational categories by Barro and Lee (2013) are widely used as their dataset is one of the most comprehensive sources for measures on international human capital. For an overview, see Hanushek (2013). The educational categories considered by Brücker et al. (2013: 2) are primary (low skilled: includes lower secondary, primary and no schooling); secondary (medium-skilled: high-school leaving certificate or equivalent) and tertiary education (high-skilled: higher than high-school leaving certificate or equivalent). These categories are consistent with those used by Barro and Lee (2013) who in turn rely on internationally-agreed definitions, i.e., the UNESCO International Standard Classification of Education.

## **Economic Freedom**

The *Fraser Institute index of economic freedom* is a summary index constructed from five components. The components in turn make use of 42 distinct variables; for instance, to construct the first component of the economic freedom index (government size) information on, inter alia, government consumption, tax rates and the share of government subsidies and transfers to total economic activity is used. In overview of all 42 variables is given in Gwartney et al. (2014: 4).

The five major components of economic freedom are:

1. *Size of government*; this component measures the influence of the political process on resource allocation. More government interference into the economic life (e.g., in the form of transfers) reduces economic freedom (Gwartney et al., 2014: 3).
2. *Legal system and property rights*; this component measures the security of property rights and the strength of the legal system, e.g., by considering the impartiality and independence of courts. A stronger legal system and more secure property rights correspond to higher levels of economic freedom (Gwartney et al., 2014: 5).
3. *Sound money*; this component considers the reliability of monetary policies. For example, price stability results in more economic freedom (Gwartney et al., 2014: 5).
4. *Freedom to trade internationally*; this component measures barriers to international trade, e.g., in the form of tariffs. Fewer barriers correspond to higher levels of economic freedom (Gwartney et al., 2014: 6).
5. *Regulation*; this component measures regulatory restraints that limit the freedom of exchange in credit, labor and other market regulations (e.g., business starting costs). Fewer regulatory restraints mean that economic freedom is higher (Gwartney et al., 2014: 6).

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