



“Brain Drain” and the Global Mobility of High-Skilled Talent

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This note outlines the challenges of retaining and attracting high-skilled professionals, briefly assesses both the “brain gain” and the “brain drain” in the health sector, and examines some of the existing programs that encourage return. It provides an overview of the role of the diaspora in fostering the transfer of knowledge, technology, capital, and remittances. It draws on my comments at the launch of the volume The International Mobility of Talent: Types, Causes and Development Impacts (edited by Andres Solimano) at the Brookings Institution on April 2, 2008.

International flows of high-skilled talent from developing countries to high-income OECD countries have grown in recent decades. Between 1970 and 1997, the number of foreign-born individuals in science and engineering occupations in the United States increased at three times the rate as that of natives, going from 7.6 percent in 1970 to 15 percent in 1997 (D’Costa, 2008). More recent data from the U.S. National Science Foundation shows that there are some 3.3 million immigrant scientists and engineers in the United States (16 percent of the total), with 2.5 million of these from developing countries (Kannankutty and Burrelli, 2007). The global competition for technical talent has led to creation of special visas to encourage immigration of high-skilled professionals in Australia, Austria, France, Germany, the United Kingdom, the United States, and other countries.²

The topics of brain drain and international talent mobility have important implications for development. The questions related to the global mobility of high-skilled workers can be grouped into two related topics:

1. brain gain and brain drain, and related to these, the challenge of retaining and attracting high-skilled professionals

such as doctors, scientists, and engineers; and

2. the contribution of the diaspora in fostering the transfer of knowledge, technology, and finance, including remittances.

High-skilled migration as brain drain or brain gain

The empirical evidence for effects of high-skilled migration on human capital accumulation is not conclusive. High rates of skilled emigration from developing countries, the so-called “brain-drain,” can imply a net transfer of human capital and scarce resources—in the form of the fiscal cost of educating these workers and foregone tax revenues—from low- to high-income countries (World Bank, 2008).³ However, the prospect of migration may also provide an incentive to acquire higher education, resulting in “brain gain.”

In the models of Stark et al. (1997), Beine et al. (2001), and others, ex ante, individuals faced with some positive probability of migration to a high-income country invest in education because of a higher expected wage. Ex post, some of the individuals who have acquired the higher level of education

are unable to migrate. This can result in an increase in the stock of human capital (“brain gain”) if the number of people acquiring education and staying at home exceeds the number of emigrants, and a reduction in the stock of human capital (“brain drain”) otherwise.

However, the evidence is mixed for the relative importance of brain drain versus brain gain. In an influential study, Beine et al. (2001) find that for a subgroup of developing countries that have a GDP per capita less than 15 percent of that of G-7 countries, the stock of human capital has a positive relationship with the migration rate, indicating “beneficial brain drain (BDD)” or brain gain. However, for the entire sample (which also includes upper-middle income countries such as Brazil, Mexico, and South Africa), they find no evidence of a loss of human capital accumulation or brain drain due to migration.⁴ In a more recent study, Angel-Urdinola et al. (2008) find a negative relationship between emigration of students from Latin American countries to the United States and tertiary enrollment rates in the countries of origin, indicating an absence of any brain gain.⁵

There are some positive experiences of brain gain in health and information technology (IT). The expectation of emigrating may have increased the incentive to invest in higher education and specialized training such as IT (for example, in India and Taiwan, China) and nursing (as in the Philippines and Ghana).

Challenges in retaining and attracting back skilled workers from abroad

In addition to large income differentials, factors explaining the decision of high-skilled professionals to emigrate to high-income countries (or to remain after completion of higher studies) include the quality of living conditions and research facilities in high-income countries, as well as the density of research networks and the size of the preex-

isting diaspora. Factors favoring a return include proximity to family, cultural affinities, and emigrants’ desire to contribute to technological progress in their native country.

Retaining skilled professionals, or attracting them back from abroad, requires a strong investment climate and adequate compensation and opportunities in the public sector. Financial incentives have not been successful for encouraging returns. Instead, encouraging return of professionals may need to involve formulating coherent research policies, strengthening public-private research linkages, and funding research through transparent, competitive processes (Thorn and Holm-Nielson, 2008).

The migration of educated individuals may provide a rationale for policies to attract the students and researchers back home. Such policies in Latin America include Mexico’s CONACYT program to subsidize the salary of returning PhD researchers for a full year to the hiring university; and Colombia’s COLFUTURO program for forgiving part of student loans granted for study abroad if the individual returns. The Mexican CONACYT program cost \$57 million to repatriate some 2,100 researchers between 1991 and 2000. Colombia’s COLFUTURO program finances graduate study abroad for 120 students up to \$25,000 a year for a maximum of two years, and forgives 25 to 50 percent of the amount for returning students. Other policies aimed at encouraging return include favorable tax treatment of returning human and financial capital, land grants to set up new companies, temporary performance subsidies, and efforts to improve the environment for research.

However, there is little evaluation of the cost effectiveness of these programs, or whether there is “adverse selection” with the least skilled returning and the more skilled staying abroad. There is need for rigorous impact evaluation of such programs. The adverse distributional and other implications of these interventions need to be taken into account when designing such targeted policies.

Restricting migration of health professionals as a policy response

There is call from some quarters for policies that restrict the immigration of highly skilled professionals from developing countries. Such policies may not be effective in the health sector and there is a need for innovative solutions. The effectiveness of controls on the recruitment of health professionals (the so-called “ethical recruitment” policy) as advocated by the United Kingdom has been limited (Bach, 2008). There have been continuing inflows of nurses from some of the poorest countries in Sub-Saharan Africa (Malawi and Swaziland) that are prohibited by the UK’s code of practice.⁶ Also, requiring graduate students to refund the cost of training if they emigrate has been ineffective, and discouraged return in Ghana and Trinidad and Tobago. Some promising schemes include establishing occupational categories that do not require huge investments in building specialized skills, such as “health surveillance assistants” in Malawi, who require two weeks of training. Another promising policy is reducing the number of years to attain a nursing degree, which makes the credential more relevant to the needs of the local market.

Financial incentives have not been successful for encouraging returns. Although temporary salary increments for health professionals have been attempted in several countries, given fiscal constraints in low-income countries, it can be difficult to improve health professionals’ pay and working conditions.

The role of the diaspora in fostering the transfer of funds, knowledge, and technology

The diaspora can play a positive role in supporting development, particularly in the context of encouraging high-tech industries. Diaspora members can act as bridges between foreign technology and markets and local entrepreneurs, and complement and strengthen local market-based institutions.

The diasporas of Taiwan (China), Chile, and Israel have helped develop high-tech industries, and more recent examples include India and China.

The one-way flow of labor from developing to high-income countries, and the flow of technology and capital from high-income to developing countries, is now being replaced by more complex and decentralized two-way flows of skill, capital, and technology between differently specialized regional economies (such as between the United States, Taiwan (China), and China) (Saxenian, 2008). In many cases, the Indian-born employees in the successful IT companies in the technology clusters in the United States (such as Silicon Valley in California) have provided technical advice, knowledge, and marketing connections that facilitate both export of software services from India and investments in the IT sector in India.

The support of the government and the Taiwanese diaspora were instrumental in the successful establishment of a venture capital industry in Taiwan for financing technology firms in the 1970s and 1980s. Taiwan, China has now become a source of technology and capital for other countries. According to Saxenian (2008), Taiwan’s investment in the IT sector in mainland China has quadrupled from \$2.6 billion in 2001 to a projected \$10.6 billion in 2006, driven by the rapid domestic market for IT products in China. Some of the most promising technology firms in China have been started by returning mainland-born or Taiwanese entrepreneurs as “cross-Pacific” start-ups. These start-ups can have research and development centers in the United States, incorporated in the Bahamas or Cayman Islands, and design and logistic capabilities in Taiwan.

The diaspora can act as global “search networks” for developing local industry. For example, key members of the Taiwanese government and leading overseas engineers in Silicon Valley played such a role in the establishment of a successful venture capital industry in Taiwan, China. However, harnessing the enthusiasm, commitment, and resources of the diaspora can be challenging. Creation

of a robust diaspora search network requires time, patience, and institutional capabilities. Furthermore, it can be challenging to turn “discussions” (for example, conferences, Websites, and online communications) into “projects,” such as a visit by a university professor to his home country or investment in a community project (Kuznetsov and Sabel, 2008). For example, programs aimed at the Armenian and Argentinean diasporas in have met with limited success. The experience of Colombia’s CALDAS diaspora research network, created with government support, is another example. Although CALDAS was initially successful in fostering collaboration with researchers in Europe and North America and in facilitating exchange programs in the 1990s, it was not possible to sustain the program over the medium term. Therefore, diaspora research networks may have better initial success with small, achievable goals.

Perhaps the most important contribution of both low- and high-skilled migrants is the remittances sent to family and friends in the origin countries. Remittances to developing countries have grown steadily in recent years, reaching an estimated \$251 billion in 2007. They are now larger than FDI and equity inflows in many countries, especially small, low-income countries.⁷

Remittances improve households’ access to finance and developing countries’ access to additional external finance. By generating a steady stream of foreign exchange earnings, remittances can improve a country’s creditworthiness and enhance its access to international capital markets. Countries such as Brazil, Mexico, Turkey, and Kazakhstan have securitized these future flows to raise cheaper and longer-term financing in international financial markets. Reducing remittance costs would result in additional remittance flows through formal channels.

Developing countries, and even the private sector in these countries, can raise additional financing by issuing bonds aimed at their overseas diaspora for economic development in the home country. The diaspora from India and Israel have raised \$11

billion and \$25 billion respectively in recent decades. The Philippines has announced that it will sell a diaspora bond to overseas Filipino workers this year to raise funds for development projects. Ghana has begun marketing the Golden Jubilee Savings Bond to the Ghanaian diaspora in Europe and the United States. Preliminary estimates suggest that Sub-Saharan African countries can potentially raise \$1–3 billion by reducing the cost of international migrant remittances, \$5–10 billion by issuing diaspora bonds, and \$17 billion by securitizing future remittances and other future receivables (Ratha et al., 2007).

Some tentative conclusions and the World Bank’s work

Some tentative conclusions on the international movement of high-skilled labor can be drawn from the analysis above:

1. The movement of talent is not to be lamented but managed, but not by imposing controls.
2. Tertiary education increasingly should be privately funded, especially in a situation of international mobility of high-skilled labor and the difficulties in capturing the externalities of publicly funded higher education.
3. Overinvestment in nurses and other professionals for export is a valid development strategy. There are other ways to offset this investment.
4. There are effective nonpecuniary incentives (such as professional networks) that can work better in retaining and attracting back talent from abroad.
5. Rich country controls or subsidizing wages of high-skilled professionals, such as doctors or nurses in home countries, are not likely to be effective.

The issues of brain drain and tapping into the resources of the diaspora are relevant for the agenda of the World Bank. The Bank has published several reports and books—including a flagship *Global Economic Prospects* report—on remittances, brain drain, temporary migration, gender aspects of migration,

and mobilizing the resources of the diaspora. We are now exploring how the extensive research findings can be operationalized in the Bank's country assistance strategies.

In formulating policies relating to high-skilled emigration, the World Bank is at a fairly early stage of trying to scope the phenomenon and its development impact. The Bank has put together a fairly comprehensive database on skilled emigration from developing countries and a database on the emigration of physicians.⁸ It appears that the so-called "brain drain" is significant mainly in smaller countries such as Grenada, Dominica, Cape Verde, and Fiji. Countries that have more than 30 percent of their tertiary-educated people abroad account for only 3 percent of the total population of developing countries.

Strong local institutions are crucial for utilizing diaspora resources effectively. The World Bank has been exploring ways to strengthen local research and development capacity and innovation systems (networks of universities and research institutions) in developing countries. Several Bank-supported projects (for example, in Mexico, Argentina, Chile, Brazil, and the Republic of Korea) have considered migration as one of the main channels for the international diffusion of technology. Furthermore, the Bank has been looking into encouraging short visits by diaspora researchers and collaboration with institutions back home. The *Global Economic Prospects 2008* report highlights contacts with the diaspora, along with trade and FDI, as critical for technology adoption by developing countries.

There is need for rigorous analysis of impacts of high-skilled emigration on critical sectors such as education and health in developing countries. We have undertaken a study on migration, remittances, and development in Africa that will attempt to address the knowledge gaps and develop concrete policy recommendations.⁹

The World Bank has been supporting the efforts of the African diaspora to mobilize resources for development. We organized a

Development Marketplace for the African Diaspora in Europe last year. We have also launched an Africa Diaspora Initiative to mobilize diaspora resources for development in Sub-Saharan Africa. The World Bank, together with the AU and the EU is also working to establish a new African Remittances Institute (ARI).

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Endnotes

1. I would like to thank Sanket Mohapatra and Dilip Ratha for useful discussions and assistance in the preparation of this note.

2. The increase in demand for high-skilled workers in the United States has been filled through permanent employer-based resident permits ("green cards") for individuals with advanced degrees in science and technology, temporary H-1B visas for high-skilled workers, and through intra-company transfer (L1) visas. Australia, Canada, and New Zealand award higher points for highly educated individuals applying for work permits. The European Union (EU) is considering a "Blue Card" that would grant high-skilled professionals selected through a points-based system unrestricted access to EU labor markets after an initial period in the host EU country.

3. The emigration of professionals who make a direct contribution to production, such as en-

gineers, may result in reduced rates of domestic innovation and technology adoption.

4. The authors used a cross-section of 37 developing countries in 1998 to examine the relationship between an indicator for the level of educational attainment and the rate of migration to the United States, controlling for other variables such as public education expenditure, wage differentials, and population of the home country.

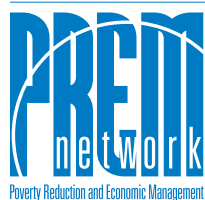
5. However, it is difficult to conclude that these results using annual data provide evidence of brain drain or absence of brain gain. Even if there is some brain gain effect, there would typically be a considerable lag between the emigration of high-skilled individuals and the incentive for those remaining behind to acquire higher education.

6. The code of practice of the UK National Health Service (NHS) applies only to active recruitment of health professionals of developing countries by the NHS in the absence of a bilateral agreement, but allows the recruitment of health professionals from developing countries on an individual basis.

7. There is a view that unskilled migrants typically send more remittances. While there are no available estimates of remittances sent by high-skilled migrants from developing countries, the number of these migrants in the OECD countries suggests that this would be considerable.

8. By Docquier and Marfouk (2004) for high skilled emigration, and by Docquier and Bhargava (2006) for emigration of physicians. Both studies were commissioned by DEC.

9. This study is the Africa Migration Project, undertaken by the Africa Region and the Development Prospects Group of the World Bank together with the African Development Bank. It includes mapping of migration, remittances, and brain drain and studies mobilizing other diaspora resources.



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