Overseas Education and Brain Drain: An Analysis of Indian Emigration to the United States

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Abstract

The purpose of this study is to discuss whether education is the gateway to permanent migration and brain drain, and the policy implications of the same. The data on the number of Indian students pursuing higher education in the United States and the number of Indians working in the United States over the period of 2010 to 2019, obtained from the American Community Survey (ACS) conducted by the United States Census Bureau, has been analysed using correlation, regression and time series analysis to understand the relationship between education and employment of Indians in the United States. Additionally, the employment and occupations data on Indians living in the United States is also studied to see if they find opportunities that align with the kind of education pursued. Our analysis finds a significant positive correlation between the two variables (r=.77). Further, Indians in college or graduate schools in the United States significantly predicted Indians employed in the United States (β = 9.636835671, p = 0.008636639). The fitted regression model is: Y = -348241.1901 + 9.636835671*X. It is concluded that the responsibility to mitigate the negative impact of brain drain should be shared by source and host countries.

Keywords: Migration, Brain Circulation, Education

Introduction:

Migrating to new lands to learn and earn is not a new phenomenon, and especially not for Indians. However, when this migration occurs at the cost of the migrant's own country, it is referred to as "brain drain". Coined by the Royal Society in 1963, the term "brain drain" referred to the migration of British Scientists to the United States of America (USA), severely hurting the British economy. In the Indian context, the term found relevance after

independence, when there was a marked increase in Indians going abroad to seek a better quality of life, rather than staying back and setting the foundation for their own economy (Verma, 2022).

India witnessed the sharpest rise in migration between 2000 and 2020 at nearly 10 million, and had the largest diaspora with 18 million people living outside their birth country with nearly 35 lakh people living in the United Arab Emirates, 27 lakhs in the USA, and 25 lakhs in Saudi Arabia (United Nations Department of Economic and Social Affairs, Population Division, 2021). In particular, a considerable number of High-Net-Worth Individuals (HNWIs) have begun to relocate abroad. Verma (2021) reported that, according to a 2018 Morgan Stanley bank estimate, 23,000 Indian millionaires have emigrated since 2014. More recently, research by the Global Wealth Migration Review found that approximately 7,000 millionaires, or 2% of India's total number of HNWIs, departed the country in 2019, costing billions in tax revenue.

However, keeping the monetary losses aside, the most important and adverse consequence of brain drain is losing out on the "brain" of these skilled migrants. According to research published in Clinical Orthopedics and Related Research, roughly 30% of physicians in England's National Health Service are of Indian heritage, and while there is only one doctor for every 2,400 Indians, there is one Indian doctor for every 1,325 Americans in the USA (Verma, 2022). Additionally, more than half of the top scorers on standard 10th and 12th board exams between 1996 and 2015 in India relocated abroad, mostly in the USA, and are currently working there (WION, 2021).

On the other hand, some argue that brain drain has a positive impact too. For example, transfer of remittances from people abroad can be a major source of revenue for a source country. Further, the skilled migrants may circulate among different countries, including their home countries, and bring back increased knowledge and investment opportunities. In fact, a reasonable amount of brain drain can be beneficial to a source country since it results in a greater number of educated workers. In other words, the prospect of emigrating encourages people in sending countries to pursue higher education. However, this advantage necessitates the retention of a certain amount of educated personnel. (Salmi & Salmi, 2017)

The USA, with its prestigious institutions and significant Indian diaspora, is a leading destination for Indian students. The US Department of State's Bureau of Educational and Cultural Affairs and the Institute of International Education (IIE) reported that the USA hosted more than 1 million international students for the fifth consecutive year in 2019-20 and the United States Department of Commerce said that international students contributed USD 44 billion to the USA economy in 2019, including USD 7.69 billion from Indian students (Press Trust of India, 2020). Students generally go to the USA to pursue courses in the fields of Science, Technology, Engineering and Mathematics, collectively known as STEM, and business

(RedSeer Strategy Consultants, 2021).

Since the United States has become a favoured destination for Indian students over the years, the objective is to see if there is a relationship between brain drain from India to the USA and the number of students going to study there, as well as discuss whether education is the gateway to permanent migration and brain drain, and policy implications of the same.

Literature Review

Choudaha (2017) studied the trends in international student mobility over 21 years, in three waves of seven years each. Here, a wave was defined by influential global events and trends as identified by the author. The first wave (1999-2006) witnessed students enrolling in fields connected to science, technology, and engineering at a higher rate with the majority of the students being master's and doctorate students who were interested in subjects where skill gaps existed so as to make a career in the destination country. The second wave (2006-2013) saw increased intake of foreign students in tertiary institutions across countries as they brought in greater revenue during a recession. Finally, the third wave (2013-2020) forecasts that while the USA is likely to remain the most popular choice despite growing anti-immigration sentiments, many new destinations, regional partnerships and modes of delivering higher education are likely to emerge.

Desai, Kapur and McHale (2001) conducted a thought experiment and estimated that the lost income tax revenues connected with Indian-born residents of the USA account for one-third of current Indian individual income tax receipts. Further, the net fiscal loss associated with the USA Indian-born resident population ranged from 0.24 percent to 0.58 percent of Indian GDP in 2001. They found a rapidly growing fiscal loss concentrated among Indian residents living overseas. In a broader context, this shows that while emigrants may make up a small percentage of the total population, their fiscal repercussions are significant, placing an even larger strain on governments attempting to build a fiscal base and convert from indirect to direct taxation. They also uncovered the following trends that are relevant to this discussion:

- Since 1990, the income distribution of Indian-born people has shifted significantly further to the right than that of native-born people and other foreign-born people, reflecting both higher inflows of highly educated Indians and their sectoral concentration in the growing high-tech sector.
- Given the costs of the process of granting H1-B visas, it was seen that the individuals selected from the engineering, medical and management professions/courses graduated from the most premiere institutions in India.

On the other hand, by using new data on emigration rates by education level, Beine, Docquier and Rapoport (2008) studied how positive and negative consequences of migration balance out. They studied the impact of skilled migration prospects on gross human

capital levels in 127 developing countries and discovered that doubling the highly skilled outflow rate causes a 5% growth in human capital formation among the native population (residents and emigrants together). On the contrary, brain drain appears to have negative consequences in nations when the highly educated migration rate exceeds 20% and/or the proportion of persons with a higher degree exceeds 5%. According to them, the major globalizers (China, India, and Brazil) all appear to be making significant gains. Thus, they concluded that the classic negative perspective of the brain drain has no scientific foundation at an aggregate level, as brain drain migration adds to an increase in the number of qualified people residing in developing nations.

An important question that comes up here then is whether education is responsible for permanent migration and "brain drain" from one country to another? Finn (2014) estimated the stay rate of foreign nationals as of 2011 who obtained doctorates from US universities in the fields of science and engineering. It was found that the combined five-year and ten-year stay rates for all foreign doctorate recipients, including those on permanent resident visas and temporary visas at graduation, were at an all-time high in 2011. Further, China and India accounted for nearly half (47 percent) of all science and engineering doctorates in 2006, up from 38 percent recorded two years ago. It's worth noting that Indians accounted for over 12.5 percent of temporary residents receiving science and engineering doctorates in the United States in 2006, with an 82 percent five-year stay rate for Indian temporary residents receiving science and engineering doctorates. It was also observed that doctorate holders in a few subjects (such as agricultural sciences, economics, and other social sciences) have significantly lower retention rates than those in other science and technical disciplines. Computer science has the greatest five-year stay rate, at 79 percent, and computer/electrical engineering has the second highest, at 77 percent.

RedSeer Strategy Consultants (2021) performed an online survey for two target groups - 300 international higher education aspirants/accepted/recent graduates and 100 non-aspirers/non admitted aspirants - and reported that better educational quality and outcomes abroad, higher living standards, gaps in the Indian education system and infrastructure, supply-demand asymmetry leading to intense competition for admissions, increased incomes in India leading to higher spending on higher education, and increased awareness about education abroad are driving the growth in Indian students opting for higher education from abroad. The Indian education system suffers from a scarcity of institutions that offer advanced and specialized courses such as Artificial Intelligence, Biotechnology, and others; a lack of institutional funding, particularly in research-oriented STEM courses; and a lack of educational flexibility in courses.

While factors like limitations in the domestic education system might push students to search for alternatives, what is it that attracts them to certain other education destinations? Toma and Villares-Varela (2019) investigated

the effect of migration policies on decisions about whether and where to relocate by drawing on an aspirations-capability framework for mobility of researchers, a highly skilled group that has been explicitly targeted by such policies. They spoke with 40 Indian researchers and discovered that destination countries' immigration regulations had little bearing on whether or not people studied there or took up jobs. In fact, many were unaware of the immigration laws in the countries they were considering, and instead placed greater emphasis on other criteria such as the institution's renown, career advancement chances, financial resources, and the influence of more senior colleagues and supervisors. However, migration regulations were thought to have a major influence in deciding whether or not to keep researchers in a specific job and/or nation. In other words, access to post-entry rights (in particular, permanency/citizenship rights) appears to determine not only the desire to stay, but also the ability to do so. Nevertheless, access to post-entry rights, desires, and capabilities to stay do not always correspond. For researchers who aspire to return home, move elsewhere, or engage in transnational academic pursuits, difficulties in obtaining permanent residence rights could (temporarily) fix them in a particular region, restricting their ability to leave and circulate.

Echoing the above discussion and findings on the threats posed by migration, Dodani and LaPorte (2005) discussed brain drain from developing countries to developed countries, the issues this higher education induced migration poses, and the mitigation strategies for the same. Egypt, India, Pakistan, the Philippines, and South Korea were recognised as nations that produced more physicians than they could absorb, and India, Pakistan, and Sri Lanka as the top "donor countries" by connecting the number of physicians per 10,000 people to GDP per capita. They suggested that developing countries, particularly in South Asia, lose out not only on their investment in training and educating healthcare professionals, but also on the contribution of these workers to their country's health care, which has a negative impact on the population's health.

Methodology

The data used in this study is secondary in nature. The major source of data is the American Community Survey (ACS) conducted by the United States Census Bureau, specifically the ACS 1-Year Estimates Selected Population Profiles for the years 2010 to 2019. The main data points used are the Indian population 3 years and over enrolled in college or graduate school (indicating the number of Indians completing higher studies from the USA) and the Indian civilian employed population 16 years and over (indicating the number of Indians working in the USA) over a period of ten years. The study also maps the composition of the employed Indian population over these ten years.

The United States has emerged as a favoured destination for Indian students over the years. The collected data was analysed using correlation, regression, and time series analysis

techniques with the objective to analyse if there is a relationship between brain drain from India to the USA and the number of students going to study there to find out if education is the gateway to brain drain from India to the United States. It also seeks to understand if Indians find employment in occupations that are related to the courses that are generally pursued there, which would further strengthen this hypothesis. Lastly, the study draws upon the analysis conducted as well as previous literature on the subject to discuss the policy action required to ensure brain drain from developing countries to developed countries is beneficial to all the parties involved, including the migrant.

Data Analysis

The data on the number of Indian students pursuing higher education in the USA and the number of Indians working in the USA over the period of 2010 to 2019, obtained from the American Community Survey (ACS) conducted by the United States Census Bureau, has been analysed using correlation, regression and time series analysis.

There has been a rather consistent increase in the number of students going to the USA for higher education and a subsequent parallel increase in the number of Indians employed abroad over the years. (Figure 1)

The Pearson correlation coefficient is computed to assess the linear relationship between the Indian civilian employed population (16 years and over) in the United States and the Indians in College or graduate schools in the United States. There is a significant positive correlation between the two variables, r=.77 (Table 1).

To further understand this relationship, simple linear regression is used to test if the Indians in College or graduate schools in the USA significantly predict the Indian civilians employed population (16 years and over) in the USA. The variables in the model are as follows:

- Dependent Variable (Y): Indian civilians employed in the USA
- Independent Variable (X): Indians in college or graduate schools in the USA

Multiple R is the correlation coefficient which, as discussed earlier, is positive and significant. The coefficient of determination, R Square, is also nearly 60% which indicates a significant goodness of fit. (Table 2)

The overall regression is statistically significant ($R2 = 0.60$, $F(1, 8) = 11.93$, $p = 0.008636639$). Since the p value is less than 0.05, the null hypothesis is rejected and the model is considered fit. (Table 3)

Thus, it is found that Indians in college or graduate schools in the USA significantly predicted Indians employed in the USA ($\beta = 9.636835671$, $p = 0.008636639$). The fitted regression model is:

$$\mathbf{Y = -348241.1901 + 9.636835671*X}$$

However, the p-value of intercept is approximately 52% which is very high and indicates that the Y intercept is not accurately predicted in the model. (Table 4)

Collegify, ForeignAdmits, Leverage Edu and Yocket are also among the foreign education platforms who reported that the majority of applicants from India are targeting STEM courses in the USA (Verma, 2021). In order to understand if students generally pursue a career in a stream which they go to study, the data showing composition of Indian workforce in the USA was studied.

Over the years, the largest portion of workers are found in management, business, science and arts occupations, with a slight but inconsistent increase over the years. While the number of people working in Science, Technology, Engineering and Mathematics (STEM) cannot be drawn conclusively, it should be noted that the occupations with the maximum share over the years include science. (Figure 2)

Additionally, the high stay-rates of foreign nationals, especially Indians, who obtained doctorates from US universities in the fields of science and engineering discussed in the above section indicate that students generally manage to find employment opportunities suitable to their education.

TABLES

Table 1: Correlation between employment and education of Indians in the USA

	Indian civilians employed (16 years and over) in the USA	Indians in college or graduate schools in the USA
Indian civilians employed (16 years and over) in the USA	1	
Indians in college or graduate schools in the USA	**0.773741102**	1

Table 2: Regression Statistics

Multiple R	0.773741102
R Square	**0.598675293**
Adjusted R Square	0.548509705
Standard Error	153429.3301
Observations	10

Table 3: Analysis of Variance

	Df	SS	MS	F	Significance F

Regression	1	2.80933E+11	2.80933E+11	11.9339833	**0.008636639**
Residual	8	1.88324E+11	23540559335		
Total	9	4.69257E+11			

Table 4: Regression Coefficients

	Coefficients	Standard Error	t- Stat	P-value
Intercept	-348241.1901	517997.6236	-0.67228337	0.520343433
Indians in college or graduate schools in the USA	9.636835671	2.789598754	3.454559784	**0.008636639**

FIGURES

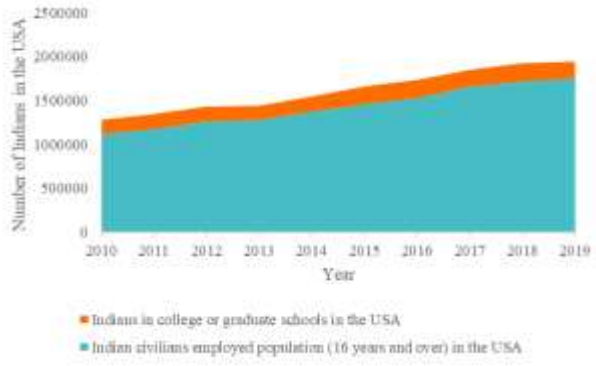

Figure 1: Trends in Overseas Education and Employment in the USA

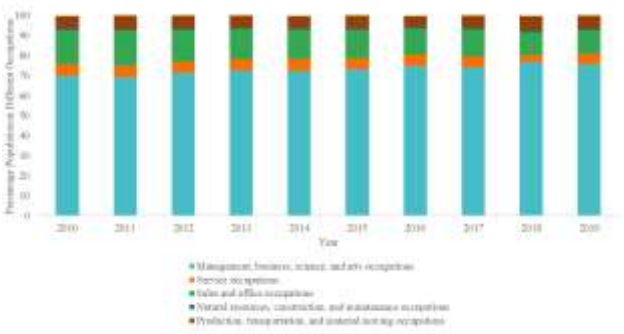

Figure 2: Composition of Indian Workforce in the USA

Policy Implications

In tandem with the education expenditure in developed countries like the USA, the National Education Policy (NEP) 1968 recommended spending 6% of the GDP on education. This recommendation has been reaffirmed by all the subsequent NEPs including NEP 2020. However, the fact that the share of public investment on education has largely remained constant at 3% of GDP as per the Economic Survey (2021-22) from 2014-15 to 2021-22 (PRS Legislative, 2022) is a good starting point for our discussion.

Having established that higher education is a prominent channel for permanent emigration, we must discuss the factors that influence an Indian student to apply abroad. As per an analysis by PRS Legislative (2022), higher education in India suffers from shortcomings such as limited intake of students in prestigious and financially viable government institutions, high number of open teaching positions across universities, and low percentage of GDP spent on research. Multiple constraints in both demand and supply of education, combined

with increasing incomes to spend on education, and greater awareness about the benefits of studying abroad, push students to pursue opportunities outside India.

There is a need to increase the size of the pie by creating more seats within existing institutions and setting up new institutions, keeping the quality of education as a central focus. The most recent and major policy development in education is the rollout and implementation of the National Education Policy, 2020. The policy envisions a multidisciplinary, comprehensive undergraduate education with flexible curriculum, unique subject combinations, vocational education integration, and different entry and exit points with proper certification. It aims to "transform India into a vibrant knowledge society and global knowledge superpower by making both school and college education more holistic, flexible, multidisciplinary, [and] suited to 21st century needs" (PIB Delhi, 2020).

This can potentially go a long way in reducing education related migration and hence, brain drain. However, a complete overhaul of the existing education system of a country is a mammoth task and will take a long time to actualise, and an even longer time to become effective. Thus, this is a long-term measure. More importantly, this puts the entire onus of mitigating brain drain on the developing country.

It should be noted that brain drain has certain positive results as well. In addition to increasing foreign remittances and pushing more people in developing countries to pursue higher education, it allows skilled individuals to lead their best lives and realize their full potential, and thus contribute effectively to their respective fields.

However, with the way things are functioning currently, there seems to be a striking similarity between students pursuing higher education abroad and finding employment there, and a colonizer purchasing raw materials at cheap rates from their colonies and developing and utilizing the final product for their own benefit. This must not be allowed to prevail and the source countries, especially developing countries, should be compensated for their financial and human resource losses, in terms of both monetary and development benefits. Some strategies to ensure the same are:

- Entering into agreements with host countries which enable people to come back and contribute to their country of origin, while keeping the door open to the host countries where they studied and subsequently worked.
- Building travel corridors between source and host countries, especially if the former is a developing country and the latter is a developed country, to enable easy access to international experts.
- Formalizing the transfer of remittances, such as salaries of professionals employed abroad, from host countries to source countries, so as to invest them in the development of the source

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- Developing partnerships and collaborative training models so that emigrated professionals can transfer their wisdom and knowledge to their home countries and contribute to their advancement.
- Setting up an organization along the lines of the World Trade Organization which regulates the movement of people from one country to another and ensures that none of the parties are at a disadvantage due to loss of human capital.
- Creating programmes which promote overseas education among students in a country with the condition to come back and utilize the education towards development of their home countries.
- Strengthening regional integration among developing countries so that all of them can pool their capabilities, train talent and circulate it among each other to aid their collective development.

Conclusion

Consistent with previous research undertaken on this topic, our analysis proves that there is a strong relationship between pursuing higher education overseas and permanent migration of people from their home countries. Our analysis finds a significant positive correlation between the two variables (r=.77). Further, Indians in college or graduate schools in the USA significantly predicted Indians employed in the USA (β = 9.636835671, p = 0.008636639). The fitted regression model is: Y = -348241.1901 + 9.636835671*X.

Brain drain can lead to severe consequences for source countries, especially if they are developing, as there is a loss of talent which can contribute towards building the foundation of the country, as well as loss of revenue which could have been diverted towards development projects. That being said, it has certain positive results as well, such as increased foreign remittances for source countries and efficient development and utilisation of human capital. However, all the countries involved would benefit from such migration only if they agree to share resources, capabilities and results.

Globalization has opened several avenues for movement of people from one country to another which makes many individuals better off as they have multiple opportunities to move, grow and realize their full potential. Certain checks and balances are required to ensure that, while individuals realize their full potential, developing countries don't lag behind due to lack of talented people. Only when we move from brain drain to brain circulation will the entire global economy be better off and globalization will be considered successful.

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