IMPACT OF IMMIGRATION ON THE DISTRIBUTION OF AMERICAN WELL-BEING

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Abstract/Policy Abstract

Changes in the net immigration rate and in the age distribution and skills of immigrants have important effects on the average age and skill mix of the population. In the short run, increases in immigration boost the number of workers and aggregate earnings and reduce the ratio of elderly to non-elderly. This paper examines the impact of U.S. immigration since 1980 on trends in wages and income and the relative incomes of young and old. It simulates the wage and income distributional impacts of a reduced flow of immigrants into the United States. Even ignoring the possible spillover effects of immigrant labor supply on the wages earned by natives, the average wage of working Americans has slipped as a result of an increased number of low-wage workers from abroad. Immigrants arriving after 1979 reduced the average annual wage by 2.3 percent in 2007. The slowdown in wage growth affects the growth of Social Security benefits. For workers attaining age 62 in 2007, the basic Social Security benefit would have been about 1.8 percent higher if the average wage had risen at the rate observed among native workers and immigrants who entered the U.S. before 1980 rather than among all resident workers, including workers who entered after 1979. Immigration since 1980 has also reduced U.S. household incomes and increased income inequality. Policies that reduce the inflow of immigrants or increase the average skills of new entrants would boost household income. If the flow of adult immigrants who have less than a high school education had been reduced by half after 1979, median income in 2006 would have been 1.8 percent higher and average income would have been 1.2 percent higher than the levels actually observed. The effects of this policy would have been significantly greater in the case of young working-age families; they would have been smaller in the case of households with a family head older than 65. On balance, immigration since 1980 has reduced the relative incomes of working-age residents compared with those of the population past 65.

1. Introduction

Immigration into the United States has grown rapidly since the 1970s. Changes in the net immigration rate, in the age distribution and skills of immigrants, and in the relation between immigration and fertility have had noticeable effects on the age distribution and skill mix of the population. In the short run, increases in immigration boost the number of workers, raise aggregate taxable earnings, and reduce the ratio of elderly to non-elderly in the population. Because immigrants typically have less educational attainment than native workers, the growth of average earnings in the economy is slower than it would have been with a lower rate of immigration, affecting the relative incomes of the aged and non-aged and the rate of Social Security benefit increase. New cohorts of retirees have experienced slower initial Social Security benefit growth than would have been the case with reduced immigration. Past immigration has also affected the composition of the aged. This means that changes in the level and character of immigration will have dynamic effects on the overall well-being of the aged and their income position relative to the non-aged.

In this paper I focus on two related questions: How has immigration since 1980 affected the income and earnings distributions? How has the changed composition of the population affected the absolute and relative income position of the aged? The paper is organized as follows. The next section briefly describes the recent history of immigration into the United States and some sources of micro-census data that permit us to measure its impact. The following section presents estimates of the impact of post-1979 immigration on the trend in average wages in the fifteen years after 1993. It also considers the potential effects of slower wage growth on the Social Security benefits of workers reaching retirement age in recent years. The fourth section of the paper considers the possible spillover effects of recent immigrants on the wages of native workers and immigrants who arrived earlier. Finally, I assess the impact of alternative immigration policies on the trend in personal incomes and on the relative incomes of households headed by young, middle-age, and older Americans. The paper ends with a brief summary of policy implications.

2. The Rise in Immigration

After five decades of comparatively modest immigration, the rate of immigrant entry into the United States began to rise in the late 1960s (Figure 1). Between 1980 and 2007, the Census count of immigrants increased by about 900,000 a year. Even excluding the children of

immigrants who were born in the United States, the increased number of first-generation immigrants accounted for one-third of U.S. population growth between 1980 and 2007. If immigrants were exactly like natives, their arrival would have little impact on the distribution of income or earnings. However, immigrants differ from natives in a number of ways, including their age distribution and the distribution of their job skills. Recent immigrants tend to be relatively young. In addition, working-age immigrants have below-average educational attainment, though immigrants are also overrepresented among workers who have a post-college degree. In 2007, 26 percent of immigrants with earned incomes had less than a high school education. Among native-born Americans with labor incomes, only 8 percent did not have a high school diploma. The gap between the educational attainment of natives and recent immigrants into the U.S. is even wider.

The differences between the immigrant and non-immigrant populations mean that immigrants' entry can affect the distribution income and earnings, even if immigrants' entry has no spillover effects on the income and wage distributions of the native population. This paper uses information on income, earnings, and immigration status in the Census Bureau's Annual Social and Economic Supplement (ASEC, formerly known as the March Current Population Survey, or CPS). The data in the files are used to identify immigrants and their children and to estimate their impact on the U.S. income and earnings distributions. The immigration status of all respondents is indicated in the ASEC files for calendar years 1993 through 2007. The files also contain information on immigrants' country of origin and year or approximate year of entry into the United States. In addition, the immigrant status of respondents' parents is also indicated.

This information allows me to calculate directly the impact of a smaller number of immigrants on the age and income distribution of the resident population. In this paper I consider the effects of hypothetical changes in immigration policy that begin in 1980 and continue through the last year covered by the ASEC data. Given the limitations of the data, the first year the impact of a policy change can be measured is 1993, which is the first year in which the immigrant status of respondents was ascertained. A proportional drop in the net immigration rate after 1979 would result in a proportional drop in the number of resident immigrants who entered the United States from 1980 to the present. I assume that U.S.-born children of the missing immigrants would also be absent from the resident population. Immigrants' children are identified in the ASEC file, though the year of entry of these children's parents is only known

with certainty if the children continue to live with their parents. For a second-generation immigrant who has already left his or her parents' household and was born after 1980 it is unclear whether the person is the offspring of immigrants who entered the United States before or after 1980. This introduces some uncertainty in identifying second-generation immigrants who are descended from post-1979 immigrants.

The current analysis also considers the potential feedback effects of immigration on the wages of native workers and immigrant workers who are already residents of the United States. In much of the analysis, however, the wages and other income sources of natives are assumed to remain unchanged when post-1979 immigration rates are varied. The analysis focuses on immigration in the period after 1979, when the immigration rate accelerated and the composition of the immigrant population shifted towards less skilled immigrants from lower income countries (Aydemir and Borjas 2007). I consider immigrants' impact on earnings, incomes, and the age profile of household income in the period from 1993 through 2007.

3. Impact on Wages

The effect of immigration on U.S. wages is controversial. Most of the debate focuses on the size and direction of the impact of immigrants' labor supply on the employment and wages of native workers (Borjas, Freeman and Katz, 1997; Card, 2005; Ottaviano and Peri 2006; Borjas, Grogger, and Hanson 2008). This section of the paper examines a much simpler question: Where do immigrants' wages fall in the distribution of overall earnings, and how would the distribution change if immigrants' wages were excluded? I focus specifically on immigrant earners who entered the United States in 1980 or a later year and on the children of these immigrants.

Immigrants entering the United States tend to be adults under age 40. For migrants who move for economic reasons, it makes sense to move early in one's career. The large economic and emotional investment associated with migration is likely to have a bigger payoff if there are many future years in which the worker can enjoy gains in wages and income as a result of the move. Table 1 compares the age distribution of immigrants and native-born U.S. residents who do not have any immigrant parents. The data cover the span of years from 1994 to 2008. The table shows the age distribution of all immigrants and of two immigrant sub-groups, those who entered the United States before and after January 1, 1980. Compared with natives who do not have any immigrant parents, U.S. immigrants tend to be underrepresented in both the youngest

and oldest age groups. This is especially true for recent immigrants, who are heavily concentrated in the 18-39 year-old age group. Very few recent immigrants are past the age of 60, and only a relatively small proportion are between 40 and 59 years old. These are ages when most workers earn their peak lifetime incomes. For obvious reasons, immigrants who entered the United States before 1980 tend to be older than average. If they are in the working-age population they are typically older than the working-age population of recent immigrants and the native-born. In addition to the earnings disadvantage they suffer as a result of their relative youth, recent immigrants are at a disadvantage because they are less likely to be fluent in English and acculturated to the norms of the U.S. job market. Although these disadvantages will decline as immigrants accumulate more experience in the United States, for working-age immigrants who have just arrived the shortcomings can severely limit workers' job prospects.

A large percentage of recent immigrants has little formal schooling. Table 2 displays the distribution of educational attainment among native-born U.S. workers and immigrants. The table distinguishes between immigrants who entered the United States before 1980 and after 1979. Compared with native-born workers, immigrant workers are somewhat overrepresented in the highest educational attainment group (those with schooling beyond college), but they are also heavily overrepresented in the lowest attainment group (those who have not obtained a high school diploma). In 2008 about 28 percent of immigrant workers who entered the United States after 1979 had not completed high school. In comparison, only 8 percent of native workers with no immigrant parents lacked a high school diploma. Recent U.S. immigrants tend to have much bigger education deficits than native workers and immigrant workers who were admitted before 1980. Part of this difference will disappear as some recent immigrants obtain additional schooling in the United States, but a sizeable percentage of the gap will persist. Many recent immigrant workers have not attended high school in their countries of origin, and they are unlikely to obtain a college or post-college degree in this country. In 2008 about 15 percent of immigrant workers who had arrived in the United States after 1980 had not completed even a year of secondary school in the U.S. or their countries of origin.

We can use a simple regression to compare the earnings of natives and immigrants and to assess the impact of age and educational attainment differences on the average earnings of each immigrant group:

(1) $\ln(Y) = c + \beta\, Age + \gamma\, Educ + \delta\, R + \varepsilon$

where *Y*   = Annual labor earnings;
       Age   = A vector of age dummies for successive 5-year age groups;
       Educ   = A vector of dummies reflecting 5 educational attainment groups;
       R   = A vector of race and ethnicity indicators for 5 mutually exclusive race/ethnicity
                  groups; and
       β, γ, δ = Vectors of coefficients.

I estimated equation (1) using annual data on individual earnings, age, educational attainment, and race and ethnicity, separately for men and women, for the 15 years from 1993 to 2007. The data were obtained from the March CPS/ASEC files for the 1994-2008 survey years. The estimation samples were restricted to 20-64 year-old workers on full-time, year-round schedules. To be included in the sample workers had to work for at least 32 hours per week and be employed for at least 48 weeks during the calendar year. In order to determine the effects of age, educational attainment, and race and ethnicity on native workers, the coefficients β, γ, and δ were estimated on a sample that was restricted to native-born U.S. workers who had no immigrant parents. With estimates of β, γ, and δ it is then straightforward to predict full-time, year-round immigrant workers' earnings under the assumption that their earnings are also generated by the same earnings function that predicts the annual earnings of native full-time, year-round workers. This assumption is unlikely to be true, but it provides an understandable benchmark for decomposing the earnings differences between natives and various immigrant populations.

Table 3 displays the results of this exercise. The top part of the table gives results for men, while the lower portion presents results for women. For both sexes I show separate estimates for second-generation immigrants (that is, the U.S.-born children of immigrants), U.S. immigrants, and seven subgroups of U.S. immigrants. To simplify the presentation, I average the results from all 15 years of the analysis. The first three columns in the table show the effects of age differences, educational attainment differences, and race and ethnicity differences, respectively, on each of these populations. These columns show the average effects of these differences under the assumption that the coefficients β, γ, and δ estimated on the native population also apply to first- and second-generation immigrants. Column 4 shows the combined effects of these differences on the logarithm of earnings in each of the first- and second-generation immigrant groups. Column 5 shows the average prediction error of the regression for each group of first- and second-generation immigrants. The size of the prediction

errors suggests that the estimated coefficients β, γ, and δ generally do a poor job of predicting earnings among first-generation immigrants. The errors for second-generation immigrants are positive and comparatively small, while those for all the first-generation immigrant groups are negative and large, especially in the case of recent immigrants and immigrants of Hispanic origin.

The total log earnings differences between immigrant groups and native workers are shown in column 6. Second-generation immigrants on average earn somewhat more than native-born workers who do not have an immigrant parent. Immigrants into the U.S. earn less, often substantially less, than their native-born counterparts. The earnings gap is particularly large in the case of Hispanic immigrants and immigrants who arrived within the past 10 years. The results in Table 3 imply that on average recent immigrants, especially those with Hispanic backgrounds, have reduced the average earnings of the full-time, year-round workforce. On the other hand, the working children of immigrants have slightly increased the average earnings of full-time workers. Figure 2 shows the average difference between immigrants' annual earnings and those of native-born workers with no immigrant parents, measured as a percentage of the average earnings of full-time, year-round native workers.[1] The earnings differences are displayed separately for male and female earners and for immigrants who arrived recently and in the more distant past. Immigrant workers who arrived within five years of the date earnings were reported on the CPS earned slightly less than workers who arrived between six and ten years before earnings were measured. Immigrants who arrived more than ten years before earnings were reported earned substantially more than immigrants who arrived more recently. All three immigrant groups earned less than native workers. The results displayed in Figure 2 show only slight changes in the percentage gap between immigrants' and natives' annual earnings over the 1993-2007 period, at least when immigrants are classified in these particular groups.

In order to determine the overall impact of recent immigration on the wage distribution it is necessary to ascertain the effects not only of immigrants but also of their U.S.-born children. The March 1994-2008 CPS/ASEC files contain information that allows us to identify immigrants

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[1] Figure 2 simply converts into percentage terms the results displayed in column 6 of Table 3. Whereas the results in the chart show the annual estimates of earnings differences for the 1993-2007 calendar years, the estimates shown in Table 3 indicate the 15-year average of the overall earnings differences.

and the U.S.-born children of immigrants. Immigrants' year of entry into the United States is ascertained in the CPS interview. For second-generation immigrants who continue to live with their parents, we observe the year of entry of the parents, allowing us to distinguish between second-generation immigrants whose parents arrived before and after January 1, 1980. Some second-generation immigrants born after 1979 do not live in households maintained by their foreign-born parents. For these second-generation immigrants it not possible to determine when their parents arrived in the United States. However, the 15 years of CPS/ASEC files contain information on nearly 150,000 second-generation immigrants born between 1980 and 2007 who continue to live in households maintained by their parents. For nearly all of these immigrant children we can determine the year their parents entered the United States. Figure 3 shows the percentage of these second-generation immigrants who are descended from immigrants who arrived after 1979.[2] In particular, the chart shows the percentage of second-generation immigrants descended from post-1979 immigrants by second-generation immigrants' birth year. Using information on the birth year, gender, and race and ethnicity of second-generation immigrants it is possible to calculate the probability that a particular second-generation immigrant is the offspring of either one or two foreign-born parents who arrived in the United States after 1979. For second-generation immigrants who lived outside of households maintained by their parents, we used this procedure to estimate the percentage descent of the second-generation immigrant from parents who arrived after 1979.

The information just described allows us to reliably identify all immigrants, their year of arrival in the United States, and all second-generation immigrants. For the great majority of second-generation immigrants we can also determine the percentage of descent from immigrants who arrived after 1979. For a small minority – those born after 1979 who live independently of their parents – we can assign a probabilistic estimate of the percentage of descent from immigrant parents who arrived after 1979. With this information it is straightforward to estimate the annual earned incomes of post-1979 immigrants and their offspring, on the one hand, and other native-born workers and pre-1980 immigrant workers, on the other. Figure 4 shows estimates of the mean annual wage and salary income of these two sub-populations as well as the

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[2] Strictly speaking, Figure 3 shows the percentage of ancestry of second-generation immigrants that can be traced to immigrants who arrived in the country after 1979. If only one of the second-generation immigrants' parents arrived after 1979, the person is classified as one-half descended from a post-1979 immigrant.

combined population of all resident U.S. wage earners.[3] The top line in the chart shows the average annual wage of natives (except the children of immigrants arriving after 1979) plus immigrants who arrived before 1980. The bottom line shows estimated average wages among post-1979 immigrants and their U.S.-born offspring. The line in between shows the average economy-wide wage, that is, the average wage and salary earnings of all resident workers, native and immigrant. The wages of post-1979 immigrants and their children are substantially below those of other wage earners, though the percentage gap has shrunk over time as post-1979 immigrants have gained greater experience in the U.S. job market. In the mid-1990s, post-1979 immigrants and their working children earned about 25 percent less than native workers and immigrant workers who arrived before 1980. By 2007 the wage gap was only 18 percent.[4] Nonetheless, the increasing importance of post-1979 immigrants in the workforce has meant their wages have a growing weight in determining the overall wage. The proportion of wage earners consisting of post-1979 immigrants and their children more than doubled between 1993 and 2007, increasing from 6 percent to 13 percent of the workers with wage and salary earnings.

Post-1979 immigrants have had a larger impact on men's than on women's average wages. Figure 5 shows the proportional effect of including post-1979 immigrants' wages in the computation of the economy-wide average wage for men, for women, and for both sexes combined. The impact of immigrants is larger on the average male wage than the female wage because immigrants arriving after 1979 represent a bigger fraction of male earners than of female earners. In addition, the gap between immigrant and nonimmigrant earnings is larger for men than for women (compare the top and bottom panels in Table 3). In 2007 male wage earners who entered the U.S. after 1979 and their children earned 25 percent less than other male wage earners. The proportional gap in pay was only half as large for female immigrant workers. When we combine the estimates for men and women workers we find that post-1979 immigrants and their children reduced the average annual earnings of wage and salary workers by 1.4 percent in 1993 and 2.3 percent in 2007. Stated another way, if we ignore the spillover effects of recent immigration on the wages of natives and immigrants who arrived earlier, the average

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[3] The average wage reflects average annual wage earnings of all workers with positive wage income, regardless of whether they worked on a full-time schedule.

[4] The differences in labor earnings – wages plus net self-employment income – are similar to though somewhat larger than those for wage income alone. I focus on the average annual wage because it is the earnings indicator used as an indexing factor in the basic Social Security benefit formula (see below).

annual U.S. wage would have been 2.4 percent higher in 2007 if post-1979 immigrants' wages were excluded in the calculation of the average. Figure 5 shows that the impact of post-1979 immigrants on the average wage of both men and women has tended to grow over time.

Immigration's impact on average wages will affect Social Security benefits of successive generations of retirees. This is because the wage indexing factors used to adjust a worker's past earnings and the bend points in the primary insurance amount (PIA) formula are both affected by the level and rate of change of the economy-wide average wage. The estimates displayed in Figures 4 and 5 can be used to calculate how much the economy-wide average wage would have increased in 1993 and later years if immigration rates after 1979 had been lower. Suppose, for example, that immigration had ceased completely in 1980 and later years. Under the assumption that the employment and earnings of other U.S. residents would have remained unaffected by the change in immigration policy, we can calculate the no-immigration trend in average wages by tabulating the earnings of residents who were citizens or residents in 1979 or were descended from citizens or residents in 1979. The estimated impact of lower immigration on the economy-wide average wage is displayed in Figure 6. The estimates for 1993-2007 show the actual change in average wage that would result from not counting the wages of post-1979 immigrants and their children in the calculation. The estimates shown in the chart for 1980-1992 represent simple linear interpolations under the assumption that the effect of the new immigration policy was zero in 1980 and 1.45 percent in 1993, the actual estimate obtained for that year.

The estimates displayed in Figure 6 can be used to calculate the impact of a reduced immigration rate on the Social Security benefits of workers reaching retirement age in recent years. The faster growth of earnings would have increased the indexing factors used to adjust earnings throughout a worker's career up through age 60. The indexing factors would rise most in the case of wages earned before the early 1980s. At the same time, the bend points in the basic Social Security formula would also increase faster. Because of the redistributive tilt in the PIA formula, a faster increase in the bend points relative to a worker's lifetime indexed earnings would produce an increase in the worker's Social Security replacement rate. The precise impact of faster economy-wide earnings growth on a given worker's Social Security pension depends on the worker's relative lifetime earnings (that is, his or her earnings compared with the average wage) and the percentage of lifetime wages that are earned early and late in the worker's career.

If we assume workers have a pattern of lifetime earnings that is similar to the age profile of earnings observed in the CPS/ASEC files, then it is possible to calculate the impact of faster economy-wide earnings growth for variety of workers, each of whom has a different level of lifetime wages. I have performed such calculations for workers attaining age 62 in 2007. Although the precise effect of faster wage growth varies from one worker to the next, the basic Social Security benefit would have risen on average by about 1.8 percent. The range of PIA increases is between 1.5 percent and 2.0 percent. From this it follows that immigration has not only helped to improve Social Security finances by increasing the number of U.S. workers and the size of the taxable earnings base, it has also slowed the rate of growth in average monthly benefit payments.

Readers should note that these simulation results are not very realistic. The simulated policy – a complete cessation of immigration after 1979 – is itself not very plausible. In addition, a maintained assumption of the exercise is that a sharp reduction in the number of immigrants would have no effect on the employment and earnings patterns of native U.S. workers and immigrants who entered the U.S. before 1980. This is unlikely. Recent immigrants represent a large percentage of the workforce in certain industries and occupations, and it is obvious that nonimmigrants would fill many of these positions if immigrant workers were unavailable. The industrial and occupational shift of native workers would in turn affect their earnings distribution. It is not obvious, however, that the induced changes in the earnings distribution of natives and pre-1980 immigrants would produce higher or lower average wages than the average wages implied in Figure 6. Depending on the responsiveness of U.S. saving and investment and of net international capital flows to the United States, American labor might become relatively more scarce compared with domestic capital, yielding a wage increase for many workers. The next section considers possible feedback effects of recent immigration on the wages earned by native-born workers and workers who immigrated before 1980.

4. Spillover Effects of Immigration on Natives' Wages

Economists and other observers disagree in their assessments of the impact of immigration on the level and distribution of native workers' wages. Ottaviano and Peri (2008), Hanson (2008), and Card (2009) provide recent summaries of this debate. Borjas (2009) offers a general equilibrium analysis of the wage impact of immigration taking account of its labor market effects through aggregate consumption as well as through labor supply. The

conventional view of the effect of immigration is that immigrants' entry into the workforce should reduce the wages and work opportunities available to native workers who are close substitutes for immigrants. On the other hand, immigrants' entry should improve the wages and job opportunities of native workers who have skills that make them complements to immigrants in the production process. It is natural to think that low-skill immigrants are close substitutes for low-skill native workers, so most economists who are not specialists in immigration probably assume an influx of low-skill immigrants reduces the wages and possibly the participation rate of low-skill natives. Since immigrants are over-represented in both the high- and low-skill segments of the labor force, their overall impact on high- and low-skill natives is uncertain, though it is clear in Table 2 that the over-representation is greater in the low-skill than in the high-skill labor market. What is plain in the statistics is that immigrant workers are under-represented in the middle of the skill distribution, at least insofar as skills can be measured by formal educational credentials.

Economists have pursued two broad approaches to estimating the impact of U.S. immigration on the wage distribution. The first is to compare the evolution of wages in different regional labor markets. The size of immigrant inflows varies greatly across different metropolitan areas, with some regions receiving an out-size share of all international migrants. If unskilled immigration affects the absolute or relative wages of unskilled native workers, it seems reasonable to expect low-skill workers' wages will fall fastest in regions that are the favored destinations of unskilled immigrants. Surprisingly, most regional analyses find little evidence that high rates of unskilled immigration depress the relative wages of an area's unskilled native workers (Borjas 1999). If this evidence is accepted at face value, it suggests that the over-representation of immigrants in the least educated labor force has exerted little if any downward pressure on the relative earnings of the least educated natives. Immigration has reduced average earnings by increasing the proportion of the workforce with limited skills, but it has not had spillover effects on the relative earnings of natives who have the same kinds of skills as immigrants.

Some labor economists are skeptical this conclusion can be valid. First, for a considerable period in the 1980s and early 1990s, when unskilled immigration was rising, the relative earnings of workers with less than a high school education fell in comparison with the wages of workers who have median schooling levels (Burtless 1995; Autor and Katz 1999). This

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trend seems consistent with the theory that a rising number of unskilled immigrants will push down the relative wage of the least skilled. Second, there is evidence unskilled native workers either moved away from regions that attracted foreign migrants or refrained from moving to those destinations (Liaw and Frey 1996; Frey and Liaw 1998). Investors may also have shifted their allocation of capital toward regions receiving large international immigrant flows. The migration patterns of unskilled natives and the investment decisions of firms may have offset part of the expected effect of foreign immigrant flows on regional wage distributions. Even if unskilled immigrants had the anticipated effect on the *national* wage distribution, the effect may not have been detectable as differences in regional wage distributions because the impact of immigrants was quickly diffused across all regional labor markets, including those that received few foreign immigrants (Borjas, Freeman, and Katz 1997).

These considerations led some labor economists to look for evidence of immigration impacts in national-level wage data. Even here, however, the evidence for a large impact of immigration on relative wages is not overwhelming. In spite of the fact that unskilled immigrant inflows remained high after 1995, the average hourly wage of workers with less than a high school education stopped falling relative to the wage of middle-skill workers (Mishel, Bernstein, and Shierholz 2009, Tables 3.15 and 3.16). Obviously, immigration is only one of many factors that influences the distribution of relative wages. Other factors include trends in technology, union density, the minimum wage, international trade and the real exchange rate, and the relative supply of U.S.-born workers in different skill categories. Separately identifying the exact impact of immigrant flows on the wage distribution is not easy. Economists who have analyzed national-level data have not reached a consensus on the magnitude of the effect.

If immigrants in a given skill class were perfectly substitutable for native-born workers in the same skill class, estimating the effect of immigration might be comparatively straightforward. However, it is not obvious whether immigrants and non-immigrants are perfectly substitutable, even in performing relatively simple tasks. Immigrants, especially recent unskilled immigrants, are likely to have language problems that may make them unsuitable job candidates in many occupations, limiting their ability to compete with native workers who have the same education and general work skills. This may mean that the adverse effects of new immigrants on wages are concentrated in a comparatively small number of occupations in which immigrants are concentrated. Wages in those occupations may be depressed as a result of

immigration, but the adverse effects could be mainly concentrated on immigrants rather than on native workers who have the same educational credentials.

Borjas and Katz (2007) assume immigrants and non-immigrants in the same skill class are perfectly substitutable in production. Using national-level data, they find measurable adverse effects of immigrant flows on the wages of the least educated U.S.-born workers. Ottaviano and Peri (2006 and 2008) find evidence that immigrants are not perfectly substitutable for U.S.-born workers in the same skill class, and they conclude that most of the adverse effect of immigration on relative wages is borne by immigrants themselves. Borjas, Grogger, and Hanson (2008) are skeptical of the evidence that immigrants are imperfect substitutes for U.S.-born workers, and they reject Ottaviano and Peri's findings. Card (2009) argues that "low-skill" workers – those who have received no schooling after high school – are highly substitutable in production, regardless of whether they have obtained a high school diploma. At the same time, "high-skill" workers – those who have received at least one year of college education – appear to be highly substitutable, regardless of whether they have actually completed college. Empirical studies suggest that "low-skill" and "high-skill" workers under these definitions are not highly substitutable in production, however. Under this two-education-group classification scheme, immigration into the United States appears much more balanced than it does under a four- or five-education-group scheme. That is, immigrants in the "low-skill" group as defined by Card are proportionately only modestly more numerous than immigrants in Card's "high-skill" group. This means that immigrant flows have not had a large effect on the relative number of "low-skill" and "high-skill" workers in the economy and have produced a correspondingly small impact on relative difference between "low-skill" and "high-skill" wages. Card (2009) concludes that both regional wage data and national-level analysis imply immigration has had little effect on native workers' wages. Of course, the entry of immigrants has still affected the overall distribution of earnings because the wage distribution of immigrants differs significantly from that of natives.

To determine the potential spillover effects of immigrant workers on the average earnings of natives, immigrants, and the wage-earning population as a whole, I have simulated annual earnings under alternative assumptions about the size and structure of these effects. The simulations are based on elasticity estimates obtained or reported in Ottaviano and Peri (2008) and Borjas and Katz (2007) (see Ottaviano and Peri 2008, Tables 7 and 8 and the associated

discussion of those tables). Ottaviano and Peri's central estimates assume that immigrant and U.S.-born workers are not close substitutes in production. The results imply that most of the adverse effect of higher immigration will be reflected in lower wages on the part of immigrants themselves. In the long run, many U.S.-born workers actually benefit from higher immigration because immigrants are complements to many native workers in the production process. In contrast, Borjas and Katz (2007) assume immigrants and non-immigrants in the same education / labor force experience group are perfect substitutes. It therefore follows that any adverse impact of a larger number of immigrants in a particular education / experience group will be reflected as an equal percentage decline in the wages of immigrants and U.S.-born workers in that group. The results reported in Ottaviano and Peri (2008) and described in the documentation of that paper allow us to calculate the percentage change in wages in 32 groups of workers, classified in 4 educational attainment groups times 8 work experience groups.[5] When immigrant and native workers are treated as imperfectly substitutable in production, the percentage wage changes in each education / experience group must be separately determined for immigrants and natives in the group.

Table 4 shows the results of six simulations, three of which are based on elasticity estimates reported by Borjas and Katz (2006). The other three are based on elasticity estimates obtained or proposed by Ottaviano and Peri (2008).[6] In all of the simulations I assume that instead of increasing between 1990 and 2006, the labor supply contribution of immigrants in each education/experience cell remained unchanged between those two years. My calculations suggest that the lower number of immigrants would have reduced the wage and salary workforce by nearly 9 percent in 2006. The largest percentage reduction would have occurred in the lowest education attainment group, that is, among workers who have not completed high school. The first simulation for each set of elasticity estimates shows the impact of reduced immigration on the average annual wage under the assumption that the U.S. capital stock did not change in response to a larger number of immigrants. In that case, a reduced supply of immigrant workers

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[5] The documentation can be found at http://www.econ.ucdavis.edu/faculty/gperi/codesOP2008.htm <downloaded September 15, 2009>. The documentation includes computer code that allows users to reproduce many of the intermediate calculations in the paper. My simulations use some of those intermediate results.

[6] Ottaviano and Peri (2008) report a variety of parameter estimates in their study. The simulations in Table 4 are based on the estimates reported in columns 9 and 10 of Table 7 in their paper.

in 2006 would have boosted the capital-labor ratio and increased the average economy-wide wage. The third simulation is performed under the assumption that the U.S. capital stock responded to immigration changes by enough to keep the rental price of capital constant. Under this assumption, the capital-output ratio would remain approximately level in the face of variations in the flow of immigrants, either because of adjustments in the domestic saving rate or in the net flow of capital into the United States. The economy-wide wage rate would remain approximately unchanged. The principal effect of immigration changes on the wage structure would be to change the relative wages of immigrant and native-born workers in different skill classes. An intermediate assumption between these two polar assumptions is that the capital stock partially adjusts to fluctuations in the capital-labor ratio produced by immigration. Ottaviano and Peri (2008) describe one partial adjustment model, and it is the one used to predict wage changes in Table 4.

The results displayed in Table 4 show the changes in average annual per capita earnings for workers in the indicated groups under the assumption that immigrant totals in each education / work experience cell remained unchanged between 1990 and 2006. For workers in each education / work experience group I assume that average hours per worker remained unchanged. In the native-born population, this also implies that total hours of work remain unchanged. Under the assumptions of the exercise the number and skill distribution of immigrants in 2006 would change. In particular, there would be fewer immigrant workers, a smaller percentage of immigrants would be in high education, high work experience groups, and a larger percentage of immigrants would be in low education, low work experience groups.[7] Turning to the results reported in Table 4, it seems plain that the assumption regarding the responsiveness of the capital

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[7] Note that the assumptions behind this set of simulations differ from those behind the other simulations described in this paper. They differ in three notable ways. First, the change in immigrant totals covers the period from 1990 through 2006. Second, the simulation does not distinguish between second-generation immigrants and other native-born workers, nor does it distinguish between immigrants who arrived before 1980 and after 1979. (This is mainly because the elasticity estimates reported by Ottaviano and Peri do not make these distinctions.) And finally, the simulations reported in Table 4, which are based on the ones described in Ottaviano and Peri (2008), do not correspond to any specific change in immigration policy. Part of the 1990-2006 increase in immigrant labor supply in many education / work experience cells was not the result of immigration that occurred between 1990 and 2006. It occurred because immigrants who were present in 1990 accumulated additional work experience and entered a different education / work experience cell. This change in the contribution of immigrants' labor supply to total labor supply in the education / experience cell would have occurred even if all immigration had ceased after 1990.

stock to immigrant entry is much more important in the determination of the economy-wide average wage than the assumption regarding the substitutability of immigrant and native-born workers in production. When the capital stock is assumed to be fixed, regardless of immigrants' labor supply, there is a much bigger impact on the average wage earned in the economy. Under the Ottaviano and Peri (2008) elasticity estimates, the average wage and salary worker would experience a 4.0 percent increase in annual earnings while under the Borjas and Katz (2006) elasticity estimates the annual wage increase would be 4.6 percent. When the capital stock is assumed to fully adjust to the increase in labor supply, the impact of lower immigrant labor supply on the average wage is much more modest. Ottaviano and Peri (2008) offer evidence that over time the capital-output ratio responds fully but with a lag to variations in labor supply growth. Thus, the more plausible simulated wage effects are probably somewhere between those assuming partial and full capital stock adjustment.

The primary difference between the simulation results implied by the Ottaviano-Peri and the Borjas-Katz elasticity estimates is the division of wage gains between native-born and immigrant workers. Native workers derive greater benefits from lower immigration under the elasticity estimates proposed by Borjas and Katz (2006). This is because immigrants in the same skill class are always considered perfect substitutes for native workers in the same skill class. With fewer immigrant competitors, native workers on average will see an improvement in their relative position and obtain higher wages. When immigrants and natives in the same skill class are imperfect substitutes, as assumed by Ottaviano and Peri (2008), native workers as a group will derive less benefit from a drop in immigrant labor supply. A certain fraction of natives will in fact be harmed by lower immigration because immigrants are complementary to some natives in the production process. The impact of lower numbers of immigrants on the average wage of immigrants depends on two principal factors. First, the composition of immigrants in 2006 would differ if immigrant labor supply were held constant at the level observed in 1990. This compositional change would have reduced the average earnings of 2006 immigrants by a little more than 6 percent, even assuming there were no effect of a lower immigrant labor supply on the wages earned by immigrants within each education / experience cell. (Compared with immigrants in 1990, immigrant workers in 2006 were more heavily concentrated in cells with relatively high annual earnings levels.) Second, the reduced immigrant labor supply in each education – experience cell affects the average wage in that cell.

If immigrants in a skill group are imperfect substitutes for native workers in the same skill group, as assumed by Ottaviano and Peri (2008), immigrants will derive a comparatively large benefit as a result of reduced competition from other immigrants in the group. Hence, the benefits of a lower immigration rate are disproportionately enjoyed by the immigrants who remain.

The overall effect of a lower immigration rate on the wage distribution depends on the changing skill composition of the workforce (holding constant wages in each skill group) and changes in the average earnings of workers in each skill group that occur as a result of a lower immigration rate. My interpretation of the simulation results in Table 4 is that these combined effects on the average wage do not look very different from the pure effects of the compositional change in the skill distribution of the overall workforce, assuming the capital stock is responsive to the labor supply growth connected to immigration. Ottaviano and Peri (2008) and Borjas and Katz (2006) do not agree on how the overall wage changes are divided between immigrants and natives, and this division is certainly crucial for assessing the welfare implications of immigration for native workers. But the simulation results in Table 4 suggest we may usefully analyze the effects of immigration on the wage and income distribution focusing mainly on the compositional effects of immigration on the resident population.

5. Immigration Impacts on Average and Relative Income

Recent immigrants differ from natives not only in their earnings capacity but also in their age distribution (Table 1). Thirty-eight percent of post-1979 immigrants and their children are under the age of 18 versus only 25 percent of the remainder of the population. Just 4 percent of post-1979 immigrants and their children are age 60 or older compared with 17 percent of the rest of the population. The relatively large number of dependent children in immigrant households reduces the number of potential earners per household member. This tends to reduce the per capita incomes of immigrant households in comparison with the incomes of households maintained by working-age native householders.

To assess the impact of post-1979 immigration on the income distribution and on the age profile of income it is first necessary to select a benchmark for measuring income. The benchmark I use is the household-size-adjusted, or "equivalent," annual income of each person in the sample. Because larger households need more money than smaller households to enjoy the same standard of living, it is useful to adjust households' reported incomes to reflect this fact. A common adjustment, which I use here, is to assume that household spending needs go up in

proportion to the square root of the number of household members. Formally, size-adjusted (or equivalent) income ($\hat{I}$) is equal to unadjusted household income (I) divided by household size (S) raised to an exponential value (e), that is, $\hat{I} = I / S^e$. My assumption implies that the value of e is ½. For purposes of this calculation, I also assume that household members share income equally, implying that every person in a household has the identical income. To calculate the age profile of income, people in each CPS/ASEC survey sample are classified according to the age of the head of household. (An alternative procedure is to classify each sample member according to his or her own age. This procedure is rarely used by the Census Bureau or other research organizations, however.)

The potential magnitude of the effect of immigration on size-adjusted personal income is displayed in Figure 7. I measure the percentage difference between the observed mean size-adjusted income in a particular year and the mean size-adjusted income when post-1979 immigrants and their children are excluded from the calculations. In each of the years, the size-adjusted income when all immigrants and their children are included is lower than the mean size-adjusted income when post-1979 immigrants and their children are excluded from the sample. To perform these calculations, individuals in the CPS/ASEC files are divided into three groups: individuals who are known to be post-1979 immigrants or who are known to be entirely descended from post-1979 immigrants; those who are known to be one-half descended from a post-1979 immigrant or who may be partly or fully descended from post-1979 immigrants; and those who are known to be in neither of the first two sub-populations. (This last group consists of natives who have no immigrant parents, immigrants who arrived before 1980, and the known children of immigrants who arrived before 1980.) To calculate the average size-adjusted income when post-1979 immigration is curtailed, the incomes of all the people in the first sub-population are excluded from the tabulation. In addition, the sampling weights of the people in the second sub-population are reduced to reflect my estimate of the proportion of the person's descent from post-1979 immigrants.[8]

The estimates in Figure 7 suggest that the actual size-adjusted personal income in 2007 was 3.1 percent lower than would have been the case if no immigration had occurred after 1979. Not surprisingly, the effect has grown over time. In 1993 the reduction in size-adjusted income

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[8] The weighting procedure for the individual observations is analogous to that used in the calculation of the effect of post-1979 immigration on average wages. See the discussion in section 3 above.

was only 2.0 percent. Note that the cumulative impact of post-1979 immigration continued to grow through most of the period after 1993. This is mainly because the percentage of residents of the United States who are post-1979 immigrants or the children of post-1979 immigrants has continued rise. At the same time, the gap between the household-size-adjusted personal incomes of immigrants and nonimmigrants, although shrinking, continues to be wide. In 2007 the mean size-adjusted income of post-1979 immigrants and their children was 23 percent lower than that of other U.S. residents.

In order to approximate the effect of a reduction in the flow of post-1979 immigrants on the income distribution, I used three basic simulation approaches. The first method has already been described. I simply changed the weight of each individual observation to reflect the person's post-1979 immigration status and the percentage reduction in immigration that occurs under the specified policy change. Under the second approach, I adjusted the weight of each ASEC household to reflect the proportion of household members who were either immigrants who arrived in the U.S. after 1979 or fully descended from immigrant parents who arrived after 1979.[9] Consider, for example, a simulation to estimate the impact of a 20 percent reduction in the net flow of immigrants into the U.S. starting in 1980. A household consisting entirely of post-1979 immigrants and their children would have its weight reduced by 20 percent to reflect the effect of lower immigration. A household consisting of two post-1979 immigrants and two pre-1980 immigrants would have its weight reduced by one-half of 20 percent, or 10 percent, because only half of household members are post-1979 immigrants or the children of such immigrants. The weights of households containing no post-1979 immigrants and no children of such immigrants are left unchanged. To calculate the mean and the distribution of size-adjusted personal income under an alternative immigration policy, the population weights of each CPS/ASEC household are adjusted to reflect the cumulative impact of the simulated policy. A shortcoming of this procedure is that it assumes a reduced rate of immigration would affect the relative number of households containing both immigrants and nonimmigrants, but the policy change would not affect the size-adjusted incomes of people in these kinds of households. This assumption ignores the possibility that nonimmigrants who otherwise would have formed

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[9] Household members who were partly descended from post-1979 immigrants are treated as descended from post-1979 immigrants in proportion to their percentage ancestry (or predicted percentage ancestry) from post-1979 immigrants.

households with immigrants might instead live independently or form households with other natives or with immigrants who arrived before 1980. In either case, the size-adjusted income of the resulting household might differ from that of the household formed with a post-1979 immigrant.

A third alternative simulation method is to assume all of the effects of reduced immigration will be reflected in a smaller number of households consisting only or mainly of post-1979 immigrants and their children. To implement this alternative strategy, I reduced to zero the weights of randomly selected post-1979-immigrant households until the number of post-1979 immigrants in the population was reduced by a target percentage, say, 20 percent. Under this simulation method, the only households that were candidates to have their weights reduced were households that consisted solely or mainly of post-1979 immigrants and their children.[10] Two variants of this simulation strategy were implemented, one with a restrictive criterion for defining households that were candidates for simulated exclusion and a second with a less restrictive criterion for defining such households.

Figure 8 shows the estimated effects of a 20 percent reduction in permitted immigration rates after 1979. The chart shows the impact of the policy change on size-adjusted median and average incomes over the period from 1993 to 2007. The change in median income is shown in the top panel of the chart, while the change in average size-adjusted income is shown at the bottom. Both panels show five estimates of the effect of the reformed immigration policy. Four of these estimates have already been described. The fifth estimate is simply the average of the other four estimates.[11] The four basic simulation estimates show a similar pattern of effects over

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[10] Under this procedure, immigrant households that were candidates for exclusion in the simulation were households in which the average household member had at least a designated percentage chance of being either a post-1979 immigrant or a second-generation immigrant who was entirely descended from post-1979 immigrants. Under the more restrictive variant of this procedure, average household members had to have a 75 percent probability of being a post-1979 immigrant or the child of post-1979 immigrants. Under the less restrictive variant, the minimum threshold was only 65 percent.

[11] Simulation 1A reduces the weights of individual CPS/ASEC post-1979 immigrant respondents by 20 percent; Simulation 1B reduces the weights of CPS/ASEC post-1979 immigrant households by 20 percent times the proportion of the household's members who are post-1979 immigrants or the descendants of post-1979 immigrants; and Simulations 2A and 2B randomly reduce to zero the household weights of households consisting solely or mainly of post-1979 immigrants until 20 percent of the post-1979 immigrant population has been eliminated. The 1A estimate shows the percent increase in median or mean size-adjusted income among *persons* in the CPS/ASEC sample. The other three estimates show the percent increase in median or mean size-adjusted personal income for the average *household* in the CPS/ASEC sample.

time. The effects of a reformed post-1979 immigration policy on median and mean income have generally increased over time. The effect of immigration reform on median income is proportionally greater than its impact on mean income, primarily because households with exceptionally high incomes tend to consist of native-born residents and immigrants who arrived before 1980. Immigrants who arrived after 1979 and their children have below-average income and tend to have low ranks in the overall income distribution. Note that the increase in median income in comparison with mean income is a signal that a reduced flow of immigrants would have reduced overall inequality.

Simulation methods 2A and 2B tend to produce higher estimates of the impact of immigration. This is because those methods disproportionately reduce the number of households consisting solely or mainly of post-1979 immigrants and their children. Such households tend to be somewhat poorer than all households containing at least one post-1979 immigrant member. The results in Figure 8 imply that a 20 percent reduction in the post-1979 immigration rate would have lifted median income by about 0.6 percent in 1993-1995 and by 1.0 percent in 2005-2007. In the same two periods the average size-adjusted income of U.S. households would have risen 0.4 percent and 0.6 percent, respectively.

The estimates displayed in Figure 8 offer an approximation of the impact of lower immigration rates into the United States. The simulated policy is one that reduces net immigration but does not change the character of admitted immigrants. The same kinds of simulation methods can be used to explore the potential effects of policies that increase or lower the proportion of immigrants with selected kinds of characteristics. I consider two such policies, both of which would reduce the entry of immigrants who have limited skills or below-average earnings capacity. One such policy is a reduction in the proportion of immigrants who come from Mexico. The percentage of all immigrant workers who are from Mexico has risen sharply since the late 1960s. Mexican immigrants have exceptionally low educational attainment compared with native workers and compared with immigrant workers from other countries. In 2000, 63 percent of male immigrant workers from Mexico had not completed high school. This compares with 9 percent of native-born male workers and 17 percent of immigrant male workers from countries other than Mexico (Borjas and Katz 2007). Another policy that would reduce the number of less skilled immigrants is to restrict the number of adult immigrants who have not completed high school. The specific policies I consider are a reduction by 50 percent in the

number of admitted Mexican immigrants and a reduction by 50 percent in the number of admitted adult immigrants who have not completed high school.

Table 5 shows the impact of policies that reduce the proportion of immigrants with limited skills. In both cases the results are obtained using the simulation methodology that produced estimate 2A in Figure 7. That is, households consisting solely or mainly of post-1979 immigrants or the children of such immigrants are randomly assigned a zero weight until I have achieved the target percentage reduction in (adult) immigrants in the indicated category. The second and third immigration policies I examine would reduce the number of post-1979 immigrants and immigrant children by substantially less than a 20 percent across-the-board cut in immigration. Nonetheless, both policies have a bigger impact on median and average U.S. incomes than the across-the-board reduction in immigration rates. The two policies reduce the number of immigrants who are very dissimilar to U.S. natives. Thus, a smaller reduction in the number of admitted immigrants produces a bigger impact on the income distribution of the remaining (simulated) population. In 2005-2007 the policies would have increased median size-adjusted income by 1.6 percent to 1.8 percent in comparison to the actual income in that year. They would have boosted average size-adjusted income by 1.1 percent to 1.2 percent. In both cases the estimated effects are substantially greater than the impact of a 20 percent across-the-board cut in net immigration.

Effects on the age profile of income. The simulation results can be used to estimate the impact of immigration policy changes on the age profile of household-size adjusted incomes. Figures 9 and 10 show estimates of the effect of three policy reforms in 2005-2007: (1) A 20 percent across-the-board reduction in the net immigration rate; (2) A 50 percent reduction in the admission of immigrants from Mexico; and (3) A 50 percent reduction in the admission of adult immigrants who have not completed high school. In all three cases, the policy change is assumed to begin in 1980 and continue through 2008. The estimates are obtained by applying simulation method 2A described earlier. Figure 9 shows the effect of each policy on the number of resident households, classified by the age of the head of household. All three policies significantly reduce the number of households headed by a person under the age of 45. They have smaller effects on the number of households headed by someone 45 or older and very little effect on the number of households headed by someone who is past age 65. Note that the across-

the-board cut in immigration has the biggest proportional effect on the total number of resident households.

The effects of the three policies on median and average income are displayed in Figure 10. Estimates are shown for U.S. residents who are members of households headed by persons in the age groups indicated along the X-axis. The percentage change in size-adjusted personal income that would result from the immigration policy is calculated relative to the actual 2005-2007 incomes of members of these households. An across-the-board reduction in the immigration rate has a comparatively modest impact on the age profile of U.S. incomes. However, changes in the admission criteria for immigrants that reduce the entry of low-skill immigrants would have more noticeable effects. Not surprisingly, all three policies have their biggest effects on members of households headed by someone who is between 25 and 44. This is mainly because post-1979 immigrants and their children are disproportionately members of such households. A 20 percent across-the-board cut in the net immigration rate produces the biggest reduction in the 2005-2007 immigrant population, but it would have only a modest impact on the relative incomes of households headed by persons of different ages. The other two policies have a sizeable effect on the personal incomes people in households with a young family head, but they have only limited effects on households headed by an older head. Both Mexican and low-education immigrant heads tend to have very low incomes compared with the incomes of native-born heads of the same age

The results in Figure 10 suggest that a more restrictive immigration policy would lift the average absolute incomes of U.S. residents, regardless of the age of the household head. However, the improvement in average incomes would be greatest for people who are members of households headed by younger adults. An implication is that U.S. immigration policy since the late 1970s has tended to reduce the *relative* incomes of residents in households headed by younger adults while boosting the *relative* incomes of residents in households headed by an older person.

6. Conclusion

Many of the conclusions in this paper are based on straightforward tabulations of the incomes of natives, immigrants who entered the U.S. before 1980, and immigrants who arrived after 1979. Only a couple of them take account of the spillover effects of reduced immigration on the earned and unearned incomes of natives and immigrants who would still be residents of

the United States under a reformed immigration policy. There are two possible channels of spillover effect. First, a reformed immigration policy, by altering the number or characteristics of immigrant workers, could affect employment patterns and the distribution of earnings of natives and immigrants. Second, the entry of immigrants into the workforce produces a direct effect on the level and annual rate of change in average wages. Estimates in this paper suggest that in the absence of immigration after 1979, average wages in the United States may have risen by an additional 2.3 percent through the middle of this decade.

Immigration's impact on average pay affects Social Security benefit payments, because the wage indexing factors used to adjust a worker's past earnings and the bend points in the PIA formula are affected by the level and rate of change of economy-wide average wages. For workers attaining age 62 in 2007, the basic Social Security benefit would have been between 1.5 percent and 2 percent higher if the average wage had risen at the rate observed among native workers and immigrants who entered the U.S. before 1980 rather than among all resident workers, including workers who entered after 1979. Thus, immigration has not only helped to improve Social Security finances through its impact on the size of the taxable earnings base and tax revenues, it has also reduced the rate of growth in monthly benefit payments among recent retirees. This indirect effect of immigration on the incomes of the aged is ignored when I calculate the impact of reduced immigration on the age profile of income. It is certainly relevant for understanding the financial outlook for Social Security, however. Many analyses of the budget outlook explicitly recognize the financial gains accruing to the Social Security Trust Fund as a result of immigrants' payroll tax contributions and the lengthy delay before immigrants begin to receive benefits. Very few observers recognize that entry of relatively low-wage immigrants into the workforce, by reducing the overall rate of wage growth, has also slowed the growth of Social Security benefit payments and increased the size of Trust Fund surpluses.

In the short and intermediate run, immigration tends to boost wage and income inequality and to improve the relative income of the nation's aged compared with its working-age and child population. Even though monthly Social Security benefits of recent retirees are somewhat smaller than would be the case with lower immigration, the entry of many relatively low skill immigrants has depressed the average incomes of working-age households by a larger percentage than it has the incomes of the aged. A 20 percent reduction in the entry of immigrants after 1979 would have lifted the 2005-2007 median incomes of aged families by only about 0.2 percent.

The same policy would have boosted the incomes of working-age families by 1.1 percent. Changing the skill mix of admitted immigrants to curtail the entry of less skilled workers would have an even bigger impact on the relative incomes of households headed by the elderly and nonelderly. For example, a 50 percent reduction in Mexican immigration after 1979 would have increased the 2005-2007 median incomes of households headed by someone over 65 by just 0.1 percent, but the same policy would have lifted the median income in working-age households by 1.7 percent.
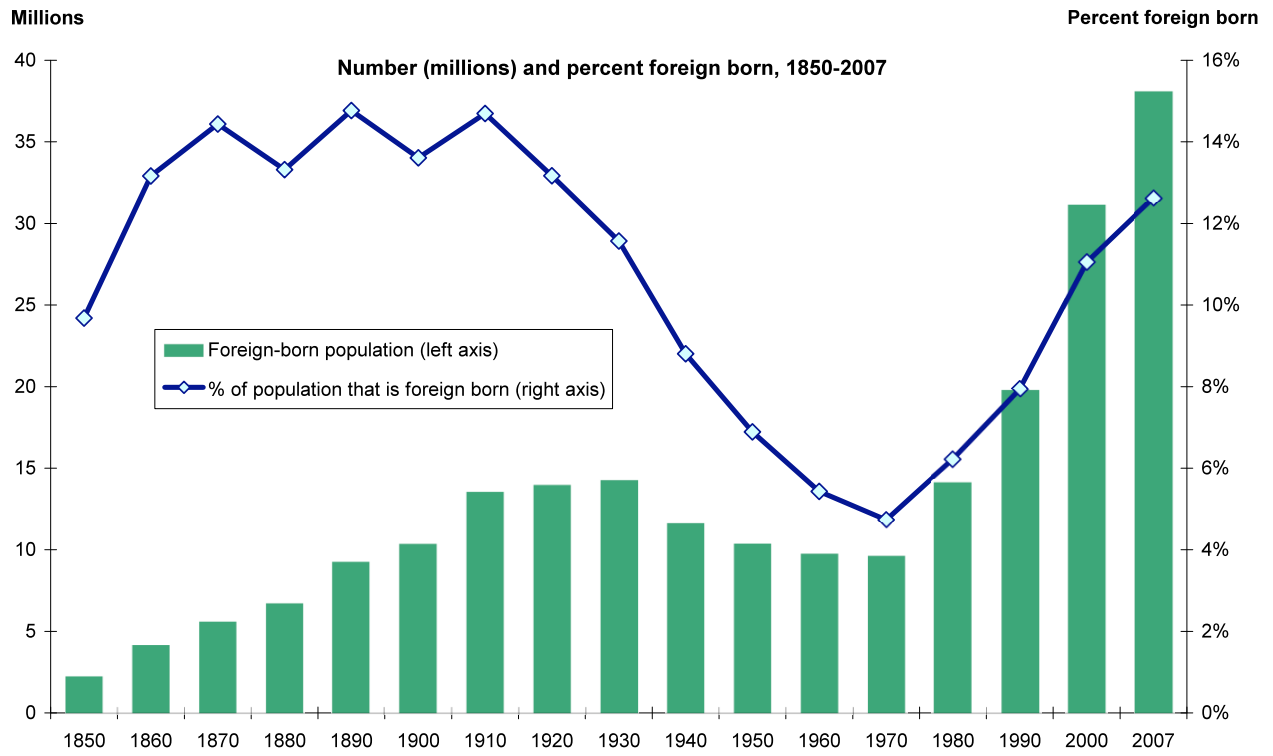
None of the analysis in the paper considers the impact of a reformed immigration policy on the immigrants whose admission to the United States would be barred by reform. Many immigrants come to the United States from countries where household income is below the U.S. poverty line. Nearly all enjoy higher incomes and wages in the United States than they would have obtained in their countries of origin. Even when their incomes place them near the bottom of the U.S. income distribution, they are usually better off financially than they would have been in their countries of birth. Thus while slowing the flow of new immigrants or increasing the skill requirements for entry would increase the average wages and incomes of U.S. residents, the same policies would inflict severe income losses on potential immigrants whose entry into the United States is prohibited.

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**Figure 1. Foreign-Born Population of the United States, 1850-2007**

Millions   Percent foreign born

Number (millions) and percent foreign born, 1850-2007

- Foreign-born population (left axis)
- % of population that is foreign born (right axis)

Source: US Census Bureau

Figure 2. Earnings Gap between Immigrant and Native Full-time, Year-round Workers, 1993-2007
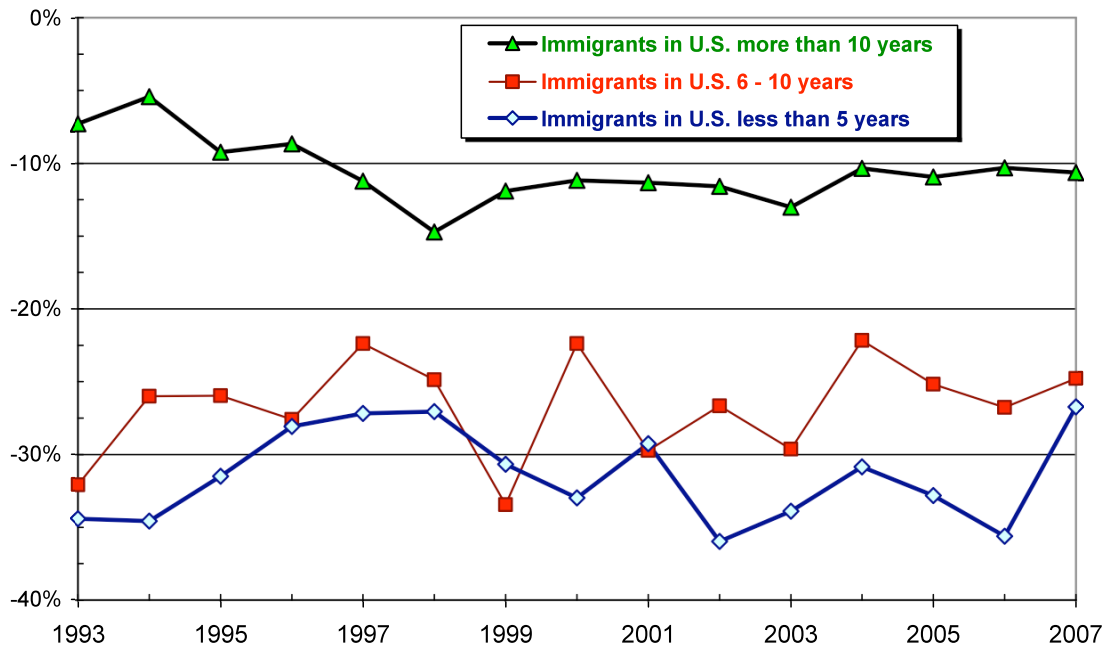
Immigrant - native wage gap
(Percent earnings difference)

Men
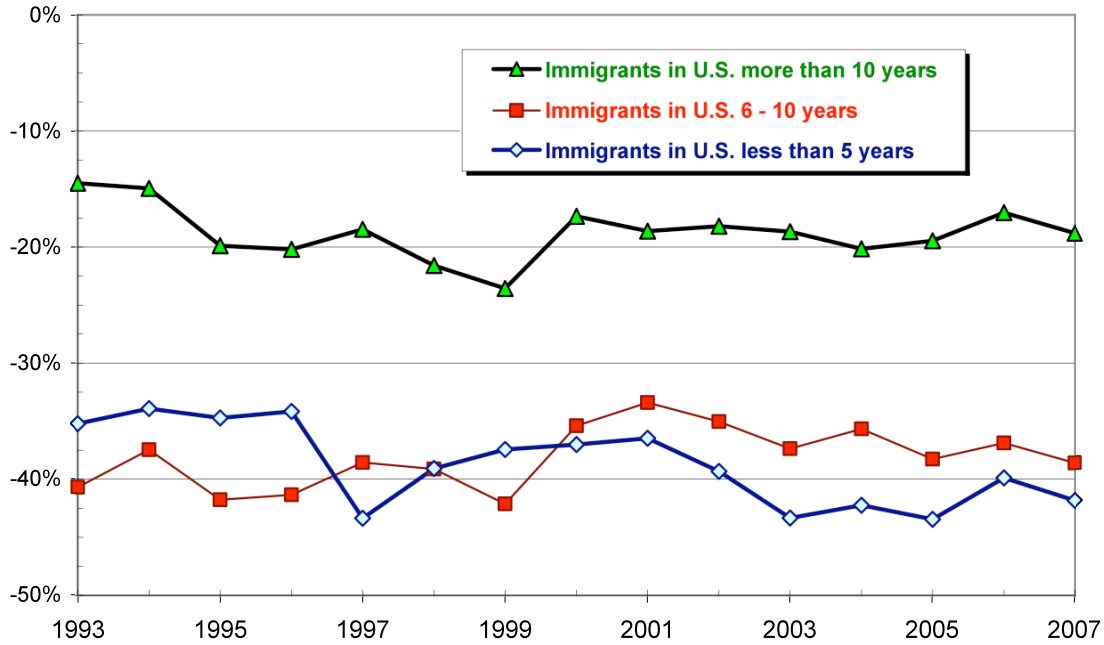
Immigrant - native wage gap
(Percent earnings difference)

Women

 Note: Native workers are defined here to exclude the native-born children of immigrant parents. For explanation of the estimates see text and notes to Table 3.
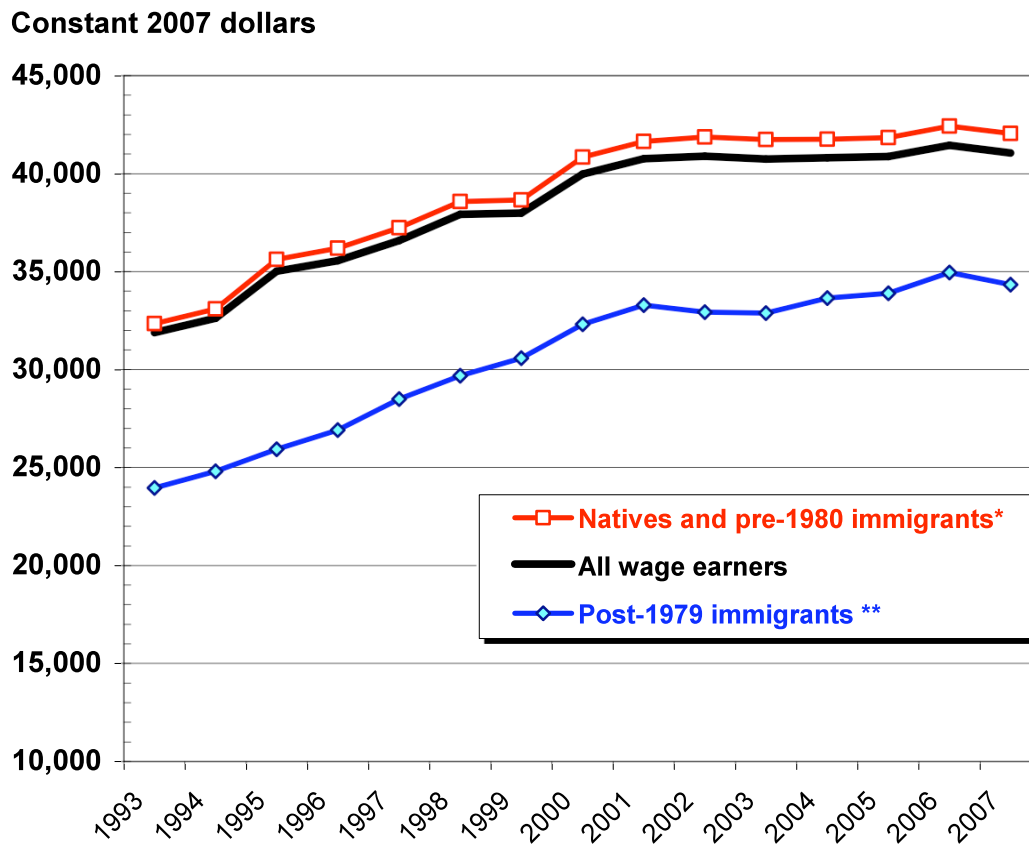 *Source:* Author's tabulations of 1994-2008 March CPS/ASEC files.

Figure 3. Immigrants' Children: Percentage Born to Parents Who Entered the U.S. after 1979, by Year of Child's Birth

Percent born to parents entering U.S. after 1979

Child's year of birth
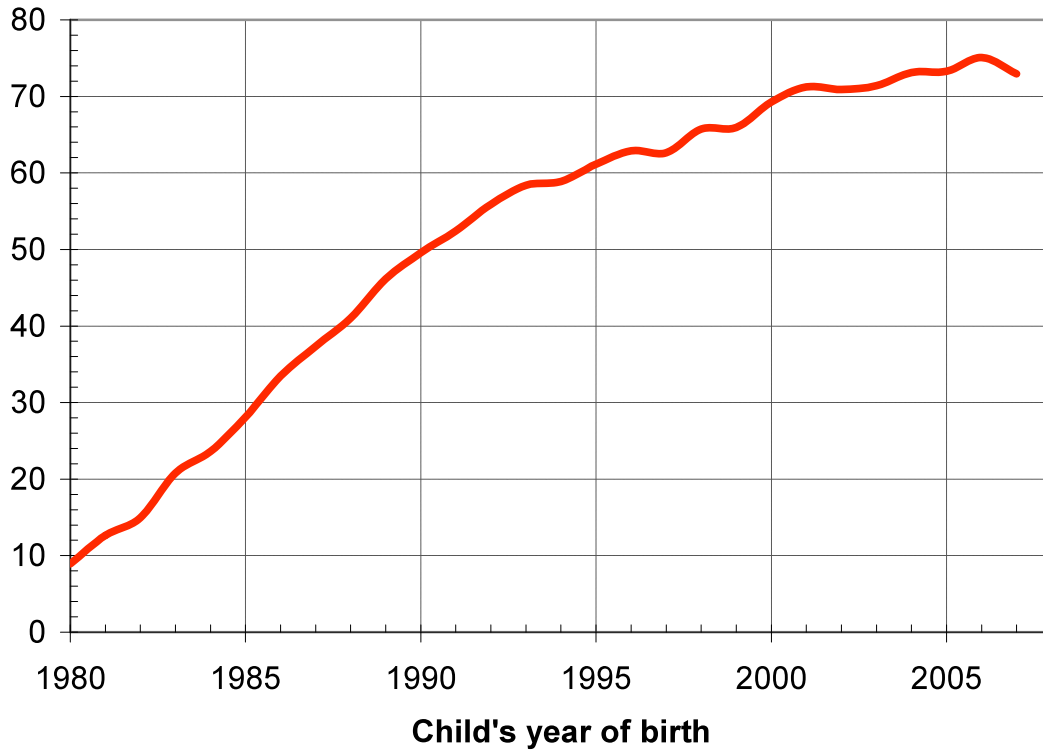
Source: Author's tabulations of 1994-2008 CPS/ASEC files.

Figure 4. Average Annual Wage by Immigrant Status and Year of Entry into the U.S., 1993 - 2007

**Constant 2007 dollars**

    * Excluding the native-born children of immigrants who entered the U.S. after 1979.

    ** Plus the native-born children of immigrants who entered the U.S. after 1979.

Source: Author's tabulations of 1994-2008 CPS/ASEC files.
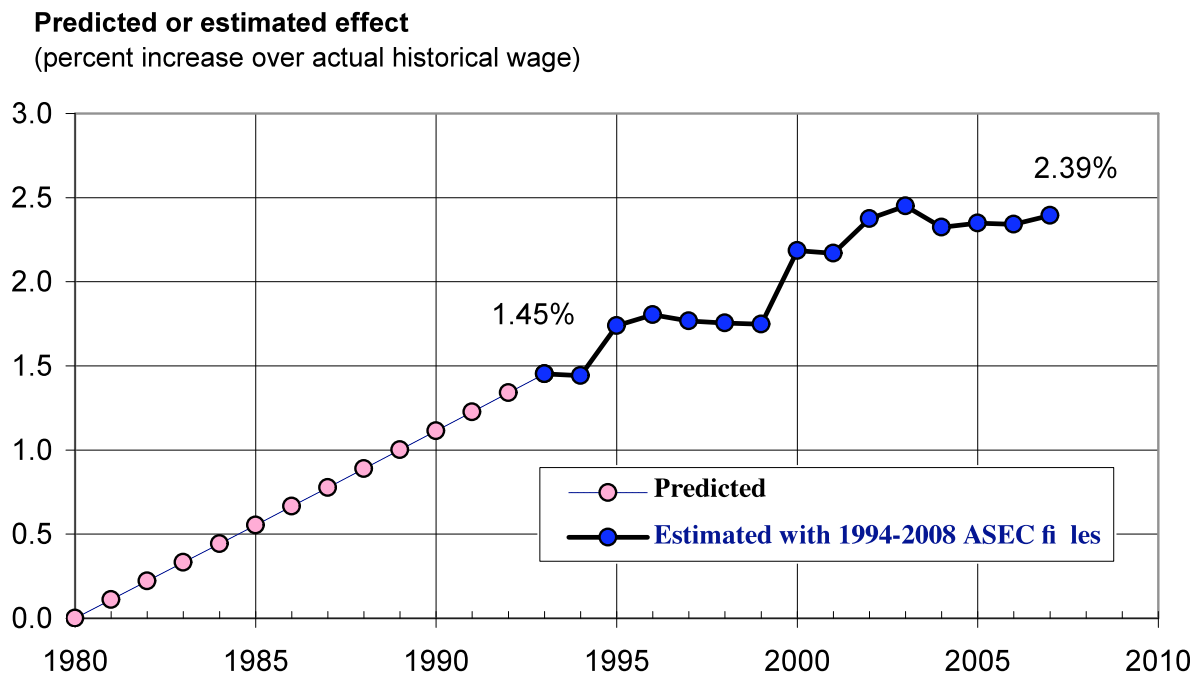
Figure 5. Impact of Post-1979 Immigrants and their Children on Average Annual Wage of U.S. Workers, 1993-2007

Percent of annual wage earned by natives and immigrants who arrived before 1980 *
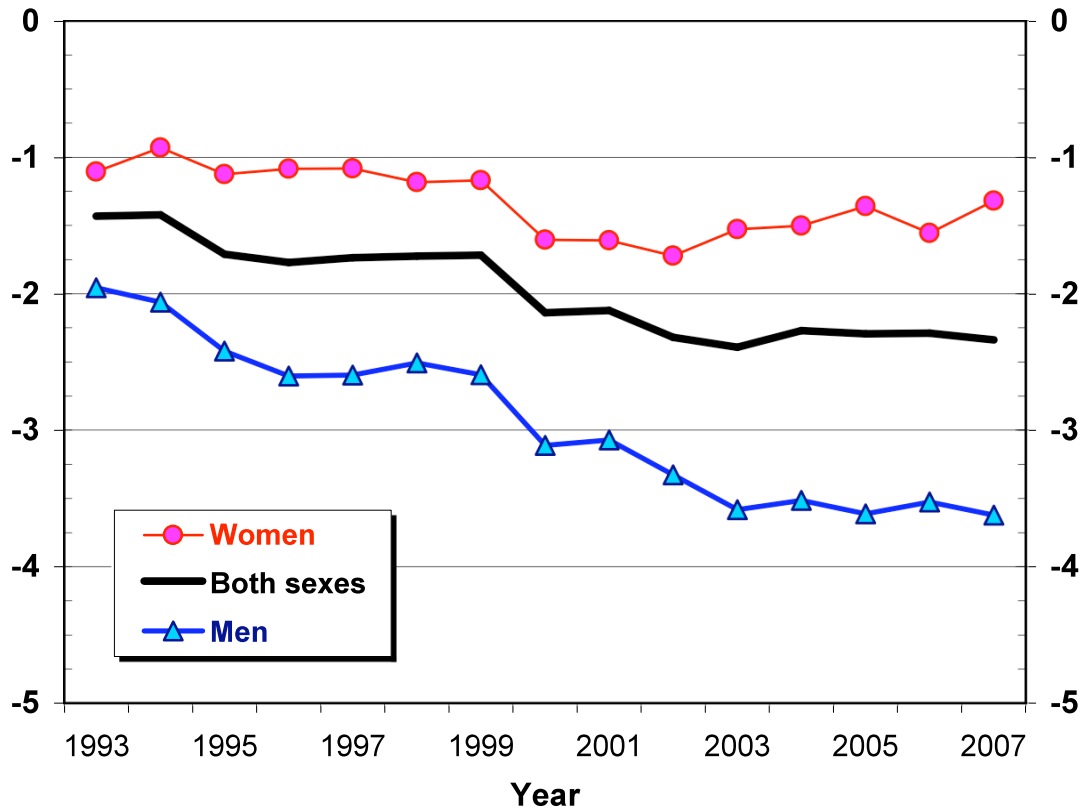
* Native population excludes the U.S.-born children of immigrants who entered the United States after 1979.
Source: Author's tabulations of 1994-2008 CPS/ASEC files.

Figure 6. Impact of Reduced Immigration after 1979 on Level of Economy-Wide Average U.S. Wage, 1980-2007

Predicted or estimated effect
(percent increase over actual historical wage)

Source: Author's tabulations of 1994 - 2008 ASEC files and calculations as explained in text.

Figure 7. Impact of Post-1979 Immigration on Average Size-Adjusted Personal Income, 1993 - 2007*

Percent of average income

Year
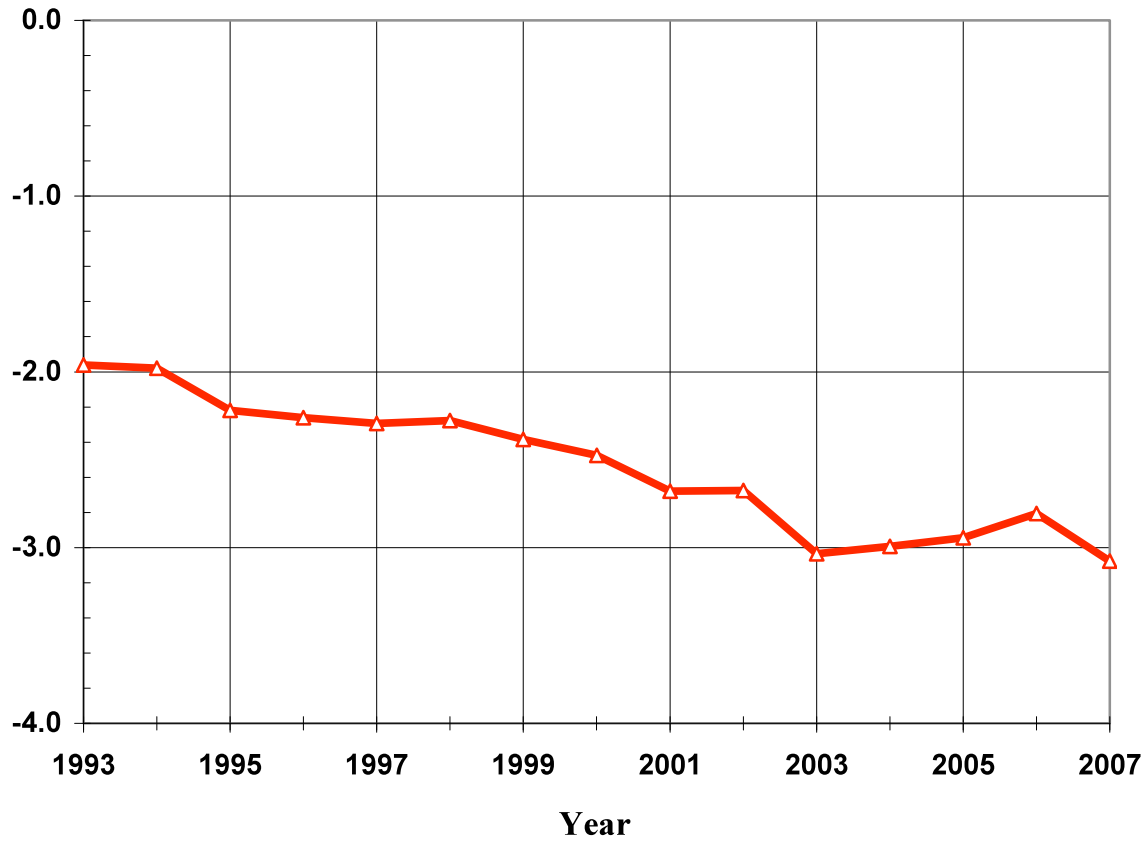
* The change in income is measured as a percent of estimated income in the absence of immigration after 1979.

Source: Author's tabulations of 1994-2008 CPS/ASEC files as explained in the text.

Figure 8. Change in Household-Size-Adjusted Income Following a 20 Percent Reduction in Post-1979 Immigration Rates, 1993-2007

Percent change in median income with lower immigration
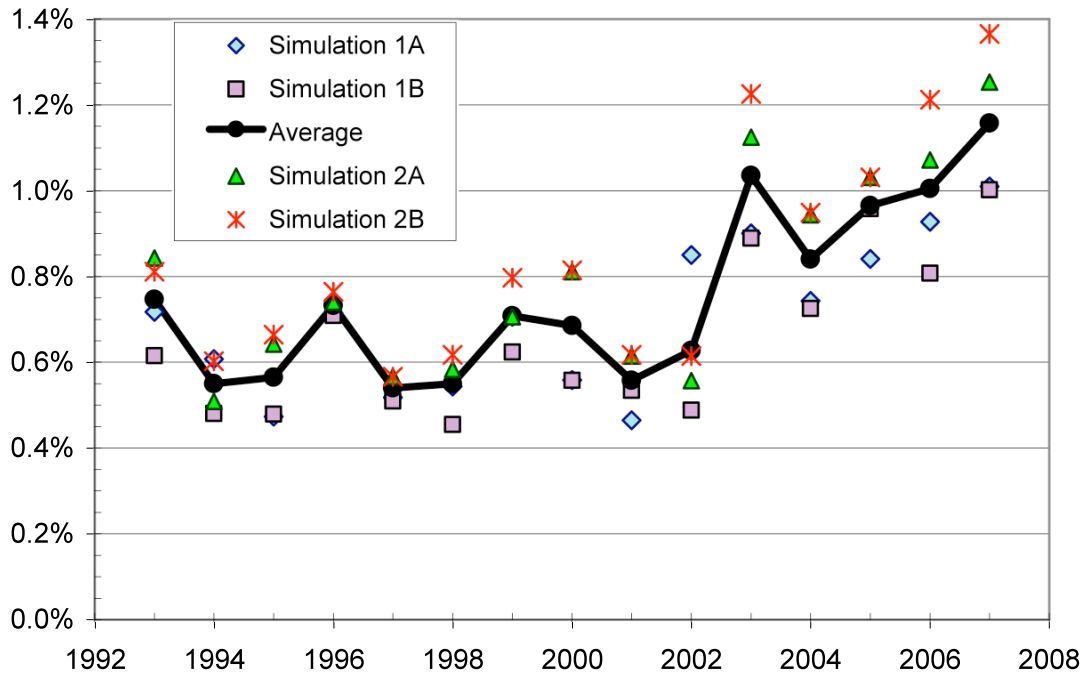
Percent change in average income with lower immigration
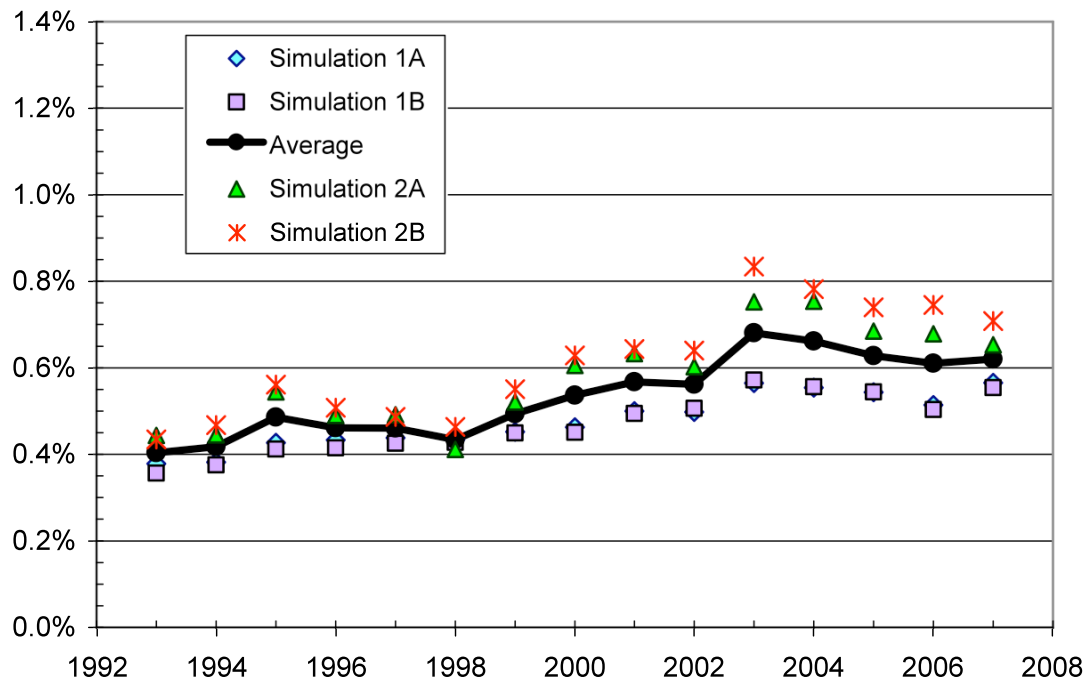
Source: Author's tabulations of March 1994-2008 CPS/ASEC files.

Figure 9. Reduction in Number of Households Resulting from Alternative Changes in Post-1979 Immigration Policies, by Age of Household Head, 2005-2007

Percent change in number of households

Age of household head
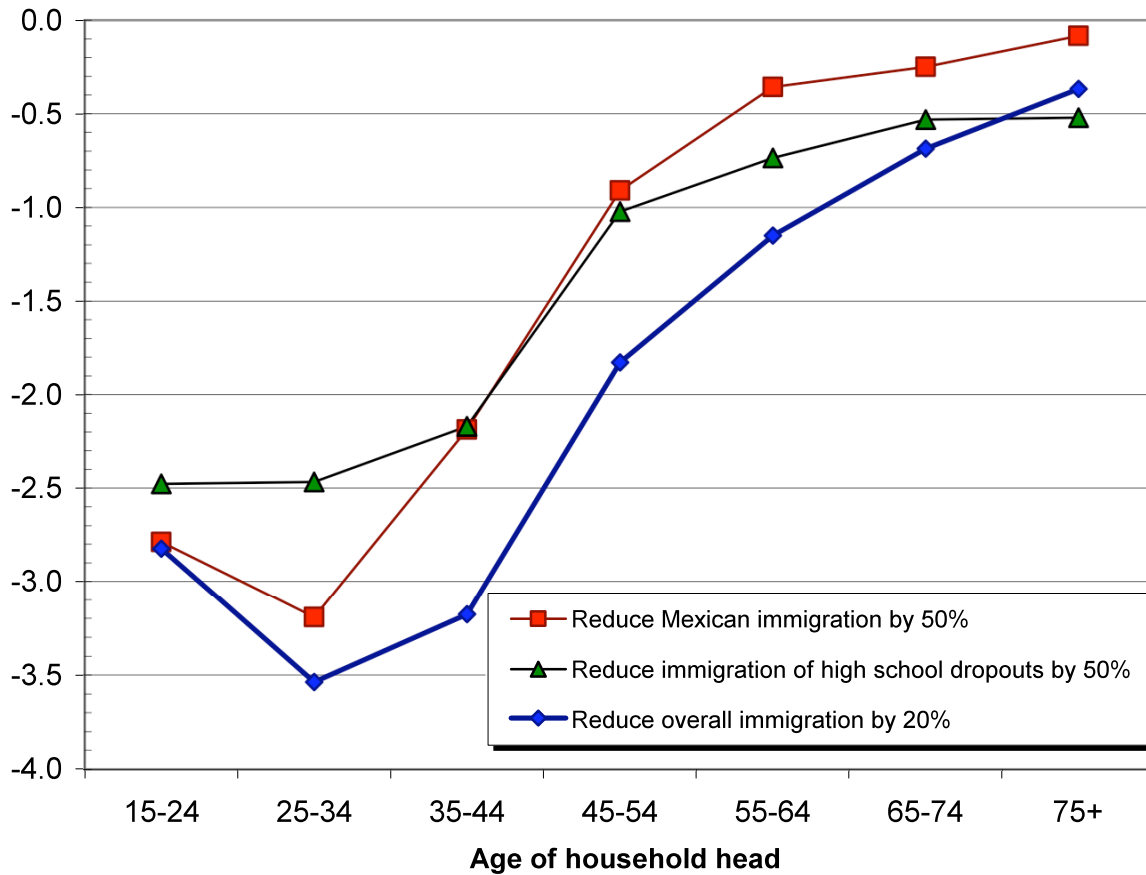
Source: Author's tabulations of March 2005-2007 CPS/ASEC files.

Figure 10. Change in Household Size-Adjusted Income Resulting from Alternative Changes in Post-1979 Immigration Policies, by Age of Household Head, 2005-2007

Percentage change in median size-adjusted income

Percentage change in mean size-adjusted income

Source: Author's tabulations of March 2005-2007 CPS/ASEC files.

Table 1. Age Distribution of the Immigrant and Native Populations, 1994-2008 1/

Percent unless otherwise indicated

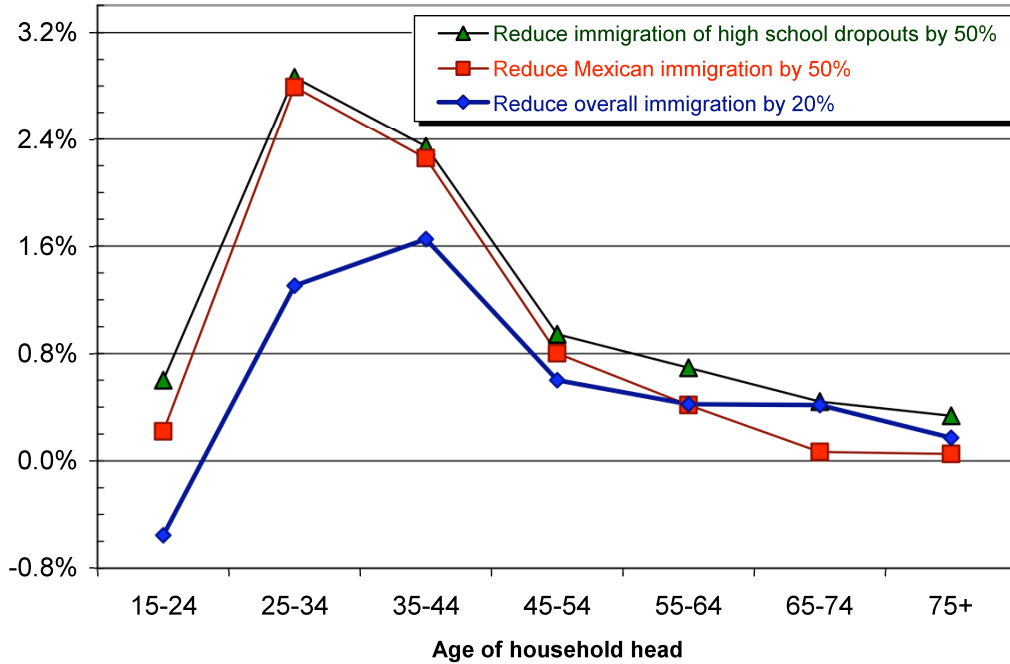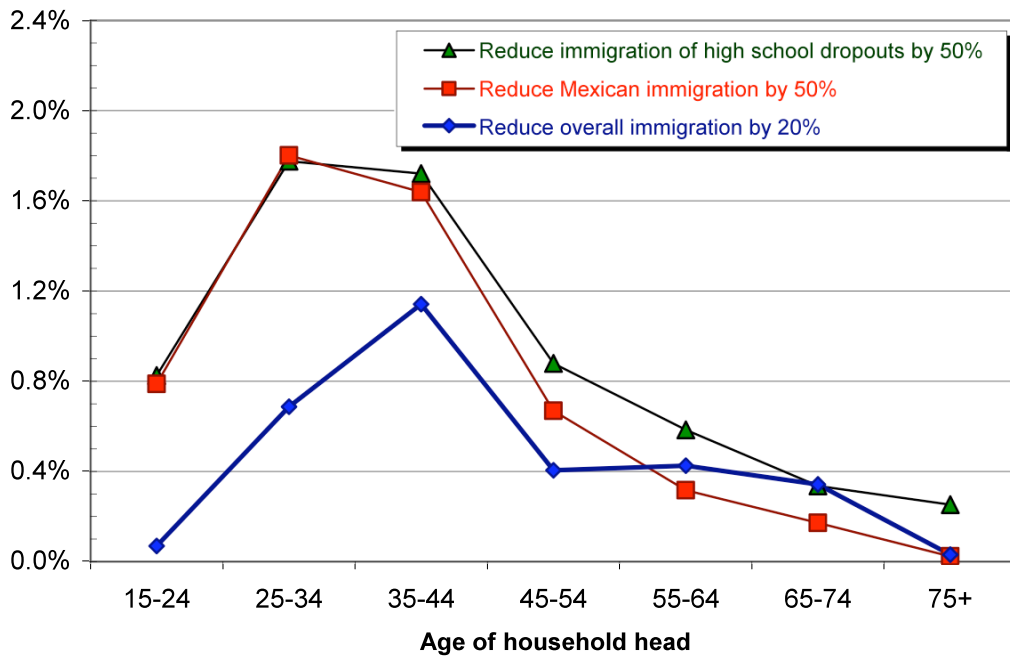|	1994	2001	2008
Natives without an immigrant parent (millions)	204,975	215,302	225,667
Under age 18	26.3	25.0	23.6
Age 18-39	35.3	31.0	29.1
Age 40-59	23.9	28.6	29.6
Age 60 and older	14.4	15.5	17.8
Total	100.0	100.0	100.0
All immigrants (millions)	26,771	34,790	40,807
Under age 18	11.3	9.5	7.8
Age 18-39	46.3	45.6	41.5
Age 40-59	27.6	30.4	34.1
Age 60 and older	14.8	14.4	16.7
Total	100.0	100.0	100.0
Immigrants who arrived before 1980 (millions)	12,419	10,645	9,818
Under age 18	0.9	0.0	0.0
Age 18-39	34.3	20.3	10.6
Age 40-59	38.8	45.9	44.7
Age 60 and older	25.9	33.8	44.6
Total	100.0	100.0	100.0
Immigrants who arrived after 1979 (millions)	14,352	24,146	30,989
Under age 18	20.3	13.8	10.2
Age 18-39	56.8	56.7	51.3
Age 40-59	17.8	23.6	30.7
Age 60 and older	5.1	5.9	7.8
Total	100.0	100.0	100.0

1/ Native residents are defined here to exclude the native-born children of immigrant parents.
Source: Author's tabulations of 1994, 2000, and 2008 March CPS/ASEC files.

Table 2. Educational Attainment among Immigrant and Native Workers, 1994-2008 1/

Percent unless otherwise indicated

	1994	2001	2008
Natives without an immigrant parent (millions)	**110,901**	**119,672**	**122,008**
Less than high school	11.8	10.3	7.6
High school diploma	34.6	32.1	30.1
Some college	30.1	30.9	31.7
College degree	16.0	18.3	20.5
Post-college education	<u>7.4</u>	<u>8.4</u>	<u>10.2</u>
Total	100.0	100.0	100.0
All immigrants (millions)	**15,538**	**22,165**	**25,937**
Less than high school	28.5	28.6	25.9
High school diploma	25.2	24.5	25.4
Some college	20.7	19.6	18.6
College degree	16.6	17.7	18.3
Post-college education	<u>9.2</u>	<u>9.6</u>	<u>11.8</u>
Total	100.0	100.0	100.0
Immigrants who arrived before 1980 (millions)	**7,883**	**6,724**	**5,603**
Less than high school	23.8	21.5	17.6
High school diploma	26.4	24.3	23.9
Some college	23.7	23.3	24.1
College degree	16.6	19.2	19.6
Post-college education	<u>9.4</u>	<u>11.7</u>	<u>14.8</u>
Total	100.0	100.0	100.0
Immigrants who arrived after 1979 (millions)	**7,655**	**15,441**	**20,333**
Less than high school	33.2	31.7	28.2
High school diploma	23.8	24.6	25.8
Some college	17.6	17.9	17.1
College degree	16.5	17.1	17.9
Post-college education	<u>8.9</u>	<u>8.6</u>	<u>11.0</u>
Total	100.0	100.0	100.0

1/ Native workers are defined here to exclude the native-born children of immigrant parents.
Source: Author's tabulations of 1994, 2000, and 2008 March CPS/ASEC files.
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Table 3. Earnings Gap between Immigrant and Native Full-time, Year-round Workers by Source of Earnings Difference, 1993-2007

Natural logarithm of earnings differences 1/

	Impact of age differences (1)	Impact of education differences (2)	Impact of race/ ethnicity differences (3)	Sum of X differences (1)+(2)+(3) = (4)	Aver- age error (5)	Total difference between immigrant group and natives 2/ (6) = (4)+(5)
Men						
Native-born children of immigrants	-0.033	0.028	-0.015	-0.020	0.049	0.029
All immigrants	-0.025	-0.099	-0.048	-0.172	-0.113	-0.285
By year of entry						
Within past 5 years	-0.137	-0.107	-0.048	-0.293	-0.199	-0.492
Within past 6-10 years	-0.112	-0.129	-0.051	-0.292	-0.189	-0.481
More than 10 years ago	0.011	-0.091	-0.047	-0.126	-0.082	-0.208
Hispanic immigrants	-0.057	-0.257	-0.076	-0.391	-0.150	-0.541
By year of entry						
Within past 5 years	-0.197	-0.286	-0.076	-0.560	-0.236	-0.796
Within past 6-10 years	-0.163	-0.280	-0.076	-0.519	-0.210	-0.729
More than 10 years ago	-0.007	-0.247	-0.076	-0.330	-0.121	-0.451
Women						
Native-born children of immigrants	-0.030	0.031	0.000	0.002	0.068	0.070
All immigrants	0.000	-0.078	0.004	-0.073	-0.087	-0.161
By year of entry						
Within past 5 years	-0.066	-0.082	0.004	-0.143	-0.235	-0.378
Within past 6-10 years	-0.039	-0.090	0.006	-0.123	-0.188	-0.311
More than 10 years ago	0.014	-0.075	0.004	-0.057	-0.054	-0.111
Hispanic immigrants	-0.012	-0.227	-0.013	-0.252	-0.144	-0.396
By year of entry						
Within past 5 years	-0.094	-0.242	-0.013	-0.349	-0.293	-0.642
Within past 6-10 years	-0.061	-0.251	-0.013	-0.325	-0.237	-0.562
More than 10 years ago	0.006	-0.221	-0.013	-0.228	-0.111	-0.339

1/ To determine the effects of personal characteristics on earnings, annual regressions were estimated of log earnings on age, educational attainment, and race and ethnicity. The annual samples were restricted to native workers with no immigrant parents who were age 20-64 years old and who worked at least 32 hours per week for a minimum of 48 weeks per year. Respondents were classified in nine 5-year age groups, five educational attainment groups, and five race/ethnicity groups (Hispanic and four non-Hispanic racial groups - white, African American, Asian, and other). The estimates shown above reflect the average estimated differences between various immigrant groups and native workers over the 15 years from 1993 to 2007.

2/ Native workers are defined here to exclude the native-born children of immigrant parents.

Source: Author's tabulations of 1994-2008 March CPS/ASEC files.

Table 4. Simulated Impact of Lower Immigration Flows on Average Annual Earnings under Alternative Assumptions, 1990-2006 1/

Percent of actual earnings in 2005

	Native-born workers	Foreign-born workers	Native- and foreign-born workers
Based on Borjas and Katz (2007)			
Impact with fixed capital stock	3.9	-2.2	4.6
Short run impact (partial capital adjustment)	1.7	-4.3	2.5
Long run impact (full capital adjustment)	0.5	-5.4	1.3
Based on Ottaviano and Peri (2008)			
Impact with fixed capital stock	2.8	3.8	4.0
Short run impact (partial capital adjustment)	0.7	1.5	1.9
Long run impact (full capital adjustment)	-0.5	0.3	0.7

1/ Percent change in average annual earnings of persons in the indicated groups under the assumption that the labor supply contributions of immigrant workers in each education/experience group remained unchanged over the 1990-2006 period.

Source: Author's tabulations of 2006 CPS/ASEC file based on results reported in Ottaviano and Peri (2008) as described in text.

Table 5. Impact of Selected Changes in Post-1979 Immigration Policy on Household-Size-Adjusted Personal Income, 1993-2007

Percent 1/

	Years				
	1993-1995	**1996-1998**	**1999-2001**	**2002-2004**	**2005-2007**
Reduce overall immigration by 20%					
Median income	0.52	0.56	0.57	0.70	0.92
Average income	0.38	0.42	0.46	0.54	0.53
Reduce net immigration from Mexico by 50%					
Median income	0.76	0.77	1.02	1.38	1.61
Average income	0.51	0.60	0.80	1.02	1.11
Reduce immigration of adult high school dropouts by 50%					
Median income	1.07	1.04	1.24	1.56	1.80
Average income	0.74	0.81	0.98	1.15	1.21

1/ Percent of observed household-size-adjusted personal income in the indicated years. The estimates are obtained using simulation method 2A as explained in text.

Source: Author's tabulations of 1993-2007 March CPS/ASEC files.

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