Social Security: Economic Growth and the Funding Shortfall

August 6, 2020

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The Old-Age, Survivors, and Disability Insurance (OASDI) program, commonly known as Social Security, is facing a projected financial shortfall. The program provides monthly benefits to retired or disabled workers and their eligible family members and to the eligible family members of deceased insured workers. Approximately 99% of program revenues are used to pay these monthly benefits, which constitute a substantial portion of income for a large segment of recipients.

The OASDI program is financed primarily by payroll taxes on covered earnings up to an annual limit, as well as federal taxes paid by some beneficiaries on a portion of their OASDI benefits. OASDI program revenues that are not needed to pay current benefits are invested in government securities held by the Federal Old-Age Survivors Insurance (OASI) and Federal Disability Insurance (DI) Trust Funds (together, the trust funds), which are managed by a Board of Trustees (the trustees). The interest earned on these assets provides a third stream of revenue to the OASDI program.

Under the current law and benefit structure, the program is estimated to be able to pay full scheduled benefits on a timely basis until 2035; the ability to pay full benefits would require the trust funds to redeem their asset reserves. When the trust funds' asset reserves are depleted, the program's benefit payments will depend entirely on continuing tax revenues (i.e., the depletion of asset reserves does not mean Social Security will be completely broke and unable to pay benefits). Policy options that would help to avoid such a shortfall generally fall into two categories: (1) those that increase revenues (e.g., payroll tax increase) and (2) those that decrease benefits (e.g., increase in normal retirement age). In addition, some argue that economic growth could prevent the projected financial shortfall. They reason that increasing economic growth would translate into increases in employment and real wages, which, through the payroll tax, would beneficially affect the program's financial status, possibly avoiding any projected financial shortfall.

Generally speaking, increases in employment (i.e., the number of workers subject to the payroll tax) and increases in real wages (i.e., after-inflation earnings subject to the payroll tax) result in higher OASDI program revenues. Some economic factors—such as the labor force participation rate, employment, real wage growth, and productivity—have been shown to significantly impact the financial status of Social Security. In their 2020 annual report to Congress, the trustees estimated how their intermediate assumptions for economic growth would affect the program's projected financial status. The trustees showed that if the underlying factors of economic growth were to increase, the program's financial status would improve. However, they also showed that economic growth alone would not resolve the projected financial shortfall. The 2020 annual report reflects the trustees' understanding of the Social Security program at the beginning of 2020. Thus, is does not account for any potential effects of the Coronavirus Disease 2019 (COVID-19).

The trustees demonstrated that the projected funding shortfall is due in part to economic and demographic factors. For instance, the changing age distribution in the United States indicates that those in covered employment are supporting an increasing number of people collecting benefits. This demographic aging, resulting in an older age distribution, is also affecting economic growth through its effects on labor force participation and employment. Under the trustees' intermediate assumptions, they estimate that growth in hours worked and productivity are unlikely to result in an economic growth rate that, alone, would avoid the projected financial shortfall and restore projected solvency. Thus, although increases in real economic growth—growth in employment, hours worked, and productivity—would benefit both workers and the program as a whole, these alone are not projected to result in a permanent solution to the OASDI program's projected financial shortfall.

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Introduction

Social Security & Coronavirus Disease 2019 (COVID-19)

The Board of Trustees of the Social Security Trust Funds are required by law to submit an annual report to Congress. Among other things, the report generally covers the projected financial status of the trust funds for a 75-year projection period. The projections require the trustees to make economic, demographic, and program-specific assumptions about future conditions. The 2020 annual report reflects the trustees' understanding of the program at the beginning of 2020. Coronavirus Disease 2019 (COVID-19) will likely have an effect on the Social Security program. However, given the then early stage of the pandemic and uncertainty about its potential magnitude and its likely effects on Social Security at the time of the annual report's release, possible impacts from COVID-19 were not incorporated into the 2020 annual report.

The Old-Age, Survivors, and Disability Insurance (OASDI) program, commonly known as Social Security, provides monthly benefits to retired or disabled workers and their eligible family members and to the eligible family members of insured deceased workers. These monthly benefits constitute a substantial portion of income for a large segment of recipients. As of January 2020 there were over 64 million recipients, of which approximately 70.5% are retired workers.[1]

The OASDI program operates primarily as a pay-as-you-go program in which revenues are paid out as monthly benefits. The largest source of financing (89.0% of program revenues in 2019) is the Social Security payroll tax paid, in equal parts by employers and employees, on covered earnings up to an annual limit.[2] The other sources of financing are income taxes (3.4% of program revenues in 2019) paid on a portion of Social Security benefits by some beneficiaries with income above a certain threshold and interest earned on reserves held in the Social Security Trust Funds, or the "trust funds" (7.6% of the program's income in 2019).[3] In 2019, the OASDI program's largest cost was monthly benefits, which accounted for 98.9% of program costs.[4]

The OASDI program's ability to pay full scheduled benefits is dependent on a favorable relationship between revenues and cost, commonly known as a *positive balance*.[5] Depending on

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[1] Social Security Administration (SSA), Office of the Chief Actuary, "Fact Sheet on the Old-Age, Survivors, and Disability Insurance Program," January 2020, at https://www.ssa.gov/oact/FACTS/index.html.

[2] SSA, Office of the Chief Actuary, "The 2020 OASDI Trustees Report," *The 2020 Annual Report of the Board of Trustees of the Federal Old-Age and Survivors Insurance and Federal Disability Insurance Trust Funds*, April 22, 2020, p. 7, at https://www.ssa.gov/OACT/TR/2020/tr2020.pdf (hereinafter cited as Board of Trustees, *2020 Annual Report*). Under current law, the Social Security payroll tax is applied to covered earnings up to an annual limit, or taxable maximum. The taxable maximum is indexed to national average wage growth for years in which a cost-of-living adjustment is payable; the taxable maximum for 2020 is $137,700. The payroll tax rate for employees in covered employment is 6.20% and matched by employers, resulting in a combined payroll tax rate of 12.4% for covered earnings up to the taxable maximum.

[3] Under current law, there are two separate trust funds for the Social Security program: (1) the Old-Age and Survivors Insurance (OASI) Trust Fund and (2) the Disability Insurance (DI) Trust Fund. They are discussed here on a combined basis as the Social Security Trust Funds, or the trust funds. Monies credited to each trust fund cannot be lent or transferred to the other trust fund without authorization from lawmakers. OASI benefits can be paid only from the OASI Trust Fund, and DI benefits can be paid only from the DI Trust Fund. For more information on the taxation of Social Security benefits, see CRS Report RL32552, *Social Security: Taxation of Benefits*.

[4] Board of Trustees, *2020 Annual Report*, p. 7. The remaining 1.1% of program costs are accounted for by administrative costs and the Railroad Retirement Board (RRB) financial interchange. For more information on the RRB, see CRS Report RS22350, *Railroad Retirement Board: Retirement, Survivor, Disability, Unemployment, and Sickness Benefits*.

[5] In 2019, the Social Security program's total revenues were larger than the program's total cost. However, the program's total cost exceeded its noninterest revenues (i.e., income from the payroll tax and taxation of benefits). This is commonly referred to as a *cash flow deficit*. Periods of cash flow deficit can be offset by interest income or the

trust fund asset reserves, however, the program may continue to pay full scheduled benefits during times when costs exceed revenue, or periods of *cash flow deficit*.[6] Given the OASDI program's dependence on a favorable revenue and cost relationship, the program's ability to meet its scheduled payments is necessarily connected to economic factors in the U.S. economy, such as growth in employment, average hours worked, and productivity.[7]

The Social Security program is facing a projected financial shortfall. That is, the program is projected to have sufficient funds needed to pay scheduled benefits until 2035, after which the level of benefits payable is dependent on continuing tax revenues. Under current law, the OASDI Trust Funds' Board of Trustees, or the trustees, manage the trust funds and submit annual reports to Congress regarding the program's expected status.[8] In recognition of the projected financial shortfall, the trustees estimate that a hypothetical payroll tax increase of 3.14 percentage points, a hypothetical benefit reduction of 19%, or some combination of both would need to immediately be enacted to avoid such a shortfall.[9] Some lawmakers argue that the best method to avoid the projected shortfall is through maintaining economic growth in the United States. That is, if real economic growth were to be maintained or increased, then the associated increases in employment and wages could reduce a funding shortfall.[10]

This report presents the current status of the trust funds, projections for the factors in real economic growth, and how projections for these growth factors are estimated to affect the program's financial status.

Current Status of the Trust Funds

The long-range financial status of the OASDI program is measured by the *actuarial balance*, defined as the difference between the *summarized cost rate* and the *summarized income rate* over a 75-year projection horizon.[11] The summarized cost rate and the summarized income rate are expressed as a percentage of *taxable payroll*.[12] At the end of 2019, the Board of Trustees

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redemption of trust fund assets. For more details, see CRS Report RL33028, *Social Security: The Trust Funds*.

[6] For more information on the ability of the program to pay benefits during periods of cash flow deficit, see CRS Report RL33514, *Social Security: What Would Happen If the Trust Funds Ran Out?*.

[7] Stephen C. Goss, "The Future Financial Status of the Social Security Program," *Social Security Bulletin*, vol. 70, no. 3 (August 2010), p. 124.

[8] 42 U.S.C. §4001(c).

[9] Board of Trustees, *2020 Annual Report*, p. 5.

[10] For instance, in a 2018 statement, Secretary of the Treasury Steven Mnuchin stated that "The Administration's economic agenda—tax cuts, regulatory reform, and improved trade agreements—will generate the long-term growth needed to help secure these [Social Security and Medicare] and lead them to a more stable path." Department of the Treasury, "Statement by Secretary Mnuchin on the Spring 2018 Meeting of the Social Security and Medicare Board of Trustees," press release, June 5, 2018, at https://home.treasury.gov/news/press-releases/sm0404. Similarly, in a 2018 Hearing of the Subcommittee on Social Security, several lawmakers expressed views that pro-growth policies such as the Tax Cuts and Jobs Act (P.L. 115-97) would result in higher economic growth and improve the Social Security program's financial status. See U.S. Congress, House Committee on Ways and Means, Subcommittee on Social Security, *Hearing on Examining Social Security's Solvency Challenge: The Status of Social Security's Trust Funds*, 115th Cong., 2nd sess., June 7, 2018 (Washington, DC: GPO, 2018).

[11] The *summarized cost rate* is the ratio of the present value of cost to the present value of the taxable payroll for the projection period. The *summarized income rate* is the ratio of the present value of scheduled noninterest income to the present value of taxable payroll for the projection period. See Board of Trustees, *2020 Annual Report*, p. 248.

[12] *Taxable payroll* is the weighted sum of taxable wages and taxable self-employment income. When this sum is multiplied by the Old-Age, Survivors, and Disability Insurance (OASDI) program payroll tax rate, it results in the total amount of payroll taxes. See Board of Trustees, *2020 Annual Report*, p. 249.

estimated the long-range actuarial balance for the OASDI program to be -3.21% of taxable payroll.[13] This negative balance indicates an actuarial deficit (i.e., a funding shortfall). Over the next 75 years, the Board of Trustees projects OASDI program costs to exceed program revenues by 3.21% of taxable payroll. To maintain program solvency throughout this period, available policy options would be to reduce costs, increase revenues, or some combination thereof to the magnitude of 3.21% of taxable payroll.[14] (This report focuses on the trustees' intermediate set of assumptions, which reflect their best estimates of future demographic and economic trends.)

Another measure of the OASDI program's long-range financial status projects how long the program could continue to pay full scheduled benefits, or the projected date for trust fund reserve depletion. Under their 2020 intermediate assumptions, the trustees projected that the trust fund reserves will be depleted in 2035.[15] This indicates that current and future beneficiaries would receive the full amount of their scheduled benefits until sometime in 2035. After that point, continuing tax revenues would determine benefit amounts.[16] Continuing tax revenues are projected to cover about 79% of scheduled benefits.[17]

Components of Real Economic Growth

Real economic output, defined as the amount of goods and services produced in the economy, is a function of economic factors. Specifically, real economic output (i.e., real gross domestic product [GDP]) is a product of employment, hours worked, and productivity. It follows that the growth in real economic output is approximately composed of the growth in its factors—employment, hours worked, and productivity.[18]

Total Employment

The growth in total employment is a major factor in the U.S. economy's real economic growth. Historical and projected total employment and growth in total employment (i.e., annual percentage change) are shown in **Figure 1** and **Figure 2**, respectively.

Figure 1 shows historical total employment in the United States, reflecting the number of individuals in the U.S. economy who are in paid employment. **Figure 2** shows the annual percentage change—or growth—in total employment. Both figures show that total employment in

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[13] The actuarial deficit of 3.21% of taxable payroll differs from the required 3.14 percentage point increase in the payroll tax increase, as it reflects behavioral response changes to payroll tax rate changes. See Board of Trustees, *2020 Annual Report*, p. 5.

[14] In June 2019, the Congressional Budget Office (CBO) projected the actuarial balance to be -4.6% of taxable payroll (see CBO, *The 2019 Long-Term Budget Outlook*, at https://www.cbo.gov/system/files/2019-06/55331-LTBO-2.pdf). CBO estimates that its assumptions for population (longer life expectancies and higher disability rates), earnings inequality (lower amount of aggregate covered earnings subject to the payroll tax), lower long-term real interest rates, slower growth in nominal economic output, and differences in analytical approaches account for the difference in the projected actuarial balance as compared with the trustees. For more information, see CBO, "Social Security," *CBO's Long-Term Social Security Projections: Changes Since 2018 and Comparisons with the Social Security Trustees' Projections*, December 19, 2019, at https://www.cbo.gov/system/files/2019-12/55914-CBO-Social-Security-Comparison.pdf.

[15] Board of Trustees, *2020 Annual Report*, p. 3. CBO projects a combined OASDI trust fund depletion date of 2032. See CBO, "Budget," *The 2019 Long-Term Budget Outlook*, June 25, 2019, at https://www.cbo.gov/system/files/2019-06/55331-LTBO-2.pdf.

[16] For more information on trust fund reserve depletion and partial benefits, see CRS Report RL33514, *Social Security: What Would Happen If the Trust Funds Ran Out?*.

[17] Board of Trustees, *2020 Annual Report*, p. 5.

[18] Board of Trustees, *2020 Annual Report*, p. 111.

the United States generally increased throughout the historical 1960-2019 period. However, as marked by the shaded bars, total employment and employment growth generally decreased during years in which the economy experienced a recession.

As seen in **Figure 1**, total employment in the United States is expected to continue to increase throughout the 75-year projection period at a slower pace than it has historically. This is reflected in **Figure 2** by a projected growth rate in total employment of less than 1%. That is, the growth rate in total employment is expected to be relatively stable, growing at less than 1% per year. Assumptions for the projection period reflect the trustees' understanding of the OASDI program at the start of 2020; thus, it does not include potential effects of Coronavirus Disease 2019 (COVID-19).

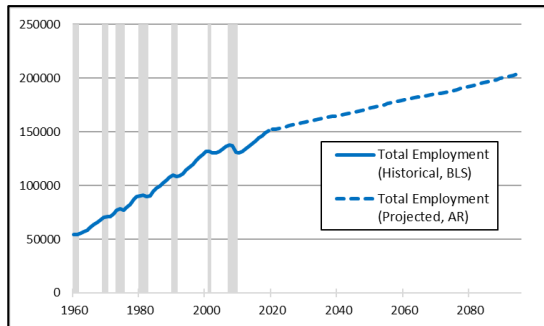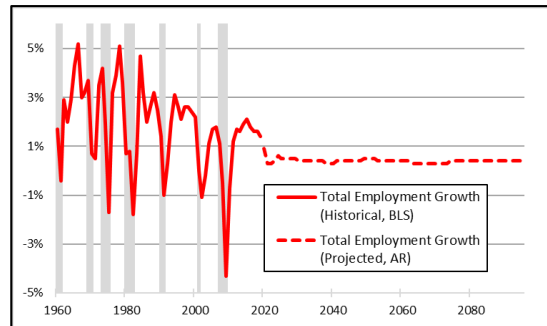### Figure 1. Historical and Projected U.S. Total Employment

(in thousands)

Figure 2. Historical and Projected Growth in U.S. Total Employment

(annual percentage change)

Source: *Congressional Research Service (CRS), from data provided by the Bureau of Labor Statistics (BLS), "Current Employment Statistics – CES (National)," at https://www.bls.gov/ces/; Social Security Administration, The 2020 Annual Report Of The Board Of Trustees Of The Federal Old-Age And Survivors Insurance And Federal Disability Insurance Trust Funds, April 22, 2020, at https://www.ssa.gov/OACT/TR/2020/tr2020.pdf (2020 Annual Report [AR]).*

Notes: Projections are based on the Board of Trustees' intermediate assumptions in the 2020 AR. Assumptions for the projection period reflect the trustees' understanding of the OASDI program at the start of 2020; thus, it does not include potential effects of Coronavirus Disease 2019 (COVID-19). Shaded areas represent a year in which a recession occurred, as designated by the National Bureau of Economic Research.

The size of the population and the labor force participation rate (LFPR), or the share of the population participating in the workforce, determine total employment. Thus, two important factors that contribute to changes in employment are fluctuations in (1) the size of the total population, or cohort, of persons of working age and (2) that population's participation in the labor market, as measured by the LFPR.

Population Change

Total employment is closely linked to a country's population in the long run. As the population of the United States has grown over time, so has its total employment. Total employment in the U.S. labor force measures the subset of the population that is working or available to work.

Generally, during periods of high employment, a larger fraction of a population is comprised of persons in their prime working ages. In the U.S. context, "baby boomers" (generally defined as those born between 1946 and 1964) grew into a large pool of working-age adults. As time elapsed, the large cohort continued to age, moving through their employment years and into their retirement ages. They were replaced by smaller cohorts of working-aged adults due to

demographic factors. Thus, as the baby boomers make up a large portion of the population, their aging and exit from the paid labor force will negatively impact the LFPR.[19] Projections from the Bureau of Labor Statistics suggest that the decreasing trend in the LFPR will continue. The LFPR is typically highest for the 24 to 54 age group (commonly known as the prime working age), and is generally over 80%.[20] This cohort was dominated by baby boomers for many years. However, the last baby boomers—those born in 1964—exited the prime working age group in 2018. The size of the cohort that moved into the 24 to 54 age group after the baby boomers was smaller, and the number of workers who newly participated in the labor force were not able to compensate for the number of baby boomers exiting the prime working age group. Although the overall population continues to grow, meaning some post-baby boom cohorts may be larger in number, the eventual exit of the baby-boom generation from the workforce entirely will continue to put downward pressure on the LFPR.[21]

Over the last several decades, the total U.S. population has been growing slowly at a decreasing rate. The **Appendix** shows this trend and two factors that are largely attributed with slowing population growth: (1) decreasing fertility and (2) decreasing net immigration. A population expands with increases in fertility (i.e., new births) and net immigration (i.e., new residents).[22] As the fertility rate (**Figure A-2**) is projected to remain low and net immigration (**Figure A-3**) is also projected to remain low, it is likely that the total population (**Figure A-1**) will demonstrate slow growth as well. The trustees' projection of a decreasing growth rate in total population is mirrored in U.S. Census Bureau projections, which show a similar slowing trend projected over the next several decades.[23]

Changes in Labor Force Participation Rates

The percentage of the civilian noninstitutional population 16 years and older that is working or actively looking for work is commonly measured using the LFPR: the percentage of the civilian noninstitutional population 16 years and older that is working or actively looking for work.[24] **Figure A-4** shows the LFPR increased from 1960 to 2000, indicating that over this period, the share of the total population in the labor force was increasing. **Figure A-4** also shows that these increases in the LFPR were, among other things, the result of the increasing share of women joining the labor force, which more than offset the falling share of men participating in the labor force.

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[19] Mitra Toossi, BLS, "Labor force projections to 2024: the labor force is growing, but slowly," *Monthly Labor Review*, December 2015 (hereinafter cited as Toossi, "Labor Force Projections to 2024").

[20] Toossi, "Labor Force Projections to 2024."

[21] Toossi, "Labor Force Projections to 2024." In 2018, approximately 10,200 baby boomers attained age 65 per day, an age commonly associated with retirement. See U.S. Government Accountability Office, *The Nation's Retirement System: A Comprehensive Re-Evaluation Needed to Better Promote Future Retirement Security*, GAO-19-342T, February 6, 2019, p. 6, at https://www.gao.gov/assets/700/696766.pdf.

[22] Increased life expectancy also plays a role in the age distribution. See CRS Report R45990, *Social Security: Demographic Trends and the Funding Shortfall*.

[23] Sandra L. Colby and Jennifer M. Ortman, *Projections of the Size and Composition of the U.S. Population: 2014 to 2060*, U.S. Census Bureau, P25-1143, March 2015, p. 1, at https://www.census.gov/content/dam/Census/library/publications/2015/demo/p25-1143.pdf. Further annual data for Census Bureau projections can be found at https://www.census.gov/data/tables/2017/demo/popproj/2017-summary-tables.html.

[24] Steven F. Hipple, U.S. Bureau of Labor Statistics (BLS), "Labor force participation: what has happened since the peak?," *Monthly Labor Review*, September 2016, at https://www.bls.gov/opub/mlr/2016/article/labor-force-participation-what-has-happened-since-the-peak.htm (hereinafter cited as Hipple, "Labor Force Participation").

A wide spectrum of reasons may explain why a sizeable portion of the population cannot or chooses not to seek work. Reasons range from individual-level characteristics, such as age, disability, or personal preference, to structural mismatches in labor demand, skill sets, and geography. As seen in **Figure A-4**, the LFPR peaked in 2000 and has generally declined since. In the years since the peak, the LFPR has decreased for most demographic groups commonly associated with working ages. From 2000 to 2015, the LFPR declined for teenagers, young adults aged 20-24, and women and men aged 25 to 54; the LFPR rose for men and women ages 55 and older.[25] Although this decrease is partly attributable to cyclical effects (e.g., economic recessions), research suggests that demographic changes (e.g., aging of the population) is also a major cause for the decrease in the LFPR.[26]

Average Hours Worked

The growth in average hours worked is another major contributor in the U.S. economy's real economic growth. Historical and projected average weekly hours worked and growth in average weekly hours worked are shown in **Figure 3** and **Figure 4**, respectively.

Figure 3 shows the historical average weekly hours worked per week in the United States, which reflects the amount of time for which participants in the paid labor force are compensated. **Figure 4** shows the annual percentage change in the average weekly hours worked per week. As seen in the figures, the average number of weekly hours worked per U.S. labor participant has generally decreased throughout the historical 1960-2017 period. For instance, the average U.S. worker was paid for about 34 hours per week in 2017, the most recent year for which data are available, whereas the average U.S. worker was paid for about 37 hours per week in 1960.

Changes in Average Weekly Hours

The decline in the average weekly hours worked is not a new or recent phenomenon. Early research pointed to changes in paid time off as the main cause for the reduction in average weekly hours worked. Specifically, researchers found that from 1947 to 1978 the amount of time allocated to workers for *paid leave* (e.g., vacation or sick leave) and *paid on-premise time* (e.g., breaks or travel time) increased. The amount of paid time off during this period almost doubled, from 5.4% of paid time hours in 1947 to 10.6% of paid time off hours in 1978.[27] In the succeeding years, Congress approved measures that could increase the amount of paid time off for workers. As examples, Congress enacted legislation in 1983 commemorating Martin Luther

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[25] Hipple, "Labor Force Participation."

[26] Estimates suggest that somewhere between one-half to two-thirds of the decrease in the labor force participation rate (LFPR) since 2007 can be attributed to an aging population. A paper by the Council of Economic Advisers found that approximately one-half of the decrease in the LFPR was due to an aging population (see Council of Economic Advisers, *The Labor Force Participation Rate Since 2007: Causes and Policy Implications*, July 2014, p. 3, at https://obamawhitehouse.archives.gov/sites/default/files/docs/labor_force_participation_report.pdf), whereas other research puts the estimate as high as two-thirds (see William R. Cline and Jared Nolan, *Demographic versus Cyclical Influences on US Labor Force Participation*, Peterson Institute for International Economics, Working Paper no. 14-4, July 2014, p. 5, at https://www.piie.com/publications/wp/wp14-4.pdf). Research published by the Federal Reserve Bank of Chicago also found that about half of the decline in LFPR could be explained by demographic factors. Additionally, this research showed that the effects on LFPR differ when analyzed by demographic group, such as gender and education (see Daniel Aaronson and Jonathan Davis, "Explaining the decline in U.S. labor force participation rate," March 2012, at https://www.chicagofed.org/publications/chicago-fed-letter/2012/march-296).

[27] Herbert R. Northrup and Theresa Diss Greis, "The Decline in Average Annual Hours Worked in the United States, 1947-1979," *Journal of Labor Research*, vol. IV, no. 2 (Spring 1983), p. 103.

King Jr.'s birthday to create a federal holiday,[28] and the Family and Medical Leave Act of 1993 (as amended, P.L. 103-3) guaranteed unpaid leave for eligible employees for certain family and medical needs.[29] Additionally, several states also have enacted paid family leave plans. Though the plans are relatively new, the general result is the option for eligible employees to access partially or fully compensated leave for caregiving needs such as childcare.[30]

Changes in the age composition of the workforce may also explain a portion of the decrease in U.S. laborers' average weekly hours worked. A study looking at U.S. Census data from 1950 through 2000 showed that average weekly hours worked per person was highest for those aged 25 to 54.[31] Therefore, an increase in the number of workers at the prime working age relative to other ages is likely to increase the average weekly hours worked by the overall workforce. This may help to explain why average weekly hours worked increased in the 1990s, when an influx of baby boomers fully entered the workforce, but declined 5% from 1950 to 2000. The large number of baby boomers would have heavily influenced average hours, which is essentially an average of hours worked weighted by the different age groups of the paid labor force. From 1900 to 2005 the average hours worked by those in prime working ages (25 to 54) remained relatively stable but declined for other age groups.[32] Time spent not working was replaced with an increase in school hours for young workers (aged 14 to 24) and an increase in leisure hours for older workers (aged 55 and older).[33]

A change in the composition of labor demand may also explain the decreasing trend in average hours worked per week. Since 1950, the growth in service-providing jobs has outpaced the growth in goods-producing (i.e., manufacturing) jobs. In 1950, for example, service-providing jobs accounted for 63% of total nonfarm employment, whereas service-providing jobs accounted for 86% of total nonfarm employment in 2019.[34] Research showed that from 1972 to 1999, the service-providing sector divisions that have experienced the largest increase in employment also showed the lowest average in weekly hours worked.[35] Employment figures from 2008 through 2019 confirmed that employment growth in the service-providing sector—the largest sector in U.S. employment—was still outpacing that of the goods-producing sector.[36] Over this period, the

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[28] P.L. 98-144.

[29] For more information on the Family and Medical Leave Act, see CRS In Focus IF10329, *The Family and Medical Leave Act (FMLA)*.

[30] Paid family leave plans vary by state; for more information on paid family leave plans, see CRS Report R44835, *Paid Family and Medical Leave in the United States*.

[31] Ellen R. McGrattan and Richard Rogerson, "Changes in Hours Worked, 1950-2000," *Federal Reserve Bank of Minneapolis Quarterly Review*, vol. 28, no. 1 (July 2004), pp. 23-27. This result corresponds to what many refer to as the *prime working age*, ages 25-54. Individuals of this age range are likely to have finished formal education and be not yet approaching retirement. See Rob Valletta and Nathaniel Barlow, *The Prime-Age Workforce and Labor Market Polarization*, Federal Reserve Bank of San Francisco, September 10, 2018, at https://www.frbsf.org/economic-research/files/el2018-21.pdf.

[32] Valerie A. Ramey and Neville Francis, "A Century of Work and Leisure," *American Economic Journal: Macroeconomics*, vol. 1, no. 2 (July 2009), pp. 190-191 (hereinafter cited as Ramey and Francis, "Century of Work and Leisure").

[33] Ramey and Francis, "Century of Work and Leisure."

[34] BLS, "Current Employment Statistics – CES (National)," at https://www.bls.gov/ces/ (hereinafter cited as BLS, "CES National").

[35] Katie Kirkland, BLS, "On the decline in average weekly hours worked," *Monthly Labor Review*, July 2000, p. 27.

[36] BLS, "Employment by major industry sector," at https://www.bls.gov/emp/tables/employment-by-major-industry-sector.htm.

average hours worked per worker in the service-providing sector remained unchanged at an average 33.3 hours per week.[37]

Figure 3 and **Figure 4** show how the Board of Trustees assumes average weekly hours worked will change over their 75-year projection period. As evidenced by most observations appearing below the 0.0% line in **Figure 4**, the trustees expect average weekly hours worked to continue to decrease throughout the projection period, albeit at a relatively slow rate.

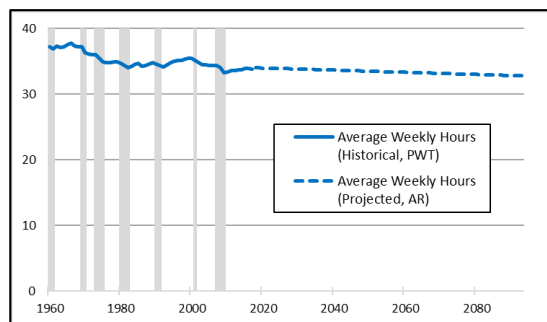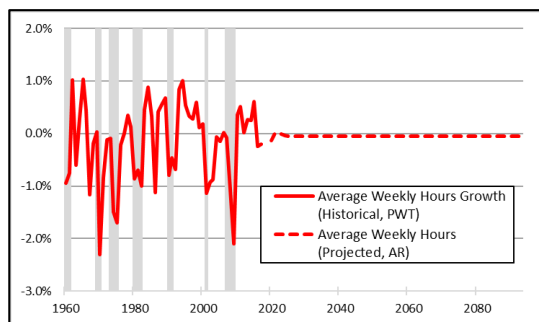| Figure 3. Historical and Projected Average Weekly Hours	Figure 4. Historical and Projected Growth in Average Weekly Hours
(in hours)	(annual percentage change)

Sources: CRS, from data provided in the 2020 Annual Report (AR), Table V.B1, at https://www.ssa.gov/OACT/TR/2020/tr2020.pdf; Robert C. Feenstra, Robert Inklaar, and Marcel P. Timmer, "The Next Generation of the Penn World Table," *American Economic Review*, vol. 105, no. 10 (October 2015), at https://www.aeaweb.org/articles?id=10.1257/aer.20130954.

Notes: The Penn World Table (PWT) is used for historical data, and projections are based on the Board of Trustees' intermediate assumptions in the 2020 AR. Assumptions for the projection period reflect the trustees' understanding of the OASDI program at the start of 2020; thus, it does not include potential effects of Coronavirus Disease 2019 (COVID-19). Shaded areas represent a year in which a recession occurred, as designated by the National Bureau of Economic Research.

Aggregate Hours Worked

The total employment in the U.S. economy represents the amount of labor employed in the production of goods and services. The average hours worked per week in the U.S. economy represents the effective usage rate for the labor. When the total employment is multiplied by the average weekly hours worked, the product is the aggregate hours worked in the entire economy per week. As shown in **Figure 2** and **Figure 4**, the annual percentage change, or growth rate, for total employment and average weekly hours worked is projected to be relatively stable throughout the 75-year projection period. Consequently, the number of aggregate weekly hours worked in the economy is projected to stable as well.

Projections for the future of the labor force necessarily incorporate projections for the role of technological advancement and automation. There is considerable debate as to the effects of automation on the supply or demand for paid labor. On one hand, some argue that automation will eventually *displace* labor. On the other hand, some argue that automation displaces some labor while it creates the need for labor elsewhere, or *reinstates* paid labor. That is, automation serves as both a substitute for labor and a complement to labor. The former results in a decrease in the

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[37] BLS, "CES National."

demand for labor, whereas the latter can result in an increase in the demand for labor.[38] This possible increase helps to explain why past advancements in automation (e.g., the industrial revolution) did not result in sustained unemployment.[39]

Generally, past advances in automation have helped to improve the efficiency of labor, not replace labor.[40] Advances in automation technologies, however, are specifically designed to replace labor, not to augment it (e.g., multipurpose machines such as industrial robots that are automatically controlled and reprogrammable).[41] Whereas past improvements in automation served to complement human labor and increase productivity, allowing the combination of humans and automation to produce more per hour of work, new automation (e.g., industrial robots) serves as a substitute for human labor, allowing for equal or greater productivity with a decrease in human labor. One study has shown that the introduction of industrial robots into the U.S. labor market has led to a reduction in the overall employment-to-population ratio and a reduction in overall wages.[42]

Workers in goods-producing sectors experience comparatively larger average drops in aggregate weekly hours worked during recessions than those in the service-providing sector, but the decline in aggregate weekly hours worked for service-providing workers has sharpened over the last several recessions. For instance, the average weekly hours in the service-providing sector decreased by 1.2% in the 2007-2009 recession versus a decrease of 0.3% in the 1990-1991 recession.[43] Although more research is needed to determine if this is a trend, future economic downturns could nevertheless exacerbate this decline considering the service-providing sector has seen the majority of U.S. job growth.[44]

Productivity

The growth in total factor productivity is another major determinant in the U.S. economy's real economic growth. Total factor productivity, or multifactor productivity, is the efficiency at which measured inputs are utilized in producing output of goods and services, measured as output per unit of *combined input*.[45] The historical and projected total factor productivity index and its growth rate can be seen in **Figure 5** and **Figure 6**, respectively.

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[38] David H. Autor, "Why Are There Still So Many Jobs? The History and Future of Workplace Automation," *Journal of Economic Perspectives*, vol. 29, no. 3 (Summer 2015), p. 5.

[39] Ben Vermeulen, Jan Kesselhut, and Andreas Pyka et al., "The Impact of Automation on Employment: Just the Usual Structural Change?," *Sustainability*, vol. 10, no. 1661 (May 2018), p. 2.

[40] Daron Acemoglu and Pascual Restrepo, *The Wrong Kind of AI? Artificial Intelligence and the Future of Labor Demand*, National Bureau of Economic Research (NBER), Working Paper no. 25682, March 2019, p. 3, at https://www.nber.org/papers/w25682.pdf.

[41] Daron Acemoglu and Pascual Restrepo, *Robots and Jobs: Evidence From US Labor Markets*, NBER, Working Paper no. 23285, March 2017, p. 2, at https://www.nber.org/papers/w23285.pdf (hereinafter cited as Acemoglu and Restrepo, *Robots and Jobs*).

[42] Acemoglu and Restrepo, *Robots and Jobs*, pp. 4-5. The employment-to-population ratio, an alternative measure of labor market strength, is the ratio of total civilian employment to the civilian noninstitutional population. For more information on this ratio, see CRS Report R44055, *An Overview of the Employment-Population Ratio*.

[43] Steven Kroll, "The decline in work hours during the 2007-2009 recession," *Monthly Labor Review*, April 2011, pp. 56-57.

[44] For more information on the growth of the service-providing sector, see CRS Report R45330, *Labor Market Patterns Since 2007*.

[45] Combined inputs, such as labor and capital, are used directly to produce output. BLS, Office of Productivity & Technology, "Productivity Glossary," at https://www.bls.gov/mfp/optglossary.htm.

Productivity is generally cyclical, exhibiting higher growth during periods of increasing economic output (e.g., expansions) and exhibiting negative growth during periods of decreasing economic output (e.g., recessions).[46] On average, productivity grew in the 1960 to 2019 period, averaging an annual growth of 1.76%. From 1960 through 1976, the growth rate in total factor productivity averaged 2.44% annually. Military-related research and technological advancements during World War II are largely cited as causes for the long-term average growth rate during this period.[47] Productivity demonstrated a marked slowdown from 1977 through 1995 (average annual growth of 1.28%). Productivity then increased for the 1996 through 2005 period (average annual growth of 2.50%), attributable to many high-tech innovations from the 1970s and 1980s (e.g. fiber optics, personal computers, internet).[48]

As **Figure 6** shows, total factor productivity growth has averaged 1.06% since 2005. This below-trend productivity growth, or missing productivity, is commonly referred to as the *productivity puzzle*. **Figure 5** and **Figure 6** also show projections for future productivity growth. These projections assume that growth in the long-run total factor productivity will average 1.63%, which is closer to the historical long-run average of 1.76% and above the post-2005 average of 1.06%.

Figure 5. Historical and Projected Total Factor Productivity Index
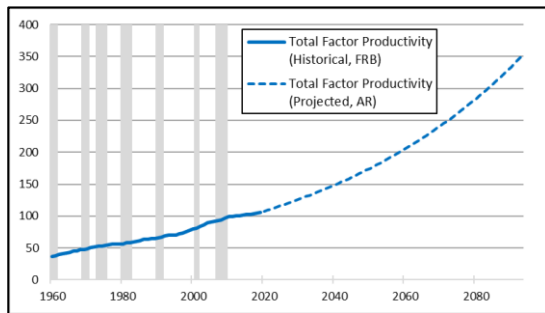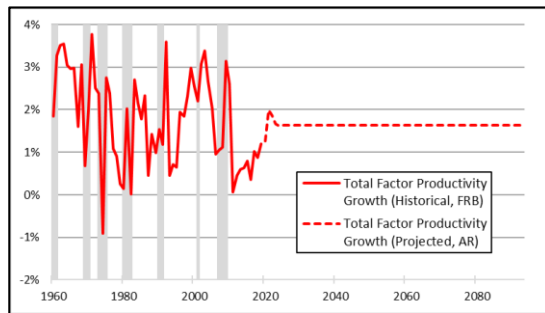
(index, 2012=100)

Figure 6. Historical and Projected Growth in Total Factor Productivity

(annual percentage change)

Sources: CRS, from data provided by Federal Reserve Bank (FRB) of St. Louis at https://fred.stlouisfed.org/; 2020 Annual Report (AR), Table V.B1, at https://www.ssa.gov/OACT/TR/2020/tr2020.pdf.

Notes: Projections based on the Board of Trustees' intermediate assumptions in the 2020 AR. Assumptions for the projection period reflect the trustees' understanding of the OASDI program at the start of 2020; thus, it does not include potential effects of Coronavirus Disease 2019 (COVID-19). Shaded areas represent a year in which a recession occurred, as designated by the National Bureau of Economic Research.

The Productivity Puzzle

Research has suggested many reasons for why productivity growth slows from its long-run average, including arguments that productivity slowdowns

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[46] Michael Chernousov, Susan E. Fleck, and John Glaser, "Productivity trends in business cycles: a visual essay," *Monthly Labor Review*, June 2009, p. 50.

[47] Roger W. Ferguson Jr. and William L. Wascher, "Distinguished Lecture on Economics in Government: Lessons from Past Productivity Booms," *The Journal of Economic Perspectives*, vol. 18, no. 2 (Spring 2004), p. 9 (hereinafter cited as Ferguson Jr. and Wascher, "Distinguished Lecture on Economics in Government").

[48] Ferguson Jr. and Wascher, "Distinguished Lecture on Economics in Government," p. 11.

- result from financial imbalances (e.g., overvalued equity prices and resulting corrections) and overinvestment into a specific sector (e.g., telecommunications);
- are associated with exogenous disruptions (e.g., oil shocks, banking crises);[49] or
- are a natural result of productivity growth levelling off after periods of high rates of innovation and technological change.[50]

This last argument contends that some innovations are more important for economic growth than others. For instance, innovations in electricity, the internal combustion engine, and transportation were widely applicable across industries and resulted in large productivity gains throughout the 1970s. These innovations were general purpose, whereas many innovations after the 1970s were narrower (e.g., information technology) in their application and resulted in smaller productivity gains.[51]

Productivity growth remains below its long-run average even with the adoption of numerous sophisticated technologies.[52] Decreases in new general purpose technologies lead many economists to conclude that productivity growth will be slower than its long-run average even though levels of technology remain high.[53]

Labor Productivity and Real Earnings

Productivity is also measured by *labor productivity*—the ratio of total economic output, adjusted for price changes, to the total number of hours worked.[54] Increases in labor productivity provide employers the means to raise wages. That is, productivity and wages are closely linked.

Since the 1970s, the trends in labor productivity and real (after-inflation)

Figure 7. Labor Productivity and Real Earnings
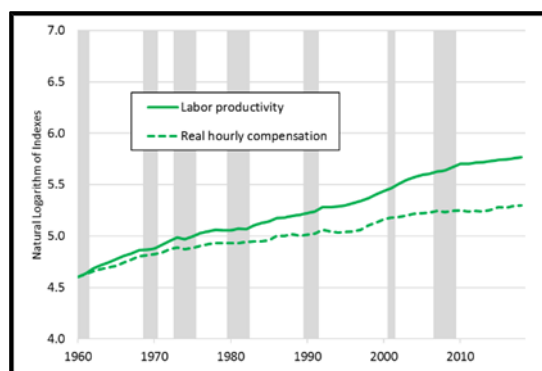
Source: CRS, from data provided by the Bureau of Labor Statistics.

Notes: Shaded areas represent a year in which a recession occurred, as designated by the National Bureau of Economic Research.

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[49] Ferguson Jr. and Wascher, "Distinguished Lecture on Economics in Government," pp. 19-21.

[50] Ferguson Jr. and Wascher, "Distinguished Lecture on Economics in Government," pp. 19-21.

[51] Robert J. Gordon, "The Ascent and Descent of Growth," in *The Rise and Fall of American Growth: The U.S. Standard of Living Since the Civil War* (Princeton, NJ: Princeton University Press, 2016), pp. 2-7.

[52] Daron Acemoglu and Pascual Restrepo, *Artificial Intelligence, Automation, and Work*, NBER, Working Paper no. 24196, January 2018, p. 13, at https://www.nber.org/papers/w24196.pdf.

[53] Dale W. Jorgenson, Mun S. Ho, and Jon D. Samuels, *Education, Participation, and the Revival of U.S. Economic Growth*, NBER, Working Paper no. 22453, July 2016, p. 3, at https://www.nber.org/papers/w22453.pdf. The economist Robert Gordon posited additional reasons why U.S. future productivity—and overall economic growth—will remain slow, including changing demographics, rising inequality, globalization, global warming, and rising household and government deficits. See Robert J. Gordon, *Is U.S. Growth Over? Faltering Innovation Confronts the Six Headwinds*, NBER, Working Paper no. 18315, August 2012, pp. 18-19, at https://www.nber.org/papers/w18315.pdf.

[54] Susan Fleck, John Glaser, and Shawn Sprague, "The Compensation-Productivity Gap: A Visual Essay," *Monthly Labor Review*, January 2011, p. 59 (hereinafter cited as Fleck, Glaser, and Sprague, "Compensation-Productivity

earnings have diverged (**Figure 7**).[55] Economists generally cite two factors for the increasing gap between productivity and real earnings. First, productivity is indexed using the implicit price deflator, whereas earnings are indexed using the Consumer Price Index (CPI).[56] In recent decades, the CPI has grown faster than the implicit price deflator.[57] Indexing generally allows the comparison of factors across time by accounting for changes in price (i.e., inflation). The fact that labor productivity and real hourly compensation are indexed using different measures accounts for some divergence between the two. Second, the *labor share* of income—the portion of economic output that employers spend on workers' earnings—has generally declined since 1980.[58] This result has affected income for the Social Security program. Had workers real earnings kept pace with gains in labor productivity, the resulting increase in real hourly compensation would have increased the program's revenue and increased future benefits.

Real Economic Output

The total value of an economy's output is measured by *GDP*, defined as the total value of all goods and services produced by a nation's economy.[59] **Figure 8** shows real economic output for the United States. As seen, the U.S. economy is generally expanding but periods of recessions may result in periods of decreased real output, or contraction. For any given period, real GDP is approximately equal to the product of total employment, average hours worked, and total factor productivity in that period. Thus, the growth rate in real GDP is approximately equal to the sum of the growth rates for total employment, average hours worked, and productivity.[60]

That is, if the annual percentage changes—growth rates—shown in **Figure 2**, **Figure 4**, and **Figure 6** were summed, the sum would equal the real economic growth rates shown in **Figure 9**. The figures below also show the projections for real economic output and real economic growth.

Gap").

[55] Fleck, Glaser, and Sprague, "Compensation-Productivity Gap," p. 57.

[56] The implicit price deflator, or gross domestic product (GDP) price deflator, is a measure of inflation in the prices of goods and services produced in the United Sates, including exports. See Bureau of Economic Analysis, "GDP Price Deflator," at https://www.bea.gov/data/prices-inflation/gdp-price-deflator.

[57] Fleck, Glaser, and Sprague, "Compensation-Productivity Gap," p. 60.

[58] Fleck, Glaser, and Sprague, "Compensation-Productivity Gap," p. 63.

[59] For more information on GDP, see CRS In Focus IF10408, *Introduction to U.S. Economy: GDP and Economic Growth*.

[60] Board of Trustees, *2020 Annual Report*, p. 111.

Figure 8. Historical and Projected Real Gross Domestic Product (GDP)
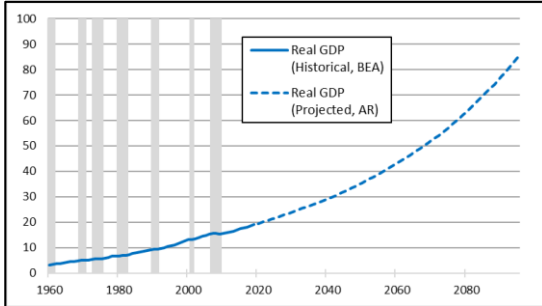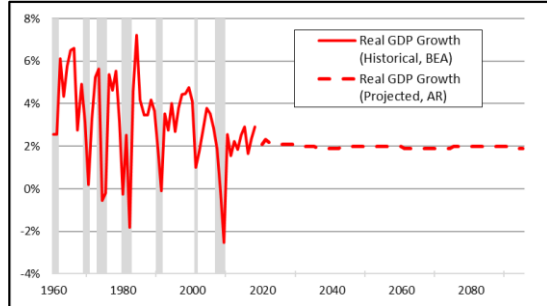
(in trillions, chained 2012 dollars)

Figure 9. Historical and Projected Growth in Real GDP

(annual percentage change)

Source: CRS, from data provided in the 2020 Annual Report (AR), Table V.B2, at https://www.ssa.gov/OACT/TR/2020/tr2020.pdf; Bureau of Economic Analysis (BEA), *Real Gross Domestic Product*; Federal Reserve Economic Data, at https://fred.stlouisfed.org.

Notes: The BEA is used for historical data; projections are based on the Board of Trustees' intermediate assumptions in the 2020 AR. Assumptions for the projection period reflect the trustees' understanding of the OASDI program at the start of 2020; thus, it does not include potential effects of Coronavirus Disease 2019 (COVID-19). Shaded areas represent a year in which a recession occurred, as designated by the National Bureau of Economic Research.

Table 1 shows the average annual growth rates for real GDP grouped by economic or business cycle.[61] For instance, the U.S. economy experienced positive real GDP growth from 1973 to 1979. The economy experienced a recession, or contraction, in 1979 but recovered and experienced another period of sustained growth until 1990. **Table 1** also shows the average annual growth rates for the factors of real GDP grouped by the economic cycles. The U.S. economy demonstrated its highest average annual growth rate during its 1969 to 1973 expansion, averaging an annual growth in real GDP of 3.6%. Since then, the average annual growth rates in GDP have generally decreased. As discussed, growth rates in total employment and average hours worked have contributed to this slowdown in economic growth. To the extent that these contributing factors show slow growth, and total factor productivity remains below its long-term trend, overall real economic growth will demonstrate slow growth rates as well.

Table 1 also shows the trustees' projections for future economic growth. The trustees project annual average growth in real economic output to be 2.0% throughout the projection period. This forecast matched the Congressional Budget Office's (CBO's) projection for growth for 2020 that was published in January 2020. At the time, CBO assumed persistent low growth in total factor productivity would lead to a further slowdown in overall growth and projected average annual growth in GDP to be 1.7% for 2021 through 2030.[62]

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[61] For more information on the economic or business cycle, see CRS In Focus IF10411, *Introduction to U.S. Economy: The Business Cycle and Growth*.

[62] See CBO, "10-Year Economic Projections," *Budget and Economic Data (January 2020)*, at https://www.cbo.gov/about/products/budget-economic-data. In May 2020, CBO released new economic projections that accounts for changes in economic activity due to COVID-19.

Table 1. Historical and Projected Real Growth and Determinants of Growth Rates

(average annual percentage change)

Year(s)[a]	Total Employment	Average Hours Worked	Productivity	Real GDP
Historical Economic Cycles				
1969-1973	1.8	-0.87	2.65	3.6
1973-1979	2.4	-0.54	1.07	3.0
1979-1990	1.7	-0.10	1.41	3.0
1990-2001	1.2	0.10	1.85	3.2
2001-2007	1.1	-0.50	2.19	2.8
2007-2019 (ongoing)[b]	0.6	-0.01	1.07	1,7
Projections[c]				
2020-2093 (intermediate)	0.4	-0.05	1.63	2.0
2020-2093 (low-cost)	0.6	0.05	1.94	2.7
2020-2093 (high-cost)	0.2	-0.15	1.33	1.3

Source: Congressional Research Service (CRS), from data provided in the 2020 Annual Report, Tables V.B1 and V.B2, at https://www.ssa.gov/OACT/TR/2020/tr2020.pdf.

Notes: Figures may not sum to total due to rounding. The annual percentage change in real gross domestic product (GDP), or real GDP growth, is the sum of the annual percentage changes in total employment, average hours worked, and total factor productivity.

a. The economic cycles are measured from peak to peak. For instance, the 1969-1973 economic cycle is measured from its beginning peak in 1969 to its ending peak in 1973; the subsequent cycle began in 1973 and ended with the next peak in 1979.

b. At the end of 2019, the economic expansion that began in 2007 (as measured from the peak of the most previous complete economic cycle) was ongoing.

c. The Board of Trustees presents three alternative (intermediate, low-cost, and high-cost) sets of assumptions for demographic, economic, and program-specific factors. The intermediate set of assumptions represent the trustees' best estimates of likely future conditions. Assumptions for the projection period reflect the trustees' understanding of the OASDI program at the start of 2020; thus, it does not include potential effects of Coronavirus Disease 2019 (COVID-19).

Productivity, Demographics, and Growth

The U.S. population has been experiencing a shift in age structure toward older ages and an increase in the median age, termed *demographic aging*.[63] Decreasing fertility and increasing life expectancy are the main factors for this demographic trend. On one hand, increased life expectancy would indicate a longer period in retirement, thus a lower LFPR. On the other hand, increasing life expectancy would indicate an increasing supply of labor as people live longer and need to save more for retirement. Most research has supported the former interpretation— demographic aging leads to an overall downward trend in labor force participation.[64] As

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[63] CRS Report R45990, *Social Security: Demographic Trends and the Funding Shortfall*.

[64] Loretta J. Mester, "Demographics and Their Implications for the Economy and Policy," speech given at the Cato

discussed, a decrease in the supply of labor, or total employment, would have negative implications for economic growth.

Demographic aging may also affect productivity. Although some slowdown in productivity (see **Figure 5** and **Figure 6**) may be cyclical, research suggests demographic aging affects this slowdown. Data indicate that productivity increases when a worker enters the workforce, then it stabilizes, and then it declines as a worker nears retirement.[65] It is possible then that *individual* productivity has not changed, but the changes in the workforce's age structure have changed *overall* productivity.

Potential Economic Output

Potential Impact of Coronavirus Disease 2019 (COVID-19)

The 2020 Annual Report reflects the trustees' understanding of the program's financial status at the start of 2020. That is, "the report does not reflect the potential effects of the COVID-19 pandemic on the Social Security or Medicare programs."[66]

A variety of factors stemming from COVID-19 may have economic repercussions that affect the program's financial status. For instance, a decrease in payroll tax revenues resulting from lower-than-expected employment or an increase in costs resulting from higher-than-expected beneficiaries would result in depletion of trust fund asset reserves sooner than as projected under the trustees' assumptions reflected in the 2020 report. Alternatively, higher-than-expected revenues or lower-than-expected costs could delay the projected date of the trust fund depletion.

Neither the short-range CBO projection nor the long-range trustees' projection for real economic growth include a projected economic contraction.[67] Both projections assume growth rates below the long-term average, but the growth rates are still positive. Regardless of how likely an economic contraction might be, much of the research since the 2007-2009 financial crisis suggests that deep contractions may exhibit long-lasting and negative impacts on an economy's *potential output*.

Potential output, or potential GDP, is an economy's normal level of production given its resources and technology.[68] Once a recession ends, the economy is expected to return to pre-contraction levels. Deep recessions, such as the 2007-2009 financial crisis, can lead to a persistent decrease in potential output: "Potential output falls because a recession reduces capital accumulation, leaves scars on workers who lose their jobs, and disrupts the economic activities that produce technological progress."[69] Said differently, a level of potential GDP would no longer be possible due to the potential continued impact of a deep recession. Thus, were real economic growth to

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Institute's 35th Annual Monetary Conference: The Future of Monetary Policy, Washington, DC, November 16, 2017, p. 4, at https://www.clevelandfed.org/en/newsroom-and-events/speeches/sp-20171116-demographics-and-their-implications-for-the-economy-and-policy.aspx (hereinafter cited as Mester, "Demographics and Their Implications for Economy and Policy").

[65] Mester, "Demographics and Their Implications for Economy and Policy," p. 6.

[66] Board of Trustees, *2020 Annual Report,* p. 1.

[67] In other words, the projections assume future GDP is always at potential. The trustees' high-cost assumption includes an assumed recession. Under the high-cost set of assumptions, all economic, demographic, and program-specific factors are assumed to be high-cost. That is, the effects of slower economic growth is not isolated from other high-cost assumptions. Board of Trustees, *2020 Annual Report*, p. 18.

[68] Laurence M. Ball, *Long-Term Damage From the Great Recession in OECD Countries*, NBER, Working Paper no. 20185, May 2014, p. 1, at https://www.nber.org/papers/w20185.pdf (hereinafter cited as Ball, "Long-Term Damage from Great Recession").

[69] Ball, "Long-Term Damage from Great Recession," p. 1.

unfold in a manner similar to CBO's or the trustees' projections, any decrease in actual growth could shift the future path of output to a lower level.

The Trust Funds and Economic Growth

The "Current Status of the Trust Funds" section of this report discusses how the Social Security program is projected to have funds necessary to pay full scheduled benefits until sometime in 2035. Once the trust funds assets are depleted, the programs' payments will depend on ongoing tax revenues (i.e., the depletion of asset reserves does not mean Social Security will be completely broke and unable to pay benefits).[70]

As part of their annual report, the trustees publish sensitivity analyses for several of their assumptions. These analyses allow the effects of a change in one assumption to be captured and its effects on the trust funds to be ascertained,[71] allowing policymakers to understand that not all economic growth factors would affect the program's finances to the same extent. For example, an increase in real economic growth resulting from an increase in the labor force does not necessarily have the same impact on the program's finances as a similar-sized increase in real earnings. In analyzing the effects of economic growth on the program's finances, it is helpful to determine the source of the growth that generated the change (e.g., change in total employment versus changes in productivity or real earnings).

Changes in the Size of the Labor Force

As discussed earlier, total employment is a factor in economic growth. It follows then that an increase in total employment would have a positive effect on economic growth. As discussed, population size is the most significant factor in determining the long-term size of the labor force. An increase in the labor force would have a positive effect on economic growth and the trust funds. In their *2020 Annual Report*, the trustees provide sensitivity analyses for two demographic factors—*total fertility rate* (TFR) and *total net immigration* (TNI)—that affect the size of the labor force and how changes in those demographic factors would affect the financial status of the trust funds.

Total Fertility Rate

The TFR is the average number of children that would be born to a woman throughout her lifetime if she were to experience, at each age of her life, the birth rate observed in that year.[72] The size of the labor force could be increased, with about a two decade lag, were the TFR in the United States to increase, all else equal. That is, an increase in the TFR would result in more people, such that were the LFPR (see **Figure A-4**) to remain relatively stable, more people would

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[70] For more information on the level of scheduled benefits payable should the trust fund assets become depleted, see CRS Report RL33514, *Social Security: What Would Happen If the Trust Funds Ran Out?*.

[71] The discussed examples—changes in labor force (i.e., fertility and immigration) and real wage growth (i.e., productivity)—demonstrate the changes in the financial status of the Social Security program given the singular effects of one factor of growth. They do not, however, demonstrate the possible combined effects if more than one factor of growth were to change at the same time. The definition of real economic growth (see "Components of Real Economic Growth"), indicates that changes in one factor of growth would have a multiplicative effect on overall growth and an additive effect on growth rates.

[72] Samuel H. Preston, Patrick Heuveline, and Michel Guillot, *Demography: Measuring and Modeling Population Processes* (Malden, MA: Blackwell Publishers, 2001), p. 95.

be available for work. As discussed, an increase in the number of workers, and a subsequent increase in employment, would result in an increase in real economic output.

The trustees' intermediate assumption for the long-range TFR is 1.95, 15% higher than the estimated TFR observed in 2019.[73] With this assumption, and their other intermediate assumptions, the trustees project a long-range actuarial balance of -3.21% of taxable payroll (**Table 2**) and a projected trust fund reserve depletion date of 2035. **Table 2** also gives the projected actuarial balance and trust fund reserve depletion date under different assumptions for a future TFR. Under an assumption for a TFR of 2.15—approximately 28% higher than the estimated TFR observed in 2019—the trustees project an actuarial balance of -2.79% of taxable payroll and a projected trust fund reserve depletion date of 2035. **Table 2** shows that although an increase in the TFR would result in a stronger financial position (i.e., smaller actuarial deficit), the trust funds' reserves are still projected to deplete in 2035. The trustees estimate that each increase of 0.1 in the TFR would increase the long-range actuarial balance by roughly 0.22% of taxable payroll.[74] Said differently, each increase of 0.1 in the TFR would decrease the actuarial deficit by 0.22% of taxable payroll. Thus, it follows that the long-range assumption for the TFR would need to increase by about 1.46, from 1.95 to 3.41, to eliminate the projected financial shortfall. The United States last experienced a TFR of 3.4 or higher in 1962 (see **Figure A-2**).

Table 2. Total Fertility Rate and Projected Financial Measures

(% of taxable payroll)

	Total Fertility Rate (TFR)		
	1.75[a]	1.95[b]	2.15[c]
Summarized Income Rate (2020-2094)	13.89	13.85	13.80
Summarized Cost Rate (2020-2094)	17.55	17.06	16.59
Actuarial Balance (Income less Cost; 2020-2094)	-3.66	-3.21	-2.79
Year of OASDI Trust Fund Reserve Depletion	2035	2035	2035

Source: CRS, from data provided in the 2020 Annual Report, Tables VI.D1, at https://www.ssa.gov/OACT/TR/2020/tr2020.pdf.

Notes: The TFR for a year is defined as the average number of children that would be born to a woman in her lifetime, at each age of her life, if she were to experience the birth rate observed for a specified year. OASDI = Old-Age, Survivors, and Disability Insurance.

a. A TFR of 1.75 is the trustees' high-cost assumption for the 75-year projection period. From the standpoint of the program's finances, this assumption would be the most unfavorable

b. A TFR of 1.95 is the trustees' intermediate assumption for the 75-year projection period. From the standpoint of the program's finances, this assumption represents the trustees' best guess of future conditions.

c. A TFR of 2.2 is the trustees' low-cost assumption for the 75-year projection period. From the standpoint of the program's finances, this assumption would be the most favorable.

Changes in the size of employment due to changes in the fertility of American women are unlikely to substantially change year-to-year. Were the TFR to differ greatly from the trustees'

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[73] Board of Trustees, *2020 Annual Report*, pp. 87-88. In each of the trustees' annual reports, the total fertility rate (TFR) for the most recent calendar year is estimated (e.g., 1.68 in 2019). The U.S. TFR has demonstrated a wide range. TFR can be affected by many factors, including social attitudes, demographic composition, economic conditions, and birth control practices. A TFR assumption of about 1.95 is close to the long-run average since 2020 end of the period resulting in the baby boom (i.e., the U.S. TFR has average 2.0 since 1964).

[74] Board of Trustees, *2020 Annual Report*, p. 181.

assumptions, it would still take time for the effects to change the total employment size and influence economic growth.

Total Net Immigration

Immigration could have a more immediate impact, as the size of the labor force could be increased with an increase in net immigration, especially if the immigrants were of working age. The total net immigration (TNI) is the sum of immigration from both *lawful permanent residency* and *other-than-lawful permanent residency*.[75] An increase in TNI would result in more people, such that were the LFPR to remain relatively stable, more people would be available for work. Similar to the TFR, an increase in workers, and a subsequent increase in employment, would result in an increase in real economic output. One difference between an increase in TNI and in the TFR is that an increase in TNI would have a more immediate effect on the number of persons available for work.

The trustees' intermediate assumption of the long-range TNI is 1,261,000 persons per year, approximately 14% lower than the estimated TNI observed in 2019.[76] The trustees' intermediate assumptions project a long-range actuarial balance of -3.21% of taxable payroll (**Table 3**) and a projected trust fund reserve depletion date of 2035. **Table 3** shows that under a higher average annual TNI—1,598,000 immigrants per year—the projected actuarial balance would be -2.96% of taxable payroll, and the projected date for trust fund reserve depletion would be 2035. That is, the program would be in a stronger financial position (i.e., smaller actuarial deficit) if an increase in immigration were to result in an increase in the size of the labor force, but the projected date for trust fund reserve depletion would not change. The trustees estimate that each increase of 100,000 in average annual TNI would improve the long-range actuarial balance by 0.08% of taxable payroll.[77] Under this assumption, it would require an increase in the average annual TNI assumption of 4.0 million immigrants, from 1.26 million to 5.27 million, to eliminate the projected financial shortfall.

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[75] Lawful permanent residency results from persons who are granted lawful permanent resident (LPR) status or those who change their status to LPR (e.g., those with legal visas but without LPR status). Other-than-lawful permanent residency results from persons not granted LPR status, such as undocumented immigrants or students with temporary visas. Board of Trustees, *2020 Annual Report*, pp. 88-89.

[76] In the 2019 Annual Report, the trustees cite two main reasons for this assumption. First, the Trump Administration has decreased the ceiling for annual refugees. Second, previous reports assumed that some people deferred immigration (i.e., other-than-lawful permanent residency immigration) due to the 2008-2009 recession. Recent immigration estimates have not supported this assumption, so the 2019 Annual Report has removed the assumption of a temporary surge in immigration. *The 2019 Annual Report of the Board of Trustees of the Federal Old-Age and Survivors Insurance and Federal Disability Insurance Trust Funds*, April 22, 2019, p. 74, at https://www.ssa.gov/OACT/TR/2019/tr2019.pdf.

[77] Board of Trustees, *2020 Annual Report*, p. 184.

Table 3. Total Net Immigration and Projected Financial Measures

(% of taxable payroll)

	Average Annual Total Net Immigration (TNI)		
	946,000[a]	1,261,000[b]	1,598,000[c]
Summarized Income Rate (2020-2094)	13.88	13.85	13.91
Summarized Cost Rate (2020-2094)	17.35	17.06	16.78
Actuarial Balance (income less cost; 2020-2094)	-3.47	-3.21	-2.96
Year of OASDI Trust Fund Reserve Depletion	2034	2035	2035

Source: CRS, from data provided in the 2020 Annual Report, Tables VI.D3, at https://www.ssa.gov/OACT/TR/2020/tr2020.pdf.

Notes: Average annual TNI is the annual total net immigration from lawful permanent residents and other-than-lawful permanent residents averaged over the 75-year projection period.

a. A TNI of 946,000 per year is the trustees' high-cost assumption for the 75-year projection period. Of the three assumptions shown in the table, this assumption would be the most unfavorable from the standpoint of the program's finances.

b. A TNI of 1,261,000 per year is the trustees' intermediate assumption for the 75-year projection period. Of the three assumptions shown in the table, this assumption represents the trustees' best guess of future conditions.

c. A TNI of 1,598,000 per year is the trustees' low-cost assumption for the 75-year projection period. Of the three assumptions shown in the table, this assumption would be the most favorable from the standpoint of the program's finances.

Changes in Real Wages

Although the *2020 Annual Report* does not include a sensitivity analysis for productivity, it does include a sensitivity analysis for real earnings growth, shown as the real-wage differential in **Table 4**. In the long run, real wage growth is largely determined by productivity growth.[78] So, assuming the usual relationship between productivity and real wages were to continue, an increase in real wages would imply an increase in productivity and increase real economic growth.

Thus, if wages increase in line with productivity gains, the effects of productivity assumptions may be gleaned from examining real (after-inflation) earnings growth.

Productivity, a key factor in real economic growth, has large implications for program finances through its effects on real earnings growth. On the program level, earnings determine the amount of payroll taxes; on the worker level, earnings determine initial benefits.[79] An increase in productivity growth, or real earnings growth, would have a positive impact on economic growth and the Social Security program's finances. Specifically, an increase in real earnings growth would lead to an increase in benefits for current and future workers but have no effect for current beneficiaries.[80] That is, an increase in real earnings growth could have an immediate positive

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[78] CBO Testimony of Douglas Holtz-Eakin, House Committee on Ways and Means, Subcommittee on Social Security, *The Role of the Economy in the Outlook for Social Security*, hearing, 109th Cong., 1st sess., June 21, 2005, p. 5, at http://www.cbo.gov/sites/default/files/cbofiles/ftpdocs/64xx/doc6492/06-21-prefunding.pdf.

[79] Payroll taxes are the largest source of program income. For more information, see CRS Report RL33028, *Social Security: The Trust Funds.*

[80] While initial benefits are determined by an individual's wages and indexed to average wage growth in the economy, subsequent benefit increases are indexed to inflation. For more information, see CRS Report R43542, *How Social*

effect on the program's financial status through increased income but not result in immediate higher costs.[81] An increase in real earnings growth would thus increase the long-range actuarial balance (i.e., smaller actuarial deficit).[82]

The trustees' intermediate assumption for real earnings growth is shown in **Table 4** as the *real-wage differential*. The real-wage differential is the difference between the annual percentage increase in average wages and the annual percentage increase in the CPI. For instance, the intermediate assumption for the long-range real-wage differential is 1.2%, indicating the trustees expect after-inflation wage growth to be 1.14%. Under these assumptions the trustees project a long-range actuarial balance of -3.21% of taxable payroll (**Table 4**) and a projected trust fund reserve depletion date of 2035. The table shows that under a higher real-wage differential (i.e., if wage growth outpaced inflation by 1.76 percentage points), the projected actuarial balance would be -2.09% of taxable payroll, and the projected date for trust fund reserve depletion would be 2037. Thus, as the real-wage differential, or real earnings, increases, it results in a stronger financial position (i.e., smaller actuarial deficit) and a later projected date for trust fund reserve depletion. The trustees estimate that each 0.1 percentage-point increase in the differential would increase the long-range actuarial balance by about 0.18% of taxable payroll.[83] Under this assumption, it would require an increase in the real wage differential of roughly 1.78 percentage points, from 1.14% to 2.92%, to eliminate the projected financial shortfall.[84] The United States has experienced real-wage differentials of this magnitude before (e.g., in 1998-1999) but not on a sustained basis. For instance, over the last five-year period (i.e., 2015 through 2019) the real-wage differential averaged 1.55%; since 1960, no five-year period has experienced a real-wage differential of at least 2.92% (the five-year period of 1996 through 2000 had a real-wage differential of 2.88%).[85] Furthermore, **Table 1** shows that of the past U.S. economic cycles, the 1969 through 1973 period resulted in the highest average annual growth in real GDP (i.e., 3.6%). The real-wage differential during this period was 1.08%.[86]

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[81] This result assumes that increases in real earnings would occur at levels subject to the Social Security payroll tax. Since 1983, the aggregate amount of earning subject to the payroll tax has declined (see *Ratio of OASDI Taxable Payroll to Covered Earnings*, at https://www.ssa.gov/OACT/TR/2020/2020_Long-Range_Economic_Assumptions.pdf). For more information on the taxable earnings base, see CRS Report RL32896, *Social Security: Raising or Eliminating the Taxable Earnings Base*.

[82] Social Security Advisory Board, *2019 Technical Panel on Assumptions and Methods*, Report, September 2019, p. 63, at https://ssab.gov/Portals/0/TPAM2019/TPAM%202019%20FINAL%20REPORT_508.pdf?ver=2019-09-24-092004-910.

[83] Board of Trustees, *2020 Annual Report*, p. 185.

[84] In a 2016 analysis, the Urban Institute published the effects on the program's finances resulting from an increase in productivity that would lead to indefinite 3.4% average real economic growth (as shown in **Table 1**, the trustees project average real economic growth to be 2.1%). This would represent a real economic growth rate that has not been experienced in the U.S. economy since the 1969-1973 economic expansion. The analysis showed that such an increase in real economic growth would delay the trust fund asset reserve depletion date by about 30 years. However, according to the analysis, even an average real growth rate of 3.4% would not result in avoidance of a financial shortfall. Richard W. Johnson and Karen E. Smith, "Can economic growth really fix Social Security?," Urban Institute, February 5, 2016, at https://www.urban.org/2016-analysis/can-economic-growth-really-fix-social-security.

[85] Board of Trustees, *2020 Annual Report*, pp. 106-108.

[86] Board of Trustees, *2020 Annual Report*, p. 105.

Table 4. Real-Wage Differential and Projected Financial Measures

(% of taxable payroll)

	Real-Wage Differential		
	0.52%[a]	1.14%[b]	1.76%[c]
Summarized Income Rate (2020-2094)	14.03	13.95	13.68
Summarized Cost Rate (2020-2094)	18.39	17.06	15.77
Actuarial Balance (Income less Cost; 2020-2094)	-4.36	-3.21	-2.09
Year of OASDI Trust Fund Reserve Depletion	2033	2035	2037

Source: CRS, from data provided in the 2020 Annual Report, Tables VI.D4, at https://www.ssa.gov/OACT/TR/ 2020/tr2020.pdf.

Notes: The real-wage differential is the difference in the annual percentage increase in average wages in covered employment and the annual percentage increase in the Consumer Price Index (CPI).

a. A real-wage differential of 0.52% is the trustees' high-cost assumption for the 75-year projection period. Of the three assumptions shown in the table, this assumption would be the most unfavorable from the standpoint of the program's finances. Assuming a 2.40% increase in the CPI, the Board of Trustees' intermediate assumption for price growth, results in an average annual wage increase of 2.92% in covered employment.

b. A real-wage differential of 1.14% is the trustees' intermediate assumption for the 75-year projection period. Of the three assumptions shown in the table, this assumption represents the trustees' best guess of future conditions. Assuming a 2.40% increase in the CPI results in an average annual wage increase of 3.54% in covered employment.

c. A real-wage differential of 1.76% is the trustees' high-cost assumption for the 75-year projection period. Of the three assumptions shown in the table, this assumption would be the most favorable from the standpoint of the program's finances. Assuming a 2.40% increase in the CPI results in an average annual wage increase of 4.16% in covered employment.

Conclusion

Economic growth has a significant impact on the Social Security program's financial status and the trust funds. The financial status of the Social Security program, as measured by the combination of the actuarial deficit and the trust fund balance, indicate how long the program is able to pay full scheduled benefits. In the absence of trust fund asset reserves, the level of payable benefits is that which is able to be supported by ongoing tax revenues. The financial health of the Social Security program would respond favorably to increases in the contributors to economic growth—total employment (i.e., a combination of population growth and increase in LFPR), average hours worked, and productivity. However, given the current demographic (i.e., population aging) and economic forces (i.e., low productivity and low real wage growth) at work in the United States, it is unlikely that these factors could combine in such a manner that would result in real economic growth capable of avoiding the projected shortfall estimated under current conditions. The trustees' intermediate assumptions, their best estimates as to the program's future experience, suggest that low growth is contributing to the projected financial shortfall (the trustees' intermediate assumptions reflect their understanding of the program at the beginning of 2020 and do not reflect any potential effects of COVID-19). Although increases in real economic growth would benefit both workers and the program as a whole, these alone would not likely result in a permanent solution to the projected financial shortfall.

Appendix. Total Employment

Figure A-1. Historical and Projected U.S. Total Population

(annual percentage change)
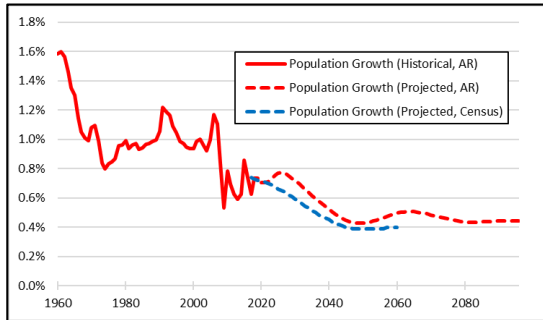
Source: Congressional Research Service (CRS), from data accompanying the 2020 Annual Report (AR), at https://www.ssa.gov/OACT/HistEst/Population/2020/Population2020.html; 2017 National Population Projections Tables, US Census Bureau, at https://www.census.gov/programs-surveys/popproj.html.

Notes: Projections based on the Board of Trustees' intermediate assumptions in the 2020 AR.

Figure A-2. Historical and Projected Total Fertility Rate (TFR)

(average number of children born)
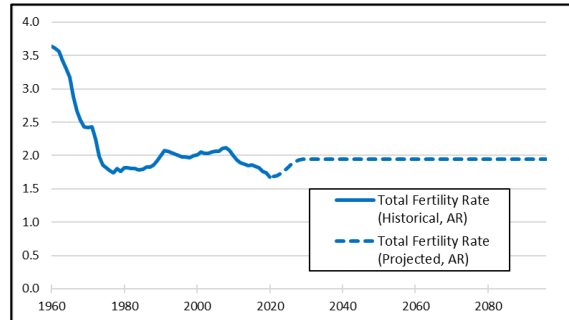
Source: CRS, from data provided in the 2020 Annual Report (AR), Table V.A1, at https://www.ssa.gov/OACT/TR/2020/tr2020.pdf.

Notes: Projections based on the Board of Trustees' intermediate assumptions in the 2020 AR. The TFR is the average number of children born to a woman if she were to experience the birth rates observed from ages 14 to 49.

Figure A-3. Historical and Projected Total Net Immigration (TNI)

(in thousands)
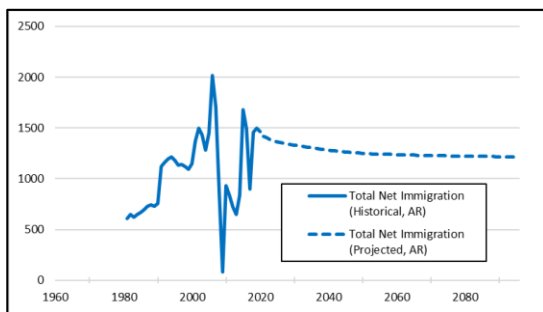
Source: CRS, from data provided in the 2020 Annual Report (AR), Table V.A2, at https://www.ssa.gov/OACT/TR/2020/tr2020.pdf.

Notes: Projections based on the Board of Trustees' intermediate assumptions in the 2020 AR. TNI includes lawful permanent residents and other-than-lawful permanent residents (e.g., undocumented immigrants).

Figure A-4. Historical Labor Force Participate Rate (LFPR)

(% of 16 and over civilian population)
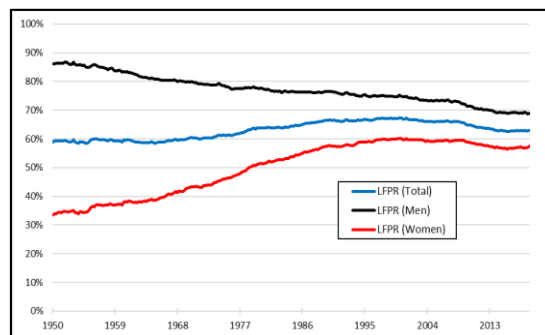
Source: CRS, from data provided by the Bureau of Labor Statistics.

Notes: The LFPR is the labor force as a percent of the civilian noninstitutional population.

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