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ABSTRACT

How Does Immigration Fit into the Future of the U.S. Labor Market?*

U.S. GDP growth is anticipated to remain sluggish over the next decade, and slow labor force growth is a key underlying reason. Admitting more immigrants is one way U.S. policymakers can bolster growth in the workforce and the economy. A larger role for immigrant workers also can help mitigate other symptoms of the economy's long-run malaise, such as low productivity growth, declining domestic geographic mobility, and falling entrepreneurship, as well as help address the looming mismatch between the skills U.S. employers want and the skills U.S. workers have. While some might argue that technological change and globalization mean there is less need to admit immigrant workers, such arguments fail to account for both recent data and historical experience. Of course, immigration—like anything else—is not without costs, which are disproportionately borne by the least educated. A plan to increase employment-based immigration as a way to spur economic growth could be paired with new programs to help low-skilled U.S. natives and earlier immigrants so that the benefits of immigration are shared more equitably.

JEL Classification: J61, J15, J18
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I. Introduction

A number of seemingly intensifying forces are bearing down on the U.S. labor market. First among them is the aging of the U.S. workforce. Combined with stagnating labor force participation rates, the aging of America speaks to a rising role immigration could play to help fill the void left by retiring baby boomers and falling birth rates. Rising educational attainment among the U.S. born and a dearth of low-skilled and blue-collar workers similarly signal a larger potential role for immigrants in seasonal and year-round low-skilled and technical work. Meanwhile, low shares of science, technology, engineering, and mathematics (STEM) professionals among U.S. natives point to a continuing need for foreign scientists and engineers to fill positions in high-skilled STEM occupations.

Potential countervailing trends include globalization and automation. The U.S. manufacturing sector today employs far fewer workers than it did at peak employment 40 years ago, yet U.S. manufacturing output has increased threefold in inflation-adjusted terms.[1] This increased productivity (that is, output per worker) is the result of both offshoring of low-skilled manufacturing, made possible by globalization, and technological change, including automation, on the factory floor. Some have argued that continued globalization and technological change, particularly the spread of automation deeper into the service sector, will make up for the abovementioned age, education, and skill trends, meaning there will not be an economic need for immigration to increase beyond its current pace.

The future of the U.S. labor market is likely to encompass all these forces, but to varying degrees. While the relatively high cost of labor in the United States compared with low- and middle-income countries will continue to push businesses to look for alternatives, such as outsourcing, offshoring, and automation, there will also be a need to increase immigration to bolster the workforce. In addition to filling labor market gaps, increased immigration can help mitigate other negative trends, such as declining geographic mobility and entrepreneurism. This paper considers current economic trends affecting the United States, exploring their implications for future economic growth and immigration policy. It also highlights the likely impacts of increased immigration on U.S.-born workers.

II. The Macroeconomic Implications of Slower Labor Force Growth

U.S. population growth since 2010 has slowed to 0.7 percent per year, the lowest rate since the 1940s. The Census Bureau's latest population projections suggest that this slowing will continue, with annual growth falling to 0.4 percent between 2040 and 2060. The agency has lowered its projections several times since 2008 to incorporate 2010 Census results, lower-than-expected post-recession immigrant inflows, and updated assumptions about the fertility and mortality rates of the U.S.- and foreign-born populations.[2] Commensurate with lower projections for labor force growth, the Congressional Budget Office (CBO) expects employment and gross domestic product (GDP) growth to slow. Over the next decade, U.S. employment is expected to grow only

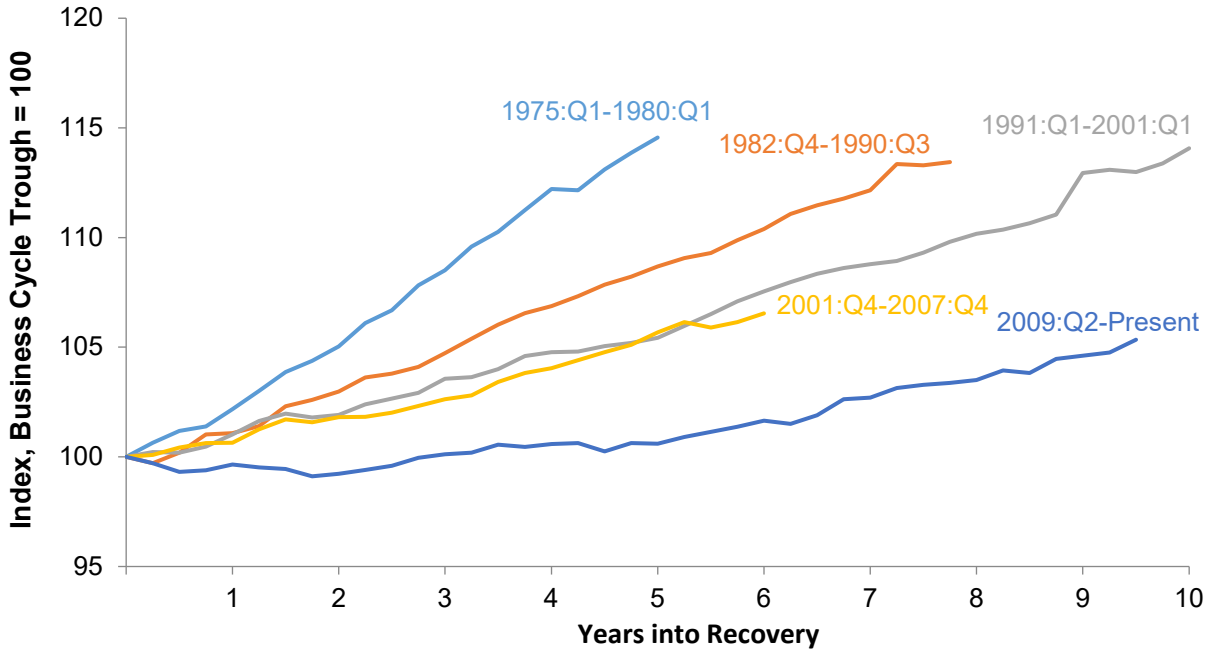
[1] Marc Levinson, *Job Creation in the Manufacturing Revival* (Washington, DC: Congressional Research Service, 2019), https://fas.org/sgp/crs/misc/R41898.pdf.
[2] U.S. Census Bureau, "2017 National Population Projections" (dataset, U.S. Census Bureau, Washington, DC, September 6, 2018), www.census.gov/data/datasets/2017/demo/popproj/2017-popproj.html.

0.5 percent per year, and GDP by only 1.8 percent per year, far short of its recent historical average of 3.0 percent annual growth.[3]

The repercussions of this slowing are evident in many macroeconomic indicators. For example, the recovery from the 2007–09 Great Recession has been the slowest among the past five U.S. recoveries—defined here as the period of economic expansion starting at the end of one recession and continuing through the peak preceding the next recession. GDP growth during the most recent recovery has trailed growth following the recessions that ended in 1975, 1982, 1991, and 2001. That said, GDP per worker has recovered more quickly; by this measure, the recovery from the 2007–09 recession is in the middle of the pack and does not stand out as a particularly poor performer.

These dynamics suggest the recovery has been slow in large part due to low labor force growth, as fewer workers joining the labor market constrains GDP growth. Labor force growth during the recovery periods between recessions is shown in Figure 1. In the ten years since the Great Recession ended, the U.S. labor force has grown 5 percent, or an annual rate of 0.5 percent. In the other four recent recoveries, annualized labor force growth exceeded 1 percent.

Figure 1. U.S. Labor Force Growth Following Economic Recessions



Note: Each series starts in the last business cycle trough quarter and ends in the peak quarter (although the recovery that started in 2009:Q2 is ongoing). Each series is indexed to the size of the labor force during its last trough quarter. The last data point for the recovery that started in 2009:Q2 is Q4 of 2018.
Sources: Authors' calculations based on labor force data from U.S. Department of Labor, Bureau of Labor Statistics, "Labor Force Statistics from the Current Population Survey: Labor Force," accessed August 2, 2019,

[3] Projections refer to 2018–28 annualized growth from Congressional Budget Office (CBO), *An Update to the Economic Outlook: 2018 to 2028* (Washington, DC: CBO, 2018), www.cbo.gov/publication/54318. Recent historical average refers to the annualized growth rate in real gross domestic product (GDP) for the period from 1979 to 1999.

www.bls.gov/cps/lfcharacteristics.htm#laborforce; business cycle dates from National Bureau of Economic Research, "US Business Cycle Expansions and Contractions," accessed August 2, 2019, www.nber.org/cycles.html.

The economy's growth potential is essentially determined by the growth rate of labor and its productivity, so it is not surprising that slower labor force growth spills over into slower GDP growth. Faster productivity growth could compensate for the slowdown in labor force growth, but productivity growth has also been lagging in the post-Great Recession period. Since 2011, annual labor productivity growth has averaged 0.9 percent, down from 2.0 percent in the two decades leading up to 2000.[4] This sharp deceleration has puzzled economists, particularly in light of the growing role of technology and automation, changes that should raise productivity.

The explanations for slowing productivity growth fall into three broad categories.[5] One, measurement problems obscure productivity growth that continues to occur, and this mismeasurement is worsening over time. Two, this is a period of secular stagnation, or a slow-growing economy characterized by excess savings and a lack of investment opportunities. Three, today's innovations are either not as transformational as those in decades past were or their impacts are taking longer to materialize and will only become apparent over time.[6]

Regardless of the underlying causes of the productivity slowdown, empirical work finds that population aging contributes to slower productivity growth. Using state-level data, a 2016 study published by the National Bureau of Economic Research found that a 10 percent increase in the share of the population that is age 60 and older decreases the growth rate of per capita GDP by 5.5 percent.[7] The study implies that annual GDP growth in the United States will slow by 1.2 percentage points this decade and 0.6 percentage points next decade as a result of population aging.[8]

III. The Aging of the U.S. Workforce

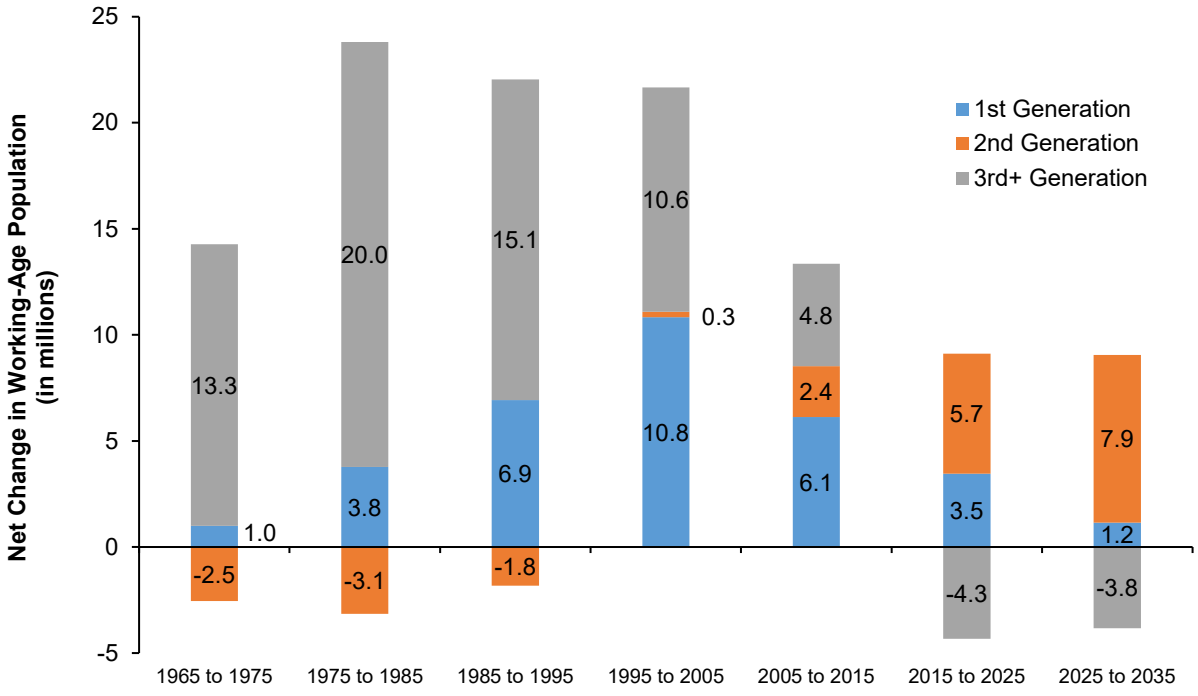
The most profound change in the U.S. labor market is the aging of the workforce. The nation is moving inexorably toward a future of older workers. Never has the pace of aging been this rapid in the United States. Between 2016 and 2030, the share of the population made up by seniors is

[4] Authors' calculations using data from the U.S. Department of Labor, Bureau of Labor Statistics (BLS), "Labor Productivity and Costs," accessed August 2, 2019, www.bls.gov/lpc/.
[5] James Manyika, Jaana Remes, Jan Mischke, and Mekala Krishnan, "The Productivity Puzzle: A Closer Look at the United States" (discussion paper, McKinsey Global Institute, McKinsey & Company, March 2017), www.mckinsey.com/~/media/mckinsey/featured%20insights/employment%20and%20growth/new%20insights%20into%20the%20slowdown%20in%20us%20productivity%20growth/mgi-the-productivity-puzzle-discussion-paper.ashx.
[6] For a discussion of secular stagnation, see Lawrence H. Summers, "The Age of Secular Stagnation: What It Is and What to Do about It," *Foreign Affairs,* February 15, 2016, www.foreignaffairs.com/articles/united-states/2016-02-15/age-secular-stagnation. On the end of innovation, see Robert J. Gordon, "Is US Economic Growth Over? Faltering Innovation Confronts the Six Headwinds" (working paper no. 18315, National Bureau of Economic Research, Cambridge, MA, August 2012), www.nber.org/papers/w18315.
[7] Nicole Maestas, Kathleen J. Mullen, and David Powell, "The Effect of Population Aging on Economic Growth, the Labor Force and Productivity" (working paper no. 22452, National Bureau of Economic Research, Cambridge, MA, July 2016), www.nber.org/papers/w22452.
[8] Interestingly, the study attributed two-thirds of the decrease in per capita GDP growth to slower growth in the productivity of workers across age groups, and one-third to slower labor force growth. See Maestas, Mullen, and Powell, "The Effect of Population Aging."

projected to rise from 15 percent to 23 percent.[9] The retirement of the baby boomers, the second-largest birth cohort in U.S. history, is the biggest force behind the aging trend currently, although falling birth rates will have a more lasting impact.[10]

Projections that separate the growth in the working-age population into growth due to U.S. natives with native-born parents, to immigrants, and to the U.S.-born children of immigrants are instructive. According to the Pew Research Center, the third-plus generation labor force—defined here as U.S.-born workers with U.S.-born parents—is projected to decrease in size by 8.2 million workers within two decades (2015–35) (see Figure 2). Immigrants and, to a larger extent, their native-born children will make up all the growth in the labor force over this period, adding 18.2 million potential workers on net. Given the direct correlation between immigration and working-age population growth, with no buffer from third-plus-generation workers, less immigration will mean slower labor force growth.

Figure 2. Net Change in U.S. Working-Age Population (in millions), by Decade and Immigrant Generation, 1965–2035*



* Data for 2015 onward are projections.

[9] Based on U.S. Census Bureau 2017 population projections. See Jonathan Vespa, David M. Armstrong, and Lauren Medina, *Demographic Turning Points for the United States: Population Projections for 2020 to 2060* (Washington, DC: U.S. Census Bureau, 2018), https://permanent.access.gpo.gov/gpo93743/P25_1144.pdf.

[10] An estimated 75.4 million baby boomers were born in the 1946–64 period, while 83.1 million millennials were born in the period 1982–2000. See U.S. Census Bureau, "Millennials Outnumber Baby Boomers and Are Fare More Diverse, Census Bureau Reports" (press release, U.S. Census Bureau, Washington, DC, June 25, 2015), www.census.gov/newsroom/press-releases/2015/cb15-113.html.

Notes: The working-age population includes adults ages 25 to 64. The 1st generation is made up of immigrant workers, the 2nd generation by U.S.-born workers with immigrant parents, and the 3rd+ generation by U.S.-born workers with U.S.-born parents.
Source: Jeffrey S. Passel and D'Vera Cohn, "Immigration Projected to Drive Growth in U.S. Working-Age Population through at Least 2035," Pew Research Center, March 8, 2017), https://www.pewresearch.org/fact-tank/2017/03/08/immigration-projected-to-drive-growth-in-u-s-working-age-population-through-at-least-2035/.

Aging also affects the labor force participation rate. Labor force participation fell from 66 percent in 2007, before the Great Recession, to 63 percent in 2014 (and has remained there since then), and about half of the decline can be attributed to aging.[11] This downward trend is expected to continue, with participation projected to slip to 61 percent by 2028.[12] Older people are not only less likely to participate in the labor force, but those who do tend to work fewer hours. While older, experienced workers may be more productive, their productivity does not grow as fast as that of younger workers; they also have slower wage growth.[13] Part of the sluggishness of wage growth in recent years can be attributed, therefore, to the growing share of U.S. workers who are older.

Population aging is also related to declining geographic mobility. Internal migration has fallen in the United States since the 1980s, although it remains higher than in most European countries. Larger cohorts of older people mean lower geographic mobility because they move less. In 2001–10, about 3 percent of U.S. adults ages 18–24 moved between states annually, on average, as did 2.2 percent of prime-working-age adults (ages 25-44), 1.0 percent of older workers (45-64), and 0.7 percent of seniors (65 plus).[14] That said, internal migration rates have also been falling over time within almost all demographic groups, pointing toward other underlying factors as explanations.[15] Declining mobility is a concern if it reflects frictions preventing workers from moving to fast-growing regions. Persistent geographic disparities in labor market conditions and prices raise aggregate unemployment and reduce productivity for the economy as a whole.

Another symptom of reduced economic dynamism is declining business creation. Business creation has been trending down since the late 1970s. There are no obvious explanations for this other than falling incentives to become an entrepreneur.[16] Population aging could be playing a role in this. Older workers have less incentive to become entrepreneurs in part because they have

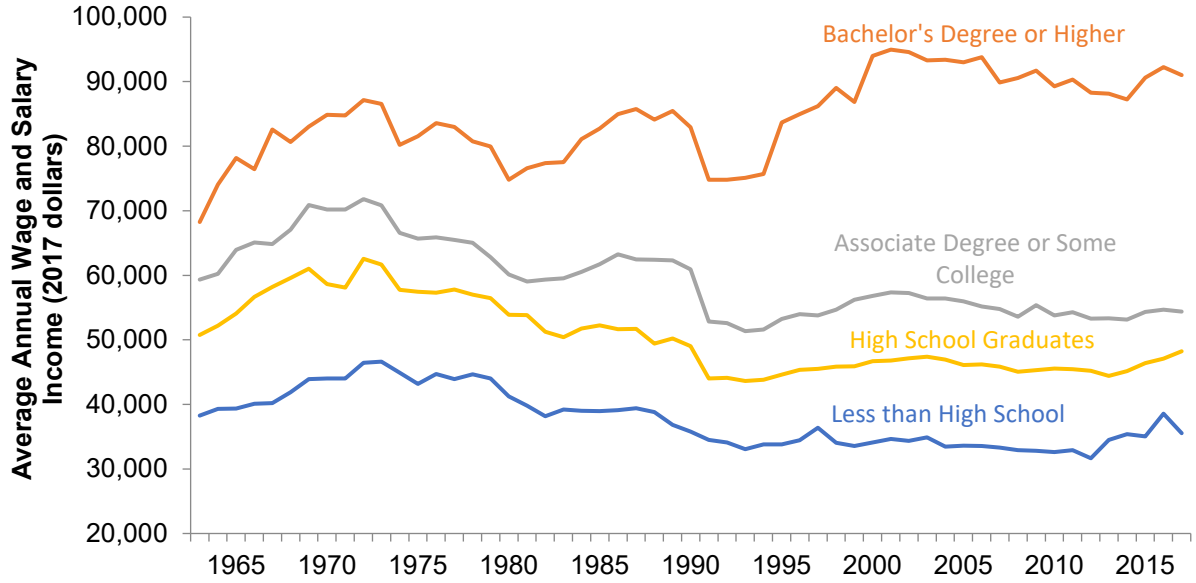
[11] Stephanie Aaronson, Felix Galbis-Reig, Tomaz Cajner, Christopher Smith, Bruce Fallick, and William Wascher, *Labor Force Participation : Recent Developments and Future Prospects* (Washington, DC: Brookings Institution, 2014), www.brookings.edu/wp-content/uploads/2016/07/Fall2014BPEA_Aaronson_et_al.pdf.
[12] CBO, "Budget and Economic Data—10-Year Economic Projections—August 2018" (dataset, CBO, Washington, DC, August 2018), www.cbo.gov/about/products/budget-economic-data.
[13] Robert Rich, Joseph Tracy, and Ellen Fu, "U.S. Real Wage Growth: Slowing Down With Age," Liberty Street Economics, September 28, 2016, https://libertystreeteconomics.newyorkfed.org/2016/09/us-real-wage-growth-slowing-down-with-age.html.
[14] Raven Molloy, Christopher L. Smith, and Abigail Wozniak, "Internal Migration in the United States," *Journal of Economic Perspectives* 25, no. 3 (Summer 2011): 173–96. https://doi.org/10.1257/jep.25.3.173
[15] Molloy, Smith, and Wozniak, "Internal Migration."
[16] Ryan Decker, John Haltiwanger, Ron Jarmin, and Javier Miranda, "The Role of Entrepreneurship in US Job Creation and Economic Dynamism," *Journal of Economic Perspectives* 28, no. 3 (Summer 2014): 3–24, https://doi.org/10.1257/jep.28.3.3; Jack Wang and Michael Weiss, "Texas Business Starts Outperform U.S.; Formation Rates Decline," *Southwest Economy* (Third Quarter 2016): 7, www.dallasfed.org/~/media/documents/research/swe/2016/swe1603f.pdf.

a shorter time span during which they can realize the returns from their investment.[17] As a result of declining business formation, young businesses make up a falling share of employment. The decline in business creation is a concern because young businesses play a critical role in innovative activity, which in turn contributes to productivity growth.[18] The U.S. economy's future growth thus depends in part on having enough young workers and young businesses alike.

IV. Growing Skill Mismatch

A dramatic increase in educational attainment has been one of the most pronounced trends in the U.S. workforce in the period since World War II. In 1960, 84 percent of U.S. adults had at most a high school diploma, while less than 8 percent had a college degree. In 2018, by comparison, 39 percent had at most a high school diploma, and 35 percent had at least a four-year college degree.[19] Notwithstanding, the rising number of highly educated workers is barely keeping up with growing demand for them; this is partly why the earnings of college-educated workers have risen faster than those of workers with less education (see Figure 3). Since the 1990s, college graduates in STEM fields have been highly sought after by a host of industries, including technology and pharmaceutical companies, as well as universities and research institutions.

Figure 3. Earnings of U.S. Workers, by Education Level, 1963–2017



Notes: Calculations are for full-time workers (ages 25 to 64) who worked between 50 and 52 weeks in the calendar year. Education groups are defined by a recoded education variable that is comparable across all years. High School

[17] See Eleanor W. Dillon and Christopher T. Stanton, "Self-Employment Dynamics and the Returns to Entrepreneurship" (working paper no. 23168, National Bureau of Economic Research, Cambridge, MA, February 2017), www.nber.org/papers/w23168.

[18] Decker, Haltiwanger, Jarmin, and Miranda, "The Role of Entrepreneurship"; Wang and Weiss, "Texas Business Starts."

[19] Authors' calculations based on data from U.S. Census Bureau, "1960 Census of Population—Table 173. Years of School Completed by Persons 14 Years Old and Over," accessed August 2, 2019, www2.census.gov/programs-surveys/demo/tables/educational-attainment/1960/pc-s1-37/tab-173.pdf; Current Population Survey data via U.S. Census Bureau, "Educational Attainment in the United States: 2018—Table 2, Both Sexes" (dataset, U.S. Census Bureau, Washington, DC, 2019), www.census.gov/topics/education/educational-attainment/data/tables.html.

Graduates include adults with a high school diploma or equivalent. Incomes are deflated using the Consumer Price Index for All Urban Consumers (CPI-U).
Source: Authors' tabulation of data from the U.S. Census Bureau's March Current Population Survey, 1964–2018.

Higher levels of educational attainment can also mean a dearth of low- and mid-skill workers, the ranks of whom have been shrinking in the United States. U.S. natives with low education levels are not only shrinking in absolute numbers but also have low labor force participation rates—particularly among men—and face many barriers to finding and keeping jobs. Importantly, their low labor force participation does not appear to be due to immigration.[20] Instead, research has attributed it to factors ranging from low demand (and low wages) to changes in marriage and family structure to incarceration policies to the opioid crisis, among others.[21]

While there is considerable talk about the labor-displacing effects of automation, which is discussed in greater detail in Section VII, there is also concern that broader technological changes have reduced the share of jobs in the middle of the skills distribution while largely sparing the top and bottom, which economists term labor market polarization.[22]

Labor market polarization involves what has sometimes been described as a "hollowing out" of the middle class due to declining employment opportunities for mid-skill workers.[23] Some economists argue that technological change has reduced demand for many mid-skill occupations. Secretary is one of the best examples of an occupation shrinking in number as a result of automation that has usurped typical functions with software that, among other things, answers and distribute mail, answers phone calls, files documents, and handles scheduling.

Economists' understanding of the relationship between demand for workers in various skill group and technological change has evolved over time. While early studies posited that companies' ability to increasingly substitute technology for workers reduced the demand for low-skilled workers and depressed their wages, this hypothesis—termed "skill-biased technological change"—proved inconsistent with the labor market polarization that later emerged.[24] Economists have since modified the skill-biased technological change hypothesis to emphasize that technological change complements abstract tasks (which typically, although not

[20] Madeline Zavodny, "Immigration, Unemployment, and Labor Force Participation in the United States," (policy brief, National Foundation for American Policy, Arlington, VA, May 2018), https://nfap.com/wp-content/uploads/2018/05/IMMIGRANTS-AND-JOBS.NFAP-Policy-Brief.May-2018-1.pdf.
[21] See, for example, Ariel J. Binder and John Bound, "The Declining Labor Market Prospects of Less-Educated Men," *Journal of Economic Perspectives* 33, no. 2 (Spring 2019): 163–90, https://doi.org/10.1257/jep.33.2.163; Alan Krueger, *Where Have All the Workers Gone? An Inquiry into the Decline of the U.S. Labor Force Participation Rate* (Washington, DC: Brookings Institution, 2017), www.brookings.edu/wp-content/uploads/2017/09/1_krueger.pdf.
[22] David H. Autor, Lawrence F. Katz, and Melissa S. Kearney, "Trends in U.S. Wage Inequality: Revising the Revisionists," *The Review of Economics and Statistics* 90, no. 2 (May 2008): 300–23, https://doi.org/10.1162/rest.90.2.300.
[23] Autor, Katz, and Kearney, "Trends in U.S. Wage Inequality." For additional perspective on the shrinking middle class, see Pew Research Center, *The American Middle Class Is Losing Ground* (Washington, DC: Pew Research Center, 2015), www.pewsocialtrends.org/2015/12/09/the-american-middle-class-is-losing-ground/.
[24] Eli Berman, John Bound, and Stephen Machin, "Implications of Skill-Biased Technological Change: International Evidence," *The Quarterly Journal of Economics* 113, no. 4 (November 1998): 1245–79, https://doi.org/10.1162/003355398555892.

always, require high levels of education) while substituting for routine ones (which are often performed by mid-skill workers).[25] This appears to be the case not only in the United States but also in Western European countries, and it suggests that technological change has been a much more important factor in labor-market polarization than offshoring—a key part of globalization, discussed in Section VIII.[26]

Surveys of businesses suggest technological change does not reduce firms' headcounts, but it does change the skill mix of the workers employers want to hire.[27] Other observers of these trends have sought to refine the concept of "mid-skill jobs," noting that not all such jobs are disappearing.[28] While some traditional mid-skill occupations are declining, including construction, production, and clerical jobs, another set are growing; these positions often require more postsecondary education or training, such as jobs in health care, mechanical maintenance and repair, and some services. The skills demanded of workers in traditionally low-skill jobs are also rising.[29]

Occupational employment projections issued by the U.S. Department of Labor's Bureau of Labor Statistics (BLS) for 2016–26 provide additional evidence that demand for low- and mid-skill workers will remain vibrant despite spreading automation. In fact, according to government projections, most new jobs in this decade will be low- and mid-skill positions. The top five occupations projected to grow the most in raw numbers are personal care aides, food preparation workers and servers, registered nurses, home health aides, and software developers.[30] The projected top five fastest-growing occupations in terms of percentage changes are solar panel installers, wind turbine technicians, home health aides, personal care aides, and physician assistants.[31]

In short, rising educational attainment among U.S. workers has not kept pace with long-run increases in employer demand for high-skilled labor. As a result, the wages of highly educated workers have risen more than the wages of other groups. Nevertheless, demand for mid- and low-skill workers has remained intact even as their relative supply has fallen, prompting employers to complain of labor shortages. Projections suggest low- and mid-skill occupations

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[25] Recent research further recasts labor market polarization. An examination of wages rather than occupational skill requirements does not find an increase in the share of workers in low-wage jobs, and so disputes that technological change has led to polarization. See Jennifer Hunt and Ryan Nunn, "Is Employment Polarization Informative About Wage Inequality and Is Employment Really Polarizing?" (working paper no. 26064, National Bureau of Economic Research, Cambridge, MA, July 2019), www.nber.org/papers/w26064.

[26] Offshoring refers to the relocation of part of a firm's operations to another country in order to reduce costs. See Maarten Goos, Alan Manning, and Anna Salomons, "Explaining Job Polarization: Routine-Biased Technological Change and Offshoring," *American Economic Review* 104, no. 8 (August 2014): 2509–26, https://doi.org/10.1257/aer.104.8.2509.

[27] Emily Kerr, Pia Orrenius, and Christopher Slijk, "New Technology Boosts Texas Firms' Output, Alters Worker Mix," *Southwest Economy* (Third Quarter 2018): 3–6, www.dallasfed.org/~/media/documents/research/swe/2018/swe1803b.pdf.

[28] Harry Holzer, *Job Market Polarization and U.S. Worker Skills: A Tale of Two Middles* (Washington, DC: Brooking Institution, 2015), www.brookings.edu/wp-content/uploads/2016/06/polarization_jobs_policy_holzer.pdf.

[29] Peter Cappelli, "Are Skill Requirements Rising? Evidence from Production and Clerical Jobs," *Industrial and Labor Relations Review* 46, no. 3 (1993): 515–30, https://doi.org/10.1177/001979399304600305.

[30] BLS, "Occupational Outlook Handbook—Most New Jobs," updated April 12, 2019, www.bls.gov/ooh/most-new-jobs.htm.

[31] BLS, "Occupational Outlook Handbook—Fastest Growing Occupations," updated April 12, 2019, www.bls.gov/ooh/fastest-growing.htm.

will add the most jobs over the next decade. The premise that labor market polarization will eliminate mid-skill positions does not seem to have been borne out. Indeed, there is growing evidence that mid-skill jobs are changing, but not disappearing.

V. Immigration's Role in Workforce Trends

Immigration is unlikely to reverse the ongoing trends discussed in previous sections, but it can mitigate the adverse effects of many of them. As shown in Figure 2, the volume of immigration directly affects the economy's potential growth rate.[32] In the ten years leading up to the Great Recession, immigrants made up more than half of employment growth. In the ten years after the recession, they accounted for only about one-third.[33] Immigrant inflows failed to quickly resume their pre-recession pace, contributing to the slow recovery.

Immigrants are not particularly young compared with the U.S.-born population, but they tend to be of prime working age and have high labor force participation rates. In fact, immigrants as a whole have participation rates about 4 percentage points higher than U.S. natives.[34] Immigrant men have labor force participation rates well above those of native-born men (78 percent versus 67 percent, respectively, as of 2018), while immigrant women participate slightly less than native-born women (54 percent versus 58 percent). This higher labor force participation helps offset the impact of population aging and the low participation rate of less-educated U.S. natives.

Several other notable characteristics also shape immigrants' role in the U.S. workforce. Foreign-born workers are less likely to be unemployed and, while they earn less on average than U.S. natives, immigrants' earnings grow faster over time. In addition, they are more likely to be self-employed and to start businesses, and they tend to settle in fast-growing areas with rising wages and job opportunities.[35] In part because of their over-representation in STEM fields, immigrants make an outsized contribution to innovation and invention. [36] Taken together, these facts amplify their potential to inject dynamism into the U.S. economy. Immigrants also have more children

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[32] Audrey Singer and Dowell Myers, "Labor Force Growth Increasingly Depends on Immigrants and Their Children," Urban Institute, September 28, 2016, www.urban.org/urban-wire/labor-force-growth-increasingly-depends-immigrants-and-their-children.

[33] Calculations for the post-recession period are based on BLS, "Foreign-Born Workers: Labor Force Characteristics (2009 and 2018)," updated May 16, 2019, www.bls.gov/news.release/forbrn.nr0.htm/labor-force-characteristics-of-foreign-born-workers-summary. The pre-recession period discussion is based on authors' calculations using Current Population Survey data for 1998 and 2007, available at BLS, "Data Retrieval: Labor Force Statistics (CPS)," updated July 8, 2015, www.bls.gov/webapps/legacy/cpsatab7.htm.

[34] BLS, "Economic News Release, Table 1. Employment Status of the Foreign-Born and Native-Born Populations by Selected Characteristics, 2016-2017 Annual Averages" (news release, May 16, 2019), www.bls.gov/news.release/forbrn.t01.htm.

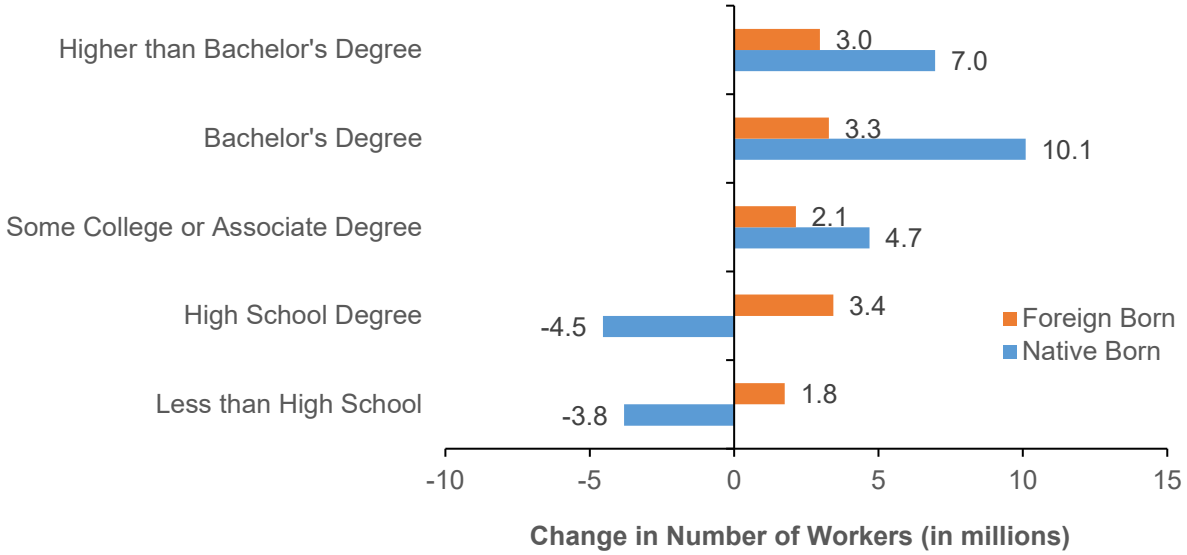
[35] National Academies of Sciences, Engineering, and Medicine, *The Economic and Fiscal Consequences of Immigration* (Washington, DC: The National Academies Press, 2017), Chapters 2, 3, and 6, https://doi.org/10.17226/23550; Pia Orrenius and Madeline Zavodny "From Brawn to Brains: How Immigration Works for America" in *2010 Annual Report* (Dallas, TX: Federal Reserve Bank of Dallas, 2010), 4–17, www.dallasfed.org/research/~/media/documents/fed/annual/2010/ar10b.pdf. On entrepreneurship, see also Robert W. Fairlie and Magnus Lofstrom, "Immigration and Entrepreneurship," in *Handbook of the Economics of International Migration*, vol. 1B, eds. Barry R. Chiswick and Paul W. Miller (Oxford, UK: Elsevier, 2015): 877–911.

[36] See National Academies, *The Economic and Fiscal Consequences of Immigration*, Chapter 5 (section 5.6). See also Jennifer Hunt and Marjolaine Gauthier-Loiselle, "How Much Does Immigration Boost Innovation?" *American Economic Journal: Macroeconomics* 2, no. 2 (April 2010): 31–56, https://doi.org/ 10.1257/mac.2.2.31.

than the native born, which contributes to population growth and helps slow population aging, although their birth rates fell unexpectedly after the Great Recession.[37]

The skills immigrants bring to the U.S. economy tend to complement those of native-born workers. As noted in Section IV, educational attainment has increased among U.S. natives over time, and while there are far more college graduates than in the past, the modal U.S. worker has some college but not a four-year degree. It may not be surprising then to see that immigrants have rounded out the skill distribution by disproportionately filling high- and low-skill jobs (see Figure 4). It also bears noting that as of 2009–12, 46 percent of college-graduate immigrants majored in STEM fields, compared with 28 percent of U.S.-born college graduates.[38] This suggests there is a shortage of STEM professionals among U.S. natives and that employers are turning to foreign workers partly out of necessity.

Figure 4. Change in Number of Foreign- and Native-Born Workers in the Civilian Labor Force (in millions), by Education Level, 1996 to 2017



Note: Data are for the civilian labor force (ages 25 and over).
Source: Authors' tabulation of data from the U.S. Census Bureau's Current Population Survey (1996, 2017), available at University of Minnesota, "IPUMS – CPS," updated May 17, 2018, www.ipums.org.

Whether U.S. employers bring in farmworkers or computer scientists, immigration can alleviate niche shortages that arise in the domestic labor market. Given that immigrants tend to be at the extremes of the skill distribution and not in the middle, it is not clear how relevant polarization—to the extent it is actually occurring—is to immigration or vice versa. Immigrants in the United

[37] Gretchen Livingston, "Over the Past 25 Years, Immigrant Moms Bolstered Births in 48 States," Pew Research Center, August 29, 2017, www.pewresearch.org/fact-tank/2017/08/29/over-the-past-25-years-immigrant-moms-bolstered-births-in-48-states/.
[38] Giovanni Peri, Kevin Shih, and Chad Sparber, "How Highly Educated Immigrants Raise Native Wages," VOX Centre for Economic Policy Research Policy Portal, May 29, 2014, https://voxeu.org/article/how-highly-educated-immigrants-raise-native-wages.

States tend to either lack a high school diploma or have a bachelor's degree or higher. On the low end of the skill spectrum, they are concentrated in manual labor jobs, often in the service industry and in difficult-to-automate occupations such as nannies, health aides, landscapers, and cooks. On the high-skill end, immigrants are concentrated in STEM and health-care jobs, which are affected by technological change but not to the same extent as workers on a factory floor who may be replaced by robots. Immigrants tend to be less concentrated in the job categories that studies have suggested are most likely to be adversely affected by automation, including office and administrative support, sales-related positions, and production jobs.[39]

Immigration thus helps alleviate population aging and the skill mismatch between U.S. employers' labor demand and U.S. natives' labor supply, in addition to mitigating other adverse labor market trends. Alleviating those forces will continue to be important in the future, even in the face of continued technological change and globalization. Before further addressing those trends, this paper steps back to consider how immigration affects U.S. workers.

VI. Immigration's Effect on U.S. Natives

No matter how compelling the evidence of the macroeconomic benefits of immigration, any recommendation to increase immigrant admissions should consider the potential effects on U.S. natives.[40] The evidence on the economic impact of immigration suggests that it increases natives' income, or GDP per capita.[41] Specifically, labor in-migration increases labor supply, which in turn increases total output, or GDP. The "immigration surplus," as it is termed by some economists, is the rise in the income that accrues to the native born when immigration occurs.

Estimates of the immigration surplus are typically based on simulations or back-of-the-envelope calculations using the share of GDP that accrues to workers, the size of the foreign-born workforce, and the responsiveness of labor demand to changes in wages. In a standard competitive model, the immigration surplus is between 0.2 and 0.4 percent of U.S. GDP. [42] In any case, a plausible range under standard assumptions and in a $20 trillion economy (roughly the size of the United States') is $40 billion to $80 billion per year in income gains to U.S. natives from immigration.[43]

Yet the distribution of immigration's economic benefits is uneven. Most of the overall gain in GDP accrues to immigrant workers as earnings. The immigration surplus—the benefits that flow to natives—goes to owners of capital and complementary workers. By lowering the cost of labor, immigration raises the return to capital. Owners of capital get a windfall gain, whether they are business owners, landowners, or shareholders. Consumers also benefit from lower-priced goods

[39] Peter Orr, "Which Careers Are Most Likely to Be Automated?" 80,000 Hours, February 4, 2015, https://80000hours.org/2015/02/which-careers-will-be-automated/; Carl Benedikt Frey and Michael A. Osborne, "The Future of Employment: How Susceptible Are Jobs to Computerisation?" *Technological Forecasting and Social Change* 114 (January 2017): 254–280, https://doi.org/10.1016/j.techfore.2016.08.019.
[40] This section is adapted from Pia M. Orrenius and Stephanie Gullo, "The Economic and Fiscal Effects of Immigration: Implications for Policy," in *The Human and Economic Implications of Twenty-First Century Immigration Policy*, ed. Susan Pozo (Kalamazoo, MI: W.E. Upjohn Institute for Employment Research, 2018), 7–32, https://doi.org/10.17848/9780880996570.ch2.
[41] See National Academies, *The Economic and Fiscal Consequences of Immigration*, 168.
[42] George J. Borjas, "The Economic Benefits from Immigration," *Journal of Economic Perspectives* 9, no. 2 (Spring 1995): 3–22, https://doi.org/10.1257/jep.9.2.3.
[43] Borjas, "The Economic Benefits from Immigration."

and services. Workers who are complements to, rather than competitors with, immigrants benefit as well. Meanwhile, native-born workers and earlier immigrants who have similar skill profiles are more likely to lose out, with lower wages or lower employment rates.[44]

According to standard economic theory, immigrant inflows should negatively affect the wages and employment of substitutable workers, at least in the short run. Despite that clear prediction, and the large immigrant inflows that the United States has experienced since the 1970s, most empirical evidence suggests that immigration has had either no effect or only a modest adverse effect on the labor market outcomes of the U.S.-born population overall.[45] However, there is evidence of more negative effects on subgroups of workers in which immigrants have historically been most concentrated, namely high school dropouts.[46] Interestingly, among the low-skilled, the largest negative labor market impact of immigration falls not on native-born workers but on earlier immigrants, because they are most similar to new immigrants and hence compete most closely with them.[47] There is little evidence that immigration negatively affects the wages or employment rates of medium- and high-skilled U.S. natives.

Why doesn't immigration have a more negative effect on U.S.-born workers? First, as noted above, the number of low-skilled workers in the United States has been on the decline for several decades. There are fewer native-born workers who compete directly with low-skilled immigrants. Second, the U.S. economy—including its workers—is constantly adapting to the forces that shape economic activity.[48] When the cost of labor falls, businesses use more labor. In other words, immigration affects how businesses combine capital, labor, and other resources (known as the "factor mix") to produce output. Immigration can also affect the types of goods or services that businesses produce (the "output mix"); if labor becomes more affordable, businesses may begin to produce goods or services that are more labor intensive. Finally, both native- and foreign-born workers may move or change occupations in response to the arrival of new immigrants, mitigating some potential adverse wage and employment effects and making them difficult to measure.

Beyond wages and employment, immigration has the potential to affect native-born workers in other ways, some direct and others indirect. Because a reduction in the cost of labor raises the relative return to capital, immigration should spur investment and inflows of capital. Immigrants also tend to settle in booming areas that otherwise might experience labor shortages, relieving labor market bottlenecks that could hinder growth. And immigrants are themselves consumers who contribute to job creation via their effect on aggregate demand for goods and services. Last

[44] National Academies, *The Economic and Fiscal Consequences of Immigration*, Chapters 4 and 5.
[45] National Academies, *The Economic and Fiscal Consequences of Immigration*, Chapter 5.
[46] For a succinct summary, see National Academies, *The Economic and Fiscal Consequences of Immigration*, 5. A more detailed analysis can be found in Chapter 5.
[47] Gianmarco Ottaviano and Giovanni Peri, "Rethinking the Effect of Immigration on Wages, " *Journal of the European Economic Association* 10, no. 1 (February 2012): 152–97, https://doi.org/10.1111/j.1542-4774.2011.01052.x.
[48] National Academies, *The Economic and Fiscal Consequences of Immigration*, Chapter 4. See also Penn Wharton Budget Model, "The Effects of Immigration on the United States Economy" (brief, University of Pennsylvania, Philadelphia, January 2016), https://budgetmodel.wharton.upenn.edu/issues/2016/1/27/the-effects-of-immigration-on-the-united-states-economy.

but not least, some immigrants create jobs via their entrepreneurial activities and innovation, as discussed above.

VII. Immigration versus Automation: A False Choice

Instead of bringing in more foreign-born workers, can the United States rely on automation to fill labor market gaps and spur economic growth? The idea that automation will displace large swaths of workers has been gaining traction. One influential study concluded that up to 47 percent of U.S. jobs are at risk of automation.[49] That study also found that an occupation's wage and educational attainment was strongly negatively related to the probability of automation, implying there will be less need for low-skilled workers in the future than there is at present.

There is, however, substantial evidence against predictions that automation will displace half of the U.S. workforce and eliminate the need for low-skill occupations. First, there is the current data. The unemployment rate is at near-historic lows in the United States, and employers cite a lack of qualified applicants as the main reason they are unable to hire.[50] BLS data on job openings indicate there are more vacancies than unemployed workers searching for jobs.[51] Second, analysis of both historical and recent experience suggests it is highly unlikely that technological change will eliminate the need for labor. The Industrial Revolution displaced labor-intensive hand production with machines, but instead of rendering workers jobless it ushered in the first-ever extended period of broad and sustained increases in employment, wages, and standards of living. Based on more recent experience, studies argue that while automation may replace workers within certain industries, it increases the number of workers in others, and that productivity gains raise aggregate labor demand. As a 2018 study published by the Brookings Institution notes:

> "Many technological innovations replace workers with machines. But this capital-labor substitution need not reduce aggregate labor demand, because it simultaneously induces four countervailing responses: own-industry output effects; cross-industry input–output effects; between-industry shifts; and final demand effects."[52]

The study argues that many forecasts of large net reductions in employment or the labor share as a result of technological progress ignore general equilibrium effects, which include the positive spillovers on other sectors that increase labor demand and prompt workers to move to other industries. Taking these dynamics into account, the study concludes that automation actually

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[49] Frey and Osborne, "The Future of Employment."

[50] According to the Dallas Fed's Texas Business Outlook Surveys, which include firms across Texas, 70.6 percent of responding firms that reported having problems finding qualified workers in November 2018 cited a lack of available applicants. This has been the top reason cited each of the four times the question has been asked since November 2017. See Federal Reserve Bank of Dallas, "Texas Business Outlook Surveys," updated November 26, 2018, www.dallasfed.org/research/surveys/tbos/2018/1811q.aspx. The Federal Reserve Banks' Small Business Credit Survey, which includes small businesses across the United States, found that in 2017 the two most commonly cited hiring challenges were "lack of job specific skills, education, or experience" (63 percent) and "too few applicants" (57 percent). See Ellyn Terry and Mels de Zeeuw, "How Do Firms Respond to Hiring Difficulties? Evidence from the Federal Reserve Banks' Small Business Credit Survey," updated March 2018, www.fedsmallbusiness.org/survey/2018/how-do-firms-respond-to-hiring-difficulties.

[51] BLS, "Job Openings and Labor Turnover Survey," accessed January 28, 2019, www.bls.gov/jlt/home.htm.

[52] David Autor and Anna Salomons, *Is Automation Labor Share–Displacing? Productivity Growth, Employment, and the Labor Share* (Washington, DC: Brookings Institution, 2018), www.brookings.edu/wp-content/uploads/2018/03/AutorSalomons_Text.pdf.

added to employment between 1970 and 2007.[53] Industries with persistent gains in relative productivity as a result of automation become a smaller share of aggregate employment as their labor needs fall. However, this direct impact is more than offset by two indirect effects: first, rising productivity within supplier industries fuels employment gains among their downstream customer industries as their input costs fall. Second, productivity growth in each sector contributes to aggregate output growth and, hence, rising final demand that in turn boosts employment growth across all sectors.

The future of the U.S. labor market almost surely includes more automation. The jobs of the future will be different as a result of automation, but there will not necessarily be fewer of them. More workers, including immigrants, will still be needed in order for the economy to grow and to help offset the trends in population aging, low labor force participation, and skill mismatch.

VIII. Globalization and Offshoring

Can promoting greater globalization of production and international trade be another policy approach to supporting economic growth without increasing immigration? Under a more open and free trade regime, perhaps including multilateral trade agreements such as the Trans-Pacific Partnership (TPP), more production could occur overseas, alleviating pressure on already tight domestic labor markets. The United States has already experienced episodes of production offshoring that have been related in part to domestic labor shortages. One example is labor-intensive forms of agriculture such as fruit and vegetable crops. Under the North American Free Trade Agreement, many U.S. fruit and vegetable growers expanded production in Mexico rather than in California. The United States now imports 41 percent of its fruits and vegetables, up from 23 percent in 1997.[54]

While it may seem sensible for policymakers to encourage offshoring economic activity and promote trade instead of addressing the problem of insufficient labor force growth, this strategy is likely to backfire. First, the employment implications of free trade are not clear. As with automation, it is often the case that offshoring's indirect employment effects will increase the demand for labor domestically in the long run, making up for any direct job losses that may initially occur[55] Second, diverting production overseas is a loss of investment that might otherwise occur domestically, which is not necessarily a desirable outcome. Third, goods production is already fairly globalized, and services make up a high and increasing share of consumption. While some services, such as digital trade and e-commerce, are a growing presence in international trade, trade in services is unlikely to reach the same global scale that trade in goods enjoys.[56] Exporting haircuts, child care, or lawn care is clearly not feasible. Most services will continue to require domestic labor. Many of those jobs are filled by low-skilled workers, who are in turn disproportionately immigrants.

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[53] Despite the employment-augmenting aspect of technological progress, the study finds it is also consistent with a declining labor share of national income. See Autor and Salomons, *Is Automation Labor Share–Displacing?*

[54] Imports as a share of gross output. Gross output data are from the Bureau of Economic Analysis and imports data are from U.S. International Trade Commission DataWeb, which uses data retrieved from the U.S. Census Bureau.

[55] Marion Jansen and Eddy Lee, *Trade and Employment: Challenges for Policy Research* (Geneva: World Trade Organization and International Labor Office, 2007), www.wto.org/english/res_e/booksp_e/ilo_e.pdf.

[56] Logan T. Lewis, Ryan Monarch, Michael Sposi, and Jing Zhang, "Structural Change and Global Trade" (discussion paper 1225, Board of Governors of the Federal Reserve System, Washington, DC, April 2018), https://doi.org/10.17016/IFDP.2018.1225.

In summary, increased automation, offshoring, and trade are unlikely to reduce the overall demand for labor, including for immigrant workers. In addition, expanded immigration can help alleviate other adverse labor market trends, population aging chief among them. Beyond its labor market impact, population aging has a fiscal impact, with fewer workers paying taxes and more retirees receiving taxpayer-funded benefits. Can immigration help with the fiscal picture as well?

IX. Fiscal Effects of Immigration

Apart from immigration's direct economic and labor-market impacts, it has a fiscal impact—the difference between what immigrant families pay in taxes and what they consume in government-provided benefits.[57] If immigrants represent a fiscal shortfall, they are a burden on native-born taxpayers, which would be an additional cost of immigration. But if they are a fiscal boon, they can contribute to financing the growing U.S. deficit and burgeoning national debt.

The good news is that a seminal study of the fiscal consequences of immigration published by the National Academies in 2017 found that recent immigrants (those who arrived within the last five years) represent a large fiscal boon; they are projected to pay much more in taxes than they use in benefits over the next 75 years. And even though low-skilled immigrants, those without any college education, impose a net long-run fiscal cost, this cost is smaller by far than that of similarly educated U.S. natives.[58]

The data suggest two ways of dealing with the fiscal impact of increasing low-skilled immigration. One way is to target the average fiscal impact of immigration. By bringing in more high-skilled than low-skilled immigrants, as is currently the case, the fiscal impact is positive. Another way is to admit low-skilled immigrants temporarily, perhaps as part of a temporary worker program where workers come on short-term or seasonal visas and do not bring their families.

The overall results of the 2017 National Academies report suggest that the rise of high-skilled immigration and more recent decline in low-skilled immigration is resolving some of the most pressing concerns around immigration's fiscal impact. Since present trends are likely to continue and possibly intensify, immigration can increasingly be seen as a fiscal boon rather than a burden. Immigration may even play a part in future plans to address the nation's looming fiscal shortfalls.

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[57] This section draws extensively on the following sources: National Academies, *The Economic and Fiscal Consequences of Immigration*; Pia Orrenius, "New Findings on the Fiscal Impact of Immigration in the United States" (working paper no.1704, Federal Reserve Bank of Dallas, Research Department, April 2017), https://doi.org/10.24149/wp1704. Immigrants, much like the native born, contribute taxes in several ways: they pay taxes on earnings (e.g., income and payroll taxes), purchases (sales taxes), housing (property taxes), motor vehicles (registration fees), and more. And as with the native born, immigrants typically consume at least some government-provided services, which may include public schools, police and fire protection, subsidized health care (Medicaid and/or Medicare), income support programs such as the Earned Income Tax Credit, and welfare programs such as Temporary Assistance for Needy Families (TANF) or the Women and Infant Children (WIC) program, and Social Security. It bears noting that unauthorized immigrants are not eligible for most welfare programs, including TANF, and there are restrictions on the eligibility of some legal immigrants for certain benefits as well.

[58] Orrenius, "New Findings on the Fiscal Impact of Immigration."

X. How Much Is the "Right" Amount of Immigration?

Suppose policymakers agree that more immigration is needed to boost economic growth. How do they then decide how many immigrants to admit? There is no magic number because there is no such thing as an optimal quantity of immigrants. Policymakers might instead decide on a workforce growth target and pick the level (and type) of immigration that is most consistent with that objective.

To further fine-tune the volume of immigration in the short to medium run, lawmakers could create an auction system where employers bid for permits to hire foreign workers.[59] The variation in the prices employers are willing to pay for permits—their bids—would convey information about labor demand in real time. Periods of growing demand, as in economic expansions, would be characterized by broader auction participation and rising bid prices. Lower demand, as in economic recessions, would be characterized by less participation and falling bid prices. Policymakers could then adjust permit quantities and, by extension, the number of new immigrant workers up in times of economic expansion and down in contractions, while meeting the broader target in the long run. Allowing markets to determine which workers enter the United States is far superior to having bureaucrats do so via a point system or a list of approved ages, skills, occupations, or industries.[60] While the current U.S. system is already employer driven for temporary worker visas and major categories of employment-based permanent visas, it allocates scarce visas on a first-come, first-served basis or via lotteries. Markets can better allocate visas to their highest-valued use, maximizing immigrant workers' economic contributions to the United States.

While there is no optimal amount of immigration, there should be safeguards against bringing in too many or too few immigrants. Too much immigration can slow newcomers' integration into the U.S. economy and hurt competing workers (both native and foreign born). Too little immigration will slow the economy and hamstring certain immigration-dependent industries. Drastic or sudden changes in immigration levels are also undesirable because the economy needs time to adjust to changes in immigrant inflows. Rapid increases in immigration can generate political backlash and resentment against the newcomers. The government must make a concerted effort to ensure that immigration occurs through legal channels and that employers adhere to labor regulations. A decision to expand immigration might thus be coupled with implementation of enforcement mechanisms such as a nationwide E-Verify program, the process whereby employers electronically verify their new hires are authorized to work in the United States.

A plan to expand immigration, particularly of low-skilled workers, could be accompanied by a compensatory scheme to transfer some of the benefits of immigration to adversely affected workers. The target population would be low-income workers with limited education since they are the most likely to be harmed by immigration, either by losing jobs or experiencing downward wage pressure. Indeed, the United States has a long history of providing support for displaced

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[59] See Pia M. Orrenius and Madeline Zavodny, *Beside the Golden Door: US Immigration Reform in a New Era of Globalization* (Washington, DC: AEI Press, 2010).

[60] For further discussion, see Orrenius and Zavodny, *Beside the Golden Door*. For a comparison of demand- and supply-based systems, see Demetrios G. Papademetriou and Kate Hooper, *Competing Approaches to Selecting Economic Immigrants: Points-Based vs. Demand-Driven Systems* (Washington, DC: Migration Policy Institute, 2019), www.migrationpolicy.org/research/selecting-economic-immigrants-points-based-demand-driven-systems.

workers; it spends 0.11 percent of GDP (approximately $2 billion) annually on labor market adjustment programs, such as the Department of Labor's Trade Adjustment Assistance (TAA) program.[61] Unlike most existing programs, which require workers to have evidence of the direct cause of their job loss (such as their employer moving their job offshore because of import competition), a program to support workers adversely affected by immigration should target vulnerable workers as a group, as identifying affected workers individually would be challenging. This approach has the added benefit of being anticipatory rather than reactive—at-risk workers could access the programs before they are adversely affected by immigration.

Policies and programs to support these workers should help them shift into jobs that are complementary to, and not likely to be substituted by, low-skilled immigrant labor. One promising option is expanding access to retraining, such as vocational programs and community college courses. Proposals to accomplish this have included increasing Pell Grant eligibility and funding, directing more federal funds toward technical and career training, and providing upfront assessments and counseling before workers begin training programs in order to increase their likelihood of success.[62] Another option that has been touted as a cost-effective intervention for displaced workers is providing job search assistance, such as resume preparation support and interview coaching.[63]

Another option could be to offer subsidized moving costs as a way to help workers relocate to areas where demand for labor is high—a policy with the added benefit of potentially relieving regional growth bottlenecks.[64] Alternatively, expanding the Earned Income Tax Credit (EITC) would be an effective way of rewarding work by supplementing the incomes of a broader population of low-wage workers. Doing so would help address not only the relatively small adverse wage impacts of immigration but also of the bigger impacts of globalization and technological change on low-wage workers. Additional resources should also be directed towards communities that receive large numbers of low-skilled immigrants as a way to offset the

[61] Mark Muro and Joseph Parilla, "Maladjusted: It's Time to Reimagine Economic 'Adjustment' Programs," Brookings Institution, January 10, 2017, www.brookings.edu/blog/the-avenue/2017/01/10/maladjusted-its-time-to-reimagine-economic-adjustment-programs/.

[62] Louis S. Jacobson, Robert J. LaLonde, and Daniel G. Sullivan, "Policies to Reduce High-Tenured Displaced Workers' Earnings Losses through Retraining" (discussion paper, Brookings Institution, Hamilton Project, Washington, DC, November 2011) www.hamiltonproject.org/assets/legacy/files/downloads_and_links/11_displaced_JLS_paper.pdf.

[63] Christopher J. O'Leary, "Policies for Displaced Workers: An American Perspective" (working paper no. 10-170, W.E. Upjohn Institute for Employment Research, Kalamazoo, MI, March 2010), https://doi.org/10.17848/wp10-170; Dayanand S. Manoli, Marios Michaelides, and Ankur Patel, "Long-Term Effects of Job-Search Assistance: Experimental Evidence Using Administrative Tax Data" (working paper no. 24422, National Bureau of Economic Research, Cambridge, MA, March 2018), www.nber.org/papers/w24422.pdf; David Card, Jochen Kluve, and Andrea Weber, "Active Labour Market Policy Evaluations: A Meta-Analysis," *The Economic Journal* 120, no. 548, Features (November 2010): F452–77, https://doi.org/10.1111/j.1468-0297.2010.02387.x.

[64] Marco Caliendo, Steffen Künn, and Robert Mahlstedt, "The Return to Labor Market Mobility: An Evaluation of Relocation Assistance for the Unemployed," *Journal of Public Economics* 148 (April 2017): 136–51, https://doi.org/10.1016/j.jpubeco.2017.02.008; Brianna Briggs and Peter Kuhn, "Paying for the Relocation of Welfare Recipients: Evidence from the Kentucky Relocation Assistance Program" (discussion paper no. DP2008-01, University of Kentucky Center for Poverty Research, Lexington, KY, June 2008), http://ukcpr.org/research/welfare-reform/paying-relocation-welfare-recipients-evidence-kentucky-relocation-assistance.

fiscal impact that such newcomers can have on local school districts and other public service providers.[65]

XI. Conclusion

The projections for U.S. economic growth are sobering. Driven lower by a number of factors, not least the aging of the U.S. workforce and falling birth rates, GDP and employment growth over the next decade are projected to be but a fraction of their pre-recession rates. Other trends further complicate the growth outlook, including falling labor-force participation, slow productivity growth, declining entrepreneurism and business creation, and an increasingly skewed skill distribution among U.S.-born workers.

Against this backdrop, immigration can play an important role. Immigrants are a small share of the U.S. labor force, but they represent a disproportionately large fraction of its growth. Under the existing system of employment-based immigration, immigrants bring to the U.S. economy skills and experience that employers demand, whether they be STEM workers or farmworkers. This rapid response workforce can alleviate growth bottlenecks, such as labor shortages, quickly and efficiently. In addition, the evidence suggests immigration has a number of ancillary macroeconomic benefits, including spurring investment and bolstering labor market efficiency.

Whether it is the decline in entrepreneurship or the drop in geographic mobility, immigration can be a force that works in the opposite direction. These trends are not likely to be reversed, but immigration can mitigate their adverse impacts. Will additional automation or continued globalization erase the need for more immigration in the near future? Not likely. These structural changes result in higher productivity and a reallocation of resources in the economy, both forces to which immigrants can help businesses adjust and adapt.

Europe underwent population aging long before the United States. Its solution, among others, was to open borders within the 28-member bloc and guarantee free labor mobility throughout the European Union. This is an unlikely solution for the United States with regard to the Western hemisphere. Instead, the most natural course of action is to use existing tools to increase legal forms of both permanent and temporary employment-based immigration. Employment-based immigration policy already prioritizes prospective immigrants' skills and fit within the labor market, but it could be updated to include more high-skilled visas and an expanded temporary worker program. The TN visa category for high-skilled workers from NAFTA countries (Mexico and Canada) could be expanded to include low- and mid-skilled workers and eligibility extended to Central Americans. Combined with an auction system in which employers bid for the right to hire foreign workers and mechanisms to reduce illegal immigration and the employment of unauthorized workers, this system could provide a reliable but flexible and legal source of workers for U.S. employers. Meanwhile, proceeds from the auction could fund a worker compensation scheme, with resources earmarked for education and workforce training for less-skilled U.S.-born workers and for communities receiving large numbers of immigrants.

A future with less immigration is a future with less economic growth. This may be a tradeoff Americans are willing to make, but the decision deserves careful examination.

[65] Pia Orrenius, "New Findings on the Fiscal Impact of Immigration."