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Migration Costs and Determinants of Bilateral Migration Flows

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ROBERT SCHUMAN CENTRE FOR ADVANCED STUDIES
MIGRATION POLICY CENTRE (MPC)

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of Bilateral Migration Flows**

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The Migration Policy Centre (MPC)

Mission statement

The Migration Policy Centre at the European University Institute, Florence, conducts advanced research on global migration to serve migration governance needs at European level, from developing, implementing and monitoring migration-related policies to assessing their impact on the wider economy and society.

Rationale

Migration represents both an opportunity and a challenge. While well-managed migration may foster progress and welfare in origin- as well as destination countries, its mismanagement may put social cohesion, security and national sovereignty at risk. Sound policy-making on migration and related matters must be based on knowledge, but the construction of knowledge must in turn address policy priorities. Because migration is rapidly evolving, knowledge thereof needs to be constantly updated. Given that migration links each individual country with the rest of the world, its study requires innovative cooperation between scholars around the world.

The MPC conducts field as well as archival research, both of which are scientifically robust and policy-relevant, not only at European level, but also globally, targeting policy-makers as well as politicians. This research provides tools for addressing migration challenges, by: 1) producing policy-oriented research on aspects of migration, asylum and mobility in Europe and in countries located along migration routes to Europe, that are regarded as priorities; 2) bridging research with action by providing policy-makers and other stakeholders with results required by evidence-based policy-making, as well as necessary methodologies that address migration governance needs; 3) pooling scholars, experts, policy makers, and influential thinkers in order to identify problems, research their causes and consequences, and devise policy solutions.

The MPC's research includes a core programme and several projects, most of them co-financed by the European Union.

Results of the above activities are made available for public consultation through the website of the project: www.migrationpolicycentre.eu

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Abstract

In this paper I research economic, non-economic and the institutional determinants of bilateral migration flows into OECD countries. My contribution to the growing literature is two-fold. First, I explicitly account for the panel structure of migration costs (information acquisition, physical costs of the move and social exclusion). Second, building upon Beine *et al.* (2011b), I proceed with the analysis of determinants of bilateral migration flows disaggregated by educational attainments in the panel data environment. The preliminary results show that the defined cost variables are significant in explaining the volume and composition of the flow of migrants, the result not being sensitive to the model specification. Network effects promote negative self-selection and the quality of migrants positively correlates, while the physical distance, existence of a common language and colonial links between countries are insignificant in explaining the educational composition of migrants. I further conclude that the restrictive and skill selective immigration policies of the major destination countries bias the conventional role of the economic push and pull factors.

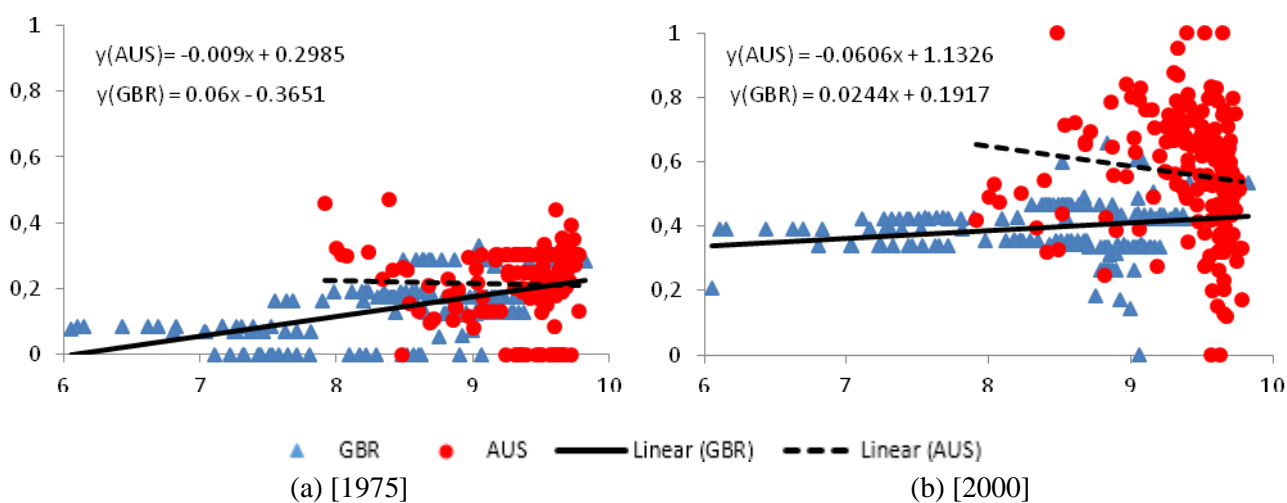
1. Introduction

According to the United Nations (2009a) the estimated worldwide stock of migrants in 2010 stood at 214 million, an increase of 19 million compared to 2005. The stock is unevenly distributed across continents: the largest being in Europe (70 million), followed by Asia (61 million) and North America (50 million). The dispersion of migrants is primarily driven by the economic opportunities, migration costs and immigration policies of receiving countries.

In order to enjoy better economic opportunities in developed destination countries, there are large migration costs to be paid upfront. The costs are associated with overcoming the distance, integration into the new society and overcoming numerous migration barriers created by immigration policies. According to Williamson (2006) after the discovery of the Americas only the wealthiest and the fearless made the move. “Then, improved educational levels and living standards in poor parts of the world and falling transport costs globally, thanks to new technologies – have made it increasingly possible for other potential emigrants to finance the move.”

To show the linkage between the migration costs and the educational composition of the immigrant population I plot the fraction of skilled migrants in the stock data against the logarithm of bilateral distance for the United Kingdom and for Australia.¹

Figure 1. Correlation of migrants’ education and distance. Horizontal axis – $\ln(\text{distance})$, vertical axis – fraction of skilled in the stock of migrants.



Comparing the pictures for 1975 and 2000 in Figure 1 two important observations have to be made: first, in 2000 compared to 1975 the mean of the educational attainments of migrants is higher. Second, the correlation between the fraction of tertiary educated in the stock and the bilateral distance was positive for the UK and negative for Australia. In 2000 the relationship weakened for the UK and became more negative for Australia. I conjecture that there is this trend because for the last two decades the migration costs have significantly decreased, making traveling easier and available to a wider population.

This paper explores the role of migration costs and institutional factors on the size, educational and country of origin composition of the migrant population. It is based on Beine *et al.* (2011b) and Mayda

¹ The figure is for illustrative purposes only as it does not account for other control variables.

(2010) and contributes to the literature in two significant ways. First, I research the flow determinants by education groups in a panel environment for 1975-2000 with a five-year interval. Second, I attempt to quantify the migration costs and investigate their correlation with the flow of migrants accounting for the binding immigration policies of destination countries.

2. Literature review

Economic, demographic, geographic, cultural, historical and policy factors all play an important role in determining the direction of migration flows, their magnitude and composition. Original research on determinants of international migration is focused on one country only: Hatton (1995) and Hatton (2005) research factors behind the emigration and immigration trends for the UK, and Clark *et al.* (2007) investigate the fundamentals of immigration into the United States. Clark *et al.* (2007) emphasize the role of the immigration policy and the selection of migrants based on the country of origin and age of entry, whereas Hatton (2005) only considers economic and policy-related variables.

The emergence of comparable cross-country migration flow and stock data made it possible to conduct the longitudinal analysis. Pedersen *et al.* (2008) and Mayda (2010) use OECD (2010a) data to research the economic and non-economic determinants of bilateral migration flows in a panel data environment. For 14 OECD countries during 1980 and 1995 Mayda (2010) finds a significant role played by geographical (distance), cultural (common language and colonial links) and demographic factors. In several specifications the author finds a positive but insignificant effect of the push factors, which can be explained by the immigration quotas in the receiving countries. The network effects are measured by including lagged flow values into the regression.

The econometric model of Pedersen *et al.* (2008) is much different from Mayda (2010) and includes a richer set of regressors. However the selective character of immigration policies in major receiving countries is badly accounted for. They found that the income in the sending country has an inverted U-shape effect: the richest and the poorest countries are the least likely to send migrants. The authors do not find empirical support for the “welfare magnet hypothesis”, according to which migrants are potentially attracted by the level of social expenditure in the receiving country. Similar to the existing literature, the network effects are found to be positive and significant in explaining immigration flows. Countries with more selective immigration policies tend to have stronger network effects.

To the best of my knowledge there are few studies that investigate the linkage between migration costs and composition of the migrant population across countries. Beine *et al.* (2011b) research the relationship between the educational composition of migrants and the size of diaspora². The authors find that diasporas have a positive effect on the volumes of migrants irrespective of the skill level. However, the effect on the educational composition of migrants is the opposite: countries with large diasporas tend to have smaller fractions of the educated among the incoming migrants from 1990 until 2000. This phenomenon is explained by the fact that larger diasporas decrease migration costs for newcomers (via information dissemination and financial channels) irrespective of skill level. The authors do not find strong evidence for the effect of colonial links. They note that historical links between countries are embodied in the current diaspora and new immigrants arrive because of the current economic benefits and the diaspora, not because of the former colonial links. The linguistic proximity increases the degree of mobility of skills and helps the low skilled find employment.

² By “diaspora” the authors refer to the cross-country dispersion of people who originally come from the same country (region) with no implicit emphasis on any nation. I will also keep to this definition here.

3. Formalization of migration costs

Overall individual migration costs can be broken down into three categories:

1. **Costs of obtaining information.** These are the costs of getting information about which destination country it is better to go to in terms of employment opportunities, welfare benefits and the legal treatment of foreign nationals. According to Beine *et al.* (2011b) potential migrants and newcomers can lower their costs by relying on the informational and financial support provided by members of diaspora. Further, diasporas affect the volume and composition of migrants via family reunification. Pedersen *et al.* (2008) and Mayda (2010) find strong empirical support for the existence of network effects.

I conjecture that the arrival of the internet in developing countries has strongly facilitated the dissemination of information amongst potential migrants. Figure 3 in Appendix D shows that even in countries with most skill-based immigration policies (Canada and Australia, for example) about 20% come through family reunification programs and at least that many are family members of accompanying workers.

2. **Physical costs.** These include the costs that are associated with the actual move (transportation and obtaining a visa, if needed). This is affected by the development of cross-border transportation network (the availability of cheaper airfares, better bus and train networks).
3. **Costs of social exclusion.** These include the costs of integration once in a foreign country. Disutility also comes from being away from the family, friends, lower pay compared to the locals, limited social communication due to the language barrier, discrimination and no access to voting.
4. **Immigration policy.** It is quite challenging to quantify the immigration policy on a comparative cross-country basis. Mayda (2010) and Ortega and Peri (2009) have separately conducted studies in which they quantified the tightness of immigration legislation over time. I use the result of Ortega and Peri (2009) for the OECD countries under investigation. The immigration policy is characterized with two variables: tightness in entry laws and tightness in asylum laws (see Appendix B). Tougher entrance or asylum laws mean higher values in the respective variables.

4. The Model

For the sake of simplicity I assume only two countries: developed country A (North) and developing Country B (South). Each country has two types of workers: low-skilled L and highly-skilled H . Respective wages for the two types are w_L^A and w_H^A in Country A and w_L^B and w_H^B in Country B . The following relationship between wages holds:

$$w_H^A > w_H^B > w_L^A > w_L^B \quad (1)$$

The assumption in (1) ensures that (i) migration incentives exist and a non-trivial fraction of population of Country B emigrates; and (ii) wages are incentive compatible - the highly-skilled workers from Country B cannot work as low-skilled workers in Country A .

The countries also differ in the skill composition of the local population. Let α^A (α^B) denote the fraction of H -type workers in country A (country B). If the population in both countries is normalized to 1 then α^A and α^B denote amounts of skilled workforce.

The individual decision to migrate is governed by the following rule:

$$w_s^A - w_s^B > w_s^B \cdot C_{is}, \forall s = L, H \quad (2)$$

where C_{is} are broadly defined individual migration costs for agent i of type s . It is important to understand the rationale behind inequality (2). It says that a worker migrates if the gain from migration (difference of the wages) exceeds the individual migration costs, which for the normalization purpose are expressed in terms of the wage of the sending country.

The individual migration costs are defined as follows:

$$C_{is} = D + H + S + R + c_{is} \quad (3)$$

where D is the geographical distance from A to B, H is the stock of migrants from Country B in Country A. S is the sending country fixed effect, which accounts for the fact that residents from certain sending countries are more welcomed in the destination countries than residents of other countries due to the inter-government agreements, political regimes or the economic situation. R is the receiving country fixed effect, which captures the degree of openness and the skill-selectivity of the immigration policy. c_{is} is a stochastic random component distributed normally with mean 0 and variance σ^2 , $c_{is} \sim N(0, \sigma^2)$.

Combining (2) and (3) I can write down the probability that a random migrant emigrates, i.e. his costs are below the threshold. Given the assumption that the population of the sending country is normalized to 1, Equation (4) also gives the number of migrants from B to A:

$$Prob(C_{is} < \frac{w_s^A}{w_s^B} - 1) = \Phi \left(\frac{w_s^A}{w_s^B} - 1 - D - H - S - R \right) \quad (4)$$

where $\Phi(\cdot)$ is the cdf of the normal distribution. Equation (4) is directly estimable. However, the wage data comparable across countries and over time are scarce (see Rosenzweig, 2010 for an overview of data sources). For this purpose I need to express equation (4) in terms of more readily available indicators.

$$\begin{aligned} X &= \frac{w_H^A}{w_L^A}, Y = \frac{w_H^B}{w_L^B} \\ W^A &= \alpha^A \cdot w_H^A + (1 - \alpha^A) \cdot w_L^A \\ W^B &= \alpha^B \cdot w_H^B + (1 - \alpha^B) \cdot w_L^B \\ Z &= \frac{W^A}{W^B} \end{aligned} \quad (5)$$

where:

X and Y is the skill premium in A and B respectively; W^A and W^B are average wages in A and B ; Z is the wage gap between A and B .

Combining equations (4) and (5) and normalizing $w_L^B \equiv 1$, the volumes of the low-skilled M_L and highly-skilled M_H migration flows are:

$$M_L = \Phi \left(\frac{Z(\alpha^B(Y-1)+1)}{\alpha^A(X-1)+1} - 1 - D - H - S - R \right) \cdot (1 - \alpha^A) \quad (6)$$

$$M_H = \Phi \left(\frac{XZ(\alpha^B(Y-1)+1)}{Y(\alpha^A(X-1)+1)} - 1 - D - H - S - R \right) \cdot \alpha^A \quad (7)$$

The above two equations show how the educational composition of migrants depends on the key economic characteristics of the sending and receiving countries and the structure of the migration costs. However, still the quality extensive panel data on the skill premium is missing. Therefore, using equations (11) and (12), I express equation (7) in terms of the Gini index, which is closely related to the skill premium (see Appendix A for the derivations):

$$M_H = \Phi \left(Z \frac{\alpha^B}{\alpha^A} \frac{G^A + \alpha^A}{G^B + \alpha^B} - 1 - D - H - S - R \right) \cdot \alpha^A \quad (8)$$

5. Estimation

5.1 Data sources

Equation (8) dictates what variables must be included in the regression. Due to data unavailability for the educational composition of the incoming migration flows, I split the estimation into two parts: flow data and stock data. Estimation based on the flow data answers the question of the determinants of the volumes of the migration flows. Analysis of the stock data will answer the question of the determinants of the educational composition of migrants. From the data sources indicated in Table 1 I construct a balanced panel dataset for 67 sending and 13 receiving countries for the period 1996-2006. The number of receiving countries was governed by the availability of the immigration policy index, the number of sending countries was chosen in such a way that it was the same for all 13 receiving countries. The chosen time frame allows us to observe the countries of the former Soviet Union and Yugoslavia as independent migrant sending countries.

Table 1. Utilized data sources.

Variable	Time span	Source
√ Bilateral flows of migrants	√ 1970 - 2007	√ United Nations (2009b)
√ Bilateral stocks of migrants	√ 1975 - 2000	√ Brucker and Defoort (2009), Beine et al. (2011a)
√ Internet penetration rate	√ 1990 - 2010	√ OECD (2009)
√ Airline deregulation index	√ 1990 - 2010	√ OECD (2009)
√ Immigration policy	√ 1985 - 2005	√ Ortega and Peri (2009)
√ Income	√ 1970 - 2010	√ Heston et al. (2010), Solt (2009)
√ Cultural and physical distance	√	√ Head et al., Glick and Rose (2002)
√ Years of schooling	√	√ Barro and Lee (2000)

5.2 Flow data

To estimate the determinants of the total flow of migrants I estimate the following regression:

$$\begin{aligned} \frac{flow_{ijt}}{pop_{it}} = & \beta_0 + \beta_1 GDPpc_{i(t-1)} + \beta_2 GDPpc_{j(t-1)} + \beta_3 Gini_{i(t-1)} + \beta_4 Gini_{j(t-1)} + \\ & + \beta_5 yr_sch_{i(t-1)} + \beta_6 yr_sch_{j(t-1)} + \beta_7 ypop_{j(t-1)} + \beta_8 IPR_{jt} + \beta_9 Airline_{it} + \\ & + \beta_{10} pol_entry_{it} + \beta_{11} pol_asyl_{it} + \beta_{12} Lang_{ij} + \beta_{13} Border_{ij} + \\ & + \beta_{14} ColLinks_{ij} + \beta_{15} Year_t + \beta_{15} Dest_i + \beta_{15} Orig_j + u_{ijt} \end{aligned} \quad (9)$$

where: i stands for a destination country, j stands for a sending country, and t is time. $GDPpc$ is gross domestic product *per capita* in PPP constant prices 2005, $Gini$ is the Gini index, yr_sch is years of schooling, $ypop$ is fraction of population aged 15-29, IPR is internet penetration rate (number of internet users per 100 inhabitants), $Airline$ is the airline deregulation index, pol_entry and pol_asyl are variables that quantify entrance and asylum immigration rules, $Lang$ is a dummy variable equal to 1 if two countries share a similar language and 0 otherwise, $Border$ is a dummy variable that equals 1 if two countries share the same border and 0 otherwise, $ColLinks$ is a dummy variable that equals 1 if two countries share common history, $Year$, $Dest$, $Orig$ are year, destination country and origin country fixed effects, u is a stochastic error term the satisfies the classical assumptions.

Regression 9 is estimated with OLS and GMM to account for the autocorrelation of the error term. Fixed effect is not applicable in this particular case, because due to the differencing the parameters at the dummy variables cannot be estimated. The estimation results are presented in Table 2.

Table 2. Flow regression estimation results (OLS and GMM). Dependent variable - inflow of migrants per 1000 residents in the receiving country. Standard errors are clustered by country couple.

	OLS		GMM	
	Estimate	Robust SE	Estimate	Robust SE
ln_distw	-0.049	0.008***	-0.048	0.008***
ln_gdp_orig	0.110	0.052**	0.116	0.049**
ln_gdp_dest	-9.622	2.882***	-5.409	1.614***
ln_gdp_orig2	-0.006	0.003**	-0.007	0.003**
ln_gdp_dest2	0.469	0.138***	0.266	0.078***
ln_g_orig	0.051	0.024**	0.037	0.023
ln_g_dest	0.039	0.019**	0.033	0.018*
yr_sch_orig	0.004	0.031	0.016	0.029
yr_sch_dest	0.147	0.123	0.086	0.118
ypop	0.010	0.126	0.084	0.116
ipr_orig	0.001	0.000	0.001	0.0004*
airline	-0.020	0.005***	-0.020	0.005***
comlang	-0.010	0.01	-0.001	0.009
comborder	0.547	0.092***	0.510	0.091***
colony	-0.010	0.013	-0.006	0.012
pol_entry	-0.008	0.003***	-0.007	0.003***
policy_asyl	0.018	0.00%***	0.014	0.004***
_cons	48.912	14.934***	27.076	8.363***
No. obs	5757		5757	
R2	0.14		0.14	

Despite technological progress distance remains a significant article of migration costs and the larger the distance between two countries the smaller are the bilateral migration flows. The coefficient at the internet penetration rate is positive and significant in most specifications suggesting that better Internet access in origin countries facilitates the dissemination of knowledge and information to potential migrants. The coefficient at *Airline* is negative and significant in all specifications, suggesting that the more developed the airline network (a decrease in the deregulation index) the higher the migration flows. Common language and colonial links do not explain the studied migration flows. However, the existence of common borders facilitates the migration flows. Immigrant entry and asylum restrictions are significant in all specifications.

Amongst the economic determinants, the effect of the mean income (proxied by *GDP per capita*) is surprising for the destination country. Contrary to the theoretical prediction it is negative and significant, meaning that more developed countries accept fewer migrants. This is the case, however, for the developed countries with restrictive immigration policies. New developed receiving countries have fewer restrictive immigration policies and thus accept more migrants. The coefficient on the income in the sending countries is positive and again contradicts the theoretical predictions. I justify this result by the fact that the fast growing developing countries are making it possible for potential migrants to satisfy the budget constraint. Significance of the squared of mean income for both countries suggests the existence of nonlinear effects that have to be investigated in more detail. Positive and significant coefficients on the Gini index suggest that more unequal countries accept more migrants. I explain this finding by the fact that there is an increasing fraction of the skilled in the official migration flows. These react positively to any increase in skill premium, a fact that is more thoroughly researched in the next section where I account for the skill composition of the migrants.

5.3 Stock data

The regression specification in the previous section helps to learn the determinants of the overall flow of migrants. Equations (6) and (7) point to the necessity to disaggregate the flows by educational attainments. I follow the approach of Beine *et al.* (2011b) and proxy the flow variable by differencing the stocks. Stock data are available for 6 OECD countries with five year intervals. This proxy is not perfect because it omits those migrants who came and left their destination country within five years. To partially account for this problem I use lagged flow variables as an instrument for the stock.

The econometric specification estimates the growth rate of the skilled and unskilled migrant stock:

$$\begin{aligned} \frac{stock_{sijt} - stock_{sij(t-1)}}{stock_{sij(t-1)}} = & \beta_0 + \beta_1 stock_{ij(t-1)} + \beta_2 GDPpc_{i(t-1)} + \beta_3 GDPpc_{j(t-1)} + \\ & + \beta_4 Gini_{i(t-1)} + \beta_5 Gini_{j(t-1)} + \beta_6 yr_sch_{i(t-1)} + \beta_7 yr_sch_{j(t-1)} + \beta_8 ypop_{j(t-1)} + \\ & + \beta_9 Airline_{it} + \beta_{10} pol_entry_{it} + \beta_{11} pol_asyl_{it} + \\ & + \beta_{12} Lang_{ij} + \beta_{13} Border_{ij} + \beta_{14} CollLinks_{ij} + \beta_{15} Year_t + \beta_{16} Dest_i + \beta_{17} Orig_j + u_{sijt} \end{aligned} \quad (10)$$

where s is migrant's skill level, $s = H, L$. Subscript i stands for a destination country and subscript j stands for an origin country. $stock_{sijt}$ is the stock of migrants of skill s at time t in destination country i who came from origin country j . $GDPpc$ is the gross domestic product *per capita*, PPP constant prices 2005, $Gini$ is the Gini index, yr_sch is years of schooling, $ypop$ is fraction of population aged 15-29, $Airline$ is the airline deregulation index, pol_entry and pol_asyl are variables that quantify entrance and asylum immigration rules, $Lang$ is a dummy variable equal to 1 if two countries share a similar language and 0 otherwise, $Border$ is a dummy variable that equals 1 if two countries share the same border and 0 otherwise, $CollLinks$ is a dummy variable that equals 1 if

two countries share common history and 0 otherwise. *Year*, *Dest*, *Orig* are year, destination country and origin country fixed effects, while u is a stochastic error term.

Since $stock_{sij(t-1)}$ on the left-hand side is included in the total stock of migrants, $stock_{ij(t-1)}$, on the right-hand side, this creates an explicit functional dependence between the dependent and independent variables. To solve the problem I instrument $stock_{ij(t-1)}$ with lagged flow values. The estimation results of regression (10) are presented in columns 1-4 of Table 3. In column 5 the dependent variable is the education composition of migrants, fraction of those with tertiary education in the stock of migrants.

6. Conclusions

The main findings of the paper can be summarized as follows. Distance is a significant costs variable. In the case of the flow of migrants, the greater the distance the smaller the flows. This result holds for all specifications. However, the result is reversed for the skill composition of migrants: the more distant the country, the likelier migrants are to be highly-skilled. This confirms my observation in the motivation section that only the most capable will make it to a distant country. The lagged stock of migrants in the instrumental variable (IV) specification is positively related to the flow of migrants and negatively to the composition. This confirms the conjecture that diasporas decrease migration costs, the decrease being most significant for the low skilled. The income in the origin country is negative and significant in all specifications. As predicted by the model, income inequality in the destination country attracts talent, which is visible by the positive and significant beta in OLS and IV specifications for the skilled growth and educational composition. The coefficient at *Airline* is negative and significant in all specifications, which, by the construction of the variable, means that the more deregulated the market (i.e. a decrease in the deregulation index) the more migrants can come into the country. The entry policy variable is significant in all specifications. Colonial links, a common language and common borders are found to play no role in the growth of unskilled migration. I would explain this result with the existence of restrictive immigration policies that are most binding for those at the bottom of the skill ladder. Common language is important in attracting talent. The coefficient on the colonial links is negative and significant in the skilled growth and composition specifications, implying that history plays a negative role for the destination of the skilled.

Table 3. Stock regression estimation results.

	Skilled growth				Unskilled growth				Composition	
	<i>1</i>		<i>2</i>		<i>3</i>		<i>4</i>		<i>5</i>	
	OLS	Robust SE	IV	Robust SE	OLS	Robust SE	IV	Robust SE	OLS	Robust SE
stock_pop (t-1)	-0.009	0.008	0.056	0.033*	-0.011	0.006*	0.013	0.029	-0.010	0.004**
ln_distw	-0.117	0.026***	-0.102	0.028***	-0.121	0.029***	-0.116	0.03***	0.065	0.010***
ln_gdp_orig (t-1)	-0.119	0.024***	-0.138	0.028***	-0.150	0.043***	-0.158	0.042***	-0.013	0.007*
ln_gdp_dest (t-1)	1.257	0.991	1.625	1.002	2.640	1.186**	2.805	1.104**	0.189	0.179
ln_g_orig (t-1)	0.021	0.088	0.007	0.090	-0.125	0.150	-0.132	0.153	0.032	0.027
ln_g_dest (t-1)	3.495	0.742***	3.467	0.750***	-2.975	0.864***	-2.981	0.899***	0.390	0.089***
yr_sch (t-1)	-0.003	0.011	-0.001	0.012	0.004	0.014	0.005	0.015	0.005	0.003
ypop (t-1)	-0.837	0.736	-0.476	0.801	1.178	0.933	1.301	1.01	-0.201	0.225
airline	-0.101	0.025***	-0.104	0.025***	-0.055	0.026***	-0.057	0.03*	-0.002	0.005
pol_entry	0.057	0.017***	0.045	0.019**	-0.143	0.032***	-0.146	0.03***	-0.018	0.004***
pol_asyl	-0.142	0.033***	-0.136	0.033***	0.041	0.036	0.042	0.035	0.060	0.006***
colony	-0.092	0.053*	-0.242	0.111**	-0.055	0.073	-0.109	0.082	-0.058	0.021***
comlang	-0.017	0.038	0.006	0.044	0.066	0.071	0.073	0.072	0.067	0.014***
comborder	-0.207	0.107*	-0.342	0.151**	-0.085	0.102	-0.134	0.135	0.048	0.060
_cons	-23.032	9.819**	-26.910	9.928**	-13.651	10.502	-16.758	10.351	-3.269	1.677*
obs	1457		1455		1470		1468		1457	
adj. R2	0.14				0.18				0.54	
F-stat(1st stage)			9.28				9.32			

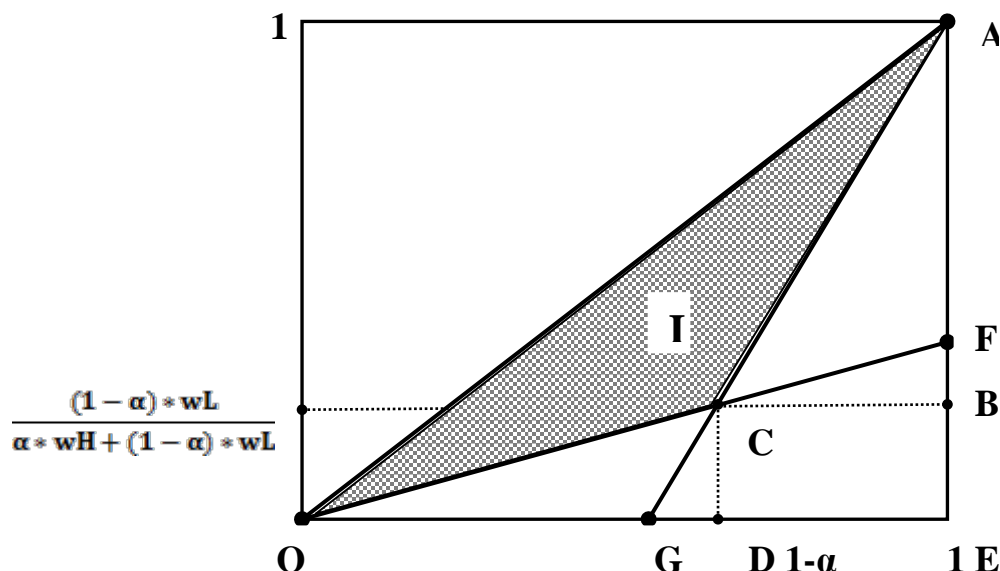
Panel one (OLS) and two (IV): dependent variable is the growth rate of skilled migrants; panel three (OLS) and four (IV): dependent variable is the growth rate of unskilled migrants; panel five (OLS): dependent variable is the fraction of skilled migrants in the total stock. For panels two and four the instrumented variable is *stock_pop*, the instruments are lagged migration flows. Year and destination country fixed effects are included in each specification. Standard errors are clustered by country couple.

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Appendix

Derivation of the Gini Index for the model



On the horizontal axis is the cumulative population of mass one with α being the fraction of the highly-skilled. On the vertical axis is the cumulative wealth in the economy. Since the low skilled get w_L their overall contribution to the economy is $w_L(1-\alpha)$, the contribution of the highly-skilled is $w_H\alpha$. Then the total wealth in the economy is $w_L(1-\alpha) + w_H\alpha$, which is normalized to one.

OA is the line of egalitarian distribution: each agent adds an equal amount of wealth to the economy. Line OF has slope $\frac{w_L}{w_L(1-\alpha) + w_H\alpha}$ and shows the contribution of the low skilled. Line

GA has slope $\frac{w_H}{w_L(1-\alpha) + w_H\alpha}$ and shows the contribution of the high skilled. The Gini index is the

ratio of the area of the shaded triangular OCA to the area of triangular OEA , which equals $\frac{1}{2}$. Then:

$$Gini = \frac{S_{OCA}}{S_{OEA}} = 2 \cdot I$$

$$I = S_{OEA} - S_{ODC} - S_{DCBE} - S_{CBA}$$

where:

$$S_{OEA} = \frac{1}{2}$$

$$S_{ODC} = \frac{1}{2} \frac{w_L(1-\alpha)^2}{w_L(1-\alpha) + w_H \cdot \alpha}$$

$$S_{DCBE} = \frac{w_L \alpha (1 - \alpha)}{w_L (1 - \alpha) + w_H \cdot \alpha}$$

$$S_{CBA} = \frac{1}{2} \frac{w_H \cdot \alpha^2}{w_L (1 - \alpha) + w_H \cdot \alpha}$$

Then the Gini index in general form is:

$$G = \frac{\alpha \cdot (1 - \alpha) \cdot (w_H - w_L)}{w_L \cdot (1 - \alpha) + w_H \cdot \alpha}$$

Taking definitions from the system of equations (5) I obtain:

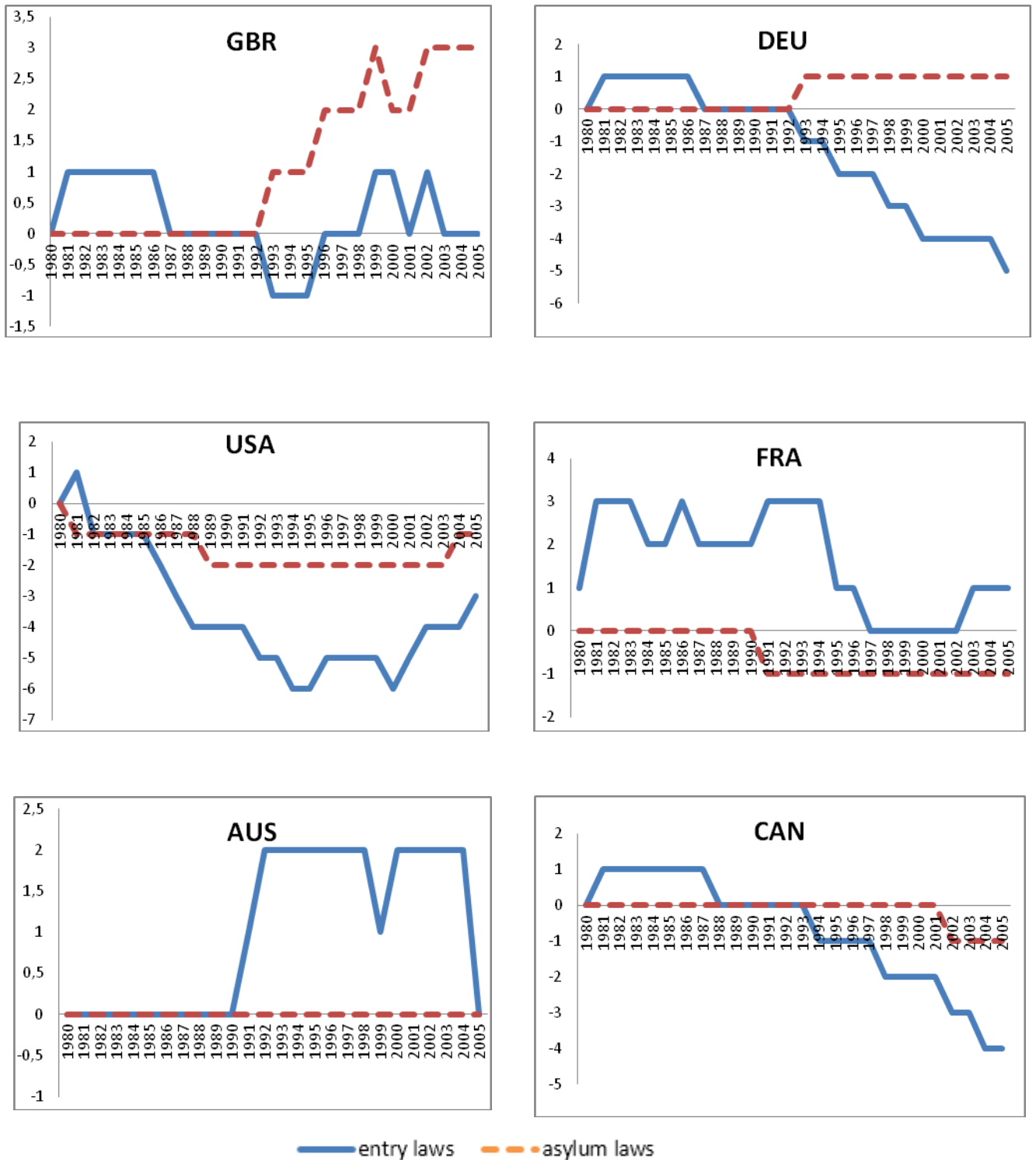
$$G_A = \frac{\alpha^A \cdot (1 - \alpha^A) \cdot (X - 1)}{1 + \alpha^A \cdot (X - 1)}$$

$$G_B = \frac{\alpha^B \cdot (1 - \alpha^B) \cdot (Y - 1)}{1 + \alpha^B \cdot (Y - 1)}$$

$$X = \frac{(1 - \alpha^A)(G^A + \alpha^A)}{\alpha^A (1 - \alpha^A - G^A)} \quad (11)$$

$$Y = \frac{(1 - \alpha^B)(G^B + \alpha^B)}{\alpha^B (1 - \alpha^B - G^B)} \quad (12)$$

Figure 3. Tightness of entrance and asylum laws.



Source: Ortega and Peri (2009). Author's illustration.

Table 4. Cross-country discrepancies in the definition of a migrant in the inflow data.

Origin criterion				
	Country of birth	Country of previous permanent residence	Country of citizenship	
Time criterion (intended duration of stay)	three months	Austria ^(F) , Czech Republic ^(*) , Denmark ^(**)	Belgium, Netherlands ^(D) , Slovenia	
	four months		Netherlands ^(D)	
	six months	Denmark ^(**) , Iceland, Norway		
	one year	Czech Republic ^(*) , Estonia, Finland, Italy, Latvia, Lithuania ^(B) , New Zealand, Sweden, United Kingdom	France, Hungary ^(A) , Switzerland	
	permanent (open-ended) permission to stay	United States	Australia, Canada, Croatia, Czech Republic ^(*) , Israel ^(E) , New Zealand, Poland, Slovakia	Hungary ^(A)
	No time criterion		Germany, Luxembourg ^(C) , Spain	Luxembourg ^(C)

* Possession of permanent or long-term residence (at least one year), and three months for foreign nationals from EEA.

** Six-months stay for foreigners from EEA and Switzerland, three months for other foreign nationals.

(A) Year-long residence permit and settlement permit issued after continuous residence for minimum three years.

(B) Holding one-year residence permit, a person must stay in the receiving country for at least six months.

(C) Country of citizenship definition has been in use since 1990.

(D) Duration of four months is valid since October 1994.

(E) Also includes holders of a three-year residence permit for "potential migrants".

(F) From 2002 onwards.

Table 5. Cross-country discrepancies in the definition of a migrant – outflow data.

Destination criterion			
	Country of next residence	Citizenship	
Time criterion (expected duration of leave)	three months	Austria ^(A)	Belgium, Slovenia
	six months	Denmark, Lithuania, Norway	
	one year	Estonia, Finland, Italy, Latvia, New Zealand, Sweden, United Kingdom	Netherlands ^(B)
	permanent (open-ended) residence abroad	Australia, Croatia, Czech Republic, New Zealand, Poland, Slovakia	
	No time criterion	Germany, Iceland, Spain	Hungary, Luxembourg, Switzerland

(A) No time criterion is specified before 2002.

(B) Year-long criterion until September 1994. Since October 1994 - eight months.

Table 6. Flow data description.

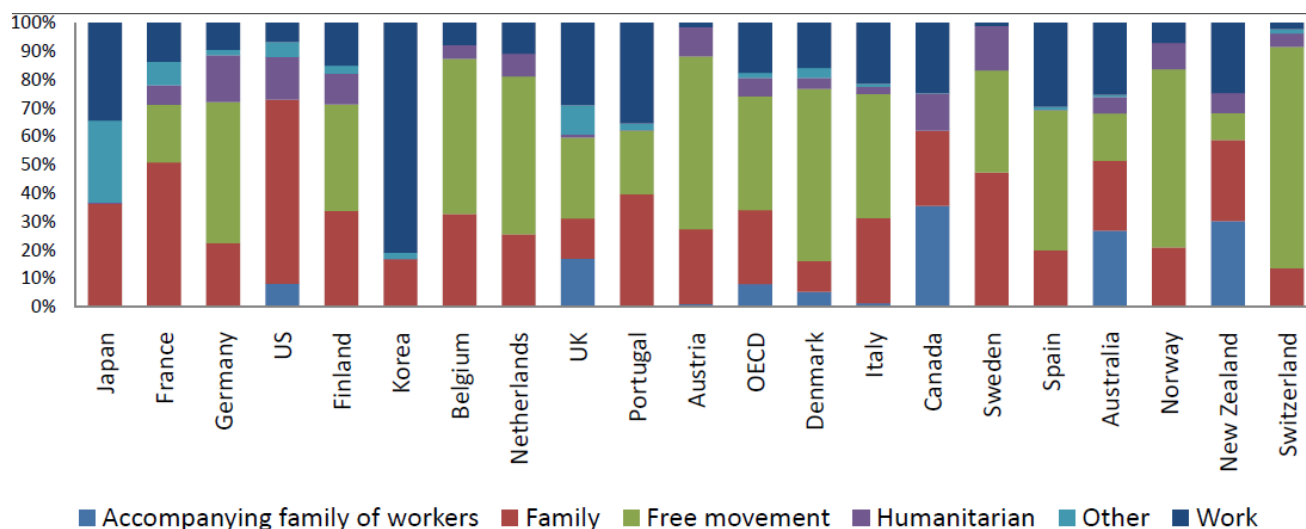
Name	Definition	
Australia	Inflow	Permanent arrivals.
	Outflow	Permanent departures.
Austria	Inflow	Foreign nationals who intend to stay for at least three months (since 2002). Before 2002 no time criterion was specified.
	Outflow	Residents who intend to reside abroad for at least three months. Before 2002 no time criterion was specified.
Belgium	Inflow	Foreign nationals and citizens who intend to stay for at least three months.
	Outflow	Residents departing with the intention to stay abroad for at least three months.
Canada	Inflow	Data are on foreign nationals granted permission to reside permanently in Canada.
	Outflow	Data are not available.
Croatia	Inflow	Foreign nationals and citizens with permanent residence in Croatia.
	Outflow	Cancellation on permanent residence.
Czech Republic	Inflow	Foreign nationals with permanent residence or residence permit valid for minimum one year, and EEA citizens who intend to stay for at least three months.
	Outflow	Expiration of residence permit or cancellation of permanent residence.
Denmark	Inflow	Foreign nationals who intend to stay for three months or more, and foreign nationals from EEA and Switzerland who intend to stay for at least six months.
	Outflow	Residents leaving the country for at least six months.
Estonia	Inflow	Registered persons who intend to stay for at least one year.
	Outflow	Deregistered citizens who intend to reside abroad for at least one year.
Finland	Inflow	Holders of a residence permit for at least one year and returning citizens
	Outflow	Residents who intend to stay abroad for at least one year.
France	Inflow	Foreign nationals who obtain a residence permit for one year or more and residents from EEA who do not require a residence permit.
	Outflow	No data are available.
Germany	Inflow	Foreign nationals who register their dwelling. Immigrating citizens are people of German descent who have the right to German citizenship and citizens from DDR.
	Outflow	Residents who leave the country to establish residence abroad.

Name		Definition
Hungary	Inflow	Foreign nationals with residence (valid for one year) or settlement permits (eligible for after three years of continuous residence).
	Outflow	Expiration, cancelation or invalidation of the residence (settlement) permit.
Iceland	Inflow	Foreign nationals who intend to stay for six months or more.
	Outflow	Foreign nationals or citizens who are absent for at least six months
Israel	Inflow	Foreign nationals who register for permanent residence or a three-year residence permit.
	Outflow	Data are not available.
Italy	Inflow	Foreign nationals who hold a residence permit for one year. Also foreign nationals from EEA members who intend to stay for at least one year. Data also include returning citizens
	Outflow	All residents departing for one year or more
Latvia	Inflow	Foreign nationals with a residence permit one year or more.
	Outflow	Persons who change their country of residence for one year or more
Lithuania	Inflow	Holders of a residence permit for one years or more and who stay in the country for at least six months.
	Outflow	Persons who intend to stay abroad for at least six months.
Luxembourg	Inflow	Foreign nationals who intend to establish residence with no time criterion specified.
	Outflow	Foreign nationals who intend to establish residence abroad with no time criterion specified.
Netherlands	Inflow	Foreign nationals who possess a residence permit and intend to stay for at least three months (until September 1994). Since October 1994 residents who intend to stay for at least four months.
	Outflow	Intention to leave the country for at least one year (until September 1994) and eight months since October 1994.
New Zealand	Inflow	Persons who intend to stay for one year or more, or permanently.
	Outflow	Residents departing for an intended period of stay for one year or permanently.
Norway	Inflow	Foreigners who wish to stay in the country for six months or more.
	Outflow	Residents who wish to leave the country for at least six months.
Poland	Inflow	Foreign nationals who establish their permanent residence.
	Outflow	Residents who leave to establish permanent residence abroad.
Slovakia	Inflow	Persons who register their permanent residence in the country.
	Outflow	Residents who de-register as permanent residents.

Name		Definition
Slovenia	Inflow	Intention to reside in the country for at least three months
	Outflow	Deregistration with intention to stay abroad for at least three months. The data are supplemented by government estimates.
Spain	Inflow	Registration of residence. No time criterion is applied.
	Outflow	Deregistration of residence. No time criterion is applied.
Sweden	Inflow	Foreign nationals and citizens who intend to stay in the country for at least one year.
	Outflow	Residents who intend to leave the country for at least one year.
Switzerland	Inflow	Foreign nationals who hold residence permit valid for at least a year.
	Outflow	Resident departing to establish temporary or permanent residence abroad.
United Kingdom	Inflow	Persons who have resided abroad for more than a year and upon entrance show intention to stay in the country for at least a year.
	Outflow	Residents who have resided in the country for at least a year and intent to stay abroad for one year or more.
United States	Inflow	Foreign-born persons who possess permanent residence.
	Outflow	Data are not available.

Source: United Nations (2009b). Author's illustration.

Figure 3. Migrants into OECD by category of entry. Reference year 2008.



Source: United Nations (2009b). Author's illustration.