Universities as Immigration Gatekeepers

IHELG Monograph

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University of Houston Law Center/Institute for Higher Education Law and Governance (IHELG)

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Summary
The number of foreign students in the OECD countries doubled between 1980 and 2000 to almost 1.8 million, and their number is projected to quadruple to 7
million by 2025. The traditional reasons for fostering student mobility over borders—cultural exchange and foreign aid—have been joined by two others: generating revenues for universities by attracting (full) fee-paying students and attracting highly skilled workers and immigrants. Universities thus play a potentially important gatekeeper role in the movement of human capital between nation states, including from developing to developed countries.

If foreign students from developing countries return after graduation, they can help to close the “knowledge divide” between rich and poor countries. In most developing nations, fewer than five percent of residents have access to higher education, so fostering student mobility to developed countries can add to their stock of human capital and enrich the educational experiences of foreign and local students. More recent reasons for encouraging foreign student mobility in developed countries include generating revenues for universities and attracting highly skilled migrant workers, which means that student mobility can be a “service export” from developed to developing countries and contribute to the brain drain.

Students moving over borders are similar to workers moving over borders in several important respects. First, most countries participate in international education as both senders and receivers of students—as with labor migration, only a few of the poorest countries primarily send students abroad. Second, just as labor markets vary in the wages, benefits, and career opportunities they offer to local and migrant workers, so higher education systems vary in their structure, governance, and goals, with the sharpest distinction between “free” systems geared to providing basic knowledge in much of continental Europe versus private and for-profit US institutions that recruit fee-paying foreign students for courses geared closely to US labor market, which helps graduates to work and settle. Third, as with labor migration, there are strong network effects, with experience and anchor students providing information that encourages and enables more students to follow.

Students go abroad for many reasons, including a lack sufficient places in appropriate institutions or courses of study in their countries of origin, in search of a foreign experience, and as a means to migrate for employment. In the past, most “non-immigrant” European countries insisted that foreign students return to their countries of origin upon graduation, while immigration countries such as Australia, Canada, New Zealand and the US generally allowed foreign graduates who found jobs with local employers to remain temporarily or permanently. Recently, many European countries have changed their policies, and now allow

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1 Half of the foreign students in 2025 are projected to be Chinese and Indian when China and India are expected to account for 35 percent of the world’s 7.9 billion residents (Bohm et al, 2002).
foreign student graduates to remain and work at least temporarily, while traditional immigration countries have made it even easier for foreign students to stay after graduation if they find jobs.

The three major issues involved with international student mobility are selection, stay and significance or impacts. Which foreign students do universities select: those most likely to study subjects useful to their countries of origin or those who pay full fees and fill slots in areas with declining enrollment, and how do selections vary between tuition-charging and “free” universities? Stay asks how many foreign students remain abroad to work, and investigates how stay rates vary by field of study, country of origin, and type of institution? Finally, what is the significance or impacts of foreign students, including in foreign-student dominated fields of study and labor markets in receiving countries and on economic growth and migration patterns in sending countries?

The ILO has long been concerned with migrant workers, those who cross national borders for jobs, and this WP pushes this concern one step back in the migration process. The major message is that international student migration is a growing phenomenon that warrants close monitoring to determine how significant a side door to the labor market it is and may become. If student mobility increases as projected, universities could become very important immigration gatekeepers to receiving country labor markets.

**Introduction: Systems and Policies**

Human capital, the stock of knowledge embedded in people, is a key to economic growth. Education adds to the stock of human capital, and is thus the major reason why practically all countries require children to go to school, make primary and elementary schooling “free,” and prohibit children from working, giving them another reason to go to and stay in school. Most leaders recognize the value of education, and a key millennium development goal is to have children everywhere complete primary school by 2015. Most countries also subsidize education beyond secondary schooling, so-called tertiary or higher education, to encourage young people to get as much education as possible.

In higher or tertiary education, there is considerable variance in structure and governance. In countries such as the United States, Germany and Switzerland,

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2 According to the World Bank, only 37 of 155 developing countries have achieved universal primary school completion (www.developmentgoals.org/Education.htm). The MDG statement says: “Education is development. It creates choices and opportunities for people, reduces the twin burdens of poverty and diseases, and gives a stronger voice in society. For nations it creates a dynamic workforce and well-informed citizens able to compete and cooperate globally – opening doors to economic and social prosperity.”
higher education is largely managed at regional, often the state (Land) level, while in countries such as France, tertiary education is a federal or central government responsibility. Countries such as the US have more private than public universities, and some of the private colleges and universities aggressively recruit foreign students to generate tuition revenues. With more OECD countries allowing foreign graduates of local universities to remain and work, aggressive recruitment coupled with rapid income growth in East and Southeast Asia have allowed universities in some countries to become important immigration gatekeepers. This means that, for a young person considering migration for employment abroad, being admitted to study may overcome the highest hurdle to developed country labor markets.

There is little systematic analysis of the implications having universities be immigration gatekeepers for sending or receiving country labor markets and economies. This Working Paper reviews data on foreign students in developed countries, the effects of moving human capital over borders, and the US experience with foreign student selection, stays, and significance. The conclusions emphasize the importance of watching closely developments in international student mobility.

**Overview**

The OECD (2004, 7) reported that “international student mobility to OECD countries has doubled over the past 20 years” for four major reasons. Institutions and governments in host nations have encouraged the arrival of foreign students to:

- promote mutual understanding by having students participate in exchange programs that involve study in another country;
- augment the local human capital stock quickly in countries of origin by sending students abroad,
- generate revenues for educational institutions in host countries by exporting educational services, and

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3 The OECD refers to the broader concept of “cross-border” higher education, meaning that students study or teachers teach outside their home countries, that is, student and faculty migration. However, the OECD also includes as cross-border education institutions that establish branch campuses and offer courses outside their home countries, so that students can learn in “foreign institutions” without migrating. This broader internationalization or globalization of higher education is also reflected in joint ventures between foreign and local universities, such as programs that allow a student to study mostly in her own country, but finish abroad and earn a degree from a foreign university. Even more recent is cross-border education centered on distance or e-learning.

4 Many countries hope that exposure to the people and institutions of developed countries will influence foreign students who return to think favorably about the country where they studied.
• attract skilled migrants for employment in the host economy after graduation. The recent growth in foreign student numbers is driven by the last two reasons, generating revenues, an estimated $30 billion a year (two-thirds in the US and UK),\(^5\) and attracting skilled immigrants. The focus of this WP is on this fourth reason, attracting foreign students “as a means of supporting economic growth and competitiveness in a knowledge economy...to attract skilled students that may become skilled immigrants.” (OECD, 2004, 210)

The International Standard Classification of Education (1997) divides post-secondary education into three categories:
• category 4 is education with a content similar to upper secondary schooling,
• category 5 is undergraduate education and
• category 6 is education for advanced degrees.
Foreign students are generally considered to be those enrolled in ISCED categories 5 and 6—category 5 is subdivided into 5A for university degrees and 5B for practical or occupational training that leads to direct entry into the labor market. It should be noted that some of those who wind up as foreign students are first enrolled as category 4 students, as when they arrive to learn the language before enrolling in universities.

There were 1.5 million foreign students in OECD countries in 2001, including 840,000 in the 22 European OECD countries, 520,000 in the three North American OECD countries, and 190,000 in the Asia-Pacific OECD countries (OECD, 2004, 194-95). By country, the US had 30 percent of foreign students, UK 14 percent, Germany 13, percent, France, 9 percent, Australia 7 percent, and Japan 4 percent. Some 85 percent of all foreign students are in OECD countries, and almost 60 percent of the foreign students in OECD countries were from outside the OECD—Russia is the only non-OECD country among the top-10 hosts of foreign students. China is the source of 10 percent of the students in OECD countries, followed by Korea, 5 percent, India and Japan, 4 percent each, Turkey, 3 percent, and Malaysia, 2 percent (OECD, 2004, 197). European students who go abroad tend to stay in Europe, while Asian students tend to go to the US.

Most OECD governments favor international student mobility for some or all of the four reasons above, and most have taken specific steps in the past decade to facilitate the entry and stay of foreign students. In countries such as the US, where foreign-born students are the majority of those enrolled in science and engineering doctoral programs, one argument for liberalizing foreign student

\(^5\) The $30 billion estimate includes tuition payments as well as student travel and living costs. However, for the US, where revenue from foreign students is estimated to be $11-$12 billion a year, numbers of foreign students are multiplied by average tuition and living costs without regard to how many students actually pay (full) tuition—many of those in graduate school do not pay (full) tuition.
admissions is that they preserve research in fields of study shunned by local students. If US institutions want to maintain instruction and research in these shrinking areas, the presence of the foreign students lowers the average cost of educating local students enrolled in subjects such as agriculture.

Many European countries offer “free” higher education, and countries such as Denmark, Germany, Norway, and Sweden do not charge tuition to domestic or foreign students. Other countries require students to pay at least some fees, but do not charge foreign students more than domestic students, including France, Italy, Japan, and Spain. Finally, some countries require all students to pay tuition and fees, and charge foreign students more than domestic students, including the major immigration countries as well as the Netherlands, Switzerland, and the UK. If the goal of a country is to attract foreign students who can remain and work after graduation, the approach of the countries that charge higher fees winds up maximizing revenue for educational institutions as well as opening doors to skilled immigrants.

Table 1. Tuition and Education Export Earnings, 2001

<table>
<thead>
<tr>
<th>Tuition and Education Export Earnings, 2001</th>
<th>Selected Countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>Denmark, Germany, Norway, Sweden</td>
</tr>
<tr>
<td>Same</td>
<td>France, Italy, Japan, Spain</td>
</tr>
<tr>
<td>Higher</td>
<td>Australia, Canada, Netherlands,</td>
</tr>
<tr>
<td></td>
<td>Switzerland, UK, US</td>
</tr>
<tr>
<td>2001($bill) Share</td>
<td></td>
</tr>
<tr>
<td>Australia</td>
<td>2.1</td>
</tr>
<tr>
<td>Canada</td>
<td>0.7</td>
</tr>
<tr>
<td>UK</td>
<td>11.1</td>
</tr>
<tr>
<td>US</td>
<td>11.5</td>
</tr>
</tbody>
</table>

Source: OECD, 2004, Tables 1.2 and 1.3

None means no tuition/fees for international and domestic students,
same means international do not pay more than domestic
higher means international students pay more than domestic students
Share is percent of the country’s service exports

There were an estimated 1.8 million foreign students in higher education institutions in OECD countries in 2000, including a third in the US. About 40 percent of these foreign students are moving within the OECD, from one OECD country to another, but 60 percent are from non-OECD countries, which explains why most OECD member countries receive far more foreign students than they
send abroad. For example, there are 23 foreign students in Australia for each Australian studying abroad, while the largest non-OECD source of foreign students is China, accounting for 10 percent of the foreign students in OECD countries. The fastest growth in foreign student enrollment in the 1990s has been in the UK and Australia.

**Europe**

The 30 European countries have 4,000 institutions of higher education enrolling 16 million students, with most enrolled in public institutions that charge no or low tuition. During de-colonization in the 1950s and 1960s, many countries established programs that allowed students from former colonies to enter for study, as they had in colonial times, and many of the post-colonial foreign students received government scholarships from the former colonial power or from the newly independent government. During the Cold War, some governments provided scholarships in the hope that future leaders of developing countries would be allies in the fight against communism.

Most European nations welcomed the presence of foreign students to enhance the educational experiences of domestic students and to achieve foreign policy goals. However, reductions in government support for higher education encouraged universities in some European countries, especially Britain[^6] and the Netherlands, to recruit non-EU foreign students in the 1990s who paid full fees (three to 10 times more than local students); some educators also noted that the foreign students tended to study sciences that were of declining interest to local students.

During the 1990s, there were expanded efforts to recruit foreign students, using the internet to provide a central web site that serves as a portal to higher education opportunities in particular countries, such as (www.hero.ac.uk/), (www.daad.de), (www.edufrance.fr/) and (www.studyinsweden.se/). Most of these sites focus on the opportunities and costs of studying in the country, but some emphasize that foreign students may work while they study and after they graduate. For example, the UK allows non-EU foreign students to work up to 20 hours a week while studying, allows spouses of students to work, and permits graduates to remain in the UK and work (www.dfes.gov.uk).[^7]

[^6]: Prime Minister Thatcher between 1980 and 1982 encouraged the admission of fee-paying foreign students, and liberalization that allows foreign graduates to stay and work helps the UK to obtain “the skilled human resources needed to make the UK a more internationally competitive trading nation and to maximize export earnings by selling education services to paying customers.” (Elliot, 1998, 332)

[^7]: The separate Highly Skilled Migrant Program, begun in January 2002, allows educated non-EU professionals to enter the UK and seek employment without having a job offer (www.ind.homeoffice.gov.uk).
Data on foreign students in Europe must be interpreted with care because they include foreigners born in the country as well as those who arrived to study and expect to depart upon graduation. In countries such as Sweden and Switzerland, foreigners born in the country who are not naturalized are considered to be foreign students, and half of the foreign students in Sweden and Switzerland were resident foreigners in 1999 (a third in Germany). On the other hand, many countries do not include as foreign students those enrolled in programs that last less than one year, as with many exchange students who pay fees to institutions in their home countries and those enrolled in a branch of the home university located abroad.

The OECD estimated that there were 857,000 foreign students in European universities in 2001, including over 90 percent in the ten countries that each had more than 15,000 foreign students and 75 percent in the Big 3 countries—UK, Germany, and France. However, the highest share of foreign students was in Switzerland, where 17 percent of the students were foreigners. Europe hosts more foreign students than the US, but over 50 percent of Europe’s foreign students are from other European countries, while most foreign students in the US are from Asia.

**Table 2. Foreign Students in Selected European Countries, 2001**

<table>
<thead>
<tr>
<th>Country</th>
<th>For Students</th>
<th>Total</th>
<th>Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>31,682</td>
<td>264,017</td>
<td>12%</td>
</tr>
<tr>
<td>Belgium</td>
<td>38,150</td>
<td>359,906</td>
<td>11%</td>
</tr>
<tr>
<td>France</td>
<td>147,402</td>
<td>2,019,205</td>
<td>7%</td>
</tr>
<tr>
<td>Germany</td>
<td>199,132</td>
<td>2,074,292</td>
<td>10%</td>
</tr>
<tr>
<td>Italy</td>
<td>29,228</td>
<td>1,826,750</td>
<td>2%</td>
</tr>
<tr>
<td>Netherlands</td>
<td>16,589</td>
<td>502,697</td>
<td>3%</td>
</tr>
<tr>
<td>Spain</td>
<td>39,944</td>
<td>1,815,636</td>
<td>2%</td>
</tr>
<tr>
<td>Sweden</td>
<td>26,304</td>
<td>360,329</td>
<td>7%</td>
</tr>
<tr>
<td>Switzerland</td>
<td>27,765</td>
<td>163,324</td>
<td>17%</td>
</tr>
<tr>
<td>UK</td>
<td>225,722</td>
<td>2,070,844</td>
<td>11%</td>
</tr>
<tr>
<td>Big 3</td>
<td>572,256</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Top 10</td>
<td>781,918</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>856,733</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source. OECD, 2004, Table 3.2

Within the 25 member EU, there is a fundamental distinction between EU nationals and non-EU nationals, so that a German student in the Netherlands has different rights than a Russian student in the Netherlands. A cornerstone of the
EU is freedom of movement, the freedom of EU nationals to seek non-
government jobs throughout the EU on an equal basis with local workers (See
the appendix for a discussion of free movement under Nafta). European Court of
Justice decisions have made clear that EU nationals also have equal access to
universities throughout the EU, which means they pay the same fees as local
students although their EU host governments do not have to provide living
allowances to non-national students (OECD, 2004, 92).\(^8\)

The EU encouragement the mobility of students, with the ERASMUS program\(^9\)
supporting over a million student exchanges between 1987 and 2002\(^10\) (OECD,
2004, 1.10), but most EU students who study in another EU country do so
without ERASMUS support.\(^11\) The countries with the largest foreign student
"surplus" are the UK and Ireland, which hosted almost two foreign students
for each one they sent abroad in 1997-98, while Finland and Italy sent almost two
students abroad for each ERASMUS student they hosted.\(^12\) ERASMUS also
supports non-EU students. For example, the Mundus program will provide €180
million to enable 4,200 non-EU students to study in EU countries for masters
degrees.

Money is not the only obstacle to foreign study: diversity in degree paths can
complicate the transfer and recognition of credits and diplomas between
countries. An ambitious effort to standardize higher education in Europe is the
Bologna Process, named for the Italian city where in 1999 representatives of 29
European countries agreed to create a common European Higher Education Area
by 2010 (some 40 countries now participate). The goal is to make standard a
three-year bachelor's and a two-year master's degree, and one side effect of this
3-2 system should be to make participating universities more attractive to EU as
well as non-EU foreign students. One scenario imagines students getting a
bachelor's degree in their country of citizenship and a master's in a
English-language program in another EU country, increasing their attractiveness to

\(^8\) The EU's education and research portal is: http://europa.eu.int/eracareers/
\(^9\) Named for Erasmus of Rotterdam, a Renaissance wandering student who moved from one
European center of learning to another in the Middle Ages.
\(^10\) Exchange education programs--Comenius for schools, Erasmus for higher
education, Leonardo da Vinci for vocational training and Grundtvig for adult
education—are considered some of the most successful EU programs. In July 2004,
significant budget increases for them were announced, including a goal of having three
million Erasmus students by 2011.
\(^11\) http://europa.eu.int/commission/education/programmes/socrates/erasmus/erasmus_en.html
\(^12\) Some 86,250 students participated in ERASMUS in 1997-98 (OECD, 2004, Table 3.1) The ratios
of foreign students in and local students out are larger for all students—the UK in 2001 received 9
foreign students for each one that it sent abroad, Belgium 3.8 and Switzerland 3.5, while Italy sent
1.6 students abroad for each foreign student received (OECD, 2004, Table 3.4).
multinational employers.\textsuperscript{13} Although questions of quality and accreditation have not been fully resolved, university systems in the vanguard of moving to the new 3-2 system include Austria, the Netherlands, and Norway, but there is strong resistance in Switzerland and Greece.

Most European countries allow students to work at least part time while they study (up to 20 hours a week is the usual standard). This has prompted some migration for (hard-to-police) part-time employment—there are estimates that at least 5,000 foreigners a year enter the UK with student visas from "bogus" private universities, some of which do not have classrooms etc, leading to a threat from the home secretary to crack down on educational "fronts" for foreign workers.\textsuperscript{14} The UK has seen a proliferation of private colleges, many with London in their name, that can secure visas for students because there is no definitive list of accredited UK institutions. In 2002, some 379,000 foreign students were admitted to the UK, including 270,000 to universities.

**Australia, Canada, and Japan**

Australia has one of highest percentages of foreign students among OECD countries—15 percent of those enrolled in higher education are foreigners on student visas. Australia had 129,000 foreign students enrolled in higher education institutions in 2001, and a total 233,400, including those in English-language and vocational programs. Some 110,500 student visas were issued in 2003, and a sixth went to Chinese students, followed by Americans, Koreans, and Indians.\textsuperscript{15} The value of Australia’s "education exports," consisting of tuition and fees as well as the expenditures of foreign students while they are in Australia, were A$5 ($3.6) billion in 2003, or an eighth of Australia’s services exports.

Government policy changes between 1985 and 1988 required universities to cover more of their costs from student tuition payments, and the government embarked simultaneously on a policy of "Asianization," prompting some of Australia’s universities to market themselves to fee-paying Asian students. The Australian advantages as a place to study, they emphasized, include centralized standards for quality and tuition and relatively low living costs. IDP Education Australia (www.idp.com/), an umbrella organization supported by all but one of


\textsuperscript{14} Donald MacLeod, "The real thing?: Private colleges and their students are being harmed by cowboys operating visa scams," The Guardian, April 20, 2004.

\textsuperscript{15}www.idp.com/marketingandresearch/research/internationaleducationstatistics/article593.asp
the country’s universities, has 72 offices in 39 countries and territories to recruit foreign students.

IDP is very optimistic about growth in foreign student enrollments—it projects 560,000 by 2025, a quadrupling to about the same number as in the US today. In contrast to the US after the September 11, 2001 terrorist attacks, the Australian government made it easier to obtain student visas, although controls have been tightened for some Chinese because of persistent overstaying after graduation.

Canada has 160 degree-granting universities and 230 community colleges, most organized and funded at the provincial level. Canada had 133,000 foreign students in 2001, more than double the 63,000 of 1995, and the leading countries of origin were China and South Korea 20,000 each, followed by the US and Japan, about 12,000 each. As in other OECD countries, many of the foreign students are enrolled in language and vocational schools—Canada does not require study permits (student visas) for foreigners in the country for courses that last less than six months. In contrast to the number of foreign workers, which was relatively stable in the past decade, the number of foreign students admitted to Canada more than doubled.

Table 3. Foreign Students and Workers admitted to Canada, 1990-2002

<table>
<thead>
<tr>
<th>Year</th>
<th>For Students</th>
<th>For Workers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>30,677</td>
<td>85,381</td>
</tr>
<tr>
<td>1991</td>
<td>30,700</td>
<td>77,858</td>
</tr>
<tr>
<td>1992</td>
<td>29,420</td>
<td>70,489</td>
</tr>
<tr>
<td>1993</td>
<td>28,189</td>
<td>65,433</td>
</tr>
<tr>
<td>1994</td>
<td>28,059</td>
<td>67,549</td>
</tr>
<tr>
<td>1995</td>
<td>32,648</td>
<td>69,617</td>
</tr>
<tr>
<td>1996</td>
<td>40,092</td>
<td>71,390</td>
</tr>
<tr>
<td>1997</td>
<td>42,597</td>
<td>75,452</td>
</tr>
<tr>
<td>1998</td>
<td>41,280</td>
<td>79,788</td>
</tr>
<tr>
<td>1999</td>
<td>51,629</td>
<td>85,932</td>
</tr>
<tr>
<td>2000</td>
<td>62,984</td>
<td>94,893</td>
</tr>
<tr>
<td>2001</td>
<td>73,607</td>
<td>95,555</td>
</tr>
<tr>
<td>2002</td>
<td>68,820</td>
<td>67,910</td>
</tr>
<tr>
<td>Ave 1991-2000</td>
<td>38,770</td>
<td>75,840</td>
</tr>
</tbody>
</table>


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16 IDP also assists foreign governments seeking advice on how to manage higher education systems. David Cohen, "Australia Has Become the Academic Destination for Much of Asia. Can It Handle the Influx?, Chronicle of Higher Education, January 31, 2003
With a study permit, foreigners can work on campus without work permits, but work permits are needed to work off campus, including in intern programs that take less than 50 percent of the study time. In order to hire foreign students for off-campus work, Canadian employers must obtain a "job-confirmation" or "labor market opinion" from Human Resources and Skills Development Canada (HRSDC), confirming that local workers are not available to fill the job. After graduation, students who get job offers from Canadian employers can work for up to one year, and employers can hire them without testing the labor market for local workers (www.cic.gc.ca/english/study/info-students.html). If a foreign student wants to immigrate as a skilled worker, education and study in Canada can add up to 10 points to the 67 needed to qualify for a skilled worker or independent immigration visa.¹⁷

In 1983, when Japan had 10,500 foreign students, Prime Minister Yasuhiro Nakasone announced that Japan would welcome 100,000 foreign students to internationalize Japanese universities. Foreign student enrollment climbed steadily, and in 2003 there were 110,000 foreign students among the 3.1 million students in Japan’s higher education system. Many of these foreign students were supported by the Japanese government: the number of foreign students with Japanese support rose sevenfold between 1978 and 2001, but the total number of foreign students in Japan increased even faster, by a factor of 13 (OECD, 2004, 239).

Some 70 percent of the foreign students in Japan are Chinese who have been welcomed by junior colleges scrambling to find students as the number of 18-year olds shrinks.¹⁸ Foreign students often say that it is not easy living in Japan. Many landlords refuse to rent housing to them without a Japanese guarantor to cover any unpaid rent and damages. Because of the high cost of living, many foreign students work part time, especially self-sponsored students, seeking jobs via student networks. School administrators say they have a hard time monitoring whether foreign students obey part-time work rules—those enrolled in ryugaku (colleges) can work up to 28 hours a week while those in shugaku (pre-college or language school) can work up to 4 hours a day (8 hours a say

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¹⁷ Since September 2003, there are a maximum 100 points in six categories, up to 25 for education, up to 24 for language, up to 21 for work experience, and up to 10 each for age, arranged employment in Canada, and adaptability or Canadian work or education experience—applicants must score at least 67 points to qualify for an immigration visa (www.cic.gc.ca/english/skilled/index.html)

¹⁸ Sakata Junior College, in Yamagata prefecture several hundred miles north of Tokyo, was forced to close when in 2001 when the Immigration Department refused to approve foreign student visas when it was discovered that most of the students were working on Tokyo. Alan Brender, “Japan’s Junior Colleges Face a Grim Future,” Chronicle of Higher Education, November 14, 2003
during school breaks). Especially if students have several jobs, it is very hard for school administrators or government agencies to monitor their employment.\textsuperscript{19}

Upon graduation, foreign students are expected to change their status to foreign worker—"gijutsu" for technical skills such as IT workers and "Jinbunchishiki-kokusaigyoumu" for business workers. Foreign workers with professional skills can remain indefinitely, but must have their work and residence permits renewed every six months or one year. Some foreign students remain in Japan after their studies end and work illegally, so-called overstayers; the government says that half of the irregular workers in Japan arrived with student visas. In response to high overstay rates, the Immigration Bureau in November 2003 established stricter screening procedures for those applying for "ryugaku" (college) and "shugaku" (pre-college or language school) visas from countries with the highest number of visa overstayers – China, Myanmar, Bangladesh and Mongolia. As a result, a sample of 400 Japanese language schools reported in spring 2004 that 70 percent of the applications from Chinese language students were rejected.\textsuperscript{20}

The experiences of Australia, Canada, and Japan are quite different. Australia aims to expand foreign student enrollments, believing it has a comparative advantage in the growing service industry of providing English-language higher education to foreigners. Canada looks to foreign students as potential workers and immigrants, and has adjusted its point system to allow easier transitions from student to work and residence. Japan achieved its goal of increasing foreign student enrollment, but reacted to problems with overstaying and crimes committed by foreign students by making it more difficult for those from some countries to get student visas.

**Asia: Growth Outstrips Capacity**

Asia, home to almost 60 percent of the world’s residents and the source of half of the world’s foreign students, has insufficient capacity to teach the growing number of students seeking higher education. The tradition of middle-class families paying for higher education, and the fact that many families want an English-language education for their children, provides a perfect match for universities in English-speaking countries recruiting fee-paying students. Almost three-fourths of Asians who leave their countries to study go to English-language countries, including almost half to the US in a process described by the OECD as offering Asians entrée to the global labor market: “a growing number of the rising generation and those who can invest in their own mobility and for whom

\textsuperscript{19} Foreign students are entitled to minimum wages while working part-time, but those in Japan less than one year do not participate in the Japanese health insurance system.


Many Asian students remain in the countries in which they studied, prompting the OECD to conclude that “much of the cross-border demand for American...education is migration-related.” For example, 88 percent of the Chinese recipients of PhDs from US universities were working in the US in 1995, as were 80 percent of the Indian PhDs (OECD, 2004, 138). In one survey, 50 percent of doctoral students from China and India had “firm plans” to stay after graduation. To explain how Chinese families can afford to send their children abroad for higher education, the OECD noted that, instead of passing on lifetime savings to their children, many families are “more interested in using these savings to invest in their children’s education. This is a distinctive Chinese feature.” (OECD, China, 2002, 789-790).  

The links between education and emigration may be clearest in the Philippines, a country of 80 million with perhaps 10 percent of its population abroad. In 2000, about 18 percent of Filipinos with college degrees were in the US, 60 percent women. Almost three-fourths of the Filipinos in Philippine higher education are in private institutions but, because salaries for graduates in the Philippines are relatively low, many Filipinos in college are considering overseas employment upon graduation, which explains the tendency to study subjects in relatively low-cost institutions that adhere to international standards in fields such as nursing.

About half of the secondary school graduates in industrial countries enter higher education institutions, versus a quarter of those in middle-income developing countries. One remarkable finding of surveys of international students is that over 90 percent rely on family or personal resources to pay for their foreign education (EduWorld, 2001). Some universities have recruiting agents in Asian countries who receive 10 to 20 percent of the first-year’s tuition payments for each student recruited who enrolls. However, the high cost of study and living abroad has also encouraged the spread of branch campuses and twinning arrangements, under which well-known foreign universities establish generally English-language branch campuses in developing countries. Students take the

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21 Not all of the Chinese seeking higher education will go abroad. By some estimates, the Chinese desire for higher education will increase university student enrollment in China from 8 million in 2000 to 45 million by 2025. (OECD, China, 2002, 787-8).
22 The OECD (2004, 150) noted that “an extraordinary 0.6 percent of GDP is absorbed in scholarships and loans largely for bumiputra families” in Malaysia. Most of the bumiputra (sons of the soil) who study abroad return to Malaysia, in part because of conditions on their scholarships.
23 Yakub Qureshi, “Foreign Student Headhunters Bag Thousands In Fees,” Scotland on Sunday, July 18, 2004
first two or three years of classes in country, go abroad for the last year or two of study and receive a foreign university degree.

The spread of for-profit private universities has raised quality and fraud concerns. In some cases, "universities" hand out degrees to "students" who pay fees but do not attend classes, while in others students pay tuition hoping to get an education they do not receive. Education is often a case of asymmetric information—the school typically has far more information on its relative quality than (potential) students, and lower-quality institutions can crowd out higher-quality institutions, especially when foreign universities establish branch campuses abroad (Akerlof, 1970). The growing uncertainty about the quality of the proliferating number of educational institutions complicates the process of credentials recognition and further encourage students to study in the country in which they want to work in order to have recognized qualifications.

**GATS and Trade in Education**

The General Agreement on Trade in Services (GATS), effective in 1995, aims to liberalize trade in services, including educational services. Educational services include encouraging students to move over borders to study, teachers to migrate to teach, and universities to establish branch campuses abroad or to offer courses via distance learning. The globalization of higher education, especially via the activities of private for-profit entities, has raised concern in European countries that provide "free" education to foreign and domestic students and raised questions in high-tuition countries that provide subsidized loans about which institutions and students should be eligible.

Many leaders of established universities are skeptical of the trend to treat higher education as a business that generates revenue by recruiting foreign students, establishes branch campuses abroad, and/or provides education via distance learning (OECD, 2004, 90). The 2002 Porto Alegre Declaration, signed by Iberian and Latin American associations and public universities, strongly opposes trade in educational services, arguing that allowing public and private universities to establish branch campuses around the world would reduce quality controls and encourage governments to reduce support for local universities. Weaker local universities, in turn, could increase in social inequalities, weaken ethical and cultural values, and erode sovereignty by standardizing education (Larsen and Vincent-Lancrin, 2003). A Joint Declaration on Higher Education and the GATS signed by North American and European educators also urged caution in expanding educational services, warning that "free trade" could negatively affect the quality, accessibility and equity of higher education systems.

The GATS excludes services provided "in the exercise of governmental authority." Most governments assert that publicly provided and funded services
are not covered in their GATS commitments, and that GATS rules for trade in educational services apply only to privately funded institutions. However, increased standardization in higher education systems is likely to increase competition between institutions within and across borders by facilitating comparisons of quality and cost. This means that if more flexible private institutions develop new methods of teaching that prove cost-effective, including internet-based learning, there will be pressure on public institutions to follow.

The GATS covers four major modes of providing services across borders:

- **Mode 1. Cross-border supply** are services provided from the territory of one country to another, such as distance learning when courses are sent via the internet from one country to another.

- **Mode 2. Consumption abroad** are services provided within a country to consumers from other countries, such as students crossing borders to study at fee-charging institutions.

- **Mode 3. Commercial presence** are services provided via a subsidiary abroad, as when a university in one country establishes a branch in another.

- **Mode 4. Temporary movement of natural persons** involves teachers or researchers crossing national borders for employment abroad.

Most industrial countries permit private institutions to offer tertiary education, and some allow foreigners to open and operate private institutions inside their borders. If GATS member countries allow private educational institutions to operate and open them to foreign providers, two GATS principles come into play—most favored nation (MFN) treatment and transparency. MFN means that there cannot be discrimination between private educational providers from different WTO member nations— if Canadian universities are allowed to open branch campuses in the US, then branch campuses should be allowed in the US from all WTO member countries, unless there is a contrary regional trade agreement. Transparency means that WTO member nations are to clearly lay out the rules foreigners must follow to provide educational services in their territory.

The globalization of higher education has been accompanied by rising fraud, exemplified by the rise of so-called diploma or degree mills that sell degrees based on the "experience" of students rather than study. Some degree mills have classrooms and libraries, and some ask "students" to prepare "theses" based on their lifetime experiences, but most give diplomas in exchange for payments. Customers in developed countries usually realize that the degrees they are buying are not the same as those earned in accredited institutions, but some students in developing countries who thought they would get an education as well as a diploma are cheated.
Brain Drains and Gains and Economic Growth

The brain drain has been a fear of developing country governments since the 1960s, when the global push to accelerate economic development coincided with de-colonization and rapid economic growth in industrial countries. Neoclassical economics concludes that the outflow of labor from a country, unskilled or skilled, slows economic growth in the sending country, since all resources are assumed to be fully employed and paid the value of their marginal productivity. However, neoclassical economics also expects convergence between labor sending and receiving areas, since the emigration of labor should raise wages in the origin area and lower them in the destination area.

Human Capital

Human capital refers to the knowledge, skills, and capabilities of individuals that generate economic output. Human capital averages about two-thirds of the total value of the capital of most developed economies, which also includes land, machinery, and other physical assets. The value of human capital is often apparent after physical destruction, as in World War II, when many of the German and Japanese cities that were bombed intensely were soon able to recover 80 to 90 percent of their previous levels of production.

Unlike financial and physical assets, human capital is embodied in people, and was first discussed extensively by two Nobel Prize-winning economists, Theodore Schultz (who won the prize in 1979) and Gary Becker (1992). Their contributions explained how a personal decision to sacrifice earnings today for a higher return tomorrow could be analyzed in the same way that a business considers whether to buy new machinery—does the future return cover the current cost and provide a profit? A nation’s stock of human capital and thus its economic growth potential could be increased, they reasoned, if governments reduced the cost of schooling and more people would study as the reward for more education rose with the shift toward a service-based economy.

The basic model of human capital acquisition compares the present value of the income streams from school followed by work with going to work immediately—rational individuals are assumed to choose the option that maximizes the present value of lifetime earnings. The major costs of schooling are foregone earnings while studying plus tuition and fees (living costs have to be paid whether studying or working), and the benefits are generally higher earnings after graduation. The alternative to schooling is going to work immediately, so differences in wages by level of education and their timing are critical variables in determining how much schooling is optimal.

Estimates of the private or personal rate of return to a college education range from 12 to 40 percent in most countries, which exceeds the return on most
investments in stocks and bonds. The average rate of return to completing a primary school education was estimated to be 29 percent in the early 1990s, 18 percent for secondary schooling, and 20 percent for higher education (Psacharopoulos), but there was variance by region. In developing African countries, rates of return were 39, 19, and 20 percent, respectively, while in the OECD countries, rates of return were 22, 12, and 12 percent, respectively. The social rate of return may be even higher than these private rates if highly educated individuals also provide leadership, commit fewer crimes, and have more entrepreneurial spirit.

Since human capital is embodied in people, a key ingredient for growth can be lost when the highly educated leave. Empirical studies confirm that, across countries and over time, lower levels of education are associated with slower productivity and economic growth. For example, Barro and Sala-I-Martin (1995) used data from 111 countries over several decades to conclude that raising the average level of education of a country’s workforce by one year results in an average 5 to 15 percent increase in productivity, in part because the additional human capital was associated with more dynamism, innovation, and creativity, which made countries with more educated people more attractive to local and foreign investors.

**Internationalists and Nationalists**

Most of brain drain literature deals with the migration of educated people from developing to developed countries, not students who are going abroad to increase their human capital. The effects of the brain drain on the development of emigration countries are marked by two extremes. At one end are “internationalists” such as economist Harry Johnson, who asserted that, because voluntary migration from poorer to richer countries increases the incomes of migrants as well as global income, economically motivated migration is good even if emigration countries are worse off; he argued that the global gains in output offset any country-specific losses. Johnson believed that there were few losses associated with the emigration of the “best and brightest” for sending countries, and that any identified could be dealt with by changing the way education is financed, such as having students rather than the government pay for higher education.

The opposite “nationalist” perspective for assessing human capital losses focuses on the nation state rather than the individual as the appropriate unit of analysis. Economist Don Patinkin argued that every developing country needs a critical mass of talent to lay the basis an economic take off, so that the emigration

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24 Migration, “like any profit-motivated international movement of factors of production—may be expected to raise total world output.” (Johnson 1968, 75).
of “too much” human capital could keep a country poor by trapping it in a low-level equilibrium in which labor is sustained and reproduced because of remittances from migrants abroad (Patinkin 1968, 93). Endogenous growth theories, which stress the role of educated workers in accelerating innovation and productivity growth, support the nationalist perspective, emphasizing the positive externalities and spillover effects of highly educated people on economic growth, and warning that the movement of human capital from poorer to richer countries can slow growth in developing countries (Mayer, 1996; Straubhaar, 2000).

**Brain Drains, Gains, and Exchanges**

The increased migration of human capital from developing to developed countries in the 1990s, in the form of more foreign students and more highly skilled workers such as IT specialists and nurses, was accompanied by a new literature that reached a counterintuitive conclusion: the emigration of human capital from a developing country can leave it with more educated workers. This conclusion rests on assumptions, not empirical evidence, and the reasoning goes as follows. Students in developing countries realize that, because of the possibility of emigrating and earning higher wages, the return to more schooling is higher than if their only option was staying home. This higher return inspires some students to get more education in anticipation of emigration, but not all of those who intend to leave actually emigrate, and the developing country winds up with more human capital than it would have had in the absence of emigration (Mountford, 1997; Beine, Docquier and Rapoport, 2001).

The practical implications of this brain-gain-from-brain-drain theory are limited, since there are few closed societies that can switch from no emigration to some emigration and thus increase their stock of human capital. Furthermore, while the theory suggests that there is an “optimal level” of brain drain, low enough to avoid a vicious downward spiral from the exodus of human capital but high enough to encourage more residents to get more schooling, there has not yet been any consensus on whether this optimal emigration level is 10, 20, or 30 percent of a country’s highly educated workers. Globally, about 10 percent of the professionals from developing countries are believed to be in developed countries, but the range of skilled worker emigration from developing countries is from less than one percent to over half (Martin, 2003a).

The second way in which a brain drain could paradoxically turn into an economic plus for migrant countries of origin is if a well-educated Diaspora abroad sends home remittances and promotes investment, trade, and technology transfers that accelerate development. While there has been a great deal of speculation about the potential of Diaspora-led development, the examples cited do not offer clear evidence that having large numbers or a high share of a
country’s educated persons abroad automatically benefits countries of origin. For example, it is often said that there are as many doctors from particular African countries abroad than there remain in the doctors’ country of origin, or as many nurses from Caribbean island nations abroad as at home, but there is little evidence that these health worker Diasporas have had significant effects on the development of their countries of origin.

The model for Diaspora-led development is the Indian IT industry: the emigration of Indian IT workers in the 1980s and 1990s led to the creation of a significant service export industry that has improved IT services in India and created jobs there. In the mid-1980s, India had about 7,000 IT specialists, and multinationals recognized their talent and moved some to operations abroad. The Indian government initially opposed expanding IT, fearing job losses, and firms such as Tata evolved to move Indian IT workers overseas. Some of these Indians abroad realized they could return some work to India, and persuaded the Indian government to bolster the budding IT industry by reducing barriers to imports of computers, help to assure reliable infrastructure, and allow the state-supported Indian Institutes of Technologies to use merit to set quality benchmarks for education.

The result was a Diaspora-led success. India in 2003 had about 700,000 IT workers and has become world-renowned for low-cost and high-quality IT services, generating about $12 billion a year in export revenues. The benefits of this emigration-led growth included a sharp jump in students studying science and engineering and the provision of world-class IT services to private firms and government agencies in India.

In some African countries, by contrast, a vicious circle seems to link migration and development. Many former British colonies train nurses and other health care workers to world-class standards, which makes it easier for them to emigrate to fill jobs in expanding health care sectors, including the British National Health System. Nursing wage gaps in 2004 were 16 to 1, reflecting $31,000 a year for an RN to start in the NHS, versus $1,900 a year in Malawi, and many nurses seeking higher wages are emigrating. African leaders argue that the loss of human capital via emigration erodes the value of foreign aid—South Africa estimated it spent $1 billion educating health workers who emigrated, the equivalent of a third of all development aid it received from 1994 to 2000. As a result of African complaints, the annual assembly of the World Health Organization urged developed nations to negotiate recruitment agreements with
developing countries that avoid “aggressive recruitment” of health care workers and include compensation for the lost investment in training nurses.25

There is no easy answer for why some migration flows lead to virtuous and others to vicious circles, just as in some cases remittances accelerate development while in others they fuel inflation. It is sometimes said that, if a country is ready to develop economically, emigration and remittances help, and if a country is not ready for a take off, they do not help. IT and health care are very different sectors: IT services are largely produced and consumed in the private sector, and IT can be provided with brains and ever-cheaper technology, while health care services tend to increase in cost over time. Governments strongly influence the demand for health care via provision of clinics and hospitals and charges for patients and drugs, and they affect the supply of health care workers via subsidized training and by setting salaries and working conditions.

The economics literature and common sense suggest that, in service-oriented economies in which human capital is an increasingly important determinant of individual earnings and a nation’s productivity and economic growth, it makes sense to maximize the stock of human capital. Governments can influence individual decisions about how much human capital to acquire by mandating participation in “free schooling,” prohibiting children from working, and subsidizing education beyond the mandatory age for school attendance. However, dealing with tertiary or higher education is more difficult— it is relatively expensive and, if graduates leave, they take their human capital with them. On the other hand, if students go abroad to study and stay abroad to work, the developing country loses only the investment in their primary and secondary schooling and their potential contributions to development at home, which may be offset by remittances and nationals abroad who steer investment to their countries of origin.

There is no consensus in the literature on the impacts of foreign students moving abroad to study, and staying abroad to work, on growth in developing countries. Iredale’s (2003) review of the Asian experience suggests that there are three types of countries, suggesting three migration phases: mostly brain drain (Bangladesh), significant returns (China recently), and brain exchange (Taiwan). Her major conclusions are that the poorer the country, the more likely it is in the brain drain phase, that significant returns in phase two tend to follow rather than lead economic development, and that growth and globalization are required to reach phase three brain circulation. This three-phase model does not deal with

why a country is in its current phase, and what role student migration plays in keeping it there or moving to the next phase.

**US: Experience and Policy Evolution**

Studies of foreign students often focus on the US because it attracts the most foreign students, about 550,000 or a third of the 1.8 million in OECD countries in 2000. Many foreign students remain to work and settle. According to Lucas (2004, 17), 75 percent of college-educated foreign-born adults in the US arrived as foreign students.

**Selection: Numbers and September 11, 2001**

The number of foreign students enrolled in US colleges and universities has increased much faster than total enrollment. Foreign students were almost five percent of US university students in 2002-03. The number of foreign students rose slightly to 586,000 in the year after the September 11, 2001 terrorist attacks, while the total number of students in US higher education fell slightly to almost 13 million with the improving economy. The share of foreign students is highest in graduate programs, about 13 percent, and foreign students receive between 25 and 50 percent of the doctorates awarded in engineering and the physical and life sciences.

**Table 4. Foreign College and University Students in the US, 1954/55-2002-03**

<table>
<thead>
<tr>
<th>Year</th>
<th>Foreign</th>
<th>Total</th>
<th>For Per</th>
</tr>
</thead>
<tbody>
<tr>
<td>1954/55</td>
<td>34,232</td>
<td>2,499,800</td>
<td>1%</td>
</tr>
<tr>
<td>1959/60</td>
<td>48,486</td>
<td>3,402,300</td>
<td>1%</td>
</tr>
<tr>
<td>1964/65</td>
<td>82,045</td>
<td>5,320,000</td>
<td>2%</td>
</tr>
<tr>
<td>1969/70</td>
<td>134,959</td>
<td>7,978,400</td>
<td>2%</td>
</tr>
<tr>
<td>1974/75</td>
<td>154,580</td>
<td>10,321,500</td>
<td>1%</td>
</tr>
<tr>
<td>1979/80</td>
<td>286,343</td>
<td>11,707,000</td>
<td>2%</td>
</tr>
<tr>
<td>1984/85</td>
<td>342,113</td>
<td>12,467,700</td>
<td>3%</td>
</tr>
<tr>
<td>1985/86</td>
<td>343,777</td>
<td>12,387,700</td>
<td>3%</td>
</tr>
<tr>
<td>1986/87</td>
<td>349,609</td>
<td>12,410,500</td>
<td>3%</td>
</tr>
<tr>
<td>1987/88</td>
<td>356,187</td>
<td>12,808,487</td>
<td>3%</td>
</tr>
<tr>
<td>1988/89</td>
<td>366,354</td>
<td>13,322,576</td>
<td>3%</td>
</tr>
</tbody>
</table>

---

26 About 140,000 US students a year study abroad, but a smaller percentage of American students abroad than foreign students in the US graduate from institutions abroad, suggesting that most American students are participating in limited-time study abroad programs.

27 US data include only nonimmigrants, foreigners in the US on temporary or nonimmigrant visas, not include foreign-born immigrants or naturalized US citizens living in the US. About 150,000 US students were studying abroad in 2002-03, most in one-semester programs in English-speaking countries—a fifth are in the UK—or in English-language programs in non-English-speaking countries.

28 Almost 100,000 of these foreign students were enrolled in two-year community colleges.
1989/90  386,851  13,824,592  3%
1990/91  407,529  13,975,408  3%
1991/92  419,585  14,360,965  3%
1992/93  438,618  14,422,975  3%
1993/94  449,749  14,473,106  3%
1994/95  452,653  14,554,016  3%
1995/96  453,787  14,419,252  3%
1996/97  457,984  14,286,478  3%
1997/98  481,280  13,294,221  4%
1998/99  490,933  13,391,401  4%
1999/00  514,723  13,584,998  4%
2000/01  547,867  14,046,659  4%
2001/02  582,996  13,511,149  4%
2002/03  586,323  12,853,627  5%

Source: IIE,
http://opendoors.iienetwork.org/?p=35931

The September 11, 2001 terrorist attacks slowed the growth of foreign student enrollment and shifted in the origins of foreign students, increasing the number from India, China, and South Korea and reducing the number from Muslim nations, although it should be emphasized that there were well-publicized difficulties encountered by foreign students seeking student visas in many countries. Numerous organizations offer to act as go-betweens for Asian students considering study in the US—some charge the students a fee, some receive fees from the US institutions when students enroll, and some collect fees from both students and universities.

Over 55 percent of foreign students in the US were from 10 countries, all Asian except for Canada, Mexico, and Turkey. The next 10 major source countries include several European countries, such as Germany, Britain, and France. According to the UN classification that puts Russia among developed countries, 14 of the top 20 sources of foreign students in the US are developing countries.

Table 5. Leading Countries of Origin: Foreign Students in US

<table>
<thead>
<tr>
<th></th>
<th>2001/02</th>
<th>2002/03</th>
<th>Per Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 India</td>
<td>66,836</td>
<td>74,603</td>
<td>12%</td>
</tr>
<tr>
<td>2 China</td>
<td>63,211</td>
<td>64,757</td>
<td>2%</td>
</tr>
<tr>
<td>3 Korea</td>
<td>49,046</td>
<td>51,519</td>
<td>5%</td>
</tr>
<tr>
<td>4 Japan</td>
<td>46,810</td>
<td>45,960</td>
<td>-2%</td>
</tr>
</tbody>
</table>

29 The sharpest year-to-year drop was in Thai students, which is explained in part by a reduction in government scholarships available to Thais who want to study abroad.
30 These organizations include www.ief-usa.org/; www.uscampus.com/; www.studyinus.com/; www.studyinus.org/
5 Taiwan  28,930  28,017  -3%
6 Canada  26,514  26,513  0%
7 Mexico  12,518  12,801  2%
8 Turkey  12,091  11,601  -4%
9 Indonesia  11,614  10,432  -10%
10 Thailand  11,606  9,982  -14%
11 Germany  9,613  9,302  -3%
12 Brazil  8,972  8,388  -7%
13 United Kingdom  8,414  8,326  -1%
14 Pakistan  8,644  8,123  -6%
15 Hong Kong  7,757  8,076  4%
16 Kenya  7,097  7,862  11%
17 Colombia  8,068  7,771  -4%
18 France  7,401  7,223  -2%
19 Malaysia  7,395  6,595  -11%
20 Russia  6,643  6,238  -6%
Total  582,996  586,323  1%
Top 10  56%  57%
Top 20  70%  71%

Source: IIE,
http://opendoors.iienetwork.org/?p=35931

Foreign students tend to study subjects that impart skills that are transferable internationally. About 20 percent of foreign students are majoring in business and management, and another eight percent are in social sciences such as economics, meaning that business, broadly defined, enrolls a third of foreign students. Another third of foreign students are enrolled in science and engineering, and the final third are scattered across many majors. It should be emphasized that there is a sharp contrast between major fields of study among undergraduate and graduate foreign students, with the graduate students far more likely to be in science and engineering.

Table 6. Leading Fields of Study: Foreign Students

<table>
<thead>
<tr>
<th>Field</th>
<th>2001/02</th>
<th>2002/03</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business &amp; Mgt</td>
<td>114,885</td>
<td>114,777</td>
<td>20</td>
</tr>
<tr>
<td>Engineering</td>
<td>88,181</td>
<td>96,545</td>
<td>17</td>
</tr>
<tr>
<td>Math &amp; Computers</td>
<td>76,736</td>
<td>71,926</td>
<td>12</td>
</tr>
<tr>
<td>Other</td>
<td>59,785</td>
<td>58,473</td>
<td>10</td>
</tr>
<tr>
<td>Social Sciences</td>
<td>44,667</td>
<td>45,978</td>
<td>8</td>
</tr>
<tr>
<td>Physical &amp; Life Sciences</td>
<td>41,417</td>
<td>43,549</td>
<td>7</td>
</tr>
<tr>
<td>Undeclared</td>
<td>36,048</td>
<td>36,395</td>
<td>6</td>
</tr>
<tr>
<td>Fine &amp; Applied Arts</td>
<td>33,978</td>
<td>31,018</td>
<td>5</td>
</tr>
<tr>
<td>Health Professions</td>
<td>24,037</td>
<td>28,120</td>
<td>5</td>
</tr>
</tbody>
</table>
The private University of Bridgeport in Connecticut bills itself as "America's most international university," with almost 40 percent foreign students, while Purdue University, with 12 percent foreign students, is the most "international" public university. According to IIE, two-thirds of the foreign students relied on personal or family funds to pay for their US education, 21 percent relied on US colleges and universities for scholarships or assistance ships, and the remaining 14 percent relied on other sponsors in the US and abroad.

The September 11, 2001 terrorist attacks led to a major change in government efforts to track foreign students inside the US. At least 15 of the 19 hijackers entered the US with student visas, and several did not enroll in the US schools to which they were admitted. In a major embarrassment, a Florida flight school received a notice six months after the attacks that two of the hijackers applications for student visas were approved—they requested a change from business/tourist visitor to student a month before the attacks.\(^{31}\)

Since F-1 student visas are valid for the duration of a normal course of study, and because over 73,000 US schools were permitted to accept foreign students and issue the I-20 forms necessary to obtain a student visa, there were calls after September 11, 2001 to stop issuing student visas. Senator Dianne Feinstein (D-California), for example, said: "the foreign student visa program is one of the most unregulated and exploited visa categories."\(^{32}\) Student visa issuance was not halted, but there were significant changes, including reducing the number of US institutions allowed to accept foreign students to about 7,000, requiring

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\(^{31}\) In a major embarrassment, Huffman Aviation in Venice, Florida was notified in March 2002 that two of the hijackers who crashed planes into the World Trade Center had been approved for student visas. The two hijackers were already in the US when Huffman submitted I-20 forms to change their status to student in August 2001. President Bush was reportedly furious, saying that immigration control "needs to be modernized so we k now who's coming and who's going out and why they're here." INS: Reorganize, Police, Sanctions. 2002. Migration News. Vol 9, No 4. http://migration.ucdavis.edu/

foreigners to be interviewed by consular officers abroad to get student visas, and tracking them inside the US.\textsuperscript{33}

The new foreign-student tracking system, known as the Student and Exchange Visitor Information System (SEVIS), was recommended after it was learned that the 1993 World Trade Center bombing involved several foreign students. A version of SEVIS was enacted in 1996, but not implemented because of opposition from universities and private trade schools afraid that it would reduce the number of foreign students. Opposition melted after the attacks, and SEVIS became operational in 2003. Foreign students pay a $100 fee to cover the costs of operating SEVIS, and US schools submit data on the foreign students they have admitted, such as when they report to campus and their progress toward graduation. SEVIS aims to allow the US government to quickly learn about those who do not follow their study plans, but does not track those who graduate and shift to another status, such as worker. (www.ice.gov/graphics/enforce/imm/imm_sevis.htm).

Foreign students enter the US to study by being admitted to US institutions that have Designated School Officials (DSOs) accredited to issue I-20 forms. Admitted foreign students take this form to a US consulate in their country, where they must prove during a personal interview they are likely to leave the US when their studies end and that they have the financial resources to study in the US. In return, they receive F-1 student visas that permit their stay in the US as long as they make satisfactory progress toward a degree.\textsuperscript{34} Spouses and dependents may accompany foreign students (they receive F-2 visas) and, after graduation, foreign students and their families may remain up to 12 months for paid practical training, and then take a final 60 days to settle their affairs before departure.

The US has 4,000 accredited degree-granting institutions,\textsuperscript{35} almost 60 percent of which are private,\textsuperscript{36} but 80 percent of US students are enrolled in the typically larger public institutions. Most students pay tuition, which ranges from less than

\textsuperscript{33} With 4,000 colleges and universities and 16,000 public school districts, most of the US institutions admitting foreign students before September 11, 2001 were trade schools and language schools. Many went out of business.

\textsuperscript{34} US immigration law assumes that she is in fact an intending immigrant, so that the "burden of proof is upon the applicant to establish entitlement for non-immigrant status and the type of non-immigrant visa for which application is made." INA, Section 214 (b) reads "Every alien ... shall be presumed to be an immigrant until he establishes to the satisfaction of the consular officer, at the time of application for a visa, and the immigration officers, at the time of application for admission, that he is entitled to a nonimmigrant status."

\textsuperscript{35} Another 2,600 mostly private institutions provide certificates but not degrees for tertiary education, including e.g. schools that certify IT skills.

\textsuperscript{36} A third of these private-granting institutions degree operate on a for-profit basis.
$2,000 a year at some public institutions to over $25,000 at some private institutions. Educational institutions are accredited by private associations, most of which belong to the Council on Higher Education Accreditation, and accreditation is normally a prerequisite for students who want to use federal loans and grants to pay their tuition.

**Stays: Foreign Students and US Work**

The major reason for foreign students to be in the US is to study, but those with F-1 student visas may work 20 hours a week while school is in session, on or off campus, and full-time during holidays and breaks after nine months of US study. US employers do not have to test the labor market for US workers before hiring F-1 student workers, and networks often help foreign students to find jobs near campus. Foreign graduate students often work on campus as teaching assistants or research assistants.

Foreign students may also engage in paid practical training with a US employer related to their field of study, as when an engineering student works for an off-campus engineering firm. Practical training or internship programs often prompt US employers to sponsor foreign students for temporary work permits or immigrant visas. The most common temporary work permit is an H-1B visa, which permits the employment of foreigners with at least a BA degree who fill US jobs that require at least a BA degree. The H-1B visa, created in 1990, was a compromise that made it easy for employers to hire foreign professionals for up to six years, but limited admissions to 65,000 a year to protect US workers.

The process for hiring an H-1B foreign worker is straightforward. The employer must file a Labor Condition Application (LCA) with the US Department of Labor (DOL), promising to pay the prevailing wage and certifying that there is no strike in progress. [There is normally no requirement to try to recruit US workers first, and some employers have lawfully laid off US workers and hired H-1B workers.](#) This employer “attestation” leads to practically automatic approval

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37 Two-year community colleges that grant associate degrees are far cheaper. Many reports of US tuition include costs for living in on-campus dorms, which range from $6,000 to $12,000 a year.

38 H-1B visas allow foreigners "to perform services in a specialty occupation [that require] theoretical and practical application of a body of highly specialized knowledge to fully perform the occupation in such fields of human endeavor as . . . architecture, engineering, mathematics, physical sciences, social sciences, medicine and health, education, business specialties, accounting, law, theology, and the arts, and which requires . . . the attainment of a bachelor's degree or higher, or its equivalent, in a specific occupational specialty, as the minimum requirement for entry into the occupation in the United States."

39 Only so-called H-1B-dependent US employers with 15 percent or more H-1Bs as employees, sometimes called "job shops" or "body shops," must certify that they did not lay off US workers to open jobs for the H-1Bs they are requesting.
of the request from DOL; there is normally no investigation of the employer unless DOL receives complaints, and penalties for violations are mild, fines of up to $1,000 and a one-year suspension of the right to hire H-1B workers. The lack of enforcement of H-1B regulations led DOL’s inspector general to conclude that many US employers requested H-1B visas for workers they already employed, making the program "a probationary employment tryout program for illegal aliens, foreign students, and foreign visitors." (US Department of Labor, 1996)

About 23 percent of the H-1B visas issued in 1999 went to foreign students, the only year for which immigration authorities reported the previous status of H-1B visa recipients. In FY02, two thirds of the H-1B recipients were in the US when they received their immigrant visas, but it is not known what status they had. The US has a ceiling of 140,000 immigrant visas a year that can be issued to foreigners for economic or employment reasons, and in recent years the number of “principals,” the foreigners who are certified as needed, has been rising—34,000 in 1998, 50,000 in 2000, and 80,000 in 2002.

Table 7. Employment-based Immigration, 1998-2002

<table>
<thead>
<tr>
<th></th>
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<th></th>
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</thead>
<tbody>
<tr>
<td>Principals getting visas</td>
<td>33,771</td>
<td>50,135</td>
<td>79,802</td>
<td>54,569</td>
</tr>
<tr>
<td>1st preference</td>
<td>8,709</td>
<td>11,452</td>
<td>13,807</td>
<td>11,323</td>
</tr>
<tr>
<td>Aliens with extraordinary ability</td>
<td>1,691</td>
<td>2,002</td>
<td>2,881</td>
<td>2,191</td>
</tr>
<tr>
<td>Outstanding professors/researchers</td>
<td>1,835</td>
<td>2,667</td>
<td>2,737</td>
<td>2,413</td>
</tr>
<tr>
<td>Multinational executives/managers</td>
<td>5,183</td>
<td>6,783</td>
<td>8,189</td>
<td>6,718</td>
</tr>
<tr>
<td>2nd pref Professionals with advanced degrees</td>
<td>6,933</td>
<td>9,815</td>
<td>21,334</td>
<td>12,694</td>
</tr>
<tr>
<td>3rd preference</td>
<td>15,143</td>
<td>24,373</td>
<td>41,238</td>
<td>26,918</td>
</tr>
<tr>
<td>Skilled workers</td>
<td>8,515</td>
<td>13,651</td>
<td>17,788</td>
<td>13,318</td>
</tr>
<tr>
<td>College graduates</td>
<td>3,927</td>
<td>8,771</td>
<td>21,679</td>
<td>11,459</td>
</tr>
<tr>
<td>Other workers (unskilled workers)</td>
<td>2,701</td>
<td>1,951</td>
<td>1,771</td>
<td>2,141</td>
</tr>
<tr>
<td>4th preference, religious</td>
<td>2,695</td>
<td>4,403</td>
<td>3,366</td>
<td>3,488</td>
</tr>
<tr>
<td>5th preference, investors</td>
<td>259</td>
<td>79</td>
<td>52</td>
<td>130</td>
</tr>
<tr>
<td>Principals-Per of US immigration</td>
<td>5%</td>
<td>6%</td>
<td>8%</td>
<td>6%</td>
</tr>
<tr>
<td>Dependents of Principals</td>
<td>43,746</td>
<td>56,889</td>
<td>95,166</td>
<td>65,267</td>
</tr>
<tr>
<td>Total US Immigration</td>
<td>654,451</td>
<td>849,807</td>
<td>1,063,732</td>
<td>855,997</td>
</tr>
</tbody>
</table>

Data are for calendar years; total can exceed 140,000 a year because visas can be used up to six months after being issued

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40 In 1999, some 40 percent of H-1Bs were issued to foreigners in the US—58 percent of these in-country adjusters previously had F-1 student visas, and 3 percent previously had J-1 exchange visitor visas.
41 Testimony of Stephen Yale-Loehr, September 16, 2003, before the US Senate Judiciary Committee
H-1B workers can become immigrants if their employers sponsor them for a second and less employer-friendly process called certification. Certification requires the employer prove that US workers are unavailable despite their attempt to recruit US workers at prevailing wages. Most employer requests to have their need for immigrant workers certified are approved by DOL, but the process is often costly and lengthy. 42 Employers must have their recruitment ads approved and then record why they did not hire the US workers who applied, a process that Hewlett-Packard estimated cost an average $15,000 and took 22 months.

Many employers request certification for immigrant visas for their temporary foreign workers. DOL’s inspector general found that 99 percent of the 24,000 foreigners sponsored by US employers for immigrant visas in FY93 were already working for the employer who requested them, including about 4,000 who were unauthorized. When the US employers advertised the jobs for which they wanted immigrant visas issued to foreigners, some 165,000 US workers responded, about seven per job, but in virtually every case the US workers were found not qualified and the foreigner already at work was certified by DOL as needed. The irony is that, as soon as the foreigner gets the immigration visa for being a needed worker, she can quit, and most do.

The separate processes of attestation and certification have been likened to large and small doors that lead to a great deal of frustration for foreign professionals. The annual limit on H-1B visas, 195,000 a year during the IT boom and now 65,000 a year, is far larger than the number of employment-related immigrant visas available, about 50,000 a year. 43 With employers seeking certification for far more than 50,000 immigrants a year, foreign workers (some of whom are foreign students who graduated from US universities) are trapped for two or three years, afraid to change jobs because that could require starting the certification process anew with another employer. George Borjas estimated that, between 1971 and 1991, an eighth of those who entered the US with foreign student visas were able to become immigrants, most by finding US employers to sponsor them for certification.44 Stay rates are much higher for graduate

42 Critics say that DOL is too quick to approve employer requests. In one case, Capital Law Centers in the Washington DC used the certification process to obtain immigrant visas for foreigners even though it hired none of them. Capital Law Centers requested certification for 2,700 immigrants over 18 months, usually for Chinese or other specialty cooks offered $12 an hour in ads that accompanied the requests, which were routinely approved. The fraud was discovered when DOL mistakenly sent an approved certification to one of the restaurants ostensibly asking for the cooks, not to Capital Law Centers.
43 The annual limit of 140,000 employment-related visas a year includes spouses and dependents of the principal applicant, and covers investors, religious workers, and several other types of immigrants.
44 Some married Americans and found other doors of entry. Personal communication, July 2002.
students, about 50 percent, and higher still for graduate students from China, India, and the other leading Asian source countries.

This process of study, internships and practical training, employer attestation for work visas and certification for immigration visas is widely acknowledged to be flawed, but there is no agreement on how to improve it. The US Commission on Immigration Reform (CIR) recommended in 1995 that certification shift from employers following recruitment rules that rarely result in the hiring of US workers to employers paying a significant fee ($10,000 was suggested) to be certified, with willingness to pay used to demonstrate “true” need for the foreigner. Under the CIR’s recommendation, which was not adopted, the funds paid by employers would have been used to provide subsidized education and training to Americans seeking to work in the areas in which foreigners were being hired.

Significance or Impacts
The impacts of foreign students and foreign workers on labor market outcomes such as wage and wage growth and employment and unemployment have been hotly debated in the US and other countries. Economic theory suggests that, holding other things constant (ceteris paribus), adding to the supply of labor should depress wages or slow their growth and add to both employment and unemployment. This section reviews efforts to measure the significance or impacts of migrant workers generally, and in science and engineering in particular.

There have been few benefit-cost analyses of the presence of foreign students. Most statements suggest foreign students have positive impacts by enriching local students with their presence, assisting development at home, and perhaps paying tuition and providing future skilled workers. In the US, university leaders point to the long list of past and current world leaders educated in part at US universities, calling education “America’s highest valued export.” Borjas (2002) used the same methodology used to estimate that the US gained a net $1 billion to $10 billion a year from immigration in the mid-1990s to estimate that higher education, which had revenues of $63 billion in 2000, might save universities $2 billion a year in wage costs because foreign students work as low-paid teaching and research assistants.45 However, he argued that even “full tuition” at public universities does not cover full costs, and that the subsidy to foreign students at public US universities exceeds $2 billion a year.

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45 With gross sales of $63 billion, and wages and salaries 75 percent of revenues or almost $50 billion, if the presence of foreign student assistants lowers wages by five percent, the cost savings to higher education could be $2 billion a year.
Estimating Impacts

There are no specific empirical estimates of the effects of foreign students on US labor markets, but students are included in the more general efforts to estimate the effects of immigrants on labor markets. These studies follow distinct tracks, including case studies, econometric studies, economic mobility studies, and public finance studies (Martin and Midgley, 2003):

- Case studies in the US tend to find the wage depression and job displacement predicted by economic theory, but emphasize that it often occurs in unexpected ways, as when firms switch from hiring workers directly to hiring them indirectly via intermediaries. The intermediaries with the most recently arrived foreign workers, many of whom may be irregular and unaware of their rights, tend to win contracts, indirect displacement.

- Econometric studies begin from the observation that the share of immigrants in labor markets varies across cities. Models of wage determination and unemployment make the share of foreign workers an independent variable in estimates of wages and unemployment for workers similar to the migrants, and seek immigrant impacts in differences across cities.

- Economic mobility or integration studies investigate the earnings trajectories of migrant workers and their children, seeking to determine if and when they catch up to similar native workers. Mobility studies are closely linked to public finance studies that compare the taxes paid by immigrants to the value of tax-supported benefits they receive.

Case studies examine migrant impacts in a particular industry or occupation, and many of the first impact studies were done after strikes by U.S. workers resulted in their replacement by immigrants. For example, after citrus workers in southern California went on strike for a wage increase in 1982, many growers switched from getting crews of workers via a cooperative unionized association to getting crews of workers from farm labor contractors (FLCs), who were often smaller operations hiring more recently arrived and irregular workers. There was no direct competition for jobs between new migrants and established workers, but the association went out of business, so the union workers lost their jobs (Mines and Martin, 1984).

Econometric studies begin with the assumption that, if immigrants depress wages or displace workers, the more immigrants there are in a city’s labor market, the greater the observed wage depression or job displacement. A typical study compares the wages and unemployment rates of blacks, Hispanics, and women in Los Angeles with similar groups in Atlanta, under the hypothesis that the wages should be lower and unemployment higher in Los Angeles, which has a far higher percentage of migrant workers. Such studies found few wage or unemployment effects, prompting George Borjas (1990, 81) to assert that "modern econometrics cannot detect a single shred of evidence that immigrants
have a sizable adverse impact on the earnings and employment opportunities of natives in the United States.” One study concluded that the 1980 influx of Cubans to Miami had no measurable negative effect on the wages and employment of local workers, even though Miami’s labor force increased by 7 percent in four months.

As more data became available, this conclusion of no immigration impact changed. The most important data involved migration patterns within the United States—workers most likely to compete with newcomer migrants were moving away from the immigration cities, so that the wage and unemployment effects of newcomers were quickly dissipated throughout the United States, making them hard to measure in any particular city labor market. It was shown that it is also hard to measure impacts of newcomer migrants on particular groups, such as women and Blacks, without considering that the wages of established residents could be set by national or regional collective bargaining agreements, or be set by government for those who are government employees. Thus, if workers who compete with migrants move away and the workers who do not compete remain, the effect of migrants will not be detected wage and unemployment rates of “similar workers” in a city’s labor market (Borjas, 1994).

Economic mobility or integration studies investigate the earnings trajectories of migrants and their children, starting with the fact that “immigrants on average earn less than native workers [and] this gap...has widened recently...[as] the skills [years of education] of immigrants have declined relative to those of the native-born.” (Smith and Edmonston, 1997, 5-33) In the 1980s, this earnings gap was not considered a problem, largely because of research that found immigrant men who arrived in the 1950s and 1960s caught up in earnings to similar US-born men. In fact, Barry Chiswick concluded that the drive and ambition that prompted men to migrate enabled the migrants to close the earnings gap after an average of 13 years, and to earn six percent more than similar U.S.-born men after 23 years, suggesting that average earnings could be raised via immigration (Chiswick, 1978). Later studies showed that this catch-up and cross-over earnings effect reflected the special case of highly skilled Asians allowed to come to the US after 1965 policy changes (Borjas, 1994).

All studies agree that migrants with more education earn more and are more likely to be net taxpayers than less-educated migrants. Migrants should provide a fiscal surplus because most are young, in their working and taxpaying years, not drawing pension and health care benefits. During the early 1990s US

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46 The average educational level of immigrants has been rising, but the educational level of U.S.-born residents has risen faster, which explains the widening education gap.
recession, several states sued the federal government to recover the cost of providing public services, especially to unauthorized foreigners. Although the suits were rejected by the courts, they stimulated research about the amount of taxes paid by migrants and the costs of providing services to them. This research reached two important conclusions:

- First, an immigrant’s fiscal balance—the taxes paid minus the cost of services consumed—depends primarily on the immigrant’s earnings—lower earnings mean less taxes paid, and many lower-earning migrant families are large, which increases schooling costs.
- Second, in the US fiscal system, there was an imbalance between levels of government. The taxes paid by immigrants are mostly income taxes and pension contributions, most of which flow to the federal government. However, the tax-supported services consumed by migrants, such as education for their children, are mostly financed by state and local government taxes.

There is no revenue-sharing arrangement between the federal and state and local governments to deal with these differential fiscal impacts, which is one reason why there is local opposition to “far-away” migration policy decisions.

The hardest impact question is what happens to earnings and taxes over time, for the migrant and his or her children and grandchildren. US studies conclude that the long-term “economic value” of a migrant depends strongly on his or her age at arrival and years of education: “If the policy goal were to maximize the positive contribution of immigration to public sector budgets, that could be achieved by policies favoring highly educated immigrants and not admitting immigrants over age 50.” (Smith and Edmonston, 1997). Estimates made for 1996 found that adult immigrants arriving with less than a high school education impose a net fiscal cost on the United States of $89,000 over their lifetimes and those with a high school education cost $31,000 over their lifetimes. However, those with more than 12 years of schooling provide a $105,000 lifetime gain for the United States, and it is this large fiscal gain from the more educated that makes the fiscal balance for all migrants positive (Smith and Edmonston, 1997, Table 6.3).

**Scientists and Engineering**

Foreign students are the majority of those in many science and engineering programs at US universities, and their presence is very controversial. After the Soviet Union beat the US into space in the 1950s with Sputnik, the National Defense Education Act of 1958, inter alia, subsidized the training of scientists and engineers to increase national security. The current justification for foreign students is that the US must train or import more scientists and engineers to improve its economic competitiveness in a globalized world.
There is no agreement on the optimal number of scientists and engineers. Science and technology indicators suggest that the EU has the highest percentage of science and technology students among all graduates, about 26 percent in 2000, but has a lower employment rate of researchers per 1,000 workers than Japan and the US, perhaps reflecting lower R & D spending as a share of GDP in Europe.\(^{47}\) Japan has a lower percentage of science and technology students among all graduates, but a higher employment rate of researchers per 1,000 workers; R & D spending that is 3 percent of GDP. The US has the lowest percentage of science and technology students among graduates, 17 percent, but employment and R&D spending rates and shares that are more similar to Japan than the EU.

Table 8. EU, Japan, US Science and Technology Indicators, 2000

<table>
<thead>
<tr>
<th>EU, Japan, US Science and Technology Indicators, 2000</th>
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<tbody>
<tr>
<td>Grads (mil)</td>
</tr>
<tr>
<td>EU</td>
</tr>
<tr>
<td>Japan</td>
</tr>
<tr>
<td>US</td>
</tr>
</tbody>
</table>

Source: OECD, 2004, 111

Graduates include BS, MS, PhDs in science and technology

Share of science and technology graduates among all graduates

Employment of researchers per 1000 workers

R&D Expenditures are share of GDP spent on R & D

Within the US, there is controversy over whether more scientists and engineers should be educated or imported. Observers such as Michael Teitelbaum see the high percentage of foreign students in US doctoral programs in science and engineering\(^{48}\) as reflections of US labor market realities and foreign student desires for immigrant visas, not as a “national need” for more PhDs in the basic sciences (Teitelbaum, 2003). US students, in his view, make rational decisions not to go into science because of the lower lifetime earnings of science PhDs. One

\(^{47}\) An estimated 400,000 of Europe’s 11 million science and technology workers are employed in the US, and 75 percent of new science PhDs reported they wanted to go to the US (OECD, 2004, 111).

\(^{48}\) Some studies suggest that as many as 50 percent of those who begin US PhD programs do not complete them, and that there is no measurable difference in quality between students who complete PhDs and those who do not. With the number of Americans earning doctorates dropping, while the number of foreign students getting US doctorates rising, the fastest way to increase the number of Americans getting PhDs is to reduce attrition. Scott Smallwood, “Doctor Dropout,” Chronicle of Higher Education, January 16, 2004.
study cited by Teitelbaum found that bioscientists can expect to earn $1 million less in their lifetimes than MBAs graduating from the same university, and $2 million less if the stock options often available to MBAs are taken into account (Teitelbaum, 2003).

A large part of the reason for this lifetime earnings difference is that most science graduates must do five to 10 years of low-paid postdoctoral research before getting a "real jobs." Postdocs—persons with PhDs gaining experience in a university or government laboratory — earn $9,000 to $55,000 a year, which helps to hold down the cost of research that is largely funded by government grants.

Much of the recent controversy over labor shortages has involved IT workers, and the focus of the debate was whether the annual ceiling of 65,000 H-1B visas a year should be raised. A combination of US employers becoming aware of the H-1B program, falling unemployment in the late 1990s, and the so-called Y2K problem led employers to request more than 65,000 H-1B visas a year. With a major push from the Information Technology Association of America (ITAA), an association representing major computer-industry firms that issued a series of reports projecting that the number of IT jobs would grow faster than the number of workers available to fill them, the ceiling on H-1B visas was raised first to 115,100 a year49 and then to 195,000 a year50 (the ceiling returned to 65,000 a year in 2004, with 6,000 H-1B visas reserved for Chilean and Singapore nationals under free trade agreements).

Government and researcher reviews of these labor shortage claims were skeptical, emphasizing that there are no reliable data to measure labor shortages, and that indirect indicators such as unemployment rates and wage trends did not show tight labor markets among IT workers. For example, one DOL analysis concluded: "As the labor market tightened [in the 1990s], shortages in certain occupations were widely reported in the media... No specific sources of data exist that provide a measure of occupational shortages. In the absence of any definitive measure, analysts generally rely on labor market data to corroborate anecdotal reports of employers' difficulties in filling jobs. Such data include

49 When the H-1B ceiling was raised by the American Competitiveness and Workforce Improvement Act of 1998, H-1B dependent employers—those whose work forces are 15 percent or more H-1B workers, must document their efforts to recruit US workers and certify that US workers were not laid off to make room for the H-1Bs in the previous 90 days, and that US workers will not be laid off for 90 days after the arrival of the H-1Bs. Most employers had to pay a $1,000 per H-1B visa fee to provide scholarships for Americans pursuing science and technology careers.

50 The raise to 195,000 a year was the American Competitiveness in the 21st Century Act (AC21).
trends in employment and earnings, as well as the unemployment rate for a particular occupation." (Veneri, 1999). ITAA projections turned out to be spectacularly wrong as the IT boom was fading. For example, in April 2001 the ITAA predicted that the number of IT jobs would rise by 900,000 in 2001, and that only 475,000 US workers would be available to fill them, leaving a shortage of 425,000. In fact, even ITAA’s numbers found that IT employment fell by 500,000 in 2001, from 10.4 million to 9.9 million.

The unemployment rate for IT workers reached an all-time high of 6.7 percent in the first quarter of 2004, when about 672,000 computer scientists and systems analysts had jobs. With unemployment rising, some IT workers and engineers have become strong critics of US immigration policy. A 2004 survey of the National Society of Professional Engineers found 33 percent agreeing with the statement: "I support the current U.S. immigration policy, which encourages foreign engineering students to be trained in the U.S. and allows foreign engineers to work in the U.S. as engineers," but 41 percent disagreed.51

**Conclusions: University Gatekeepers?**

The increased mobility of students enables human capital to flow more easily over national borders. The developed countries have most of the world’s human capital, and the rising number of students from developing countries they accept promises more concentration of human capital in already rich countries. The result could be divergence in the division of human capital, a knowledge gap that is mirrored in the division of economic wealth.

The ILO is committed to narrowing the knowledge divide and accelerating development so that people do not feel compelled to migrate. The growing number and diversity of education institutions acting as immigration gatekeepers raises new questions are raised about how student selection and stay affect sending and receiving countries. In an important sense, especially private and for-profit educational institutions can become very important merchants of labor, enabling students to can pay to gain entrance into developed country labor markets.

The US is the major recipient of foreign students from developing countries, and many of those who receive advanced degrees from US institutions stay and work. The September 11, 2001 terrorist attacks did not prevent the number of foreign students from continuing to rise, but did lead to a new tracking system for them while they are in the US. Foreign students can work while they study, and US temporary worker programs enable those who find US employers to remain as guest workers and eventually immigrants. The effects of universities

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selecting students who stay is unclear, but the importance of universities as immigration gatekeepers promises to be a major issue in 21st century human capital flows.

Bibliography


Appendix: Nafta Professionals
The North American Free Trade Agreement took a first step toward EU style freedom of movement, but only for professionals with at least a BA degree moving to fill a job requiring a BA. As the so-called Nafta professional visa becomes better known, students may use it to cross borders to study and then remain with indefinitely renewable visas.

Nafta’s Chapter 16 created a fairly open labor or market for professionals. To enter the US to work, a Canadian (and Mexican since January 1, 2004) simply shows the US inspector at the port of entry a written job offer that spells out the entrant’s job duties, expected length of stay, and salary arrangements, and is signed by the potential employer. The applicant then shows proof of Canadian or Mexican citizenship and the requisite education credential, a college degree, and receives an indefinitely renewable visa.

The number of Canadian professionals entering the US to accept jobs with Nafta-TN visas almost tripled since 1995, from about 25,000 entries a year to 70,000 entries a year, but the number of Mexican entries remains low, generally less than 2,000 a year.

Table A1. US Admissions of Nafta Professionals, 1994-2002

<table>
<thead>
<tr>
<th></th>
<th>Canadians</th>
<th>Mexicans</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1994</td>
<td>25,104</td>
<td>16</td>
<td>25,120</td>
</tr>
<tr>
<td>1995</td>
<td>25,598</td>
<td>63</td>
<td>25,661</td>
</tr>
<tr>
<td>1996</td>
<td>28,237</td>
<td>229</td>
<td>28,466</td>
</tr>
<tr>
<td>1997</td>
<td>48,430</td>
<td>436</td>
<td>48,866</td>
</tr>
<tr>
<td>1998</td>
<td>60,742</td>
<td>785</td>
<td>61,527</td>
</tr>
<tr>
<td>1999</td>
<td>60,755</td>
<td>1,242</td>
<td>61,997</td>
</tr>
<tr>
<td>2000</td>
<td>89,864</td>
<td>2,354</td>
<td>92,218</td>
</tr>
<tr>
<td>2001</td>
<td>70,229</td>
<td>1,806</td>
<td>72,035</td>
</tr>
<tr>
<td>2002</td>
<td>71,082</td>
<td>1,732</td>
<td>72,814</td>
</tr>
</tbody>
</table>

Source: Roger Kramer, Developments in International Migration to the US, 2003
Calendar year data

Table A2. Professions covered by Nafta Chapter 16

Professions covered by Nafta Chapter 16
General Teaching
<table>
<thead>
<tr>
<th>Accountant</th>
<th>College</th>
</tr>
</thead>
<tbody>
<tr>
<td>Architect</td>
<td>Seminary</td>
</tr>
<tr>
<td>Computer Systems Analyst</td>
<td>University</td>
</tr>
<tr>
<td>Insurance Claims Adjuster</td>
<td>Scientists</td>
</tr>
<tr>
<td>Economist</td>
<td>Agriculturist/Agronomist</td>
</tr>
<tr>
<td>Engineer</td>
<td>Animal Breeder</td>
</tr>
<tr>
<td>Graphic Designer</td>
<td>Animal Scientist</td>
</tr>
<tr>
<td>Hotel Manager</td>
<td>Apiculturist</td>
</tr>
<tr>
<td>Industrial Designer</td>
<td>Astronomer</td>
</tr>
<tr>
<td>Interior Designer</td>
<td>Biochemist</td>
</tr>
<tr>
<td>Land Surveyor</td>
<td>Biologist</td>
</tr>
<tr>
<td>Landscape Architect</td>
<td>Chemist</td>
</tr>
<tr>
<td>Lawyer</td>
<td>Dairy Scientist</td>
</tr>
<tr>
<td>Librarian</td>
<td>Entomologist</td>
</tr>
<tr>
<td>Management Consultant</td>
<td>Epidemiologist</td>
</tr>
<tr>
<td>Mathematician/Statistician</td>
<td>Geneticist</td>
</tr>
<tr>
<td>Range Manager/Range</td>
<td>Geologist</td>
</tr>
<tr>
<td>Conservationist</td>
<td>Geochemist</td>
</tr>
<tr>
<td>Research Assistant (in college/uni)</td>
<td>Geophysiologist/Oceanographer</td>
</tr>
<tr>
<td>Scientific Technician/Technologist</td>
<td>Horticulturist</td>
</tr>
<tr>
<td>Social Worker</td>
<td>Meteorologist</td>
</tr>
<tr>
<td>Technical Publications Writer</td>
<td>Pharmacologist</td>
</tr>
<tr>
<td>Urban Planner/Geographer</td>
<td>Physicists</td>
</tr>
<tr>
<td>Vocational Counselor</td>
<td>Plant Breeder</td>
</tr>
<tr>
<td><strong>Medical-related</strong></td>
<td>Poultry Scientist</td>
</tr>
<tr>
<td>Dentist</td>
<td>Soil Scientist</td>
</tr>
<tr>
<td>Dietitian</td>
<td>Sylviculturist (Forestry)</td>
</tr>
<tr>
<td>Medical Lab. Technologist</td>
<td>Zoologist</td>
</tr>
<tr>
<td>Dietitian</td>
<td></td>
</tr>
<tr>
<td>Medical Lab/Technologist</td>
<td></td>
</tr>
<tr>
<td>Nutritionist</td>
<td></td>
</tr>
<tr>
<td>Occupational Therapist</td>
<td></td>
</tr>
<tr>
<td>Pharmacist</td>
<td></td>
</tr>
<tr>
<td>Physician (teaching or research only)</td>
<td></td>
</tr>
<tr>
<td>Physiotherapist/Physical Therapist</td>
<td></td>
</tr>
<tr>
<td>Psychologist</td>
<td></td>
</tr>
<tr>
<td>Recreational Therapist</td>
<td></td>
</tr>
<tr>
<td>Registered Nurse</td>
<td></td>
</tr>
<tr>
<td>Veterinarian</td>
<td></td>
</tr>
</tbody>
</table>