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Education and migration: insights for policymakers

Björn NILSSON*

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Education and migration: insights for policymakers

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Abstract

Connections between migration and education are numerous, both at the macro and micro level. Recognizing this implies that educational policy as well as migration policy may generate spill-over effects, either in countries implementing the policies or in countries whose citizens may be concerned by them (or both). In an era of increased global connectedness, there is thus scope for the successful implementation of coordinated policies in the areas of migration and education. To tailor policies that work, however, a solid basis of evidence needs to be constituted, and theoretical predictions need to survive empirical examination from multiple contexts. This article provides an overview of the most important findings in the economics literature regarding the role of education in the migration-development nexus, emphasizing theoretical and empirical findings of interest for policymakers. The article will draw from multiple sources in the literature, including papers presented in the annual AFD/World Bank 'Migration & Development' conference. It intends to highlight the main findings regarding the role of education in the emigration decision, and in particular the issue of endogenous selection of migrants, but also the impact that migration has on the education of migrants and of non-migrants in both origin and destination countries. It will furthermore provide some stylized facts on the evolution of migrants' skill composition around the world. Finally, the paper will provide a discussion on the challenges source and host countries face in implementing policies to tailor migration flows.

Keywords: Migration, Education, Brain drain, Migration policy

JEL Codes: F22, F24, H00, I25, I28.

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Connections between migration and education are numerous, both at the macro and micro level. Recognizing this implies that educational policy as well as migration policy may generate spill-over effects, either in countries implementing the policies or in countries whose citizens may be concerned by them (or both). In an era of increased global connectedness, there is thus scope for the successful implementation of coordinated policies in the areas of migration and education. To tailor policies that work, however, a solid basis of evidence needs to be constituted, and theoretical predictions need to survive empirical examination from multiple contexts. This article provides an overview of the most important findings in the economics literature regarding the role of education in the migration-development nexus, emphasizing theoretical and empirical findings of interest for policymakers. The article will draw from multiple sources in the literature, including papers presented in the annual AFD/World Bank 'Migration & Development' conference. It intends to highlight the main findings regarding the role of education in the emigration decision, and in particular the issue of endogenous selection of migrants, but also the impact that migration has on the education of migrants and of non-migrants in both origin and destination countries. It will furthermore provide some stylized facts on the evolution of migrants' skill composition around the world. Finally, the paper will provide a discussion on the challenges source and host countries face in implementing policies to tailor migration flows.

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Executive summary

Migration is currently a hot topic in the world's state of affairs. Despite being behind the initial geographical dispersion of humanity, the nation-state configuration of the modern era has since long strongly questioned migration as a natural phenomenon. The debates on migration have been particularly loud in recent years, as a significant number of political leaders from around the world have blamed migrants for the underperformance of their welfare states and labor markets, or the transformation of their societies and value systems. As migrants engage in economic, social and cultural competition with non-migrants, debates in the policy arena rage over what migrant flows actually imply for current and future welfare—of non-migrants and migrants, and of host and origin countries. A crucial element in this debate is education. Migrants are rarely presented as a random draw of the population (neither in their origin countries nor in their host countries), and their educational qualifications are often relied on to make arguments regarding the welfare effects of their displacement: too unskilled, migrants disturb local labor markets by bringing low quality labor to the market or by undercutting local wages; too skilled, they are accused of betraying their origin countries, which need them more than their host countries. What are the realities behind these arguments? and what does economics have to say about the links between education and migration?

First of all, the share of international migrants in the world barely increased from 1960 to 2000, and most migration still takes place between developing countries; so called South-South migration. However, two trends clearly emerged over the same period: migration from developing to developed countries increased strongly, as did the average educational endowment of migrants from the South living in the North. Behind this evolution lies an increase in the average educational attainment of origin country populations, rather than an increase in the propensity to emigrate of educated workers in these countries. Although educated individuals are more likely to migrate than uneducated individuals, this likelihood has not increased over time. While closing the educational gap with developed countries seems to be a major explanation for increasing educational attainment among migrants from the South in OECD countries, recent data from DIOC-E suggests a strong educational bias for migrants within Africa, such that Africans living in another African country than their own are about ten times more likely to have a tertiary education than their host populations.

Among the early rationales for migration, the competitive factor mobility model suggests that migrants move in order to acquire better labor market prospects (usually approximated by a higher expected wage). The wages they can acquire in different markets depend on how these markets value their abilities (education, professional skills and/or intrinsic ability), such that more able individuals would tend to move to markets valuing ability, and vice versa. Although this hypothesis has found some support in the literature, other determinants of flows that are linked to education, such as costs, language barriers, the

presence of diasporas or credit constraints have been suggested to matter at least as much. More than the reasons behind it, however, the *consequences* of educational selection—or brain drain—have been a matter of discussion in academia since the 1960s. In the last decades, the idea of positive repercussions from selective emigration has emerged. Among other things, the possibility of emigration might act as an incentive to acquire education for origin country populations, and those who end up migrating usually stay connected with origin countries, transferring cash, human capital and ideas. These transfers may be direct inputs into the host country educational stock, when they finance children’s education for example. A strand of papers have indeed found positive effects from remittances on the education of remaining household members. A difficulty has been to separate this effect from that of having a household member, usually a parent, absent. The physical absence of a father or a mother (especially the latter) has indeed been shown to deteriorate educational accumulation.

Often, migration and acquisition of education occur simultaneously and studying abroad becomes a motive for migration. This can however be for the value of a foreign education in the origin country, or as a gateway to establishment in the host country using local educational credentials to access the labor market. Immigration can of course occur at an even earlier age, such that most or all of schooling takes place in the host country. Studies linking age at immigration to school outcomes have found that there is no learning penalty (in terms of worse school progression) when children arrive younger than 6-9 years, since up until this age, they have little experience from school and more easily adapt to the host country schooling environment. From the perspective of host countries, it has been claimed that immigrants deteriorate school quality and thus act as negative externalities for natives. Some evidence of such an effect, as well as a ‘native flight’ response, has been found at high levels of migrant presence.

This paper ends by discussing migration policies. First of all, policies aiming to restrain individuals from crossing borders are not very efficient. Actively headhunting skilled emigrants and proposing beneficial return conditions has been tried by several Asian countries, but their success rate is unclear and it is possible that such policies also act as incentives to move in the first place. There are also grounds to question the efficiency of selective immigration policies, for example due to the fact that diasporas benefit low-skilled migrants disproportionately, and the fact that a large proportion of the factors that migrants self-select on are unobservable to customs officers. Finally, the generosity of the welfare state has been suggested to also influence migrant flows as well as their skill content, with empirical evidence suggesting that a more generous welfare state attracts proportionally more lower educated migrants.

1 Introduction

Connections between migration and education are numerous, both at the macro and micro level. Recognizing this implies that educational policy as well as migration policy may generate spill-over effects, either in countries implementing the policies or in countries whose citizens may be concerned by them (or both). In an era of increased global connectedness, there is thus scope for the successful implementation of coordinated policies in the areas of migration and education. To tailor policies that work, however, a solid basis of evidence needs to be constituted, and theoretical predictions need to survive empirical examination from multiple contexts. Thus, a continuous provision of evidence seems particularly important when considering that while economics may keep finding efficiency gains from the theoretical movement of people, real movements ultimately respond to a combination of individual incentives and national policies. Those policies are put in place by policymakers who all answer to their particular constituents, which may feel that they have more or less to lose from migration. Although abolishing border controls in the world has been estimated to roughly double the world GDP (Clemens 2011) or increase global welfare threefold (Desmet, Nagy, and Rossi-Hansberg 2018), recent declarations by European and North American leaders go against a gradual opening of borders. Part of the problem seems to be, as elegantly and ironically put by Max Frisch, that migration doesn't only give us foreign workers, but foreign people¹, with different cultures, educational backgrounds and a perceived knack for taking large bites out of the social security cake. The case for (and against) migration has been made both through positive (negative) effects on sending countries and through positive (negative) effects on receiving countries. In both cases, the skill dimension of migration is drawn on, and migrants are rarely presented as a random draw of their origin country populations: too *unskilled*, they threaten low-skilled natives' labor market prospects, creating unemployment and falls in wages; *high-skilled*, they are seen as a driving force, but also one that deprives source countries of talents necessary for catching up to the development levels of host countries. Whatever the argument, the skill composition and the linkages between education and migration are often at the center of migration debates, and this paper aims to present and clarify the theoretical and empirical relationships between migration and education by surveying the growing economics literature dedicated to this topic.

On the one hand, education is a prerequisite for migration to some countries such as Canada or Australia, who implement fairly selective migration policies tailored to ensure that only those individuals deemed the most beneficial make it across the border; on the other hand, migration is also a means to get a good quality education for individuals in developing countries whose educational systems lack the resources for providing individuals with globally marketable skills. Education thus becomes a motive to

¹"We asked for workers. We got people instead." (Man hat Arbeitskräfte gerufen, und es kommen Menschen). Foreword to «Siamo italiani – Die Italiener. Gespräche mit italienischen Arbeitern in der Schweiz» by Alexander J. Seiler.

migrate, as the increasing stock of international studies bears witness to. Furthermore, from the point of view of origin households, having a member in migration may have effects on the education of remaining household members, both during and after migration. These links are at the center of policy debates both in migrant-sending countries and migrant-receiving countries, eager to make the best use possible of their resources.

Adopting the point of view of potential migrants, the past decades of research into migration have shown that the decision to migrate is embedded both in a lifelong strategy of poverty alleviation and the search for a "better life", and that this decision is often made jointly within the household and communal structures in which individuals are embedded. Whether the reasons for migrating are directly linked to education or not, the cross-country flows of young persons alter the compositions of potential school-goers around the world, both at the household, local and country levels, and impacts from migration on educational outcomes can be expected in both sending and receiving countries. Furthermore, a distinction can be made regarding the duration of migration: while the willingness to migrate for better opportunities may take the form of temporary migration, where improving livelihoods in the origin country remains the main motivation, migration may also be permanent, and better possibilities for subsequent generations may play into the migration decision. The two types of migration (temporary and permanent) are not likely to have the same effects on education of household members. Starting at the other end of the relationship, adopting the point of view of a young potential school-goer, education may in itself be a prerequisite or a deterrent for migration. Income differentials between countries may incite young people in migrant-sending regions to get educated, even when the probability of migration is relatively low. They may also deter education, if educational attainment is perceived as irrelevant for labor market success in the host country. Directly linked to this question is the debate on brain drain versus brain gain from the migration of educationally selected migrants. Causal evidence of the impact of selective migration on countries' educational level is of high importance both in defining migratory policy, and for shaping development strategies on the whole.

Furthermore, while skills (or human capital) are generally rewarded in the labor market, education does not equal skill. Education does not always lead to skills that are applicable in the work environment, and the low efficiency of education in developing countries leads many advanced countries to grant little value to educational credentials from such countries. In the following, I will use the terms education and skills or human capital interchangeably, but the reader should keep in mind that skills generally refer to a broader set of endowments which are not necessarily acquired in formal education. Furthermore, education and skills are also distinguished from *ability* in chapter 3. The term ability here designates the intrinsic, generally immeasurable endowments of resourcefulness, motivation and talent that individuals carry and which are generally much more than the result of their schooling.

This review aims to approach the linkages between education and migration from all the above points of view. First, some stylized facts pertaining to the educational composition of worldwide migrant flows are presented and discussed. Next, theoretical and empirical findings regarding educational selection into migration are presented, including the positive and negative impacts associated with flows of high educated workers out of developing countries. Section 4 addresses the impacts of migration on education in origin households, discussing remittances, parental absence and return migration. Section 5 discusses education as a motive for leaving, and also elaborates on the impact of migrant cohorts on natives' schooling. Section 6 presents evidence on migration policies, and the last section concludes.

2 Stylized facts on the skill composition of migrant flows

Summary

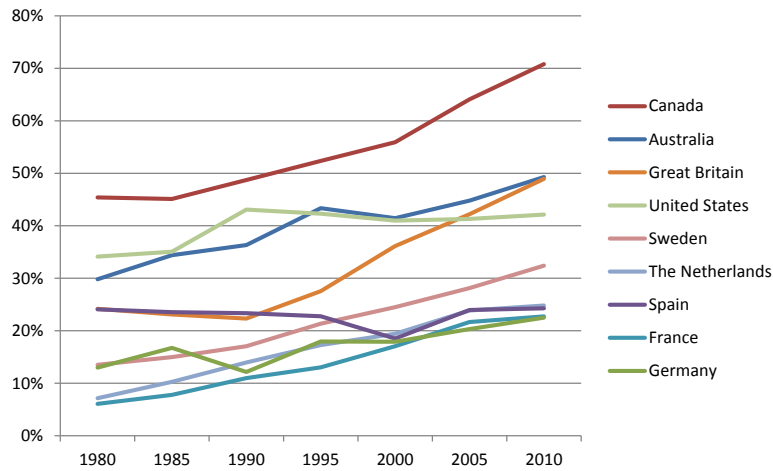
Contrary to common perception, the number of migrants as a share of the world population has remained relatively stable since the 1960s. However, there has been a steady increase in South-North migration as well as in the educational endowments of migrants in OECD countries. The most likely candidate to explain this evolution is the sharp increase in average educational endowments in origin countries. However, more selective migration policies and educational self-selection of migrants may also play a role for bilateral flows, and a fair share of migrants' education is acquired abroad, lending some discredit to criticism in the form of the brain drain argument. Furthermore, looking at South-South migration, data from DIOC-E suggest that the selection on education of African migrants in African countries is substantial.

Human cross-border mobility is a long-standing feature of economic life in the world. Despite increasingly loud discussions about migration in the media, the share of the world's population living in a country different from the one they were born in has remained stable since the 1960s, at around 3% (Ozden et al 2011).² This naturally implies an increase in numbers of migrants proportional to worldwide population growth, such that the absolute number of migrants has experienced the same high growth rates as population over the last half-century. Although declining, as of the year 2000 the largest share (45%) of the international migrant stock was *still* composed of migrants who migrated between developing countries (Docquier 2014), as opposed to between developed countries or in between developed and developing countries. Nevertheless, the stock of immigrants in OECD countries has tripled since the 1960s, and the growth in the absolute number of migrants during the period 1960-2000 was largely driven by migration from developing countries to developed countries, increasing from ten million to 55 million (Docquier 2014). A natural question to ask, for our purposes, is whether or not this affected the skill composition of

²Alternative data from the UN Global Migration Database suggest a slight increase from 2.5% to 3.1% (Docquier 2014)

the foreign-born in developed countries.

Figure 1: Share of tertiary skilled migrants (male) in total male migrant stock, by destination (selected OECD countries)



Source: Author's computation using data from Brücker, Capuano and Marfouk (2013).
Population: foreign-born men aged 25 years and older.

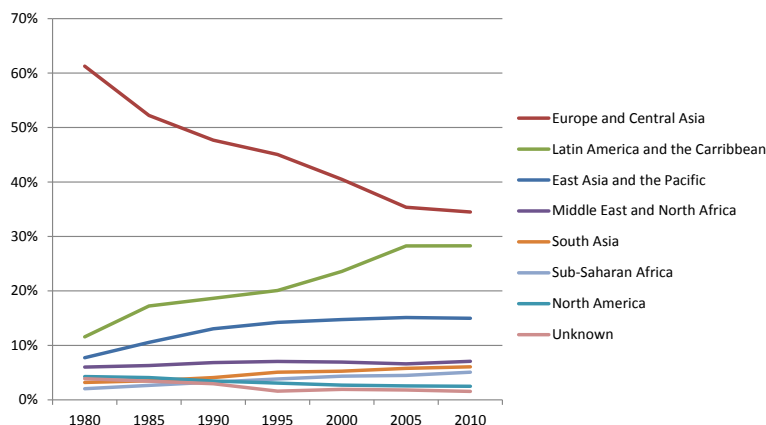
In other words, how did the skill composition of migrants change as the migrant stock was multiplied by a factor of 5.5? Figure 1 shows the increasing concentration of high skilled migrants in OECD countries, from 1980 to 2010. The figure shows, for a selection of OECD countries, the share of individuals with a tertiary education out of the foreign-born population aged 25 years or more. Clearly, the educational attainment of migrant stocks has increased over time in all countries (with the exception of Spain, where the share first dipped and then caught up to its initial level). From whichever perspective one looks at these figures, they are by all accounts significant, and suggest that the foreign-born in OECD countries in general have educational attainments close to those of their host countries. Taking the difference between the educational attainment of host countries in 2010 and the educational attainment of their migrant stock in the same year gives us an idea of whether migration is a contributor to countries' average educational attainment or not. Focusing again on the share of individuals with tertiary education, it turns out that this is the case for Canada (+25.4 pp), Australia (+14.9 pp), the United Kingdom (+10.8 pp), Sweden (+3.4 pp) and for the United States (+2.8 pp). On the contrary, countries like The Netherlands (-9.4 pp), Germany (-7.3 pp), Spain (-5.3 pp) and France (-4.6 pp) all have a migrant stock that is negatively contributing to their shares of tertiary educated. If current trends prevail however, it is not unlikely that all the above countries will be net beneficiaries in the foreseeable future.

The important increase in the educational attainment of foreign-born in OECD countries can have several origins: first of all, the graph above could reflect an increasing endogenous selection of migrants by skill, such that the share of tertiary educated in origin countries to a larger extent migrate than previously. The standard migration model predicts migration to respond to wage differentials, and an increase in the relative wage of skilled workers in developed countries could thus account for an increasing concentration of high-skilled migrants in international flows. Second, increased provision of education to migrants by host countries may also account for a share of this evolution. Either, foreign-born minors who migrated in the past move through host countries' educational systems and end up making a positive dent in recent data—or, adult migrants are trained to better prepare them for host countries' labor markets, for example through catch-up schemes such as Sweden's 'Komvux', a type of secondary education for adults and which permits individuals without secondary school credentials to obtain them and subsequently pursue education at higher levels. Third, the increasing skill level of the migrant stock could also reflect a change in the country composition of inflows, such that flows from countries with on average higher educational attainment have replaced flows from countries with lower educational attainment. Fourth, general improvements in educational attainments of origin countries' population may reduce the average skill-gap between origin and destination countries, increasing the average skill level of more recent migrants. The exponential growth of tertiary education establishments in the developing world is well known, with enrollment rates in developing countries today being higher than those of industrialized countries only a few decades ago (Schofer and Meyer 2005). Fifth and finally, the adoption of selective migration policies, allowing only the most educated migrants status as legal migrants, also has the potential to explain these findings. Relatedly, increased student mobility or increased retention of high educated students upon graduation, which may be part of migration policy, can also translate into higher shares of tertiary skilled foreign-born.

To gauge whether compositional changes of migrants by origin country are related to these increases in skills, it is useful to look deeper into the data shown in Figure 1, distinguishing migrants by their origins. Figures 2 and 3 respectively show the distribution of OECD migrants in terms of their origin countries, and the share of tertiary educated in migrant populations by region of origin. Figure 2 shows the decreasing importance of Europe and Central Asia as an origin region. Its fall is compensated by increases in stocks of migrants from other regions, and in particular from Latin America (the huge increase in migration from Mexico and Central America to the U.S. is the main driver here). Figure 3 however does not support the idea that country compositional changes in flows would be the major driver of increased educational attainments in migrant stocks. The figure shows increasing educational attainments for migrants originating from all regions in the world. This does not exclude compositional changes from having occurred at the country level however. In Australia for example, a foreign born population initially

composed of a strong majority of migrants from Europe (the United Kingdom in particular) has diversified, with migration from all other regions increasing over time. It turns out that non-European migrants have on average higher educational attainment than past flows originating from Europe. This may reflect both more selective migration policies put in place by Australia in recent years, and the fact that European migrants are older, having arrived in the past when the global average educational attainment was lower. Globally, previous studies have shown that the stock of foreign-born in OECD countries is increasingly composed of migrants from developing countries (Docquier 2014). Although Figure 3 shows increasing shares of tertiary graduates for migrants from regions such as South Asia and Sub-Saharan Africa, these migrants are still relatively less educated than migrants from Europe and Central Asia. The compositional shift that has occurred over the last decades has thus contributed negatively—if anything—to the share of skilled migrants in OECD countries.

Figure 2: Distribution of migrant stock by origin, (20 OECD countries)

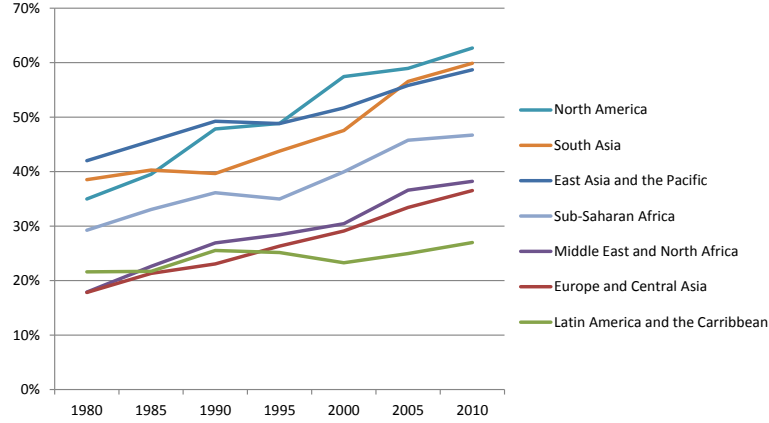


Source: Author's computation using data from Brücker, Capuano and Marfouk (2013).

Population: foreign-born men and women aged 25 years and older. Destination countries included: Australia, Austria, Canada, Chile, Switzerland, Germany, Denmark, Spain, Finland, France, United Kingdom, Ireland, Greece, Luxemburg, Netherlands, Norway, New Zealand, Portugal, Sweden, United States.

If compositional changes are not it, what is then the reason behind the increase in educational attainment? Is it linked to educational progress in origin countries? Table 1 shows information on the emigrant stock, on tertiary educated emigrants and on shares of tertiary educated for the 20 largest contributors to changes in the migrant stocks in OECD countries. The data come from Brücker, Capuano, and Marfouk (2013) and Barro and Lee (2013). The first two columns show the total stock of emigrants by country as a share of the country's population, for 1980 and 2010. It shows that some countries,

Figure 3: Share of tertiary educated in migrant stock by origin, (20 OECD countries)



Source: Author's computation using data from Brücker, Capuano and Marfouk (2013).

Population: foreign-born men and women aged 25 years and older. Destination countries included: Australia, Austria, Canada, Chile, Switzerland, Germany, Denmark, Spain, Finland, France, United Kingdom, Ireland, Greece, Luxemburg, Netherlands, Norway, New Zealand, Portugal, Sweden, United States.

such as Latin American countries situated in the northern hemisphere, have seen tremendous increases in their migrant flows over the period 1980 to 2010. The most striking evolution, that of El Salvador, implies that the share of emigrants in the population rose from 3% to 27% in three decades. The next two columns, containing the shares of emigrants among the tertiary educated, show that the proportion of skilled Salvadorians who choose to migrate, rose from 16% to 39% over the same period. The percentage increase in tertiary migration is smaller than the percentage increase of the general population, however, such that the overall share of tertiary educated among Salvadorian emigrants has decreased. This share was computed for all 20 countries using Barro and Lee's figures for educational attainment together with the emigration stocks and shares of tertiary emigrants.³ The figures are presented in the last two columns, and clearly show the diversity of situations prevailing. While it seems clear that the share of tertiary educated individuals in the stocks of foreign-born are increasing on the whole, this is due both to increases in the average educational attainment of countries, and to increasing rates of emigration among the high skilled. In some countries, a sharp fall in the emigration rates of tertiary educated can thus be accompanied by an increasing share of tertiary educated in the stock of emigrants. This is the case for Iran, who witnessed both a sharp fall in the rate of high-skilled emigration (from 21% to 7%), and an increase in the share of the population with tertiary education (from 2% to 16%), completely offsetting the previous such that tertiary educated as a share of emigrants rose from 45% to 64%.

³ $\delta_{ter} = \frac{S_{BL,t} \times E_t}{E_{all,t}}$, where δ_{ter} is the share of tertiary educated among emigrants, $S_{BL,t}$ the share of tertiary graduates in the population, E_t the share of tertiary educated who emigrate, and $E_{all,t}$ the total emigration rate.

The fact that educational attainment and relative emigration rates interplay provides an illustration of two sides of the brain drain coin. Increasing emigration rates of skilled labor need not imply that migrant flows are increasingly skilled, and vice versa. As previously shown, this also depends on the emigration rate and the average educational attainment of the whole population. From the perspective of source countries, the debate has often been centered around the emigration of skilled workers. From the perspective of host countries, the different experiments with quality-selective immigration policies show that the issue is one of skill composition of flows. El Salvador is one country showing increasing emigration rates. As can be seen from Table 1, Guatemala also witnessed an increase in the emigration rate of tertiary skilled from 13% to 44%. This confirms the finding of Docquier and Marfouk (2006), who show that the highest increases in brain drain intensities to OECD countries occurred in Western and Eastern Africa and in Central America. As far as host countries go, however, this does not mean that the stock of migrants from these countries has become more skilled. Other countries, such as Morocco, Cuba, Iran, Turkey and China, have seen their tertiary educated emigrate less over the period. As previously mentioned for Iran, this is perfectly compatible with increasing shares of skilled workers among the stocks of migrants from these countries.

Table 1: Shares of emigrants to OECD countries and tertiary education

	<i>Emigration rate</i>		<i>Tertiary emigration</i>		<i>Barro & Lee</i>		<i>Share tertiary</i>	
	%		%		%		%	
Country of residence	1980	2010	1980	2010	1980	2010	1980	2010
El Salvador	0.03	0.27	0.16	0.39	0.02	0.05	0.12	0.07
Dominican Republic	0.05	0.14	0.16	0.22	0.01	0.03	0.04	0.04
Guatemala	0.02	0.10	0.13	0.44	0.02	-	0.15	-
Mexico	0.05	0.14	0.09	0.12	0.04	0.13	0.07	0.12
Ecuador	0.02	0.10	0.07	0.16	0.05	0.07	0.16	0.11
Morocco	0.05	0.09	0.22	0.20	0.00	0.06	0.02	0.14
Peru	0.01	0.04	0.03	0.09	0.08	0.16	0.34	0.34
Cuba	0.09	0.12	0.40	0.37	0.04	0.09	0.15	0.27
Colombia	0.01	0.04	0.08	0.15	0.04	0.18	0.28	0.69
Iraq	0.01	0.03	0.06	0.13	0.02	0.10	0.23	0.36
Philippines	0.03	0.05	0.09	0.11	0.10	0.07	0.36	0.16
Vietnam	0.01	0.03	0.19	0.23	0.01	0.05	0.17	0.33
Iran	0.01	0.02	0.21	0.07	0.02	0.16	0.45	0.64
Nigeria	0.00	0.01	0.08	0.12	-	-	-	-
Pakistan	0.01	0.01	0.07	0.07	0.02	0.06	0.19	0.38
Kenya	0.01	0.02	0.24	0.24	0.01	0.05	0.14	0.72
Brazil	0.00	0.01	0.01	0.03	0.04	0.08	0.24	0.45
World	0.02	0.02	0.05	0.05	-	-	-	-
India	0.00	0.00	0.04	0.05	0.02	0.06	0.27	0.67
China	0.00	0.00	0.03	0.02	0.01	0.02	0.22	0.21
Turkey	0.08	0.05	0.10	0.07	0.02	0.07	0.03	0.10

Source: Author's computations using data from Brücker, Capuano and Marfouk (2013) and Barro and Lee (2013).

Emigrant stocks are restricted to those in the 20 OECD countries used above.

The world emigration rate, reasonably static between 1980 and 2010 both on the whole and when focusing on tertiary educated (although there is a slight growth of 0.5 pp), hardly paints a picture of increasing educational selection. The emigration rate of tertiary educated did not evolve between 1980 and 2010, remaining at 5%. The increasingly skilled migrants worldwide thus rather seem to originate from increased enrollment in tertiary education. Indeed, the world gross enrollment rate in tertiary education jumped from 12.4 to 29.3 between 1980 and 2010 (World Bank Data Bank). The worldwide pool of candidates for migration has thus become more educated, and a random draw of individuals from most countries today would contain larger shares of secondary and tertiary graduates than 30 years back. This is not to say that the two remaining explanations for the increasing educational attainment of migrants in OECD countries are invalid. Both selection on education in the emigration decision and more selective migrant policies arise as potential determining factors of the rise in educational attainment at a bilateral level. However, as Table 1 shows, educational selection of emigrants remains fairly heterogeneous among the main source countries for OECD immigrants, both in terms of levels and in terms of evolution between 1980 and 2010. A recent report by the World Bank (World Bank 2018) on asylum seekers arriving by sea in Italy and Greece presents interesting data on the educational attainment of precarious migrants. There is some heterogeneity across countries, but in general asylum seekers have similar educational attainments as their origin country populations, suggesting an absence of selection in precarious migrant populations. A natural interpretation is that educated migrants are more prone to enter their destination countries legally. Although most countries do not exhibit large difference between asylum seekers and origin country residents, an outlier case is that of Sudanese migrants who on average have 6 years less education than Sudanese residents.

Previous research has shown that among the main determinants of high rates of skilled emigration are closeness to an OECD country and being a small—predominantly island—country. Indeed, according to the DIOC-E database, most of the top countries in 2000 in terms of emigration rates of tertiary skilled satisfied these criteria: Barbados (90.4%), Guyana (77.4%), Haiti (70.4%), Trinidad and Tobago (66.6%), Cambodia (54.1%), Mauritius (53.8%), Tonga (51.9%), Jamaica (46.1%), Seychelles (40.6%) and Mozambique (40.6%). While these numbers seem extremely high, most countries are not so badly affected: the five most populous countries in Africa are nowhere near those numbers: Nigeria (2.8%), Ethiopia (10.5%), Egypt (5.1%), Democratic Republic of the Congo (12.6%) and South Africa (17.6%). The world's two largest countries, China and India, are even less causes for concern, with emigration rates of the tertiary educated of 2.3% and 2.9% respectively. Part of the perceived unfairness of brain drain relies on the fact that poorer, financially constrained countries finance education for their citizens without reaping the benefits of this investment. As shall become clear later, this is not all too obvious, since the emigration of qualified labor might induce both productive investment and demand for educational services. Putting

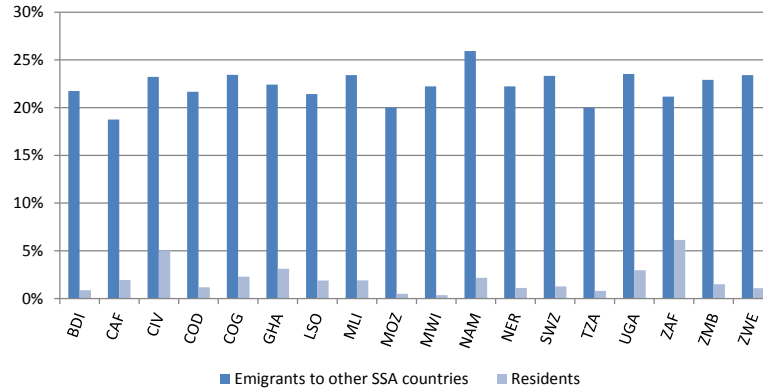
this fact aside, however, most data on migration does not distinguish whether education was actually acquired in the origin country or not. Beine, Docquier, and Rapoport (2007) look at data on immigration in a set of OECD countries, using age of entry as a proxy for where education was acquired. Their exercise shows that a significant proportion of what is generally termed skilled emigration occurred before the age of 22 (38%), suggesting that at least part of education took place in the host country. The figures for ages 12 and 18 are 13% and 22%. Overall, however, global cross-country differences are maintained and there is a good correlation between skilled migration rates before and after their correction was applied. Relatedly, Özden and Phillips (2015) focus on African-born doctors practicing in the United States, showing that almost half of them were trained outside their birth country. Thus, if brain drain is to be understood as the emigration of domestically trained individuals, then stocks of skilled migrants at best provide an upper bound to this figure.

What about south-south migration?

The previous discussion focused on migration to industrialized countries, showing that the educational qualifications of migrants have increased over time. What about migration between developing countries? As stated above, this migration still accounts for a significant share of population movements in the world. Although the work of Docquier and Marfouk (2006), Arslan et al. (2014) or Brücker, Capsuano and Marfouk (2013) has provided a knowledge base regarding skilled emigration to OECD countries, much less is known about the educational composition of migrant flows *between* and *within* developed countries. The extended database on immigrants in OECD countries (DIOC-E), containing information on immigrants in non-OECD countries, allows us to examine whether South-South migration is skill distorted in the manner of South-North migration. Figure 4 shows the shares of tertiary educated among migrants and natives for a selection of African countries. Darker bars denote the shares of tertiary educated among emigrants to other African countries, while lighter bars denote shares of tertiary educated in the resident population. A quite homogeneous picture of intra-African skill mobility emerges. Removing observations related to missing information either on educational characteristics, or on country of origin, the share of tertiary educated among foreign-born Africans in Africa's 56 countries (including Western Sahara and Saint-Helena) amounts to 21.6%. As can be seen in Figure 4, all countries have emigrant populations significantly more educated than their resident populations.

The emergence of skilled mobility within developing countries was documented in Artuç et al. (2015), who claim that non-OECD countries now account for one third of skilled mobility, and that this share is on the rise. This also suggests that the competition for talent is not only a competition between rich countries for the skilled resources of poorer countries—relatively poor countries also manage to attract skilled migrants. The precise contours of this migration warrant further study. Plausible explanations are

Figure 4: Share of tertiary educated by residence, selected African countries (2010)



Source: Author's computation using data from DIOC-E and Barro and Lee (2013). *Population:* foreign-born men and women aged 25 years and older. *Origin countries are:* Burundi (BDI), Central African Republic (CAF), Côte d'Ivoire (CIV), Democratic Republic of the Congo (COD), Republic of Congo (COG), Ghana (GHA), Lesotho (LSO), Mali (MLI), Mozambique (MOZ), Malawi (MWI), Namibia (NAM), Niger (NER), Swaziland (SWZ), Tanzania (TZA), Uganda (UGA), South Africa (ZAF), Zambia (ZMB) and Zimbabwe (ZWE).

the movements of skilled workers to regional hubs where jobs relevant for their skills are in larger supply. A second explanation is student mobility and subsequent retention. A recent report has shown that other African countries account for an increasing share of international student mobility in Africa, with South Africa emerging as the top destination, receiving as many African students as the United States, and second only to France (Campus France 2016). Other popular destinations on the continent are Ghana and Morocco, who attract large shares of Africans. There are also considerable differences in the shares of mobile students leaving the continent: in some countries, such as the North African countries, virtually all international students leave the continent. In other countries, such as those with borders to South Africa, a large majority of students stay on the continent.

A recent report (Trends in international student mobility) suggests that the number of international students in higher education reached 5 million in 2014, increasing from 1.2 million in 1990. It also confirms the increasing trend of staying in one's continent. Between 1999 and 2007, the share of international Latin American students studying in another Latin American country increased from 11% to 23%, and the number of East Asian students studying in ASEAN countries from 26% to 42%. No credible figure for Africa exists, since information on foreign-born students at African universities is lacking for many countries.

The evidence presented in this section suggests that international migration is increasingly composed of

migrants with higher education. There can be a number of concomitant reasons for this development, but the main reason is likely to be increased enrolment in tertiary education worldwide. Increased educational selection and more selective migration policies may also be good candidates for specific bilateral flows. The following section will examine educational selection from both a theoretical and an empirical point of view, and relate this to the discussion of brain drain versus brain gain.

3 The educational selection of migrants

Summary

Much of economic theory on migration originates from the factor mobility model, where migrants move to destinations where their labor force is highly rewarded. This leads to a selection on ability of migrants, since ability is rewarded differently in different labor markets. Whether this means that migrants to rich countries are selected from the lower or the higher part of the ability distribution has been a matter of debate in the academic literature, with much research having focused on Mexicans in the U.S. Other determinants of migration, such as cost—supposed lower for highly educated individuals—and different preferences, are however likely to be as important in explaining why migrants are more educated than their origin country populations. The negative effect of brain drain, present in the early literature on migration from developing to developed countries, has been challenged in more recent works, and theories of a brain gain have emerged. Positive channels range from an incentive effect to acquire education from the possibility of migration, to transfers in the form of remittances or knowledge, such that the net effect on origin countries need not be negative.

3.1 Theory and empirical support

The earliest economic theory of migration arises from the competitive factor mobility model, stating that migrants move from location i to location j if wages are higher in j than in i . In this framework, wages in destination areas (relative to wages in origin areas) become *pull* factors attracting migrants seeking to maximize their income, similar to the way capital is allocated between sectors and countries according to its relative returns. This basic framework essentially states that in their decision on whether to migrate or not, potential migrants compare their lifetime earnings at home with their potential lifetime earnings in other destinations, net of migration costs. The migrant's educational attainment becomes relevant for this decision when the net gains or losses of migration are a function of migrants' educational attainment. Whether they are or not (and they most likely are) will depend on the age-earnings profiles for different skill levels at potential destinations and in the home country. Positive selection in schooling occurs when the destination country values schooling more than the origin country (Borjas 1991), such that the more schooled have relatively more to gain from migration. Conversely, negative selection in schooling will occur

when the relative return to schooling is lower in the destination country than in the origin country. Rather than focusing on endogenous selection by education, however, the early literature referred to selection in terms of unobserved *ability*.

The selection of migrants regarding to ability was initially deemed a good explanation for an early finding in the migration literature—that of steeper age-earnings profiles for immigrants than for natives in the U.S. Chiswick (1978) documents the fact that although earnings for immigrants are lower than for natives upon arrival, they rise more quickly and surpass those of natives after a period of 10-15 years. This finding, based on cross-sectional data, seemed to confirm the positive ability bias of migrants: even if they faced initial hardships in destination countries' labor markets, the fact that they were drawn from the upper tail of the ability distribution implied that they would end up being paid more than natives. Borjas (1987), however, argued that there was no fundamental reason for positive selection on ability to occur, and that the type of selection expected was related to the skill-income distribution in the origin country. If a destination country values ability more than an origin country, relatively speaking, migrants will be selected from the upper tail of the ability distribution, *i.e.* there will be positive selection on ability. If, on the other hand, the ability-income distribution is more equal in the destination country than in the origin country—such that ability is relatively less valued—then migrants will be selected from the lower tail of the skill distribution, so called negative selection on ability. Borjas (1987) famously speculated that due to higher ability premia in the third world labor markets, immigrants from less developed countries were likely to be selected from the lower tail of the ability distribution (negative selection on ability), while immigrants from advanced industrialized countries such as Western European countries (with tighter income distributions) were more likely to be from the upper tail of the ability distribution (positive selection on ability). In this analysis, ability can readily be replaced by educational attainment. The two types of selection, on observables (education) and on unobservables (unmeasured ability), follow the same logic (Borjas 1991): selection on both educational attainment and ability depends on how countries reward measured and unmeasured skills, with migrants flowing to the countries that offer the highest rewards for their skills. There are reasons to be doubtful of Borjas's 1987 hypothesis however, at least when educational attainment is the object of study. Recent studies do not show negative selection from third world countries and positive selection from European countries as far as measured skills are concerned. In this literature, the selection of Mexican immigrants to the U.S. has received particular attention. Chiquiar and Hanson (2005) find that Mexican immigrants, rather than being negatively selected, are on average more educated than residents of Mexico, and would occupy the middle and upper portions of the wage distribution in Mexico. Ibarra and Lubotsky (2007), on the other hand, argue that selection of migrants from Mexico to the U.S. is negative, with local returns to education in Mexico acting as a significant determinant of the skill bias of migration flows to the U.S. In a comparison of origin

countries, Feliciano (2005) examines educational selection for 32 immigrant groups in the U.S. Her findings indicate that all groups—except for Porto Ricans, who represent a particular group since they are U.S. citizens—are more educated than their home country populations. There is substantial variation however, and the variation is unrelated to the stage of development of the country. European countries are found in both the lower and the upper tails of the selection distribution, and developing countries are found throughout the distribution (e.g. Iran [1], Jamaica [7], El Salvador [21], Mexico [31]). Bivariate regression results furthermore do not suggest that income inequality in the home countries matters significantly for educational selection. Significant associations are however found for distance to the U.S. and average years of schooling in the home country. Using data on OECD countries, Grogger and Hanson (2011) find that positive selection on education is a feature of all origin countries, and suggest that this fits well with a model where the skill-related differences in wage levels, rather than the relative return to skill, drive migration.⁴ This model fits well with their data and suggests that labor productivity differences are a driver of flows. Brücker and Defoort (2009) also look at selection and origin country inequality, using data on migration flows to 6 OECD countries. They find a positive relationship between origin country inequality and educational selection, *a priori* inconsistent with Borjas’ model as well as the more general Roy (1951) model it is derived from. They propose an alternative model where the cost of migration, as a share of income, is decreasing in education. This leads to more ambiguous results which fit better with their findings. Borjas has argued, however, that positive selection on observable characteristics such as educational attainment, is perfectly compatible with a negative selection on unobservables, such that high educated emigrants would have done less well than high educated natives had they stayed in their origin country (Borjas and Bronars 1991). Finally, some experimental evidence has emerged in the migration literature. McKenzie, Stillman, and Gibson (2010) draw on the New Zealand random ballot allowing a quota of Tongans to immigrate each year. They compare Tongans who had their name drawn with those who didn’t, and with a group of Tongans who did not apply for the ballot. They conclude that migrants are selected both on observable characteristics and on unobservables. The latter since, conditional on observable characteristics, their average average earnings prior to migration were higher.

From the factor allocation model it follows that if highly educated have more to gain from migration, such that $\frac{W_1}{W_2}$, their expected wage gain from migration from country 2 to country 1, is higher than the corresponding $\frac{W_1}{W_2}$ for less educated workers, the skill composition of emigrants from country 2 should be biased towards the more educated, such that the average educational attainment is higher for emigrants than for the origin country resident population. Belot and Hatton (2012) test this using data from 29 OECD countries. Their framework allows for poverty constraints to influence the migration decision. This corresponds to the intuition that since migration is costly, the poorest households, living at subsistence

⁴In their specification, the pull factor of educated migrants is $W_{E,j} - W_{E,i}$ rather than $\frac{W_{E,j}}{W_{E,i}}$, where $W_{E,j}$ is the wage of a skilled person in country j and $W_{E,i}$ the wage of a skilled person in country i .

level, are unlikely to be able to afford it (at least as far as long distance migration is concerned). Even if some type of credit market exists, a credible collateral may be difficult to provide given that the purpose of the loan is to leave the country. Their findings indicate that only when taking into account poverty constraints does the relative wage premium act as a significant determinant of educational selection. Secondly, they find that other factors such as distance and cultural proximity are at least as important as wage premia in determining the degree of selection. The evidence provided thus suggests that although relative wage returns may appear as determinants of migration skill bias, they may not be the sole, or even the main drivers. Costs and credit constraints appear to matter greatly. Chiswick (1999) puts forward the argument that the costs of migration and adapting to a new environment may be lower for the better educated. This is an application to migration of Schultz's (1975) argument that education enhances individuals' "allocative efficiency". Education, Schultz argues, helps us improve our efficiency in dealing with disequilibria, such that educated members of society are better at adopting new technologies and adjusting to shocks. Schultz's theory is underpinned by empirical evidence, largely from studies on agricultural productivity which show that efficient adaptation to new agricultural technologies or unforeseen shocks are increasing in education. If such allocative efficiency extends to human capital mobility, then Chiswick's presumption, that costs of migration are a decreasing function of educational attainment, implies that selection on education may occur even if two countries value skill in the same manner.

Another determinant of skill bias, directly related to costs, is the presence of migrant networks at the destination. Networks lower the cost of migration in several ways: they provide contacts for the job market and facilitate entry into the destination country; they may provide vital services upon arrival such as housing and credit or help out with administrative tasks. It has been argued that low-skilled migrants benefit disproportionately from such networks, since they are more likely to be credit constrained, less fluent in the destination country language, and generally less informed. A natural consequence of this would be for migrants with lower educational attainment to exhibit a stronger reliance on diasporas in their migration. Borjas (1998) indeed shows that low-skilled immigrants are more likely to settle in segregated areas in the U.S. than high-skilled migrants, and Bauer, Epstein, and Gang (2005) show that English proficiency determines the size of the enclave in which migrants settle upon arrival. McKenzie and Rapoport (2007) draw on these ideas to reconcile opposing findings on the skill bias of Mexican migrants. Their model assumes that the skill-cost curve for migration is related to the size of migration networks in communities, such that the incentives to migrate for low skilled are higher in communities with large networks. Thus, their framework predicts negative selection in communities with large networks, and positive selection in communities with small networks. The fact that diasporas shape the educational content of migrant flows has been confirmed in later studies such as Bertoli (2010) for Ecuadorian migrants, Neubecker, Smolka, and Steinbacher (2017) for immigrants to Spain and Beine, Docquier, and Özden

(2011), focusing on immigrants from the whole world in 30 OECD destination countries.

Other models with implications on the skill flows of migration focus on information asymmetries. Stark and Katz (1987) develop a model in which the true productivity of migrants is imperfectly observable to employers in destination countries. Migrants are thus paid according to their true productivity in origin countries, and according to expected (average) productivity in destination countries. This creates incentives to migrate for workers of low skills and disincentives for workers of high skills (a situation of adverse selection). If, however, the true skill is discovered by destination country employers after a delay, both high skilled workers and low skilled workers are better off. The former, since after a delay they will be paid according to their true marginal productivity; the latter, since the presence of the former increases average productivity, and thus their initial wages. Such a model would also rationalize longer stays (or higher shares of permanent migration) for more educated migrants, and shorter stays for less educated migrants. Information asymmetries are also at the core of the model proposed by Kwok and Leland (1982). Their framework, however, focuses on the ability of employers to gauge qualifications from educational certificates. They assume that employers in the country of training are better at judging the productivity of potential workers than employers abroad, since they are familiar with the educational system and the ranking and curricula of different schools. This also generates a situation of adverse selection, where the most productive workers stay abroad, where they will be paid according to their productivity, and where the least productive workers return to their origin country, where they will be paid according to average productivity. Endogenous selection on ability thus occurs in terms of return probabilities. Another feature of migration, absent from the above models of the migration decision, is the fact that migration can occur at the family level rather than at the individual level. Families may decide on who to send and for how long, and they may consider sending several members or even reunite the entire family in the host country. Borjas and Bronars (1991) cast the migration decision as a family income maximization problem. Their framework, a model of two persons migrating, attenuates the endogenous selection of migration, since the profitability of moving for one individual may compensate for the lack of profitability of another individual, given that it is the income of the whole family that matters. Joint decisions thus reduce educational selection. The framework implies, among other things, that the nature and generosity of family reunification policies are likely to affect the educational composition of immigrants.

While wage and cost incentives are at the center of most theoretical frameworks regarding both migration and the educational selection of migrants, they surely do not account for all motives. Alternative hypotheses include a correlation between wealth and education, a stronger preference of high-skilled migrants for the lifestyles and political freedom of destination countries and the absence of labor markets for particularly educated workers with narrow skills. As Bodvarsson and Berg (2013) put it, "simple income

maximization is rarely a sufficient explanation for migration, with motives ranging from family reunification, political asylum or religion". While this is true, extensions to the classical income-maximization model do provide a rationale for endogenous skill selection on migrants, as the literature cited above has shown. Other than pure cost variables, psychological determinants could also drive the decision to migrate: evidence from a survey run on the very highly talented in three nations of the Pacific examines the determinants of both emigrating and returning (Gibson and McKenzie 2011). It shows that although virtually all individuals state higher potential gains abroad, many do not migrate, and within the group of migrants, many return. The microeconomic determinants of the migrant decision seem to be more linked to risk aversion, the subject studied in high school or patience than to liquidity constraints or the skilled wage gap. Risk aversion was also documented as a determinant of Chinese out-migration in Dustmann et al. (2017), who build a model of migration where conditionally on gains from migration, the less risk averse members of a household should have higher propensities to migrate. The fact that socio-psychological determinants such as risk aversion and patience, and probably personality traits in the more broader sense, are determinants in the migration decision is an interesting study area whose links to selection on education warrants further investigation. Since studies have shown that the evolution of non-cognitive skills within individuals are partially linked to environment, and that school-based interventions modify them (Durlak et al. 2011), the link between education and personality traits can be a hitherto unexplored determinant of the endogenous selection of migrant flows.

3.2 Consequences of selection: the brain drain - brain gain debate

The previous subsection has shown that there are a number of theoretical reasons why migration flows between countries should be (and are) disproportionately composed of skilled migrants. The rationales and magnitudes of the brain drain, the outflux from—primarily poor—countries of their most high skilled and/or talented individuals, has indeed been a recurrent theme in the migration literature throughout the second half of the 20th century. If one agrees on income maximization as a rationale for migration, then a relatively higher value placed on skill in developed countries than in developing countries leads to the latter losing large proportions of their most skilled individuals—the very same individuals which may have a crucial role to play in promoting development in their home countries. Early discussions on the brain drain emphasized it as a situation where the departure of one individual deteriorated the *average income* of remaining individuals (Grubel and Scott 1966; Bhagwati and Hamada 1974). Grubel and Scott (1966) argued that in general, this should not be the case, since the departure of an individual would increase the capital to labor ratio of the origin country.⁵ They recognized, however, that the departure of *some* individuals could lead to decreases in the average national income: exceptionally bright individuals,

⁵Unless, of course, migrants are able to bring significant quantities of physical capital to their destination.

whose human capital was a large enough loss to counterbalance the gain in physical capital per worker, and individuals whose economic activity generated positive externalities. It was also recognized that foregone tax revenue could lead to the origin country's resident population being worse off than prior to departure. In general, the early literature concluded on negative effects (Oteiza 1965; Perkins 1966; Berry and Soligo 1969). This dystopian view of skilled emigration prompted Bhagwati (1972) to argue for a tax flowing from developed to developing countries, proportional to the stock of skilled migrants from developing countries residing in developed countries. The tax was never adopted, and the dismal view has been replaced by a more nuanced view incorporating possibilities of brain *gain*. This mainly refers to the idea that the mere prospect of migration raises incentives to become educated, such that the possibility of emigration can have a positive impact on educational attainment for some non-migrants. Sometimes, this brain gain may even dominate brain drain, creating a net positive effect of skilled migration on average educational attainment or growth. Besides the quantity of schooling, the possibility of migrating may also influence the fields chosen in higher education, with programs conferring more general, transferable skills gaining in popularity as migration possibilities rise.

Why does brain drain arise and gain momentum? The theories used to justify migrants' educational selection state that when costs or benefits related to migration are higher for the educated, positive selection is bound to occur. This explains the incentives of skilled migrants to leave, but not the intensification of brain drain over time. Previously mentioned, the Kwok and Leland (1982) model of asymmetric information between foreign and national employers on the productivities associated with different types of education in foreign countries can be mobilized to explain why brain drain arises and intensifies. In this framework, the existence of information asymmetries induces the most able to stay in the host country, where their productivity is perfectly observed, while the less able are more likely to return to their origin country. The resulting adverse selection however uniquely relies on the assumption of better knowledge about educational qualifications in host countries. At least two reasons question this assumption in today's global labor market: first, with time, domestic employers are likely to become better at identifying productivity signals through diplomas acquired abroad, especially if they belong to generations which themselves experienced migration. Second, the existence of Internet and rankings such as the Shanghai classification implies that in a few minutes, employers from everywhere can distinguish a very good university from an average or a mediocre one. Rather than asymmetrical information, agglomeration effects provide an alternative explanation for rising brain drain over time. Miyagiwa (1991) was the first to formalize such a mechanism, in which wages are related to the size of skill groups in countries. Using the example of USA and Taiwan⁶, Miyagiwa argues that the inflow of skilled workers from Taiwan to the USA will increase wages of skilled labor in the USA, due to agglomeration effects, while it will

⁶The same example countries used by Kwok and Leland (1982).

simultaneously decrease wages of skilled labor in Taiwan, which loses skilled labor (and thus benefits less from agglomeration effects). The departure of some very highly skilled Taiwanese may thus induce slightly less highly skilled Taiwanese to depart as well, provided that the endogenously created skill gap is sufficiently important. The model implies that an optimal policy to maximize national income in Taiwan would be to subsidize education and tax emigration, potentially through the provision of scholarships containing a return clause for students studying abroad.

Optimal migration policies involving restrictions on flows or taxation result from many of the theoretical models presented above. Punishing emigrants or receiving countries may however not be warranted if unintentional externalities of emigration arise. The idea, first formalized by Mountford (1997) and Stark, Helmenstein, and Prskawetz (1997) and briefly stated above, relies on the uncertainty of migration. When the probability of successful migration is less than one, some individuals, which will have raised their education level as a consequence of expected returns related to migration prospects, will stay in their origin countries and contribute to average educational attainment. Mountford's model also incorporates a growth externality, whereby growth is related to the number of skilled workers present in the economy in the previous period. With such an externality, even workers who end up migrating can generate a brain gain. The policy conclusion of the model is that countries have no interest in banning emigration of skilled workers. Rather, it rationalizes the existence of emigration quotas. Beine, Docquier, and Rapoport (2001) develop a model of brain drain and derive conditions for it to be beneficial. Their results suggest that beneficial brain drain is likely to occur in two scenarios: when countries are poor and close to an underdevelopment trap with low migration, and in relatively fast-growing economies with intermediate migration flows. Furthermore, the existence and magnitude of the brain gain—at least from a growth perspective—depends on whether non-migrants (who have been induced to get educated) are productively employed in the workforce or not (Fan and Stark 2007; Stark and Fan 2011). Another positive externality of skilled emigration possibilities arises when "positive" activities are more transferable than negative ones. Mariani (2007) shows that if productive activities are more transferable than rent-seeking activities, which together with skilled emigration are a feature of many less developed countries, then increased migration will lead to higher returns to productive activities and thus to a higher share of the workforce resorting to such activities rather than rent-seeking behavior. This result however does not hold when workers endogenously invest in protection, and notably depends on the extent to which citizens' investment in protection are efficient.

Empirical estimates of the impact of brain drain—both on schooling levels and growth—are important for policy, since the categorization of countries into those with a net brain drain and those with a net brain gain brings opposite conclusions for policymakers—broadly speaking, retention is only a good policy

if the drain effect outweighs the gain effect under free movement. Beine, Docquier, and Schiff (2008) show that small states are disproportionately affected by brain drain. This is due to a combination of factors such as country size and a greater responsiveness to push factors among high skilled of these nations. Another paper by Beine, Docquier, and Rapoport (2008) reflects on the distribution of net gains between states, showing substantial heterogeneity. Under their theoretical framework, there is a net brain gain whenever the incentive effect of emigration on education is larger than actual skilled emigration. They thus suggest that countries with low emigration rates are relative winners of the skilled migration race. Through counter-factual simulations they establish that most countries are actually net losers, and the losers lose more than the beneficiaries gain. Di Maria and Lazaro (2012) confirm the existence of the incentive effect on a set of countries and also affirm that skilled migration affects the composition of human capital, with more skilled emigration leading to a larger proportion of students choosing science and technology majors. The effect however depends on the distance from the technological frontier, such that this effect is positive for countries with intermediate levels of development, but negative for low and high developed countries. Studies testing the brain gain hypothesis in single countries tend to find results in favor of the incentive effect: Batista, Lacuesta, and Vicente (2012) find that a 10pp increase in the probability of own migration improves the probability of completing intermediate secondary schooling by 11.2pp in Cape Verde, a small island country with high emigration rates of the highly educated. Chand and Clemens (2008) show for Fiji that the increase in emigration of highly skilled led to a net gain in numbers of highly skilled Fijians. The evidence includes studies from China (Ha, Yi, and Zhang 2016), Nepal (Shrestha 2017), DRC, Ghana and Senegal (Méango 2016). Kangasniemi, Winters, and Commander (2007) argue that screening may prevent the brain drain from having positive externalities. Examining the case of medical doctors in the U.K., their findings suggest that doctors are highly screened and that only a minority of migrated doctors actually considered migration as a plausibility during their training. This evidence can be contrasted with the findings of Mandeville, Bartley, and Mipando (2012), who examine post-graduate plans for Malawian medical students. Their survey suggests that 39% of students plan to leave the country immediately upon graduation. Related to this, Özden and Phillips (2015), show that almost half of African doctors were trained outside their home country and that many of them migrate after years of service on the continent, such that all of their human capital is not lost to the countries providing their training. Chojnicki and Oden-Defoort (2010) carry out an analysis similar to that of Beine, Docquier, and Rapoport (2008), focusing on medical doctors. They first establish the presence of a cross-country conditional convergence in the number of doctors per capita, and then show that doctors' emigration has a positive and significant impact on the education of medical doctors in origin countries, suggesting by way of counterfactual experiments that some African states may be net beneficiaries from medical outmigration. Skilled outmigration is thus not always negative, as the comparison of three case studies by Docquier and Rapoport (2009) shows: the exodus of European researchers to the U.S. has been

negative for source countries; the skilled migration of Indians' contribution to the development of the IT sector in India has been positive; they conclude that the effects of the brain drain of medical doctors in Africa has been mixed. In general, the brain gain discussion has (for obvious reasons) been concentrated on the effects of stayers, *i.e.* the pool of workers who remain in origin countries and contribute to their growth. The destinies of skilled migrants however matter as well. If, as discussed above, the possibility of migration acts as an incentive to acquire education, and that this incentive is based on higher expected wages, then skilled migrants' education must be properly rewarded in host countries' labor markets. This is not always the case though. Mattoo, Neagu, and Ozden (2005) investigate the positions held by foreign-educated migrants in the U.S. labor market. They find large differences in employment patterns for migrants with similar educational qualifications but from different countries. Only 35% of Moroccan immigrants with professional degrees hold skilled jobs, compared to 89% of Canadians. Differences between developing countries are also large, with 87% of skilled Ethiopians holding skilled jobs. Generally, distance is correlated with the proportion of skilled migrants holding a skilled job such that the farther away a country, the higher the proportion of well-matched workers. The authors suggest that self-selection and cost may interplay here: since it is more costly to go from Ethiopia to the U.S. than from Mexico to the U.S., only those expecting to succeed would make the journey from Ethiopia. Furthermore, countries further away are likely to have other migration options nearby, such as Europe or the Gulf. Choosing the U.S. thus suggests that individuals may consider themselves good fits for the American job market. Lastly, illegal migration is easier when migrants can travel by land. Since migration is highly regulated, and a larger share of African migrants come as legals than migrants from Mexico or Central America, it comes as no surprise that the latter fare less well in the labor market.

Besides educational incentives and associated growth externalities à la Mountford (1997), other factors have been suggested as offsetting the losses suffered by countries with high rates of skilled emigration. For example, it has been argued that the physical disappearance of migrants embodying high levels of human capital does not automatically imply that their knowledge does not serve the origin country. In a framework where diasporas exchange knowledge with the home country and where there are positive knowledge returns to migrating for individuals, an optimal diaspora of innovators can exist (Agrawal et al. 2011). Emigration of knowledge creators also increases knowledge creation in the home countries, especially if intellectual property rights are poorly enforced in the sending country (Kuhn and McAusland 2006). Another offsetting factor is return migration. If migrants only stay abroad for a while, perhaps even increasing their skill levels while abroad, then the negative effect of initial emigration is weakened. Dustmann, Fadlon, and Weiss (2008) model human capital as having a country-specific component. The initial endowments and rates of acquisition of two types of skills abroad determine who will return and not. They show that a brain gain can arise if skills acquired in the host country are sufficiently transferable,

but that selective migration policies in host countries, targeting individuals with skills relevant for the host country, can aggravate the brain drain. Mayr and Peri (2008) incorporate return migration into a model with educational incentives from emigration, and calibrate a model for migration from Eastern to Western Europe. They argue that for plausible parameter values their model presents a situation where increased openness would be beneficial for Eastern Europe, both in terms of human capital and wages. Alongside knowledge diffusion, the negative effects of emigration of high-skilled workers may be offset through remittances. It has been argued that more skilled migrants remit more, so that the negative effect on educational attainment of remaining individuals is partially offset by a positive effect on transfers from the host to the home country. Whether skilled emigrants actually do remit more or not remains an open question: Faini (2007), Adams Jr (2009) and Niimi, Ozden, and Schiff (2010) claim that educated migrants remit less. Support in favor of the thesis is provided by Bollard, McKenzie, and Morten (2010) and Bollard et al. (2011). Docquier, Rapoport, and Salomone (2012) show that the inclusion of migrant policy variables (specifically *restrictiveness* and *selectivity*) makes the relationship between education and remittances depend on the type of immigration policy facing host countries. The education effect on remittances is more likely to be positive when policies are restrictive but not selective.

Since one of the arguments against skilled emigration is the notion that home country governments finance human capital put to use in foreign countries, it is important to distinguish the proportion of education acquired prior to migration from that acquired during migration. Student mobility may figure in the decision to migrate, such that the skill gap for migrants with respect to the populations in their origin countries is accounted for to a large extent by education acquired after migration. The endogenous selection on skill would then be a selection on anticipated education, through a forward-looking reasoning, rather than reflect educational discrepancies in the origin country. It also seems plausible that those who have better migration opportunities also to a higher extent have the possibility to migrate as students. Beine, Docquier, and Rapoport (2007) look at this issue using age of entry as a proxy for where education was acquired, finding that 68% of the global brain drain is composed by individuals aged at least 22 years upon migration. Excluding those who acquired their education in their origin countries indeed makes a difference in some countries. They however show that the main cross-country patterns remain unchanged by this alternative definition.

This section has discussed the endogenous selection on education in migrant flows, its causes and consequences. The literature related to selection and the brain drain mostly relies on macro data being used to empirically evaluate theoretical propositions such as the brain gain incentive argument or the endogenous selection of migrants from the upper or lower tails of the ability distribution. Although a perfect consensus on causes and consequences is not established, we can fairly surely affirm that globally,

emigrants have higher educational attainment than non-migrants. It could be, however, that the origins of this discrepancy are to be found less in the relative cost- and income differences between origin and destination countries than in psychological characteristics associated with higher education. There is also evidence pointing strongly to the existence of positive externalities of brain drain in terms of educational attainment in the host country—a brain gain. The magnitude of the effect and whether it outplays the drain effect depends on the theoretical framework mobilized, but counterfactual simulations suggest that in most cases it does not, such that brain drain would translate into a welfare loss for many developing countries. Some of the assumptions underlying these findings are however contested in the literature, with claims being made that the empirical evidence for large social externalities from skills in developing countries are lacking in the literature (A. Clemens 2016). The next section will deal with the impact of migration on origin households, and will review the—mostly empirical—evidence on this relationship and the channels through which it may operate.

4 Migration and education in the origin household

Summary

Migration is tightly associated with remittances, and most studies on the education effect in origin households point to a positive effect from remittances on schooling. The absence of a household member—often a parent—however mitigates this effect, through income loss and less parental investment in children’s education, such that a negative net effect has sometimes been found. The overall effect is very likely to depend on both the timing of the migration spell, its length and the return of the migrant or not during schooling. Returnees may furthermore bring back different norms which may influence schooling both directly via preferences for more or less schooling, and indirectly, through preferences related to fertility and income-generating activities.

The above literature has largely taken a theoretical, macroeconomic approach to answer the question of whether economic growth and human capital accumulation in developing countries are negatively affected by the emigration of their highly skilled members. Shifting focus from aggregate skilled emigration, and adopting a household-centered, microeconomic perspective of migration we might ask ourselves what the emigration of a household member implies for the welfare of remaining household members? The literature in the 1990s mainly focused on the role of remittances in this process. It is by now well established that most emigrants remit part of their income to their home country, and although an early literature held that remittances were mostly squandered away on consumption goods of no durable utility, many studies have since shown that remittances can be put to productive use, helping household to escape poverty (Adams Jr and Page 2005) or increase their consumption of investment goods (Yang 2008; Adams Jr and Cuecuecha 2013). Educational benefits from remittances are thus a plausible outcome which has been amply tested in the literature. Yet, remittances are not the sole link between migration and education

in origin households. The loss of income associated with a departure, both in terms of direct costs and foregone earnings, may have effects on educational investments for income constrained households. Other than income concerns, if migrants are parents, their absence may in itself modify both the quantity and quality of children's education and learning. Lastly, return migration and the transfer of norms has the potential to influence educational attainment, although this channel has been little studied in the literature. This section aims to review the evidence on the effects of migration on education through these channels.

4.1 The remittances channel

A vast, mainly experimental literature has evaluated the efficiency of cash transfers, both conditional and unconditional, on educational attainment, attendance and school progression in developing countries. The results are mainly positive, suggesting that transfers do ease households' budget constraints and lead to increased probabilities of enrollment and learning. Migrants' remittances are a particular kind of transfers, since they are most often associated with the displacement of a household member, decreasing the household's cost of living, but potentially implying a loss of income and a redistribution of household chores. Furthermore, remittances are usually not labeled transfers, and recipients are free to do whatever they like with the money, the use of which the sender typically has little control over. These features have motivated a literature attempting to measure the impact of receiving remittances on educational spending and school attainment in origin households.

The first article to directly study the impact of remittances on school attendance is the study by Edwards and Ureta (2003). Using survival analysis, they find a positive impact of remittances on retention rates. The implied effect is large: the impact of remittances outweighs the impact of other income by a factor of 2.6 in rural areas, and 10 in urban areas. Remittances and other income therefore do not seem fungible. The authors however do not control for the selection into migration or into remitting, so endogeneity concerns apply strongly here. Some studies have used labor market conditions (Amuedo-Dorantes, Georges, and Pozo 2010; Amuedo-Dorantes and Pozo 2010) and costs of international transfers (Calero, Bedi, and Sparrow 2009) as sources of exogenous variation of remittances, concluding on positive effects on children's schooling. Amuedo-Dorantes and Pozo (2010), for example, attempt to isolate the remittance effect from that of having a migrant by considering only households which do not have a household member abroad (and which are thus receiving their remittances from distant relatives or friends). Their findings, using data from the Dominican Republic, suggest a 28.6 percentage point increase in the probability of schooling when households receive remittances. The results are driven mainly by secondary school pupils and younger children. The positive impact of remittances is also confirmed in Yang (2008), who relies on

exchange rate shocks as an instrument for remittance receipts by Filipino households. He first establishes that exchange rate variations are strong determinants of remittance amounts, with an estimated elasticity of remittances in Philippine pesos to the exchange rate of 0.6. He furthermore concludes that exchange rate shocks, through the remittances channel, also led to decreased child labor and increased schooling. Adams Jr and Cuecuecha (2010a) argue that migrants view remittances as transitory shocks, rather than permanent income, and that their marginal expenditure when income is transitory is associated with investment in health and education, rather than consumption goods. These findings, from Guatemala, are echoed by those of a later study from Ghana (Adams Jr and Cuecuecha 2013), but in Indonesia (Adams Jr and Cuecuecha 2010b) remittances recipients spend more money on food and less on housing. In the latter case, the authors suggest that since households with migrants are poorer than households without migrants in Indonesia, marginal spending in migrant households tends to go more to subsistence goods than in non-migrant households. This suggests that the positive impact of remittances on education is far from universal, and that in severely income constrained households it may be a way of alleviating extreme poverty rather than increasing investment. The relationship between remittances and schooling has also been analyzed for Mexico with a focus on the 2008-2009 recession (Alcaraz, Chiquiar, and Salcedo 2012). The authors compare pre-crisis non-recipient households with pre-crisis recipient households, controlling for the endogeneity of receiving remittances through the use of proximity to rail lines important for historical migrant worker flows. They find that the shock on remittances provoked by the recession caused an increase in child labor and a reduction of school attendance in Mexico, suggesting that remittances indeed played a part in schooling, either directly (through financing educational costs) or indirectly through relaxing households' budgets constraints and permitting children to go to school rather than work.

As noted by Adams Jr and Cuecuecha (2010b) for Indonesia, the positive effect of remittances on schooling is not universal. In Mexico, Córdova (2006) uses rainfall patterns and the distance to Guadalajara⁷ as instrumental variables for remittances, and finds mixed effects. On the one hand, remittances seem to decrease illiteracy of children and increase school attendance of the very youngest (5-year olds). On the other hand, there is no effect on schooling for 6-14 year-olds, and a negative effect on school attendance for 15-17 year olds. The author suggests that remittances may create disincentives for schooling, for example if they are linked to a future emigration decision and the returns to schooling in the destination country are lower than in the origin country. However, although rainfall shocks may influence the composition of income through the search for diversified income streams in agricultural municipalities, it may also influence the total income of municipalities, such that there are grounds to doubt the validity of the exclusion restriction. Also in Latin America, Acosta (2011) finds no effect on schooling of remittances receipt in El Salvador, using geographical averages of return migrants and migrant networks as instruments.

⁷The latter instrument is motivated by the fact that US recruiters in the early 20th century travelled to Guadalajara to recruit Mexican workers from surrounding areas.

Some interesting experimental evidence has emerged on the channeling of remittances to specific uses, on the grounds that this can reduce information asymmetries and improve migrants' willingness to remit. Ambler, Aycinena, and Yang (2015) propose a subsidized transfer service for Salvadorian migrants in Washington DC. By providing a card, where transfers to a student in El Salvador are matched to a public subsidy, the authors conclude on a crowd-in effect: increasing transfers (including subsidies) led to a more than proportional increase in spending by the student, suggesting that rather than liberating income for other uses, transfers were actually associated with complementary investments in education by the recipients. They also found that receipt of transfers was associated with a higher probability of being in a private school. Relatedly, De Arcangelis et al. (2015) run a lab-in-the-field experiment with Filipino migrants in Rome to assess how remittances behavior varies with various commitment rules. Results from the experiment suggested that being able to label and control remittance use increased the amount of money migrants were (theoretically) willing to send. The authors also show that those who increased their remittances the most when given the possibility of control were also the most interested in a product called *EduPAY*, which gave migrants the possibility to pay Filipino tuition fees from abroad, and to receive information on attendance and grades. These experiments highlight the importance of asymmetry of information in the decision to remit (Ambler 2015), and on the potential for efficiency improvement of policies addressing adverse selection in transnational relationships.

Two studies have attempted to look at the link between remittances and education in a cross-country setting. Zhunio, Vishwasrao, and Chiang (2012) analyze the effect of remittances on aggregate educational outcomes in a panel of 69 low and middle-income countries, using age dependency ratios, outward migration rates and colonial history dummies as instruments for remittance flows. The results strongly suggest a positive effect on secondary enrollment, with a 1% increase in real remittances provoking a 0.12% increase in enrollment. Azizi (2017) estimates bilateral remittances on the basis of labor market and macroeconomic conditions in destination countries, and creates a weighted indicator summarizing these conditions as an instrument for total remittances flows to a country. In line with previous findings, the author suggests that remittances increase school enrollment and completion as well as private school enrollment. The (scarce) macroeconomic evidence available thus confirms the positive findings of studies conducted using survey data.

The main challenge in identifying the effects of remittances on educational indicators is the double selectivity problem. Households are selected in terms of the presence of migrants abroad, and on the amount these migrants remit. Furthermore, the composition and dependency ratio of households is correlated with migrant presence. Some of the previous literature, such as Amuedo-Dorantes and Pozo (2010) and Amuedo-Dorantes, Georges, and Pozo (2010) has attempted to sidestep this issue by

focusing on remittances to households with no migrants abroad (which implies that the remittances they receive come from friends or distant relatives rather than household members), finding positive effects of remittances. It is important to highlight that these households are most probably also selected, on the obvious grounds that they have acquaintances sending them money from abroad, such that refraining from interpreting the generally positive findings from the literature as reflecting "general population" effects seems warranted. On the whole, however, remittances, like other transfers (Baird et al. 2013), do seem to induce favorable educational outcomes. While this is relevant information for the shaping of policy linked to international financial flows, it falls short of answering a more relevant question for migration policy: what is the effect of the emigration of a household member on children's educational attainment? The next subsection will review evidence from studies focusing on the total effect of departures, including remittances, displaced labor and shifts in the time allocation of remaining children.

4.2 Parental absence and labor substitution

As mentioned previously, the emigration of a household member is associated with both potential income loss, and increased household chores for remaining members. The relevant question to ask is then whether remittances compensate for these losses or not? Hanson and Woodruff (2003) reflect on this, using historical migration patterns between Mexico and the US to evaluate the impact of emigration on the educational progression of 10-15 year-olds in origin households. The theoretical grounds for this instrument is the persistence of traditional migration patterns over time.⁸ The authors find that having a migrant abroad increases the estimated schooling for girls by 0.73 to 0.89 years, but has an inconclusive effect on boys. However, also looking at Mexico and using a similar instrument, McKenzie and Rapoport (2011) find that migration reduces the chances of boys completing junior high school and girls completing high school. They do not find a positive impact of schooling for girls 13-15 years old, but the precision is insufficient to reject a positive impact of the magnitude found by Hanson and Woodruff (2003). Also in Mexico, Antman (2012) distinguishes the effects from migration to the US from effects from migration within Mexico. She finds a positive effect on girls' educational attainment, which is only present for US migrants. The fact that internal migrants do not decrease their children's educational attainment leads her to conclude that the mere absence of a parent does not reduce education, and the positive effect from US migrants comes from (larger) remittances.

Using a migration lottery program for Tongans wanting to move to New Zealand, Gibson and McKenzie (2011) find that the increased remittances of migrant-sending households are not sufficient to compensate

⁸Although, as the diaspora literature has shown, if the less educated benefit more from diasporas than the more well-educated, then historical migration patterns may be tied to educational composition of migrants, questioning the external validity of the instrument.

for foregone earnings, such that the average per capita income level falls. On left behind children, they also find negative but insignificant effects on schooling attainment, and a positive impact on English literacy. Exploiting a natural experiment in Malawi, whereupon migration increased threefold due to a 1967 labor treaty, and was banned seven years later in the aftermath of a plane crash, Dinkelman and Mariotti (2016) find long-lasting positive effects of migration on educational attainment. Studies from other settings however find negative effects on the outcomes of left-behind children (Antman 2013). For example, Giannelli and Mangiavacchi (2010) study the case of Albania, where temporary migration is widespread. Out of the 2 575 compulsory school-age children in their sample, 22% had been left behind by a parent for an average of 9.5 months. Using a duration model they find increased hazard rates of drop-out for left-behind children. Other studies from Eastern Europe however mitigate this negative conclusion (Botezat and Pfeiffer 2014; Gassmann et al. 2013), as does other evidence from Indonesia (Ramirez 2017). Ferrone and Giannelli (2015) study the Ugandan context and find results suggestive of a displacement effect: the migration of children is associated with a positive impact on attendance rates for remaining children, while that of adult migration bears a significant negative effect. In their setting, remittances do not seem to play a role, such that the negative impact from adult migration can be taken as a pure absence effect. Negative effects of migration on learning were found in China, where having migrated parents led to a reduction in the child's math score rank by 16% (Zhao et al. 2014). These negative impacts in tests scores were confirmed again for China in Zhang et al. (2014) who find decreases of about 5 percentage points in math and Chinese for children whose both parents migrated. However, children with only one absent parent are not significantly worse off. In a comparative study using data from the "Young Lives" project, Nguyen (2016) finds negative effects on cognitive ability from migration in India and Vietnam, but not in Ethiopia or Peru. Evidence put forward by Cortes (2015) suggests that the parental absence mechanism may be very different for fathers and mothers. Comparing Filipino households with absent mothers to households with absent fathers, she is able to single out the "mother" effect from a remittances effect. Her results suggest that children of migrant mothers are 5 percentage points more likely to be lagging behind in school compared to children of migrant fathers.

Using aggregate data at the provincial level in the Philippines, and relying on the fact that preferred migrant destinations vary across provinces, Theoharides (2017) relies on time-varying destination country shocks to identify variations in migration intensity at the provincial level. It turns out that a 1% increase in migration demand increases secondary school enrollment by 2.5%. Distinguishing the induced effect (enrollment increasing due to an increase in the expected returns to education) from an income effect, through mobilizing the proportion of women and men working in each destination country, her evidence suggests it is increased income that acts as the mediating effect.

4.3 Return migration and norms

The above studies tend to compare children in households with and without migrants, or households which have or do not have members who have migrated. This somewhat eludes the question of return migration. It is likely that children in households with a migrant never returning and households with a migrant bound to return will draw different benefits from the migration experience, and end up with different educational attainments. Dustmann and Glitz (2011) show that return migrations are common and that the duration of migration is mostly chosen by the migrant. First, assuming (for practical purposes) a negative effect of migration on children's schooling, a longer stay would be associated with worse outcomes than a short one. Especially if remittances are decreasing over time, or are related to return plans (Dustmann and Mestres (2010) show that this is indeed the case). In any case, under such circumstances, the beneficial or detrimental nature of migration hinges on the duration of the migratory experience. Also, shorter migration episodes imply less foregone earnings in the household and any labor displacement effects present in the household thus last a shorter while when migration episodes are short. Second, return migrants may have accumulated capital during their stay abroad. These skills and/or funds can be invested in the home economy, increasing income for the household and potentially reduce child labor to the profit of schooling. Another potential mechanism at work is that of migrants' input into their children's educational production functions: if migrants have been exposed to foreign languages during their migration episodes, they are more likely to be able to assist their children in homework in these subjects. Lastly, returnees may also bring back norms and ideas acquired in the destination country, and these norms may influence their decisions on children's schooling. Regrettably, these issues have not been thoroughly investigated in the literature. The main issue is probably that of simultaneity in the educational choices for migrants' children and the duration of migration. Démurger and Xu (2015) use a duration model to show that the parents of children in primary school tend to prolong their migration spells, delaying returns until children are out of school-age. They interpret this as the need for parents to accumulate savings to pay for children's education. They also find delayed returns when grand-parents are available and co-reside with children in rural areas, suggesting that grand-parents' time is substitutable for parental time. That children play into the return decision was also shown by Dustmann (2003), who shows that return plans are influenced by the gender composition of children in migrant households in Germany. He takes this to imply that parents value the potential well-being of female versus male children differently in the origin and in the host country.

Although direct evidence on the role of return migration on education is scarce, some studies reflect on mechanisms that could be of importance for this relationship. Wahba (2015) shows that migrants gain a wage premium upon return, such that at similar characteristics, they are better off than workers without a temporary migration experience. Other evidence suggests that returnees are more likely to be entrepreneurs (McCormick and Wahba 2001) and that their businesses survive longer (Marchetta

2012). However, even if household income increases upon migrants' return, this does not imply that the amounts invested in children's education increase. Furthermore, the analysis is rendered complex by the fact that children are not at the same stage of the educational cycle when migrants return as when they were abroad. More closely related to our considerations, Tuccio and Wahba (2015) use destination specific shocks as instruments for return migration to Jordan. These shocks include the 1967 Arab-Israeli war, the first Lebanon war and the first Gulf War. They find that return migrants assimilate norms in their host countries, and return migrants from more conservative countries assign less significant roles to women than non-migrants. The results are significant both for attitudes and behavior, with girls with fathers returning from more conservative countries having higher probabilities of dropping out of school. Indirectly related to education, return migration from Gulf countries has also been shown to positively affect fertility (Bertoli and Marchetta 2015; Tuccio and Wahba 2015), with norms appearing as a plausible driver of these changes. If there is indeed a quantity - quality trade-off in children, as famously suggested by Gary Becker, then increased fertility should be associated with lower average educational outcomes. The link between fertility and migration has been studied at a cross-country level outside the context of returns from conservative Gulf countries. Beine, Docquier, and Schiff (2013) also show, using data from 175 countries, that the presence of bilateral migrant stocks in a country influences the fertility rate of the origin country in the direction of the host country.

The variety of studies and sometimes contradictory results with respect to migration and education in the origin household confirm the multiplicity of channels at work. While, on the one hand, remittances seem to influence schooling positively in most studies, both microeconomic and cross-country ones, several studies focusing on the net effect of migration find negative effects, both on schooling and on cognitive skills. Although this strand of literature is well invested, more research is needed and researchers typically need to pay close attention to the type of migration and the rationale behind it when attempting to measure effects on schooling. More studies attempting to distinguish the effects of remittances from those of household member absence or return migration would be welcome additions to the literature.

5 Education as the cause of migration

Summary

Relatively little has been said about international students in the field of economics. The few studies that exist tend to show that international student flows respond to similar cost and benefit considerations as labor migrants. Rosenzweig defines two motives for studying abroad: bringing home a high-value foreign diploma, or acquiring credentials to enter foreign labor markets, arguing that data on US immigrants fit better with the latter motive. Providing a better place to live for one's children may also be part of migrants' motivations, and a literature has examined how children of migrants do in host country educational systems. It

turns out that there is a migrant penalty, which is linked to the age of arrival of migrant children. Furthermore, there is some evidence that the concentration of migrants in host country areas deteriorates the quality of learning, since facing language barriers and new, unfamiliar school systems, migrant children mobilize teacher resources and create negative peer effects on local children. It however seems that the effect mostly operates when the share of migrant children is substantial, and mostly concerns the learning of migrants themselves. There is also evidence of native flight from schools with high concentrations of migrants.

Most models of the migration decision take as given the educational attainment of migrants. In reality, as shown by Beine, Docquier, and Rapoport (2007), migrants acquire part of their education in the host country. Indeed, this can often be a motivation for migration, as the increasing importance of international student mobility suggests. The desire to migrate can also be motivated by intergenerational concerns such as a willingness to provide one's children with an environment conducive to success through the presence of better infrastructures and formal safety nets. However, when migrant flows are large and unexpected, they may exert pressure on receiving countries' educational systems and labor markets. This section discusses these and related issues.

5.1 International students

As pointed out by Rosenzweig (2006), it is not clear whether or not students in general cross borders in order to find education that they could not find at home, or whether these crossings are linked to differences in how skills are rewarded in the origin and destination country (or potentially, both). On the one hand, international studies may be a way of providing oneself with a scarce and "more valuable type of cultural capital in the form of a Western university degree" (Waters 2006), suggesting that education is the finality of student migration, and that local returns to spending a year abroad are what determines the willingness to pursue studies abroad. On the other hand, migration to pursue education can be but the first step in a chain of events that leads to permanent establishment in the host country. Findlay (2011) shows, using statistics based on data from the UK Home Office, that non-British student inflows have been multiplied by 5 over the period 1980-84 to 2000-2004. During the same period, the outflows of non-British students, roughly equal to inflows at the beginning of the period, only increased by a factor of 2. Thus, permanent settlement of international students seems to have increased heavily in the UK over the last decades. Restricting focus to post-millennial years, the author also shows that the ratio of students asking to remain one year after admission to the number of student entries increased from 1/4 to 1/2 only during the period 2000-2006. Rosenzweig (2006) investigates how data from the New Immigration Survey on US immigrants (including students) fits with two competing models of student mobility. The first model depicts a scenario of constrained domestic schooling but with high returns to skill in the home country labor markets. This should imply that investment in schools in sending countries would reduce the share of students studying in high-income countries. The second model suggests that skills are little rewarded in

the home country, and predicts that increases in domestic schooling will increase outflows of international students. Using data on skill prices and university availability from 125 countries, Rosenzweig claims that the data fits better with the second model, suggesting that international students seek schooling in high-wage countries in order to increase their chances of employment in those countries. The idea thus suggest that wage premia, rather than educational premia, should appear as strong determinants of student mobility. In latter work, Rosenzweig (2008) develops a model where demand for schooling abroad depends on the returns to skill in the host and origin country, on the quality of schools in the origin country and on income in the origin country. His estimations for student flows to the US are consistent with this model. In both studies, the quantity (and to some extent, quality) of educational services in the home country is positively related to stocks of students of that origin in the United States, discrediting the constrained-schooling model. Focusing on African students enrolled abroad, Kritz (2016) finds a negative impact of enrollment rates in tertiary education on the shares of outbound students, arguing that the constrained-schooling model still has relevance in some settings.

A number of other authors have estimated the determinants of student mobility. Much like other migrant flows, costs and benefits enter the migrant's decision to move. However, in the case of student mobility, costs and benefits may be evaluated in the educational market rather than in the labor market. Abbott and Silles (2016) rely on a gravity model to estimate student mobility, finding that distance, common language, and being a EU country all play into the size of student flows. The average rank of institutions does not however play in. This contrasts with other findings in the literature (González, Mesanza, and Mariel 2011; Perkins and Neumayer 2014). Beine, Noël, and Ragot (2014), who use several indicators for attractiveness in their estimation, find that the number of universities present in the Shanghai Top 500 rank divided by the total number of students is a significant predictor of student flows, as are costs of living. Costs of living however appear as a stronger and more robust predictor of flows than rank, for which the authors find a modest impact. Interestingly, although related to costs, tuition fees seem to play a more limited role. This echoes within-country findings from Germany (Dwenger, Storck, and Wrohlich 2012), the United Kingdom and Ireland (Wakeling and Jefferies 2013) and the United States (Mixon Jr 1992; Mixon Jr and Hsing 1994). Moreover, Ragot, Beine, and Delogu (2017) focus on the location choice of international students once the choice of country has been made, and study the cases of Italy and United Kingdom. For Italy, they use a dummy variable denoting private institutions as an instrument for fees, and find that a 10 per cent increase in fees would reduce the bilateral flow to the university of about 5%—a stronger effect than the ones found at the country level. It thus seems premature to downplay the role of tuition fees in shaping bilateral student flows.

Rosenzweig's assertion—that most international students in the US adhered to a logic of education

for local labor market integration—is important information for policymakers, and several studies have assessed the determinants of where international students settle upon graduation. Huang (1988) addresses this issue using data on international students in the US from 25 countries, from 1962 to 1976. Average return rates vary greatly, with European students displaying high return rates while Asian students display low rates. He finds that while economic variables seem relevant for the decision to stay or not, social and political considerations appear to be as important (this echoes a finding by Zweig (1997) on the intentions to return of Chinese residents in the US). Bratsberg (1995) reinvestigates these findings using a different data set for 69 origin countries, while simultaneously assessing Borjas’ hypothesis of the skill bias being related to the relative value placed on skills in the host country versus the origin country. The author indeed finds that source countries that value skill more are associated with larger shares of return, a finding consistent with Borjas’ selection theory. More recent evidence confirms the importance of both career opportunities and quality of life as determinants in the decision to remain in the host country (Musumba, Jin, and Mjelde 2011). Individual success in the labor market is also a determining factor: using a timing of events framework on data from the Netherlands, Bijwaard and Wang (2016) show that students unemployed upon graduation have a higher hazard of return compared to those in employment, and individuals who married in the Netherlands are less likely to leave than unmarried ones. Most studies highlight the heterogeneity of countries in terms of return prospects. Relying on interviews carried out with 232 international students in a Canadian university, Wu and Wilkes (2017) find that return intentions are linked to how students conceive of the notion of home. From their interviews, they derive four conceptualizations of "home", one which corresponds to stayers, one to returnees, and two with open migration plans. Finally, when education is acquired abroad, in a more democratic country than the country of origin, returnees help to promote democratic values (Spilimbergo 2009; Mercier 2016).

5.2 Second generations

What are the effects of migration on children of migrants? On the one hand, migrants’ children are in most cases citizens with full rights in the countries they grow up in, and the question of their schooling is thus a question of assimilation: if society plays its role of opportunity equalizer well, there is no apparent reason that migrants’ children should have worse educational outcomes than children of natives. On the other hand, if migrants are structurally different in terms of characteristics that are of importance for their children’s education, such discrepancies may very well exist. A natural example is that of parental inputs into the educational production function. If migrants are less proficient in the destination country language and less familiar with the contents of educational programs, they may be less able to assist their children with homework, thus negatively influencing their progress in school. Under such circumstances, cultural and linguistic proximity to the destination country should be a positive determinant of school

progression of migrants' children. Another possibility is that of access: it may be that the cost of acquiring education is higher for migrants' children than for natives, due to discrimination, lack of information or higher adaptation costs. This may hold particularly true when children arrive at an age where they have acquired a significant share of their schooling in their origin country. Finally, if migration flows are characterized by positive (or negative) selection on ability, migrants' children may in average be of better (or worse) 'quality' than natives. Schultz (1984) investigates the schooling outcomes of children of migrants versus natives relying on the 1976 Survey of Income and Education run in the U.S. He finds that when parental education is controlled for, children of immigrants have schooling attainments similar to children of natives. The duration of residence in the U.S. however arises as an important determinant, with children of parents having resided in the US for more than a decade receiving slightly more education than natives, and children of migrants from more recent immigration waves receiving slightly less. Assimilation, as measured by length of being in the country, was also found to be a determinant of migrant children's schooling in Germany (Haisken-DeNew, Büchel, and Wagner 1997). Also studying education of second generation immigrants in Germany, Gang and Zimmermann (2000) note that educational attainment in 1984 for native Germans was 2.6 years higher than for children of Spanish immigrants (the next highest group). They also find that these country of origin differences persist after controlling for the influences of parental human capital, social support, assimilation measures and competition from Germans within the educational cohort. Finally, they argue that parental education has no independent effect on the schooling outcomes of migrants' children. Rather, the size of the ethnic group in Germany at school entry plays a positive role in the quantity of schooling obtained, and age of entry is negatively correlated to quantity of schooling. Focusing primarily on age of entry into the U.S., Gonzalez (2003) shows that age of entry is related to subsequent school attainment for Latin American and European immigrants, but not for immigrants of other origins. His calculations suggest that marginal tax revenue from increased schooling due to earlier migration may be enough to offset the cost of providing schooling for migrants from Latin America, suggesting that having children go through school in the U.S. rather than in their origin country might be a desirable policy outcome. The fact that early arrival is beneficial to educational attainment was also found by Ohinata and Ours (2012) in the Netherlands, by Di Liberto (2015) for Italy and by Cobb-Clark, Sinning, and Stillman (2012) on a set of OECD countries. Di Liberto suggests that there is a critical age (about 9) above which there is an immigration penalty on education. Such a critical age was also found by Lemmermann and Riphahn (2017), who uses family fixed effects on German data and find that when arriving after the age of 6, the immigrant child has an expected future educational attainment lower than that of natives. The expected gap, and the critical age associated with a penalty, may however depend on the quality of education in the origin country. Giannelli and Rapallini (2016) show, using PISA scores for 13000 immigrant students, that the gap between natives and immigrants in Math scores decreases when immigrant children come from a country that ranks well in Math and

have spent at least a year in education there. Overall, Sweetman and Ours (2015), in a review of the literature on the educational and labor market success of migrants' children and grandchildren, also recall the importance of age at arrival, along with language spoken at home and the educational attainment of parents, as important predictors of children's attainment. They also affirm that there is substantial heterogeneity between countries, with traditional immigration countries (U.S., Canada, Australia), along with the United Kingdom, seeing migrant children outperforming natives, while in European countries the opposite seems to occur.

Focusing on Western Europe, Heath, Rethon, and Kilpi (2008) review the evidence of performance of minorities on a country of origin basis. They find that migrants from less-developed non-European origins tend to have the largest gaps with natives in several countries. Minorities of European ancestry perform better, but are still behind natives. A few groups outperform natives, such as those of Chinese and Indian origin in Britain, and those of Indian origin in Norway. Cobb-Clark, Sinning, and Stillman (2012) contemplate the gap through the lens of institutional arrangements. They argue that complex relationships characterize their results, with migrants sometimes profiting from institutional features such as tracking on ability or early school starting ages. Tracking on ability is used in several educational systems in Europe and is generally thought to increase educational inequality. Ruhose and Schwerdt (2016) study the impact of tracking students into different secondary schools based on ability on migrant-native gaps, using data on test scores from 45 countries. They find no negative effect of tracking on the average native - migrant gap. However, for the subgroup of second-generation immigrants who do not speak the host country language at home, there is a negative significant yet small effect on reading (of 11% of a standard deviation).

Algan et al. (2010) find, studying first- and second generation immigrants in France, Germany and the United Kingdom, that the natives - migrant educational gap is lower for second generation migrants than for first generation migrants in all three countries. This is true also for positive gaps, and there thus seems to be convergence in educational attainment between migrants and natives. Dustmann, Frattini, and Lanzara (2012) also carry out a comparative study, comparing children of Turkish immigrants in several OECD countries. One interesting finding for mathematics is that in most countries children of Turkish immigrants have lower test scores than those of natives, but higher than their respective cohorts in Turkey (whether parents' characteristics are controlled for or not). There can thus be a human capital rationale for migration even in the presence of important gaps between natives and immigrants. These findings call for more in depth studies on the reasons behind these gaps. Primarily, is the gap associated with sociodemographic disadvantages in immigrant families, such that conditional on family background, immigrant children do not perform worse than natives? Evidence provided by Krause, Rinne, and Schüller (2015) suggest so. They study the native-migrant gap in Germany from the angle of progression, choice of

school type and recommendations from school. Retaining children born in Germany or who arrived before the age of 6, and relying on a matching method, they show that a comparison between migrants and natives matched on family background characteristics yields no systematic difference in terms of recommendations from school or the probability of choosing an upper rather than a lower track in secondary school.

5.3 Effects on education in host countries

The previous subsection revealed that assimilation (in the sense of similar schooling trajectories and outcomes between natives and migrants) seems to occur all the more when children arrive early to their destination countries, and perhaps even more so when they are second generation rather than first generation migrants. Substantial heterogeneities however prevailed, linked to the origin-destination pairs and the cohorts involved in migration. Indeed, for large flows, and if public spending on education fails to expand, there may be congestion effects leading to lower quality of education. This may negatively affect the schooling experience of both migrants' and natives' children. Another possibility is that of peer effects. Peer effects in education have been shown to be substantial, and the arrival of large disadvantaged groups may provoke a decrease in learning for all students. Such effects may furthermore be exacerbated if migrants do not settle uniformly across the territory (preferring or being forced to locate in specific cities or neighborhood).

The question of negative spill-over effects from migrants on natives has been explored in a fairly recent and growing literature. Early evidence from the U.S. suggested that immigrants crowd out disadvantaged native Americans in college (Hoxby 1998). Two channels operate here: first, immigrants often belong to the same racial groups (i.e. Black or Hispanic) as disadvantaged natives, and thus fill up quotas from affirmative action programs, such that the trade-off in some colleges may be one-to-one.⁹ Secondly, immigrants may compete with disadvantaged Americans for pedagogical resources. Shifting focus from college to secondary school progression, Betts (1998) studies the impact of immigration on the probability of high-school graduation. Using a difference in difference strategy, the author finds a negative impact of immigration on the probability of Hispanic and Black Americans finishing high school. Focusing on college again, Borjas (2004) asks whether the increase in foreign students over the last quarter of the 20th century was accompanied by crowding out of natives. He finds that the typical native was not crowded out by migrant enrollment, but that the subgroup of white native men saw strong reductions in their numbers, particularly at elite institutions. Focusing on the presence of second-generation immigrants in Sweden, Neuman (2016) concludes that a larger share of immigrants in one's childhood neighbourhood is associated with a lower probability of higher education, for migrants and natives alike. Using the mass influx of Russians to Israel as a quasi-natural experiment, Gould, Lavy, and Daniele Paserman (2009) also conclude on negative effects

⁹For every immigrant student enrolled, one less minority student is enrolled.

for natives. Arguing random variation of immigrants between grades, conditional on schools, they find large adverse effects on the probability of natives to drop out and to fail the high school matriculation exam.

There are however plausible channels influencing natives' attainment positively (Hunt 2012). For example, if immigrants arriving have low educational qualifications, then this should modify the relative returns to a high school diploma, providing more incentives for both natives and migrants of school-going age to acquire more education (Chiswick 1989). In the study by Hunt (2012), where she instruments the presence of migrants with historical flows, a small but positive effect of immigrants is found on the probability of high school completion for natives generally, and for blacks in particular.

A series of papers (focusing mainly on European countries) have investigated the link between immigrant concentration and pupil performance, relying on PISA scores or class retention rates. Jensen and Rasmussen (2011) find a negative influence of local migrant concentrations on math scores and reading scores of natives. For math scores, their findings are robust to instrumenting local migrant shares by migrant shares at a higher administrative level, but not for reading scores. Brunello and Rocco (2013), using PISA scores from several OECD countries, conclude on a small negative effect from immigrant concentration. Discussing the heterogeneity of their results, they find that natives with "good" parental background are protected against this negative effect.¹⁰ A small negative effect is also found by Tonello (2016) using administrative data for Italian junior high schools, and for North Carolina by Diette and Uwaifo Oyelere (2014). Ichino, Ballatore, and Fort (2018) exploit a strategy used by Angrist and Lang (2004) to measure an impact of immigrants net of any class size modifications. Their contribution lies in the fact that class size is not independent of composition, and that principals may react to increases in the immigrant composition of classes by reducing their size. Controlling for this they estimate a "Pure Composition Effect", found to be negative in early primary school: replacing one native pupil by an immigrant pupil reduces natives' test scores by 1.6%. Not all studies find a significant negative impact, however. Ohinata and Van Ours (2013) study peer effects of immigrants in primary school in the Netherlands. Arguing that allocation of migrants across schools is near random, they run quantile regressions to estimate the effect of the share of migrants across the whole test score distribution of Dutch children. The idea is that better-abled children may be protected against the effects induced by a lowering of the average language proficiency. They however fail to find an effect at any point in the distribution, suggesting that previous studies which fail to account for non-random sorting of migrants might show biased results. The same argument finds support in the study of Geay, McNally, and Telhaj (2013), who investigates the impact of pupils whose first language is not English on the educational attainment of native English speakers at the primary level, in the United Kingdom. After controlling for various sources

¹⁰Good parental background in their studies denotes having a number of books at home superior to the country average.

of heterogeneity, the authors affirm that the share of non-native English speakers has no negative effect on natives' educational attainment. It seems important to recall the fact that even if natives' may be unaffected by concentrations of immigrants, migrants themselves may not be. Schneeweis (2015) finds no negative impact on Austrian natives in terms of track choice, but does find a negative impact on students with migrant background. The impact is particularly strong when migrants come from similar backgrounds, suggesting peer networks may form along ethnical lines.

If there is, as suggested by a number of studies (although not all), negative effects on educational attainment and test scores from the presence of immigrants, then natives' response may be to withdraw their children from schools with high shares of immigrants, and place them in other schools, possibly private ones. This notion of 'native flight' was studied by Gerdes (2013) who finds that the probability of enrolling children in private schools in Denmark increases with the share of children of immigrant background, and that the effect is most pronounced in smaller municipalities and absent from larger ones. Rangvid (2009) also finds an effect in Denmark, but argues the effect is only present above a threshold of 35% of immigrant pupils. Murray (2016) also finds evidence of native flight to private schools in the U.S., and argues that in smaller, non-traditional immigrant school districts native flight occurs among white students, while it occurs among native minorities and Hispanics in school districts in traditional migrant receiving states. The results of Betts and Fairlie (2003) suggest that U.S. native flight occurs in secondary, but not in primary school.

Apart from negative peer effects, native flight can be understood in the context of a dilution of resources occurring when migrant flows are large and geographically concentrated. Unless school districts expand their budgets to accommodate the arrival of immigrant populations, it is likely that the arrival of large scores of migrants translates into a decrease in the available resources per student. Speciale (2012) uses two Balkan wars as an exogenous variation of immigration into EU countries, and finds an elasticity of the immigrant share to education spending of $-.15$. This is consistent with the reallocation of resources to other migrant needs, but also with a literature showing lower public good provisions in ethnically fragmented societies. Böheim and Mayr (2005) discuss an anti-social effect, upon which the perceived return to public goods is negatively related to the ethnic heterogeneity of society. They find that public spending increases with high-skilled immigration and decreases with low-skilled flows.

6 The rationale of migration policies

Summary

Punitive emigration policies destined to prevent nationals from leaving have a poor track record and are rarely the best way of achieving socially

efficient outcomes. Several Asian countries have pursued active return policies, promising benefits to skilled emigrants upon their return. The success of such policies is poorly evaluated, and it might be that return benefits create incentives to migrate in the first place. On the other side of the spectrum, receiving countries often develop selective migration policies destined to acquire talented foreigners (the battle for talent). Anglo-saxon countries emerge as winners of this battle, but selective migration policies may not be the only explanation—the extent of the welfare state is also linked to the type of migrants countries are able to attract.

Given the multiple channels linking migration and education in the above theoretical and empirical studies, are there any clear policy recommendations that should be brought to the attention of policymakers? In order for this question to be answered, the objectives of the policymaker need to be clearly stated. Are we interested in the welfare of migrants, of natives, of remaining households? The recommendations put forward strongly hinge on the interest groups one chooses to represent. As stated in the introduction to this review, from an international perspective migration is a way of increasing the efficiency of the global labor market by removing barriers to trade. In some contexts, it also provides a way for individuals to realize their potential in a way that would otherwise have been unavailable to them. However, as the previous evidence has shown, migration has consequences both on origin and destination countries that may induce delays (or, on the contrary, advances) in development. It may also affect the income distribution in both sets of countries. The present section will draw on both theoretical articles and case studies from origin and host countries to analyze the potential welfare effects of managing migrant flows focusing on skills.

6.1 Emigration policies

Following the brain drain hypothesis, according to which the departure of an individual is a net social loss to the origin country, countries have attempted various policy measures (ranging from wage subsidies to quotas or punitive actions against recruitment intermediaries) to retain their most skilled members. Clemens (2014) evaluates the efficiency of such policies, and relates how a significant number of scholars back up such policies, sometimes even going as far as to suggest criminal persecution of intermediaries assisting skilled emigration (Mills et al. 2008). Focusing first on Pigovian taxes¹¹, Clemens reminds us that in the case of a net negative externality resulting from the migration of a skilled worker, it is plausible that the cost of removing this externality on the worker's side far exceeds that of removing the externality from the state's side.¹² In that case, social efficiency is obtained through the government compensating workers who do not leave, for example through raising wages. Along these lines, Antwi and Phillips (2013) show how a policy reform raising wages for public servants in Ghana led to important

¹¹Pigovian taxes, named so after Arthur Pigou, are taxes destined for markets which generate externalities. They are set to the value of the social cost of the externality as to fully internalize it and achieve an efficient market.

¹²In the case of the worker, it corresponds to a loss of all future income streams in the host country. For the government, it represents the costs of training a new skilled worker.

reductions in the emigration of health workers. Nevertheless, Pigovian taxes are notoriously difficult to price, and emigration is definitely no exception to this. This has led to taxes being justified with other arguments such as equity or ethics. If efficiency-increasing Pigovian taxes are technically infeasible, Clemens also points out flaws in taxes motivated by other justifications. Taxing skilled migrants from an equity perspective essentially means considering that they remain members of the societies which they left upon migrating. A global equity-improving tax would tax citizens of rich countries more heavily than migrants, who generally earn less working the same jobs. Additionally, in practice, taxing non-residents has proved difficult in countries where taxation is based on citizenship (Commander, Kangasniemi, and Winters 2004). A better policy, Clemens suggests, is one where employers in destination countries would finance the training of workers intended to migrate against a partial government subsidy.

Related to the education-migration nexus, emigration policies have also been suggested as a way of encouraging human capital accumulation, which tends to be suboptimal at the individual level when externalities are present. Stark and Wang (2002) compare the theoretical efficiencies of educational subsidies versus emigration policy in order to stimulate human capital accumulation, and conclude that the latter is more optimal. Countries should keep migration of skilled a possibility but regulate the numbers, gradually relaxing the obstacles to migration as their economies develop. In a paper on the same topic, Docquier, Faye, and Pestieau (2008) contend that free migration is only desirable in the presence of high tax distortions. Their empirical analysis suggests a negative relationship between education subsidies and migration prospects for a sample of 108 countries and posits that when educational policies are set endogenously, the net losses from skilled migration increase.

Given the difficulty of taxing emigrants, and the concomitant desire to keep skilled emigration at a low level, some countries have pursued active policies of retention and return. At the turn of the millennium, several Asian countries (including China, Taiwan, India and South Korea) started to see increasing returns of skilled expatriates, as their countries developed and provided increased opportunities to high-skilled workers. These flows may however also have been related to efforts by countries to produce an attractive environment for potential returnees. As such, India for example provides dual citizenship, tax breaks and rights to own agricultural land for foreign passport holders in Bangalore, and investment in large technological hubs have made China, Taiwan and South Korea attractive for expatriates (Ismail, Kunasegaran, and Rasdi 2014). Malaysia's TalentCorp agency keeps a database of Malaysians abroad and actively headhunts them with tax incentives to return (Ismail, Kunasegaran, and Rasdi 2014; Del Carpio et al. 2016). Zweig (2006) however contends that most studies show that governments have little power over the return decision, and that advantages given to returnees may end up spurring emigration (since only expatriates are eligible for advantages).

6.2 Immigration policies

While, on the one hand, source countries may tailor policies destined to keep their skilled citizens in the country, many destination countries are on the other hand implementing quality-selective immigration policies. Such policies make sense if we believe that skilled workers provide larger positive externalities on things like productivity and growth, and if their integration into society is believed to be less costly than that of unskilled migrants. Regarding the upper tail of the talent distribution, what is sometimes described as a fierce "battle for talent" rages (Bertoli et al. 2012), with a select few mainly English-speaking OECD countries emerging as the winners. The most well-known example of a selective immigration policy is probably the H1-B visa in the United States (Commander, Kangasniemi, and Winters 2004). Through this visa, employers hiring workers for a select number of qualified jobs are allowed to hire foreigners, provided that an American worker is not available at the prevailing wage. The degree to which H1-B workers actually compete with native workers or are paid similar wages is however not clear, and criticism has been raised both on the grounds that the H1-B visa is a way for firms to undercut wages and that there are in reality no labor supply shortages of Americans in the sectors covered by the H1-B scheme (such as IT). Quality-selective immigration schemes have been used in a range of countries¹³, often through the use of points attributed to migrants according to criteria which revolve around qualifications, occupation, work experience, financial self-sufficiency and language proficiency. The efficiency of selective immigration schemes has however been questioned in the literature. Bertoli and Rapoport (2015) ask whether such schemes are effective in the long-run, given that the establishment of diasporas have been shown to reduce costs of migration and benefit low-skilled migrants disproportionately. They highlight the fact that educational demand in origin countries may be responsive to both policy and networks in destination countries, and that the impact of network size on migration goes through both the channel of self-selection (with lower-skilled migrants benefiting more from networks) and through the channel of educational demand in the origin country. Their work extends the prediction by McKenzie and Rapoport (2010), of a negative relationship between quality and network size with non selective immigration policies, to a setting where educational attainment in origin countries is endogenous. They however also show that network size and quality can be positively correlated under a number of assumption related to the selectivity of immigration policies, prevailing patterns of selection and the discrepancy of cost related to networks for skilled and unskilled workers. Finally, selection may actually decrease the quality of migrants if pushed too far (Bertoli, Dequiedt, and Zenou 2016). If migrants self-select on unobservables such as ability, such that they are paid more than non-migrant workers with the same observed characteristics, then increased selectivity may produce a decrease in the average quality of migrants, as measured by the wage they are faced with on arrival. In Canada, Aydemir (2011) concludes that the restrictive point system has produced a stock of migration of a higher skill level than if purely preferential factors were

¹³e.g. the Highly Skilled Migrant Program (UK), the Third level Graduate Scheme (Ireland), the Quality Migrant Admission Scheme (Hong Kong), the Migration Programme (Australia), etc.

determinant. However, he interestingly finds that migrants admitted due to their skills do not perform better in the labor market in the short run.

Migration policy in itself is not the only policy that is likely to affect the skill composition of migrants. Welfare benefits have also been suggested to be drivers of migration, and have often been highlighted in the public debate. Cohen and Razin (2008) develop a model analyzing the effect of the generosity of the welfare state on the skill composition of immigrants. In a controlled migration framework, natives decide on the migration policy which is resumed by the share of skilled workers among immigrants. In this scenario, if the decisive voter is an unskilled native, his preferred policy is constant whatever the generosity of the welfare state—he/she always prefers only skilled immigrants. The skilled native, however, faces a trade-off between competition in the skilled labor market and help in sharing the fiscal burden. As a consequence, the more generous the welfare state, the more skilled natives will favor skilled immigration. In their free migration scenario, however, generosity affects the skill composition of immigration through an effect on the net wages. The net wage loss of an increasingly generous redistribution scheme affects skilled workers more severely than unskilled ones, leading to a negative relationship between the generosity of the welfare state and the share of skilled workers among immigrants. Testing the model's predictions on data from 16 European countries their findings are consistent with generosity negatively affecting the skill composition of migrants. Regarding generosity and migrant flows in general, several scholars have found a significant positive relationship flows and the generosity of benefit schemes, both for migrant location choices within countries (Borjas 1999; Levine and Zimmerman 1999; Meyer 1998) and across countries (Peridy 2006; De Giorgi and Pellizzari 2009). De Giorgi and Pellizzari (2009) also find a positive coefficient for the interaction between education levels and benefits, suggesting that the welfare benefits disproportionately attract lower educated migrants, consistent with the framework of Cohen and Razin (2008). In line with the above studies, Ortega (2005) considers a situation where voters choose immigration policies and where immigrants eventually end up with the right to vote. The model provides a trade-off between a willingness to adopt a policy of migrants' whose skill level is complementary to that of natives (which is beneficial for natives in the labor market), and the fact that this also consists in conceding future political power if migrants vote in the interests of their skill group.

Empirical evidence based on the efficiency of alternative policies is hard to come by, since immigration policies are complex and heterogeneous structures. Steps towards assembling statistics on different migration regimes and their associated policies have however recently been undertaken. The DEMIG POLICY (Haas, Natter, and Vezzoli 2016) contains 6500 policy changes in 45 countries since 1945. Its analysis shows that overall migration policy has become less restrictive in the last 70 years, although a focus on selection has appeared in the latter decades. Similarly, results from the IMPALA initiative

(Beine et al. 2016) highlight the important heterogeneity in migration policy across countries—with a trend towards increasing complexity.

7 Conclusion

This paper has attempted to synthesize the theoretical and empirical findings in the literature related to the education - migration nexus. After showing that the share of skilled migrant workers in OECD countries has increased, an analysis of the data provided in the first section suggests that compositional changes in migrant flows are unlikely to be behind this finding. Although a precise analysis of the origins behind this increase goes beyond the scope of the paper, it does seem that increased educational attainment in developing countries seems to be a good candidate for this overall trend, although increased endogenous selection in migrant flows and selective migration policy may well explain flows at the bilateral level. Looking at selection, trends across countries are strongly heterogeneous with several countries seeing their emigrant flows becoming less skilled.

Much of the migration literature has focused on migrants' endogenous selection on education, according to which migrants who are more able (in terms of observable or unobservable characteristics) migrate more often since they face larger returns (net of costs) to such movements whenever destination countries value abilities more than source countries. Although the literature finds support for this proposition, it has also put its importance into perspective, given that psychological determinants and factors such as linguistic and cultural proximity also seem to be strong (sometimes stronger) determinants of the skill bias in migrant flows. Whatever the reason behind the skill bias, its impact on origin countries has long been subject of debate. Although a brain gain effect is plausible, related to scientific and business cooperation on the one hand, but also increased educational attainment through access to the possibility of migration on the other, attempts to quantify it suggest many countries may be losers in the game.

The brain gain-brain drain debate has retained a strong macro orientation, sometimes ignoring the microeconomic effects of migration which may well play into the overall effect. Focusing on remittances, the early literature—suggesting remittances were squandered away on unnecessary consumption—has given way to more encouraging results suggesting the presence of effects on investment in health and education in origin households. Disentangling the various channels involved—remittances, redistribution of work and in general the transfer of human and physical capital as well as norms—remains a challenge for empirical research however, and future papers on such topics would help to further clarify how and when migrants contribute positively to the development of their home communities. Another aspect of the migration - education nexus—that of the impact of an arrival of migrants on host countries' educational

systems— reminds us that policymakers in host countries should consider plausible peer effects and resource depletion in deciding on the allocation of migrant pupils.

Finally, migration policy is generally thought to have a fairly weak impact on migrant flows, both out from and into countries. Emigration policies might have had some impact in limiting outflows or encouraging returns, but in general large-scale economic development is thought to be the most promising policy for the return of skilled emigrants. Quality-selective immigration policy, on the other hand, may be efficient as the experiences of countries like Canada and Australia suggest. Its impact may be limited, however, when large scale family reunification programs exist. In the end, the impact of various policy components is hitherto poorly understood, since policy schemes are complex. Recent efforts to assemble databases on migration policy changes however have a potential for bridging this knowledge gap.

Although a lot has been done, further research is necessary to understand more deeply the mechanisms through which individuals' decisions to move influence and are influenced by their educational attainments. In particular, personality determinants and their links to education have not been sufficiently investigated in the literature on selective migration. Likewise, although a large number of studies have investigated the effect of migration on education in origin households, the majority fail to distinguish a parental absence effect from one working through remittances. Along those lines, to what extent norms acquired by the migrant influence schooling in origin, while abroad and upon return is not well known.

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