BRAIN CIRCULATION

A Case Study of High-Skilled Migration from India

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INDIAN MIGRATION TO THE U.S. DATES BACK TO THE THE 1800S, BUT RECENT LEGISLATION HAS RESULTED IN A LARGE FLOW OF HIGHLY SKILLED INDIAN WORKERS TO THE UNITED STATES. WHILE THIS INFLUX HAS BOOSTED THE U.S. ECONOMY AND HAS CONTRIBUTED TO THE CREATION OF MORE JOBS, INDIA HAS NOT EXPERIENCED THE SAME DEGREE OF BENEFICIAL EFFECTS. THOSE WHO EMIGRATE TYPICALLY CONTINUE TO EXCHANGE VALUABLE INFORMATION— IN THE FORM OF INVESTMENTS AND REMITTANCES— BACK WITH INDIA TO INCREASE PRODUCTIVITY AND STIMULATE THE ECONOMY. HOWEVER, THIS HAS NOT PROVEN TO COUNTERACT THE GREAT ECONOMIC LOSS DUE TO THE OUTFLOW OF THEIR MOST EDUCATED AND SKILLED LABORERS. THIS PAPER EXPLORES THE WAYS IN WHICH INDIAN IMMIGRATION TO THE U.S. HAS CONTRIBUTED TO AN ACADEMIC PHENOMENON KNOWN AS “BRAIN DRAIN”, AND THE ADVERSE AS WELL AS POSITIVE EFFECTS THAT THIS FLOW OF HUMAN CAPITAL HAS HAD ON BOTH THE U.S. AND INDIAN ECONOMIES. FURTHER, WE EXAMINE HOW PRESIDENT TRUMP’S ADMINISTRATION WILL LIKELY HANDLE THE H-1B VISA PROGRAM.

"Labor is prior to and independent of capital. Capital is only the fruit of labor, and could never have existed if labor had not first existed. Labor is the superior of capital, and deserves much the higher consideration."

—Abraham Lincoln, State of the Union Address, 1861

INTRODUCTION

This statement by Abraham Lincoln in 1861 demonstrates the continuing importance of labor as a factor input in the economy. In terms of immigration, Indian migrant workers are important because capital is a result of labor, which stimulates the United States economy. While Indian migration to the United States dates back to the 1800s, recent legislation has changed the qualifications of the people migrating. As a result of the Immigration and Nationality Act of 1965 and of the Immigration Act of 1990, the majority of Indians migrating to the U.S. are now highly skilled. These high-skilled immigrants make up a key component of the technology boom in the United States, with a high concentration of immigrants living in entrepreneurial hot spots such as Silicon Valley and Denver.[1] Furthermore, India has become the third largest source country of emigrants to the United States, only surpassed by Mexico and China. The resulting influx of high skilled and high performing labor has boosted the U.S. economy and led to the creation of more jobs, yet has also had detrimental effects on the U.S. and Indian economices alike. This paper explores the ways this immigration has contributed to the academic phenomena called the "brain drain." We conclude that the U.S. H-1B program has had ambiguous impacts for the source country of India yet positive effects for the United States as the destination country. Further, we examine how President Trump's administration will likely handle the H-1B visa program, whether it be outright abolishment or revision.

MOTIVATION

The India-to-U.S. migration flow is especially unique because of the occurrence of highly skilled workers leaving the third-world country to pursue better opportunities in the U.S., a phenomenon otherwise known as "brain drain." The H-1B visas have allowed for increasingly more highly skilled foreign workers to migrate and work in the United States, most of whom are from India. While the economic effects for the U.S. are beneficial, India seems to experience the opposite. On one hand, India is losing its most educated and skilled laborers, but on the other hand, those who emigrate typically continue to exchange investments and remittances back to India, thereby furthering the flow of productivity and stimulating the economy. Yet, the benefit of these exchanges has not proven to counteract the great economic loss due to this outflow. It is hard to neglect the ways in which this migration flow positively impacts the U.S. — however, there are policymakers that believe H-1B visas should be cut to promote the hiring of native unemployed laborers in the U.S. rather than bring in more foreign workers. With the results of the 2016 election, we believe it is topical to analyze the future of the India-to-U.S. migration flow in the upcoming years, and how this flow will be affected by President Trump's administration.

HISTORY OF INDIAN-U.S. MIGRATION FLOWS

Indians began migrating to the U.S. as early as 1820.[2] During the nineteenth century, most of these immigrants were "unskilled and uneducated" farmers attracted to California agriculture. This migration flow came to a standstill due to the Immigration Acts of 1917 and 1924 that were fueled by security concerns during World War I. This legislation banned all immigration from Asia except for Japanese and Filipino migrants.[3] As a result, in 1960, Indian immigrants made up only 0.5 percent of the foreign-born population of the United States.[4] The India to U.S. migration flow started up again when the 1965 Immigration and Nationality Act was instituted. While this

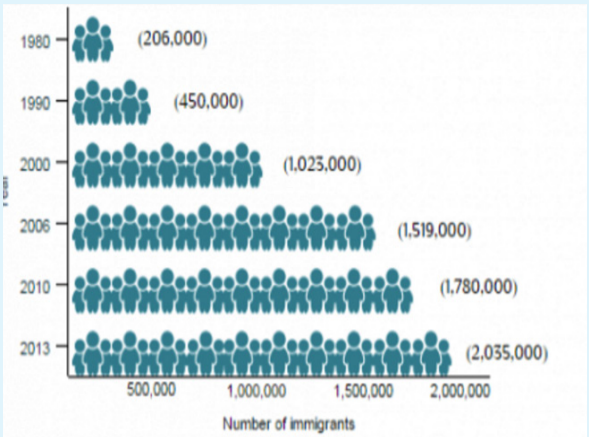

FIGURE 1: INDIAN IMMIGRANT POPULATION IN THE UNITED STATES, 1980-2013 (COURTESY OF *MIGRATION POLICY INSTITUTE*)

abolished the quota system, there remained caps on source countries and the total annual immigration flow remained.[5] U.S. citizen or permanent resident relatives, refugees, or those with skills deemed useful for the country were preferred.[6] The wave of immigrants that followed were "young, educated urban dwellers, with strong English language skills," constrasting sharply with the initial immigrant population from India.[7]

The Immigration Act of 1990 further increased the cap on permanent work-based or H-1B visas, attracting even more high-skilled immigrants. This 1990 act is likely why as of 2010, 37.6 percent of Indian American adults had resided in the United States for ten years or less.[8] The Indian immigrant population grew significantly in the 1990s and by 2010 became the third largest immigrant population in the U.S, lagging only behind Mexican and Chinese immigrant populations.[9] Figure 1 depicts the tenfold increase of the Indian immigrant population in the United States, from 206,000 in 1980 to 2.04 million in 2013.[10] This is a trend for India as a whole, since as of 2015, India has the highest number of international immigrants in the world, with the United Nation's estimate that over 16 million Indians were living abroad.[11]

ABOUT THE MIGRANTS

As stated before, these immigrants are highly educated and highly skilled workers. This is due to several factors. Indian immigrants are more likely to be proficient in English than the overall foreign-born population, which means that they can engage in high-skilled labor jobs with relative ease. Recent numbers show that only 26 percent of Indian immigrants have limited English proficiency versus the overall average of 50 percent of all immigrants. In addition, 10 percent of Indian immigrants spoke only English at home, showing high levels of English proficiency that could compete even with Native English.[12] Further, Indian immigrants are much more educated compared to foreign- and native-born populations. For example, 28 percent of all immigrants and 30 percent of U.S. born adults over 25 have a bachelor's degree or higher. Meanwhile, 76 percent of Indian immigrants ages 25 and older have achieved this level of education.[13] This number has grown since 2010, as shown in Figure 2. Also, among these college educated immigrants, more than half have either a graduate or professional degree.[14]

A likely factor for many highly skilled Indians immigrating to the U.S. is the aforementioned H-1B visa. This visa program allows highly skilled foreign workers in

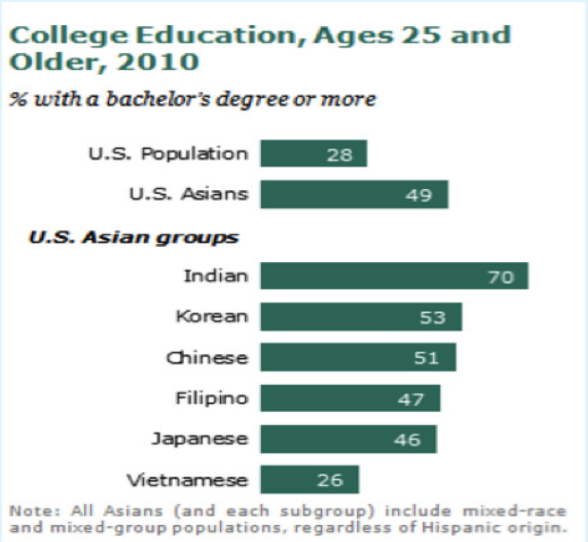

FIGURE 2: IMMIGRANT POPULATION WITH A COLLEGE EDUCATION (COURTESY OF *PEW RESEARCH CENTER*)

"designated specialty occupations" to come and work in the U.S.[15] Today Indian migrants are the number one recipients of temporary high skilled H-1B visas. In 2014, they accounted for 70 percent of the approved H-1B petitions.[16] The Migration Policy Institute has found that Indian immigrants participate in the labor force at a higher rate than overall foreign- and native-born populations.[17] Figure 3 illustrates that Indian immigrants are more than twice as likely to be employed in management, business, science, and arts occupations; these immigrants on

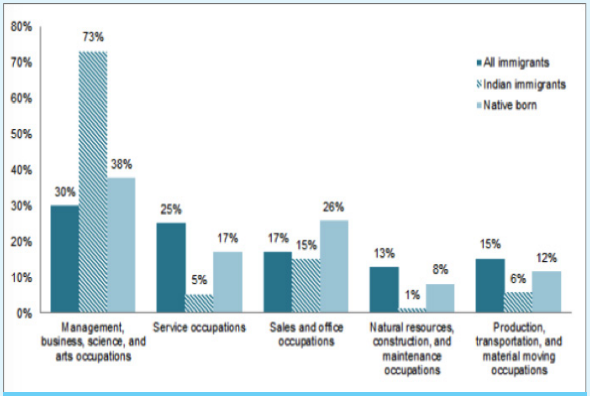

FIGURE 3: EMPLOYED WORKERS IN THE CIVILIAN LABOR FORCE (AGES 16 AND OLDER) BY OCCUPATION AND ORIGIN, 2013 (COURTESY OF *MIGRATION POLICY INSTITUTE*)

average are paid higher than those in other service industries, sales, natural resources, and production.[18] More specifically, in 2013, 18 percent work in science and engineering fields, versus the 5 percent of the U.S. population and 14 percent of overall U.S. Asian population.[19] Thus, the median annual household income for Indian Americans, in 2010, was $88,000, while for all U.S. households it was $49,800.[20] The enactment of the H-1B visa led to an influx in high-skilled Inidian workers in the U.S. that earned high wages and helped advance their respective fields, such as science and engineering. In the long term, the economic value of temporary high-skilled Indian migrants is estimated to exceed $45 billion, which is larger than India's value to US cross-border imports of goods or services. [21]

INTRODUCTION TO BRAIN DRAIN

Due to the major economic impacts "brain drain" and "brain circulation" have had on India and the U.S., we decided to evaluate the beneficial and adverse of impacts these phenomena have had on the countries between 1990 and 2010. The term "brain drain" was first coined in by the British Royal Society in the 1950s and 1960s to describe the phenomenon of highly skilled science workers leaving the UK to pursue opportunities in the United States.[22] In contemporary times, the term has been transformed to mean the flight of human capital from less developed to more developed countries. This flight exacerbated global income inequality, presenting an additional challenge to developing countries. According to a 1985 textbook in Economic Development: "The people who migrate legally from poorer to richer lands are the very ones that Third World countries can least afford to lose, the highly educated and skilled."[23] One example of the stark trajectory of this human capital flight is the career paths of students who go to the Indian Institute of Technology. With an acceptance rate of just over two percent, this pretigous university sends over two-thirds of its graduates abroad each year, with a majority of those graduates leaving for the U.S.[24]

There is undoubtedly a flight of human capital happening throughout the world, especially in India. According to World Bank data, between 1990 and 2010, high-skilled migration from non-OECD countries rose 185 percent from 6.2 million to 17.6 million.[25] Indian emigrants are the largest population of these high-skilled workers. Between 1990 and 2000, the UK was the largest origin country for skilled laborers, but in 2010, India surpassed the UK with a stock-count of over 2.1 million high-skilled emigrants to the OECD, increasing its emigrant count by 370 percent since 1990.[26] It is important to note here that, because of India's population size, at 4.3 percent, this is still a relatively low percentage of the total Indian population, ranking relatively low on the list of countries losing high-skilled workers. Indian-Americans make up the third-largest immigrant population in the United States, with over 2.8 million residing in the U.S.[27] Based on their median household income level, as well as their compositional education level (over 70 percent hold tertiary degrees), it is evident that there is a large number of high-skilled Indian immigrants to the United States.[28]

IMPACT ON THE UNITED STATES

The United States has benefitted from this human capital flight. AnnaLee Saxenian of UC Berkeley performed an in-depth analysis on "brain drain" and "brain circulation" in 2005 for Indian and Chinese communities in Silicon Valley specifically. She notes that by 2000, over half of Silicon Valley's scientists and engineers were foreign born, one quarter of those being Indian and Chinese.[29] In 2008, Wadhwa at UPenn conducted research on 2,054 engineering and technology startups, companies founded between 1995-2005 with over $1 million in revenues. Wadha found that over 25.3 percent of the key founders were immigrants, and 26 percent of those immigrants were Indian. In Silicon Valley, the number of immigrant-founded startups was at 52.4 percent.[30] Figure 4 shows the percent of immigrant founded startups by industry.

Furthermore, the majority of $1 billion technology companies are founded by immigrants, with India responsible

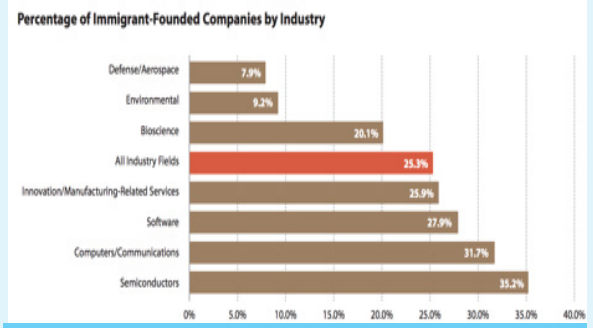

FIGURE 4: PERCENTAGE OF IMMIGRANT-FOUNDED COMPANIES BY INDUSTRY[31] (COURTESY OF *ISSUES IN SCIENCE AND TECHNOLOGY*)

"[T]he majority of $1 billion technology companies are founded by immigrants, with India responsible for 14 of the 44 companies."

for 14 of the 44 companies.[32] These companies founded by Indian migrants not only propel the US technology industry forward with new ideas but also create jobs. This pool of immigrant-founded companies was responsible for generating an estimated $52 billion in 2005 sales and creating just under 450,000 jobs as of 2005.[33]

In addition, Indian migrants run many of the massive corporations at the heart of the United States. The chief executive of PepsiCo, Indira Nooya, is a female Indian immigrant. Pepsico is a part of the growing proportion of US companies that are being created or lead by immigrants. Sundar Pichai, the CEO of Google, turned Chrome into the world's most popular web browser and ran the Android division in just 11 years.[34] Microsoft, Adobe Systems, and Citigroup are just a few more examples of prominent Indian immigrants holding leadership roles in big corporations in the United States.

Among these companies, Indian migrants are responsible for new technology innovations in data management, performance management, power generation, internet-based grocery delivery, cloud-based platforms, targeted advertisements, network security, and much more.[35] Beyond startups, Indian immigrants contribute intellectual property. In 1998, Indian immigrants filed 9.5% of the total U.S. patent applications. This number grew to 13.6% by 2006.[36] Figure 5 shows the total number of patents filed by immigrants between 1998-2006.[37]

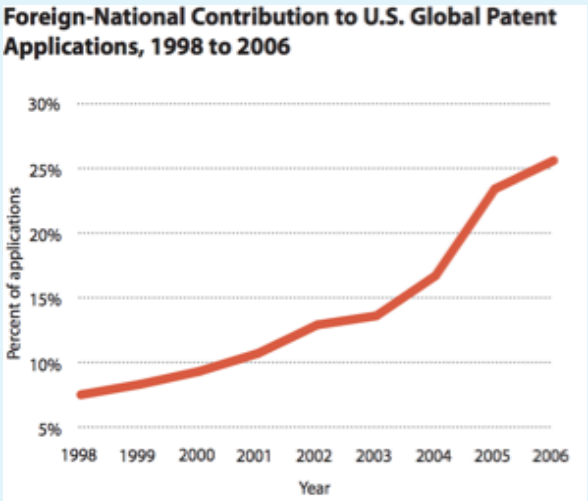

FIGURE 5: FOREIGN-NATIONAL CONTRIBUTION TO THE U.S. GLOBAL PATENT APPLICATIONS (COURTESY OF *ISSUES IN SCIENCE AND TECHNOLOGY*)

Further, Indian immigrants provide the cultural and linguistic links to vital Asian markets. There is measurable economic evidence to back this up. For example, in California, for every 1 percent increase in first-generation immigrants in a state, there is a 0.5 percent increase in exports, and holding everything else equal, California exports 4 times more to the Asia Pacific than any other country.[38] This means that "brain drain" from India has clearly proved to be a boon to the United States, providing new jobs, innovation, and startups that create new technology, as well as provide links that facilitate increased international trade. The effects that this flight of skilled-human capital has on India, on the other hand, has been subject to countervailing forces.

IMPACT ON INDIA

As for India, there are counteracting impacts from this human capital flight. The growth of trade, investments, and shared ideas from Indian immigrants in the U.S., remittances, as well as potential high human capital emigrants that return all serve to benefit India.[39] Yet, the flight of some of the country's most high-skilled workers can make the country less appealing for direct foreign investment thus hindering the growth and development of "high technology clusters" and institutions, especially universities.[40] Further, those still residing in India will feel the negative effect of higher taxes and lower spending on them. This fiscal burden is harmful on a macroeconomic level because of a lost addition to India's potential GDP from innovation and hard work at home,[41] as well as a documented loss in tax revenue for the government at .5 percent of GDP.[42]

"[T]he flight of some of the country's highest skilled workers can make the country less appealing for direct foreign investment, thus hindering the growth and development of 'high technology clusters'..."

A study on the fiscal impact of high-skilled emigration from India to the U.S. by Desai et al. visualizes the impact on the Indians that did not leave, referred to "those left behind" (TLBs). Figure 6 demonstrates that when the number of skilled workers decreases from S0 to S1 due to emigration, and national income is lowered because of the net fiscal loss (shaded green) and lost basic surplus (shaded grey). The total loss depends on the current tax rate, *t*, the skilled wage, *w*, the benefit level, *b*, and the number of emigrants, *E*.[43] Although this simple model cannot explain the entire impact that emigration has on India, it is clear that based on this model and the assumptions of Desai, there is a loss to the national income when high-skilled immigrants leave the country.

This loss could be compensated with investments or remittances from the emigrating stock, which is not accounted for in the above model. Yet, due to the modest Foreign Direct Investment from Non-Resident Indians (NRIs), investment has resulted in little to no fiscal gain for India.[44] On the other hand NRI remittances have a powerful impact on stimulating consumption, thus leading to a positive fiscal impact on the Indian government through indirect tax receipts. There was an estimated indirect tax yield due to remittances reaching 0.07 percent of gross national income in 2005[45] that can offset the net fiscal loss seen in Figure 7, but not by much. So although there is room for some counteracting factors, there is an overall initial loss felt by India due to the emigration of high skilled workers to the United States.[46] Possibly, the only way to reconcile this in their economy is if these Indian immigrants were to return. Borjas found in a 1996 empirical study that return migration is positively related to the income per capita in their home country and negatively related to the distance from the U.S. Since we see a flight of human capital in the first place, high skilled migrants most likely have higher returns in the U.S. Further, India and U.S. are not geographically close to one another, so Borjas' study may hold that there is a reluctance on the part of Indian immigrants to return home. Although there has been very little effort on the part of the U.S. or India to track returnees, there is evidence that Indians may not in fact return back home. [47]

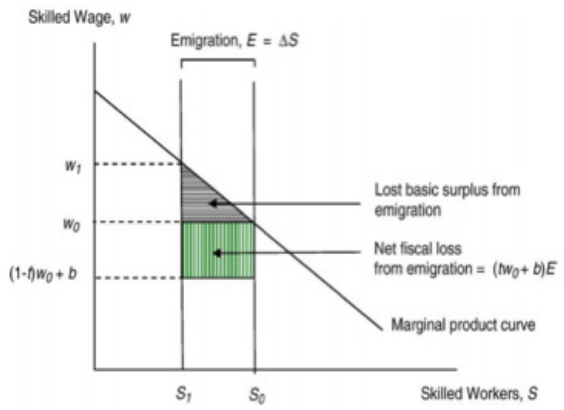

FIGURE 6: THE FISCAL IMPACT OF EMIGRATION ON "TLBS" (COURTESY OF *DESAI ET AL*)

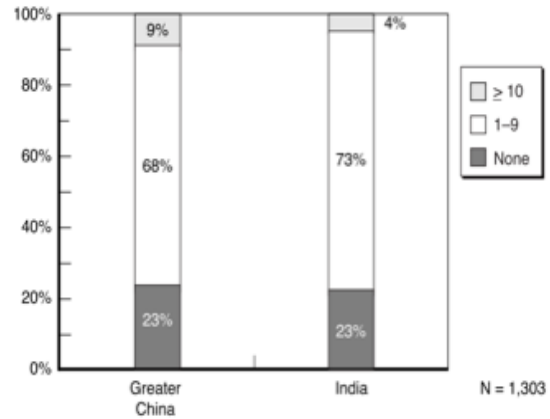

FIGURE 7: PERCENTAGE OF FRIENDS OR COLLEAGUES HAVE RETURNED TO THEIR COUNTRY OF BIRTH TO WORK OR START A COMPANY (COURTESY OF *BORJAS ET AL*)

BRAIN CIRCULATION

It is important to highlight that "brain drain" may be a bit of a misnomer for this migration flow. In academia, a new term, known as "brain circulation" has been coined. This term is used to describe "training and career paths in which students or workers go abroad to specialize and then return to their country of origin, drawing on the experience they have amassed to secure more advantageous employment conditions."[48] In this scenario, India is not being "drained" of its highly-skilled workers, rather, its workers are acquiring human capital abroad. Talented workers will go abroad and bring back new skills, networks, knowledge, and contacts which creates industries and businesses where otherwise there might have been none.

Studies have shown that immigrants who leave their source country continue to exchange valuable information to their countries back home, some of whom even end up returning home after a number of years. AnnaLee Saxenian of UC Berkeley conducted a survey of Chinese- and Indian-born immigrants in Silicon Valley in 2002. She found that over 96 percent of the Indians she polled knew of friends or colleagues who had returned to their country of birth to work or start a company (see).[49] She also found that over 70 percent of individuals exchanged information with friends, classmates, or business associates in their country of birth regarding jobs or business opportunities in the U.S., jobs or business opportunities in their home country, and technology.[50] There is also evidence that those who work abroad have better success in India. A 2008 survey by Commander et. al. found that 30-40 percent of higher-level employees in India's software industry have relevant work experience in a developed country.[51]

Furthermore, the "loss" of these high skilled workers and their potential impact on the Indian economy may be overstated. These individuals can add more economic value in a place like the U.S. with well developed infrastructure and laws that encourage innovation. Later on, Indian immigrants can use their social networks across borders created in the U.S. in order to "circumvent the barriers arising from imperfect domestic institutions in developing countries."[52] This reveals the important fact that even when Indian immigrants do not return to their home country, they become important intermediaries, facilitating scientific and technical cooperation between India and the U.S. One such example of this phenomenon is in the software industry. There are social connections between Indian CEOs and professionals in Silicon Valley and the low-cost software expertise in India.[53] Despite the positive evidence of brain circulation and the increased globalization of the economy, a 2001 East West Center working paper by AnnaLee Saxian has found that Indian emigrants are often reluctant to return home permanently, and that India is lacking the "critical mass" of returnees that would help improve Indian technological infrastructure to match international standards. [54]

POLICY

With the results of the 2016 Presidential Election, U.S. policy regarding immigration for high-skilled laborers and H-1B visas is expected to shift significantly. President Trump spoke about the H-1B program several times during his campaign with somewhat conflicting statements.It is therefore unclear how he will reform the current H-1B program and high-skilled immigrants to the U.S. in the future. President Obama implemented a program that will expand the H-1B outsourcing program, which was to go into effect just a few days before Trump is inaugurated.[55] Trump having promised to end the H-1B visas as a cheap labor program during his campaign will likely attempt to abolish or at least revise it.

During President Obama's two terms, his administration expanded the H-1B program considerably. Silicon Valley, in particular, has lobbied to increase the number of H-1B visas they are allowed to us apply for to bring high-skilled workers in from other countries, as well as to sponsor the spouses of these workers to work in the U.S.[56] While Obama's policies were quite friendly to the H-1B program, President Trump's agenda will be less so, since a central point of his campaign was to put American workers first.

Proponents of the H-1B argue that the program is used to recruit and hire the best and brightest from around the world, fill gaps in the U.S. workforce, and retain talented foreign students who received education in the United States. H-1B data and the SCE case do not explicitly prove these arguments to be valid, however, projected data shows that raising the cap of H-1B visas issued to 195,000 would increase revenues by a total of nearly $69 billion over eight years.[57] Opponents of the H-1B visas argue that these migrants are taking the jobs of native, unemployed laborers. However, empirical data shows a demand for more skilled workers in the labor market, specifically in the computer and mathematical fields. Without enough skilled workers

"Overall, Trump has shown that his views on the H-1B program have changed over time and have somewhat contradicted each other at certain points."

at home, many American companies must either expand outside the U.S. or not expand at all. An immigration policy focused on increasing economic growth should seek ways to admit more immigrants with the advanced education levels desired by domestic employers. This influx of highly skilled and educated workers has proven to increase U.S. jobs while stimulating the economy and adding astronomical value to the companies to which they are employed. In the early days of Trump's presidency, he will have to weigh the advantages and disadvantages that the H-1B poses to the United States. - Trump has previously spoken out several times regarding H-1Bs, but he has given somewhat contradictory statements regarding on what he plans to do to the program.

Trump's initial view on foreign high-skilled employment early in his campaign was that they are holding down American salaries and hurting employment rates. Trump proposed bringing the H-1B program to an end, citing that it took away many coveted IT jobs from American workers. Trump called for these companies to search for American workers to fill their positions before looking overseas. On October 28, 2015, Trump was asked about these H-1B visas during the Republican debate. His answer was essentially that if these visas are needed in order to fill positions at these companies, and if the immigration is done legally, that he sees no problem with them.[58] In a March 2016 debate, Trump further expressed general support for H-1B visas, explaining that America needs highly-skilled immigrants, and that too many foreign-born people are attending our best colleges and then bringing their talent back to their home country. In regard to this, Trump said, "we absolutely have to keep the brain power in this country," which implies he is in favor of these visas and perhaps even increasing the number of them.[59]

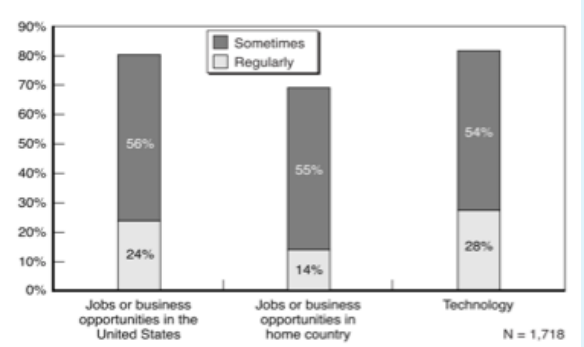

FIGURE 8: PERCENTAGE OF TIMES INFORMATION IS EXCHANGED WITH FRIENDS, CLASSMATES, OR BUSINESS ASSOCIATES IN YOUR COUNTRY OF BIRTH (COURTESY OF *PUBLIC POLICY INSTITUTE OF CALIFORNIA*)

However, almost directly after this debate, Trump released a statement essentially denouncing the H-1B program, which likely means that he either misunderstood the question that was asked, or that he was attempting to express conflicting views. Trump's statement was that he is not in favor the H-1B program because it is not high-skilled immigration, but temporary foreign workers imported in order to substitute for American workers who must be paid more. Trump said that he would forever abolish the H-1B program as a cheap labor program, and institute a requirement to hire American workers first over visa and immigration programs. However, this is somewhat confusing, considering that many workers who are given opportunity by the H-1B visa are high-skilled workers – 55% of H-1B recipients have a bachelor's degree or higher, and their median salary in 2014 was $75,000.[60]

Overall, Trump has shown that his views on the H-1B program have changed over time and have somewhat contradicted each other at certain points. Companies around the United States, particularly in Silicon Valley, are wary of what the Trump presidency will mean for the future of their employment of foreign-born workers. While it is somewhat challenging to speculate what will happen, it is likely that President Trump will not be as friendly to the H-1B visa program as President Obama was, which could cause difficulty for Silicon Valley companies as well as those which rely on foreign-born workers. Trump's plan for H-1B visas, if he follows through with some of what he has said regarding the program, will likely negatively affect the India to U.S. migration flow, as high-skilled Indians tend to benefit the most from this program.

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