IIE Center for Academic Mobility
Research and Impact

Global Knowledge and Talent Flows:

An Imbalanced Equation?

Rajika Bhandari, Ph.D.
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Global Knowledge and Talent Flows:

An imbalanced equation?

Rajika Bhandari, Ph.D.
Senior Advisor, Research & Strategy
Director, IIE Center for Academic Mobility Research & Impact
Institute of International Education (IIE)

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As an independent, 501(c)(3) not-for-profit founded in 1919, IIE's mission is to help people and organizations leverage the power of international education to thrive in today's interconnected world. IIE's work focuses on advancing scholarship, building economies, and promoting access to opportunity.

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Foreword

Historically, education has been the shortest bridge between the haves and have-nots, and the key to progress and prosperity for individuals and countries. However, the current education system is showing cracks, exacerbating the rich-poor divide and benefiting a few developed nations at the cost of others. The rising cost of education globally and relevance of what we learn at schools today further raises the risk profile of current-day education, both from a student return-on-investment and long-term value creation for countries. A focus on intelligence testing, memorization and standardization will be easily and efficiently supplanted by Artificial Intelligence (AI). While we are working to create this massive and much-needed shift, we still haven't made even the current education system accessible to everyone across the world. According to UNICEF, more than 72 million children of primary education age are not in school and 759 million adults are illiterate and do not have the awareness necessary to improve both their living conditions and those of their children. As we take on education transformation, daisy chaining across 3 key categories—access, equity, quality/impact—is critical to unleashing potential.

- **Access**: How do we make it easier for students across the world to have access to education and learning? Can technology play a key role in bringing learning to students? How can countries, particularly developing ones, hold on to top talent to ensure economic progress?
- **Equity**: While equality means treating every student the same, *equity* means making sure every student has the support they need to be successful. Fairness (ensuring that personal and social circumstances do not prevent students from achieving their academic potential) and inclusion (setting a basic minimum standard for education that is shared by all students regardless of background, personal characteristics, or location) being the key drivers.
- **Quality and impact:** The definition of quality and success has to move beyond standardized test scores to a more holistic measurement tied to life improvements and societal impact. Quality education would provide learners with capabilities and competencies required to make them economically productive, develop sustainable livelihoods, enhance individual well-being, and contribute to community. The impact orientation will help shift our gaze away from behavior and activities (attending school and checking the box) to value-creation environments (personalized learning to career counselling to job readiness to responsible global citizens).

Released on the occasion of the fourth IC3 Conference focused on access, equity and inclusion for all students through effective college and career counseling, this joint report by the Institute of International Education (IIE) and IC3 presents an important and timely analysis of which postsecondary students around the world have access to a global education experience and what institutions and countries can do to right the balance, especially at a time when students are being affected by higher costs and growing competition for college seats.

Global education opportunities play an important role in unleashing student potential and instilling lifelong learning, preparing future generations for the challenges and opportunities of a fast-paced and disruptive world.

Karthik Krishnan
Global CEO, Britannica
**Advisory Committee Member, IC3**
August, 2019

GLOBAL KNOWLEDGE AND TALENT FLOWS: AN IMBALANCED EQUATION?

Introduction

Despite the overall growth in student mobility and the rise of new destination countries, the global movement of postsecondary students remains a remarkably unidirectional phenomenon: students from the developing world, or Global South, take their knowledge and talents to the developed world, or the Global North. Eight of the top ten host countries of the world are all located in the developed world and attract approximately 60 percent of the world's five million mobile students (Project Atlas, 2018). On the other hand, in the developing world, China and India as sending countries alone account for almost a quarter of the world's outbound, globally mobile students (UNESCO, 2018). Europe is one exception to this overarching pattern of South-to-North mobility, where there exists a long history of educational flows within the region.

While the issue of "brain drain" was front and center in the 1950s and 1960s and was even described as a form of neo-colonialism (Altbach, 2013; Beine, Docquier & Rapoport, 2006), by the advent of the 21st century the discourse had shifted to "brain circulation" or even "brain gain," where it was widely argued that the loss of human capital by sending countries had been replaced by an even and balanced exchange of knowledge; long-term international partnerships between equal players; and even the high economic contributions of emigrants to their home countries in the form of remittances. Yet immigrant and emigrant populations show that most immigrants (those received by a country) are heavily clustered in the developed world, while emigrants come mainly from developing countries in Asia, Africa and Latin America.

Total immigrant and emigrant populations by country, mid-2017 estimates
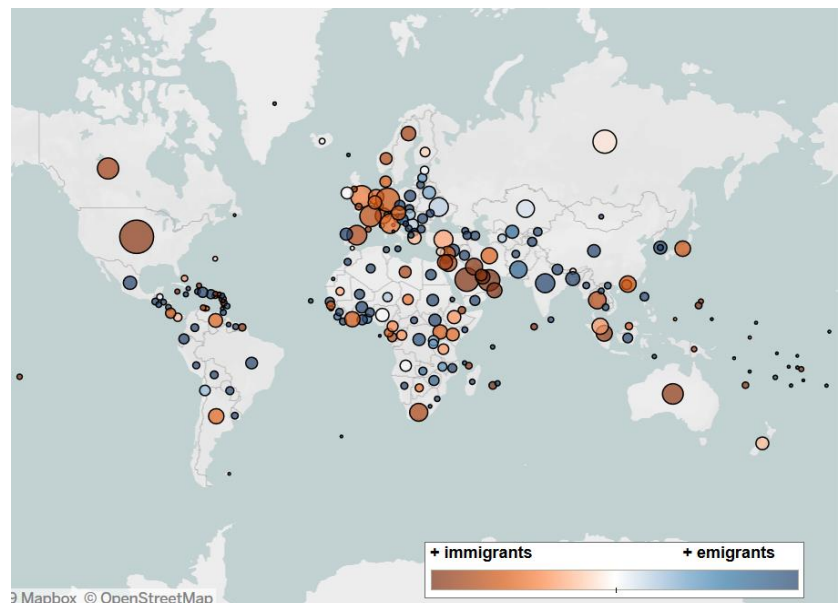
Source: Migration Policy Institute's Migration Data Hub
www.migrationpolicy.org/programs/migration-data-hub

Revisiting the brain-drain debate in the context of student flows is also timely because of the United Nations' 2015 Sustainable Development Goals (SDGs) that have brought a renewed focus to the critical issues of equity and access in higher education and the availability of a global experience to a diversity

of students. When access to higher education is constrained to begin with due to socioeconomic factors where only one percent of the poorest 25-29 year-olds in low-income countries have completed four years of higher education as compared with 20 percent of the richest, being able to participate in a global tertiary experience can seem like an enhancement to education but not a necessity. In all of the world regions and countries described above, access to quality higher education remains a challenge, with many countries lacking a clear policy for closing such gaps (Salmi, 2018).

In China…students from poor, rural backgrounds are seven times less likely to enter higher education than poor students living in urban areas. In India, where there are over 300 million HE students…those whose families are in the highest income brackets are over 20 times more likely to enter HE…The gap becomes even wider when gender and geography are considered—poor women from rural areas are 40 times less likely to go on to HE than wealthy, urban males.

Atherton, Dumangane & Whitty, 2016

Added to this is the fact that the more educated an individual, the more likely they are to leave the country to go overseas, thus compounding many of the pre-existing inequities and resulting in brain-drain (UNESCO, 2018). Traditionally, participation in academic mobility has been viewed as an elite privilege reserved for those who either have the social and financial capital to access high-quality postsecondary education at home and abroad, or for those who have the skills and know-how to apply for and obtain financial aid overseas. The imperative to make global education more accessible is growing in both developed and developing countries, with technological developments also providing new modalities to reach students who may not have the means or ability to leave their home countries for higher education.

The more educated are more likely to migrate
Migration intensity rate by education, selected countries, five-year intervals, 1999–2010
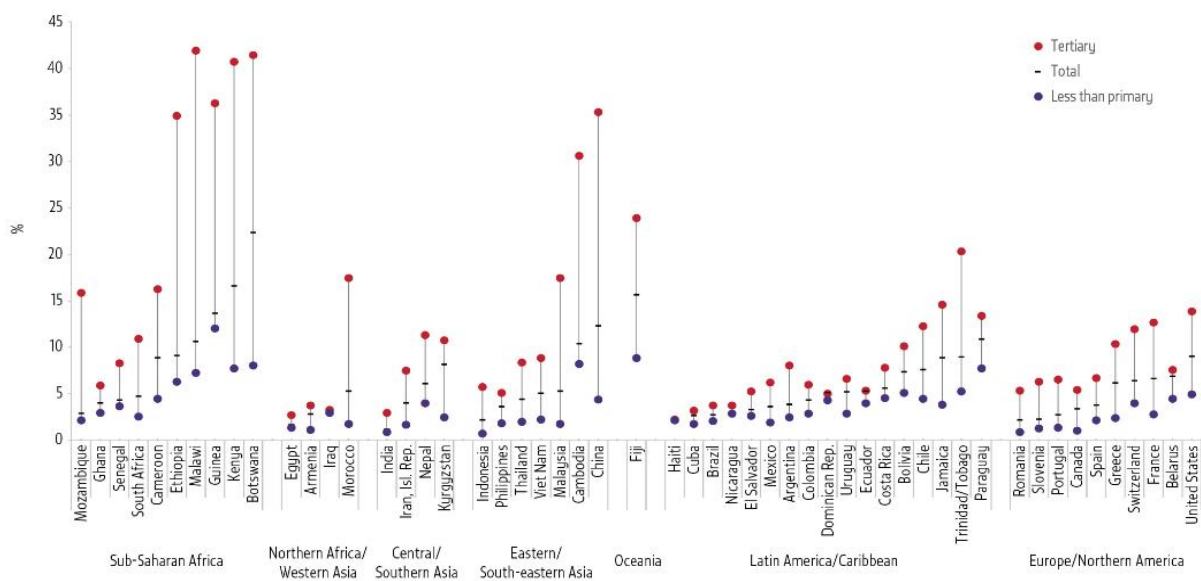
GEM StatLink: http://bit.ly/fig2_3
Source: Bernard et al. (2018).

A newer angle to existing inequities in higher education access has been the wave of academic displacement seen around the world and the surge of refugee populations. While displaced students fall outside the profile of what is typically considered an international student, their circumstances require special attention from the higher education community. As displaced students seek entry to higher education institutions outside their home countries, issues of transferability of academic credentials, language preparation, integration, and support of these students on campus, and preparation of students to enter labor markets following graduation will become significant issues for higher education institutions around the world.
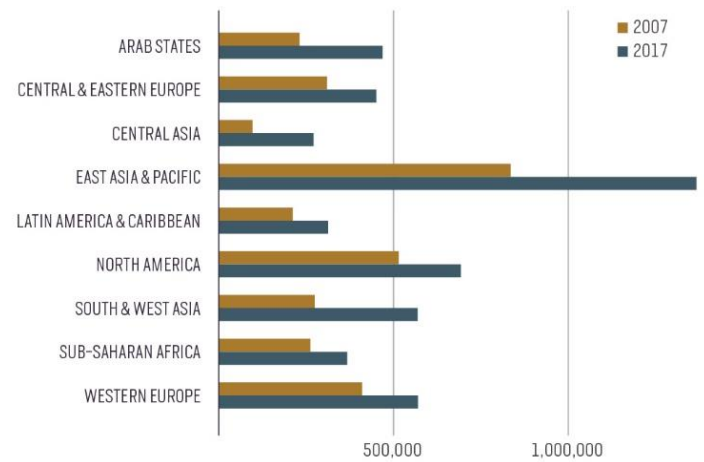
The Current Report

Framed by the broader issues of access and equity within postsecondary education, the current report raises the following questions: Are the current global flows of students advantaging wealthier nations over developing ones? Are students from the developing world returning at higher rates to their countries of origin? How do we ensure that the mobility of students and talent is based on principles of access, equity and inclusiveness, both at the individual student level and at a national level? Student mobility is an individually-driven phenomenon and students will seek the best opportunities for themselves, whether at home or elsewhere. While it is not the goal of this report to suggest that the north-to-south flow of students should be reversed or that countries in the Global South would even have the capacity to host large volumes of international students, the report does argue that when it comes to international student recruitment policies, host countries in the Global North need to consider how to balance their own needs to fill critical knowledge and skill gaps by attracting global talent with the needs of developing countries to retain their valuable human capital. Thus, the report proposes solutions for programmatic and national-level initiatives to create a balance between the home and host countries of globally mobile students.

A few definitions and assumptions are worth noting. The report uses a broad definition of "skilled migrant" to include individuals who have either postsecondary education or work experience that provides them with a certain skill set that is valuable to knowledge economies (Chappell and Glennie, 2010). Further, while not all international students become skilled migrants and while global data is not available on how many international students actually transition into being skilled immigrants in their host country, related evidence on "stay rates" and "return rates" suggests that a very large proportion of students from developing countries eventually immigrate to the host country where they went as an international student. For example, in 2017 in the U.S. alone, almost 90 percent of Indian doctoral students and 83 percent of Chinese doctoral students indicated their interest in remaining in the U.S. after their studies (NSF, 2018). Additionally, 80 percent of international doctorate recipients in STEM fields with definite post-graduation plans reported that the location of their future employment position was in the United States, up from 71 percent twenty years ago.

The Current Status of Student Flows

Worldwide, three of the five largest senders of students for overseas study in 2016 were in Asia, namely China, India, and South Korea; these three countries together account for over 25 percent of all outbound students (UNESCO, 2018). Viewed as an outbound ratio—that is, the number of tertiary-aged students who leave a country as compared with those who remain—countries in East Asia and the Pacific have the largest numbers of students leaving to receive an education outside their home country, followed by South Asian countries. Seen from the receiving country end, there is then a clear "international exchange imbalance," with many more students from the developing world studying in the Global North. Taking the

OUTBOUND INTERNATIONAL MOBILITY BY REGION, 2007 & 2017

(chart showing outbound international mobility by region for 2007 and 2017, with regions: Arab States, Central & Eastern Europe, Central Asia, East Asia & Pacific, Latin America & Caribbean, North America, South & West Asia, Sub-Saharan Africa, Western Europe; horizontal axis marked at 500,000 and 1,000,000)
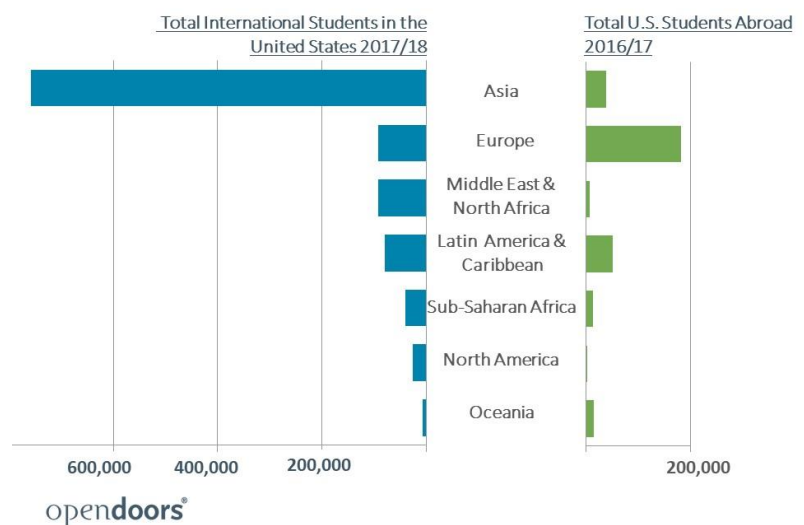
Source: UNESCO, 2018

PROJECT ATLAS® is an initiative of the INSTITUTE OF INTERNATIONAL EDUCATION and has been supported by the Ford Foundation, the Bureau of Educational and Cultural Affairs (ECA) of the United States Department of State, IIE, and country partners.

Project Atlas®

U.S. as an example, there are more students from every world region studying in the U.S. than American students going to those regions; the only exception to the pattern is Europe, where there are more U.S. students going to Europe than there are Europeans studying in the U.S.[1] That being said, major host countries like the U.S. will likely always draw a disproportionately larger number of students from around the world because of their large and established higher education sectors and their significant capacity to host international students. For example, the over one million international students that study in the U.S. make up just five percent of the total higher education enrollment (with higher proportions at the graduate level).

International Exchange Balance

(chart comparing Total International Students in the United States 2017/18 and Total U.S. Students Abroad 2016/17 across regions: Asia, Europe, Middle East & North Africa, Latin America & Caribbean, Sub-Saharan Africa, North America, Oceania; left axis marked at 600,000, 400,000, 200,000; right axis marked at 200,000)

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However, despite the predominance of students from the Global South that are studying in the Global North, the rise of non-traditional and emerging destinations cannot be ignored, especially when a country like China now occupies the unique position of being the world's largest "supplier" of international students but also one of the top five hosts of students from other countries. With a governmental target of hosting 500,000 international students at all academic levels by 2020, international

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[1] One caveat in conducting these comparisons is that most international students in the U.S. are pursuing degree study, whereas most U.S. students going abroad are doing so for shorter periods of study.
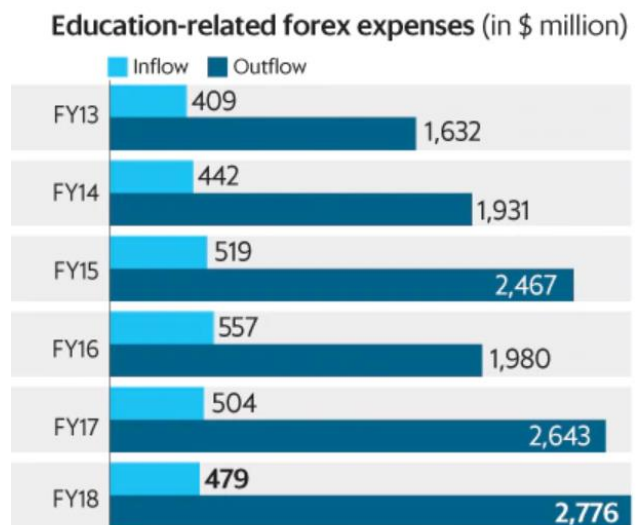
students in China grew by almost 11 percent between 2017 and 2018, making it the third top host of international students globally (Project Atlas, 2018).[2] In India, too, the Ministry of Human Resource Development launched its Study in India initiative in 2018 which aims to invest $23 million by 2020 to attract 200,000 international students initially from South Asia, other parts of Asia, Africa, and the Middle East, with the goal of expanding to other countries in the future. Providing scholarships to international students is a key strategy of the initiative, with about 55 percent of students slated to receive fee waivers at 160 Indian host institutions.

Other developments include a growing number of students studying within their geographic region or even choosing to stay home due to expanded capacity within their home country to offer quality higher education. For example, students from within the Asia-Pacific region accounted for 36 percent of the 1.3 million international students hosted by countries in the region in 2016, primarily due the large shares of three top hosts in the region: Australia, China, and Japan. In some key destinations in Asia, other Asian students make up a much larger proportion of the total international student body: Hong Kong (91 percent), Japan (87 percent), and South Korea (75 percent) (Project Atlas, 2017; UNESCO, 2018).

While Europe is the second largest sending region of international students—accounting for 23 percent of the world's globally mobile students in 2016—it falls outside the South-to-North framework as a large part of the European mobility is from one European country to another, largely due to Erasmus and other European Union (EU) funding, and the growing harmonization of higher education systems across the European Higher Education Area (EHEA) which enable credit and degree recognition credit transfer. Among the more than 878,000 European students who study outside their home country, three-fourths remain within Europe with the top five senders – Germany, Turkey, France, Italy, and Poland – accounting for almost half (48 percent) of this intraregional mobility (Eurostat, 2016; UNESCO, 2017).

When the balance or rather imbalance of student flows is viewed in financial terms, there is also a significant gap. Seen from the sending country end, the large number of Indian students studying overseas has resulted in continuing increases in foreign exchange spending on the part of Indian students and their families, while the reverse inflow of revenue has been declining. According to the Reserve Bank of India (RBI), spending on tuition and hostel fees by Indian students studying abroad has increased by 44 percent from $1.9 billion in 2013-14 to $2.8 billion in 2017-18. At the same time, spending by foreign students in India declined from $557 million in 2015-16 to $479 million in 2017-18, thus resulting in a much larger outflow of resources from India. When viewed

Education-related forex expenses (in $ million)

Inflow ■ Outflow

Year	Inflow	Outflow
FY13	409	1,632
FY14	442	1,931
FY15	519	2,467
FY16	557	1,980
FY17	504	2,643
FY18	479	2,776

Source: Reserve Bank of India

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[2] Note: the estimates of the numbers of international students in China as well as China's ranking as a host vary based on the source of the data and differences in definitions and methodology. Project Atlas data is provided by the Chinese Ministry of Education and therefore not comparable to UNESCO data.

from the receiving end, in 2017 in the U.S alone, Indian and Chinese students contributed $21.3 billion to the U.S. economy (Bureau of Economic Analysis, U.S. Department of Commerce, 2017).

Higher Education Receipts for the U.S. from Selected Places of Origin, 2009-2017											
Place of Origin	2009 [millions]	2010 [millions]	2011 [millions]	2012 [millions]	2013 [millions]	2014 [millions]	2015 [millions]	2016 [millions]	2017 [millions]	% of 2017 Total	% Change
World Total	19,689	20,937	22,823	24,710	27,241	30,795	35,760	39,425	42,400	100.0	7.5
China	3,049	4,014	5,123	6,420	8,041	9,793	11,429	12,551	13,889	32.8	10.7
India	3,077	3,199	3,269	3,273	3,272	3,648	5,014	6,543	7,521	17.7	14.9
European Union	1,800	1,820	1,895	1,983	2,057	2,224	2,452	2,584	2,754	6.5	6.6
South Korea	2,115	2,146	2,265	2,307	2,310	2,333	2,303	2,251	2,286	5.4	1.6
Saudi Arabia	362	452	688	1,016	1,334	1,747	2,061	2,160	1,876	4.4	-13.1
Canada	917	903	915	922	971	1,054	1,076	1,088	1,141	2.7	4.9
Vietnam	*	*	*	*	542	585	694	818	881	2.1	7.7
Taiwan	787	777	758	731	707	712	739	774	824	1.9	6.5
Mexico	431	*	433	450	473	508	605	617	633	1.5	2.6
Japan	800	709	640	613	595	605	620	636	627	1.5	-1.4
Brazil	243	*	265	280	340	473	820	676	477	1.1	-29.4

* Data not available from the U.S. Department of Commerce

Source: Bureau of Economic Analysis, U.S. Department of Commerce, www.bea.gov/international

Growing South-South Mobility

Looking beyond the common South-to-North mobility patterns and increasing regionalization of student flows, other unique patterns exist that are worth noting. One such development is the rapid rise of the numbers of African students studying in China, where China is now the second largest host destination for African students after France (Nakkazi, 2018). This trend reflects the expanding economic and business ties between Africa and China, as well as China's commitment to provide scholarships to African students. At the 2018 FOCAC (Forum on China-Africa Cooperation) meeting, the Chinese government expanded its support to include 50,000 government scholarships and 50,000 training opportunities. Other unique mobility patters include sizable numbers of francophone African students in France as well as Latin America students in Spain, both due to factors such as shared languages and historical ties.

Despite these developments, it is clear that South-to-South flows remain generally weaker and inequities in access to an international higher education persist. Insufficient funding in many countries continues to pose barriers both for increasing the quality of higher education necessary to attract international students, and also in the form of scholarships necessary to support student flows. Growing populations of refugees, while accommodated to some extent in certain parts of the globe, remain a group in need of smoothed pathways into higher education and the new societies in which they have been relocated.

Implications for major sending countries: Loss of intellectual capital

India and China:

It is estimated that by 2025, higher education enrolment worldwide will double to 262 million and that much of this growth can be attributed to "Chindia"[3]—a portmanteau that describes the joint power of China and India, which together are major players in the global student mobility space both as source countries but also as emerging hosts, especially in the case of China. By 2020, China alone will account for almost 30 percent of the world's university graduates between the ages of 25-34 or, in absolute numbers, there will be as many Chinese graduates in that age group as the entire U.S. population aged 25-64 (OECD, 2012). India, Asia's third largest economy, will add up to 300 million people to its workforce over the next two decades—the equivalent of the entire U.S. population. All of India's growth will be amongst its youth population, a "demographic dividend" whose educational needs cannot be met by Indian institutions alone (although their capacity is growing substantially) and who will thus continue to seek an international education in large numbers, whether through traditional mobility to a host country or through other arrangements such as Trans National Education (TNE). Interestingly, and adding an additional layer to the relationship between India and China, is the fact that an increasing number of Indian students are now seeking out China as a destination, primarily for a medical degree, with the Indian student population in China growing from 8,145 in 2008 to 16,694 in 2015 (Lavakare, 2018).

For India and China the outbound ratios might be small but a focus on quantity or volume conceals which students are leaving the country

However, this optimism and domestic growth notwithstanding, outbound mobility from both countries remains high, both numerically and in terms of quality. In 2017, 869,387 students from China and 306,000 from India were studying abroad. While these very large absolute numbers represent a very small proportion of the college-aged cohort in both countries—one percent for China and 0.3 percent for India—the focus on low proportions masks the human capital potential and "quality" of the students that leave to go abroad. While the notion of quality can be subjective, one proxy might be to examine what Indian and Chinese students are studying overseas, with higher levels of education and certain fields of study associated with greater gains for receiving countries and economies. In the U.S., for example, almost half of all Indian students are enrolled at the graduate (post-graduate) level and in the STEM fields (81 percent) (Baer, Bhandari, Andrejko & Mason, 2018). As for Chinese students in the U.S., while the number of Chinese undergraduates has grown rapidly over the past few years to now outnumber graduate students, 36 percent of Chinese students are nevertheless pursuing study at the master's and doctoral levels.

Africa

While there has been an inordinate focus on China and India and their growing demand, a world region that does not receive sufficient attention in discussions of student flows is Africa even though the proportion of African students who were globally mobile increased by 49 percent between 2006 and 2017, reaching a total of 514,737 students (UNESCO, 2017). In terms of future population growth and

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[3] The credit of coining the now popular term goes to Indian Member of Parliament, Jairam Ramesh.

potential demand for education, Africa has the most people in the world under 18 and is projected to account for half of the world's population growth between 2015 and 2020 (United Nations, 2017). Given this surging demand and insufficient higher education provision at home, Africa continues to experience a significant loss of human capital through student mobility and is one world region where—unlike some countries in Asia—return rates remain low and almost nil (Ziguras & Gribble, 2015). It has been estimated that each year $4 billion is spent on salaries for approximately 100,000 western expatriates who make up the loss of professionals in Sub-Saharan Africa (Teichler & Yağcı, 2009).

Lower tertiary education opportunities at home are associated with more students seeking opportunities to study abroad
Relationship between outbound mobility ratio and gross enrolment ratio, 2016
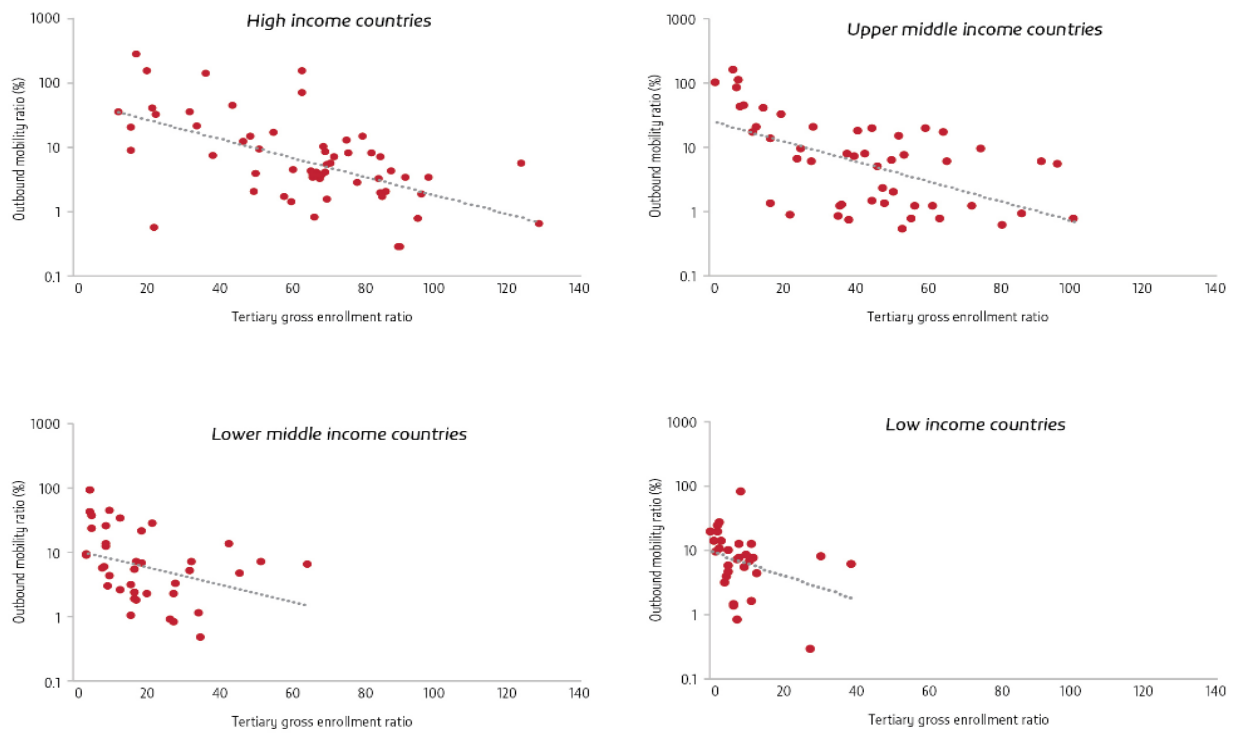
GEM StatLink: http://bit.ly/fig16_2
Source: UIS database.

Solutions & Key Takeaways

Solutions for balancing the knowledge equation between sending and receiving countries requires an understanding of why students move in the first place. It might be argued that comparing the mobility statistics of sending and receiving countries presents an incomplete picture because the fundamental motivations of international students from the developing world are different from those from developed countries. For example, a meta-analysis of papers that examined the trends for potential migrants from 28, primarily developing, countries in Eastern Europe, Asia, Latin America, the Caribbean, South Asia and Africa found that there are five common factors that drive mobility: wages, employment, professional development, networks and socio-economic and political conditions in countries of origin (Chappell & Glennie, 2010).

Take the case of students from India, whose primary motivation for going to countries such as the U.S. and the U.K. is not necessarily the pursuit of cultural exchange or the desire to learn a foreign language, but is rather a set of much more pragmatic considerations driven by the sheer insufficiency of adequate seats in high-quality Indian colleges and universities as well as the desire for professional advancement. This fits within both the "constrained-schooling" and the "migration-for-employment" paradigms. The example of the Indian Institutes of Technology (IITs) s is often cited, where over a million students appear for the entrance exam and fewer than one percent are admitted, with most talented and aspiring engineers then leaving the country to seek an education elsewhere. On the other hand, student flows between developed countries—such as between Europe and the U.S.—are often pursued for reasons such as mutual and cultural exchange, science diplomacy, and the overall Western philosophy of broadening one's perspective, a more contemporary version of the "grand tour." The former group of students from the developing world is driven by educational need, lack of access, and the pursuit of opportunity; the latter is driven by the goals of enhancement and expansion.

What can home countries do?

The push factors for students from the Global South suggest that the converse also ought to be true: when offered solid professional opportunities and adequate wages, coupled with the pull of family ties, foreign-educated talent might be open to returning home. Ziguras and Gribble (2015) offer a three-part framework for what home or sending countries can do: retention, return, and engagement.

- **Retention, or the expansion of home country capacity:** Many large sending countries have begun to focus on expanding the capacity of their higher education systems to retain their students. Retention approaches and policies aim to provide sufficient and high-quality higher education seats to prevent high levels of student migration in the first place. This is the sort of recent expansion seen in both China and India with the rise of new public and private universities that aim to be world-class. However, the demand continues to outstrip supply (as evidenced by the large numbers of students from both countries that continue to go overseas), and a lack of regulation and quality continue to be issues.

- **Return, or initiatives to attract back foreign-trained talent:** In addition to retaining talent at home, countries are also offering incentives for their foreign-educated talent to return home. Han et al. (2015) identified 18 countries with programs designed to attract expatriates (see table on following page). Examples include China's Thousand Talents Plan, launched in 2008, and that provides incentives for Chinese scientists and other experts living abroad to return to China. To date, the plan has attracted over 7,000 individuals, including both Chinese expatriates and others (Jia, 2018). Additionally, in October 2018, 12 Shanghai-based universities launched a joint initiative to recruit professors from the U.S. (Sharma, 2018). According to a recent report, 432,500 students returned to China after graduating from overseas universities in 2016, up 36 percent from 2012 (Center for China and Globalization, 2018). The Indian government has also launched similar initiatives to attract back highly-trained Indians educated and residing overseas. Launched in 2015, the Global Initiative of Academic Networks (GIAN) in higher education, aims to tap the talent pool of scientists and entrepreneurs internationally to encourage their engagement with Indian institutions and to further develop India's scientific and technological capabilities in the global arena. Also designed to attract faculty is the Department of Science and Technology's Visiting Advanced Joint Research (VAJRA) faculty scheme[4] that enables non-resident Indians and the overseas scientific community to participate and contribute to research and development in India. Such initiatives are also based on the assumption that returnees can also influence peers and others to return, thus creating a wider network of returnees.

> **In Taiwan…this led to several distinct behaviors: initial returnees, who fostered an innovative environment; individuals in their networks who joined them and also recruited from their networks; and temporary returnees, who work in both Taiwan and the destination country and reinforce the links between them.**
>
> **Han et al., 2015**

- **Networks and engagement:** These strategies are based on the understanding that highly-educated and qualified individuals will choose their final destinations, yet can be engaged through diasporic networks and other initiatives that would ultimately benefit their home country and allow them to contribute, albeit from a distance. Examples of such strategies include the Singapore government's 21 project aimed at re-engaging the hearts and mind of Singaporeans abroad and developing a strong Singaporean identity and affiliation (Ziguras & Gribble, 2015). Other efforts can include initiatives by the philanthropic sector, such as the Carnegie Corporation's African Diaspora Fellowship Program that matches African-born academics living and working in the U.S. and Canada with African institutions in Ghana, Kenya, Nigeria, South Africa, Tanzania and Uganda.[5]

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[4] http://www.vajra-india.in/
[5] https://www.iie.org/programs/carnegie-african-diaspora-fellowship-program

Programs, by country, that promote the return of STEM talent back to their home country

Country	Program	Website	Program description
Argentina	R@ICES	www.raices.mincyt.gov.ar	A program under the Ministry of Science, Technology and Productive Innovation of Argentina. The goals of the program are to strengthen the link between Argentine researchers in the country and abroad, bring Argentines abroad back to Argentina to develop research, and implement retention policies that promote the return of Argentines.
Bavaria	Return to Bavaria	www.returntobavaria.com	Sponsored by the Bavarian Ministry of Economic Affairs and Media, Energy and Technology, the program was initiated in 2012 to motivate Bavarian and German professions to return home.
Brazil	Science Without Borders "Young Talent Program" (i.e., Jovens Talentos)	www.cienciasemfronteiras.gov.br	A joint effort from Brazil's Ministry of Education and the Ministry of Science and Technology, the program aims to (1) place 100,000 Brazilian students and researchers in top universities worldwide by 2014 and (2) to attract talented young researchers from outside the country, especially Brazilians, to Brazil.
Chile	Start-up Chile	startupchile.org	Program started by the Chilean government in 2010 to attract early stage entrepreneurs to build their startup companies in Chile.
China	1000 Talents Program	www.1000plan.org	Launched by the Central Organization Department of the Chinese Communist Party in 2008, the program aims to recruit 1000 outside Chinese talents to return to China.
Europe	Horizon 2020	ec.europa.eu	Commencing in 2014, Horizon 2020 is an initiative aimed at securing Europe's global competitiveness. There are many different programs (e.g., European Research Council Starting Grants, European Research Council Advanced Grants, Marie Sklodowska-Curie Actions Program, etc.) that facilitate the return of young European scientists back to Europe.
Germany	German Academic International Network (GAIN)	www.gain-network.org	Created by the Deutscher Akademischer Austausch Dienst (i.e., German Academic Exchange Service) in cooperation with the German Research Foundation and the Alexander von Humboldt Foundation, the program provides support, networking opportunities, workshops, and job postings for German scholars and scientists working in North America. GAIN promotes the dissemination of information across the Atlantic and prepares German scientists to return to Germany.
Israel	Gvahim	gvahim.org.il	Initiated in 2006, this non-governmental organization promotes Israel's "Brain Bain" efforts by offering highly-skilled Olim with opportunities and networking in Israel.
Italy	Dulbecco Telethon Institute	dti.telethon.it	Founded in 1999, the institute provides funding to early stage researchers who work on human genetic diseases.
Moldova	Gsorm Gala Studenilor	galastudentilor.md	Moldovan students abroad competed in the competition "Academic Excellence Moldova". The program encourages Moldovan students abroad to return to Moldova.
Portugal	Cienca 2007	www.fct.pt	An international call for 1000 post-doctoral research positions, both Portuguese and foreign nationals, at Portuguese scientific institutions. The program was launched and closed in 2007.
Russia	Mega Grant (i.e., Resolution No. 220)	www.p220.ru	Launched in 2010 by the Government of the Russian Federation, the program provides grants of up to $5 million USD to conduct research in Russia. The program hopes to bring Russian scientists residing abroad as well as foreign scientists to Russian institutions.
South Korea	Brain Return 500*	www.ibs.re.kr/en/careers/brainReturn.jsp	Established by the Institute for Basic Science, the goal of the program is to attract 500 talented young scholars and scientists back to South Korea by 2017.
Spain	Spanish Ramón y Cajal Program	www.mineco.gob.es	Funded by the Spanish Ministry of Economy and Competitiveness, the program provides financial support to PhD researchers for a period of five years.

(Continued)

Country	Program	Website	Program description
Sub-Saharan Africa	Homecoming Revolution	homecomingrevolution.com	Started in 2003, the goal of Homecoming Revolution is to bring highly skilled Africans back to their homelands.
Sweden	Study in Sweden Swedish Institute	www.studyinsweden.se	The institute is a public agency that provides grants to researchers around the world in order to establish cooperating and lasting relations with other countries. A variety of programs and grants are available depending on the applicant's nationality.
Thailand	Reverse Brain Drain (RBD)	www.nstda.or.th	The RBD initiative by Thailand's National Science and Technology Development Agency began in 1990. Initially, the primary goal of the initiative was to promote the permanent return of overseas Thai professionals. In 1997, the RBD's main objective shifted to the promotion of temporary returns of science and technology professionals. As of 2007, RBD promotes the brain circulation of Thai professionals overseas.

Source: https://journals.plos.org/plosone/article/file?id=10.1371/journal.pone.0118183&type=printable

What can receiving countries do?

Student mobility is primarily an individually-driven phenomenon, where individuals' needs and aspirations drive them to seek the best education possible, regardless of where it is offered. Nonetheless, examining brain drain raises the issue of international student recruitment policies and what obligations and responsibilities host countries in the Global North have when it comes to balancing their own needs to fill critical knowledge and skill gaps by attracting global talent, with the needs of developing countries to retain their valuable human capital. There are at least four ways in which this imbalance can be mitigated, both at a national policy level and at the institutional level:

- **Scholarships:** Scholarships provided by host countries have been an enduring mechanism for increasing access not only for students from poorer countries, but also for certain groups of marginalized and under-represented students within those countries. The provision of such scholarships to students from developing countries by the governments of developed countries is now being monitored under Target 4.b of the SDGs, but the current global estimate of the volume of such scholarships is a significant undercount since most developed countries providing such scholarships do not have in place the systems to report data on scholarship recipients (Bhandari & Yaya, 2017; UNESCO Global Education Monitoring Report, 2016, 2017). Despite these data limitations, a preliminary analysis of globally available government scholarship data reveals that the total number of such scholarships is small and serves only one percent of those from the developing world who seek a global education (Bhandari & Mirza, 2016). In some cases, government scholarship programs for students from the developing world are viewed as a form of development aid. However, although such scholarships provide international educational opportunities for students from low-income countries such as Africa, a complicating factor is that students who obtain them do not always return home, thus perpetuating the cycle of brain drain and global inequity. Yet other scholarship programs funded by private foundations such as the Ford Foundation and the Mastercard Foundation aim to provide international fellowships to marginalized individuals from developing countries and have been shown to have a significant impact on increasing access to international education.

- **Diversifying the international student pool through recruitment practices:** Institutions on their part can attempt to diversify not just the countries from which they recruit international students, but can also pay more attention to which students from sending countries are able to access mobility opportunities and whether host institutions can play a role in widening access. However, to begin with, there is very little known about the socioeconomic backgrounds of mobile students, as well as other factors such as urbanicity and parents' educational levels that are known to have an impact on students' educational plans as well as their access to information about their future options.

- **From mobility to exchange; sending more students abroad:** When major receiving countries begin to send more of their own students abroad to the countries from which they receive large numbers of students, it does begin to address in some small measure the educational exchange imbalance that currently exists between major sending and receiving countries. While it does not necessarily redress potential brain drain issues, it does result in a more mutual and two-way exchange of knowledge and talent, where sending countries in the Global South are not merely viewed as the "suppliers" of the world's mobile talent but rather as equal partners in a mutually beneficial exchange.

- **Encouraging networks and university partnerships:** More can be done at the institutional-level and at the national-level in major destination countries to foster networks and partnerships that enable their international students and immigrant faculty and diaspora to connect with their peers in their home countries. These sorts of global connections that enable the transfer and exchange of knowledge are already common in the STEM fields, where scientific progress and innovation relies on international collaborations. But there is room to expand such initiatives at the institutional and strategic level as part of campus-wide internationalization plans.

Against the backdrop of the recent optimism surrounding the growth of global student mobility, this report attempted to take a step back to deconstruct some of the current imbalances between sending and receiving countries, with a particular view to whether brain-drain persists. In addition to proposing solutions for both developing and developed countries, the report also reveals some key data gaps that remain and that need to be tackled in the future. For one, very little is known about the varied backgrounds of students who are able to participate in a mobility experience. Second, more concrete measurements are needed of which type of students leave their countries and how this impacts the future talent pools of both their home and host countries. Finally, given the reality that there will likely always be larger outflows of students and talent from the Global South, we need to develop more precise, meaningful, and nuanced measures of how skilled immigrants and diaspora communities continue to contribute to their home countries through fostering international collaborations and networks—multiplier effects that go beyond simplistic (albeit critical) financial measures such as remittances.

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