Grass Is Greener on the Other Side: Return Migration of Indian Engineers and Scientists in Academia

Meghna Sabharwal¹ and Roli Varma²

Abstract
Studies on skilled return migration from developed to developing countries have focused on the industrial sector. This article focuses on why academic engineers and scientists from developing countries leave developed countries to return to their countries of birth. Data for this study comes from a National Science Foundation funded study with 83 engineers and scientists who returned to India after study and work in U.S. universities. Better career prospects in India namely ample funding available for research, less competition for grants, ability to work on theoretical topics, and freedom in research objectives emerged as the key factors that prompted return. These findings, therefore, differ with return migration of industrial engineers and scientists who moved back primarily to start companies in India and immigration challenges in the United States. With very little scholarly work on return migration of academic engineers and scientists, this study expands the understanding of high skilled migration in a globalized world.

Keywords
skilled migrants, return migration, reverse brain drain

Introduction
The U.S. foreign-born represented 13% (41 million) of the total population in 2013 (Zeigler & Camarota, 2014). The country’s 25.7 million foreign-born workers accounted for 16.5% of the total civilian workforce aged 16 years and older (U.S. Bureau of Labor, 2015). Over the past decade, foreign-born in the science and engineering (S&E) workforce has grown dramatically. In 2013, of the 5.4 million engineers and scientists, 27% were foreign-born (National Science Board, 2016).

Though it was uncommon for foreign-born engineers and scientists in the United States to sever their ties with their home country entirely, very few from developing countries returned to their country of birth in the 1970s and 1980s (Gaillard & Gaillard, 1997; Sabharwal & Varma, 2015). International immigration of highly skilled personnel from the developing to developed countries was popularized as “brain drain” because it deprived developing countries of intellectual talent and skilled labor essential for their economic growth and development (Docquier, Lohest, & Marfouk, 2007). Since 1990s, engineers and scientists from some developing countries are returning to their home country after acquiring education and/or training in the United States (Varma & Kapur, 2013). Doctorate recipients in the United States from the top two countries, China and India, reported a drop in their stay rates since 2000s (National Science Board, 2016). This has led some to use the terms “brain circulation” (Saxenian, 2005) and “reverse brain drain” (Wadhwa, 2009). It has been argued that the United States is experiencing “the immigrant exodus” (Wadhwa & Salkever, 2012), which has resulted in a gap between the growing need for engineers and scientists in the United States and the country’s academic production of them (Jackson, 2007; Wadhwa, Jasso, Rissing, Gereffi, & Freeman, 2007). In an effort to avoid this, Thomas Friedman (2007) has argued that foreign-born engineers and scientists should receive permanent residency, immediately after attaining a doctorate to encourage them to engage in their research and innovation in the United States.

Scholarly literature on skilled migration has begun to pay attention to the fact that many foreign-born engineers and scientists from developing countries return to their home countries after having spent a number of years in the United States (King, 2000). Their focus has been either on how the United States is losing its competitive edge in science and technology with return migration (e.g., Wadhwa & Salkever, 2012) or how it is leading to innovation and contributing to...
economic growth of developing countries (e.g., Chacko, 2007; Kale, Wield, & Chataway, 2008; Saxenian, 2002, 2005). Most studies have centered on the high-technology industrial sector. There are very few studies on return migration of engineers and scientists in American institutions of higher education, a sector different from industry. Often, claims are made in media on the reverse migration of engineers and scientists in the academic sector. For instance, when Dr. Shi Yigong, a Princeton University molecular biologist, rejected a prestigious $10 million grant in the United States to return to China in 2008 as the dean of life sciences at the Tsinghua University, this example was used in the media to highlight how the United States is losing its intellectual capital.

In this article, we study return migration—the process of a person returning to his or her country of origin—among Indian engineers and scientists in the U.S. academic sector. It relies heavily on the contributions made by foreign-born engineers and scientists (Corley & Sabharwal, 2007; No & Walsh, 2010). We limit this study to Indian faculty members because they make up 15% of the foreign-born faculty members at U.S. 4-year colleges and universities (Sabharwal, 2011). Existing studies on return migration to India have primarily examined transnational migration patterns among technical staff with ties to the Silicon Valley in the United States and India (Chacko, 2007; Saxenian, 2002, 2005; Wadhwa & Salkever, 2012). Indian S&E faculty, however, is different from technical staff in industry. The article is based on in-depth interviews with academic engineers and scientists who returned to India after study and work in the United States, which is elaborated in the methodology section.

**Scholarly View**

Before World War II, U.S. immigration policy for Asians was based on the exclusion of “unfavorable,” defined largely by a person’s country of origin. With a number of laws such as the Chinese Exclusion Act of 1882, the Gentleman’s Agreement with Japan in 1907, the Barred Zone Act of 1917, and the Immigration Act of 1924, emigration from most Asian countries was either restricted or banned. During World War II, the United States allowed a small number of immigrants from Asian countries. The Immigration and Nationality Act of 1952 permitted a quota of 100 immigrants per country, with a ceiling of 2,000 from most countries in Asia. In this period, the majority of Asian immigrants provided unskilled labor for America’s growing needs (Varma, 2007). A major shift in the U.S. immigration occurred when the 1965 Immigration Act placed Asian nations on an even plane with other countries by setting a 20,000 immigrant per year/per country limit. The 1965 Act gave priority to the economic needs of the United States by admitting immigrants based on their technical knowledge or ability to do jobs that employers had been unable to fill with U.S. workers. The vast majority of Asian immigrants, who arrived after 1965, were professionals and their families (Varma, 2007). The Immigration Act of 1990 placed an annual numerical ceiling of 65,000 on admissions of temporary specialty occupation workers—aliens entering under the H-1B nonimmigrant visa to fill jobs requiring a baccalaureate degree or equivalent work experience. The American Competitiveness and Workforce Improvement Act of 1998 increased H-1B visa quotas to 115,000 each for 1999 and 2000, 107,500 for 2001, and 65,000 in each succeeding year. The American Competitiveness in the 21st Century Act of 2000 increased H-1B visa quotas to 195,000 for each of 3 years (2001, 2002, 2003), and then returned them to the original 65,000 per year limit thereafter.

Since 1965, the United States has been the top importer of talent in S&E from Asia. In 2013, 57% of foreign-born individuals in the United States with and S&E highest degree were from Asia. India accounted for 20% of the foreign-born S&E degree holders in the United States, China was the second leading country with 8% (National Science Board, 2016). A common pattern has been for Asian students to come to the United States for graduate studies, work and stay in the United States after attaining their doctorates. Some Asians with doctorates have been coming to the United States directly for work on temporary visa, which is later converted into permanent residency with sponsorship. From 1993 to 2013, students from four Asian countries (China, India, South Korea, and Taiwan) earned more than half of all U.S. S&E doctoral degrees awarded to international students. In 2013, of all foreign-born individuals with S&E doctorates living in the United States, 22% were from China, 14% from India, and over 3% each from South Korea and Taiwan (National Science Board, 2016).

The most widely utilized scholarly approach to the causes of immigration from developing to developed countries has been the “push-pull” model. It is based on the notion of individual’s utility maximization and rational choice in the context of global inequality. The push factors tend to be negative and prevalent in developing countries, while the pull factors tend to be positive and prevalent in developed countries. Within the push-pull model, economic factors tend to dominate. Typically, focus has been on differentials in wages and employment conditions between developed and developing countries (Beorjas, 1989). Migration from developing countries has been linked to the structural requirements of industrial economy in developed countries, which is facing labor shortage (Khadría, 1999). Also, it has been suggested that migration is a family decision aimed to diversify income and minimize economic risks (Stark, 1991). Among noneconomic factors, the social networks through which migrants obtain information, reduce cost, and the risks associated with migration are thus considered important inputs (Massey, 1990).

The push-pull model, however, has been criticized in its explanations of migration from developing to developed countries (Malmberg, 1997; McDowell & de Haan, 1997).
Basically, the push-pull model focuses on economic factors and leave other factors. It does not explain why some developing countries experience sizable immigration while others do not. Most importantly, it focuses on unskilled and manual laborers and assume their reasons for migration apply to all categories of workers (Varma, 2006).

The push-pull model assumes one-way movement of people from developing to developed countries; in reality, many developing countries are now experiencing a reverse flow. Typically, return migration is explained on economic grounds. The target income theory proposes that individuals emigrate in the hope of amassing wealth and return home once they have reached their target (Massey, 1990). The disappointment theory suggests that individuals who return to their countries of origin are among the least successful in the emigrating countries (Borjas & Bratsberg, 1996). The theory suggests that individuals who are unsuccessful in finding a job or earn low wages miscalculate the benefits of migrating to a new country. The rate of miscalculation is higher as the distance between the home nation and the host nation increases (Reyes, 1997). If this theory is correct, one would expect the returnees to have low human capital.

Political factors behind return may range from direct restrictions initiated by developed countries such as nonrenewal of visas or deportation, to indirect restrictions such as limits on changing jobs, inability to bring one’s family, or enjoying other citizenship benefits. Social motives for return involve being homesick, family-related factors, or lack of assimilation in the host country (Alba & Nee, 2003). However, most studies on the return migration are on manual/unskilled workers; if they address reverse brain drain, they focus on the technical staff in the technology sector (Chacko, 2007; Saxenian, 2002, 2005; Wadhwa & Salkever, 2012). They point out problems in immigration policies of developed countries. For instance, Wadhwa (2009) has argued that without immigration reforms, the United States will be risking a vast “reverse brain drain”. Most importantly, reverse brain drain scholars do not separate different sectors of developed countries.

In the era of globalization and information society, scholars have drawn attention to “transnational migration”—a process by which immigrants forge and sustain simultaneous multistranded social relations that link together their societies of origin and settlement (Schiller, Basch, & Blanc, 1995). Transnationalism postulates that the spaces migrants inhabit are so prevalent that discussion, interaction, and thought exchange take place without crossing physical borders (Levitt & Jaworsky, 2007). Within transnationalism, return migration does not denote an end in itself; instead, it appears fluid and continuous.

Current theories of transnational migration are greatly focused on the economic impacts on the home countries, while social, cultural, and political impacts have started gaining momentum (Duany, 2002; Guarnizo, 2003; Itzigsohn, Cabral, Medina, & Vazquez, 1999). Several of these studies examine transnational migration among Latin American and Caribbean migrants with traditional and social ties to the United States. Furthermore, they mostly focus on transnational migration among manual or semiskilled laborers, rather than on engineers and scientists. There is a need to focus on how return migration operates in a world in which technology has revolutionized the way information is communicated and exchanged—a phenomenon that can affect the way we traditionally think of migration, bound by national boundaries to an emerging concept of virtual migration. In an increasingly connected world, return has individual ramifications as much as it has global considerations.

**Methodology: A Qualitative Approach**

Neither U.S. government publishes data on the number of Indians leaving the United States permanently nor does the Indian government compile data on Indians who have returned home permanently. In the absence of information on the total number of returnees, we decided to carry out a qualitative study to explore the experiences of faculty in S&E who decided to return to India. In 2013, a total of 83 in-depth interviews were conducted with returnees across 14 prestigious institutions in seven Indian states to have a balanced geographic mix. In a qualitative study, participants are studied in an in-depth manner; thus, their number cannot be much larger. The names of the institutions are not provided to comply with the institutional review board’s requirements for anonymity of participants. We examined the curriculum vitae or biographical information posted on Indian faculty on the institutions’ websites. We made a list of returnees based on their stay and work in the United States and randomly selected participants for interviews. A semistructured interview guide was used to conduct face-to-face interviews, which lasted anywhere from an hour to 2 hours. The interviews were recorded, transcribed, and inserted in NVivo for analysis. To ensure trustworthiness of data and minimize researchers’ bias, two independent coders coded the data. The codes were categorized by themes that allowed the researchers to identify patterns within the entire text. Intercoder reliability for each category was assessed using Cohen’s kappa statistic, and reliability was established between coder one and coder two. We had coefficients of 0.90 or greater as acceptable level of reliability. Since it is a qualitative study, the findings are reported with interview excerpts to highlight the complexity of concepts and to show their strength by how frequently they were mentioned. Of the 40 questions asked in the interview, 5 specifically pertained to return migration and thus formed the basis for this article.

Majority (75%) of the returnees were employed at public institutions, while the remaining worked at private institutions (25%). Close to half of the sample (44.2%) were younger than 40 years of age, while 30% of them were in the age groups ranging between 40 and 49 years, close to 20% belonged to age group ranging from 50 to 59 years, and a
mene 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. In the United States, a large majority of the returnees were on temporary visa (82%) and the remaining had a permanent residency card including one was a U.S. citizen. On average, these returnees spent 9.5 years in the United States before they decided to leave and were in India for more than 5 years postreturn (average of 9.3 years). On average, these returnees had spent over 13 years in academia. The overwhelming majority of them were male (84%) in the sample; this study, therefore, does not take gender into consideration.

Findings

Why Leave India for the United States?

Indian returnees were first asked: Why did you choose to go to the United States? Their responses show that an overwhelming majority of returnees (90%) came to the United States for higher studies. After finishing their bachelor’s in India, they sought to pursue either doctorate (72%) or master’s degrees (17%) leading to doctorates in the United States; only one returnee (1%) went to the United States to acquire a bachelor’s degree and continued with a master’s and doctorate. For a few, the ultimate goal was only to get a master’s but once enrolled, they continued to attain a doctorate.

The returnees selected the United States for higher education for a variety of reasons. Most of them (54%) thought that the United States was the best place for graduate studies. They talked about vibrant PhD-level research, superior master’s-level education, updated experimental facilities, and good mentorship. As one returnee declared, “I wanted to do forefront research and the United States was the best place for it.” Some returnees (13%) stated that the prevalent culture or trend at the time they were students in India was that the best students go to America for higher education; accordingly, they went with the “flow.” One returnee noted that almost 80% of his classmates went abroad to study. Some returnees (10%) wished to experience research, educational perspectives, and new ideas different from what they had been exposed to in India. They believed the quality of higher education in India to be not to their satisfaction. One returnee asserted that, “IITs were predominately undergraduate focused at that time.” A few returnees (8%) were advised by their professors to go to the United States to pursue research and education. Some of these professors had returned from the United States after education and work and encouraged the returnees to explore education outside India, especially in the United States. As one returnee noted, “I was advised that I would find depth and breadth in the U.S. education system.” A handful of returnees (6%) had specific information about U.S. faculty whose work was of great interest to them, or American universities known in the area they wanted to do a PhD. As one returnee recalled, “When I was a student back in India, I had read his [thesis advisor] books and I wanted to work with him.” A handful of returnees (5%) viewed the U.S. education system to be flexible and open to a diverse educational background. Most importantly, admission to American universities was backed with assistantships, fellowships, or scholarships. Though many returnees talked about financial support provided by the American universities without which they did not have resources to pursue education in the United States, it was the core reason for a small percentage of returnees (4%).

A few returnees (6%) came to the United States to attain research and work experience; three of them came as postdoctoral fellows after finishing their doctorates in India, whereas two came to work after attaining their masters in India and once in the United States, they decided to attain their PhD after working for some time. For these returnees, it was important to experience life/work outside India. As one returnee said, “I wanted to go to the U.S. to get a different perspective on things, thinking, and values.” They viewed that the United States has an innovative research/work environment and comfortable living style, and believed the working environment in India available to them was constrained and inflexible.

Finally, a handful of returnees (4%) wanted to leave India to get away from some family obligations. As one returnee said, “I am very close to my family, but I needed to get out of that. If I had stayed, I would have taken a regular engineering job in a company, which I did not want to do.” They believed that socially the United States 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 United States.

Why Leave the United States for India?

We directly asked returnees to identify the primary reasons to move back to India as well as to rank their reasons, which are noted in the Table 1. It shows that the returnees had an interesting mix of reasons to return to India.

Better Career Prospects in India. Almost half of returnees (44%) moved to India for better career prospects. This category consisted of statements, which showed Indian institutions have better chances for engineers’ and scientists’ career advancement compared with the ones in the United States.

The returnees varied in their characterization of better career prospects in India compared with in the United States. Most returnees (41%) talked about dynamic and the
changing nature of Indian economy. They believed that in the past Indian economy was stagnant with very little opportunity for engineers and scientists; now Indian economy has gained momentum with economic liberalization policies since 1990s—opening up of India to foreign investments. Most importantly, the Indian public sector has been expanding its S&E infrastructure and thus increasing employment opportunities and career prospects for engineers and scientists returning from abroad. As this returnee expressed his enthusiasm, “There is so much infrastructure work happening in India. . . . Whereas in the U.S., the infrastructure is easily well built. . . . So your ability to influence [in the United States] is incremental.” This returnee explained,

I really think India is at a place where the U.S. was in the late 60s. The quantum of interest from national agencies in putting together research programs is not something that we have seen in many years here in India. I believe that we are the cutting edge of that wave. I was looking at some of the numbers. The department of science and technology [in India] has grown almost double digits over several years now. So even including inflation, it is huge, it is a huge growth, which I doubt even the NSF has had in many years.

Several returnees (33%) compared their work in the United States versus in India on two interrelated indicators—external funding and type of research. First, they acknowledged that the American research universities are vital centers for performance of research and perhaps the best in the world. In addition to teaching, faculty members are required to perform research by getting external funds. However, they believed that progressively American universities are seeking to increase their own resources by pushing faculty to generate external funding. Instead of universities providing support for faculty research such as student assistants, laboratory equipment, travel for conferences, and office supplies, they require faculty to get these through external grants. The returnees recognized that with external funding, they could perform higher quality research. Yet they did not like their faculty role that they were required to “chase the money.” These returnees had problems with the American universities’ main priority to push faculty to pursue external funding in normal economic times. With the university budget cuts, they believed it was difficult to support the dual teaching/research mission without external grants. At the same time, sources for external funding were limited in the United States. As one returnee said,

There was a little too much competition in U.S. academics. And the emphasis was more upon getting funds for research, rather than research and teaching. It was more about managing research and getting funds and the real joy of teaching was not there.

In contrast, they believed Indian universities’ main goal is to produce high-quality students and thus faculty members are expected to be excellent in teaching. They also are expected to do research for which universities provide necessary support. While they also seek external funding, the pressure to succeed in securing it is not there. As one returnee said,

The U.S. science at that time did not seem very appealing in the sense that there were all these studies in the newspapers and magazines and you would get your first National Science Foundation grant at the age of 41 and I did not want to wait that long . . . In India, there were all these money opportunities to do all sort of interesting research that I would not be able to do in the U.S. anyway.

Another stated, “You have to compete very high [in the United States] to get funds especially if you are at a mid-rank university. Competition to get funds is not that severe in India.” This returnee explained, “The reason I came back was because of funding and students. Here, I have nine PhD students and I have enough money . . . In U.S., I only had one student and no money.”

Second, returnees believed there was more flexibility in the type of research they can engage in India than in the United States. They explained that the U.S. academic sector is viewed as the place for theoretical curiosity-driven research; industry is seen as a place for applied research that contributes to the development of technologies. In reality, however, support for theoretical curiosity-driven research in American universities is declining. It is being maintained by the limited sources of funding for such research. In contrast, Indian universities desire to make fundamental breakthroughs; consequently, it is possible for the returnees to continue curiosity-driven theoretical research. Their work is appreciated among colleagues and university administrators on the originality and soundness rather than by external funding. As one returnee said,

I have a better research career here than I would have had in the U.S. In the U.S., it is not enough to do fundamental research. If you are doing applied research than that is good. You get funds for it. If you are doing fundamental research, you will have to market it. But, this is not the case in India.
This returnee expressed similar sentiment,

In the U.S., there is not enough room for people who want to do theoretical stuff. Everything seems to be about producing something that has a tangible aspect. Things are getting more and more toward that end in the U.S. If I want to explore mathematical formulas, it will be difficult for me to get funding.

Some returnees (17%) believed that India offered better job security than the United States. Tenure in the United States is seen as the main path for long-term job security as well as academic freedom. However, tenure-track jobs are becoming scarce and they are being replaced with temporary faculty in the United States. Typically, the tenure system allows tenure-track faculty members a period of 6 years to establish a record and receive tenure. However, if they do not get tenure at a given institution, their academic career is jeopardized. They cannot move to another comparable university; they can only get a job in a lower rank university, a college, or in industry. In contrast, permanent faculty positions are increasing in Indian universities. Furthermore, the grace period to become permanent is 1 to 3 years long. Faculty do not have a fixed time period to establish their record to move from being an assistant professor to an associate professor; they can take their own time since research productivity is not related to time. As one returnee explained,

I was not very keen to work in the U.S. . . . I felt that the U.S. system, at least tenure track is very brutal . . . I have seen people who are extremely smart but could not clear it. . . . In India, we are on one year probation and after that we are okay.

Another echoed, “There are many benefits you get in a socialist system than in a capitalist system such as job security.”

A few returnees (9%) linked their move to India with economic or material betterment. They believed in the United States they were contributing more, but getting less in return, since salaries did not keep up with the inflation. In contrast, salaries for faculty in India have gone up relatively speaking but not in absolute terms. They were clear that salaries are low in India compared with the United States. But as one returnee explained, “You have to look at the purchasing power. Yes, salaries are still low here, but the cost of living is also low compared with the U.S.”

Immigration Problems. About one fourth of returnees (26%) moved back to India due to U.S. immigration-related issues. This category included comments, which showed they felt like second class citizens due to immigration processing time, spousal visas without which they could not join the U.S. workforce, and inability to bring family members to the country. In order for foreign-born engineers and scientists to work in the United States, they need to have a temporary work visa commonly known as H-1B. This is converted into a permanent resident visa with the sponsorship of the employing institution. This takes 3 to 5 years or more. If they are married, their spouses hold H-4 visa, which allows them to stay in the United States as dependent on H-1B, but does not allow them to work. As one returnee said, “H-1B visa is not a nice visa. My wife could not work . . . It was a waste of my wife’s talent to not work. Before she went to U.S. she was working in India.” Similarly, another one said, “My wife did not want to sit and become a housewife. Without changes in immigration status, there was no job security for us.” Furthermore, the returnees were frustrated with the bureaucratic procedure associated with processing of their visa. As one returnee said, “If I had a green card I probably would have reconsidered returning to India.”

Some returnees did not directly face immigration problems, but did not like the U.S. immigration system for their families. If they were able to bring their immediate family members to the United States in a timely fashion, they may not have moved back to India. As one returnee said,

My parents are quite old. They came to visit us [in the U.S.], But, back and forth can go on for some time but cannot go on forever. I could not have them there [United States] on any decent health insurance . . . Otherwise, I would have preferred to stay in the U.S.

Similarly, another said,

my parents can only stay there [United States] for six months, at the most. . . . So every time either they have to return to India or we have to make a trip to Canada and get their passports stamped and come back to the U.S.

Indian Cultural Identity. About one seventh of them (14%) decided to move to India for their social and cultural identity with the society. This category included comments, which showed an affinity to Indian culture, lifestyle, feeling that India was a true representation of their identity, bringing their children in an Indian set up, and exposing children to the Indian heritage. Some of them did not care for Indian social values, but their spouses wanted to move back because they preferred Indian society over American society. Despite living in the United States for many years, they continually held on to their Indian identity. As one returnee said, “My feelings are more here and I am happier after coming back than when I was there [United States]. I like my social life and it seemed to be more interesting here than there.” Another declared, “To be near my roots, not just family but overall cultural environment. I am much more comfortable in India.” This one did not want “to grow old in the U.S.” One returnee generalized, “Many of us wanted to return to India for maybe for purely romantic reasons.”

Family Reunification. One tenth of returnees (10%) moved to India to fulfill their family obligations. This category included comments, which showed caring for aging or ailing parents or family in India wanted them to return. In Indian
culture, family relations tend to play a very important role. Indian people are supposed to think first about the family before considering what is good for themselves. In fact, they are supposed to forsake their own happiness for the sake of families. As one returnee said, “I realized parents are getting old, aunt passed from cancer, unable to be there, started to feel they were too far away, and it takes much time to go to India and return.” Another said,

I am the only child. I knew I had to comeback for my parents. In 2006, my father retired from service and I told myself that I need to go home and take care of him. . . . My wife is not 100 percent happy with the decision to come back because her whole family is in the U.S. But, she does not complain about it.

Indian Patriotism. Finally, a small number of returnees (6%) moved to India by what can best be characterized as Indian patriotism. This category included comments, which showed that the returnees wanted to return to India after a certain number of years in the United States with an altruistic intention of giving back to India or contribute to their home country to which they felt indebted for their success. There was no disagreement on India being a developing country in relation to the United States. The returnees felt patriotic with their identification with India and believed their individual actions may benefit the country. As one returnee said, “It is my country, my nation. I wanted to go back home.” Similarly this one echoed, “I felt that I would be more valuable in India compared to everyone that is in the States. You can say this is an old patriot.” This returnee “had political beliefs that were not compatible with U.S. foreign policy. It seemed like hypocrisy [for him] to stay on in the U.S.”

Did U.S. Immigration Push Them to India?
We specifically asked the returnees whether their U.S. immigration status had any influence on their decision to return to India. For a large majority of returnees (62%), U.S. immigration status did not have any influence on their decision to return to India. Most believed they could have stayed in the United States longer if wanted and some had permanent residency cards. Their decision to return was based on factors other than immigration issues namely better career prospects in India and social/family issues as outlined earlier. A few returnees even noted that they made an active decision to return to India by not applying for permanent residency. As one returnee said, “Immigration status was never an issue . . . my wife was a U.S. citizen, her parents are U.S. citizens. So, if I wanted to be a U.S. citizen, I could have probably stayed on and become that.” Similarly another declared, “At that time, nobody could have kept me in the U.S. . . . I did get a green card.”

Over one fourth of returnees (28%) mentioned that U.S. immigration had an influence on their decision to return to India though they varied on the weight it played. For most, problems arose because their spouses could not work in the United States under their current visa, in spite of qualifications or degrees; these returnees did not mention their own experience. Others mentioned the problems related to processing of U.S. visas or permanent residency card. They preferred not to wait for their status to change, which influenced their decision on when they should leave. Some returnees showed their annoyance with their temporary immigration status since it restricted their families’ visits. A few talked about how they could not apply for certain jobs due to their visa status. As one returnee said, “the H-1 visa was the worst thing possible. I mean the dependent visa is like her being invisible in the society.” Another mentioned, “I found the visa thing and waiting for the paperwork very tiring.” This returnee showed his frustration, “If I could look at a wide variety of jobs which allowed H-1 to apply, I may have changed my mind.”

Would They Move Back to the United States?
To find out whether their decision to return to India is permanent, we asked returnees whether they would like to move back to the United States. Majority of returnees (79%) were satisfied with the work life in India and were not considering to return to the United States or any other country, even if the right opportunity arose. They expressed a connection to India and an unwillingness to leave permanently, albeit some were open to the idea of leaving temporarily as a visiting faculty or to work on a research project. These returnees considered themselves well established in India and did not want to start a new life elsewhere. Many felt committed to their research, work, and family in India. Some felt rewarded by contributing to India with their work. As one returnee said, “It would take something extraordinary for me to consider moving back.” Other said, “No. I have established my research group here. My lab is known internationally in some areas. It takes long to establish a lab. I don’t want to start again.” This returnee believed, “It is a pretty momentous time to be [in India] today. And I think I would like to be part of this experience.”

About one fifth of the returnees (21%) expressed their desire to move to the United States if a better opportunity arose. These returnees slightly differed in their reasons to move back to the United States. Most returnees (15%) felt somewhat attached to the United States and thus wanted to return. However, they were not thinking of returning to the United States at the time of the interview, but were open to it in the near future. As one returnee said, “I am open to it. If I get an offer from a top U.S. school it would be attractive. It would be something I would think about.” A small number of returnees (6%), however, expressed dissatisfaction with their life in India and had an ardent desire to return to the United States. They believed the caliber of research was better in the United States than in India. As one returnee said, “U.S. is
study has shown that Indian engineers and scientists did not unskilled, semiskilled, and manual laborers. However, as this study has shown, Indian engineers and scientists did not return migration as an outcome of somewhat a failed migration experience. These migrants either did not earn wages as expected, did not get employment they sought, or miscalculated the cost of migration in a given time period. The disappointment theory sees return migration as an unsuccessful occurrence. Such interpretation may apply to unskilled, semiskilled, and manual laborers. However, as this study has shown that Indian engineers and scientists did not

Discussion

Why do Indian engineers and scientists come to the United States? International migration theories centered on the push-pull factors are limited in providing satisfactory answers to such question, mostly because they are centered on economic variables as the main reason for migration and focus on one-way migration from developing to developed countries. As this study has shown that economic factors are not the main reason for engineers and scientists to go to the United States and migration is no longer a one-way phenomenon as return migration from United States to India is taking place among people belonging to S&E professions.

On migration of people from developing to developed countries, the push-pull model sees salary differentials as the major motivation. This may be the case with the migration of unskilled, semiskilled, and manual workers, but this does not apply to engineers and scientists. As this study has shown that the majority of Indian engineers and scientists came to the United States for educational advancement. They selected to earn a doctorate in the United States to be creative and innovative. Though they were able to come to the United States with the financial support provided by the American universities, making money was not their primary goal. Since their first aim was to come to the United States to study and it was not to migrate to the United States to make money, it shows limitation of the push-pull model for this group of people. This study suggests that the push-pull model could be expanded by incorporating factors specific to academic migration. For instance, wage and income (the main motivators for unskilled and manual laborers to migrate) could be replaced with better research and educational infrastructure and the opportunity to work with known faculty (the main motivators for students to migrate). The push-pull factors for academic migrants can thus be modified from the original theory that is primarily focused on economic factors. On the contrary, social network theory emphasizes the importance of noneconomic factors in migration decisions. However, as this study has shown, Indian engineers and scientists did not come to the United States through social networking.

The push-pull model does not posit return migration of engineers and scientists from developed to developing countries as such. Since it theorizes that migrants expect higher earnings by moving from developing to developed countries, return migration is viewed as an outcome of somewhat a failed migration experience. These migrants either did not earn wages as expected, did not get employment they sought, or miscalculated the cost of migration in a given time period. The disappointment theory sees return migration as an unsuccessful occurrence. Such interpretation may apply to unskilled, semiskilled, and manual laborers. However, as this study has shown that Indian engineers and scientists did not strategize to get an academic position by coming to the United States. They came as students, applied for academic positions after attaining their degrees and were working in the United States. They returned to India in spite of graduating from a top-tier university and having a job in the United States. Furthermore, they returned to India despite of earning higher salaries in the United States. This study, therefore, does not find support for return due to failed migration experience. Many respondents did point out the challenges in getting tenured, funding as well as working permission for family members as reasons for returning to India. Yet they did not see these challenges as disappointment in the United States; but, rather better opportunities for career advancement in India.

Indian engineers and scientists cited many reasons to move back to India including immigration hassles and family obligations as has been the case in the past, but there is an additional reason. They found better opportunities for building their careers namely easier funding opportunities including attractive start-up packages, less competition for future funding as well as less pressure to compete for research funding, ability to pursue long-term theoretical research, and less pressure to appease funding agencies. In the United States, the federal government’s share for academic research has declined from 68.8% in 1972 to 57.7% in 2014. Similarly, state and local governments’ funding share has declined from 10.2% to 5.6% for the same years (National Science Board, 2016). It should be noted that most decline in government funding for academic R&D in the United States has taken place since early 2000. Funding rates in many National Science Foundation programs are now at historical lows, declining from more than 30% before 2001 to 20% or even less in 2011 (Howard & Laird, 2013). In 2013, basic research activities in the United States accounted for around 18% of total U.S. R&D, applied research was about 20%, and development was 63% (National Science Board, 2016). Before 1980s, U.S. academic sector was performing substantial amounts of basic and applied research. Since most returned engineers and scientists are able to get placed at top academic institutes and universities in India, they have access to top undergraduate students of the country, giving them satisfaction in teaching talented and motivated students who can also be attracted to do research. It should be noted that such opportunities are available mostly to those faculty in the United States who get hired in top universities. Economic downturn in the United States as well as antiresearch atmosphere prevalent in the U.S. legislature do not help in keeping top Indian talent in the United States. It is especially problematic when research funding in India has been increasing and the importance of long-term research is recognized not only to boost the prestige of India in the world scientific community but also viewed as essential for future economic and technological development (which relies less and less on Western technology). This is especially reflected in the returned Indian engineers’ and scientists’
response to the question about whether they had desire to return to the United States. Unlike 30 years ago, when Indian S&E personnel felt isolated as they did not have quick and easy access to new research publications, the emergence of Internet connectivity and e-mail has broken this isolation. With improved global communication and the World Wide Web, having access to new research in the West is easy for researchers residing in India and anywhere else in the world. Further big multinationals including General Motors, Google, IBM, Intel, Microsoft, and Texas Instruments have set up research laboratories in India not only to tap Indian talent but also to build close ties with Indian academic institutions. Because of these developments, critical mass of researchers necessary to sustain a productive research environment is emerging in many scientific areas in India. As this study shows returned Indian engineers and scientists were very enthusiastic about the new developments in S&E in India.

It appears that a kind of reverse push-pull is taking place. Originally, these immigrants were pushed from India and pulled to the United States since India did not offer better educational opportunities, which the United States did. Now, these immigrants are being pushed from the United States and pulled back by India since the Indian academic sector is offering better career opportunities than the American academic sector. This study finds support for the news reports, which tie challenges to U.S. competitiveness with reverse brain drain. It further supports transnationalism perspective as it shows Indian engineers and scientists are attached to their motherland, while at the same time emotionally connected with the United States. Their self-identification with India has a bearing on their decision to return to India. More studies need to be carried out to show how Indian engineers and scientists are maintaining their transnational identities after return.

Results of this study further suggest that individual and family immigration issues in the United States serve as a factor for some engineers and scientists to return to India. Yet the findings do not support the claim that the United States is experiencing reverse brain drain due to its immigration policies as argued by Wadhwa and Salkever (2012). This may be the case in the industrial sector, but not in the academic sector. Only one fourth of Indian engineers and scientists in this study returned due to immigration problems. Moreover, many personally did not face troubles acquiring work visas though they were somewhat frustrated with the bureaucratic procedures. Their spouses, on the other hand, were not allowed to work on H-4 visas at the time these interviews were conducted. This has been a contested issue in the U.S. Congress. After much debate, former U.S. President Barack Obama signed an executive order in November 2014, which allowed spouses of H-1B visa holders to work legally in the United States. The Department of Homeland Security issued a final rule, effective May 26, 2015. This is a positive step in the right direction; however, the time it takes to process these applications, and further challenges that emerge with the new Trump administration remain to be seen. Returned engineers and scientists also expressed challenges with visas for parents and extended family members who can stay no more than 6 months at a time. Additionally, they were not able to claim their parents as dependents on their health insurance—this was a major concern as most of them had parents in age groups that required medical care and coverage. The health insurance they purchased for visitors had several restrictions and was practically unusable. Since the United States does not provide health care for visitors of nonimmigrants, it led to further discontentment among returned Indian scientists and engineers. With impending permanent residency cards and the enormous backlog for citizenship among legal immigrants in the United States, it is highly unlikely that the United States will provide family visas for extended periods along with health coverage.

Socially, Indian culture and family values continue to play an important motivation in return migration. Almost one third of engineers and scientists in this study returned to India for their social/cultural identity, family reunification, and Indian patriotism. This study expands the social network theory, which emphasizes the involvement and impact of family in international migration decisions. However, the role of social factors in return migration is yet to be analyzed in the social network theory. Studies need to be undertaken to find out what kind of support, for example, does the family provide, and how do return migrants benefit from social networks.

The Indian government is slowly but surely recognizing the importance of scientific and technical human capital and is devising measures and instituting programs to attract talent back to India. Unlike China, India is not proactive in recruiting talent back home. This study shows that a large majority of engineers and scientists returned to India on their own initiatives. Certainly, more needs to be done to increase funding, remove administrative burdens and streamline the funding process before India can become a major player in the global scientific arena.

What implications can this have for the U.S. scientific workforce? Certainly, losing engineers and scientists in the form of reverse migration can add to the human capital challenges faced by the scientific enterprise in the United States. The returnees are among the best and brightest, they graduated with PhDs from research universities in the United States. While there is concern about lost talent from the United States, return migration can result in immense gains for Indian science in the form of economic gains, enhanced human capital, increased knowledge flows and skilled mobility, fostered collaborations, and increased entrepreneurial activities (Regents, 2001). Most importantly, in a technologically wired world, return migrants can serve as a bridge between the United States and India as they build on their national resources and expertise toward furthering global systems for joint research. Future research can study the impact of return on research collaboration and networks.
Conclusion

This is one of the first systematic studies to investigate the reasons why academic engineers and scientists born in India who come to the United States to seek higher education and/or work decide to return after living and working in the United States. Most studies on Indian engineers and scientists have focused on brain drain; this study is among the very few that has focused on brain return. The results of the study show that Indian engineers and scientists are returning primarily due to increasing career and growth opportunities in India, improved funding, job security, family and cultural ties, and cumbersome immigration policies and structures in the United States. Most returnees expressed satisfaction with their career advancement in India. Funding of graduate research assistants and generous start-up funds provided by the Indian Ministry, various funding agencies, and the institution itself are luring returnees. The monies allocated for research in India can never be compared in dollar amount to the United States, but one must remember that the cost of doing research in India is less than in the United States. Furthermore, the ability to do basic research and not chase money helped returnees focus on their research and take more risks. According to the returnees the ability to undertake risky research is minimized in the United States due to the constant pressure to seek grant dollars. Added to the challenges of seeking funding, untenured faculty expressed greater job insecurity in the United States. The tenure system in India is not as stringent—faculty are usually tenured after a year’s probation. This study has shown that the return migration can be best understood with the contextual approach in both countries.

Authors’ Note

An earlier version of this article was presented at the Annual Meeting of American Association of Behavioral and Social Sciences (AABSS), Las Vegas, NV, USA, February 9 to 10, 2015.

Acknowledgments

We would like to recognize our students Shelia Cunningham, late Eliana Herrera, Gianna Marie May, and Salma Mirza, who assisted us in transcription of interviews or coding of data. We would like to thank all interviewees who gave their valuable time.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This research was supported by grants from the National Science Foundation (1230091, 1229990).

References


Author Biographies

Meghna Sabharwal is an associate professor and PhD director in the Public Affairs Program at the University of Texas at Dallas where she teaches human resource management. Her research interests are focused on workforce issues as it relates to high skilled migration, diversity, job satisfaction, and performance. She has won two best paper awards, and is the recipient of the Julia J. Henderson International Award by the American Society for Public Administration (ASPA).

Roli Varma is Carl Hatch Endowed professor in the School of Public Administration at the University of New Mexico, Albuquerque. Her research focuses on women and minorities in information technology and immigrants in the science and engineering workforce. Her research has been supported by the National Science Foundation. She is the author of Harbingers of Global Change: India’s Techno-Immigrants in the United States (2007). She served on the Association for Computing Machinery Task Force on Job Migration in 2004–2005.