In: International Migration
Editor: Elizabeth J. Stephens

ISBN: 978-1-63485-029-2

Chapter 5

WHY ONE STAYS? WHY ONE RETURNS? INDIAN IMMIGRANT ENGINEERS AND SCIENTISTS IN THE UNITED STATES

Meghna Sabharwal and Roli Varma[*]
University of Texas at Dallas,
University of New Mexico, New Mexico, US

ABSTRACT

Why some Indian engineers and scientists leave the U.S. to return to India whereas some continue to stay in the U.S.? Data for this study come from two sets of in-depth interviews: 83 engineers and scientists who returned to India to join academic institutions after study and work in the U.S., and 51 Indian immigrant engineers and scientists who are working in research universities across the U.S. It analyzes the complex dynamic between return and stay which Indian immigrants face in the U.S. Both situations appear to be complex, usually driven by a mixture of professional, economic, political and social factors. Findings show that better career prospects in India combined with immigration challenges in the U.S. and cultural and family ties in India are the key factors that prompted return. In contrast, Indian engineers and scientists chose to stay in the U.S. mostly due to the research opportunities, favorable work environments, career prospects and lifestyle preferences available in the

[*] Corresponding author: MSC053100, School of Public Administration, University of New Mexico, Albuquerque, NM 87131, Email: Varma@unm.edu.

U.S. This study expands understanding of high skilled migration in a globalized and interconnected world. Theoretically, it expands the models of brain drain and reverse brain drain.

Keywords: return migration, reverse brain drain, skilled migration

INTRODUCTION

The immigration of engineers and scientists from developing to developed countries has been referred to as "brain drain" (Gaillard 1991). The word "brain" refers to departure of both, the students whose brain is being trained and the professionals whose brain is already trained. The word "drain" refers to the loss of such people from developing countries to developed countries. The brain drain model sees migration from developing to developed countries as a unidirectional movement. It has identified various economic, social and political push-and-pull factors that prompt migration from developing to developed countries (Borjas 1994; Massey et al. 1994; Beine, Docquier and Rapoport 2001). Benefits to developed countries with migration have been referred as their "brain gain."

In the past, immigrant engineers and scientists from developing countries rarely returned to their country of birth. Increasingly, engineers and scientists from some developing countries are moving back to their home country after obtaining education and work experience in developed countries. This phenomenon has been referred as "brain circulation" (Saxenian 2005) or "reverse brain drain" (Wadhwa 2010). It has been proposed that engineers and scientists are returning back to their home country due to immigration challenges (Wadhwa and Salkever 2012). Advantages to developing countries with reverse migration have been referred as their "brain gain."

This chapter presents dynamics between two interrelated occurrences, which are taking place: (i) immigration of engineers and scientists from developing countries to developed countries, and (ii) return migration of engineers and scientists from developed countries to developing countries. It presents a case study of Indian immigrant engineers and scientists in the United States. The U.S. science and engineering (S&E) workforce heavily relies on immigrants. In 2012, of the 5.4 million engineers and scientists in the U.S., 27% were foreign-born. India accounted for 19% of the foreign-born holders of advanced S&E degrees with 13% of those holding doctorates

(National Science Board 2014). India is one of the leading countries of origin among immigrants in S&E in the U.S.

Historically, Indian engineers and scientists have viewed themselves as sojourners who are to acquire an education, get training, enhance their careers, or accumulate wealth which they will use to fulfill their goals back in India (Varma 2006, 2007). But most have stayed in the U.S. and this chapter presents why this is the case. Increasingly, many Indian engineers and scientists are moving back to India after having spent a number of years in the U.S. Finn (2012) has shown that the number of India-born PhDs in S&E who stay in the U.S. has dropped, from 85% in 2005 to 79% in 2009. Their re-migration is taking place despite more favorable conditions in the U.S. than in India, and this chapter outlines why this is happening now. The chapter is based on empirical data collected by the authors, which is elaborated in the methodology section.

REVIEW OF LITERATURE

With changes in the immigration policies since 1965, the U.S. has been the top importer of engineers and scientists from developing countries especially from Asia. The push-pull model is the most popular explanation of international migration from developing to developed countries (Portes 1987). Scholars working within their own respective disciplines have emphasized a number of push-pull factors that make engineers and scientists to migrate from developing to developed countries. Typically, push factors prevalent in developing countries tend to be totalitarian governments, low wages, fewer job opportunities, bureaucratic organizational structure and little social prestige; in contrast, pull factors prevalent in developed countries tend to be representative governments, high wages, abundant job opportunities, streamlined organizational structure and high social standing.

Within push-pull model, economic explanations tend to dominate much of scholarly thinking on international migration. Neoclassical theory holds that people from developing to developed countries migrate to maximize their personal income. They move if the expected benefits of immigration exceed the perceived costs. It, therefore, shows differentials in wages and employment conditions between developed and developing countries (Sjaastad 1962; Todaro 1969; Borjas 1989). Neoclassical theorists claim that in the long run, the incentives for migration will diminish because international labor

migration will raise wages in the developing countries (due to shortage of labor) and lower wages in the developed countries (due to increase in labor).

Labor market theory links international immigration to the structural requirements of industrial economy in developed countries. It shows inadequate supply of labor in developed countries because of which companies recruit labor from developing countries (Piore 1979). In other words, people from developing countries do not migrate on their own; instead, companies recruit them to perform jobs. Unskilled labor is recruited because the native workers will not perform such work; skilled labor is recruited since developed countries are experiencing labor shortage in key areas (Khadria 1999). Developing countries are seen as a cheap source of labor for developed countries.

The dependency school characterizes labor mobility from developing to developed countries as a natural outcome of capitalist development and market penetration (Wallerstein 1980). It divides the world into small number of developed countries making a core and large number of developing countries making a periphery. Economic surplus is extracted by core from the periphery in international trade, which leads to the capitalist development of core and underdevelopment of periphery. This unequal economic core-periphery dynamic creates incentive for international migration from periphery to core.

Critics, however, have argued that the economic reasons alone are not the root cause of international migration. They acknowledge that some developing countries do experience sizable migration; however, they also show that others experiencing worse economic conditions do not (Arango 2004). Political factors such as changes in immigration laws and national security considerations are equally important in international migration. Furthermore, social networks are seen as an important factor in international migration. Social network scholars discuss interpersonal ties that connect immigrants with nonimmigrants. They propose that such ties facilitate migration by providing necessary information about legal matters, living and work (Portes 1995). They further show how immigration of one person creates an information feedback loop for others hoping to migrate (Boyd 1989). Economically, social networks reduce the costs and risks associated with migration (Appleyard 1992). It is, therefore, no surprise that migration tend to take to areas where a social network is functional. Though social network theory incorporates non-economic factors as important variables in international migration, it does not include external factors that may lead to migration. Also, not all social networks are playing positive roles (e.g., human trafficking).

Most importantly, these theories view migration as a one-way movement of people from developing to developed countries. In the last two decades, however, return migration has been increasing (Cassarino 2004). Like international migration from developing to developed countries, scholars explain return migration on economic ground. The disappointment theory suggests that migrants return to their countries of birth due to being unsuccessful in achieving their goals in the emigrating countries (Borjas and Bratsberg 1996). The target income theory, on the other hand, proposes that people emigrate from developing countries to acquire wealth in developed countries; after they achieve their target, they return home (Massey 1990). It is proposed that the recent economic downturn among the leading economies of the world has prompted reverse brain drain (Docquier and Rapoport 2012). Non-economic reasons for return migration tend to be social, namely family-related issues and lack of assimilation in the host country (Alba and Nee 2003). Political factors behind return migration tend to be non-renewal of visas, delay in granting permanent immigration and deportation (Wadhwa 2010). In other words, people are forced to return to their home countries by immigration policies prevalent in developed countries.

Such explanations of reverse migration, however, consist of isolated factors; scholars do not link various economic, social and political factors. It is the case that some people from developing countries are returning home, but many continue to stay in developed countries. Scholars on return migration do not address why some are leaving and not others. Also, it is not clear that people are returning because of failed migration experience; in fact, return may be because of successful migration experience. Most importantly, return migration is not an end in itself in the era of globalization and information technology. Transnational migration scholars show a process by which immigrants construct and maintain social relations that link together developing and developed countries without bodily movement of migrants (Schiller, Basch and Blanc 1995). Accordingly, the spaces migrants occupy are so widespread that information exchange and social interaction take place without physically crossing the borders (Levitt and Jaworsky 2007).

Furthermore, one-way migration and two-ways migration theories do not make a distinction between skilled and unskilled/manual migrations. They assume that the immigration of engineers and scientists is a part of the greater international immigration of all categories of people/labor. According to these theories, many factors that make manual workers, semi-skilled people and agricultural laborers to leave developing countries in the first place and later return to their home countries also pertain to engineers and scientists.

However, it should be noted that though there are some similarities between the immigration of all types of labor and that of engineers and scientists; but there are important differences between the two groups. Immigration of engineers and scientists from developing countries has been characterized as brain drain, and their return migration has been characterized as reverse brain drain experienced by developed countries. Yet, there are very few systematic empirical studies, which present both brain drain and reverse brain drain of engineers and scientists.

METHODS

Data for this paper comes from a National Science Foundation (NSF) funded study on the return migration of engineers and scientists from the U.S. to India. In 2013, a qualitative study was carried out with two groups of Indian immigrants in S&E. The first group included 51 Indian immigrant faculty, who decided to stay and work in the U.S. after finishing their study. They were employed in 18 universities, identified as doctorate-granting institutions with very high research activity. Their selection was balanced for geographical locations with the highest Indian population. The second group included 83 Indian immigrant faculty, who decided to return to India after study and work in the U.S. They were employed in 14 prestigious institutions of higher education in seven states. Their selection was to have a balanced geographic mix. The total sample size for this study, therefore, is 134 subjects from 32 institutions. The names of the subjects and/or institutions are not provided to comply with the Institutional Review Board's (IRB) requirements for anonymity.

The first group of 51 Indian immigrants (hereafter referred as stayed) took faculty positions after finishing their studies. Most stayed participants (78%) were employed by public institutions, and the rest (22%) worked for private institutions. The majority (78.5%) worked in an engineering department: aerospace, civil, computer, electrical, environmental or mechanical; the remaining (21.5%) worked in biology, chemistry and physics departments. An occupational ranking of stayed subjects showed that nearly half them were full professors (47%), followed by assistant professors (27.5%) and associate professors (25.5%). The mean number of years the stayed subjects lived in the U.S. was 23 years, while the mean number of years that they had been in academia was 15.5 years. A majority of them were somewhat young; 33%

were in the 30 to 39 age group and 31% were age 40 to 49. About one fourth (22%) were in the 50 to 59 age group, and the rest (14%) were age 60 and above. A large number of them (86%) reported being married and most of the married stayed subjects (73%) had children. All but three of them were male.

The second group of 83 Indian immigrants (hereafter referred as returnee) moved back to India after work in the U.S. All but three returnees received a Ph.D. from a U.S. institution in science or engineering. Majority (75%) of the returnees were employed at public institutions, while the remaining worked at private institutions (25%). Close to half of them (44.2%) were under 40 years of age, while 30% of the were in the age group 40-49, close to 20% belonged to age group ranging from 50 to 59 and a mere 6.5% were 60 years and beyond. About one-third of the returnees were full professors (32%), approximately one-fifth were associate professors (22%) and almost half of them were assistant professors (46%). Nearly 55% of them were working in various engineering departments: aerospace, civil, computer, electrical, environmental or mechanical, while the remaining worked in biology, chemistry and physics departments. Almost all of them were married (96%) and about three-fourths (73%) had children. When living in the U.S., a large majority of the returnees (82%) were on temporary visa and the remaining (18%) had permanent residency card including one was a U.S. citizen. On average, these returnees spent 9.5 years in the U.S. before they decided to leave and were in India for more than five years post return (average of 9.3 years). On average these returnees have spent over 13 years in academia. Overwhelming majority of them were male (84%).

A semi-structured interview guide was used to conduct in-depth interviews with both groups of subjects, which lasted anywhere from an hour to two hours. Of the 40 questions (excluding demographic questions) asked in the interview, five questions pertained to migration to the U.S. from India, and another five questions dealt with return migration from the U.S. to India. These 10 questions, therefore, formed the basis for this chapter. The interviews were recorded, transcribed and inserted in NVivo for analysis. Two independent coders coded the data. Typically subjects gave multiple responses, which were categorized by concepts that allowed us to identify patterns within the entire text. In this chapter, findings are reported with frequency to show the strength of concepts; due to space limit, interview excerpts are not included. Also, gender is not taken into analysis because of low number of female participants in both groups.

FINDINGS

Why Leave India for the United States?

Both stayed and returnee participants were asked to identify the primary reasons to come to the United States. They were further asked why the U.S. and not another destination. Their responses show that there was no difference between stayed and returnee participants to come to the U.S. An overwhelming majority of them (92%) came to the U.S. for higher studies. After finishing their bachelor's in India, they sought to pursue either a doctorate or Master's leading to a PhD in the U.S. Only one returnee went to the U.S. to acquire a bachelor's degree and continued with a Master's and doctorate.

The participants selected the U.S. for higher education for multiple reasons. Most of them thought that the U.S. was the best place for graduate studies. They mentioned exciting research at the doctorate level, excellent master level education, advanced technology, up-dated laboratories, mentorship and flexibility in the U.S. Some even mentioned that when they were students, the trend was that the best students went to the U.S. for higher studies, so there was no reason for them to consider any other country. Also, a handful of them believed that socially the U.S. was an open society compared with India. The best way for them to accomplish their social goals was through education. So, they applied for higher studies and moved to the U.S. Their bachelors and/or master's training in India followed the western knowledge in S&E because of which they could apply for admission to universities in the U.S. Most importantly, their admission in the U.S. universities was backed by financial support; if they did not have fellowships to pursue education in the U.S., it would have been difficult for them to go there.

A few participants (8%) came to the U.S. for attaining research/work experience; three of them came as post-doctoral fellows after finishing their doctorates in India whereas two came to work after attaining their masters in India and once in the U.S., they decided to attain doctorates after working for some time. For these participants, it was important to experience life/work outside India. They viewed that the U.S. has an innovative research/work environment and comfortable living style, and believed the working environment in India available to them was constrained and inflexible.

Why Stay in the USA? Why Leave the USA?

Participants who stayed in the U.S. were asked to describe the primary reasons to stay in the U.S. They were further asked to rank those reasons. Similarly, participants who returned to India were asked to identify the primary reasons to move back to India as well as to rank their reasons. Typically, participants contrasted their reasons to stay in or leave the U.S. with conditions in India.

Almost half of the stayed participants (44%) identified prospects for research as the major reason to stay in the U.S., which included front-line research, up-to-date technical resources, instant flow of technical information, effective administrative support for research, good graduate students and a sizable scientific community. They discussed the kind of research they wanted to do could not be done in India mostly because of the lack of sophisticated technical equipment. Some participants emphasized human resources that were accessible to them in the U.S. as compared to India. Typically they liked having good quality graduate students in the U.S., whom they train for research, which in turn enhances their own research. Some explained the importance of having critical mass of researchers available to them in the US to generate scientific knowledge, which was unlike India. Quality of research in India was certainly an issue for some. There was a general agreement among stayed participants that the U.S. is the best place for research.

About one-third of the stayed participants (33%) identified the existence of an intellectually stimulating work environment in the U.S. as their main reason to stay. These participants did not have a positive feel of the overall work environment in India primarily due to its hierarchical value system and bureaucratic red tape. In contrast, they viewed the overall work environment in the U.S. as positive and egalitarian with streamlined administrative structure. Because they are involved in brainstorming and creativity, positive work environment was considered a necessity.

For some stayed participants (16%), career goals were the main motivation to stay in the U.S. Some tied their career goals to physical needs such as high income and tenured job. Others tied their career goals to professional needs such as academic productivity and reputation among peers. They believed they had worked hard to get where they were and wanted their careers to grow further without being constrained by India's compulsory retirement policy.

Finally, some stayed participants (14%) chose to stay in the U.S. for personal reasons, namely family and social values. Most of them now have spouses and their children were accustomed to living in the U.S.; they thought it would be hard for family to adjust in India. Some described India's rigid social value system that would not welcome their social life styles.

In contrast to stayed participants, almost half of returnees (44%) moved to India for better career prospects than what they had in the U.S. on multiple indicators. First, most returnees talked about Indian economy, which was changing rapidly for better. They explained that after the implementation of economic liberalization policies in early 1990s and opening borders to foreign investments, Indian economy has gained momentum. S&E infrastructure has been growing, which has increased employment opportunities for engineers and scientists returning from abroad. Second, several returnees acknowledged that the American research universities are vital centers for the research performance. Yet, they did not like chasing the external funds in the U.S. to support their research. They complained that instead of American universities providing support for faculty research (e.g., graduate students, laboratory equipment, travel for conferences, and office supplies), they require faculty to get these by securing external grants, which has become rather competitive. In contrast, they believed Indian universities provided necessary financial support for faculty to conduct research. The pressure to succeed in research by securing external grants is not intense in India. Third, returnees believed there is more flexibility in type of research they can engage in India than in the U.S. They explained that the support for theoretical curiosity-driven research in American universities is declining by lack of funding for such research, and there is more push to support applied research. In contrast, Indian universities do not place priority over basic or applied research. Consequently, the returnees are able to engage in theoretical fundamental research. Their research is appreciated purely on merit rather than by external funding. Fourth, some returnees believed that India offered better job security than the U.S. In the U.S., tenure is the main path for job security. The tenure system allows faculty members a period of six years to establish a funding and publication records to become tenured. If they do not get tenure at a given institution, their academic career is over in the sense they cannot move to another comparable university. In contrast, permanent faculty positions are increasing in Indian universities. Most importantly, the probationary period to become permanent is one to three years long, and research productivity is not related to time. In India, they can take their own time to build their research output to move up to associate professor from assistant professor without being fired. Fifth, some

returnees believed that in the U.S. they were contributing more, but getting less in return since salaries were not keeping up with the inflation. In contrast, salaries for faculty in India have gone up relatively speaking but not in absolute terms. Finally, a few returnees pointed out that the transition from industry to a tenure-track academic appointment is not welcomed in the U.S.; in contrast, moving from industry to academia and vice versa is much easier in India.

About one-third returnees (30%) moved to India for social and cultural reasons. For some, social and cultural identity with the Indian society was very important. They had a kinship to Indian culture and life style. They wanted to bring-up their children in Indian set up and expose them to the Indian heritage. Some of them stated that their spouses wanted to move back because they preferred Indian society over American society. Despite living in the U.S. for many years, their spouses held on to their Indian identity. A few moved to India to fulfill their family obligations, namely caring for aging or ailing parents or family in India wanted them to return. They explained that in their culture they are supposed to think first about the family before considering what is good for themselves.

Finally, about one-fourth of returnees (26%) moved back to India due to the U.S. immigration related problems. They felt unwelcomed in the U.S. due to immigration processing time, spouses' inability to work in the U.S. due to the visa given to them, and failure to bring family members. Some returnees had temporary work visa (H-1B) in the U.S. and conversion to this into permanent resident visa was a time consuming process. If they were married, their spouses held H-4 visa, which allowed them to stay in the U.S. as a dependent; but it did not allow them to work. A few returnees did not like the U.S. immigration system since it did not allow them to bring their immediate family members, namely parents to the U.S. in timely fashion.

Is Immigration to the U.S or Return to India Permanent?

To find out whether their stay in the U.S. is permanent, stayed participants were asked if they had any plans to return to India to work/live in the near future. Similarly, to find out whether their decision to return to India is permanent, returnees were asked whether they would like to move back to the U.S.

Over half of the stayed participants (57%) did not want to return to India permanently. They were satisfied with their work and life; conversely, they

were not optimistic about work and life in India. Interestingly, they felt that there was no need for them to move back to India permanently since they go there regularly. They often combine personal visits with professional visits by attending conferences and workshops, and giving talks at Indian institutes or universities. Some even have collaborative projects with their peers in India. Some of them had a desire to work in India for a short duration, but not to move back permanently. Not everyone had firm plans to stay in the U.S. Over one-fourth of them (27%) were undecided and another one-sixth (16%) had no plan to return to India at the time of interview, but were open to the idea. Some stayed participants could see themselves returning to India if offered a suitable job. However, they were not actively looking for positions in India. Other could see themselves returning at some point for personal reasons. They were in constant touch with people in India, and regularly took personal and professional trips there.

Similarly, majority of returnees (79%) were not considering to return to the U.S. or any other country. They were satisfied with their work and life in India. They conveyed a bond to India and a reluctance to leave permanently, albeit some were willing to entertain the notion of leaving India temporarily as a visiting faculty or to work on a collaborative research project. These returnees believed they were settled in India and did not want to start a new life all over again. They were committed to their work and family in India. Some felt satisfied by making a contribution to India with their work. About one-fifth of returnees (21%) expressed their desire to move to the U.S. if they were offered good jobs with immigration opportunities. Most of these returnees were not thinking of returning to U.S. at the time of the interview, but were willing to think about it. Only a handful of them were dissatisfied with their life in India and believed they will be more productive in the U.S.

DISCUSSION

Why do students from recognized Indian institutions of higher education come to the U.S., take a job after graduation, and continue to stay permanently there? Why do Indian engineers and scientists return to India after study and work in the U.S.? The international migration and return migration theories reviewed in this paper are limited in providing answers to these questions. These theories center on the migration and return migration of manual and low-skilled laborers and do not differentiate among labor types. As this study

has shown, the migration and remigration of engineers and scientists cannot be taken as similar to manual and low-skilled laborers.

Most migration and return migration theories are centered on economic determinism. They see salary differentials as the major motivation for people to move from developing to developed countries. Similarly, disappointment with not earning wages as expected in developed countries motivates people to return home. Salary differentials may dictate the migration and return migration of manual and low-skilled workers, but this does not apply to engineers and scientists. This study has shown that both stayed and returned participants, as students, did not come to the U.S. to flee from poor or substandard life-style in India and attain economically prosperous one in the U.S. Instead, they went to the U.S. to attain higher education. They chose to earn doctorates in the U.S. to be innovative and creative. The U.S. universities financially supported them; yet, making money was not their main objective. When stayed participants decided to take a job in the U.S., only a small number of them considered salary differential between the U.S and India. They pointed out research opportunities available in the U.S. than in India as the main reason to stay. They wanted to do research, improve their technical skills and solve scientific problems; making money was not their main ambition. Similarly, returnees did not strategize to get an academic position by coming to the U.S.; instead, they took academic positions after attaining their degrees. They returned to India in spite of having a job in the U.S. Further, they returned to India in spite of earning higher salaries in the U.S. This study, therefore, shows limitation of the migration and return migration theories by not separating labor types.

When scholars have focused on skilled labor, they have shown how technology companies are aggressively hiring short-term skilled workers due to the labor shortage in the developed countries and the availability of such labor in developing countries. This may be the case with skilled labor holding bachelors' and master's degrees in developing countries recruited to work in technology companies in developed countries. However, this is not applicable to engineers and scientists holding doctorates and working in institutions of higher education. As this study has shown stayed participants and returnees were not actively recruited by the institutions of higher education as a cheap source of labor in the U.S. and India, respectively. Instead, after earning their doctorates, stayed and returned participants applied for faculty positions and were hired from a pool of candidates.

Social network scholars emphasize the importance of non-economic factors in migration and return migration decisions. Knowing people in

developed countries may be an important factor in international immigration of manual and low-skilled labor as well as temporary skilled labor. However, social networks are not the core reason of students arriving to the U.S. to study. As this paper has shown stayed and returned participants Indian came to the U.S. as students to study in the best institutions; they did not come because they knew someone.

It is also the case that after being employed as faculty in the U.S., many stayed participants expressed dissatisfaction with the work environments and social norms in India. They believed that the work especially research prospects are better in the U.S. than in India. They noted existence of quality research, high academic productivity, critical mass of researchers, up-to-date technology, competent graduate students, and streamlined administration in the U.S. compared with in India. However, they did not leave India to overcome various problems in India with the expectation of better conditions in the U.S.; instead, they took the faculty position, which was the normal course of action after attaining doctorates. In contrast, many returnees found better opportunities for building their careers in India such as ample funds, ease in obtaining grants, less pressure to compete for research funding, ability to pursue fundamental basic research and freedom from funding agencies to pursue their research agenda. Returnees recognized that though research prospects have improved in India, they were not comparable to the U.S. Similarly, despite the fact that salaries have gone up in India, they were low to what they were getting in the U.S. These engineers and scientists returned to India despite low salaries and challenges in work environment. This study, therefore, does not find support for the push-pull model.

Social factors continue to play an important motivation in return migration and migration. Almost one-third of returnees in this study returned to India for their social/cultural identity and family reunification. Similarly, one-fifth of stayed participants chose to remain in the U.S. because their family was accustomed to living in the U.S. This study, therefore, expands the social network theory, which highlights the engagement of family in international migration decisions.

The findings of this study do not support the claim that the U.S. is experiencing reverse brain drain due to its immigration policies. This may be the case in the industrial sector, but not in the academic sector. Only one-fourth of returnees in this study moved back to India due to immigration problems. They did not have any problem in getting work visas in the U.S. though they were somewhat discouraged with the rigid administrative procedures. Their problems centered on spouses who were not allowed to

work in the U.S. and family members who were not allowed to come to the U.S.

At the first glance, international migration of stayed participants appears to be one-way migration and return migration of returnees as two-ways migration. This is a physical movement of people from one country to other. However, stayed participants and returnees are mentally connected to India and the U.S., respectively. As this study has shown that some stayed participants in the U.S. maintain relationships with researchers in India through periodic visits, conferences, department talks and collaborative projects. Similarly, some returnees in India travel to the U.S. to attend conferences and work on joint research projects. Through this process, stayed and returned participants are being connected with the S&E community in India and in the U.S., respectively. In other words, the physical separation of stayed and returned participants does not prevent them from being connected with each other in some way. This shows a new global reality where the borders containing engineers and scientists are beyond the control of any country. This study, therefore, shows a support for the transnationalism perspective.

CONCLUSION

This is the first systematic study to investigate the reasons why engineers and scientists of Indian origin who come to the U.S. to seek higher education and/or work decide to stay in the U.S. or return after living and working in the U.S. Most studies on Indian engineers and scientists have focused on the brain drain, a few on the reverse brain drain; this study has focused on both, brain drain and reverse brain return. The results of the study show that Indian engineers and scientists are staying in the U.S. due to the research opportunities, favorable work environments, career prospects and lifestyle preferences, which are not available in India. Interestingly, some Indian engineers and scientists are moving back home due to increasing career and growth opportunities in India, improved funding, job security, family and cultural ties, and cumbersome immigration policies in the U.S. In other words, economic, political and social factors prevalent in both countries shed light on international migration and return migration.

ACKNOWLEDGMENTS

This work was supported by the National Science Foundation (Grants 1230091 and 1229990). We would like to thank all participants who gave their valuable time.

REFERENCES

Appleyard, R. T. (1992). Migration and development: An unresolved relationship. *International Migration, 30*(3/4), 251–266.

Arango, J. (2004). Theories of international migration. In D. Joly (Ed.) in *International Migration and the New Millennium,* (pp. 15–35). Aldershot: Ashgate.

Alba, R. and Nee, V. (2003). *Remaking the American mainstream.* Cambridge: Harvard University Press.

Beine, M., Docquier, F. and Rapoport, H. (2001). Brain drain and economic growth: Theory and evidence. *Journal of Development Economics, 64,* 275–289.

Borjas, G. J. (1989). Economic theory and international migration. *International Migration Review, 23*(3), 457-485.

Borjas, G. J. (1994). The economics of immigration. *Journal of Economic Literature, 32*(4), 1667–1717.

Borjas, G. J. and Bratsberg, B. (1996). Who leaves? The outmigration of the foreign-born. *Review of Economics and Statistics, 78*(1), 165-176.

Boyd, M. (1989). Family and personal networks in international immigration: Recent developments and new agendas. *International Immigration Review, 23*(3), 638–670.

Cassarino, J. P. (2004). Theorising return migration: The conceptual approach to return migration revisited. *International Journal on Multicultural Societies, 6*(2), 253–279.

Docquier, F. and Rapoport, H. (2012). Globalization, brain drain and development. *Journal of Economic Literature, 50*(3), 681–730.

Finn, M. G. (2014). *Stay Rates of Foreign Doctorate Recipients from U.S. Universities, 2011.* Oak Ridge: Oak Ridge Institute for Science and Education.

Fischer, K. (2011, February 22). American universities have major stake in immigration reform, speaker says. *The Chronicle of Higher Education*. http://chronicle.com/article/American-Universities-Have/126474/.

Gaillard, J. (1991). *Scientists in the Third World*. Lexington: Kentucky University Press.

Khadria, B. (1999). *The Immigration of Knowledge Workers*. New Delhi: Sage Publications.

Levitt, P. and Jaworsky, B. N. (2007). Transnational migration studies: Past developments and future trends. *Annual Review of Sociology*, *33*(1), 129–156.

Massey, D. S. (1990). Social structure, household strategies, and the cumulative causation of migration. *Population Index*, *56*(1), 3–26.

Massey, D. S., Arango, J., Hugo, G., Kouaouci, A., Pellegrino, A. and Taylor, E. (1994). An evaluation of international immigration theory: The North American case. *Population and Development Review*, *20*(4), 699–752.

National Science Board. (2014). *Science and Engineering Indicators*. Arlington: National Science Foundation.

Portes, A. (1987). One field, many views: Competing theories of international immigration. In J.T. Fawcett and B.V. Carinos (Eds.), *Pacific Bridges: The New Immigration From Asia and the Pacific Islands*, (pp. 53–70). New York: Center for Immigration Studies.

Piore, M. J. (1979). *Birds of Passage: Migrant Labor and Industrial Societies*. Cambridge: Cambridge University Press.

Portes, A. (1995). *The Economic Sociology of Immigration Essays on Networks, Ethnicity, and Entrepreneurship*. New York: Russell Sage Foundation.

Saxenian, A. L. (2005). From brain drain to brain circulation: Transnational communities and regional upgrading in India and China. *Studies in Comparative International Development*, *40*(2), 35–61.

Schiller, N., Basch, L. and Blanc, C. (1995). From immigration to transmigrant: Theorizing transnational migration. *Anthropological Quarterly*, *68*(1), 48–63.

Sjaastad, L. A. (1962). The costs and returns of human immigration. *Journal of Political Economy*, *70*(3), 80–93.

Todaro, M. P. (1969). A model of labour migration and urban unemployment in less developed countries. *The American Economic Review*, *59*(1), 138–148.

Varma, R. (2006). *Harbingers of Global Change: India's Techo-Immigrants in the United States.* Maryland: Lexington Books.

Varma, R. (2007). Changing borders and realities: Emigration of Indian scientists and engineers to the United States. *Perspectives on Global Development and Technology*, 6(4), 1–18.

Wadhwa, V. (2010). A reverse brain drain. *Issues in Science and Technology*, *25*(3), 45–52.

Wadhwa, V. and Salkever, A. (2012). *The Immigrant Exodus: Why America Is Losing the Global Race to Capture Entrepreneurial Talent.* Pennsylvania: Wharton Digital Press.

Wallerstein, I. (1980). *The Capitalist World Economy.* Cambridge: Cambridge University Press.

BIOGRAPHICAL SKETCH

Meghna Sabharwal is an associate professor in the Public and Nonprofit Management program in the School of Economic, Political and Policy Sciences at the University of Texas at Dallas. She teaches graduate and undergraduate courses on Human Resources Management, Public Management, Diversity, and Organization Theory. Her areas of research are public human resources management, specifically workforce diversity, comparative human resources and high-skilled migration. Her research has been supported by the National Science Foundation. She has published two books: Public Personnel Administration (2013) and Public Administration in South Asia: India, Bangladesh, and Pakistan (2013). In 2013, she won two best paper awards, one in the Journal of Public Affairs Education and the other in the Review of Public Personnel Administration. In 2015, she also received the Julia J. Henderson International Award from the American Society for Public Administration, Section on Women in Public Administration, which recognizes demonstrated commitment to international public administration.

Roli Varma is Carl Hatch Endowed professor in the School of Public Administration at the University of New Mexico, Albuquerque. She teaches graduate courses on research methods, public policy and diversity management for the School of Public Administration and a core undergraduate course Technology in Society for the School of Engineering. Her research focuses on women and minorities in information technology, Asian immigrants in the science and engineering workforce, the management of industrial research, and professional ethics. Her research has been supported

by the National Science Foundation and the Sloan Foundation. She is the author of *Harbingers of Global Change: India's Techno-Immigrants in the United States* (2006, 2007) and *Managing Industrial Research Effectively* (2006). She is an invited member of the Social Science Advisory Board of the National Center of Women in Information Technology (NCWIT) in the USA. She also served on the Association for Computing Machinery (ACM) Task Force on Job Migration in 2004–2005.