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**SKILLED TEMPORARY AND PERMANENT IMMIGRANTS
IN THE UNITED STATES***

by

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ABSTRACT

The U.S. temporary migration system is closely intertwined with the permanent system. First, this paper defines the various temporary and permanent admission categories. It presents available statistics on the occupations of temporary migrants upon admission and upon adjustment to permanent residency, especially since the Immigration Act of 1990 went into effect in 1992. There has been a sizable increase in the number of temporary workers over the past few years and those who adjust from specialty workers (H-1B) and intracompany transferee (L) have increased the overall skill composition of permanent immigrants. Secondly, the paper reviews the literature on the labor market impact of temporary migrants in academia and in the private sector. While there are marked concentrations of foreign-born workers among the college educated and especially Ph.D.'s, the literature raises concerns but does not establish adverse effects (wage differentials, unemployment, etc.). There is, however, reason for some concern given trends in the postdoctoral labor market and for employers in "job shops" who undercut U.S. workers with temporary workers.

Introduction

Most of the U.S. debate over immigration has focused on the permanent or resident foreign-born population and the unauthorized population. Putting it simply, unauthorized migrants are typically low-skilled and are not seen favorably as they tend to adversely affect low-skilled natives, and their children place a fiscal burden on local schools. Many argue that the permanent system, with its heavy emphasis on family-based immigration, selects for lower-skilled workers as well. Economists in particular are joined by many policymakers in arguing for more skill selection and a greater emphasis on employment-based immigrants. Interestingly, discussion of skilled temporary immigrants has arisen only within the last few years.

The Immigration Act of 1965 is the architecture of today's U.S. immigration system. It divided the inflow into a predominantly family-based intake and a smaller employment-based one, the practice of certifying that the latter will not harm U.S. workers, and the elaboration of an alphabet of temporary workers. With the exception of reform on refugee policy, the next major legislation was the Immigration and Reform Act of 1986. It traded amnesty for nearly 3 million formerly unauthorized immigrants for sanctions against employers who employ unauthorized workers. Having "closed the back door," Congress enacted the Immigration Act of 1990, which increased the overall number of permanent immigrants, nearly tripling the number of employment-based admissions. The 1990 act also expanded the number of visas for temporary workers, simplified some procedures, and made the transition from temporary to permanent immigrant easier. Since then, the welfare act of 1996 has taken away the right to most federal means-tested benefits from new immigrants, and the Immigration Act of 1996 took away specific rights of due process as a means of easing deportation of criminal aliens and claimants for asylum.

Today's debate turns around the temporary system with claims that there is a shortage of information technology workers and a need for high-skilled, specialty workers — a view that won the day and an expansion of the number of temporary speciality workers admitted. Indeed, technology in the United States continues to drive an economy demanding highly skilled workers. Scientists and engineers are at the core of the new economy, and the recent controversy, and this paper will give preference to studies of such highly skilled occupations.

Currently, information technology is a leading growth sector with rapid increases of its native- and foreign-born labor force.

Remarkably little empirical information is available on just the temporary component of the skilled foreign labor force. This paper presents data on the number of temporary migrants and discusses the literature on the labor market impact of skilled foreign workers, both temporary and permanent. The temporary admission classes are defined and statistics are presented with attention given to the increases in the number of temporary migrants since the 1990 Act went into effect. While the central focus of the paper is temporary migrants, it should become clear that any analysis of the temporary system needs to follow through to the juncture where temporary meets permanent. There is a lot of debate over the impact or non-impact of temporary workers, especially in the sciences and engineering, but no solid body of research that systematically establishes impacts. A review of the literature breaks out into the academic and the private-sector labor markets.

ADMISSION CATEGORIES

Skilled foreign workers enter the United States under one of several admission statuses, chiefly as “non-immigrant” temporary workers, students or exchange visitors, and as legal permanent residents (“immigrants”). The temporary visa-holder is oftentimes referred to as a “non-immigrant” (a.k.a. NIV), and the permanent admission as a legal permanent resident (a.k.a. LPR). Admission to the United States is authorized by different rules for each visa class and, correspondingly, there are varied sources of administrative data collected.

Temporary Classes of Admission

Admission classes for temporary migrants with work authorization fall into two broad categories, those that are specifically for work-related purposes and those for which the visa is primarily issued for other reasons but may be work authorized.

Working Visas. Foreign scientists and engineers enter under a select set of temporary working visas. These are largely for special-purpose occupations, for international trade, and for employment by multinationals.

H-1B speciality workers are professionals and highly skilled individuals. The H-1B visa generally requires a baccalaureate or higher degree. Its major features are a six-year maximum duration of stay, i.e., a three-year visa renewable for another three years; a labor condition application (LCA) or the requirement that employers attest that they comply with conditions intended to protect U.S. workers from undue competition with specialty workers; and a numerical limit of 65,000 temporary migrants to be admitted into the United States each year (see exception below).

Primarily as the result of lobbying by the information technology industry, in the closing months of last year the U.S. Congress passed the "American Competitiveness and Work Force Improvement Act of 1998." The new legislation, which began in October of 1998, provides a temporary increase in the number of available H-1B visas from 65,000 per year to 115,000 per year in 1999 and 2000 respectively, and 107,500 in 2001. Unless new levels are legislated, the numerical limit is to return to 65,000 in the year 2002. As a trade-off to those who opposed increased numerical limits, the bill includes new worker protections for so-called "H-1B dependent" firms, e.g., those most likely to unfairly exploit the specialty worker at the expense of U.S. workers. Dependent firms are defined as those with a certain percentage of their workforce who are H-1Bs. These protections will come off in three years when the number falls back to 65,000 in the year 2002.

The new law has a requirement that H-1B workers receive the same fringe benefits as U.S. workers. It also requires an additional \$500 fee for petitions filed and provides for new investigative procedures and new penalties for violations. The bulk of the fee will go toward training of displaced workers and scholarships for low-income students. Employers such as universities, federally funded research institutes, etc., are exempt from the fee.

H-2B visa for temporary nonagricultural workers permits entry for nonprofessionals who work in science and engineering fields.¹ This category dictates that the employer first submit and

¹ Although the numbers are small, H-2A agricultural workers also require a labor certification by the U.S. Department of Labor, as do D visas for foreign crewman.

have approved by the Department of Labor (DOL) a labor certification, which requires that the employer fulfill a number of wage and working conditions that demonstrate that the job will not adversely affect similar workers. It also provides for the scrutiny of employer evidence stating that insufficient U.S. workers were qualified or available for hire, which, typically, takes some time to process. The program has a double-temporary requirement, i.e., that both the job be temporary or seasonal and the worker remain only for temporary periods. About one-half of the H-2B entrants are for low-wage, low-skill occupations such as in the seafood, hotel, and resort industries. The higher-skilled H-2Bs appear to be in health-related services or engineering.

E visas for treaty traders and investors do not require labor market testing, and attestations or certifications are not required. The E visa entitles a temporary alien to enter the United States under the provisions of treaties with foreign nations to carry on trade, including trade in services or technology, and develop or direct the operations of an enterprise.

L visas for intracompany transferees are employed by a multinational company and do not require labor market testing and attestations/certifications are not required. The classification dates from 1970 and requires that the alien has been employed continuously for one year by a firm or corporation or other entity to render services to their employer in the capacity of a manager, executive, or position of specialized knowledge. The Immigration Act of 1990 amended previous requirements and permits dual intent, i.e., the worker may possess an intent to immigrate permanently at some future time for a position that may be permanent. Stays are from between five and seven years.

TN professional workers are citizens of Canada or Mexico and the category was created by the North American Free Trade Agreement (TN refers to “Trade NAFTA”). Their status is somewhat analogous to H-1 workers; however, the TN category remains separate and distinct, and the number of TNs is in addition to other working visas issued to Canada or Mexico. Presently, TN professionals from Canada are exempt from visa requirements, whereas Mexicans must first obtain a visa with requirements that are similar to the H-1B before they can be admitted to the United States in TN status. The applicant must have a baccalaureate degree or appropriate professional credentials and stay for up to one year with no limit on the number of extensions.

O visas are for aliens with extraordinary abilities in sciences, arts, education, business, or athletics, and those assisting in their athletic or artistic performances, and may include scientists and engineers.² The individual must demonstrate sustained national or international acclaim and must be entering the U.S. to work in his or her particular field. Petitions are filed with the INS.

Students and Exchange Visitors. Both the foreign student (F) and the cultural exchange visitor (J) visas are intended primarily to promote both formal education and learning by experience, and both permit limited work authorization.

Foreign students (F) are admitted with the understanding that they have no intention of abandoning their home country. These visas are issued only to students who are attending INS-accepted institutions. Work authorization is generally restricted to campus with one year of off-campus work (practical training) allowed. Work may also be authorized if a student faces financial hardship and students from certain countries may on occasion be granted blanket work authorization due to economic crises in their home countries. The number of such workers is essentially unknown.

The exchange visitor (J) visa may partly be governed by international agreements, some may only study, while others engage in significant work activity during their stay. The USIA regulations state that the underlying purpose must be to stimulate international collaborative teaching and research efforts or to promote interchange between research and education institutions. Although many (those funded by U.S. institutions and paid the prevailing wage) could qualify under the current H-1 category and some of extraordinary ability could qualify under O, most who are funded from abroad or who are paid less than prevailing wage qualify only under J. There are number of separate subcategories of J visas including trainees, students, teachers, and physicians.

² P visas for internationally recognized entertainers and athletes, artists or entertainers on an exchange program or under a culturally unique program are applicable to those who cannot qualify as extraordinary. Stay is limited to the project or training program. Q visas for participants in international exchange programs were created by the Immigration Act of 1990 and allow entry for pre-arranged employment with comparable wages and working conditions to domestic workers. Cultural exchange is the underlying motive for admission. The 1990 Act also established R visas for religious workers to meet the need for nonprofit religious organizations that have different requirements for jobs from the business world (e.g., B, H, or Js). Additional workers, such as researchers, scholars, *au pairs*, and camp counselors, enter under the J visas (see text).

The vocational student (M) visa is used for vocational students who are prohibited from any employment except for practical training after completion of studies.

Permanent Classes of Admission

Permanent resident admissions are given to several classes of immigrants, the two broadest of which, family-based (FB) and employment-based (EB), are generated, respectively, through the sponsorship of an immediate family member or an employer.

Family-Based. Family-based admissions dominate the flow of immigrants into the country. Any family-based immigrant may work in the United States. These categories do not require labor market tests or exceptional ability to contribute to the U.S. economy.

Employment-Based. There are four preference categories of those admitted to work. The first four apply to those admitted for employment in the U.S. labor market, while the fifth applies to self-employed entrepreneurs.

Priority workers or first preference (EB-1) permanent immigrants includes those with extraordinary ability and outstanding professors/researchers. These workers are exempt from labor market tests and must demonstrate sustained national or international acclaim. The required level of expertise should make the individual one of a very small percentage of those who have risen to the top of their field. EB-1 also includes multinational employees, many of whom initially enter under the L visa.

Professionals with advanced degrees or second preference (EB-2) immigrants are those with exceptional ability who do not meet the criteria laid out for priority workers and are labor market tested. The Attorney General may waive the job offer requirement when it is deemed to be in the national interest. The requirements for the Permanent Labor Certification (PLC) are the same as described above for the H-2B, i.e., the employer must first submit and have approved by DOL a labor certification which requires that the employer fulfill a number of wage and working conditions that demonstrate that the job will not adversely affect similar workers.

Skilled workers/professionals with baccalaureate degrees, or third preference (EB-3) immigrants are those with at least two years of training or experience and are labor market tested. The employer must first submit and have approved by DOL a permanent labor

certification which requires that the employer fulfill a number of wage and working conditions that demonstrate that the job will not adversely affect similar workers. This preference category includes those who generally have a baccalaureate degree (EB-3a) and those with less than two years training or experience (EB-3b).

COUNTING TEMPORARY WORKING MIGRANTS

Data on the entry of temporary migrants into the United States are collected or made available by the Immigration and Naturalization Service (INS) and the Department of State (DOS). The INS temporary admission figures are frequently seen in the literature, but they are misleading and it is preferable to avoid or to explain their faults.³ At the same time, the DOS data do not include information on certain categories of admission. Both sources miss some migrants. Reliable data or estimates for the resident population of temporary workers are currently nonexistent. See Table 1 for statistics corresponding to the discussion below.

State Visa Issuances. Visas are issued by the U.S. Department of State to individuals abroad. From 1992 to 1996 the number of visas issued grew 16 percent from 5.4 to 6.2 million. Individuals apply for their visa through U.S. embassies and, when the application is approved by the appropriate agency, DOS issues the visa for admission to the United States. These figures are for individuals; however, they are over counts to the degree that a few individuals who are issued a visa consequently fail to enter the United States. These figures also do not include non-working visa “waivers,” which permit individuals from qualified countries to enter the United States on a temporary basis without a non-immigrant visa.⁴

Change of Status. The figures do not include non-immigrant visas obtained in the United States through a non-immigrant visa “change of status,” which occurs when an individual is granted a new and different non-immigrant visa within U.S. borders. For example, in FY 1995 there were more than 26,000 changes of status to H-1B, out of a possible 65,000 H-1B approvals, which are

³ Observers tend to omit or to be very careful in discussing, for example, the INS multi-count of illegal border entries or apprehensions. Temporary admissions data are little more valid.

⁴ Established by the Immigration Reform and Control Act of 1986, extended by the Immigration Act of 1990 through 1994, and further extended by subsequent legislation.

not captured in the visa issuance data.⁵ Most were from the foreign student (F) non-immigrant visa.⁶ With no regular and accurate information on change of status, it is not possible to examine whether or not increasing proportions of speciality workers (H-1B) were previously foreign students (F), which might signal changes in the academic market and graduate training.

Non-immigrant Admissions. The temporary or NIV admission data collected by the INS do not count individuals, but rather they count the multiple entries made by individuals over the course of the year. Each time the INS admits a tourist, businessperson, worker, etc., they are counted in the admissions data, which is consistent with its administrative role to inspect each entrant. The number grew 19 percent from 20.8 million in 1992 to 24.8 in 1996. Admissions data do not include parolees, withdrawal, stowaways, and refugees, but they do include admissions on a non-immigrant basis under the temporary visa-waiver program. The visa-waiver program extends only to countries that offer a reciprocal waiver of visas to U.S. citizens. It is limited to admissions in the visitor for pleasure and for business classes of admission, with admission not to exceed 90 days. In 1996, there were 25 countries in the Visa Waiver Pilot Program with 11,192,932 admissions (INS 1996:108).

Person-year Population. Temporary workers by definition come and go, but some sizable proportion effectively reside in the U.S. for at least one year and more. Yet the number of persons working in the U.S. at any given time is not known. In the case of H-1Bs and other workers the effective year-round population must be sizable. If 65,000 H-1Bs enter the U.S. and spend up to the three to six years permitted, then the number working in the U.S. at any point during the year might reach 180,000 to 360,000. However, we simply have no administrative data for this population.

⁵ These would be added to the 51,832 visa issued to H-1B non-immigrants. Additionally, individuals are not counted against the 65,000 legislative limit when they are granted an extension of time beyond that allotted on their first H-1B visa (an initial three years is allowed with up to six years maximum with the same or another U.S. employer). In FY 1998 as many as 47,500 extensions were petitioned for and, assuming that most all were approved, these logically might be added to the 65,000 initial visas issued in that year (as a measure of employer demand for jobs to be filled by H-1Bs).

⁶ Special tabulations from data provide by the INS cited in Lowell, 1999.

Ideally, there should be a number of reliable estimates of duration of stay and of the average or person-year population. This is the “average” population, reflecting just the portion of a year that all temporary individuals spend in the United States. For example, 50 person-years represents the full-time equivalent contributed by 100 workers.

In 1994, the INS was able to estimate an average duration of stay for temporary workers that yields an estimate of the person-year population shown in Table X for selected working visas. The person-year population calculated here includes only those who travel outside of the U.S. during the year and return. In 1994, the only year for which an estimate is available, a year-round average population of 1.4 million temporary migrants (with tourists) was estimated, including some 48,815 temporary workers and trainees, 89,651 exchange visitors, and 20,765 intracompany transferees. These figures suggest that a small, numerical role is played by temporary migrants when compared to the total U.S. labor force; however, they underestimate the stock of the temporary population.

Occupations of Temporary Speciality Workers (H-1B)

The DOS visa issuances and INS admissions data do not tell us about the occupations of temporary workers. Data from the U.S. Department of Labor gives us an indirect measure of the occupations that H-1B workers are likely to fill.

The DOL data come by the way of Labor Condition Attestations (LCA) filed by employers who petition to have a job filled by a non-immigrant. The first attestation system was enacted as part of the Immigration Nursing Relief Act of 1989.⁷ The Immigration Act of 1990 created attestations for crewmembers (D), a very small student-worker program (F), and for specialty occupation workers (H-1B). In principle, LCAs are faster to process than the more carefully verified certification that the jobs of certain classes of employment-based permanent residents must clear before a visa is issued. The employer must attest that certain wage and employment conditions prevail before they are permitted to fill a job(s) with a non-immigrant

⁷ The non-immigrant nursing program (H-1A) was discontinued in 1995.

worker. Once approved by the DOL, the employer may turn to the INS to have a non-immigrant visa issued to a qualified foreign person.⁸

Table 2 shows, nevertheless, that something can be learned from the DOL data on applications for H-1B speciality non-immigrants. Notice that there is substantial growth in the average wage of Computer-related occupations (24%) from 1992 to 1997, as might be expected for an occupation with growing employer demand and spot shortages of qualified U.S. workers. More interesting is the eleven-fold growth in applications for H-1B workers. Although the number of applications has no direct relationship to actual individual workers — applications may include numerous requests by the same employer and multiple jobs may be requested on each application — they do reflect increased employer search activity/demand for such workers. The movement of the wage and applications data loosely mirror the increase in visa issuances in H-1Bs. They suggest that the demand for computer-related (foreign) workers is greater today than in other occupations.

Adjusters From Temporary to Permanent Status

How temporary are “temporary” workers? Not only do they stay several years in the United States with a temporary visa, but a sizable proportion stays on and gains permanent status. Temporary non-immigrants are permitted to “adjust” their status in-country to that of legal permanent resident. Working temporaries tend to adjust within the same occupation, about one-third of the H-1B adjusters report science or engineering occupations, while 90 percent of intracompany transferees (L) report executive or administrative occupations upon adjustment. In contrast, temporaries for whom work is most often secondary, e.g., foreign students (F) and exchange visitors (J), do not have typical occupations upon adjustment (Lowell 1999).

We might expect an increase in the numbers of those who adjusted following the Immigration Act of 1990 as it increased the number of permanent LPR slots available. In the

⁸ The DOL collects information on the employer, on each petition made by an employer (who may petition for multiple persons to fill a job description), and on the occupation of the job being petitioned for and the wage offered. Along with the admissions data just discussed, the INS collects petitions for non-immigrant workers. Because the two data systems are not linked in any fashion, and because the INS does not gather basic job information, the number of workers issued temporary visas by occupational category is not known.

year immediately following the act's implementation in 1992, the increase in numbers also had to do with the relief of a backlog that had built up in previous years. Table 3 shows that there was more than a doubling of the number of those adjusting from temporary specialty worker (H) to any permanent (LPR) status between 1991 and 1992. Note that those adjusting from intracompany L status increased almost four-fold across the same two-year span. Following a decline in the number of adjusters FY 1994 and 1995, the numbers increase again after the initial backlogs had been worked through. Perhaps, the increase has to do with the growing number of specialty workers (H-1B) and intracompany transferees (L) who were admitted around 1992, and who, four years later, became eligible to adjust their status.⁹

Thus, we can see a visa-status trail that leads from temporary to permanent residency. There are no data that tell us what proportion of temporary non-immigrants make the transition from temporary NIV to legal permanent resident LPR status. But while the data do not permit us to directly track adjusters, indirect estimates suggest that the proportion of adjusters as of FY 1994 are substantial (North 1996,74):

<u>Temporary Class Prior to Adjustment</u>	<u>Adjustments Over Visas Issued</u>
H	38.0%
L	21.2%
F&M	16.7%
J	4.0%

Nearly four-tenths of temporary speciality workers (H) but just 4 percent of exchange visitors (J) may adjust into some LPR immigrant category. The high rates of adjustment for the H and L categories are partly due to the fact that the law permits them to enter with the intent to stay, and many companies employ them with that permanent status in mind. The exchange (J) visa

⁹ The different temporary classes have distinct propensities to adjust into specific LPR categories of admission. As of FY 1994, 47 percent of foreign students (F) adjusted into the exempt spouse category and 44 percent into the skilled EB category (EB-3). In contrast, about one-half of both speciality workers (H-1B) and exchange visitors (J) adjusted into the skilled EB-3 category; while about one-half of intracompany transferees (L) adjust into the priority EB-1 category.

however, requires that the migrant return for two years to their country of origin before applying for permanent admission.

Of course, these figures do not tell us about the longer chains that exist — such as a “change in status” from one temporary visa to another (e.g., F student to H-1B speciality worker), followed by the adjustment into permanent status. One crude lower-bound estimate based on available data suggests, for example, that about one-fifth of the foreign students moved both from F directly, *and* indirectly through H-1B, to achieve any permanent status in fiscal year (FY) 1996 (Lowell 1999). The estimate of direct adjustment shown above, therefore, is too low.

Occupations of Status Adjusters and the Immigration Act of 1990

Two outcomes of the Immigration Act of 1990 should be evident in the adjustment patterns of temporary migrants and in the overall occupational make-up of those admitted into permanent status. Because the Act increased the number of admissions for skilled employment-based workers, there should have been an increase in the relative numbers of those admitted in professional categories.¹⁰ Because the Act fosters temporary to permanent visa-adjustments, by permitting H-1Bs to intend to stay in jobs that are permanent in nature, we might expect an especially strong growth in the occupations represented by these adjusters.

These are, to some extent, “counterfactual” possibilities that can be best addressed by asking what admissions would look like if the 1990 Act had not been implemented. Table 4 addresses this question by taking the linear trend from FY 1972 to FY 1991 and extrapolating it to FY 1996 by admission category (with projections bounded by category maximums). The actual FY 1996 numbers are then compared to the “what if” projections to get an idea of how much growth occurred after the Immigration Act of 1990 went into effect in 1992 (Greenwood and Ziel 1997).

The upper-left quadrant of Table 4 shows that for “new” principal immigrants — those with no reported prior work experience in the United States — there was an actual decline in numbers from a predicted 152,598 to 118,376. The 1996 figure was only 78 percent of those

¹⁰ Immediate occupational increases would reflect those in the employment-based backlog in the first two years following the Act’s implementation in 1992.

predicted for new immigrants. Conversely, among principals who adjusted from a prior temporary status, the numbers were 252 percent larger than predicted with the greatest growth in speciality and technical occupations, which include computer scientists. At the same time, there was substantial growth only among adjusters from H-1B status in the number of those reporting health professional occupations (498 percent), while adjustments from L status saw substantial growth in the executive and managerial occupations (353 percent).

There has been substantial growth in the numbers of those in professional, scientific and engineering occupations following implementation of the Immigration Act of 1990. Growth in executive, administrative, and managerial occupations occurred only for those adjusting from temporary to permanent status. The bulk of the speciality occupations (H) adjusts into professional and especially health-related occupations, while the bulk of intracompany transferees adjusts into executive and managerial occupations. Temporary migration is clearly affecting the skill-composition of the permanent admission system.

FOREIGN SKILLED WORKERS AND THE U.S. LABOR MARKET

Highly skilled workers generally play a positive role in the U.S. economy. Of course, immigrants are well represented in any listing of U.S. Nobel laureates and great inventors (Endleman and Loughran 1998). Research suggests that all foreign research and development (R&D) workers are exceptionally productive, contributing disproportionately to cited research literature and patent awards (Stephan and Levin, n.d.). Estimates are made yearly for the number of jobs created by foreign students in the hundreds of thousands. Employers tell us that temporary workers also create jobs in the private sector. Consider the recent contributions of temporary immigrants to information technology, a sector that contributes between 5 to 8.5 percent of U.S. Gross Domestic Product. While the many advantages of highly skilled immigrants are well known, there is debate over whether or not they interfere with labor market incentives and conditions.

Foreign Students and Higher Education

Science and engineering occupations have significant concentrations of foreign-born workers in the U.S. labor force. Because they are admitted for their skills, both employment-based permanent and temporary workers are common. They make up a greater share of doctorates than

masters, although the numbers have increased at all levels of education.¹¹ Consider Table 5 and the most recently available data for the post-secondary labor force in research and development by degree received in 1993. At that time, 28.3 percent of all foreign-born graduates were employed in academia, where they made up 20.7 percent of the workforce employed in that sector. While 62.7 percent of all foreign born were employed in private industry, they made up 15.5 percent of workers in that sector.

The foreign-born concentration is much greater among those with Ph.D.'s than it is for those with Master degrees or less. There may be different outcomes following completion of the Ph.D. in the teaching and in the postdoctoral ("apprentice") labor markets. There seems to be some consensus that most scientific fields are overproducing Ph.D.'s, at least insofar as the number of academic teaching positions is not growing fast enough to absorb new graduates.

We are witnessing a restructuring of academics with an increasing share of non-tenured and part-time faculty, and a large pool of postdoctoral workers who spend more years in that status (Leslie 1998; CPST 1997). Consider that the number of postdoctoral appointments increased 210 percent from 16,829 in 1975 to 35,379 in 1995; and that the foreign born have received half of all postdoctoral appointments since 1990 (CPST 1997). Of course, with solid access to postgraduate employment, many foreign students go on to temporary work authorization and, ultimately, permanent employment.¹² Nearly half of the temporary foreign students who received their Ph.D.'s in 1990-91 were still working in the United States five years later in 1995 (NSF 1998).

This tendency is greater in some disciplines, especially in engineering and health and life sciences, but it occurs across-the-board. Beginning in 1988, the National Research Council reported a substantial increase in the share of foreign engineers over the previous decade (NRC 1988). It found that a disproportionate part of the increase occurred in the academic sector. For example, over half of the assistant professors younger than 35 years were foreign born in 1983-

¹¹ Most foreign-born graduates got their advanced degree from an U.S. institution. Only 29.3 percent of foreign R&D workers received their education abroad in 1993.

¹² Typically they change temporary status to speciality worker (H-1B), and the adjust as permanent third-preference (EB-3) employment based immigrants.

85, and about two-thirds of postdoctoral appointees were not U.S. citizens. Other than academia, the NRC surveyed 20 major R&D firms which reported they were “dependent upon foreign talent and that such dependency is growing” (NRC 1988: 3). Nevertheless, the NRC concluded that the foreign engineer played a positive role in academia and in the private-sector labor market. Indeed, without foreign engineers universities and industry would “experience difficulty in staffing.”¹³

A decade later and in a different field the story is similar, but the conclusions indicate a hint of concern for the continued growth of foreign student enrolments. In their publication, *Trends in the Early Careers of Life Scientists*, the National Research Council reported exclusively on developments in academia, including that of foreign students and faculty (NRC 1998). They found that the number of foreign students earning life-science degrees at U.S. universities doubled from 1987 to 1996 and that temporary residents earned one-quarter of all Ph.D.’s. At the same time, about one-half of postdoctoral appointees are temporary foreign residents. To be sure, the bulk of the report deals with the increased age at graduation and the explosion of postdoctoral appointments in the life sciences.¹⁴ Many graduates do not end up in independent research positions, and years in postdoctoral study have increased. Overall, the report concludes that limiting the number of visas is not a good policy option. At the same time, it suggests that U.S. institutions should not continue to enroll increasing numbers of foreign students.

In short, most research from the premier institutions that investigate academics — The National Research Council and the National Science Foundation — do not find obvious adverse effects from foreign temporary or permanent residents. In fact, foreign students have faster and higher Ph.D. completion rates, indicating that they certainly do not lower standards in U.S. graduate institutions (Espenshade and Rodriguez 1997). Other observers are concerned by the

¹³ The 1988 study did note that the large number of foreign students could create problems over time in the educational sector. Minorities and women might be adversely affected because of competition with a growing number of foreign students. Especially in education, large numbers of foreign students may compete for scarce funding resources. Further, they found that the linguistic and cultural backgrounds of the predominantly Asian foreign students are likely to be significantly different from natives. Foreign teaching assistants and instructors might make it difficult for students to learn. Yet, no clear adverse effects were noted and the report recommended little other than tests for language proficiency for foreign-student instructors.

¹⁴ Most all life-science fields have experienced increased numbers of enrolments and graduations, coupled with declining slots in academic employment with more employment in industry.

remarkable growth in the post-Ph.D.-completion market and the high concentration of the foreign born among Ph.D. workers (North 1995). They assert that an expanding postdoctoral market, with large shares of foreign students and workers willing to take these typically underpaid postdoctoral positions, may create conditions that discourage natives. Competition may be especially steep with minorities. More than 75 percent of foreign doctoral recipients in 1996 reported that their U.S. university was their primary source of funding (Morris 1996; NSF 1998). But while there are many suggestive findings that point in the direction of such competition, there is to date no conclusive research to support broad assertions.

Non-Academic Labor Markets

The non-academic labor market has many foreign workers in high-skilled occupations, although research most often cannot differentiate temporary from permanent workers. While the available research does not indicate that foreign workers have clear-cut effects on the earnings and employment of natives, it suggests that there are subtle labor market mechanisms that may result in adverse outcomes for native workers.

For example, the expansion of foreign-born scientists, engineers, and mathematicians has been substantial and some observers argue that minorities might have been able to fill the jobs taken by foreigners (Bouvier and Martin 1995). They calculate that, if minorities were educated and took these types of jobs at the same rate as white males, their numbers would nearly supply the actual labor force numbers counted in the 1990 U.S. Census. Only a very few foreign born would be needed to meet demand if minorities and women were attracted to science and engineering employment. In fact, across all professions there is a much greater concentration of Asian and white professionals than Black or Hispanic (Bouvier and Simcox 1994). It is asserted that the “striking” under representation of Blacks and Hispanics discourages their entry into the professions, and that the foreign born, who are often temporary workers at the highest skill levels, disrupt incentives to stimulate the latent supply of minority professionals. But what is the causal chain?

Other than through their sheer numbers, how would the foreign born displace minorities? The most straightforward arguments are that the foreign-born professionals, much like their blue-

collar counterparts, are willing to work longer hours for less pay.¹⁵ However, there is no strong evidence for this typically cited displacement mechanism. Asian and white professionals, especially the foreign born, tend to earn more on average than Black or Hispanic professionals (Bouvier and Simcox 1994; Gurcak and Espenshade 1996). Rising unemployment, especially among U.S. workers, might be another manifestation of adverse competition. But skilled U.S. workers in 1994 had a 2.2 percent unemployment rate as compared to 3.9 percent for the skilled foreign born (Gurcak and Espenshade 1996). In highly competitive high-technology fields with increasing numbers of foreign workers, rates of employment and year-to-year earnings increases are outpacing the market at large (Anderson 1996).

Even if immigrants do not work for lower wages, a “glut of any group in the marketplace” may lower wages because even equally qualified unemployed would be willing to work for less (Gurcak and Espenshade 1996:32). Note that recently arrived Asian immigrants make 18 percent less than whites after controlling for human capital characteristics, training, specialty, and government employment. This wage difference takes six to eleven years for the skilled foreign-born worker to overcome (Tang 1993). A study of M.S. graduates of the UCLA engineering school found that the initial earnings disadvantage of immigrants relative to natives in their first job, disappeared with subsequent employment. Nor do immigrant engineers experience a glass ceiling on their upward mobility (Waldinger et al. 1995). If there is an adverse effect of a “glut” it appears to be short-lived, although the long-term effect may be to lower wage growth in given occupations over time. Given that these high-skilled occupations have unemployment rates below three percent and earnings are well above average, most observers express little concern.

If there is an effect of immigrants on natives, especially minorities, the effect must be a subtle one for it does not appear immediately in the data. Perhaps if employers simply prefer the foreign born to minorities, then discrimination may be a mechanism whereby U.S. natives and

¹⁵ Similar arguments apply to the postdoctoral market in and outside of academia. Here, the wage structure is determined mostly by government funding of research projects and the effect of immigrant competition has to be analyzed within that structure. Temporary immigrants are willing to take half of these low-skilled jobs and, perhaps, put off a day of reckoning for U.S. higher education and federal funding agencies. But the evidence still suggests that natives and minorities, in particular, are favored over immigrants in competition for university funds (Gurcak and Espenshade 1996).

minorities lose out to immigrants. Yet, tests for the effects of discrimination demand a *ceteris paribus* explanation and there are no earnings differences between immigrants and natives after controls are introduced (NRC 1997). Discrimination that favors immigrants over minorities in the open labor market must play itself out in some way other than in wages.

One possible adverse effect of immigrants may be that they are, indeed, preferred and that they are sorted at the top of a labor queue. Smith (1997) analyzed the 1993 National Survey of College Graduates. He found that there no earnings differences between race/ethnic groups or for the foreign born, after introducing controls for human capital and the likelihood of being employed as a scientist or engineer. In fact, the differences that occurred happened much earlier. Blacks, Hispanics, and Native Americans with S&E educations were less likely than immigrants and native-born whites to find S&E employment. Minority natives are thus more likely to experience occupational mismatch, and the indication is that employers differentiate between individuals not once they are hired, but well before. One implication is that a ready supply of immigrants and native-born white aspirants are at the top of the hiring-queue (if not the pay scale), at least when supply is able to meet demand. As tempting as it might be to draw parallels with the indirect effects of immigrants on the academic job market, this is only one study and it relies on a methodology that produces many internally inconsistent results.

CONCLUSION

What role do temporary workers play in the U.S.? At present, this is an almost impossible question to answer because of the paucity of data and research that distinguishes between temporary and permanent workers. We do know that the temporary admission system is growing in numbers, not the least because of the recent increases in the cap on speciality workers (H-1B), and it is contributing to an increase in the skill composition of permanent admissions. At the same time, the available research suggests that there is little direct impact of skilled foreign-born immigrants on the high-technology labor market and there are potentially great rewards from the high levels of productivity and creativity that foreign workers bring to science and engineering.

As discussed above, there is little evidence that competition from immigrants may dissuade native-born whites from pursuing crowded scientific and engineering fields. However, in either the academic or private-sector labor markets, there may be a long trail of effects

whereby minorities are dissuaded from beginning the long-haul in the postdoctoral labor market now dominated by foreign students, or from seeking employment in the private sector, which seemingly gives hiring preference to foreign-born workers and white natives. But these long trails are difficult to tease out from the existing data and surely are confounded by the fact that minorities and women tend not to pursue scientific and engineering studies long before they reach college.

Further, there are inconsistent findings regarding the marketplace as it is. Field research on temporary workers in San Francisco and Houston did not find undue competition with temporary workers in the academic labor market at the level of instructor or professor in the sciences, possibly because of the highly selective hiring process at that level (Hagan and McCollom 1999; Smith 1999; Lowell 1999). However, the field research did find instances of competition among postdoctoral students. In the private sector, the field research also uncovered clear instances of the abuse of the temporary system in so-called job shops. These are out-contracting outfits — in this instance in computer programming — that hire large numbers of temporary foreign labor whom they underpay in order to underbid competitors. Yet other field research efforts find that the movement of temporary workers, while it has “significant deficiencies,” reflects the reality of today’s global marketplace. These workers expand employment opportunities and help the U.S. stay competitive (Keely 1998).

The issue of shortages or employer demand, in turn, is the hottest topic in the policy-making arena. Most recently the passage of an expansion of the speciality worker (H-1B) visa largely turned around claims of a “shortage” of information technology (IT) workers. There is no doubt that the available 65,000 visas were issued well before the FY 1998 year was finished, which is consistent with high demand. This paper is not the venue in which to address all the nuances of this debate, i.e., claims that employers prefer young workers with just-the-right skills and drive (often immigrants from U.S. colleges) at the expense of older IT workers; claims that the shortage is manufactured by employers to justify the importation of “cheaper” immigrants; claims that employers refuse to take responsibility for training their workforce, etc. Suffice it to say that, even if the industry is “struggling to fill vacancies,” most experts do not believe that there is a clear shortage of IT workers (Jerome Levy Economics Institute 1998).

It is not difficult to find observers who will take strong stances on the pros and cons of foreign temporary workers. And there is a lot of data that suggests that concentrations of temporary workers exist in academia and in specialized private-sector occupations, which raise concerns. In addition to the findings in the field research just noted, there is reason to be concerned with the so-called job shops, even if there are few, because they tend to violate the terms of the temporary visa and harm, to some extent, the labor market. However, the evidence is yet to be systematically and convincingly marshaled to persuade a large share of the policy-making audience that something is amiss. Rather, temporary workers are widely seen as playing a positive role in the U.S. economy.

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Table 1. Temporary Non-immigrant Visa Issuances and Admissions: Individuals and Count of All Non-immigrant Trips

	Person- Year Population	Visa Issuances			Admissions		
		1992	1996	1996/	1992	1996	1996/
				1992			1992
All classes	1,444,319	5,368,437	6,237,870	1.16	20,793,847	24,842,503	1.19
Foreign officials (A)	30,997	62,674	78,078	1.25	102,645	118,157	1.15
Temporary visitors (B)	107,027	4,272,120	4,947,899	1.16	19,238,240	22,880,270	1.19
Transit aliens (C)	4,520	155,040	186,556	1.20	345,610	325,538	0.94
Treaty traders & investors (E)	54,657	31,805	29,909	0.94	152,416	138,568	0.91
Students (F1, M1)	245,319	223,309	247,432	1.11	241,093	426,903	1.77
Students' spouses/children (F2, M2)	27,876	22,325	21,518	0.96	33,431	32,485	0.97
International representative (G)	22,773	25,162	30,258	1.20	69,985	79,528	1.14
Temporary workers & trainees	48,815	79,573	119,334	1.50	163,262	227,440	1.39
Registered Nurses (H-1A)	n.a.	7,377	1,745	0.24	7,176	2,046	0.29
Specialty occupations (H-1B)	31,092	44,290	58,327	1.32	110,223	144,458	1.31
Performing services n.a. (H2)	8,562	18,997	23,204	1.22	34,442	23,980	0.70
Agricultural workers (H-2A)	3,328	6,445	11,004	1.71	16,390	9,635	0.59
Unskilled workers (H-2B)	5,234	12,552	12,200	0.97	18,052	14,345	0.79
Industrial Trainees (H3)	n.a.	2,069	1,877	0.90	3,352	2,986	0.89
Extraordinary ability (O1, O2)	2,131	674	4,359	6.47	714	9,289	13.01
Athletes & entertainers (P1,2,3)	1,822	4,319	23,885	5.53	4,769	33,633	7.05
Exchange & religious (Q1, R1)	2,516	1,847	5,946	3.22	2,586	11,048	4.27
Spouses (H4, O3, P4, R2)	16,943	25,194	38,496	1.53	40,009	53,572	1.34
Exchange visitors (J1)	89,651	145,020	171,164	1.18	189,940	215,475	1.13
Spouses/children of exchange (J2)	29,035	32,470	33,068	1.02	42,031	41,250	0.98
Intracompany transferees (L1)	20,765	17,345	32,098	1.85	75,347	140,457	1.86
Spouses/children of transferees (L2)	24,207	21,358	37,617	1.76	45,501	73,305	1.61
Professionals, North American Free Trade Agreement (TC/TN)	n.a.	n.a.	n.a.	n.a.	12,531	26,987	2.15

Sources: Admissions (INS 1996), Visa Issuances (DOS 1996), Person-Year Population (memorandum from the U.S. INS 'Statistics Branch' 1996).

Notes: Categories may not equal totals because of omitted categories. N.A. means not available. The TC category was subsumed by the TN with the passage NAFTA in 1994 (overwhelming Canadian workers).

Table 2. Labor Condition Attestation: Average Yearly Salary and Number of Petitions

Occupational Category	Average Wage			Petitions		
	1992	1997	1997 /	1992	1997	1997 /
			1992			1992
Architecture, Engineering and Surveying	\$42,188	\$49,643	1.18	4,520	18,279	4.04
Mathematics and Physical Sciences	\$40,217	\$46,189	1.15	2,093	3,178	1.52
Computer-related Occupations	\$39,750	\$49,178	1.24	5,732	63,468	11.07
Life Sciences	\$33,673	\$35,678	1.06	2,120	3,482	1.64
Social Sciences	\$42,449	\$42,826	1.01	808	3,153	3.90
Medicine and Health	\$43,891	\$55,903	1.27	4,114	12,569	3.06
Education	\$33,945	\$36,302	1.07	4,878	8,226	1.69
Museum, Library, and Archival Sciences	\$29,309	\$36,562	1.25	98	255	2.60
Law and Jurisprudence	\$64,605	\$67,499	1.04	342	818	2.39
Religion and Theology	\$25,980	\$32,090	1.24	50	77	1.54
Writing	\$37,212	\$37,613	1.01	235	1,092	4.65
Art	\$35,479	\$39,535	1.11	336	1,876	5.58
Entertainment and Recreation	\$37,953	\$39,637	1.04	135	348	2.58
Administrative Occupations	\$38,514	\$42,508	1.10	2,132	11,225	5.27
Managers and Officials	\$62,706	\$59,072	0.94	1,919	6,613	3.45
Professional, Technical, and Managerial	\$49,910	\$52,563	1.05	895	3,741	4.18
Fashion Models	\$134,583	\$115,000	0.85	4	11	2.75
Total	\$41,244	\$48,390	1.17	30,411	138,411	4.55

Source: Tabulations by the Author with Department of Labor, Administrative Data 1992, 1997.

Note: Data are for full time work, yearly salary reported, and approved cases in each database year.

Table 3. Adjustments to Legal Permanent Residence from Selected Non-immigrant Classes.

Year	Specialty Workers H	Intracompany Transferees L	Foreign Students F&M	Exchange Visitors J
1985	8,000	6,300	22,600	2,100
1986	9,200	6,200	21,000	2,000
1987	9,100	5,400	19,600	1,900
1988	10,100	5,200	20,400	2,100
1989	11,000	3,900	21,900	2,800
1990	14,600	3,900	25,100	2,800
1991	14,900	2,900	20,900	2,600
1992	34,700	10,900	23,600	6,200
1993	38,900	9,400	37,900	10,300
1994	30,300	8,600	29,600	7,300
1995	27,081	7,386	18,002	3,852
1996	35,863	11,855	19,963	5,159

Source: North, 1999; INS, 1996.

Table 4. Principle Immigrants by Adjustment Status and Occupation: Predicted and Actual Admissions, 1996

	Predicted	Actual	Actual/ Predicted	Predicted	Actual	Actual/ Predicted
	NEW IMMIGRANTS			NON H O R L ADJUSTERS		
All occupations	152,598	118,376	0.78	37,605	94,737	2.52
Professional, Technical, and Kindred	23,391	26,664	1.14	9,480	18,450	1.95
Specialty and Technical Occupations	13,533	14,598	1.08	4,650	9,565	2.06
Health Professionals	6,160	6,479	1.05	2,770	4,889	1.76
Other Professionals	3,698	5,587	1.51	2,060	3,996	1.94
Executive, administrative and managerial occupations	11,691	11,857	1.01	4,292	7,784	1.81
Sales occupations	8,710	6,742	0.77	2,802	4,032	1.44
Administrative support occupations (incl. clerical)	13,346	11,194	0.84	4,267	4,825	1.13
Precision production, craft, and repair occupations	17,260	10,112	0.59	1,891	6,891	3.64
Operator, fabricator, and laborer occupations	30,556	23,100	0.76	3,835	25,245	6.58
Farming, forestry, and fishing occupations	9,864	9,404	0.95	252	1,324	5.25
Service Occupations	37,780	19,303	0.51	10,786	26,186	2.43
No occupation	167,794	176,604	1.05	81,008	171,097	2.11
	H-1B ADJUSTERS			L ADJUSTERS		
All occupations	7,288	18,784	2.58	1,708	4,600	2.69
Professional, Technical, and Kindred	5,564	15,292	2.75	277	256	0.92
Specialty and Technical Occupations	1,767	3,519	1.99	39	76	1.95
Health Professionals	1,040	5,181	4.98	4	2	0.50
Other Professionals	2,757	6,592	2.39	234	178	0.76
Executive, administrative and managerial occupations	1,102	2,585	2.35	1,194	4,217	3.53
Sales occupations	50	124	2.48	55	36	0.65
Administrative support occupations (incl. clerical)	220	314	1.43	75	34	0.45
Precision production, craft, and repair occupations	77	165	2.14	24	16	0.67
Operator, fabricator, and laborer occupations	55	83	1.51	11	17	1.55

Farming, forestry, and fishing occupations	12	16	1.33	2	3	1.50
Service Occupations	208	205	0.99	70	21	0.30
No occupation	886	440	0.50	235	67	0.29

Source: Greenwood and Ziel, 1997.

	<u>Total</u>		<u>Sector</u>					
	≤ MA	Ph.D.	<u>Education</u>		<u>Industry</u>		<u>Government</u>	
			≤ MA	Ph.D.	≤ MA	Ph.D.	≤ MA	Ph.D.
Total	2,340,000	345,000	413,000	179,000	1,612,000	135,000	315,000	31,000
US Born	2,010,000	244,000	342,000	128,000	1,387,000	90,000	281,000	26,000
Foreign	330,000	101,000	71,000	51,000	225,000	45,000	34,000	5,000
Foreign % of Sector	14.1%	29.3%	17.2%	28.5%	14.0%	33.3%	10.8%	16.1%
Foreign % Total	100.0%	100.0%	21.5%	50.5%	68.2%	44.6%	10.3%	5.0%

Source: NSF, 1998.

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