

## **International Migration and Development**

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Abstract. In this chapter, I selectively review academic literature on the causes and consequences of emigration from developing countries. My aim is to identify facts about international migration that are relevant to those concerned about why labor moves between countries and how these movements affect sending-country economies. Empirical work on global labor flows is still in an early state. As is often the case, the literature provides incomplete answers to some of the most urgent questions. Nevertheless, recent work yields a number of robust results and is helpful for identifying where future research should be directed.

## 1. Introduction

A decade ago, trade and investment liberalization dominated the global economic policy agenda. The WTO had recently been created, the US, Mexico and Canada were implementing NAFTA, and much of Southeast Asia and South America were near the peak of an economic boom that was driven in part by greater openness to inflows of foreign capital. In bilateral and multilateral discussions of economic integration, global migration was often missing from the docket entirely.

Today, international labor flows are seen as an integral part of the process of globalization. Between 1990 and 2005, the number of individuals residing outside of their country of birth grew from 154 million to 190 million, reaching a level equivalent to 3% of the world population (United Nations, 2006). In many developing countries, emigration rates have increased dramatically. Between 1990 and 2000, the fraction of the adult population living in OECD countries rose from 30% to 35% in Jamaica, 14% to 20% in El Salvador, 8% to 13% in the Dominican Republic, 8% to 12% in Mexico, 7% to 12% in Haiti, 4% to 8% in Honduras, and 2% to 6% in Ecuador.<sup>1</sup>

The growth in labor flows from low-income to high-income countries has not been greeted with universal enthusiasm, either by policy makers or academics. In theory, international migration increases economic efficiency by shifting labor from low-productivity to high-productivity environments. As workers move from Central America to the US, North Africa to Europe, or Southeast Asia to Australia, the global labor supply shifts from labor-abundant to labor-scarce economies, compressing international differences in factor prices and raising global GDP. Migrants enjoy large income gains (Rosenzweig, 2007), family members at home share in these gains through remittances

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<sup>1</sup> See Docquier and Marfouk (2006). Adults are those 25 years and older.

(Ozden and Schiff, 2006; Fajnzylber and Humberto Lopez, 2007), and non-migrating workers in the sending country enjoy higher wages thanks to a drop in local labor supply (Aydemir and Borjas, 2007). What is not to like?

One source of dissension is that international migration redistributes income within and between countries. It thus comes as no shock that inflows of foreign labor provoke political conflict and have become a frequent topic of debate in labor-importing countries. More surprising, perhaps, is that economists are often among those criticizing migration. In the literature, one finds two broad complaints. In low-income sending countries, the concern has long been that the wrong individuals leave (e.g., Bhagwati and Hamada, 1974). In most of the developing world, the more skilled have the highest propensity to emigrate (see Figure 4). If there are positive spillovers associated with accumulating human capital (Lucas, 1988) or education is public and financed through taxes (Bhagwati and Rodriquez, 1975), then the emigration of skilled labor can undermine economic development (Benhabib and Jovanovic, 2006). Possible corrections include taxing the emigration of skilled labor (McHale, 2007) or having receiving countries admit more unskilled workers from the developing world (Pritchett, 2006).

In high-income receiving countries, the complaint is that the wrong individuals are arriving (Borjas, 1999a). In the US and Europe, the average immigrant has much less schooling than the average native worker (Boeri, Hanson, and McCormick, 2002). If immigrants have low income relative to natives, increased labor inflows may exacerbate distortions created by social-insurance programs or means-tested entitlement programs (Borjas and Hilton, 1996; Wellisch and Walz, 1998), fueling political opposition to immigration (Hanson, Scheve, and Slaughter, 2007). Most rich receiving countries

tightly restrict immigrant admissions, in contrast to their pro-liberalization stances on trade and investment (Hatton and Williamson, 2005).

To be sure, the claims made by both the emigration pessimists and the immigration pessimists are controversial. On brain drain, recent literature counters earlier arguments by suggesting that opportunities for emigration may increase the incentive to acquire human capital by enough to create a brain gain (Stark, Helmenstein, and Prskawetz, 1997; Stark and Wang, 2002). In receiving countries, especially the US, some economists see the consequences of immigration for native workers as benign or even positive (Card, 2005; Cortes, 2005; Ottaviano and Peri, 2006). Still, the literature leaves one with the impression that the workers sending countries would most like to see go are the ones receiving countries would least like to see come. No wonder there has never been a Washington consensus on international migration. If economists cannot agree on the benefits of open borders, surely policy makers will not either.

A further complication is that control over international migration is largely in the hands of receiving countries. Labor flows between rich and poor nations tend to be unidirectional, from the latter to the former. In 2005, just 12 higher income nations were host to 51% of the global stock of international migrants (United Nations, 2006).<sup>2</sup> The US, alone, is home to 20% of the global migrant stock, but sends few migrants to developing countries. Because high-income countries are able to set global migration policy unilaterally, they have little incentive to address sending-country concerns.

The disconnect between sending and receiving-country perspectives on international migration raises a host of important policy questions. Is emigration a viable

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<sup>2</sup> These 12 were the US, Russia, Germany, France, Canada, the UK, Spain, Australia, Hong, Kong, Israel, Italy, and Japan.

strategy for developing countries to raise living standards? Are there environments where emigration may be particularly helpful or harmful? Is it possible to identify policies on global migration that both low-income sending countries and high-income receiving countries could embrace?

In this chapter, I selectively review academic literature on the causes and consequences of emigration from developing countries. My aim is to identify facts about international migration that are relevant to those concerned about why labor moves between countries and how these movements affect sending-country economies.<sup>3</sup>

Empirical work on global labor flows is still in an early state. As is often the case, the literature provides incomplete answers to some of the most urgent questions.

Nevertheless, recent work yields a number of robust results and is helpful for identifying where future research should be directed.

In section 2, I begin by describing current trends in international migration. Developing countries that are small, densely populated, and middle income tend to have the highest emigration rates. In section 3, I move on to discuss the relationship between skill and migration. In nearly all countries, the more skilled are those most likely to emigrate. The positive selection of emigrants is consistent with international differences in labor productivity – rather than international differences in inequality – being the primary determinant of which types of workers leave. Emigrants sort themselves across destination countries according to the reward to skill, in a manner consistent with income

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<sup>3</sup> While there are labor flows between low and middle-income countries, data constraints require me to focus on flows into high income countries. There appear to be sizable flows from the former Soviet Republics to Russia; Bangladesh to India; Egypt, India, Pakistan, and the Philippines to the Gulf States; Afghanistan to Iran; Iraq to Syria; other Southern African states to South Africa; Indonesia to Malaysia; Malaysia to Singapore; Guatemala to Mexico; and Nicaragua to Costa Rica (Ratha and Shaw, 2007).

maximization. In section 4, I discuss the contribution of migrant networks to lowering migration costs, which for many countries appear to be substantial.

In section 5, I examine research on the impact of emigration on sending countries.<sup>4</sup> In the few cases that have been studied, labor outflows appear to help raise sending-country wages, while having little impact on fiscal accounts. Though there has been recent progress in the literature, the question of brain drain versus brain gain remains unresolved. We still will do not know how opportunities for emigration affect the stock of human capital in sending countries. Recently, migrant remittances have grown rapidly, and their positive correlation with household consumption has lead some to ascribe a causal role to remittances in development. A more reasoned view is that remittances are simply a byproduct of intrahousehold specialization. There is some evidence that labor outflows promote trade, technology diffusion, and political openness, though the econometric identification of these impacts is not problem free.

By way of conclusion, in section 6, I summarize what appear to be the more empirically robust findings (or nonfindings) in the literature.

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<sup>4</sup> Literature on impacts on receiving countries is much more developed. See Borjas (1999b, 2007).

## **2. The Dimensions of International Migration**

International migration appears to be on the rise. Only recently have cross-country data on emigrant stocks have become available. As a result, research on international migration is still emerging. In this section, I discuss data sources on the stock of international migrants and then move on to examine emigration rates in sending countries, the distribution of migrants across receiving countries, the correlates of bilateral migration flows, and the emigration of skilled labor.

### **2.1 Data and Recent Trends**

There have been several recent attempts to measure international migration. Carrington and Detragiache (1998) estimate emigration rates in 1990 for individuals with tertiary education from 61 source countries to OECD destination countries. Adams (2003) applies a similar methodology to estimate emigration rates for 24 large labor-exporting countries in 2000. The OECD (2003) lists the foreign-born population 15 years and older in 2000 by source country and education level (primary, secondary, tertiary, unknown) for each OECD country. While these sources are welcome additions to the literature, each has gaps in coverage regarding sending countries, migrant skill levels, and/or time (Docquier and Marfouk, 2006; Hanson, 2007a).

In useful recent work, Docquier and Marfouk (2006) extend the OECD data by constructing more complete estimates of the stocks of international migrants. They use the population censuses for 30 OECD countries in 1990 and 2000 to obtain the count of adult immigrants (25 years and older) by source country and level of education (primary, secondary, or tertiary schooling). (Primary indicates 0-8 years of schooling, secondary indicates 9-12 years of schooling, and tertiary indicates 13 or more years of schooling.)

They combine these counts with the size of adult populations and the fraction of adult populations with different levels of schooling from Barro and Lee (2000) to obtain emigration rates by education level and source country, yielding 174 source countries in 1990 and 192 in 2000. While the set of source countries is comprehensive, the coverage of destination countries excludes those countries not in the OECD as of 2000.<sup>5</sup>

Low-income countries are an increasingly important source of migrants to high-income countries. Table 1 shows the share of the immigrant population in OECD countries by sending-country region.<sup>6</sup> In 2000, 67% of immigrants in the OECD were from a developing country, up from 54% in 1990. This gain came almost entirely at the expense of Western Europe, whose share of OECD immigrants fell from 36% to 24%. Among developing sending regions, Mexico, Central America, and the Caribbean is the most important, accounting for 20% of OECD immigrants in 2000, up from 15% in 1990. Half of this region's migrants come from Mexico, which in 2000 was the source of 11% of OECD immigrants, making it by far and away the world's largest supplier of international migrants.<sup>7</sup> The next most important developing source countries for OECD immigrants are Turkey (3.5% of OECD immigrants); China, India, and the Philippines (each with 3%); Vietnam, Korea, Poland, Morocco, and Cuba (each with 2%); and Ukraine, Serbia, Jamaica and El Salvador (each with 1%).

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<sup>5</sup> OECD members in 2000 were Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Korea, Luxembourg, Mexico, the Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Spain, Sweden, Switzerland, Turkey, the UK, and the US.

<sup>6</sup> Tables and figures are based on calculations using raw data from Docquier and Marfouk (2006).

<sup>7</sup> As recently as 1990, the UK was the largest source country for immigrants in the OECD.

**Table 1: Share of OECD Immigrants by Sending Region, 2000**

Low Income Sending Region	Share of Immigrants by OECD Receiving Region				Change in OECD Share 1990 to 2000
	All OECD	North America	Europe	Asia, Oceania	
Mex., Cen. Am., Caribe	0.202	0.374	0.025	0.002	0.053
Southeast Asia	0.102	0.137	0.039	0.160	0.016
Eastern Europe	0.099	0.049	0.161	0.116	0.042
Middle East	0.063	0.032	0.113	0.029	0.001
South Asia	0.052	0.052	0.055	0.036	0.011
North Africa	0.044	0.009	0.098	0.018	-0.006
South America	0.041	0.050	0.031	0.035	0.010
Cen., So. Africa	0.036	0.021	0.061	0.021	0.007
Former Soviet Union	0.029	0.023	0.042	0.010	-0.002
Pacific Islands	0.004	0.003	0.001	0.027	0.000
Total	0.672	0.750	0.626	0.454	0.132
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High Income Sending Region					
Western Europe	0.244	0.152	0.336	0.368	-0.111
Asia, Oceania	0.055	0.062	0.018	0.156	-0.010
North America	0.029	0.037	0.020	0.023	-0.011
Total	0.328	0.251	0.374	0.547	-0.132

Notes: This table shows data for 2000 on the share of different sending regions in the adult immigrant population of the entire OECD and of three OECD subregions. High Income North America includes Canada and the U.S. and High Income Asia and Oceania includes Australia, Hong Kong, Japan, Korea, New Zealand, Singapore, and Taiwan.

There is a tendency for different destination regions to draw more heavily on migrants from particular source countries. Mexico, Central America, and the Caribbean are the largest source region for North America, but send few migrants to other parts of the world; Eastern Europe is the most important developing source region for OECD

Europe; and Southeast Asia is the most important developing source region for Australia and Oceania. Unsurprisingly, geographic distance plays an important role in migration.

**Table 2: Share of Foreign-Born Population in Total Population**

	1995	2000	2002	2004	Change 1995-2004
Australia	23.0	23.0	23.2	23.6	0.6
Austria		10.5	10.8	13.0	
Belgium	9.7	10.3	11.1		
Canada	16.6	17.4	17.7	18.0	1.4
Czech Republic		4.2	4.6	4.9	
Denmark	4.8	5.8	6.2	6.3	1.6
Finland	2.0	2.6	2.8	3.2	1.2
France (a)		10.0			
Germany (b)	11.5	12.5	12.8	12.9	1.4
Greece (c)		10.3			
Hungary	2.8	2.9	3.0	3.2	0.4
Ireland (d)	6.9	8.7	10.0	11.0	4.0
Italy (c)		2.5			
Luxembourg	30.9	33.2	32.9	33.1	2.2
Mexico	0.4	0.5			
Netherlands	9.1	10.1	10.6	10.6	1.6
New Zealand (d)	16.2	17.2	18.4	18.8	2.6
Norway	5.5	6.8	7.3	7.8	2.3
Poland			1.6		
Portugal	5.4	5.1	6.7	6.7	1.3
Slovak Republic (c)		2.5		3.9	
Spain (c)		5.3			
Sweden	10.5	11.3	11.8	12.2	1.7
Switzerland	21.4	21.9	22.8	23.5	2.2
Turkey		1.9			
United Kingdom	6.9	7.9	8.6	9.3	2.3
United States	9.3	11.0	12.3	12.8	3.5

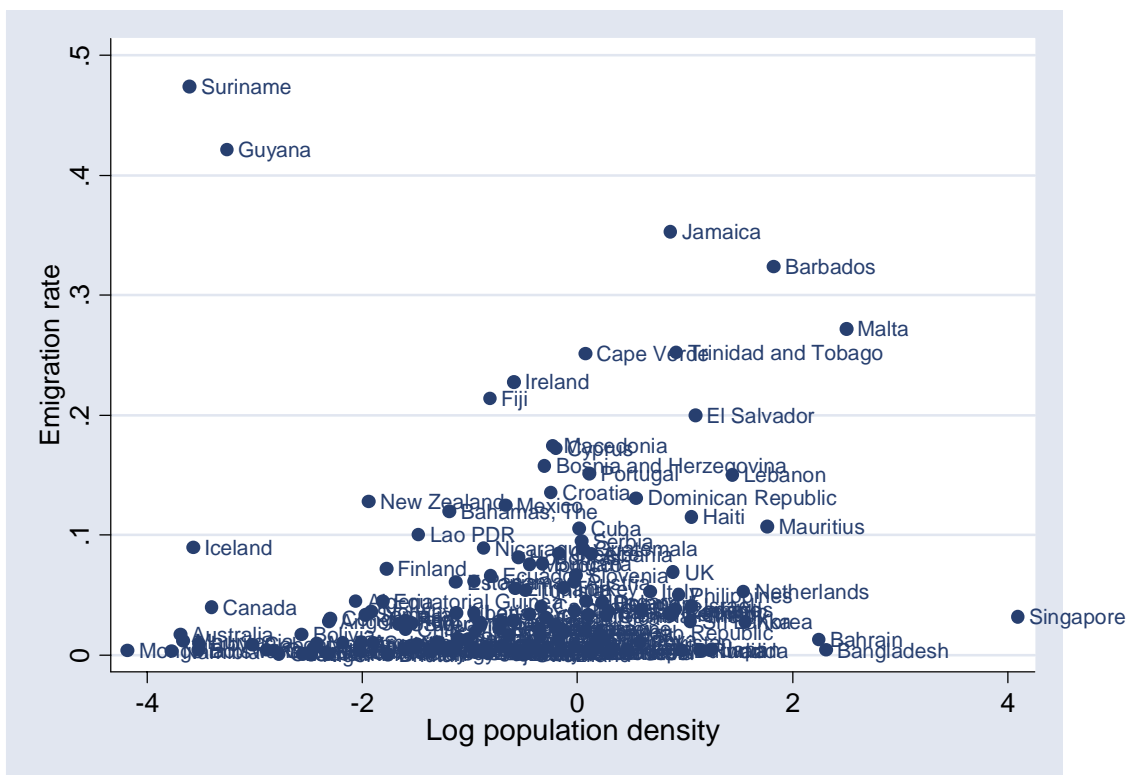
Notes: (a) 2000 value is from 1999; (b) 2004 value is from 2003; (c) 2000 value is from 2001; (d) 1995 value is from 1996. Source: *International Migration Outlook*, OECD, 2006.

The growing importance of lower-income countries in the supply of international migrants has contributed to an overall increase in labor flows into rich countries. Table 2 shows the share of the population that is foreign born in select OECD members. The size of the immigrant population varies across destinations, reflecting differences in both their attractiveness and openness to international migrants. Aside from tiny Luxembourg, the countries with the largest immigrant presence in 2004 are Australia (24%), Switzerland (24%), New Zealand (19%), and Canada (18%). Next in line are the large economies of Germany (13%), the US (13%), France (10%), and the UK (10%), with the US alone hosting 40% of immigrants living in OECD countries. In the last decade, there have been substantial increases in foreign-born population shares in a number of rich countries, with the largest changes over 1995-2004 occurring in Ireland (4%), the US (3.5%), New Zealand (2.6%), the U.K. (2.3%), Norway (2.3%), and Switzerland (2.2%).

There is strong evidence that a rising share of labor inflows in rich countries are made up by illegal entrants, with data for the US being the most extensive. Passel (2006) estimates that in 2005 illegal immigrants accounted for 35% of the US foreign-born population, up from 28% in 2000 and 19% in 1996. Of the 2005 population of illegal immigrants, 56% were from Mexico, implying that 60% of the population of Mexican immigrants in the US was unauthorized (Hanson, 2006).

There is substantial variation across countries in the propensity to emigrate. As of 2000, there were 22 developing nations with 10% or more of their adult population having migrated to the OECD, and 16 developing countries with emigration rates above 5%. At the other extreme, 52 developing countries had emigration rates below 1%. Figure 1 plots emigration rates for countries against their log population densities in 2000,

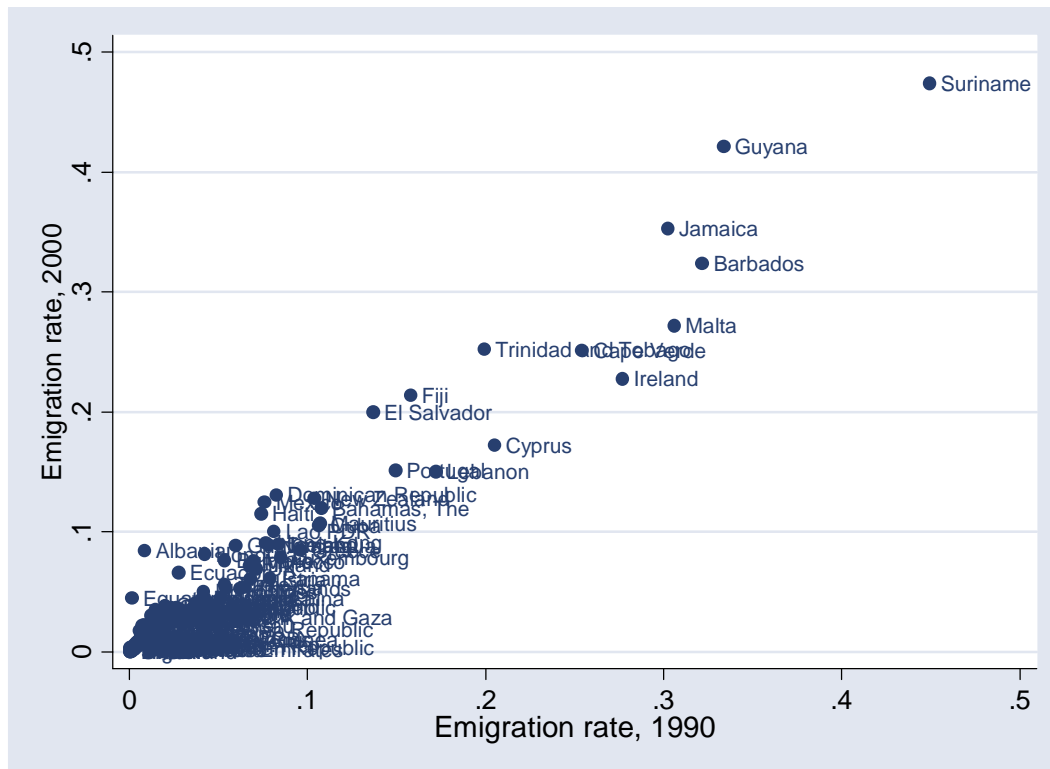
where the emigration rate is the fraction of a country's adult population that has migrated to an OECD country. There is a strong positive correlation between emigration rates and population density, with more densely populated countries sending a higher fraction of their population abroad. Countries with the highest emigration rates tend to be small, poor countries that are relatively close to the US. Island economies in the Caribbean and the South Pacific stand out for their high emigration rates.



**Figure 1: Emigration Rates and Population Density, 2000**

While emigration is rising over time, there is strong persistence in which countries send more people abroad, as seen in Figure 2, which plots emigration rates in 1990 and against those in 2000. The countries with the largest increase in emigration rates over 1990 to 2000 include neighbors of the US (the Caribbean, Central America,

Mexico) and former east bloc countries (Albania, Bulgaria). The countries experiencing the largest decrease in emigration rates were Ireland, Lebanon, Panama, and Greece. Interestingly, war-torn countries do not show up as having particularly high emigration rates to the OECD overall or large increases in emigration rates over the 1990s.





In related work, Mayda (2005) examines bilateral migration between a large number of source countries and 14 OECD destination countries over 1980-1995. She regresses bilateral migration rates on income per capita in the source and destination country and average income per capita in other OECD destinations, among other control variables. Bilateral migration is increasing in destination-country income and decreasing in the income of other destinations, consistent with the idea that better economic conditions in third countries deflect migration away from a given destination.

## **2.2 Brain Drain**

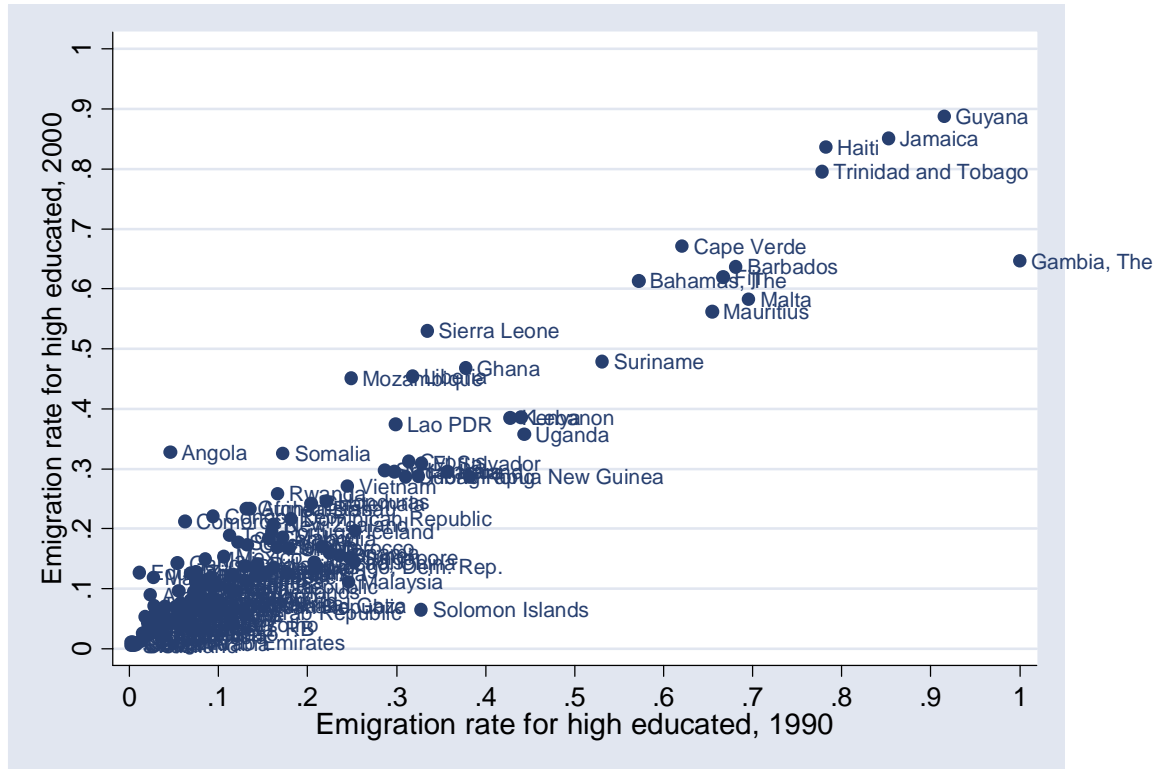
Much of the literature on international migration focuses on the movement of skilled labor, whose departure may drain poor economies of scarce supplies of human capital. Figure 3 shows the emigration rate for adults with a tertiary education against the emigration rate for all adults. In 2000, there were 41 developing countries with emigration rates for the tertiary educated above 20%.

Brain drain is a concern where there are distortions in the decision to acquire human capital. Absent distortions, moving labor from a low-productivity to a high-productivity economy unambiguously raises global income, though not necessarily global welfare (Benhabib and Jovanovic, 2007). However, if there are positive externalities associated with learning (e.g., Lucas, 1988), then the social product of human capital exceeds its private product and the exodus of skilled labor from a country may have adverse consequences for its economic development (Bhagwati and Hamada, 1974). Another negative impact of brain drain is that many individuals have their education subsidized by the state, meaning their emigration would deprive their origin country of tax contributions to offset the cost of their schooling (McHale, 2007).



the distribution of wealth is highly unequal, such that few individuals can afford the up front costs of either acquiring human capital (which may involve both direct costs for schooling and indirect costs in terms of time out of the labor force) or moving abroad (which may involve direct costs to acquire a visa and indirect time costs).

Only a handful of empirical papers examine the relationship between emigration and human-capital accumulation. For a cross-section of countries, Beine, Docquier, and Rapoport (2006b) report a positive correlation between emigration to rich countries (measured by the fraction of the tertiary educated population living in OECD countries in 1990) and the increase in the stock of human capital (measured as the 1990 to 2000 change in the fraction of adults who have tertiary education). While this finding is consistent with emigration increasing the incentive to acquire education, the cross-section correlation between emigration and schooling is not well suited for causal inference about the impact of brain drain on educational attainment. Education and migration decisions are likely to be jointly determined, making each endogenous to the other. Valid instruments for migration are very difficult to find. For causal analysis, one would need to observe changes in human-capital accumulation in sending countries before and after they experienced unexpected and exogenous shocks in the opportunity to emigrate. Such experiments have yet to be found in the data. Despite four decades of research, we still do not know how the opportunity to emigrate affects the supply of human capital in sending countries, leaving the debate about brain drain unresolved.

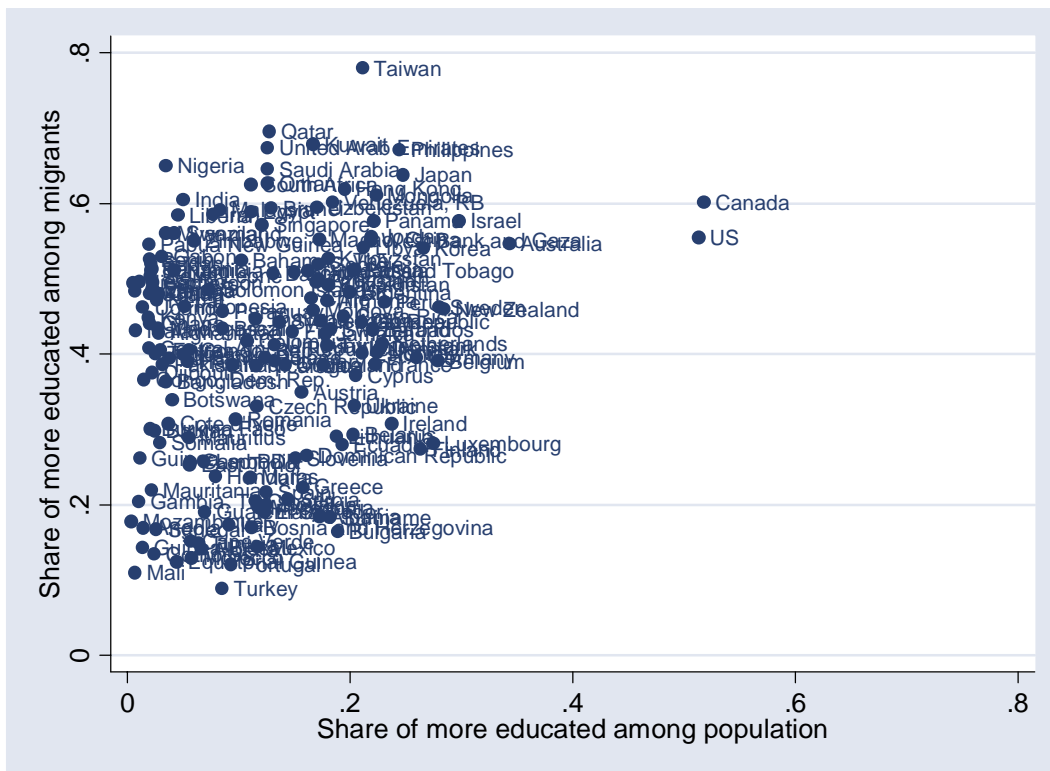


**Figure 5: Persistence in the Emigration of the Highly Educated**

Finally, it is worth considering how emigration rates for the highly educated have changed in recent decades. Figure 5 plots emigration rates for the tertiary educated across countries in 1990 and 2000. The countries with the largest increase in emigration rates for the highly educated are primarily countries that have experienced civil conflict, such as Afghanistan, Angola, Congo, Haiti, Mozambique, Rwanda, Sierra Leone, and Somalia. Thus, while civil conflict does not provoke a general flight to OECD countries (see Figure 2), it does appear to provoke the flight of the more skilled. It has long been recognized that the induced emigration of skilled labor may be an important cost of civil war. Figure 5 is consistent with this perception, though careful research quantifying these costs is difficult to find in the literature.

### 3. Selection into Migration

Who migrates from poor to rich countries is the subject of a growing empirical literature. The high propensity of the highly educated to migrate abroad is seen clearly in Figure 6, which plots the share of emigrants with tertiary education against the share of the general population with tertiary education in 2000. Nearly all points lie above the 45-degree line, indicating that in the large majority of countries emigrants are positively selected in terms of schooling. That is, with the exception of a few countries (e.g., Canada, Turkey, the US), the more highly educated are over-represented among emigrants relative to their presence in the population as a whole



**Figure 6: Selection of Emigrants in Terms of Education, 2000**

Interestingly, positive selection of emigrants is at odds with much recent empirical literature on international migration. In an influential line of work, Borjas (1987, 1991) uses the Roy (1951) model to show how migration costs and international variation in the premium for skill affect the incentive to migrate. In countries with low average wages and high wage inequality, as appears to be the case in much of the developing world, there is negative selection of emigrants. Those with the greatest incentive to relocate to rich countries (which tend to have high average wages and low wage inequality) are individuals with below-average skill levels in their home countries.

Much of the recent empirical research on Borjas' negative-selection hypothesis examines labor movements either from Mexico to the US or Puerto Rico to the US mainland. Puerto Rican outmigrants tend to have low education levels relative to non-migrants (Ramos, 1992; Borjas, 2006), consistent with migrants being negatively selected in terms of skill. Mexican emigrants, however, appear to be drawn more from the middle of the country's schooling distribution, consistent instead with intermediate selection. Feliciano (2001), Chiquiar and Hanson (2005), Orrenius and Zavodny (2005), McKenzie and Rapoport (2006), and Cuecuecha (2005), and find that emigrants from Mexico are drawn from the middle of the wage or schooling distribution, while Ibarra and Lubotsky (2005) and Fernandez-Huertas (2006) find that Mexican emigrants are drawn from the lower middle of the wage or schooling distribution.

Based on Figure 6, Mexico and Puerto Rico (and Turkey) would appear to be exceptional cases. Positive selection of emigrants is a nearly universal phenomenon. Despite strong evidence that emigrants are positively selected in terms of schooling, there is confusion in the literature over the relationship between income inequality and the

incentive to emigrate. An empirical approach made popular by Borjas (1987) is to explain bilateral migration using sending-country per capita GDP and income inequality (e.g., as measured by the GINI coefficient) relative to the receiving country (e.g., Clark et al., 2007; Mayda, 2005). A positive parameter estimate on the GINI coefficient is seen as an indicator that migrants are negatively selected in terms of skill. However, this approach characterizes selection into migration only under restrictive conditions.

To characterize the relationship between income inequality and migration, it is useful to develop a simple model of the migration decision. Let the wage for individual  $i$  from sending country  $s$  in receiving country  $r$  be

$$(1) \quad W_{isr} = \exp(\mu_r + \delta_r z_i),$$

where  $\mu_r$  is the return to raw labor in  $r$ ,  $\delta_r$  is the return to an additional year of schooling level in  $r$ , and  $z_i$  is an individual  $i$ 's years of schooling. Let the cost of migrating from country  $s$  to country  $r$  be given by,

$$(2) \quad C_{isr} = f_{sr} + \varepsilon_{isr},$$

where  $f_{sr}$  is a fixed monetary cost common to all individuals that migrate from  $s$  to  $r$  and  $\varepsilon_{isr}$  is an idiosyncratic migration cost term that has mean zero and an extreme value distribution. Finally, let the utility associated with migrating from country  $s$  to country  $r$  be a linear function of wages and migration costs, such that

$$(3) \quad U_{isr} = W_{isr} - C_{isr}.$$

where utility from not migrating equals the sending-country wage. If individuals make the migration decision in order to maximize utility, then, given the error is extreme value,

the model is a logit. Consider the log odds of an individual with a college education migrating from  $s$  to  $r$ , which, given the logit structure, can be written as,

$$(4) \quad \ln \frac{E_{sr}^c}{E_s^c} = (W_r^c - W_s^c) - f_{sr},$$

where  $E_{sr}^c$  is the share of the college educated in  $s$  that migrate to  $r$ ,  $E_s^c$  is the share of college educated that remain in  $s$ , and  $W_h^c$  is the wage to college educated labor in country for  $h=r,s$ . Equation (6) expresses the logic of the Roy model, in which income maximization is the motivation for migration. More individuals will move from country  $s$  to country  $r$  the larger is the wage differential between the two countries and the smaller are fixed migration costs. Grogger and Hanson (2007) show that this setup can be generalized to allow for migration costs specific to skill and correlation in idiosyncratic migration costs across receiving countries.

To use this model to evaluate migrant selection in terms of skill, I follow Grogger and Hanson (2007) and compare the log odds of emigrating for those with a college education (c) relative to those with a primary education (p), which from (4) is given by,

$$(7) \quad \ln \frac{E_{sr}^c}{E_s^c} - \ln \frac{E_{sr}^p}{E_s^p} = (W_r^c - W_s^c) - (W_h^p - W_s^p),$$

where fixed migration costs are differenced out of the expression. If the net gain to emigrating for the college educated exceeds that for the primary educated, the expression in (7) would be positive and emigrants from  $h$  would be positively selected in terms of education. Using (1), this would require that

$$(8) \quad e^{\mu_r - \mu_s} > \frac{e^{\delta_s z_c} - 1}{e^{\delta_r z_c} - 1},$$

where  $z_c$  indicates years of schooling for a college educated worker and the return to primary educated labor is normalized to equal  $\mu$ . Under the convenient approximation that  $\exp(x)-1=x$  for small  $x$ , we can rewrite equation (8) as,

$$(9) \quad \frac{W_r^P}{W_s^P} > \frac{\delta_s}{\delta_r}.$$
<sup>10</sup>

On the left of (9) is the ratio of *wages paid to raw labor* (proxied here by the wage for primary educated labor) in the *receiving relative to sending* country, which can be thought of as the ratio of raw labor productivity in the two countries; on the right of (9) is the ratio of the Mincerian *return to schooling* (the log wage gain from an additional year of schooling) in the *sending relative to the receiving* country.

Equation (9) says that emigrants from sending country  $s$  will be positively selected in terms of schooling as long as the gain in the productivity of raw labor from moving abroad more than compensates educated workers for the loss in the return to schooling.<sup>11</sup> One can think of the ratio of the return to schooling on the right of (9) as capturing wage inequality, since, all else equal, higher returns to schooling in country  $s$  will imply greater wage inequality. Apparent in (9) is that higher wage inequality in a country by no means guarantees more negative selection of emigrants. Other factors come into play, namely labor productivity. Differences in labor productivity matter for selection because more skilled workers have more productivity equivalent units of labor to supply than unskilled workers. All else equal, higher labor productivity increases the incentive to emigrate more for the more skilled. One way to explain positive selection of

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<sup>10</sup> See Grogger and Hanson (2007) for more details on this derivation.

<sup>11</sup> A similar implication is present in Rosenzweig (2007), who derives a Roy model of migration with moving costs that include components that are fixed in monetary units and time-equivalent units.

emigrants in Figure 6 is that international differences in labor productivity are large relative to international differences in the Mincerian return to schooling.

To interpret the condition in (9), note that when comparing poor sending countries to rich receiving countries, it is usually the case that the raw wage is higher in the receiver while the return to schooling is higher in the sender. Suppose that in Nigeria someone with a primary education would earn \$1,000 a year and someone with a college education would earn \$5,000 a year, while the comparable sums in the US are \$20,000 and \$40,000. Clearly, the implied return to schooling in Nigeria (log return to schooling of 0.16) is higher than in the US (log return to schooling of 0.07). Yet, the higher productivity of raw labor in the US (US/Nigerian raw wage ratio is 20) more than compensates, making the net gain from emigrating from Nigeria greater for more educated workers. Thus, when there are large differences in raw labor productivity between countries, emigrants will tend to be positively selected in terms of skill.

Negative selection of workers by skill will obtain either where differences in labor productivity across countries are small or migration costs are increasing in skill. The latter feature is adopted by Borjas (1987), who assumes that migration costs are fixed in units of time (such that more skilled workers pay more to migrate). As a result, in his model (at least in its most simplified form—see Borjas (1991) for more elaborate models with negative and positive selection) the pattern of migrant selection is determined entirely by the relative return to skill across countries. However, once one introduces large productivity differences between countries or migration costs that are fixed in monetary units, the pattern of selection is indeterminate. Selection may be positive or negative, depending on relative labor productivity, relative returns to skill, and skill-

specific migration costs. Even in the simple model of migration I develop here, migration selection in terms of skill is not robust. While this may seem obvious once one inspects the theory, it is perhaps a result that is underappreciated in the literature.

Credit constraints in sending countries could make migration costs *decreasing* in skill, which would strengthen pressure for positive selection. Suppose, for instance, that education and migration are subject to a fixed monetary cost and credit-market imperfections make wealthier individuals subject to lower borrowing costs (e.g., Banerjee and Newman, 1993; Rapoport, 2002). Then, the wealthier will be more likely to become educated and more likely to migrate abroad (Assuncao and Carvalho, 2007). For Mexico, McKenzie and Rapoport (2007) find an inverted U-shaped relationship between migration and wealth, consistent with low-wealth individuals being too poor to afford migration and high-wealth individuals having an incentive not to leave.

Rosenzweig (2007) examines migrant selectivity with data from the New Immigrant Survey. The NIS reports the wage an individual earned in his last job before coming to the US, which Rosenzweig uses to estimate the marginal product of labor by source country. A country's overall emigration rate to the US is decreasing in the marginal product of labor, suggesting countries with higher labor productivity send fewer migrants to the US. Rosenzweig estimates that raising a country's marginal product of labor by 10% relative to the US would reduce the number of emigrants obtaining US employment-based visas by 8%. The average schooling of emigrants to the US is increasing in the marginal product of labor, indicating that in countries with higher labor productivity it is the more educated migrants who are most likely to leave.<sup>12</sup>

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<sup>12</sup> In related work, Rosenzweig (2006) finds that the numbers of students who come to the US for higher education and who stay in the US after completing their education are each decreasing in the marginal

Any analysis of migrant selection based on observed characteristics leaves open the question of how migrants are selected on unobservables. McKenzie, Gibson, Stillman (2006) examine this issue using data on Tonga, in which individuals may apply to a lottery to obtain a visa to move to New Zealand. Comparing visa applicants who lost the lottery (meaning they stayed in Tonga) with non-applicants, they find that those desiring to migrate have higher earnings, controlling for observed characteristics, suggesting prospective migrants from Tonga are positively selected in terms of unobserved skill. McKenzie, Gibson, Stillman find that failing to account for selection on unobservables leads to substantial overstatement of the gains to migration.

What does the simple model of income maximization in (7) imply about how emigrants sort themselves across destination countries? Rewrite the expression as,

$$(10) \quad \ln \frac{E_{sr}^c}{E_s^c} - \ln \frac{E_{sr}^p}{E_s^p} = (W_r^c - W_r^p) + \alpha_s + \eta_{sr}$$

where  $\alpha_s$  is a country fixed effect that absorbs sending country wages and  $\eta_{sr}$  is a disturbance term capturing measurement error in migration flows. Equation (10) is a regression specification which predicts that more skilled workers will flow in greater numbers to receiving countries that have larger rewards to skill, expressed here by the level difference in wages between high and low educated labor. Grogger and Hanson (2007) develop a fixed-effects specification similar to (10) and, using data from Beine, Docquier and Rapoport (2006a), find that the bilateral flow of more-educated migrants (relative to less-educated migrants) is increasing in the destination-country earnings gap between high-income and low-income workers.

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product of labor in the source country, suggesting that low rewards to skill in a country induce students seeking university training to pursue their schooling abroad.

Their results can account for the observed pattern of emigrant sorting across destinations, seen in Table 3. The US is by far and away the largest destination country for international migrants, with Canada being the second largest. In 2000, 53% of the foreign-born population in OECD countries resided in North America, while 36% resided in the European Union and 10% resided in Asia and Oceania. The draw of the US and Canada is strongest for the more educated. While North America attracts only 38% of emigrants with primary education it attracts 66% of emigrants with tertiary education. In Europe, the shares are flipped, as it attracts 22% of emigrants with tertiary schooling and 53% of emigrants with primary schooling.

**Table 3: Share of OECD Immigrants by Receiving Region and Education, 2000**

Destination Region	Education Group			
	All	Primary	Secondary	Tertiary
North America	0.514	0.352	0.540	0.655
Europe	0.384	0.560	0.349	0.236
Australia & Oceania	0.102	0.088	0.111	0.109
All OECD		0.355	0.292	0.353

Notes: This table shows the share of OECD immigrants by receiving region and education group in 2000. Source: Grogger and Hanson (2007).

The pattern of emigrant sorting in Table 3 is consistent with observed differences in the reward to skill. Among OECD destinations, the level difference in income between high-skill and low-skill labor is largest in the US, with Canada having the

fourth-largest difference (and the UK and Australia coming in at numbers two and three). Continental Europe, on the other hand, has a relatively low income gap between high and low-skill labor, consistent with relatively low income inequality. The consequence of these income differences appears to be that North America and Australia attract a more-skilled mix of immigrants, while Continental Europe attracts a less-skilled mix.

#### 4. Networks and Migration Costs

Although the evidence in Table 2 points to growth in international migration, the global stock of emigrants remains small, at around 3% of the world population. This is surprising, given that the gains to international migration appear to be huge. Hanson (2006) reports that in 2000 the average hourly wage for a male with nine years of education was \$2.40 in Mexico and \$8.70 for recent Mexican immigrants in the US (in PPP-adjusted prices). At the average labor supply for US adult male workers of 35 hours per week, this would amount to an annual income gain of \$12,000.

One way to reconcile large and persistent cross-country income differences with small global labor movements is that receiving countries are successful in restricting labor inflows. While long queues for immigration visas in receiving countries indicate legal admission restrictions bind, rising levels of illegal immigration suggest that borders are porous. Further, observed costs of illegal entry are small in comparison to estimated income gains. In a sample of high migration-communities in Mexico during 2002 to 2004, Cornelius (2005) finds the average price paid by migrants to be smuggled across the US border was \$1700, or one-seventh the apparent income gain.

Another explanation for small global labor flows is the existence of large unobserved migration costs associated with credit constraints in financing migration, uncertainty over economic opportunities abroad, the psychic cost of leaving home, or other factors. There is considerable academic interest in the role of migration networks in lowering such costs. Survey evidence suggests transnational migration networks provide prospective migrants with information about economic conditions in destination countries, support in managing the immigration process, and help in obtaining housing

and finding a job (Massey et al., 1994; Massey and Espinosa, 1997). Much of the research on migration networks focuses on Mexico. On the process of crossing the border, Orrenius and Zavodny (2005) report that among young males in Mexico the probability of migrating to the US is higher for individuals whose fathers or siblings have emigrated. Gathmann (2004) documents that migrants with family members in the US are less likely to hire the services of a professional smuggler, and, among those that do, likely to pay lower prices. And McKenzie and Rapoport (2005) find that average schooling is lower among migrants from communities in Mexico with a stronger US presence. These results are each consistent with networks lowering migration costs.

One might be concerned that the presence of migration networks reflects unobserved characteristics of communities or families that are associated with a higher propensity to migrate, making the correlation between migration behavior and networks difficult to interpret. To address the issue of endogeneity in migration networks, Munshi (2003) uses instruments for the size of the US population from a migrant's origin community in Mexico using lagged rainfall in the Mexican origin community. He finds that Mexican migrants in the US are more likely to be employed and more likely to be employed in a higher-paying nonagricultural job the larger is the US population of residents from their origin community in Mexico. These results suggest that having a larger network improves a migrant's ability to assimilate economically in the US.

While we still know little about the magnitude of migration costs, research on networks suggests that migrant flows are sensitive to changes in these costs. Other evidence on the sensitivity of migration to migration costs comes from illegal crossings at the Mexico-US border. For illegal migration, the intensity of border enforcement is an

important determinant of entry costs, which take the form of fees paid to smugglers.

Cornelius (2005) reports that smuggler prices to enter the U.S. illegally increased by 37% between 1996-1998 and 2002-2004, which spans the period during which the United States stepped up border enforcement efforts in response to the terrorist attacks of 9/11.

Gathmann (2004) examines the consequences of expanded border enforcement for migration. She identifies the correlates of smuggler prices paid by migrants from Mexico to the US and estimates the impact of smuggler prices on migrant demand for smuggler services. The price a migrant pays to a smuggler is higher in years when border enforcement is higher, but the elasticity of smuggler prices with respect to enforcement is small, in the range of 0.2 to 0.5. During the sample period, a one-standard-deviation increase in enforcement would have led to an increase in smuggler prices of less than \$40. The demand for smuggler services and the probability of choosing to migrate to the US are both responsive to changes in coyote prices. However, given the small enforcement elasticity of coyote prices, the increase in US border enforcement over 1986 to 1998 (during which real spending on border enforcement increased by four times) would have reduced the average migration probability in Mexico by only 10%.

In many destination countries, migrants reinforce networks by forming home-town associations that help members of their home communities make the transition to living in a new location. By creating links between the destination country and a specific community in the source country, these associations may lower migration costs for individuals linked by kinship or birthplace to migrants living abroad. Of 218 home-town associations formed by Mexican immigrants enumerated in a 2002 survey in California, 87% were associated with one of the nine central and western states in Mexico that have

dominated migration to the US since the early 20<sup>th</sup> century (Cano, 2004), indicating that migrant networks in Mexico are organized along regional lines.

Regional variation in migration networks creates regional variation in migration dynamics. McKenzie and Rapoport (2007) show that in Mexican communities with historically weak migration networks moderately more wealthy individuals are more likely to migrate, though very high wealth individuals are not. Migrants are thus drawn from the middle of the wealth distribution, meaning that migration increases inequality. In communities with strong migration networks, however, lower wealth individuals can afford to migrate, such that in these locations migration lowers inequality.

## **5. Impact of Emigration on Sending Countries**

Emigration changes a country's supply of labor, skill mix, and exposure to the global economy. These effects may have important consequences for a sending country's aggregate output, structure of wages, fiscal accounts, and trade and investment flows, among other outcomes. In this section, I discuss recent empirical research on the impact of emigration on developing economies.

### **5.1 Labor Markets and Fiscal Accounts**

Most research on the labor-market impacts of emigration focuses on Mexico. Mishra (2007), applying the regression framework in Borjas (2003), examines the correlation between emigration to the US and decadal changes in wages for cohorts in Mexico defined by their years of schooling and labor-market experience. She estimates that over the period 1970-2000 the elasticity of wages with respect to emigration in Mexico is 0.4, implying a 10 percent reduction in labor supply due to emigration would raise wages by 4 percent. Using a similar approach, Aydemir and Borjas (2007) estimate a wage elasticity for emigration in Mexico of 0.6. Wage elasticities of this magnitude suggest emigration has had a substantial impact on Mexico's wage structure. Based on her estimation results and that fact that between 1970 and 2000 13% of Mexico's labor force emigrated to the US, Mishra (2007) calculates that emigration has raised average wages in the country by 8%. Upward wage pressure has been strongest for young adults with above-average education levels (those with 9 to 15 years of schooling), who in the 1990s were those most likely to emigrate (Chiquiar and Hanson, 2005).

In response to changes in labor supply associated with emigration, one might expect the supply of capital in Mexico to adjust, with the country becoming less attractive

to inward foreign direct investment. Alternatively, higher wages could erode Mexico's comparative advantage in labor-intensive industries, reducing the net exports of labor services embodied in goods. Either change would tend to offset the effects of emigration on wages in the country. Since the estimation approaches in Mishra (2007) and Aydemir and Borjas (2007) are reduced form, they capture the wage impact of emigration, *net* of these and other adjustments. Their results suggest that any response of capital accumulation or trade to emigration is too slow or too small to undo the wage consequences of labor outflows, at least over ten-year time intervals. Such a finding is not all that surprising. Factor-price differences between the United States and Mexico create an incentive for trade in goods, north-to-south flows of capital, and south-to-north flows of labor. Despite dramatic reductions in barriers to trade and investment between the two countries during the last two decades, US-Mexico wage differences remain large. Since trade and investment are insufficient to equalize factor prices within North America, theory would predict that migration from Mexico to the US would affect wages in both countries, consistent with the evidence.

In many sending countries, the propensity to emigrate varies greatly across sub-national regions. In Mexico, central and western states have long had the highest labor flows abroad. The literature attributes regional variation in emigration to the emergence of migration networks, which grew out of the hiring practices of US agriculture. In the early 1900's US labor contractors utilized Mexico's railroad network to recruit workers in the country's interior (Cardoso, 1980). Communities close to rail lines have had the

highest emigration rates in the country since at least the 1920s.<sup>13</sup> With the advent of large-scale emigration from Mexico in the 1980s and 1990s, the historically high-migration states have had relatively large labor outflows. Between 1990 and 2000, the cohort of men in their twenties born in high-migration states declined by 33 log points, while the number of similarly aged men born in low-migration states dropped by only 9 log points. Since mortality rates are relatively low for this age group, the relative decline in the number of young men from high-migration states (of 24 log points) is most likely due to emigration. Hanson (2007) finds that over this time period, wages in high-migration states rose by 6-9% relative to wages in low-migration states, controlling for regional shocks associated with globalization.

The Mexican emigration experience differs from other countries in terms of the absence of positive selection, the high fraction of those leaving who enter the destination country as illegal migrants, and the sheer scale of the exodus. The positive selection of emigrants in most source countries raises the prospect of important fiscal impacts from international migration. In countries with progressive income taxes, the loss of skilled emigrants could adversely affect public budgets through a loss of future tax contributions. These lost contributions are in part the returns to public investments in the education of emigrating workers, which, after emigration, accrue to destination countries.

While there is a large body of theoretical literature on the taxation of skilled emigration (e.g., Bhagwati and Hamada, 1974; Bhagwati and Wilson, 1989; Docquier and Rapoport, 2007), empirical research on the subject is sparse. One recent contribution is Desai, Kapur, and McHale (2003), who examine the fiscal effects of brain drain from

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<sup>13</sup> From the 1920s to the 1960s, the nine west-central states accounted for 44% to 56% of Mexican migration to the United States, but only 27% to 32% of Mexico's total population (Durand, Massey, and Zenteno, 2001).

India. In 2000, individuals with tertiary education made up 61% of Indian emigrants but just 5% of India's total population. Between 1990 and 2000, the emigration rate for the tertiary educated rose from 2.8% to 4.3%, compared to an increase of just 0.3% to 0.4% for the population as a whole. Desai et al. examine Indian emigration to the US, which in 2000 was host to 65% of India's skilled emigrants (and 49% of all Indian emigrants). They begin by producing a counterfactual income series that gives emigrants the income they would have earned in India based on their observed characteristics and the returns to these characteristics in India (using a Mincer wage regression). On the tax side, they calculate income tax losses by running the counterfactual income series through the Indian income tax schedule and indirect tax losses using estimates of indirect tax payments per unit of gross national income. On the spending side, they calculate expenditure savings by identifying categories for which savings would exist – which are most categories except interest payments and national defense – and then estimating savings per individual. The results suggest Indian emigration to the US cost India net tax contributions of 0.24% of GDP in 2000, which are partially offset by the tax take on remittances of 0.1% of GDP. For India, it appears that the tax consequences of skilled emigration are modest. For small countries with very high emigration rates (Figure 5), the tax consequences would obviously be larger.

The research discussed so far address the static consequences of emigration for an economy, ignoring dynamic considerations that may arise if skilled emigration raises the incentive of unskilled workers to acquire human capital. In theory, feedback effects from emigration to human-capital accumulation may change a country's rate of economic growth. Mountford (1997) shows that in the presence of human-capital externalities an

emigration-induced increase in the incentive to acquire skill can help an economy escape a poverty trap, characterized by low investment in education and low growth, and move to an equilibrium with high investment and high growth. Yet, it is entirely possible for feedback effects to work in the opposite direction. Miyagiwa (1991) develops a model in which, because of human capital spillovers, the migration of skilled labor from a low-wage, skill-scarce economy to a high-wage, skill-abundant economy reinforces the incentive for brain drain, depleting the low-wage country of skilled labor. In Wong and Yip (1999), the negative effects of brain drain on the stock of human capital reduce the labor-exporting country's growth rate.

Given that plausible theoretical models offer very different predictions for the long-run consequences of skilled emigration, the effect of brain drain on an economy is ultimately an empirical question. As mentioned in section 2, the literature on how emigration affects the incentive to acquire skill has yet to produce conclusive results, making it impossible to say whether the consequences of brain drain for growth are likely to be positive or negative. Case-study evidence is similarly inconclusive. In China, India, and Taiwan, the migration of skilled labor to Silicon Valley in the US – where Indian and Chinese immigrants account for one third of the engineering labor force – has been followed by increased trade with and investment from the US, helping foster the creation of local high-technology industries (Saxenian, 2002). The recent rise in educational attainment in China, India, and Taiwan may be partly a result of the lure of working in the US and the domestic expansion of sectors intensive in the use of skilled technicians.<sup>14</sup> In Africa, however, the exodus of skilled professionals, many of whom

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<sup>14</sup> Between 1990 and 2000, the share of the adult resident population (i.e., net of brain drain) with a tertiary education rose from 2.0% to 2.7% in China, 4.1% to 4.8% in India, and 12.2% to 19.1% in Taiwan.

work in health care, may adversely affect living standards. Clemens (2006) reports that in 25 out of 53 African nations at least 40% of native-born individuals practicing as physicians were living and working abroad as of 2000. He finds a weak negative correlation between child mortality and the share of the stock physicians (or nurses) that has emigrated. Schiff (2006) offers further evidence that suggest pessimism about the prospects for a beneficial brain drain.

## **5.2 Remittances and Return Migration**

In a static setting, were the only effect of international migration to move labor from one country to another, welfare in the sending country would decline (Hamilton and Whalley, 1984). While the average incomes of migrants and destination-country natives would rise, average income in the sending country would fall. Migrants, however, often remit a portion of their income to family members at home, possibly reversing the income loss in the sending country associated with the depletion of labor. In the last several years, there has been substantial academic and policy interest in the consequences of remittances for economic activity in sending countries.

Table 4 shows workers' remittances received from abroad as a share of GDP by geographic region. Remittances have increased markedly in East Asia and the Pacific, Latin America and the Caribbean, South Asia, and Sub-Saharan Africa. As of 2004, remittances exceeded official development assistance in all regions except Sub-Saharan Africa and were greater than 65% of foreign direct investment inflows in all regions except Europe and Central Asia. Among the smaller countries of Central America, the Caribbean, and the South Pacific, remittances account for a large share of national income, ranging from 10% to 17% of GDP in the Dominican Republic, Guatemala, El

Salvador, Honduras, Jamaica, and Nicaragua, and representing an astounding 53% of GDP in Haiti (Acosta, Fajnzylber, and Lopez, 2007).

**Table 4: Workers' Remittances and Compensation of Employees, % of GDP**

Region	1992	1996	2000	2002	2004	2005
East Asia & Pacific	0.56	0.71	1.00	1.47	1.48	1.50
Europe & Central Asia		1.02	1.42	1.27	1.28	1.44
Latin America & Caribbean	0.70	0.79	1.04	1.67	2.06	1.98
Middle East & North Africa	8.31	3.69	3.07	3.76	4.31	4.13
South Asia	1.76	2.42	2.85	3.72	3.57	3.53
Sub-Saharan Africa	0.76	1.04	1.49	1.67	1.60	1.57

Source: World Development Indicators.

Reported remittances reflect those captured by the balance of payments, which Freund and Spatafora (2007) suggest may understate actual remittances. Formal remittance channels include banks and money transfer operators (e.g., Western Union) for which service fees average 11% of the value of remittances. Informal remittances, which are moved by couriers, relatives, or migrants themselves, tend to have lower fees, but presumably higher risk. Formal remittances are negatively correlated with service charges, with a 10% increase in fees being associated with a 1.5% reduction in transfers. Fees are lower in economies that are dollarized and more developed financially (as measured by the ratio of bank deposits to GDP).

Theoretical literature on migration models remittances as the outcome of a dynamic contract between migrants and their families (e.g., Lucas and Stark, 1985). A family helps finance migration costs for one of its members in return for a share of future income gains associated with having moved to a higher wage location. Remittances are the return on investments the family has made in the migrant. The prediction is that remittances would rise following an increase in emigration and decline as existing emigrants age and pay off debts to their families.

Having migrants abroad may also provide insurance for a family. To the extent income shocks are imperfectly correlated across countries, migration helps families smooth consumption over time by keeping remittances high when sending-country income is low relative to the destination country and low when sending-country income is relatively high (Rosenzweig and Stark, 1989). Yang (2007) examines changes in remittances to households in the Philippines before and after the Asian financial crisis, which he uses as a natural experiment to examine the impact of remittances on household behavior. As of 1997, 6% of Philippine households had a member that had migrated abroad. Some had gone to countries in the Middle East, whose currencies appreciated sharply against the Philippine peso in 1997-1998, while others had gone to countries in East Asia, whose currencies appreciated less sharply or even depreciated. Consistent with consumption smoothing, remittances increased more for households whose migrants resided in countries that experienced stronger currency appreciation against the peso. Since income shocks associated with movements in exchange rates are largely transitory in nature, the response of remittances reveals the extent to which migrants share

transitory income gains with family members at home. Yang finds that a 10% depreciation of the Philippine peso is associated with a 6% increase in remittances.

Contrary to Yang's results, remittances appear to be unresponsive to changes in government transfers. In Mexico (Teruel and Davis, 2000) and Honduras and Nicaragua (Olinto, 2007) remittances are uncorrelated with changes in rural household receipts from conditional cash transfer programs, which were introduced into communities on a randomized basis, permitting the experimental analysis of their impact on household behavior. Were remittances a vehicle for consumption smoothing among rural households, one would expect them to decline for a sending-country household, following an exogenous increase in government income support.

There is some evidence that increases in remittances are associated with increased expenditure on education and health. Cox Edwards and Ureta (2003) find that in El Salvador households that receive remittances are more likely to allow children to stay in school, with the effect being stronger in rural areas. Why should remittances be correlated with school attendance? One possibility is that remittances allow credit-constrained households to increase investments in productive activities that capital-market imperfections prevent them from financing through borrowing. However, an equally plausible explanation is that households that receive remittances are less credit constrained to begin with and so more likely to invest in education, in which case the correlation between remittances and educational investments may be the byproduct of their correlation with some omitted variable, such as unobserved wealth.

To identify the impact of remittances on education, Yang (2007) examines changes in household expenditure and labor supply in the Philippines before and after the

Asian financial crisis. Households with migrants in countries experiencing stronger currency appreciation vis-à-vis the peso had larger increases in spending on child education, spending on durable goods (televisions and motor vehicles), children's school attendance, and entrepreneurial investments. In these households, the labor supply of 10-17 year old children fell by more, particularly for boys. In Mexico, Woodruff and Zenteno (2007) also find a positive correlation between migration and sending-country business formation. For a sample of small-scale enterprises, capital investment and capital-output ratios are higher in firms where the owner was born in a state with higher rates of migration to the United States. Woodruff and Zenteno instrument for current state migration rates using proximity to the railroads along which Mexico's initial migration networks became established (Durand, Massey and Zenteno, 2001). Their results are consistent with two different mechanisms for business formation: remittances relax credit constraints on the creation of small enterprises, or return migrants – who may have accumulated valuable work experience in the United States – are more likely to launch new businesses upon returning to Mexico.

Remittances indicate migrants maintain contacts with family members at home. They may do so in part because they anticipate returning home in the future, in which case return migration may depend on their foreign earning opportunities. Yang (2006) finds that an exchange rate shock that raises the peso-value of foreign earnings reduces the likelihood a Philippine emigrant returns home, with 10% real appreciation being associated with a one-year return rate that is 1.4% lower.

The use of a clear empirical identification strategy in Yang (2006, 2007) and Woodruff and Zenteno (2007) is important, given the obvious concern that remittances

and household expenditures are jointly determined. Many recent papers report a positive correlation between remittances and household spending on education, household spending on health, children's survival rates, or the likelihood a household is above the poverty line, among other outcomes.<sup>15</sup> Absent a natural experiment or valid instrument for remittances, such correlations are difficult to interpret. Less credit constrained households may be more likely to send migrants abroad *and* to invest in durable goods or services (Assuncao and Carvalho, 2007). Remittances are the return to households from having invested in sending a migrant abroad. Presumably, households invest in migration for the purpose of enjoying higher spending in the future, meaning remittances are evidence that a dynamic household contract has been fulfilled, not an independent causal force. One would hope that the recent enthusiasm among international financial institutions for the role of remittances in economic development (e.g., Inter-American Development Bank, 2004) does not lead policy makers to ignore the economics of migration in recommending policies related to labor outflows.

### **5.3 Information and the Flow of Ideas**

The positive correlation between bilateral trade and migration has been interpreted as evidence of a "diaspora externality," in which previous waves of migration create cross-national networks that facilitate exchange. Gould (1994) finds that bilateral trade involving the US is larger with countries that have larger immigrant populations in the US. Head and Reis (1998) find that a 10% increase in Canada's immigrant population from a particular country is associated with a 1% increase in bilateral Canadian exports and a 3% increase in bilateral Canadian imports, with more recent

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<sup>15</sup> For a discussion of work in this literature, see Caglar and Ozden (2006) and Fajnzlber and Lopez (2007).

immigration having a stronger correlation with trade. It is difficult to draw causal inferences from these results, since immigration may be correlated with unobserved factors that also affect trade, such as the trading partners' cultural similarity or bilateral economic policies (e.g., preferential trade policies or investment treaties that raise the return to both migration and trade).

Pushing the analysis a step further, Rauch and Trindade (2002) focus specifically on networks associated with overseas Chinese populations. Successive waves of emigration from southeastern China have created communities of ethnic Chinese throughout Southeast Asia, as well as in South Asia and on the east coast of Africa. Rauch and Trindade find that bilateral trade is positively correlated with the interaction between the two countries' Chinese populations (expressed as shares of the national population), similar to the findings in Gould and Head and Ries. More interestingly, the correlation between Chinese populations and trade is stronger for differentiated products than it is for homogenous goods. To the extent differentiated products are more subject to informational problems in exchange (Rauch, 1999), these are the goods one would expect to be most sensitive to the presence of business networks.

Still unclear is whether greater trade is the natural outcome of increased migration or a reflection of the types of individuals who select into migration. If more skilled and more able individuals are more likely to migrate abroad and more likely to exploit opportunities for commercial exchange, then the correlation between trade and migration may be a byproduct of migrant self-selection. Subsequent policies to liberalize immigration in destination countries would not necessarily increase trade with sending countries, unless they allowed for the admission of individuals with a propensity to

engage in trade. Head and Ries (1998) find that immigrants admitted as refugees or on the basis of family ties with Canadian residents have a smaller effect on trade than immigrants admitted under a point system that values labor-market skills.

More controversial is the impact of emigration on political outcomes in sending countries. When individuals live and work in another country they are exposed to new political ideologies and alternative systems of government. This exposure may be most important for students who go abroad to obtain a university degree, as they are at an impressionable age and often travel on visas that require them to return to home after completing their studies. Spilimbergo (2006) suggests there is an association between a country's democratic tendencies and the political systems of the countries under which its students did their university training. He finds a positive correlation between the democracy index in for a sending country and the average democracy index in the countries in which a country's emigrant students have studied. Unknown is whether the political system of a sending country influences the types of countries in which its students choose to study. Kim (1998), for instance, finds that the bilateral flow of foreign students is larger between countries that share a common religion.

## 6. Final Discussion

Over the last decade and a half, migration flows from low and middle-income countries to high-income countries have been increasing. The phenomenon is just beginning to be understood, as cross-country data on international migration have only recently become available. Another factor hindering research is that migration is jointly determined with many other outcomes, complicating causal inference on the impact of migration on economic development. With these concerns in mind, I summarize what appear to be the more robust findings (or nonfindings) in the literature.

*1. Bilateral migration flows are negatively affected by migration costs, as captured by geographic or linguistic distance between countries, the absence of migration networks, or the stringency of border enforcement against illegal entry.* That migration is negatively correlated with migration costs is not surprising. What is surprising is that migration flows are so small in relation to observed migration costs, suggesting that unobserved costs – broadly defined – must be substantial.

*2. Emigration rates are highest for developing countries at middle income levels and with higher population densities.* The inverse U relationship between average income and migration is suggestive of credit constraints that prevent individuals with very low incomes from being able to finance migration through borrowing.

*3. In most developing countries, it is the more educated who have the highest likelihood of emigrating.* In the large majority of sending countries, emigrants are positively selected in terms of observable skill. In theory, positive selection would result from large international differences in labor productivity, small international differences in the

return to skill, and/or migration costs that do not increase in skill too strongly. In Australia, Europe and North America, high labor productivity attracts more-educated immigrants from low-income countries, despite the fact that many of these individuals could earn a higher annual percentage return on their schooling at home.

*4. Emigrants sort themselves across destinations according to income-earning possibilities, with the countries that have the highest incomes for skilled labor attracting the most educated mix of immigrants.* The ability of a country to attract more-skilled emigrants appears to depend on its reward to skill relative to other destinations. Thus, Australia, Canada, the UK, and the US, in which high-skilled workers enjoy relatively high earnings, attract a more skilled mix of emigrants than continental Europe.

*5. Empirically, the impact of opportunities for skilled emigration on the stock of human capital in a country is unknown.* In the last decade, a new theoretical literature has emerged which takes a more sanguine view of brain drain. While the idea that skilled emigration raises the incentive to acquire skill in a country is plausible, the literature is missing well identified econometric estimates of how human capital accumulation and economic growth respond to labor outflows. Standard economic models would suggest the departure of skilled workers adversely affects the livelihoods of the poor majority in developing countries (Benhabib and Jovanovic, 2007). At least for now, there are no compelling data to suggest this view be overturned.

*6. There is some evidence that emigration puts upward pressure on wages in sending countries.* In the short run, economic theory suggests the exodus of labor from a country would raise wages. Evidence from Mexico indicates that emigration has increased wages

for the skill groups and regions with the highest emigration rates. The preponderance of relatively highly educated individuals among emigrants suggests labor outflows may have adverse consequences on sending countries' public finances. However, in the case of India the fiscal effects of skilled emigration appear to be small.

*7. Migrant remittances tend to positively correlated with household consumption and investments in education and entrepreneurial activities in sending countries.* These findings, while intriguing, lack a clear policy interpretation. Complicating inference about the development impacts of remittances is the fact that less credit constrained households are the ones most likely to send migrants abroad in the first place.

Concluding that remittances *cause* these households to have higher spending, higher investment, or improved health outcomes for women and children may confound the effects of emigration with the effects of unobserved wealth that make emigration possible. Finding that remittances improve the livelihoods of the poor is certainly more exciting than saying wealthier households are more likely to enjoy higher standards of living, but it is not a result for which there is yet broad empirical support.

Despite recent advances in the theoretical and empirical analysis of international migration, there is still a great deal that we do not know about global labor movements. Much of the individual level data on international migration covers Mexico and/or the US, which are the subject of a large literature. As the largest sending country and receiving country, there is still more to learn about the Mexico-US context. Yet, the highest payoff to research is likely to be in the many under-studied parts of the world. Since 1990, Central and Eastern Europe have become major sending regions; the Gulf

States, Russia, and Spain have become an important receiving regions; and emigration from China, India, Indonesia, Pakistan, and the Philippines have accelerated, to name but a few of the recent developments in global labor flows.

Among the many questions about international migration that deserve further study, I would emphasize the following:

- We know little about the magnitude of international migration costs. What is the relative importance of uncertainty, credit constraints, and destination-country admission policies in keeping the poor from migrating to rich economies?
- While there is evidence that migration networks play an important role in reducing moving costs, the dynamics of networks are poorly understood. Are there diminishing returns in the impact of network size on migration costs? Or does the existence of networks imply that spatial opportunities for emigration will only become more unequal over time?
- We still know little empirically about the factors that determine who leaves different countries. What are the contributions of international differences in labor productivity, returns to schooling, and migration costs to migrant selection?
- Given the importance of human capital in economic development, how skilled emigration affects a country's relative supply of skill is a question of first-order policy importance. How do changes in education, tax, or other policies in developing countries affect skilled emigration, the domestic supply of skill, or remittances from skilled emigrants?
- Sending and receiving countries are still far from having equal factor prices, in which case we might expect to see trade, migration, and FDI to happen

concurrently, even reinforcing one another. How does migration interact with international trade and foreign direct investment?

- The inflow of remittances has been a welcome financial boon for many labor-exporting countries. Do remittances in fact help deepen domestic financial markets, as households use banks or other intermediaries to manage lumpy income receipts from abroad?

Within the development policy community, there are calls for rich countries to open their economies more widely to labor inflows from poor countries (e.g., Prichett, 2006). Completely open borders are off the table politically. Were the developed world to propose an increase in immigration quotas, should developing countries take the offer? The answer would depend on how destination countries structured the additional labor inflows. An increase in immigration quotas that targeted workers with higher levels of skill could raise global income, even as it lowered welfare for the less-skilled majority in source countries (Benhabib and Jovanovic, 2007). Quotas targeted to less-skilled workers could raise global welfare, though in the presence of human capital externalities they would not necessarily maximize global income. The adoption of such a policy would surely face opposition in receiving countries over concerns about fiscal and labor-market consequences. Getting sending and receiving countries to coordinate on international migration is a difficult task. A helpful first step would be to determine if the interests of the two groups of countries are really as far apart as they seem.

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