Migration and US economic competitiveness

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Abstract

Most Americans are dissatisfied with US immigration policies. This dissatisfaction stems from several factors, including the presence of over 11 million unauthorized foreigners and the fact that many US immigrants who want their spouses and children to join them face long waits. There is also a sense that the US, which accepts over a million immigrants and several hundred thousand temporary foreign workers a year, is not getting enough highly skilled immigrants and temporary workers who could bolster innovation and competitiveness in an increasingly knowledge-based economy. It is very hard to measure the benefits and costs of immigrants and migrant workers, which is one reason why the unsatisfactory status quo persists.

Keywords: Immigration, migrant workers, competitiveness, United States

Introduction

The United States is a nation of immigrants. Almost all US residents are immigrants or their descendants, and most Americans celebrate their immigrant heritage. Immigrants have made and continue to remake America as they change the size and composition of the population, reshape the economy and labour market, and influence politics, society and culture.

About 104,000 foreigners arrive in the United States every day, including 3,100 who receive immigrant visas that allow them to settle and become naturalized US citizens after five years (DHS). The foreigners arriving in the United States include almost 100,000 tourists, business visitors, foreign students and workers, persons whom the US Department of Homeland Security considers non-immigrants or temporary visitors who will leave the US after a few days, weeks, or years. For most of the past decade, some 2,000 unauthorized foreigners a day settled in the United States (DHS).

The US had 40 million foreign-born residents in 2010, including 11.2 million, over a quarter, who were illegally present (Grieco *et al.*, 2012). The US has more foreign-born residents than any other country, three times more than number two Russia, which has 12 million international migrants (United Nations, 2012). The US also has more unauthorized foreign residents than any other country (United Nations, 2012). The 30 rich or industrial countries in the world have an average 10 per cent foreign-born residents. However, there is wide variation. Foreigners are less than two per cent of residents in Japan and South Korea, but almost a quarter of the residents Australia and New Zealand were foreign-born. The US, with 13 per cent foreign-born resi-

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dents, had a higher share of immigrants than most European countries, but a lower share than Canada, where over 20 per cent of residents were born outside the country (United Nations, 2012).

Two recent developments rekindled the US debate over how to change immigration policy for the 21st century. The 2008-09 recession, the worst in 50 years, doubled the US unemployment rate to almost 10 per cent and reduced the entry of unauthorized foreigners (Passel *et al.*, 2012). Most unauthorized foreigners in the US did not go home even if they lost their jobs, since there were also few jobs in their home countries. Legal immigration continued at over a million a year as US residents sponsored family members for admission.[1] The second stimulus for a renewed debate over immigration is the increasing number of states, beginning with Arizona in April 2010, that enacted laws aimed at pushing unauthorized foreigners out of the state.[2]

Immigration

Between 1990 and 2010, the number of foreign-born US residents doubled from 20 million to 40 million. The US population increased from 250 million to 310 million, so that immigration contributed a third to US population growth and, with the US-born children and grandchildren of immigrants, migration accounted for over half of US population growth (US Statistical Abstract, 2012; Tables 1, 5, 81).

Legal immigration has been increasing. Immigration averaged 250,000 a year in the 1950s, 365,000 a year in the 1960s, 443,000 a year in the 1970s, 640,000 a year in the 1980s, almost a million a year in the 1990s, and 1.1 million a year in the first decade of the 21st century. The number of foreign-born

[1] The 2008-09 recession resulted in the loss of eight million jobs; civilian employment fell from 146 million at the end of 2007 to 138 million at the end of 2009. Job growth resumed in 2010 (http://data.bls.gov/cgi-bin/surveymost?bls). There was also stepped-up enforcement of immigration laws, especially after the failure of the US Senate to approve a comprehensive immigration reform bill in 2007, including a proposal to require employers to fire employees whose names and social security data do not match (http://migration.ucdavis.edu/mn/more.php?id=3315_0_2_0).

There is agreement that the stock of unauthorized foreigners fell in 2008-09 for the first time in two decades, but disagreement over why. Some studies stress the US recession, suggesting that the stock of unauthorized foreigners could increase again with economic recovery and job growth. Others stress the effects of federal and state enforcement efforts to keep unauthorized workers out of US jobs as well as an improving Mexican economy. For a review of the debate, see http://migration.ucdavis.edu/mn/ more.php?id=3433_0_2_

[2] Arizona and other states require all employers to use E-Verify to check the legal status of newly hired workers, which encourages some unauthorized workers to move to other states and seek jobs with employers who do not use E-Verify (California and Illinois have state laws that restrict the ability of local governments to require employers to use E-Verify). Alabama, Arizona, and other states also require state and local police to determine the status of persons they encounter or arrest. The US Supreme Court has upheld the authority of states to require their employers to use E-Verify and to have police check suspected unauthorized foreigners.

US residents is higher than ever, but the 13 per cent foreign-born share of the population is below the 15 per cent share a century ago, when a million immigrants a year arrived in a country of 92 million in 1910, versus 309 million in 2010 (DHS). Until the 1960s, most immigrants were from Europe (DHS, Table 2).[3] Since the shift in policy from national origins to family unification in 1965, most immigrants have been from Mexico, other Latin American countries, and Asia.

Immigration is sometimes likened to entering a house, with a front door for legal permanent immigrants, a side door for legal temporary visitors, and a back door for the unauthorized. Each door has subcategories of entrants. For example, there are four major types of front-door immigrants, family-sponsored, employment, refugees, and those who win immigration visas in a lottery. Two thirds of front-door immigrants receive immigration visas because their family members already in the US petitioned the US government to admit them. Some of these US relatives are US citizens who request about 500,000 immigration visas a year for their immediate family members, spouses, children under 21, and parents (Martin and Midgley, 2006). In many cases, the US citizens who are petitioning for the entry of relatives are immigrants who have naturalized (Martin and Midgley, 2006).[4]

There are several ways to look at the queues for other relatives of US citizens trying to obtain immigrant visas. On the one hand, most countries do not give immigrant visas to adult sons and daughters or adult brothers and sisters of US citizens, that is, the US has a more expansive family unification system than most other countries. On the other hand, many relatives do not wait abroad for immigrant visas. Instead, they enter the US as temporary visitors and stay or slip into the US illegally, so that a million or more of the unauthorized foreigners in the US are likely to eventually qualify for immigrant visas even without a large-scale legalization program.

A second and much smaller number of immigrant visas are available to foreigners requested or sponsored by US employers. There are 140,000 employment-based visas a year available for foreigners and their families requested by US employers.[5] There are several types of employment-based immigrant visas, but the largest number is for foreigners whose employers demonstrate to the US Department of Labor that US workers are not available to fill a job.[6] Almost all of the foreigners who are sponsored by employers for immi-

[3] During the 1950s, for example, over 55 per cent of the immigrants arriving in the US were from Europe, including almost half from Germany and Austria.

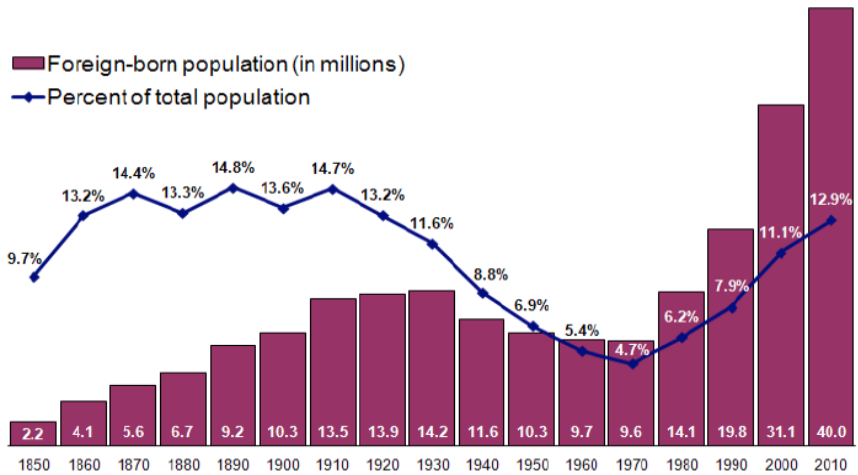
[4] There are limits or quotas on immigrant visas available for more distant relatives of US citizens and the family members of legal immigrants settled in the US. There are more such relatives than visas, leading to sometimes lengthy queues averaging around 3 years to seven years.

[5] The number of employment issued can be higher than 140,000 because employment visas not issued in earlier years can be carried forward.

[6] There are five types of employment-based immigration visas: (1) priority workers with "ex-

grant visas are already in the US, over 90 per cent in recent years, and many already fill the job for which the employer says there are no qualified US workers. Another employment-based immigrant visa is available to foreigners who invest at least $500,000 in the US and create or preserve at least 10 jobs.[7]

Figure 1. Immigration to the US: 1850-2010



Source: Calculated from DHS and US Statistical Abstract 2012.

The third group of front-door immigrants includes refugees and asylees, and the fourth is for "diversity immigrants," a category created in 1990 to offset the decline in migration from Ireland and other European countries who found it hard to obtain immigrant visas because they had few close relatives in the US to sponsor them. The Immigration Act of 1990 made 50,000 diversity visas available each year, and all were reserved initially for the Irish. Today, diversity visas are available to citizens of countries that sent fewer than 50,000 immigrants to the US during the previous five years.[8]

traordinary ability" in the arts or sciences or multinational executives; (2) members of the professions holding advanced degrees; (3) professionals with Bachelor's degrees and skilled and unskilled workers; (4) special immigrants, including ministers; and (5) investors.

[7] EB-5 investor visas are available to those in invest at least $1 million and create or preserve at least 10 full-time US jobs, $500,000 in areas with unemployment rates that are 1.5 times the US average. Most foreign investors invest $500,000 via US firms that recruit foreign investors, the foreigners generally do not actively manage their US investments. After two years and a check on the investment and jobs, foreign investors can convert probationary immigrant visas into regular immigrant visas.

[8] Foreigners enter the lottery via the internet in October, and the winners of immigrant visas are drawn the following spring. In FY10, over half of the 15 million applicants were Bangladeshis (8.6 million applied), followed by two million Nigerians; 1.1 million Ukrainians; and almost 800,000 Ethiopians and another 800,000 Egyptians. In FY11, only eight million foreigners applied for diversity immigrant visas, perhaps because Bangladesh was for the first time excluded. Nigerians submitted 1.4 million entries in FY11, Ghanaians 910,000, and Ukrainians 850,000.

Table 1. Foreigners coming to or in the US, FY06-10

	2006	2007	2008	2009	2010
Legal immigrants	1,266,129	1,052,415	1,107,126	1,130,818	1,042,625
Immediate relatives of US citizens	580,348	494,920	488,483	535,554	476,414
Other family-sponsored immigrants	222,229	194,900	227,761	211,859	214,589
Employment-based	159,081	162,176	166,511	144,034	148,343
Refugees and asylees	216,454	136,125	166,392	177,368	136,291
Diversity and other immigrants	88,017	64,294	57,979	62,003	66,988
Estimated emigration	316,000	320,000	324,000	328,000	
Temporary visitors	33,667,328	37,149,651	39,381,925	36,231,554	46,471,525
Pleasure/business	29,928,567	32,905,061	35,045,836	32,190,915	40,337,290
Foreign students (F-1)	693,805	787,756	859,169	895,392	1,514,783
Temporary foreign workers	985,456	1,118,138	1,101,938	936,272	1,682,132
Illegal immigration: apprehensions	1,206,457	960,756	791,568	613,003	516,992
Removals or deportations	280,974	319,382	358,886	395,165	387,242
Unauthorized foreigners	572,000	572,000	-650,000	-650,000	

Sources: DHS Immigration Statistics, www.dhs.gov/immigrationstatistics
Unauthorized Foreigners from Passel et al., (2012).
There was net outmigration of unauthorized foreigners in 2008 and 2009. Beginning in FY10, DHS made a more complete count of land admissions

Temporary visitors

US businesses are eager to attract most types of side-door temporary visitors or non-immigrants, as evidenced by airline and hotel ads for foreign tourists. Arrivals of temporary visitors increased in the 1990s, but fell after the September 11, 2001 terrorist attacks for reasons that included new rules for issuing visas, including a requirement that most foreigners who require visas to come to the US appear in-person at US embassies and consulates to be interviewed.[9] Temporary visitor arrivals have since rebounded, and today approach 50 million a year (DHS).[10]

[9] The US Visa Waiver Program in 2012 allowed the citizens of 36 countries to visit the United States for up to 90 days without a visa.

[10] Some of the recent increases in the temporary visitor admissions reported by DHS reflect a more complete count of foreigners who arrive from Canada and Mexico. If an individual enters the US several times, she is counted each time in DHS admissions data. Beginning in 2010, DHS separated unique individuals and admissions, and reported that 25 million unique individuals were admitted, meaning there were almost two "admissions" for each unique individual. The ratio between admissions and unique individuals varies by type of temporary visitor. For example, admissions and unique individuals were about 140,000 a year for H-2A and H-2B workers until 2005, when admissions increased sharply before falling slightly in 2009-10. One

Several categories of side-door temporary visitors are of special interest. For example, foreign student admissions have increased sharply, reflecting the global reputation of US higher education, affluence in Asia that enables more Chinese, Indians, and Koreans to seek US degrees, and active recruitment of fee-paying foreign students by some US universities. About 215,000 foreign students arrived in the US in 2010-11, when a total of 725,000 were enrolled at US universities (Open Doors, 2011). About 35 per cent of US foreign students are from China and India, and the University of Southern California has more foreign students than any other US university (Open Doors, 2011).[11]

Many foreign students graduate from US universities and stay, which they can most easily do by marrying a US citizen or finding a US employer to sponsor them for an immigrant visa. Most US employers are not willing to sponsor fresh graduates for immigrant visas, instead, they often try to hire them as interns or as H-1B guest workers if visas are available. (Martin and Midgely, 2006).[12]

The H-1B visa makes it easy for US employers to hire foreigners with at least a college degree to fill US jobs that normally require a college degree. The H-1B visa was created in 1990 to deal with perceived labour market mismatches, that is, Congress believed that the US had enough workers, as indicated by a higher-than-normal unemployment rate, but not enough with computer skills to fill the growing number of jobs in the then nascent IT-sector. The compromise embodied in the H-1B program makes it very easy for employers to gain approval to hire foreign guest workers, but caps the number of visas available at 65,000 a year, plus 20,000 visas a year for foreigners with advanced degrees from US universities, and an unlimited number for non-profit universities and research centres.

Most employers only need to attest or sign a document in which they promise to pay the prevailing wage in order to receive permission to hire foreigners with H-1B visas; most can legally lay off US workers and replace them with H-1B workers. Congress thought that easy access to foreign H-1B workers would jumpstart computer-related businesses, and expected the number of

reason for the spike in admissions may be because employers of H-2A workers in Arizona for the winter vegetable harvest provide housing in Yuma and other border cities, but some H-2A visa holders prefer to live in Mexico and commute daily to US jobs. Counting each daily admission of such workers ensures that admissions are significantly higher than unique individuals. (www.dhs.gov/files/statistics/publications/ impact-changes-non-immigrant-admissions.shtm)

[11] After September 11, 2001 because some of the attackers had student visas but did not enroll at the institutions that admitted them, the US government developed a new database, the Student and Exchange Visitor Information System, to track foreign students at colleges and universities (www.ice.gov/sevis/index.htm). Foreign students pay a fee to cover the cost of SEVIS.

[12] All foreign graduates of US universities can stay in the US a year after graduation for what is called Optional Practical Training (OPT), usually a paid internship. If their degree is in a science, technology, engineering, or mathematics (STEM) field, foreign graduates of US universities may stay in the US an additional 17 months, giving their employers more time to determine if they should be sponsored for a guest worker or immigrant visa.

employer requests to start high and then fall as more Americans earned degrees in science and engineering. But employer requests for H-1B visas did not start high and fall. Instead, the annual quota on H-1B visas, which at 65,000 a year was three times admissions of foreign professionals in the late 1980s, was not reached until 1997. With all H-1B visas requested, employers who had become accustomed to hiring Indian IT workers persuaded Congress to raise the cap, eventually to 195,000 a year (Migration News, 2011)

The evolution of the H-1B program illustrates the path dependency that can occur in agriculture, IT, and other sectors. Once employers become accustomed to hiring workers from a particular country, the supervision and training system changes to make it ever easier to employ more, and the demand for Mexican farm workers or Indian IT workers rises. In the case of H-1B visas, few anticipated the emergence of Indian outsourcing firms that use H-1B visas to bring Indian workers into the US and send them from one US firm to another. Instead of employer requests for H-1B visas rising and then falling, outsourcers requested ever more visas, and they and firms such as Microsoft and Intel combined forces to raise the cap on the number of H-1B visas available. Employers want Congress to raise the cap, but critics have blocked more H-1B visas until the law is changed to require all employers to first try to recruit US workers before requesting permission to hire foreigners with H-1B visas. They also want US employers to certify that they did not lay off US workers to open jobs for foreign H-1B visa holders (Migration News, 2012a).[13]

Unauthorized foreigners

Unauthorized, undocumented, or illegal foreigners are persons in the US in violation of US immigration laws. The best estimate is that their number rose by over 500,000 a year, from about 3.5 million in 1992 to 12 million in 2008, before falling to 11.2 million in 2012 (Passel, 2012).

The two agencies of the Department of Homeland Security (DHS), the Customs and Border Protection (CBP) agency including the Border Patrol and customs inspectors (who aim to prevent unauthorized foreigners from entering the United States) and the Immigration and Customs Enforcement (ICE) agency (who seeks to identify and remove unauthorized foreigners), are responsible for dealing with unauthorized migration. CBP agents today are

[13] The H-1B program remains controversial. On January 30, 2012, Jennifer Wedel complained to President Obama that her husband, an engineer laid off by Texas Instruments, could not find a job. Obama responded that the US was short of such engineers, and asked for Darin Wedel's resume. After an initial flurry of calls to Wedel, recruiters said that since he was limited to the Dallas area by a child-custody agreement, they could not help him to get a job. Wedel blames the H-1B program for making younger and less expensive foreign engineers readily available to US employers.

apprehending fewer than 1,000 foreigners a day just inside US borders, down from over 4,000 a day in 2000 (DHS).[14]

Most Mexicans apprehended just inside the United States are fingerprinted and allowed to return "voluntarily" to Mexico rather than being formally removed or deported (McCabe and Batalova, 2009). The distinction between voluntary return and formal removal is important, since foreigners who return to the United States after formally being removed can be imprisoned. CBP is trying to discourage repeated attempts to slip into the United States from Mexico with a Consequence Delivery System introduced in 2012 that punishes all unauthorized entrants.[15]

ICE agents also enforce the employer sanctions laws that fine on employers who knowingly hire unauthorized workers. To prevent unauthorized workers from getting jobs, newly hired workers must present documents to their employers that prove their identity and right to work in the US, and both workers and employers sign a so-called I-9 form to demonstrate that they completed this procedure. Employers do not have to determine the authenticity of the documents that workers present, and many workers present false documents or documents belonging to other workers. DHS operates the E-Verify system that allows employers to check worker-presented documents, but employer participation in E-Verify is voluntary for most employers. Bills pending in Congress would require all employers to participate in E-Verify.[16]

Workplace enforcement has been a relatively low priority for immigration enforcement since employer sanctions were enacted in 1986. However, President George W. Bush ordered more workplace raids after the Senate failed to approve comprehensive immigration reforms in 2007. President Obama halted workplace raids in 2009, and ICE agents now try to keep unauthorized workers out of jobs by auditing or checking I-9 forms. ICE audits the I-9 forms of about 10 employers a day, and advises them which employees appear to be unauthorized. Employers, in turn, inform employees and ask them to

[14] It should be emphasized that Border Patrol apprehensions record the event of capturing an unauthorized foreigner rather than a count of unique individuals, so that one foreigner apprehended five times is recorded as five apprehensions.

[15] For example, Mexicans apprehended in Arizona may be returned to Mexico in Texas, where they have few contacts, a policy aimed at encouraging them to return to their homes rather than to try to re-enter the United States. Those apprehended five or more times may be prosecuted and imprisoned. Foreigners who are "other than Mexicans" (OTMs) are normally detained before being brought before an immigration judge to be formally removed or deported. In the past, OTMs were often released until their court dates because there was not enough space to detain them, and most did not appear when their case was scheduled in immigration court. This "catch-and-release" policy was changed to a "catch-and-detain" policy, so that DHS regularly detains 34,000 foreigners awaiting removal hearings (McCabe and Batalova, 2009).

[16] In Fall 2011, all federal contractors and 18 states required some or all of their employers to participate in E-Verify. The US Supreme Court in May 2011 upheld Arizona's Legal Arizona Workers Act that required employers in that state to participate (Migration News, 2012a).

clear up the discrepancies noted by ICE in their records. Most suspect employees quit and, since they are not removed from the US, some switch to other employers.

Immigration and competitiveness

Most immigrants come to the United States for economic opportunity. About half of US residents are in the US labour force, and a sixth of US workers were born abroad (BLS, 2012). US-born residents 25 and older, when arrayed by the best single predictor of earnings, years of schooling, form a diamond shape to reflect the fact that about 60 per cent have completed secondary school but not college, 10 per cent did not complete high school, and 30 per cent have college degrees or more (BLS, 2012). Foreign-born adults have more of a barbell shape, since over 30 per cent did not complete high school and over 30 per cent completed college. What is unusual about foreign-born workers is that most who lack a high school diploma did not finish ninth grade, while many of those with college degrees also have Master's or PhDs (BLS, 2012).

Macroeconomic effects

Immigration adds to the population and the labour force. The standard static or short-run analysis of the economic impacts of migrant on resident workers assumes that adding foreign workers to the labour force shifts the aggregate labour supply curve to the right along a fixed labour demand curve, increasing employment and lowering wages in a larger economy. The effects are summarised as follows: *"Although immigrant workers increase output, their addition to the supply of labour ... [causes] wage rates in the immediately affected market [to be] bid down... Thus, native-born workers who compete with immigrants for jobs may experience reduced earnings or reduced employment."* (USCEA, 1986: 213-4).

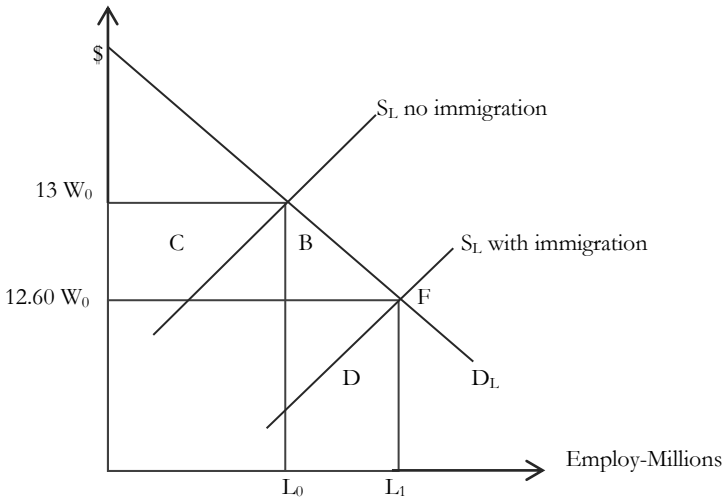
Figure 2, adapted from a National Research Council study (Smith and Edmonston, 1997), summarizes this wage-depressing effect of immigration. In 1996, the US had about 140 million workers earning an average $12.60 an hour at **F**, including 15 million foreign-born workers. The NRC consensus was that these foreign-born workers reduced average hourly earnings in the US labour market by 3 per cent, to about $12.60 an hour, that is, eliminating foreign-born workers would have resulted in 125 million US workers earning $13 an hour at **E.**

The shift from **E** to **F** as a result of immigration creates two rectangles and a triangle:

- rectangle **C** is a transfer between natives, as lower wages mean higher returns to owners of capital and land
- the economy expands by rectangle **D** and triangle **B**. Immigrants get most of the benefits of this economic expansion as wages in **D**, but owners of capital gain triangle **B** as well as the economy grows

The major economic beneficiaries of immigration are migrants who earn higher wages, gaining **D**, and employers who pay lower wages, gaining **B** and **C**. The major losers are workers employed before the arrival of immigrants lowered wages. This static analysis suggests that immigrant workers expand the economy by lowering wages and increasing the returns to capital.

Figure 2. The Effects of immigration



The size of triangle **B**, the net increase in national income (in per cent) due to immigration, can be estimated by using the formula for the area of a triangle, viz, 1/2 (3 per cent decrease in US wages due to immigration x 11 per cent immigrant share of US labour force x 70 per cent share of labour in US national income), or 1/2 x 0.002 = 0.001, that is, US national income increased 1/10 of 1 per cent due to immigration.[17] US GDP was $8 trillion in 1996, making the net benefit **B** equal to $8 billion a year. Since economic growth was 3.7 per cent or $292 billion in 1996, the net contribution of immigration to the US economy was equivalent to 10 days economic growth.[18]

The NRC estimate that immigration generated net economic benefits of $8 billion yielded two opposite reactions. Admissionists trumpeted the $8 billion net gain, while restrictionists emphasized how small the net gain from immi-

[17] The underlying NRC model assumed constant returns to scale in a two-factor production function with homogeneous labour and full employment, meaning that immigration did not change long-run returns to capital and labour. Wage depression due to immigration lasts for about a decade If immigrants arrive in one period and then immigration stops. If labour is heterogeneous, the arrival of immigrants has long-run distributional consequences, helping complementary workers and hurting those who are substitutes.

[18] Nominal GDP was $7.9 trillion in 1996, when nominal growth was 3.7 per cent. Tables B-1 and B-4 of the Economic Report of the President.

gration was in the large US economy. The fact that immigration's net economic effects were the equivalent of less than two weeks economic growth explains why many economists assert that the major economic issues associated with immigration are distributional. Borjas (1995, p9) concluded: *"If the social welfare function depends on both efficiency gains and the distributional impact of immigration, the slight benefits arising from the immigration surplus may well be outweighed by the substantial wealth redistribution that takes place, particularly since the redistribution goes from workers to owners of capital (or other users of immigrant services)."*

Assumptions about the nature of the aggregate production function, the extent of wage depression, and other variables can change the estimated economic benefits of immigration. However, the overall conclusion is unchanged, viz, adding immigrants to the labour force expands GDP by slightly lowering wages and increasing returns to capital, with most of the increase in national income accruing to immigrants. The question is what impact migrants have on resident workers? Macroeconomic studies suggest that immigration reduces the wages of resident workers slightly, prompting debates about how much.

Labour market effects

Case studies document the sometimes dramatic impacts of immigrants on particular industries and occupations. When unionized citrus workers employed by grower-formed labor cooperatives in southern California went on strike for a wage increase in 1982, many growers turned to labor contractors who hired unauthorized workers to get their lemons and oranges harvested. After the strike was settled, the six unionized harvesting coops lost business, as some of their grower-members quit and continued to rely on labor contractors. The costs of unionized coops increased, and eventually they went out of business. In this case, an industry that was mostly unionized and employing US citizens and legal immigrants in 1978 was mostly non-union and dominated by unauthorized workers six years later. The wages and especially the benefits of workers declined as 27 labor contractors replaced six coops (Mines and Martin, 1984).

Case studies in low-wage industries such as agriculture and construction show that immigrants can displace workers and depress wages, confirming accepted labour market theory (GAO, 1988:37-8). However, as the citrus example shows, the effects of unauthorized workers can be indirect and hard to measure. The older and unionized coop workers were displaced in a competition between two types of employers, coops versus labour contractors, that was won by the contractors. There were no studies of the older US workers who had been employed by the coops, and there were few complaints about contractors hiring unauthorized workers.

Two aspects of case studies of are very important: network hiring and the fate of resident workers. Farm work, janitorial services, and food preparation are occupations that typically have high worker turnover, making the search

for new workers to replace those who quit a challenge for management. Immigrant networks can reduce this management challenge by making it less necessary to invest in the recruitment and training of new workers. Current workers can bring friends and relatives into the workplace, and they tend to refer only those who can perform the job and often take responsibility for training new workers.[19] Immigrant networks thus "take over" the recruitment and training new workers. For this reason, friends and relatives of current workers who are outside the country may learn about job vacancies before jobless native workers living nearby (Waldinger and Lichter, 2003).

The second aspect involves workers who are replaced by migrants or do not learn about vacant jobs. Many "immigrant jobs" offer low wages for hard work at "unsocial" hours and have other attributes that do not make them the first choice of resident workers. The question is whether the availability of migrants "pushes natives up" the job ladder or leaves them jobless and out of the labour force.

The data are hard to interpret. Some argue that an influx of low-skilled migrants who are preferred by employers because of their "good attitudes" encourages or forces low wage resident workers to obtain additional skills and move up the job ladder (Waldinger and Licther, 2003). Others argue that the falling labour force participation rate of Black men, and their rising incarceration rate, are due in part to the arrival of low-skilled immigrants.[20]

The second type of labour market study, spatial-correlation econometric studies, examine wages and unemployment rates across cities with different shares of immigrant workers in their labour forces. These studies assume that the wages and unemployment rates of workers similar to migrants, such as US-born Blacks, Hispanics, and women, will be affected as the share of low-skilled migrants in city work forces increases.

Comparisons of the wages and unemployment rates of low-skilled US workers in cities with more and fewer low-skilled immigrants rarely find lower wages and higher unemployment rates for resident workers in cities with more immigrants (Borjas, 1994). Indeed, despite the Mariel boat lift that brought 125,000 Cubans to the US, including half who settled in Miami and increased the city's labour force by seven per cent in summer 1980,[21] the unemployment rate of Blacks was lower in Miami in 1981 than in cities such as Atlanta that

[19] Migrant workers from lower wage countries can also be relatively more skilled than the local workers they replace, since their frame of reference is the lower wages that prevail at home (Piore, 1979). It has been widely reported that the so-called A8 migrants from Central European countries working in the UK had higher levels of education than the British workers employed in farming and similar occupations alongside them (Ruhs and Anderson, 2010).

[20] About 20 per cent of US-born Black men without high-school diplomas are imprisoned.

[21] US-bound migrants had to leave Cuba via the port of Mariel.

did not receive Cuban immigrants (Card, 1990).[22] Wage rates for Blacks and other low-skill workers expected to compete with newly arrived Cubans were also unchanged, leading Card to conclude that Miami-area businesses expanded their employment with labour-intensive techniques to create jobs for the newly arrived *Marielitos*.

Card (2001) followed up with another study that examined the share of migrants in particular occupations in 1990 (rather than simply the share of migrants in a city's labour force). He found that the average hourly earnings of US-born workers in the 175 largest US cities were lowered by migrants more in some occupations than others, but the effect was small, and found little evidence that US-born residents moved away from "immigrant cities." (2001).

After reviewing the other spatial-correlation studies of Card and others, Friedberg and Hunt concluded: "Despite the popular belief that immigrants have a large adverse impact on the wages and employment opportunities of the native-born population, the literature on this question does not provide much support for this conclusion" (1995:42). However, Borjas (1994:1700) warned that economists "still do not fully understand how immigrants affect the employment opportunities of natives in local labour markets; nor do we understand the dynamic processes through which natives respond to these supply shocks and reestablish labour market equilibrium." For example, one explanation for Card's failure to find expected wage-depressing effects of immigrants is internal migration. If resident workers who compete with immigrants move away from cities with more immigrants, or do not move to such cities, internal migration can explain why spatial correlation studies fail to find expected wage effects.[23]

The major alternative to spatial-correlation studies are skill-cell or age-education cell econometric studies that estimate the impact of migrants on resident workers within a cell, such as 25-30 year olds with less than secondary school education. Borjas (2003) grouped US and immigrant workers into four education and eight work-experience cells, viz, less than high school, high school graduates, some college, and college graduates, and measured work experience in five-year increments, grouping workers who were 25 to 30, 35 to 40 etc. Borjas made two important assumptions: there was little mo-

[22] The unemployment rate of blacks in Miami in 1979 was 8.3 per cent and rose to 9.6 per cent in 1981. However, in the four comparison cities of Atlanta, Houston, Los Angeles and Tampa-St Petersburg that did not receive Cuban migrants, the unemployment rate of blacks rose from 10.3 per cent in 1979 to 12.6 per cent in 1981.

[23] Immigrants may also be attracted to cities with low unemployment and fast job growth, which could result in spurious positive correlations between the share of immigrants in the city labour forces and unemployment rates.

bility between the 32 cells, and migrants and US workers are substitutes within each cell.

Using census data for 18-64 year old men between 1960 and 2000, Borjas (2003) estimated a labour demand elasticity of -0.3, suggesting that a 10 per cent increase in the supply of labour in a particular education and age cell reduced wages by three per cent. There was more wage depression at the extremes of the education distribution, for those who did not finish high school (resident worker wages down eight per cent) and those with college degrees (down five per cent). Borjas found that the adverse effect of migrants on resident workers was smaller if the model was estimated by state rather than nationally, suggesting that internal migration biased the estimates in spatial correlation studies downward.

Ottaviano and Peri (2005) grouped US and immigrant workers into the same four education and eight work-experience cells as Borjas, but they assumed that migrant and US-born workers within each cell were complements, that is, 25 to 30 year old immigrants with less than a high-school education fill different jobs than similar US-born workers in that age and experience cell. The immigrant workers can complement US-born workers within a cell, as when a 30-year old US-born carpenter with a high-school education is more productive because he has a foreign-born helper. Ottaviano and Peri (2005) also assumed that there could be an investment response to the arrival of migrants that increases the demand for labour, as when the arrival immigrants creates construction jobs to build additional housing.

These assumptions changed the results, so that the arrival of migrants *increased* the wages of US-born workers. For example, between 1990 and 2000, there was an eight-per cent increase in the number of foreign-born workers, and Ottaviano and Peri estimated that the wages of all US-born workers rose by two per cent as a result of this immigration (wages for the lowest education group declined by two per cent, but rose for the other three education groups). By assuming that migrants and US-born workers are complements,[24] and by allowing investment to respond to the additional workers supplied by immigration and create additional jobs, Ottaviano and Peri find more positive than negative effects of migrants on US-born workers.

The fact that economists must make assumptions about how migrant and resident workers interact, and about how investors and businesses respond to the arrival of migrants, means that the results of econometric studies depend on the assumptions about migrant-resident worker interactions. One summary of econometric studies of over the past three decades concluded that, because "immigration triggers a variety of dynamic responses throughout the

[24] The US work force includes persons 16 and older. Ottaviano and Peri included US-born high school students with migrants in the young and not-completed secondary school group, which Borjas et al. (2011) found explained the Ottaviano and Peri complements within cells estimate.

economy [econometric studies] do not come close to accurately capturing the full long-run effects of immigration." (Bodvarsson and Van Den Berg, 2009: 155).

The failure of spatial correlation studies to find the expected adverse effects of migrant on resident workers, and disagreement about the appropriate assumptions in national models of migrant and resident worker interactions, has limited the impacts of econometric studies on policy. The Borjas studies that assume substitutability between migrants and resident workers and find wage depression are cited by restrictionists urging less migration, while admissionists point to studies such as those by Ottaviano and Peri to argue for more migrant workers.

Other economic effects

Productivity growth, producing more with less, is the ultimate source of economic and income growth. Entrepreneurship and innovation are often credited with raising productivity, and immigrants are frequently associated with both. Immigrant entrepreneurship is visible in high-tech start-up businesses as well as ethnic restaurants and gardening services (Waldinger *et al.* 1990). Innovation can be measured by the share of foreign-born students in science and engineering or the share of patents issued to foreign-born residents (Partnership for a New American Economy, 2012).

Self-employment is slightly higher for foreign-born than US-born workers.[25] In 2009, seven per cent of US born workers were self-employed, versus 7.4 per cent of foreign-born workers (Hipple, 2010:24).[26]

There are significant differences in self-employment rates by country of origin, level of education, and other factors. US-born residents from countries such as Korea and Middle Eastern countries such as Iran, Lebanon and Syria have very high rates of self-employment, perhaps reflecting relatively high levels of education and access to capital (Hipple, 2010). Middle Eastern and Korean immigrants are visible operating retail shops and other businesses in central cities.

Do immigrants have higher rates of self-employment because they are entrepreneurial or because they cannot find "regular" jobs? Economists believe that most workers prefer to work for wages and benefits, meaning they shift from farming to wage work or from consulting to wage work when jobs are

[25] There were almost 10 million self-employed workers among the 140 million employed persons in the US in 2010, including 40 per cent in management occupations such as consulting, 20 per cent in service occupations such as restaurants and gardening, 15 per cent in farming and construction occupations, and 15 per cent in sales occupations (US Statistical Abstract, 2012, Table 606).

[26] Some 7.5 per cent of foreign-born workers who had become naturalized US citizens were self-employed and unincorporated, versus 7.3 per cent of foreign-born non-US citizens.

available (Filer *et al.*, 1996). In most industrial economies, self-employment declines as the share of farmers falls, and many professions once dominated by self-employed professionals such as doctors today have an increasing share of wage workers. There are also business-cycle effects, as self-employment rates rise with unemployment: "self-employment rises during recessions when regular jobs may be harder to find and laid-off executives may enter self-employed 'consulting'" (Filer *et al.*, 1996:364).

The links between immigration and innovation are also murky. Immigrants are widely seen as innovators, and there are frequent references to the large share of Nobel prizes awarded to immigrants and the fact that a high share of students who win science prizes are immigrants or the children of immigrants. The most studied measure of innovation is patents, and a commonly cited conclusion is that increasing the share of college-educated immigrants in a state is associated with up to 10 per cent more patents per capita in that state (Hunt and Gauthier-Loiselle, 2010).

However, Mare et al. (2011) found no relationship between workforce characteristics and innovation. Critics of the implied immigration-innovation link emphasize that, with immigrants concentrated in fields such as science and engineering where many patents are issued, immigrants should have higher patent rates than US-born professionals concentrated in business and law. If patent measures are standardized to reflect the shares of foreign- and US-born workers in fields associated with patents, such as science and engineering, immigrant patent rates are the same as the rates for US-born workers.

The information-related firms of Silicon Valley are closely associated with immigrants from China and India.[27] Wadhwa *et al.* (2008) reported that well-educated immigrants were founders or co-founders of a quarter of 28,000 US IT start ups launched between 1995 and 2008. Almost all of the founder immigrants in these IT start ups had more than college degrees (a quarter had PhDs), and the largest group was born in India. Wadhwa argued that concluded that "legal, skilled immigrants are contributing significantly to the U.S. economy…and are helping the U.S. keep its global lead"[28].

There is no easy way to assess immigrant entrepreneurship and innovation. The proxies for the underlying variables of interest are imperfect, and the methods of analysis do not establish conclusive answers. Policy makers may want to encourage some types of entrepreneurship and innovation, but filling

[27] A typical assertion: "It's well known that America's high-tech economy has prospered thanks largely to highly educated foreigners." Business Week, July 9, 2010. www.businessweek.com/ investor/ content/jul2010/pi2010079_863838.htm

[28] Quoted in "The implications of immigrant entrepreneurship," Forbes, July 3, 2007. www.forbes.com/2007/07/02/immigration-india-china-ent-law-cx_kw_0703 whartonimmigration_print.html

research gaps in ways that influence migration policy in this area is very difficult.

Conclusions

The US admits over a million immigrants a year and several hundred thousand temporary foreign workers. Net unauthorized or illegal migration, which averaged over 300,000 a year over the past decade, has slowed sharply. Mexico, the source of more than half of the unauthorized foreigners in the US, appears to have received as many returning Mexicans as went to the US between 2005 and 2010 (Passel *et al.*, 2012). The reasons for the slowdown in Mexico-US migration are debated, and include stepped up border and interior enforcement in the US, high US unemployment rates during and after the 2008-09 recession, and improving conditions in Mexico.

The effects of immigrants, temporary workers, and unauthorized workers on the US economy and labour market are hotly debated. Economic theory and the most comprehensive macroeconomic study (Smith and Edmonston, 1997) find that adding workers to the labour supply via immigration reduces wages (or wage growth) by about three per cent and enlarges the US economy by about a tenth of one per cent. The major beneficiaries of immigration in this increase-labour-supply-and-depress-wages model are the immigrants who earn higher wages, US owners of capital and land, and some complementary US workers. The major losers are workers similar to the immigrants, including earlier immigrants.

Case studies confirm the wage depressing and worker displacement effects of especially unauthorized workers in particular labour markets, highlighting the importance of intermediaries in introducing migrant workers into the industry and path dependency, as when a particular industry becomes more dependent on migrant workers over time. However, econometric studies that examine wages and unemployment rates in cities with different shares of immigrant workers in their labour forces cannot find adverse effects of immigrants on native workers believed to be similar to the immigrants, leading some economists to assert that migrants have few or no adverse effects.

So-called spatial-correlation or city comparison studies may miss migrant effects if US workers who would compete with migrants move away from "immigrant cities" or do not move to them. For this reason, a new generation of national studies group immigrant and native workers into age and education cells and look at how immigrants and natives interact. The results of these studies depend largely on the assumptions made about the nature of immigrant-native worker interactions. If it is assumed that 25 to 30 year old immigrants with less than a high-school education compete with similar US workers, the immigrants adversely affect the natives. If the immigrants fill different jobs than similar US-born workers, they complement the US workers.

Immigrants have other economic effects as well, on public finance and innovation and entrepreneurship. However, the fact that foreign-born US resi-

dents are more likely to obtain patents than US-born residents may reflect their concentration in fields such as science and engineering where many patents are issued. Similarly, the fact that the foreign-born have a slightly higher rate of self-employment may reflect their lack of English and connections to good jobs as much as more entrepreneurship.

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