THE LONG-RANGE ECONOMIC ASSUMPTIONS FOR THE 2025 TRUSTEES REPORT

OFFICE OF THE CHIEF ACTUARY
SOCIAL SECURITY ADMINISTRATION

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PRINCIPAL ECONOMIC ASSUMPTIONS

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OVERVIEW

Each year, the Board of Trustees of the Federal Old-Age and Survivors Insurance (OASI) and Disability Insurance (DI) Trust Funds provides an annual report to the Congress on the financial and actuarial status of the Old-Age, Survivors, and Disability Insurance (OASDI) program. For this report, the Office of the Chief Actuary (OCACT), on behalf of the Board of Trustees, projects future cost and income based on three separate sets of long-range (75-year) assumptions for key economic parameters. The intermediate (alternative II) set of assumptions represents the Trustees' best estimate for future experience, while the low cost (alternative I) and high cost (alternative III) sets of assumptions represent more and less favorable scenarios, respectively, from the perspective of program cost and income as a percent of taxable payroll. The intermediate assumptions are also used as the point of comparison for sensitivity analysis and the central tendency for the stochastic projections presented in the OASDI annual report of the Board of Trustees (the "Trustees Report").

This memorandum presents the long-range ultimate economic assumptions (generally the level, trend, or average over the last 65 years of the 75-year long-range projection period) used in the 2025 Trustees Report.

On June 8, 2020, the Business Cycle Dating Committee of the National Bureau of Economic Research determined that a peak in quarterly economic activity occurred in the fourth quarter of calendar year 2019.[1] The peak marks the end of an economic cycle, which began in the fourth quarter of calendar year 2007. Consequently, the analysis that follows includes the latest complete economic cycle ending in 2019 as well as the period since the last cycle peak (2019 to 2023). As usual, the majority of the analysis is based on long-term trends, which are not significantly affected by the most recent four years of data.

The key economic parameters include the average annual percentage changes in total-economy productivity, the Consumer Price Index for Urban Wage Earners and Clerical Workers (CPI-W), the gross domestic product (GDP) deflator, and the average OASDI covered wage, as well as the unemployment rate, the annual trust fund new-issue real interest rate, and the OASDI taxable ratio. Total-economy productivity is the ratio of real GDP to total hours worked. The OASDI taxable ratio is the share of OASDI covered earnings that is subject to the payroll tax.

[1] See https://www.nber.org/cycles/june2020.html.

Table A.1, below, lists the assumed ultimate future values for these key economic parameters in the 2025 Trustees Report alternatives I, II, and III. The only changes to these long-range assumptions from the 2024 Trustees Report are slightly lower average real growth rates in the average OASDI covered wage in alternatives I and II; all other long-range assumptions are unchanged from the 2024 Trustees Report.

Table A.1: Key Economic Assumptions and Summary Measures for the Long-Range (75-Year) Projection Period

Measure (for the last 65 years of the 75-year projection period unless otherwise stated)	2025 Trustees Report Alternative			2024 Trustees Report Alternative			2025 Trustees Report Less 2024 Trustees Report		
	I	**II**	**III**	**I**	**II**	**III**	**I**	**II**	**III**
Average Percentage Change In:									
Productivity (Total-Economy)	1.93	1.63	1.33	1.93	1.63	1.33	0.00	0.00	0.00
Prices (CPI-W)	3.00	2.40	1.80	3.00	2.40	1.80	0.00	0.00	0.00
Prices (GDP Deflator)	2.75	2.05	1.35	2.75	2.05	1.35	0.00	0.00	0.00
Average OASDI Covered Wage (adjusted for the change in CPI-W)	1.73	1.13	0.53	1.74	1.14	0.53	-0.01	-0.01	0.00
Unemployment Rate (Percent)	3.50	4.50	5.50	3.50	4.50	5.50	0.00	0.00	0.00
Annual Trust Fund New-Issue Real Interest Rate (Percent) for the Last 55 Years of the Projection Period	2.80	2.30	1.80	2.80	2.30	1.80	0.00	0.00	0.00
OASDI Taxable Ratio for the Tenth Year of the Projection Period	0.840	0.825	0.810	0.840	0.825	0.810	0.000	0.000	0.000

The remainder of this section provides brief descriptions and summary information for the key economic parameters, as well as the assumed values for alternative II.

Productivity: The rate of growth in total-economy productivity is the fundamental component contributing to the real growth rate of GDP and average earnings. OCACT uses a weighted average of the productivity growth rates in economic sectors, where the weights are the shares of each sector in total GDP. The economic sectors include the nonfarm business sector, the farm sector, the household sector, the nonprofit institutions sector, and the general government sector. In the long-range period, OCACT assumes that the sector weights will remain fixed at approximately recent levels. Based on an analysis of past data and expected future trends, the ultimate assumed growth rates for the sectors are as follows: 2.00 percent for the non-farm business sector, 2.00 percent for the farm sector, 1.63 percent for the household sector, 0.00 percent for the nonprofit sector, and 0.00 percent for the government sector. The weighted average of the assumed sector productivity growth rates is equal to the Trustees' assumed ultimate average annual rate of growth in total-economy productivity of 1.63 percent, which is the same ultimate rate used in the 2024 report.

Price Inflation: The rate of growth in the CPI-W is used to determine the cost-of-living adjustment (COLA). The average annual growth rate in the CPI-W (adjusted for past changes in computation methodology) was 3.62 percent over the last six complete economic cycles, from 1969 to 2019, and 2.20 percent over the last three complete economic cycles from 1990 to 2019.[2] OCACT expects that monetary policy will continue to target relatively low inflation, but will not be able to prevent occasional bursts of inflation caused by demand and supply shocks over the long-range period. Accordingly, the ultimate average annual percentage change in the CPI-W is assumed to be 2.4 percent, which is unchanged from the 2024 report.

The GDP deflator is another measure of price inflation. It is used in projecting the level of aggregate nominal GDP and wages and, therefore, OASDI tax revenues. The ultimate assumed long-range average annual growth rate in the GDP deflator is 2.05 percent, or 0.35 percentage point below the 2.4 percent assumed ultimate average annual growth rate in the CPI-W. The difference, or "price differential," of -0.35 percentage point is the sum of -0.3 percentage point due to computational difference and -0.05 percentage point due to coverage differences between the two indexes. The GDP deflator and the price differential assumptions are the same as those used in the 2024 report.

Average Real Growth Rate in the Average OASDI Covered Wage: Annual real wage growth varies to a small degree over the last 65 years of the 75-year projection period (i.e., from 2034 to 2099), averaging 1.13 percentage points, 0.01 percentage point less than in the 2024 report.

The Trustees assume that after the first ten years of the long-range projection period, the average annual rate of change in the average OASDI covered wage will be approximately the same as for (1) average U.S. wages and (2) average U.S. earnings (which include earnings from self-employment). The average annual real growth rate in average U.S. earnings is assumed to be 1.15 percent over the 65-year period. This reflects average annual changes of 1.63 percent for total-economy productivity, -0.35 percent for the price differential, -0.09 percent for the ratio of earnings to compensation, 0.00 percent for the ratio of compensation to GDP, and -0.05 percent for the average hours worked per week.

Unemployment Rate and Labor Force: Unemployment rates and the labor force together determine employment, which is fundamental to projecting GDP and aggregate levels of earnings and compensation. The aggregate civilian unemployment rate, adjusted to the 2020 age-sex distribution of the labor force, averaged about 5.5 percent over the last six complete economic cycles from 1969 to 2019 and 5.6 percent over the last three cycles from 1990 to 2019. As noted in prior reports, the Trustees believe that there has been a structural shift, such that the future age-sex-adjusted unemployment rates will average somewhat lower than they did over the last six complete economic cycles. Therefore, the ultimate civilian age-sex adjusted unemployment rate is assumed to be 4.5 percent, which is the same as in the 2024 report.

[2] Consecutive NBER defined peak years are used to define each economic cycle, except that OCACT uses the 1979 through 1990 period as an economic cycle. NBER identified January 1980 as a peak month, but 1979 is more representative of a peak on an annual basis. NBER also identified a peak in July of 1981. This brief 18-month economic cycle is merged to the 1981 to 1990 cycle to form the 1979 to 1990 cycle.

For the 2021 Trustees Report, OCACT updated the labor force model based on data including the latest complete economic cycle. The relationship between unemployment and labor force in the updated model is in closer alignment with the structural shift in the relationship between unemployment rates and labor force participation rates, mentioned above.

Annual Trust Fund New-Issue Real Interest Rate: The real interest rate (real effective annual yield) on the special public debt obligations issuable to the trust funds for a given year is defined as the nominal effective annual yield adjusted for the increase in the CPI-W for the first year after issue. Real ex-post (actual) interest rates on long-term Treasury securities averaged 2.43 percent over the last six economic cycles (from 1969 to 2019) and 2.28 percent over the last three complete cycles (1990-2019). However, real interest rates have been substantially lower recently, averaging just 0.85 percent for the last complete cycle (2007-2019). The extreme low recent rates appear to be due in part to slow economic growth in most of the developed world.

The assumed ultimate real interest rate for new issues is 2.3 percent, which is the same as in the 2020-2024 reports, and 0.4 percentage point lower than was assumed for the 2018 report. This ultimate assumption is consistent with a sustainable domestic fiscal policy over the long-range period and a gradual return to the sustainable rate of economic growth throughout the developed world. However, as the Trustees expect relatively low real interest rates to persist in the near future, the ultimate rate is assumed to be reached by the 20th year of the projection, rather than by the 10th year as it was for the 2023 and earlier Trustees Reports.

OASDI Taxable Ratio: The OASDI taxable ratio is the share of OASDI covered earnings that is subject to the payroll tax. It is a fundamental component of projections of taxable payroll. This ratio declined substantially between 1983 and 2000, while the decline appears to have effectively ceased since then. After reaching 82.6 percent for 2000, the ratio has been largely at or above that level. The ratio for 2020 and 2021 was low in part due to the differential effects on workers at different pay levels during the pandemic, but it has rebounded for 2022 and 2023. The ratio is assumed to reach 82.5 percent by the tenth projection year (2034 for the 2025 report), which is the same ratio assumed for the 2024 report, and remain near this level thereafter.

1. PRODUCTIVITY

THE 2025 TRUSTEES REPORT
OFFICE OF THE CHIEF ACTUARY, SOCIAL SECURITY ADMINISTRATION

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1 Productivity

1.1 Summary

For the 2025 Trustees Report, the assumed ultimate annual rates of increase in total-economy productivity are 1.93 percent, 1.63 percent, and 1.33 percent for alternatives I, II, and III, respectively, as shown in Table 1.1. These rates of increase are unchanged from those used in the 2024 Trustees Report. The assumed rates of increase for total-economy productivity are consistent with assumed ultimate annual rates of increase in nonfarm business productivity of 2.36 percent, 2.00 percent, and 1.63 percent for alternatives I, II, and III, respectively.

Table 1.1: Assumed Ultimate Annual Rates of Increase in Total-Economy Productivity

	2025 Trustees Report Alternative			2024 Trustees Report Alternative			2025 Trustees Report Less 2024 Trustees Report		
Measure	**I**	**II**	**III**	**I**	**II**	**III**	**I**	**II**	**III**
Total-Economy Productivity	1.93	1.63	1.33	1.93	1.63	1.33	0.00	0.00	0.00

Total-economy productivity is defined as the ratio of real gross domestic product (GDP) to total hours worked by all workers in the U.S. economy. The Bureau of Economic Analysis (BEA) estimates historical values for real GDP in its National Income and Product Accounts (NIPA). The Bureau of Labor Statistics (BLS) provides total hours worked based mostly on data from its Current Employment Statistics (CES) Survey.

This section is divided into four subsections. The first reviews recent BEA and BLS revisions to real GDP and total hours worked. The second decomposes total-economy productivity by major sector and analyzes differences in sector productivity growth over time. The third discusses various views in the economic literature on the possible future paths of productivity growth. A final subsection describes alternative long-run projections from private forecasters.

1.2 Recent BEA and BLS Data Revisions

BEA made a regular annual update of the NIPA data on September 26, 2024.[3] This update affected historical nominal GDP levels and real GDP growth rates back to 2019. Compared to the values published in September 2023, the estimated level of nominal GDP was revised up for this period: slightly up for 2019 through 2021, up by about 1 percent for 2022, and up by 1.3 percent for 2023. The estimated level of real GDP was also revised up for this period: slightly up for 2019 through 2021, up by 1 percent for 2022, and up by 1.3 percent for 2023. The annual *growth rate* of real GDP was revised up by 0.1 percent for 2019, up by 0.3 percent for 2021, up by 0.6 percent for 2022, and up by 0.4 percent for 2023.

Since September 2023, BLS also revised its estimates of total hours worked. For the government sector, the total hours worked were revised for 1980 and later; for the private sector, the total

[3] See https://www.bea.gov/index.php/news/2024/gross-domestic-product-third-estimate-corporate-profits-revised-estimate-and-gdp-0 and https://www.bea.gov/information-updates-national-economic-accounts.

hours worked were revised for years 2000 and later. For years prior to 2007, the revisions are generally small, with the total hours for the economy being revised by 0.1 percent or less, although the revisions to the hours in various sectors of the economy are more substantial. For years 2007 to 2022, the revisions have lowered the total hours for the U.S. economy by an average of 0.11 percent, with the reduction ranging from 0.18 percent in 2018 to 0.02 percent in 2008. These revisions resulted in a slightly higher *level* of productivity for the period since 2007 than was previously estimated.

The revisions to real GDP and total hours resulted in slightly different *growth rates* of productivity for the period 1980 to 2022. For most years between 1980 and 2006, the growth rate of the revised total-economy productivity differs from the values prior to the revisions only slightly (by less than 0.1 percentage point), due to a slightly different growth rate in total hours. For 2007 through 2019, the revised level of total-economy productivity is higher than prior to the revisions, but the growth rate of the revised total-economy productivity is lower for some years (2008, 2010, 2013, and 2015) and higher for the other years. For 2019 through 2022, the growth rate of the revised total-economy productivity is higher than prior to the revisions, mainly due to the higher revised growth rate of real GDP. For 2021, the revised growth rate of total-economy productivity is significantly higher at 1.59 percent versus 1.28 percent prior to the revisions. For 2022, the revised growth rate of total-economy productivity shows that the productivity decline was significantly less pronounced, at -0.63 percent versus -1.17 percent prior to the revisions.

1.3 Productivity Growth Rates for Major Sectors and Over Long Time Periods and Economic Cycles[4]

Table 1.2 lists the average annual rates of increase in productivity for the total economy and its major sectors over several different time periods and economic cycles.[5] The major sectors include nonfarm business, farm, households, nonprofit institutions, and general government. Listed in Table 1.3 are the assumed ultimate average annual rates of increase in productivity for the total economy and its major sectors for alternatives I, II, and III. For these ultimate assumptions, the Trustees assume that the relative size of employment by sector will generally be stable.

[4] Peaks in economic cycles roughly follow the NBER cycle dating, except for short recoveries such as 1980-1981, which are not counted as separate cycles.

[5] Historical productivity growth rates in this section are based on the published real GDP data from BEA, without the adjustments to pre-1978 data used in Sections 2 and 3. While the adjusted data are more consistent with current inflation measurement methods (see Section 2.6 for the description of the adjustments), they are available only for aggregate GDP and not by sector. Therefore, in this section unadjusted data are used for consistency between the aggregate rate of change and the rates of change in each sector. With the adjustments, the annual growth rates for years before 1978 would be about 0.1 percentage point higher.

Table 1.2: Historical Average Annual Rates of Increase in Total-Economy Productivity and Its Components (%)

	Total Economy	Nonfarm Business	Farm	Households	Nonprofit Institutions	General Government
Long-Term Historical Averages:						
1958-2023 (65 years)	1.79	2.03	3.96	4.11	0.52	0.23
1973-2023 (50 years)	1.53	1.79	3.63	3.40	0.28	0.19
1973-1998 (25 years)	1.37	1.56	4.34	3.65	0.19	0.18
1998-2023 (25 years)	1.68	2.02	2.92	3.15	0.36	0.19
By Economic Cycle:						
1969-1973	2.64	2.97	4.50	7.03	1.31	0.42
1973-1979	1.06	1.23	3.74	3.06	0.34	-0.44
1979-1990	1.40	1.48	6.05	3.23	0.32	0.71
1990-2001	1.84	2.25	4.17	6.32	-0.24	-0.26
2001-2007	2.17	2.61	3.59	0.67	0.34	0.26
2007-2019	1.20	1.50	0.71	0.57	0.81	0.14
2019-2023 (incomplete cycle)	1.76	1.86	4.34	9.38	-0.16	0.95
By Multiple Complete Cycles:						
Last Six: 1969-2019 (50 years)	1.60	1.88	3.64	3.22	0.40	0.14
Last Five: 1973-2019 (46 years)	1.51	1.78	3.57	2.90	0.32	0.12
Last Four: 1979-2019 (40 years)	1.57	1.87	3.54	2.87	0.31	0.20
Last Three: 1990-2019 (29 years)	1.64	2.01	2.61	2.73	0.31	0.01
Last Two: 2001-2019 (18 years)	1.52	1.87	1.66	0.60	0.65	0.18

Table 1.3: Ultimate Average Annual Rates of Increase in Total-Economy Productivity and Its Components for the 2025 Trustees Report

Alternative	Total Economy	Nonfarm Business	Farm	Households	Nonprofit Institutions	General Government
I	1.93	2.36	2.36	1.93	0.00	0.00
II	1.63	2.00	2.00	1.63	0.00	0.00
III	1.33	1.63	1.63	1.33	0.00	0.00

The annual growth rate in productivity generally varies from its trend growth rate over an economic cycle, assuming employers are slow to adjust labor to changes in output. Going into a

recession, the growth rate in productivity may drop below trend, as employers reduce output faster than labor. During an economic recovery, the growth rate in productivity may rise above trend, as employers increase output using their existing stock of labor. The recession that began abruptly in 2020 due to the COVID-19 pandemic is clearly an exception.

Productivity growth rates also exhibit periods of high or low growth not necessarily related to economic cycles. For example, the growth rate in total-economy productivity was 2.78 percent over the 25-year period from 1948 to 1973, 1.28 percent over the 22-year period from 1973 to 1995, 2.48 percent over the 10-year period from 1995 to 2005, and 1.30 percent over the 18-year period from 2005 to 2023. Hence, it seems reasonable to analyze productivity growth rates over longer periods, such as the 50-year period from 1973 to 2023 or a 65-year period from 1958 to 2023.[6]

Data on productivity for earlier historical periods, beyond the latest 65 years, are less useful for several reasons. First, the NIPA data are less reliable in earlier periods.[7] BEA began measuring income in the mid-1930s, and output in the early to mid-1940s.[8] It then "backcasted" both measures to 1929. According to BEA analysts, the agency did not introduce the more modern methods of sampling, collecting, and processing of data until 1948, and did not simultaneously collect and balance income and output data until the early 1950s. Consequently, it seems reasonable to limit the use of historical data to the last 65 years. Compound annual rates of growth for total-economy labor productivity for approximately the past five decades are shown in Table 1.4.

A second important consideration in the use of historical data on productivity is that a significant portion of the total historical average annual rate of increase in total-economy productivity occurred because of reallocation of employment from relatively low- to high-productivity sectors. An example of such reallocation is the shift of employment from the farm sector to other sectors of the economy. Over the 50-year period from 1973 to 2023, the ratio of agricultural to total-economy hours worked declined from about 0.037 to 0.014, and the ratio of agricultural to total nominal GDP declined from about 0.033 to 0.008. Furthermore, although farm productivity grew faster than total economy productivity over those 50 years, the average *level* of productivity for agricultural workers was lower throughout the period, and recently (in the ten years from 2014 to 2023) was still only about 44 percent of the average *level* of productivity for all workers. This reallocation of employment from the lower-productivity farm sector to other sectors of the economy with higher productivity has resulted in a higher observed total-economy productivity growth rate than what it would have been without such reallocation.

[6] Ferguson, Roger W. and William L. Wascher. "Distinguished Lecture on Economics in Government: Lessons from Past Productivity Booms," *Journal of Economic Perspectives*. Volume 18, Number 2 (Spring 2004), pp. 3-28.

[7] NIPA data for the most recent years are also less reliable, because they are subject to revisions.

[8] BEA, "GDP: One of the Great Inventions of the 20th Century," *Survey of Current Business*, January 2000, p. 7.

This reallocation complicates the consideration of historical experience. The assumed ultimate average annual rate of increase in total-economy productivity should be consistent with the average rate of increase over a long-range historical period with adjustment for differences between conditions of the past and conditions expected for the future. The average long-range historical rate of increase is elevated due to sectoral shifts in employment that are not expected to continue into the future.[9] This problem can be resolved by removing the effects of sectoral shifts in employment from the historical record or, more simply, by setting the ultimate value for the annual rate of increase in total-economy productivity to a weighted average of the expected ultimate values for the annual rate of increase in productivity for each sector. However, it is important to keep in mind that, while difficult to anticipate, there will continue to be sectoral shifts in the future.

1.3.1 Sector Productivity Growth Rates

1.3.1.1 Nonfarm Business (NFB)

The average annual growth rate in NFB productivity was 1.50 percent over the last complete economic cycle (i.e., a 12-year period from 2007 to 2019), 1.87 percent over the last two economic cycles (18-year period from 2001 to 2019), and 2.01 percent over the last three economic cycles (29-year period from 1990 to 2019).

Looking at longer periods, the average annual growth rate in NFB productivity was 1.87 percent over the last four economic cycles (40-year period from 1979 to 2019), 1.78 percent over the last five economic cycles (46-year period from 1973 to 2019), and 1.88 percent over the last six economic cycles (50-year period from 1969 to 2019). These productivity growth rates include the effects of a relatively low growth rate period from 1973 to 1995. The 1973-1995 slowdown has been attributed to a shift in employment from relatively high-productivity manufacturing jobs to low-productivity service jobs, and to the influx of new unskilled baby-boomers into the workforce.

The reallocation of employment across subsectors within the nonfarm business sector, such as between manufacturing and services, or across different service subsectors, has happened in the past and is likely to happen in the future. However, the magnitude and direction of such future reallocation is difficult to project. By considering the past historical productivity growth of the nonfarm business sector as a whole, which includes the effects of past employment shifts across the subsectors, we implicitly take the historical experience of such shifts across the subsectors as an indication of future effects. Historical compound annual rates of growth in labor productivity for the nonfarm business sector are shown in Table 1.5.

The 1.88 percent average annual growth rate for NFB productivity over the last six economic cycles (1969 to 2019) is a reasonable starting point for estimating the ultimate growth rate. Although productivity growth in the last cycle was slower, the average over the longest available

[9] For example, the 0.023 decline (i.e., from 0.037 to 0.014) in the ratio of agriculture to total-economy hours worked over the 50 years from 1973 to 2023 cannot be repeated in the future since the level of the ratio in 2024 is only 0.014 and it cannot become negative.

period of good data points to a somewhat higher long-range rate of growth. (The growth rate in NFB productivity over the 65 years from 1958 to 2023 was 2.03 percent and would be somewhat higher if pre-1978 inflation adjustments were consistent with today's methodology.) Therefore, the Trustees assume an ultimate rate of increase in NFB productivity of 2.00 percent.

1.3.1.2 Farm

The average annual growth rate in farm productivity was about 3.63 percent over the 50 years from 1973 to 2023. A significant portion of the relatively high growth rate in farm productivity was due to a shift in farm operation and ownership from smaller farms run by the self-employed to larger, more efficient, and capital-intensive farms run by corporations. For example, based on BLS' Current Population Survey (CPS) data, the ratio of self-employed to all paid workers in the agricultural sector fell from about 0.51 in 1973 to 0.31 in 2023. For the long-range future, this shift is expected to slow and the difference in the productivity growth rates between the farm and nonfarm sectors is expected to decline to zero. Thus, the assumed ultimate rate of increase in farm productivity is 2.00 percent, equal to the assumed ultimate average annual growth rate in NFB productivity.

1.3.1.3 Nonprofit Institutions (NI)

The average annual rate of change in NI productivity was 0.19 percent over the 25-year period from 1973 to 1998, 0.36 percent over the 25-year period from 1998 to 2023, and 0.28 percent over the combined 50-year period from 1973 to 2023. Over the 50 years covered by the last six complete economic cycles, the average annual growth rate in NI productivity was positive in most cycles, but negative during the 1990-2001 cycle. The pattern of growth rates in NI productivity, with periods of positive and negative values, is largely due to shifts in employment within the NI sector, as well as the change in the share of labor compensation in NI nominal GDP.

In the NIPA, the nominal GDP (gross value added) of the NI sector is measured as the sum of the compensation of employees, the rental value of the nonresidential fixed assets owned and used by nonprofit institutions, and the rental income for tenant-occupied housing owned by non-profit institutions.[10] NI labor compensation accounts for the majority of NI nominal GDP, but this share has changed over time. Over the 50-year period from 1973 to 2023, the share of labor compensation in NI nominal GDP varied between about 80 and 85 percent.

NI compensation is summed from five subsectors including education, health, social, religious, and business services. For each subsector, the level of real output is defined as the product of the level of average compensation per hour in a base year (currently 2017) and the level of hours worked. This means that the *level* of productivity in each subsector is a constant (i.e., the average compensation per hour in a base year), and that the *growth rate* in productivity in each subsector is zero. However, this also means that the *level* of productivity for the total NI sector is a weighted average of the *levels* of productivity in the subsectors, and that the *growth rate* in total NI productivity may be positive (or negative), due to relative shifts in employment from

[10] BEA, NIPA Table 1.3.6.

subsectors with relatively low (high) average compensation to sectors with relatively high (low) compensation.

Some limited insight into this dynamic can be obtained from the NIPA data on compensation and full-time equivalent employment in health care, educational services, and social assistance.[11] These three subsectors are mostly composed of NI workers[12], although the fraction of the total employment in the three subsectors that is attributable to the NI sector has generally declined over the last several decades.[13] The level of average annual compensation for full-time equivalent employment in 2017 (the base year for computing the level of real output) was $74,200, $58,700, and $33,900 in health care, educational services, and social assistance, respectively. As an example of how shifts among subsectors can affect productivity growth rates, the increase in employment in the higher-paying health care subsector relative to the other subsectors during the 1970s and 1980s contributed to the increase in NI productivity at that time.

Changes in the share of labor compensation in nominal GDP have also affected NI productivity. For example, in the 25 years from 1998 to 2023, the share of labor compensation in NI nominal GDP fell from 84.5 percent to 81.4 percent, contributing to the productivity growth for the NI sector.

It seems reasonable to assume that the share of labor compensation in NI nominal GDP will ultimately stabilize in the future, and that the ultimate growth rates in employment in the NI subsectors will be roughly equal.[14] Thus, the assumed ultimate growth rate in NI productivity is zero.

1.3.1.4 General Government (GOV)

The average annual rate of increase in GOV productivity was 0.18 percent over the 25-year period from 1973 to 1998 and 0.19 percent over the 25-year period from 1998 to 2023. These relatively small growth rates in GOV productivity are due to shifts in employment within the GOV sector.

GOV labor compensation accounts for about 77 percent of GOV nominal GDP.[15] GOV compensation is the total of compensation from three primary subsectors: federal civilian, federal military, and state and local government. As with the NI sector, the *level* of productivity in each GOV subsector is a constant (i.e., the average compensation per hour in a base year), and the

[11] BEA, NIPA, Tables 6.2B through 6.2D and Tables 6.5B through 6.5D.

[12] BEA, "Income and Outlays of Households and of Nonprofit Institutions Serving Households," *Survey of Current Business*, April 2003, p. 14, https://apps.bea.gov/scb/pdf/2003/04April/0403household.pdf.

[13] The ratio of NI employment in the Current Employment Statistics (CES) to the total full-time equivalent employment in in health care, educational services, and social assistance NIPA subsectors has declined from 0.844 in 1998 to 0.638 in 2023.

[14] Given that the overall assumptions reflect a continued growth in the health sector as a percent of GDP, this faster growth is assumed to occur in the for-profit sector of the economy.

[15] BEA, NIPA, Table 3.10.5.

growth rate in productivity in each subsector is zero. However, this also means that the *level* of productivity for the total GOV sector is a weighted average of the *levels* of productivity in the subsectors, and that the *growth rate* in total GOV productivity may be positive (negative), due to shifts in employment from subsectors with relatively low (high) average compensation to subsectors with relatively high (low) compensation.[16]

The relatively small, positive growth rate in GOV productivity over some historical periods is due to reallocation of employment among subsectors. In the future, the growth rate in GOV productivity could be negative, reflecting a reversal of historical trends. For the future, however, it seems reasonable to assume that the ultimate growth rates in employment in the GOV subsectors will be about equal and that the assumed ultimate growth rate in GOV productivity will be zero.[17]

1.3.1.5 Households

In the NIPA, nominal GDP in the household sector is the sum of the nominal compensation of private household workers and the nominal imputed output of owner-occupied housing (IOH). In 2023, the nominal compensation of private household workers made up only about 1.3 percent of the total nominal GDP in the household sector. Though this component is relatively small, it is useful to analyze each component of GDP in the household sector.

Compensation of Household Workers - As with NI and GOV compensation sectors, BEA sets the real growth rate in GDP in this sector equal to the growth rate in hours worked. Hence, the growth rate in productivity is, by definition, zero.

Imputed Output of Owner-Occupied Housing (IOH) - Renters of apartments and homes pay rent and receive streams of housing services. BEA includes these business transactions in the NIPA. Although the owners of homes pay no rent and have no business transactions, they receive similar streams of housing services. Hence, for consistency, BEA estimates the real and nominal values of housing services received by those who own their own homes (i.e., real and nominal IOH) and includes these amounts in the NIPA.

BEA's inclusion of IOH in GDP creates a problem. Since IOH has no associated measure of labor hours worked, it is not clear how it should be included when estimating historical and projecting future growth rates in sector and total-economy productivity. There are two possible approaches to handle IOH in projections of total-economy productivity for the long range.

First, total real GDP could be projected as the sum of projections for real IOH and real GDP less IOH. Real GDP less IOH would be the product of the total-economy-less-IOH productivity and

[16] BEA, "Government Transactions, Methodology Papers: U.S. National Income and Product Accounts," September 2005, http://www.bea.gov/national/pdf/mp5.pdf.

[17] Beginning with the 2017 report, OCACT estimates that the number of active military will remain constant rather than grow in proportion to civilian employment. This implies a gradual shift in the weights of civilian government and the military, and a resulting small decrease in average productivity of the government sector, but the effect is small.

total hours worked. The ultimate average annual growth rate in total-economy-less-IOH productivity could be set to the weighted average of the assumed ultimate average annual growth rates in sector productivity.[18] Real IOH could be projected as a fixed ratio to total real GDP less IOH. [19] Total real GDP could then be constructed as the sum of real IOH and real GDP less IOH.

As a second and equivalent approach, household productivity could be defined as the ratio of the sum of real IOH and real output of private household workers to the total hours worked of private household workers (as in Table 1.2). Using this definition, the average annual rate of increase in productivity for private household workers over the 50-year period from 1973 to 2023 was about 3.40 percent.

In the future, however, the average annual growth rate in productivity for private household workers is expected to equal the average annual growth rate of total-economy-less-IOH productivity, as described in the first approach.[20] The ultimate average annual growth rate in total-economy productivity could be set to the weighted average of the assumed ultimate average annual growth rates in sector productivity.[21] Finally, total real GDP would be the product of total-economy productivity and hours worked.

1.3.2 Total-Economy Productivity Growth Rate

The assumed ultimate growth rate in total-economy productivity is equal to a weighted average of the growth rates in sector productivity and employment (see Section 1.5 Appendix). This

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[18] Sector weights would be defined as the ratio of sector to total nominal GDP less IOH.

[19] Over the 35-year period from 1989 through 2023, the ratio of real IOH to real GDP less IOH has been fairly constant and averaged 0.079.

[20] If,

$$Pph = \text{Real IOH} / Hph$$
$$Pxph = \text{Real GDP less IOH} / Hxph$$

Then,

$$\dot{Pph} = \dot{\text{Real IOH}} - \dot{Hph}$$
$$\dot{Pxph} = \dot{\text{Real GDP less IOH}} - \dot{Hxph}$$

Assuming,

$$\dot{\text{Real IOH}} = \dot{\text{Real GDP less IOH}}$$
$$\dot{Hph} = \dot{Hxph}$$

Then,

$$\dot{Pph} = \dot{Pxph}$$

Where,

Pph = Productivity, private household
Pxph = Productivity, total economy less private household
Hph = Hours worked, private household
Hxph = Hours worked, total economy less private household
$\dot{Y}$ = Rate of change in Y

[21] In this second approach, sector weights would be defined as the ratio of sector to total nominal GDP.

relationship is simplified by assuming that the ultimate future growth rate in employment in each of the sectors of the economy will be about equal, and that the ultimate growth rates in productivity for the nonprofit institution and general government sectors will be zero. Given these assumptions, the ultimate growth rate in total-economy productivity is equal to the weighted average of the ultimate growth rates in productivity in the farm, nonfarm business, and household sectors of the economy. It is important to keep in mind that this approach to estimating future productivity growth is tied to the assumption of no shifts in employment across sectors. Such shifts across sectors will undoubtedly occur in the future.

Sector weights are defined as the ratio of sector to total nominal GDP. This "nominal output" weight for the farm sector declined from about 0.033 in 1973 to 0.008 in 2023, and it averaged about 0.008 over the last complete business cycle from 2007 to 2019. The nominal output weight for the nonfarm business sector was much more stable. It averaged 0.753 over the 25-year period from 1974 through 1998, 0.750 over the 25-year period from 1999 through 2023, and 0.745 over the last complete business cycle. For the future, the ultimate values for the nominal output weights are assumed to remain at 0.75 for the nonfarm business sector and 0.01 for the farm sector.

The nominal weight for the household sector rose from about 0.053 in 1977-1979 to the historically high value of 0.079 in 2009, largely because the GDP deflator for IOH grew faster than the GDP deflator for all other goods over the period. More recently, the weight has fallen to 0.069 in 2015 and has averaged 0.070 between 2015 and 2023. In the future, OCACT expects the GDP deflator for IOH will grow at about the same rate as the GDP deflator for all other goods and that therefore the nominal weight for the household sector should stabilize at 0.07, close to its recent historical average.

Sector weights can also be defined as the ratio of sector to total nominal GDP excluding IOH. In this case, the ultimate values for the nominal output weights will be 0.0108 (i.e., 0.01 / (1.0 – 0.07)) for the farm sector, and 0.8065 (i.e., 0.75 / (1.0 – 0.07)) for the nonfarm sector.

This analysis, under the assumption of a stable distribution of employment across sectors in the future, indicates that the long-range future growth rate in productivity for the total economy excluding IOH will be about 1.63 percent (i.e., 2.00 * (0.8065 + 0.0108)). It also indicates that the long-range future growth rate in productivity for the total economy including IOH will be about 1.63 percent (i.e., 2.00 * (0.75 + 0.01) + 1.63 * 0.07). Thus, for the 2025 Trustees Report, the assumed annual rates of increase in total-economy productivity are 1.93 percent, 1.63 percent, and 1.33 percent for alternatives I, II, and III, respectively. These rates of increase are unchanged from those used in the 2024 Trustees Report.

1.4 Future Expectations

Growth in total economy labor productivity has been unusually slow during the last complete economic cycle. From 2007 to 2019, total economy productivity grew 1.20 percent per year on average, while nonfarm business productivity grew 1.50 percent per year on average. This is significantly slower than the historical average growth rate over the 65-year period (1958-2023)

of 1.79 percent for total economy productivity and 2.03 percent for the nonfarm business productivity.

The reasons for the recent productivity slowdown (through 2019) are being debated by economists with different views. One view, proposed by Borio et al. (2015), holds that recessions precipitated by credit booms followed by financial crises have persistent negative effects on productivity growth stemming from misallocation of labor to sectors with lower productivity growth.[22] The recession of 2007-2009 was one such recession, and thus low productivity growth over roughly a decade in its aftermath was to be expected, but is not necessarily predictive of much longer periods such as 75 years into the future. Considerations of more traditional factors also lead to a debate as to whether the productivity slowdown of recent years is a temporary phenomenon that will be reversed, or a more fundamental change that is likely to persist.

The position that future productivity growth is likely to be slower than the historical average observed prior to 2007 rests primarily on the argument that the pace of technological innovation has slowed. Its main proponent, Robert J. Gordon, has argued that the unusually rapid pace of technological innovation observed in 1920-1970 period resulted from the invention of several general-purpose technologies, such as electricity and the internal combustion engine, that dramatically boosted productivity. He argued that similarly powerful general-purpose technologies have not been invented since the 1970s and are not likely to be invented in the near future. This explains the productivity slowdown in recent decades and suggests slower productivity growth in the future. [23]

Additionally, Robert J. Gordon, Dale W. Jorgenson, and others contend that some of the past productivity growth was driven by improvements in labor quality owning to the rising educational attainment of the labor force. However, as Jorgenson noted, "average levels of educational attainment remain high for people entering the labor force, but will no longer increase." As a result, rising average educational attainment will gradually disappear as a source of productivity growth.[24]

The opposing view holds that productivity growth will rebound in the future owing to new technologies evolving at a pace at least as fast as in the past. Proponents of this view, primarily Erik Brynjolfsson and his co-authors, have pointed to artificial intelligence and machine learning as the new general-purpose technology that will result in a return to faster productivity growth in the future. They contend that slow productivity growth in the recent past is not a predictor of

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[22] See Borio, Claudio, Enisse Kharroubi, Christian Upper, and Fabrizio Zampolli, 2015. "Labour reallocation and productivity dynamics: financial causes, real consequences", Bank for International Settlements Working Paper No. 534, https://www.bis.org/publ/work534.pdf.

[23] See Gordon, Robert J. 2016. *The Rise and Fall of American Growth: The U.S. Standard of Living Since the Civil War*. Princeton: Princeton University Press, and Gordon, Robert J. 2012 "Is U.S. Economic Growth Over? Faltering Innovation Confronts the Six Headwinds*",* NBER working paper 18315, http://www.nber.org/papers/w18315.pdf.

[24] Jorgenson, Dale W., Mun S. Ho, and Jon D. Samuels. "Educational Attainment and the Revival of U.S. Economic Growth." In *Education, Skills, and Technical Change: Implications for Future U.S. GDP Growth*. Chicago: University of Chicago Press, 2017.

future productivity growth. In fact, as new technology is being developed, new investments required to fully realize the transformative potential of the new technology are being made, and complementary innovations are being undertaken, one should expect productivity growth to be slow—until the effects of the new technology begin to spread across the economy.[25]

The future rate of technological innovations and their effects on productivity are extremely difficult to foresee. OCACT believes that it is reasonable to base the productivity assumption on the analysis of long historical trends, with adjustments for foreseeable differences between future and past conditions, such as a slower rate of change in educational attainment.

The developments since the last economic cycle ended in 2019, with the massive changes in the economy precipitated by the COVID-19 pandemic, have caused many to speculate on the possibility that the pandemic will have lasting or permanent effects on the structure of the economy. There might be a permanent shift in the level of future productivity as in many past recessions. But would a potential change in structure also affect the growth rate, even after the pandemic is behind us? Several years after the beginning of the pandemic, there is no consensus about what the lasting effects on long-term productivity growth might be, if any. There is no consensus on the magnitude of such effects or even on their direction. The pandemic-induced changes in the patterns of employment and consumption resulted in large increase in productivity in 2020, followed by a moderation of productivity growth in 2021, and an outright decline in productivity in 2022, followed by a moderated increase in productivity in 2023. Debates continue about the long-term effects of the pandemic on productivity, ranging from the impact of increased business investment to the potential consequences of "the lost year" of education stemming from pandemic-related disruptions to schooling.

Given the unprecedented level of uncertainty, OCACT believes that at this time there is no firm basis for reflecting such effects in the ultimate assumption for productivity growth. Basing the ultimate assumption for productivity growth on the analysis of long historical trends remains the best strategy.

1.5 Projections from Other Sources

At the time assumptions were developed, the following projections from other sources were available.

S&P Global provided projections through 2054 in its August 2024 30-year trend forecast (see *The 30-Year Focus, Third Quarter, August 2024*). For the 20-year period from 2034 through 2054, S&P Global projected that the average annual rate of increase in productivity for the nonfarm business sector would be about 2.10 percent. Moody's Analytics provided projections through 2054 in its September 2024 forecast. For the 20-year period from 2034 to 2054, Moody's Analytics projected the average annual growth rate in productivity would be about 2.10 percent for the nonfarm business sector.

[25] Brynjolfsson, Erik, Daniel Rock, and Chad Syverson, 2017. "Artificial Intelligence and the Modern Productivity Paradox: A Clash of Expectations and Statistics" NBER working paper No. 24001, http://www.nber.org/papers/w24001.

The Office of Management and Budget (OMB) Mid-Session Review to the Fiscal Year 2025 Budget included projections through 2034. The OMB annual growth rate for total-economy productivity was 1.74 percent for 2034. In *The Long-Term Budget Outlook: 2024 to 2054* published in March 2024, the Congressional Budget Office (CBO) included projections through 2054. CBO's annual growth rate for total-economy productivity was 1.34 percent for the period 2034 through 2054.

The Social Security Advisory Board's 2019 Technical Panel on Assumptions and Methods recommended an assumed ultimate annual rate of increase in total-economy productivity of 1.55 percent, compared to the 2019 Trustees Report alternative II assumption of 1.63 percent. The prior technical panel, which met in 2015, recommended no changes to the ultimate annual rate of increase in total-economy productivity of 1.68 percent that had been assumed in the 2015 Trustees Report, alternative II.

Table 1.4: Total-Economy Productivity: Compound Annual Rates of Growth (%) Base Year = 2017

		From																					
To	Variable	1961	1965	1970	1975	1980	1985	1990	1995	2000	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
1961	37.72																							
1965	42.83	3.23																						
1970	47.38	2.57	2.04																					
1975	52.49	2.39	2.06	2.07																				
1980	54.99	2.00	1.68	1.50	0.94																			
1985	59.90	1.95	1.69	1.57	1.33	1.72																		
1990	63.99	1.84	1.62	1.51	1.33	1.53	1.33																	
1995	68.23	1.76	1.56	1.47	1.32	1.45	1.31	1.29																
2000	76.56	1.83	1.67	1.61	1.52	1.67	1.65	1.81	2.33															
2005	87.17	1.92	1.79	1.76	1.71	1.86	1.89	2.08	2.48	2.63														
2010	95.65	1.92	1.80	1.77	1.73	1.86	1.89	2.03	2.28	2.25	1.87													
2011	95.71	1.88	1.76	1.73	1.68	1.80	1.82	1.94	2.14	2.05	1.57	0.06												
2012	96.11	1.85	1.73	1.70	1.65	1.76	1.77	1.87	2.04	1.91	1.41	0.24	0.42											
2013	96.84	1.83	1.71	1.68	1.62	1.73	1.73	1.82	1.96	1.82	1.32	0.41	0.59	0.76										
2014	97.39	1.81	1.69	1.65	1.60	1.70	1.69	1.77	1.89	1.73	1.24	0.45	0.58	0.66	0.56									
2015	98.15	1.79	1.67	1.63	1.58	1.67	1.66	1.73	1.84	1.67	1.19	0.52	0.63	0.70	0.68	0.79								
2016	98.74	1.77	1.65	1.61	1.55	1.64	1.63	1.68	1.78	1.60	1.14	0.53	0.63	0.68	0.65	0.69	0.60							
2017	100.00	1.76	1.64	1.60	1.55	1.63	1.61	1.67	1.75	1.58	1.15	0.64	0.73	0.80	0.81	0.89	0.94	1.27						
2018	101.09	1.74	1.63	1.59	1.54	1.62	1.60	1.65	1.72	1.56	1.15	0.69	0.79	0.85	0.86	0.94	0.99	1.18	1.09					
2019	102.51	1.74	1.63	1.59	1.53	1.61	1.59	1.64	1.71	1.55	1.17	0.77	0.86	0.93	0.95	1.03	1.09	1.26	1.25	1.40				
2020	107.26	1.79	1.68	1.65	1.60	1.68	1.68	1.74	1.83	1.70	1.39	1.15	1.27	1.38	1.47	1.62	1.79	2.09	2.36	3.00	4.63			
2021	108.70	1.78	1.68	1.64	1.60	1.68	1.67	1.72	1.81	1.68	1.39	1.17	1.28	1.38	1.45	1.58	1.72	1.94	2.11	2.45	2.97	1.35		
2022	107.41	1.73	1.63	1.59	1.54	1.61	1.59	1.63	1.70	1.55	1.24	0.97	1.05	1.12	1.16	1.23	1.30	1.41	1.44	1.53	1.57	0.07	-1.19	
2023	108.61	1.72	1.62	1.58	1.53	1.60	1.58	1.62	1.67	1.53	1.23	0.98	1.06	1.12	1.15	1.22	1.27	1.37	1.39	1.44	1.45	0.42	-0.04	1.12

Table 1.5: Nonfarm Business Productivity: Compound Annual Rates of Growth (%) Base Year = 2017

		From																						
To	Variable	1961	1965	1970	1975	1980	1985	1990	1995	2000	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
1961	32.61																							
1965	37.32	3.44																						
1970	41.41	2.69	2.10																					
1975	46.34	2.54	2.19	2.28																				
1980	49.36	2.21	1.88	1.77	1.27																			
1985	53.77	2.11	1.84	1.76	1.50	1.73																		
1990	58.06	2.01	1.78	1.70	1.51	1.64	1.54																	
1995	62.81	1.95	1.75	1.68	1.53	1.62	1.57	1.59																
2000	72.29	2.06	1.91	1.87	1.79	1.93	1.99	2.22	2.85															
2005	84.37	2.18	2.06	2.05	2.02	2.17	2.28	2.52	3.00	3.14														
2010	94.44	2.19	2.08	2.08	2.05	2.19	2.28	2.46	2.76	2.71	2.28													
2011	94.32	2.15	2.04	2.03	1.99	2.11	2.18	2.34	2.57	2.45	1.87	-0.14												
2012	95.08	2.12	2.01	2.00	1.96	2.07	2.13	2.27	2.47	2.31	1.72	0.34	0.81											
2013	95.80	2.09	1.98	1.97	1.93	2.03	2.08	2.20	2.37	2.19	1.60	0.48	0.78	0.75										
2014	96.69	2.07	1.96	1.95	1.90	2.00	2.04	2.15	2.30	2.10	1.53	0.59	0.83	0.84	0.93									
2015	97.93	2.06	1.95	1.93	1.89	1.98	2.02	2.11	2.25	2.04	1.50	0.73	0.95	0.99	1.11	1.29								
2016	98.69	2.03	1.92	1.91	1.86	1.94	1.98	2.06	2.18	1.96	1.43	0.74	0.91	0.93	1.00	1.03	0.77							
2017	100.00	2.02	1.91	1.89	1.85	1.93	1.96	2.03	2.14	1.93	1.43	0.82	0.98	1.01	1.08	1.13	1.05	1.33						
2018	101.37	2.01	1.90	1.88	1.84	1.91	1.94	2.01	2.10	1.90	1.42	0.89	1.04	1.07	1.14	1.19	1.16	1.35	1.37					
2019	103.56	2.01	1.91	1.89	1.84	1.92	1.95	2.02	2.11	1.91	1.47	1.03	1.18	1.23	1.31	1.38	1.41	1.62	1.77	2.17				
2020	108.98	2.07	1.97	1.95	1.92	2.00	2.04	2.12	2.23	2.07	1.72	1.44	1.62	1.72	1.86	2.01	2.16	2.51	2.91	3.69	5.23			
2021	110.82	2.06	1.96	1.95	1.91	1.99	2.03	2.11	2.21	2.05	1.72	1.46	1.63	1.72	1.84	1.97	2.08	2.35	2.60	3.02	3.44	1.69		
2022	108.72	1.99	1.89	1.87	1.83	1.90	1.92	1.98	2.05	1.87	1.50	1.18	1.30	1.35	1.42	1.48	1.50	1.63	1.69	1.77	1.63	-0.12	-1.90	
2023	110.19	1.98	1.88	1.86	1.82	1.89	1.91	1.96	2.03	1.85	1.49	1.19	1.30	1.35	1.41	1.46	1.48	1.59	1.63	1.68	1.56	0.37	-0.28	1.35

1.6 Appendix

Nordhaus demonstrates how the growth rates in productivity in *n* sectors of the economy can be aggregated to the growth rate in total-economy productivity.[26] Monaco adopts the formulation to aggregate the growth rates in productivity in the nonfarm business, farm, and "all other" sectors.[27] Equation A1 is a similar adaptation to five sectors: nonfarm business (n), farm (f), households (h), nonprofit institutions (i), and general government (g).

$$(A1) \quad \dot{P}_t = \dot{P}_n wt_n^Q + \dot{P}_f wt_f^Q + \dot{P}_h wt_h^Q + \dot{P}_i wt_i^Q + \dot{P}_g wt_g^Q + \dot{H}_n (wt_n^Q - wt_n^H) + \dot{H}_f (wt_f^Q - wt_f^H) + \dot{H}_h (wt_h^Q - wt_h^H) + \dot{H}_i (wt_i^Q - wt_i^H) + \dot{H}_g (wt_g^Q - wt_g^H)$$

Where,

$\dot{X}$	=	rate of change in x
P	=	productivity
H	=	hours worked
wt^Q_f	=	nominal output weight for farm sector defined as the ratio of nominal GDP in the farm sector to nominal GDP for the total economy
wt^H_f	=	hours worked weight for farm sector defined as the ratio of hours worked in the farm sector to hours worked in the total economy
t	=	total economy

In the long-range, it is reasonable to assume that the growth rate in hours worked in all sectors will be equal. Thus, Equation A1 can be simplified to A2.

$$(A2) \quad \dot{P}_t = \dot{P}_n wt_n^Q + \dot{P}_f wt_f^Q + \dot{P}_h wt_h^Q + \dot{P}_i wt_i^Q + \dot{P}_g wt_g^Q$$

Furthermore, if the ultimate growth rates in productivity in the household, nonprofits, and general government sectors are zero, Equation A2 can be further simplified to A3.

$$(A3) \quad \dot{P}_t = \dot{P}_n wt_n^Q + \dot{P}_f wt_f^Q$$

[26] Nordhaus, William D., "Productivity Growth and the New Economy." Brookings Papers on Economic Activity, (Volume 2, 2002). pp.211-265.

[27] Monaco, Ralph, "Issues in Projecting Productivity in the Very Long Term." Sept. 28, 2005. Treasury Office of Economic Policy. Unpublished.

2. PRICE INFLATION

THE 2025 TRUSTEES REPORT
OFFICE OF THE CHIEF ACTUARY, SOCIAL SECURITY ADMINISTRATION

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2 Price Inflation

2.1 Summary

For the 2025 Trustees Report, the assumed ultimate annual rates of increase in the CPI-W are 3.00 percent, 2.40 percent, and 1.80 percent for alternatives I, II, and III, respectively, as shown in Table 2.1. The Trustees also assume the ultimate annual rates of increase in the gross domestic product implicit price deflator (PGDP) to be 2.75 percent, 2.05 percent, and 1.35 percent for alternatives I, II, and III, respectively. Thus, the ultimate price differential, defined as the PGDP less CPI-W average annual rates of increase, is assumed to be -0.25, -0.35, -0.45 percentage point for alternatives I, II, and III, respectively.[28] The assumed ultimate annual rates of increase for CPI-W and PGDP are unchanged from those assumed for the 2024 Trustees Report.

Table 2.1: Assumed Ultimate Annual Rates of Increase in Price Level Measures

	2025 Trustees Report Alternative			2024 Trustees Report Alternative			2025 Trustees Report Less 2024 Trustees Report		
Measure	**I**	**II**	**III**	**I**	**II**	**III**	**I**	**II**	**III**
CPI-W	3.00	2.40	1.80	3.00	2.40	1.80	0.00	0.00	0.00
PGDP	2.75	2.05	1.35	2.75	2.05	1.35	0.00	0.00	0.00
Price Differential (PGDP less CPI-W)	-0.25	-0.35	-0.45	-0.25	-0.35	-0.45	0.00	0.00	0.00

2.2 Recent Revisions to BLS and BEA Data

2.2.1 Recent and Expected Future Changes to Methods BLS Uses to Compute the CPI

The Bureau of Labor Statistics (BLS) collects and publishes data on the CPI. BLS updated the consumption expenditure weights in the CPI-W and in the CPI for all Urban Consumers (CPI-U) from calendar year 2021 to calendar year 2022, effective January 2024. The annual updating of expenditure weights had been announced in May 2022 and was first implemented in January 2023. From 2000 through 2022, BLS was updating the weights at regular intervals every two years, while before 2000 the updates occurred about once per decade. [29]

[28] The projected price differential is important because it affects the real rate of increase in the average OASDI covered wage (see Section 3.3.2.4) and, therefore, the long-range actuarial balance.

[29] For BLS's CPI methodology, see https://www.bls.gov/opub/hom/pdf/cpihom.pdf. Information about the 2024 weight update is at https://www.bls.gov/cpi/tables/relative-importance/weight-update-comparison-2024.htm. The new weights are at https://www.bls.gov/cpi/tables/relative-importance/2023.htm, and the weights they replaced are at https://www.bls.gov/cpi/tables/relative-importance/2022.htm. Notices about other methodological changes in measuring CPI are at https://www.bls.gov/cpi/additional-resources/recent-upcoming-methodology-changes.htm.

2.2.2 OCACT Adjustments to the Published CPI-W

Over the years, BLS has introduced numerous improvements to the CPI-W. For example, beginning in January 1995 and July 1996, BLS introduced changes to correct methodological errors introduced into the index in January 1978 and January 1987. In addition, beginning in January 1999, BLS introduced a new geometric mean formula that assumes some lower-level substitution among items purchased by consumers within broad categories of goods and services due to changes in relative prices.

Because BLS has no plans to revise the historical CPI, these improvements present a comparability problem. The goal is to project future growth rates in the CPI, based, in part, on an analysis of historical growth rates. Any projected growth rate in the CPI will be affected by the BLS method improvements mentioned above. Thus, OCACT adjusted the historical CPI to reflect the estimated effects of these method changes, effectively reducing the measured growth rate in the CPI-W over the historical period.[30] This adjustment uses the same methodology as in last year's Trustees Report. Table 2.5 lists the adjusted CPI-W. (See Section 2.6 Appendix for details on OCACT's adjustments to the actual published CPI-W annual growth rates.)

2.2.3 BEA Annual Update

On September 26, 2024, BEA released a regular annual update to the NIPA data. This update affected historical nominal GDP levels and real GDP growth rates back to 2019.[31] Compared to the values reported a year earlier, the growth rate of PGDP is revised down by less than 0.05 percentage point for 2019 and 2021, and up by about 0.1 percentage point for 2022.

2.2.4 OCACT Adjustments to the Published PGDP

BEA's estimate of the PGDP is based, in part, on the CPI. BLS has introduced numerous improvements to the CPI that have lowered its post-1995 growth rate. BEA "backcasted" these improvements in the NIPA, lowering the growth rate in the PGDP (and raising the real growth rate in GDP). However, because BEA only backcasted these effects to 1978, OCACT has lowered the pre-1978 growth rate in the PGDP for consistency (see Section 2.7 Appendix for further details on the adjustments to the actual published annual growth rates in PGDP and annual real growth rates in GDP). The adjusted PGDP is shown in Table 2.6.

[30] While historical values in this document are adjusted for consistency with assumptions about the future, the historical values shown in the Trustees Report are unadjusted published values.

[31] See https://www.bea.gov/news/2024/gross-domestic-product-third-estimate-corporate-profits-revised-estimate-and-gdp-0 and https://www.bea.gov/information-updates-national-economic-accounts.

2.3 Consumer Price Index for Urban Wage Earners and Clerical Workers (CPI-W)

2.3.1 Historical Growth in the Adjusted CPI-W[32]

Over the last six complete economic cycles (1969 to 2019), the adjusted CPI-W grew at an average annual rate of 3.62 percent. The growth rates by cycle were 4.44, 7.59, 4.99, 2.45, 2.64, and 1.75 percent for the 1969-1973, 1973-1979, 1979-1990, 1990-2001, 2001-2007, and 2007-2019 economic cycles, respectively. The relatively higher inflation rates experienced from the late 1960s to the mid-1980s can be reasonably attributed to high-capacity utilization associated with the Vietnam War, the two oil price shocks in the early and late 1970s, and the fiscal and monetary policy responses to those events. Even over the last four complete economic cycles (1979 to 2019), the adjusted CPI-W grew at an average annual rate of 2.96 percent. However, over the last three complete economic cycles (1990 to 2019) that took place after these adjustments had concluded, the adjusted CPI-W grew at an average annual rate of 2.20 percent.

The high inflation rate in the late 1970s led the Federal Reserve to place a greater emphasis on price stability as part of their mandate to pursue maximum employment and stable prices. In the early 1980s, the Federal Reserve raised the federal funds rate to reduce the double-digit inflation rates that occurred in 1979 and 1980. In the mid-1990s, the Federal Reserve made a judgment that inflation at the rate of 2 percent (as measured by the annual change in the price index for personal consumption expenditures, referred to as PGDP_C later in this section) is most consistent over the longer run with the Federal Reserve's statutory mandate. The Federal Reserve publicly announced their 2 percent goal in 2012, and in their May 2018 meeting clarified that the goal was meant to be symmetric and that "a temporary period of inflation modestly above 2 percent would be consistent with the Committee's symmetric inflation objective." In August 2020, the Federal Reserve announced an update to its "Statement on Longer-Run Goals and Monetary Policy Strategy". This statement indicated that the Federal Reserve will more strongly emphasize the maximum employment part of its mandate. This implies that the Federal Reserve is willing to allow inflation to exceed the target of 2 percent in the interest of promoting maximum employment. Specifically, the statement says that "following periods when inflation has been running persistently below 2 percent, appropriate monetary policy will likely aim to achieve inflation moderately above 2 percent for some time."[33]

Between 1981 and 2020, various other factors also contributed to the slowdown in the inflation rate. Oil prices were mostly stable between 1980 and 2001, and the dependence of the U.S. economy on oil decreased. The economic output of developing nations with relatively low labor costs (for example, China and India) increased substantially, as did the share of U.S. imports from those countries. The dollar appreciated relative to the trade-weighted average of other currencies between 1980 and 1985 and again between 1995 and 2002, further contributing to decreases in prices of imported goods. Between 2002 and 2008, some of those factors reversed: the price of oil and other commodities increased sharply and the dollar depreciated sharply, but there was relatively little corresponding increase in the inflation rate. During 2009 through 2020,

[32] See section 2.2.2 for a description of the adjusted CPI-W.

[33] See https://www.federalreserve.gov/monetarypolicy/files/fomcminutes20180502.pdf (page 9) and https://www.federalreserve.gov/monetarypolicy/review-of-monetary-policy-strategy-tools-and-communications-statement-on-longer-run-goals-monetary-policy-strategy.htm.

the inflation rate was even lower, due to a recession, a decrease in the price of oil and other commodities, appreciation of the dollar, and eventually the pandemic-induced recession of 2020.[34] This period was also characterized by unusually weak aggregate demand for goods and services. The Trustees do not expect this weak demand to continue into the long-range future.

The COVID-19 pandemic that started in 2020 interrupted the global supply of a broad range of goods. The imbalance of supply and demand was exacerbated by a shift in demand from services to goods as various services were much less available. Additionally, economic stimulus in many countries kept aggregate demand relatively strong. By mid-2021, the excess of demand over supply was manifested in faster price increases globally, with countries whose economies were recovering from the pandemic-induced recession at the fastest pace (such as the United States) experiencing the highest rates of price inflation. Russia's invasion of Ukraine in early 2022 further aggravated price inflation globally, affecting energy prices most strongly. This second wave of inflation hit Europe the hardest, but was felt globally, including in the United States. In response to the large price increases, the Federal Reserve began increasing the federal funds rate in March 2022. This was followed by ten more increases through July 2023, with the cumulative rate increase of 5.25 percentage points. Since reaching its peak in the first half of 2022, the inflation rate has decreased significantly, approaching, though remaining somewhat above, the Federal Reserve's policy target of 2 percent. The Federal Reserve decreased the federal funds rate in September 2024, with further decreases expected to follow. While the relatively high inflation rate during 2021 and 2022 illustrates the possibility of episodes of inflation exceeding policy targets, there is so far no evidence that expectations of long-term price growth have changed significantly.

[34] CPI-W grew at a 2.22 percent annual rate over the 7-year period 1995-2002, 3.09 percent over the 6-year period 2002-2008, and 1.52 percent over the 12-year period 2008-2020. The dollar has appreciated significantly relative to the euro and the British pound since 2008, and did not change much relative to the yen and the yuan during that period.

Table 2.2: Historical Growth in the Adjusted CPI-W, the Adjusted GDP Deflator, and the Price Differential

	CPI-W Average Annual Rate of Growth (percent)	GDP Deflator Average Annual Rate of Growth	Price Differential = GDP Deflator less CPI-W
Long-Term Historical Averages:			
1958-2023 (65 years)	3.39	3.24	-0.15
1973-2023 (50 years)	3.64	3.36	-0.29
1973-1998 (25 years)	4.74	4.48	-0.26
1998-2023 (25 years)	2.56	2.25	-0.31
By Economic Cycle:			
1969-1973	4.44	4.93	0.49
1973-1979	7.59	7.45	-0.14
1979-1990	4.99	4.62	-0.37
1990-2001	2.45	2.08	-0.37
2001-2007	2.64	2.52	-0.12
2007-2019	1.75	1.56	-0.19
2019-2023 (incomplete cycle)	4.74	4.13	-0.60
By Multiple Complete Cycles:			
Last Six: 1969-2019 (50 years)	3.62	3.42	-0.20
Last Five: 1973-2019 (46 years)	3.55	3.29	-0.26
Last Four: 1979-2019 (40 years)	2.96	2.68	-0.28
Last Three: 1990-2019 (29 years)	2.20	1.96	-0.24
Last Two: 2001-2019 (18 years)	2.05	1.88	-0.17

Note: Price differentials displayed may not equal the CPI-W less GDP deflators displayed because of rounding.

2.3.2 Future Growth in the CPI-W

If only past inflation rates were used to determine the assumed ultimate rate for the future, then only the period (e.g., the most recent 50 or 20 years) and method (e.g., a simple, weighted, or geometric average) would need to be chosen. The best historical period would be the one that is most representative of the conditions that are expected to prevail over the upcoming 75-year projection period. The historical record is filled with inflation-related events, some of which occurred in unique circumstances and have limited relevance for projecting the future. These include the Vietnam War, oil price shocks, and periods of price controls. Furthermore, after a historically unusual departure in the 1970s, monetary policy returned to a relatively strong emphasis on price stability.

While these specific historical events will not recur in the future (at least not exactly as they have in the past), other inflation-related events may take their place. The spike in inflation following the pandemic-induced recession illustrates the continued possibility of inflationary episodes, especially those triggered by supply shocks, and thus more difficult to counteract with monetary

policy. At the same time, long-term market interest rates during the period of elevated inflation have not revealed a significant increase in the expected long-run inflation rate, indicating continued confidence that monetary policy will be consistent and generally successful in containing inflation. The appreciation of the U.S. dollar during the inflation wave of 2021-2022, which preceded the Federal Reserve's interest rate increases, is also consistent with confidence in the U.S. monetary policy.

It is reasonable to expect additional upward pressure on the future growth rate in the CPI due to changes in international trade. The ratio of net exports (i.e., exports less imports) to GDP averaged about -3.2 percent over the last economic cycle, i.e., the 12-year period from 2008 through 2019. Part of this imbalance is due to imports of relatively low-priced consumer goods from emerging economies, such as China. However, as these developing economies mature, their average wage and consumption levels are expected to rise relative to their output, and their currencies and price levels are expected to rise relative to those of the U.S. This may lessen the downward pressure on the prices of basic commodities and, therefore, the CPI. These trends are also expected to ultimately return the ratio of net exports to GDP to zero in the future.

OCACT believes that the 2.96 percent average annual growth rate for the adjusted CPI-W for the last four economic cycles from 1979 to 2019 is higher than the most reasonable assumption for the ultimate CPI-W annual rate of increase, because it includes several years of high inflation rates unlikely to be repeated at a similar frequency under the current monetary policy. Over the last three complete economic cycles (from 1990 to 2019), which better reflect the current domestic monetary policy environment, the average annual growth rate for the adjusted CPI-W was 2.20 percent. However, that period includes unusually low inflation rates of the last cycle, heavily influenced by the deep recession of 2007-2009, slower-than-usual recovery, and a continuation of a trend of inexpensive imported goods, a set of circumstances also not likely to be typical in the long run. Thus, the assumed ultimate rate of increase in the CPI-W for the 2025 Trustees Report is 2.40 percent for alternative II, and 3.00 and 1.80 percent for alternatives I and III, respectively, the same as the rates assumed for the 2024 Trustees Report.

2.4 Gross Domestic Product Implicit Price Deflator (PGDP)

2.4.1 Historical Behavior of the Adjusted PGDP

Table 2.3 shows historical data for the average annual percentage change in PGDP and its key components. The PGDP can be viewed as a weighted average of its key components, which include the implicit price deflator for personal consumption expenditures (PGDP_C), the implicit price deflator for gross private domestic investment (PGDP_I), and the implicit price deflator for government consumption expenditures and gross investment (PGDP_G). While the implicit price deflators for imports and exports also contribute to PGDP over the historical period, the effect of net exports on the deflator is assumed to be zero on average over the 75-year projection period. The weights are the ratios of the components' nominal expenditures to total nominal GDP. The weights have been relatively stable in the historical period. In 2023, the weights for personal consumption, investment, and government expenditures were about 0.68, 0.18, and 0.17, respectively. These weights summed to more than one because net exports were negative. Adjusting for the assumed effect of net exports on the PGDP, the weights for personal consumption, investment, and government expenditures are assumed to be 0.63, 0.18, and 0.19,

respectively. These values are consistent with the average values observed in the historical period.

Table 2.3: Average Annual Percentage Change in the GDP Deflator, and the Implicit Price Deflators for Consumption Expenditures (PGDP_C), Investment Expenditures (PGDP_I) and Government Expenditures (PGDP_G)

	GDP Deflator	PGDP_C	PGDP_I	PGDP_G
Long-Term Historical Averages:				
1958-2023 (65 years)	3.27	3.25	2.56	3.92
1973-2023 (50 years)	3.37	3.42	2.62	3.86
1973-1998 (25 years)	4.50	4.71	3.74	4.75
1998-2023 (25 years)	2.25	2.14	1.51	2.97
By Economic Cycle:				
1969-1973	5.04	4.43	4.72	7.57
1973-1979	7.54	7.75	8.64	7.55
1979-1990	4.62	4.95	3.42	4.88
1990-2001	2.08	2.12	0.68	2.79
2001-2007	2.52	2.36	2.18	4.05
2007-2019	1.56	1.50	0.61	1.92
2019-2023 (incomplete cycle)	4.13	3.87	3.82	4.12
By Multiple Complete Cycles:				
Last Six: 1969-2019 (50 years)	3.44	3.46	2.69	4.13
Last Five: 1973-2019 (46 years)	3.30	3.38	2.52	3.83
Last Four: 1979-2019 (40 years)	2.68	2.74	1.63	3.29
Last Three: 1990-2019 (29 years)	1.96	1.91	0.96	2.69
Last Two: 2001-2019 (18 years)	1.88	1.78	1.13	2.63

Note: All values shown are consistent with the unadjusted values reported by BEA, because adjusted values are not available for the components of PGDP. Therefore, the values shown in this table may differ from the values shown in Tables 2.2 and 2.6.

The annual percentage change in PGDP tends to be lower than the annual percentage change in the CPI-W, as shown in Table 2.2, primarily due to two factors. First, the computational weighting method for the PGDP allows for substitution between items over time, which contributes to a slower annual rate of change when compared to the CPI-W. Second, the PGDP covers investment and government expenditures in addition to consumer expenditures. The second factor generally contributes to slower growth in PGDP due to the PGDP_I, apart from the 1969-1973 period and the 2001-2007 period where the average annual growth in PGDP_G was elevated due to the Vietnam war and the Afghanistan and Iraq wars, respectively. While there are other differences between the two measures, such differences are relatively less important in explaining the differences in the annual percentage change.

The long-run historical growth rate in PGDP is mostly explained by the separate historical growth rates in PGDP_C, PGDP_I, and PGDP_G. The historical and expected future growth rates for each component deflator are examined below.

2.4.1.1 Adjusted Deflator for Personal Consumption Expenditures (PGDP_C)

While both the PGDP_C and the CPI-W focus on changes in the prices of consumer goods, the PGDP_C differs from the CPI-W in terms of the formula used for the computation and the scope of items covered. The PGDP_C formula allows for substitution between items, which tends to result in a lower annual rate of change when compared to the CPI-W. The difference in the scope of items covered tends to contribute less to systematic differences over time than the difference in the formula. Thus, all else equal, the average annual change in the PGDP_C contributes to the annual percentage change in the PGDP being lower than the annual percentage change in the CPI-W.

When examining the historical data on the PGDP_C and the CPI-W, the more recent complete economic cycles provide a good basis for assessing the future relationship between the two price measures because the BLS provides the information necessary to produce a good approximation of the current CPI-W computation method from 1979 to the present. Over the last four complete economic cycles (40-year period from 1979 to 2019), the average annual growth rate for the adjusted PGDP_C was 2.74 percent, or 0.22 percentage point below the CPI-W growth rate of 2.96 percent. Over the last three complete economic cycles (29-year period from 1990 to 2019), the average annual growth rate for the adjusted PGDP_C was 1.91 percent, or 0.29 percentage point below the CPI-W growth rate of 2.20 percent. Over the last two complete economic cycles (18-year period from 2001 to 2019), the average annual growth rate for the adjusted PGDP_C was 1.78 percent, or 0.26 percentage point below the CPI-W growth rate of 2.05 percent. Over the most recently completed economic cycle from 2007 to 2019, the average annual growth rate for the adjusted PGDP_C was 1.50 percent, or 0.26 percentage point below the CPI-W growth rate of 1.75 percent.[35]

The historical difference in the last two complete economic cycles between the PGDP_C and the CPI-W of 0.26 percentage point is similar to the difference between the CPI-U and the chained-CPI-U (C-CPI-U), as shown in Table 2.4. Like the PGDP_C, the C-CPI-U allows for substitution between items over time and tends to grow at a slower rate than the CPI-U. BLS has published monthly values for the C-CPI-U for each year beginning in January 2000. Final values for 2022 are now available. The average annual growth rate in the C-CPI-U from the first quarter of 2000 to the fourth quarter of 2022 was 2.22 percent. Over the same period, the average annual growth rates in the PGDP_C, CPI-U, and CPI-W were approximately 2.13, 2.49, and 2.50 percent, respectively. The data suggest that over this period, the contribution of the difference in computational methods was about 0.27 percentage point (i.e., 2.49 – 2.22), and that the PGDP_C price differential (the difference between the growth rates of PGDP_C and CPI-W) was -0.37 percentage point (i.e., 2.13 – 2.50).[36] OCACT believes that the PGDP_C price

[35] In calculations shown throughout this section, components may not sum to totals due to rounding.

[36] The data also suggest that from the first quarter of 2000 to the fourth quarter of 2022, the average annual growth rate in the C-CPI-U (2.49 percent) was a reasonable approximation of the average annual growth rate in the PGDP_C (2.50 percent).

differential of -0.37 may be temporarily increased in magnitude by the measurement differences specific to the inflation surge of 2021–2022.

Table 2.4: CPI-U vs. C-CPI-U Growth Rates

Year	CPI-U growth rate less C-CPI-U growth rate (December-to-December, percentage points)	
	All Items Less Food and Energy	All Items
2000	0.7	0.8
2001	0.6	0.3
2002	0.3	0.4
2003	0.4	0.2
2004	-0.1	0.1
2005	0.3	0.5
2006	0.4	0.3
2007	0.5	0.4
2008	0.0	-0.1
2009	0.3	0.3
2010	0.2	0.2
2011	0.0	0.0
2012	0.3	0.3
2013	0.2	0.2
2014	0.4	0.2
2015	0.4	0.3
2016	0.3	0.3
2017	0.5	0.4
2018	0.5	0.4
2019	0.6	0.5
2020	-0.1	-0.1
2021	0.4	0.5
2022	0.1	0.0
Average 2000-2022	0.31	0.27

Over the long-range period, it is reasonable to assume that the average annual growth rates in the CPI-W and CPI-U will be roughly equal. It also seems reasonable to assume that the difference in the long-range average annual growth rates (PGDP_C less CPI-W) will be -0.30 percentage point, and that this difference will be only due to the expected 0.30 percentage point effect from the different computational weighting methods. Stated differently, the expected growth-rate differential for the personal consumption deflator (PGDP_C less CPI-W) due to factors other than the computational weighting methods is assumed to be zero. Thus, the assumed ultimate annual growth rate for PGDP_C is 2.1 percent, equal to the assumed ultimate annual growth rate for CPI-W (i.e., 2.4 percent) less the 0.30 percentage point effect of the different computational weighting methods.

2.4.1.2 Deflator for Investment Expenditures (PGDP_I)

The PGDP_I can be viewed as a weighted average of deflators for its principal components: investment in equipment (PGDP_INE), investment in intellectual property (PGDP_INIP), residential investment (PGDP_IR), and investment in nonresidential structures (PGDP_INS).[37] The equipment and intellectual property components in their current form were first used in the 2013 revisions to NIPA. The 2018 comprehensive revisions to NIPA further refined the definition, which resulted in revisions to historical data for investment in software and computer equipment.

Deflator for Equipment (PGDP_INE): Over the last four complete economic cycles (the 40-year period from 1979 to 2019), the average annual growth rate was about -0.15 percent for the PGDP_INE, compared to 2.74 percent for the PGDP_C. The PGDP_INE growth rate has been depressed by the rise in nominal investment expenditures for computers and the sharp decline in their quality-adjusted prices. Over this period, the deflator for computers fell at an average annual rate of about 11.08 percent, and the ratio of nominal investment expenditures for computers to all investment expenditures for equipment rose from about 5 percent in 1979 to about 13 percent in the late 1990s, followed by a decline to about 9 percent in 2014-2017. The ratio rose slightly to about 10 percent in 2018-2019 and averaged about 12 percent for 2020 through 2023.

It seems reasonable to assume that quality-adjusted computer prices will continue to decline in the future, but at a somewhat slower rate. The average annual rate of decline was about 12.9 percent over the 1982 to 1994 period, 20.2 percent over the 1994 to 2001 period, 10.1 percent over the 2001 to 2009 period, and 0.7 percent over the 2009 to 2023 period. The large rate of decline in the late 1990s was probably due to a combination of technological advances and production volume increases that are unlikely to be sustained over a longer period. On the other hand, the recent slowdown has been dramatic, but it is unclear if it is permanent. It seems reasonable to assume that the future rate of price decline will be similar to that over the last two complete economic cycles (18 years between 2001 and 2019) over which the rate of decline was 5.3 percent per year; thus, the assumed rate of decline in quality-adjusted computer prices is 5 percent per year. Furthermore, it is expected that the ratio of nominal investment expenditures for computers to all investment expenditures for equipment will stabilize at the approximate average value of the ratio over the last decade (i.e., 10 percent).

Over the last four complete economic cycles (the period from 1979 to 2019), the deflator for equipment other than computers grew on average at a 1.16 percent annual rate, or 1.57 percentage points less than the 2.74 percent annual growth rate for the PGDP_C. OCACT believes that the growth rate in the price deflator for other equipment will continue to be depressed relative to the PGDP_C, since the prices for at least some items in other equipment will be driven down by the same types of future technological advancements expected for computers. Thus, it is reasonable to expect that, in the future, the average annual growth rate in other equipment will be about 0.6 percent, or 1.5 percentage points less than the 2.1 percent assumed ultimate average annual growth rate in the PGDP_C.

[37] This decomposition excludes the change in business inventories, which has averaged roughly 1.8 percent of total investment expenditures over the 40-year period from 1979 to 2019.

Using these average annual growth rates and weights, it is reasonable to set the assumed ultimate average annual rate of growth in PGDP_INE in the future to about 0.04 percent (i.e., -5.0 * 0.10 + 0.6 * 0.90).

Deflator for Intellectual Property (PGDP_INIP): Over the last four complete economic cycles (the 40-year period from 1979 to 2019), the average annual growth rate was about 1.24 percent for the PGDP_INIP, compared to 2.74 percent for the PGDP_C. The PGDP_INIP growth rate has been depressed by the rise in nominal investment expenditures for software and a slow but steady decline in its quality-adjusted prices. Over this period, the deflator for software fell at an average annual rate of about 1.76 percent, and the ratio of nominal investment expenditures for software to all investment expenditures for intellectual property rose from about 17 percent in 1979 to about 38 percent by 2000, and has since continued to slowly increase to about 42 percent in 2023.

Software prices have been declining slowly, but steadily. They declined over five of the last six economic cycles (the only exception being the 1973-1979 cycle), and their rate of decline ranged from 0.16 percent in the 1969-1973 cycle to 2.41 percent in 2001-2007. Over the last cycle (a 12-year period from 2007 to 2019), software prices declined at an average annual rate of 1.79 percent. It seems reasonable to expect some future price decline, but at a somewhat slower rate than the average over the last 40 years. OCACT expects that software prices will decline at a rate of 1 percent per year. OCACT also expects that the ratio of nominal investment expenditures for software to all investment expenditures for intellectual property will stabilize at about 45 percent.

Over the last four complete economic cycles (from 1979 to 2019), the deflator for intellectual property other than software grew on average at a 2.59 percent annual rate, or 0.15 percentage point less than the 2.74 percent annual growth rate for the PGDP_C. OCACT believes that it is reasonable to expect that, in the future, the average annual growth rate in the price deflator for other intellectual property will continue to be somewhat lower than the PGDP_C. The assumed growth rate in the deflator for other intellectual property is 2.0 percent, or 0.1 percentage point less than the 2.1 percent assumed ultimate average annual growth rate in the PGDP_C.

Using these average annual growth rates and weights, it is reasonable to set the assumed ultimate average annual rate of growth in PGDP_INIP in the future to about 0.65 percent (i.e., -1 * 0.45 + 2.0 * 0.55).

Deflator for Residential Investment (PGDP_IR): Residential investment is almost entirely composed of investment in fixed structures, which, in turn, is composed of single-family, multifamily, and other structures (e.g., manufactured homes, dormitories, etc.). Over the 22-year period from 1979 to 2001, which spans two complete economic cycles, the average annual growth rate was about 3.80 percent for the PGDP_IR, about 0.27 percentage point higher than the 3.52 percent growth rate for the PGDP_C over the same period. Over the next economic cycle (6-year period from 2001 to 2007), this differential increased substantially. From 2001 to 2007, the average annual growth rate was about 4.74 percent for the PGDP_IR, about 2.38 percentage points above the 2.36 percent growth rate for the PGDP_C.

The unusually large growth rate differential between the PGDP_IR and the PGDP_C over the 2001-2007 period was consistent with temporary market conditions characterized by overheated demand for housing, house "flipping," subprime mortgage lending, and unusually high profits and gains in stock prices for the builders of new homes. The last complete economic cycle, 2007 to 2019, began with a market correction: the housing bubble collapsed, new and existing home sales dropped nationally, prices of new homes in most markets declined, and the profits and stock prices of new homebuilders plummeted. After a relatively slow housing market recovery, home prices in 2019 were about 14 percent above the 2006 level, while the number of sales remained well below the mid-2000s level. During the latest complete economic cycle, from 2007 to 2019, the average annual growth in PGDP_IR and PGDP_C was 2.16 and 1.50 percent, respectively, indicating a 0.66 percent (2.16 – 1.50) differential between the two deflators. From 2019 to 2022, home prices increased further, by about 42 percent, due to a combination of factors unique to the COVID-19 pandemic and the policy response that followed: historically low interest rates, changes in housing preferences, and a rapid rise in the prices of other assets. More surprisingly, home prices have been resilient to the large increases in nominal interest rates since 2022. While the average home price initially declined by 5 percent from June 2022 to January 2023, this was followed by a rebound and the price level in June 2023 exceeded the previous June 2022 peak, and the price growth has accelerated in 2024. The number of home sales declined in 2022 and has not rebounded, so it remains to be seen if the current price level is sustainable.[38]

One of the reasons home prices have been growing faster than the overall price level (whether measured by CPI-W or PGDP-C) has been low productivity growth rate in the construction industry. Over the 35 years from 1987 to 2022, labor productivity in single-family residential construction changed at an average annual rate of -0.37 percent. By far the most residential construction in the U.S. is in single-family units, so this decline is only partially offset by labor productivity in multiple-family residential construction, which increased at an average rate of 1.51 percent during the same period.[39]

OCACT believes housing prices will grow at a somewhat faster rate than PGDP_C, but a large difference in rates might not be sustainable over a long period. The assumed ultimate average annual rate of increase in the PGDP_IR is therefore 2.35 percent, or about 0.25 percentage point higher than the 2.1 percent assumed ultimate average annual rate of increase in the PGDP_C. [40]

Deflator for Investment in Nonresidential Structures (PGDP_INS): Investment in nonresidential structures includes investment in structures used for drilling for petroleum and natural gas. Over the 22-year period from 1979 to 2001, spanning two complete economic cycles, the average annual growth rate for PGDP_INS was 3.69 percent, or slightly less than the 3.80 percent growth rate in PGDP_IR. However, over the next complete economic cycle from 2001 to 2007, the average annual growth rates for PGDP_INS and PGDP_IR were 7.49 and 4.74 percent,

[38] Home price data in this paragraph are from the S&P/Case-Shiller U.S. National Home Price Index, available from FRED, series ID: CSUSHPINSA.

[39] Construction Labor Productivity: U.S. Bureau of Labor Statistics (bls.gov): https://www.bls.gov/productivity/highlights/construction-labor-productivity.htm.

[40] In the future, the PGDP_IR may grow faster than the PGDP_C due to more rapid increases in the prices of scarce land and basic building commodities such as copper, lumber, and cement.

respectively. The relatively faster average annual growth rate for PGDP_INS occurred because the average annual growth rate in the deflator for investment in petroleum and natural gas was about 20.3 percent. Excluding the effects of petroleum and natural gas, the average annual growth rate for PGDP_INS was about 5.0 percent, closer to the 4.74 percent average annual growth rate in PGDP_IR over the period.

OCACT believes the relatively rapid growth rate in the deflator for investment in petroleum and natural gas is a temporary market phenomenon associated with a run-up in oil prices. The price of a barrel of oil rose from about $26 in 2001 to $72 in 2007, or at an average annual rate of about 19.0 percent. As the market price for oil rose, previously expensive technologies became economically profitable. Over the last complete cycle, from 2007 to 2019, the deflator for investment in petroleum and natural gas rose at a much lower annual rate of 1.8 percent, and PGDP_INS grew at a 2.15 percent annual rate, or 0.01 percentage point lower than the 2.16 percent annual growth rate in PGDP_IR. In the four years since the last cycle peak (2019 to 2023), the deflator for investment in petroleum and natural gas decreased at an annual rate of 2.4 percent, partly offsetting the 7.4 percent annual growth rate in the deflator for investment in other non-residential structures, resulting in an annual growth rate in PGDP_INS of 6.44 percent, considerably higher than the adjusted PGDP_C (3.87 percent), but lower than PGDP_IR (7.63 percent). OCACT believes the large recent decrease in the deflator for investment in petroleum and natural gas is also a temporary phenomenon, caused by record low oil prices in the early part of the pandemic. The price of a barrel of oil averaged less than $17 in April 2020, and was even negative on April 20, 2020. As the global economy recovered from the recession, the price of a barrel of oil increased to well above its pre-pandemic level, exceeding $90 in February 2022, and then increased even further after Russia's invasion of Ukraine, peaking at above $120. Although the price of oil has declined from its peak in mid-2022, so far it remains much higher than its levels over the period 2015 through 2020. The deflator for investment in petroleum and natural gas has followed a similar pattern, decreasing sharply in 2020 and 2021, but increasing in 2022 and 2023.

OCACT believes that in the long-range future the average annual growth rate in the price of a barrel of oil will not be significantly different from the growth rate in the PGDP_C and that the average annual growth rates in the PGDP_INS and PGDP_IR will be approximately equal. Thus, the assumed ultimate average annual rate of increase in PGDP_INS is 2.35 percent, or 0.25 percentage point higher than the 2.1 percent assumed ultimate average annual growth rate in the PGDP_C, and equal to the assumed ultimate average annual rate of increase in the PGDP_IR.

The ratio of investment expenditures in equipment to total investment expenditures has averaged about 36 percent over the past 60 years. For the 20 years 2004 through 2023, the average has decreased slightly to 32 percent. OCACT assumes that the share of investment expenditures in equipment to total investment expenditures will be about 35 percent, in the future. Investment in intellectual property has been an increasing share of total investment. Much of the increase, however, has been due to the sharp rise in investment in software from the 1970s to the early 2000s. Since the share of software in the investment in intellectual property has stabilized recently, OCACT believes it is reasonable to assume that the ratio of investment in intellectual property to total investment will be similar to its recent levels, or about 25 percent. OCACT also assumes that the investment expenditure weights for nonresidential investment for structures and

residential investment will account for approximately equal shares of the rest of the investment expenditures, or 20 percent each.

Thus, the assumed ultimate average annual rate of increase for PGDP_I is 1.12 percent (i.e., 0.04 * 0.35 + 0.65 * 0.25 + 2.35 * (0.20 + 0.20)).

2.4.1.3 Deflator for Government Expenditures (PGDP_G)

The PGDP_G can be viewed as a weighted average of deflators for government consumption expenditures (PGDP_GC) and government investment (PGDP_GI).

Deflator for Government Consumption Expenditures (PGDP_GC): Government consumption expenditures can be separated into employee compensation and other (residual) government consumption expenditures. In the NIPA, the deflator for government consumption expenditures on employee compensation is defined as an index proportional to average employee compensation. From 1979 to 2001, a 22-year period covering two complete economic cycles, the average annual growth rate in the average employee compensation in general government and the adjusted CPI-W were about 5.35 and 3.71 percent, respectively. This indicates that over the period, the real annual growth rate in average employee compensation was 1.58 percent (i.e., 100 * (1.0535 / 1.0371 – 1)), slightly higher than the 1.23 percent assumed ultimate real annual growth rate in average compensation in the 2024 Trustees Report.[41]

From 2001 to 2007, a 6-year period covering a complete economic cycle, the average annual growth rate in the average government employee compensation and the adjusted CPI-W were about 4.78 and 2.64 percent, respectively. This indicates that over the period, the real annual growth rate in average employee compensation was 2.09 percent (i.e., 100 * (1.0478 / 1.0264 – 1)), about 0.86 percentage point higher than the 1.23 percent ultimate real annual growth rate in average compensation assumed in the 2024 Trustees Report.

OCACT believes that the relatively high growth rate in the deflator for employee compensation over the 2001 to 2007 period was a temporary phenomenon mostly associated with military pay incentives related to the conflicts in Iraq and Afghanistan. Over this period, the average annual growth rates in the average compensation of state and local, federal civilian, and federal military employees were 4.10, 5.62, and 9.52 percent, respectively. By contrast, between 2007 and 2019, the latest complete economic cycle, the average annual growth rates in the average compensation of state and local, federal civilian, and federal military employees were 2.37, 2.56, and 1.87 percent, respectively, and the average annual growth rate in the deflator for employee compensation was 2.37 percent, or just 0.62 percentage point higher than the 1.75 percent growth rate in CPI-W over the same period.

It is reasonable to assume that in the future the average annual nominal growth rate in the average compensation for all government employees will be equal to the rate assumed for the economy-wide average compensation, which is assumed to be 3.66 percent for the 2025 Trustees

[41] For the 2024 Trustees Report alternative II, the Trustees assumed that the ultimate average annual nominal rates of increase in the average compensation for all employees and in the CPI were 3.66 and 2.4 percent, respectively.

Report. Therefore, OCACT believes that the average annual growth rate in the deflator for government consumption expenditures on employee compensation will be 3.66 percent.[42]

It is also reasonable and consistent to assume that the average annual growth rate in the deflator for other government consumption will be equal to the assumed ultimate average annual growth rate in the PGDP_C, or 2.1 percent.

Using rough averages over the 1979 to 2019 period, OCACT assumes that future government consumption expenditures for employee compensation will be about 71 percent of total government consumption expenditures. Thus, the assumed ultimate average annual growth rate for PGDP_GC is 3.21 percent (i.e., 3.66 * 0.71 + 2.1 * 0.29).

Deflator for Government Investment (PGDP_GI): Government investment can be separated into 1) structures, 2) equipment, and 3) intellectual property. It is reasonable to assume that the future average annual growth rate in the deflator for each of these categories of government investment will be equal to the expected future average annual growth rate in the corresponding categories of private investment. Thus, OCACT also assumes the future average annual growth rates in the deflator for government investment will be 2.35 percent for investment in structures, 0.04 percent for investment in equipment, and 0.65 percent for investment in intellectual property.

Using rough averages over the 1979 to 2019 period, OCACT assumes the future ratio of government investment components to total government investment will be about 0.45 for structures, about 0.25 for equipment, and about 0.30 for intellectual property. Thus, the assumed ultimate average annual growth rate for PGDP_GI is 1.26 percent (i.e., 2.35 * 0.45 + 0.04 * 0.25 + 0.65 * 0.30).

Finally, the historical proportions of government consumption and investment expenditures over the last four economic cycles (40-year period from 1979 to 2019) averaged about 78 and 22 percent of total government expenditures, respectively. OCACT assumes that the future proportions of government consumption and investment expenditures will also be 78 and 22 percent of total government expenditures, respectively. Hence, the assumed ultimate average annual rate of increase in the PGDP_G is 2.78 percent (i.e., 3.21 * 0.78 + 1.26 * 0.22).

2.4.1.4 Ultimate Assumption for the GDP Deflator

The assumed annual growth rates for the components of the GDP deflator, and corresponding weights, result in an assumed average annual growth rate of 2.05 percent for the intermediate assumption. The 2.05 percent is approximately equal to the sum of the PGDP_C component of 2.1 percent times its weight of 0.63, the PGDP_I component of 1.12 percent times its weight of 0.18, and the PGDP_G component of 2.78 percent and its weight of 0.19. For alternatives I and III the assumptions are 2.75 percent and 1.35 percent, respectively.

[42] OCACT assumes the size of the active military remains constant throughout the projection period, rather than increasing proportionally with the civilian employment. This implies a gradual shift in weights between civilian government employment and the military and, since the average military compensation is higher, a slightly slower average growth in government compensation. However, the effect is small.

The assumed annual increase in the GDP deflator for the 2025 Trustees Report is unchanged from that used in the 2024 Trustees Report.

2.5 Price Differential

The price differential is defined as the annual growth rate in the PGDP less the annual growth rate in the CPI-W. For the 2025 Trustees Report, the assumed ultimate price differential is -0.25, -0.35, and -0.45 percentage point for alternative I, II, and III, respectively.

For alternative II, the ultimate price differential of -0.35 percentage point is the sum of -0.30 percentage point due to the difference in computational methods and -0.05 percentage point due to coverage differences between the PGDP and CPI-W. These values are unchanged from those used in the 2024 Trustees Report.

2.6 Projections from Other Sources

At the time assumptions were developed, the following projections from other sources were available.

S&P Global provided projections through 2054 in its August 2024 30-year trend forecast (see *The 30-Year Focus, Third Quarter, August 2024*). Over the 20-year period from 2034 to 2054, S&P Global projected an average annual rate of increase of 2.19 percent for the CPI and 2.18 percent for the PGDP, with a resulting price differential of -0.01 percentage point (2.18 – 2.19). Moody's Analytics provided projections through 2054 in its September 2024 forecast. Over the 20-year period from 2034 to 2054, Moody's Analytics projected an average annual growth rate of 2.57 percent for the CPI-W and 2.15 percent for the PGDP, for a price differential of -0.42 percentage point (2.15 – 2.57). Blue Chip's October 2024 Economic Indicators report of top analysts' forecasts provides a consensus projection of 2.2 percent for CPI and 2.1 percent for PGDP in 2035.

The Office of Management and Budget (OMB) Mid-Session Review to the Fiscal Year 2025 Budget included projections through 2034. OMB's annual growth rates for the PGDP and CPI-W (and CPI-U) for 2034 were 2.11 and 2.30 percent, respectively. Thus, OMB projected a price differential of -0.19 percentage point (i.e., 2.11 – 2.30). In *The Long-Term Budget Outlook: 2024 to 2054* published in March 2024, the Congressional Budget Office (CBO) included projections through 2054. CBO's annual growth rates for the PGDP and CPI-U from 2034 to 2054 were 2.01 and 2.25 percent, respectively. Thus, CBO projected an average annual price differential of -0.24 percentage point (i.e., 2.01 – 2.25 for the period.

The Social Security Advisory Board's 2019 Technical Panel on Assumptions and Methods recommended assuming an ultimate (i.e., long-range average) annual rate of increase in the CPI-W of 2.4 percent for alternative II, and a price differential of -0.35 percentage point. The prior technical panel, which met in 2015, recommended an ultimate annual rate of increase in the CPI-W of 2.5 percent for alternative II, and a price differential of -0.4 percentage point.

Table 2.5: Adjusted CPI-W: Compound Annual Rates of Growth (%) Base Year = 1982-1984

		From																					
To	Variable	1961	1965	1970	1975	1980	1985	1990	1995	2000	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
1961	35.26																							
1965	36.84	1.10																						
1970	43.89	2.46	3.56																					
1975	59.19	3.77	4.86	6.16																				
1980	86.03	4.81	5.82	6.96	7.77																			
1985	111.58	4.92	5.70	6.42	6.55	5.34																		
1990	132.27	4.66	5.25	5.67	5.51	4.39	3.46																	
1995	149.99	4.35	4.79	5.04	4.76	3.78	3.00	2.55																
2000	167.96	4.08	4.43	4.58	4.26	3.40	2.76	2.42	2.29															
2005	189.95	3.90	4.19	4.27	3.96	3.22	2.70	2.44	2.39	2.49														
2010	212.81	3.74	3.97	4.03	3.72	3.07	2.62	2.41	2.36	2.40	2.30													
2011	220.45	3.73	3.97	4.02	3.72	3.08	2.65	2.46	2.44	2.50	2.51	3.59												
2012	225.13	3.70	3.93	3.97	3.68	3.05	2.63	2.45	2.42	2.47	2.46	2.85	2.12											
2013	228.32	3.66	3.87	3.91	3.62	3.00	2.59	2.40	2.36	2.39	2.33	2.37	1.77	1.42										
2014	231.85	3.62	3.83	3.86	3.56	2.96	2.55	2.37	2.32	2.33	2.24	2.17	1.70	1.48	1.55									
2015	231.02	3.54	3.74	3.76	3.46	2.86	2.46	2.26	2.18	2.15	1.98	1.66	1.18	0.86	0.59	-0.36								
2016	233.35	3.50	3.69	3.70	3.40	2.81	2.41	2.21	2.13	2.08	1.89	1.55	1.14	0.90	0.73	0.32	1.01							
2017	238.30	3.47	3.66	3.67	3.37	2.79	2.40	2.20	2.13	2.08	1.91	1.63	1.31	1.14	1.08	0.92	1.56	2.12						
2018	244.37	3.45	3.63	3.64	3.35	2.79	2.40	2.22	2.15	2.11	1.96	1.74	1.48	1.38	1.37	1.32	1.89	2.34	2.55					
2019	248.44	3.42	3.60	3.60	3.31	2.76	2.38	2.20	2.13	2.08	1.94	1.73	1.51	1.42	1.42	1.39	1.83	2.11	2.11	1.67				
2020	251.70	3.39	3.56	3.55	3.27	2.72	2.35	2.17	2.09	2.04	1.89	1.69	1.48	1.40	1.40	1.38	1.73	1.91	1.84	1.49	1.31			
2021	265.27	3.42	3.59	3.59	3.31	2.78	2.43	2.27	2.22	2.20	2.11	2.02	1.87	1.84	1.89	1.94	2.33	2.60	2.72	2.77	3.33	5.39		
2022	287.96	3.50	3.67	3.68	3.42	2.92	2.60	2.46	2.45	2.48	2.48	2.55	2.46	2.49	2.61	2.75	3.20	3.57	3.86	4.19	5.04	6.96	8.55	
2023	298.99	3.51	3.68	3.69	3.43	2.94	2.63	2.50	2.49	2.54	2.55	2.65	2.57	2.61	2.73	2.87	3.28	3.60	3.85	4.12	4.74	5.91	6.17	3.83

Table 2.6: Adjusted GDP Deflator: Compound Annual Rates of Growth (%) Base Year = 2017

		From																					
To	Variable	1961	1965	1970	1975	1980	1985	1990	1995	2000	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
1961	15.93																							
1965	16.79	1.32																						
1970	20.35	2.76	3.92																					
1975	27.88	4.08	5.20	6.50																				
1980	39.38	4.88	5.85	6.82	7.15																			
1985	50.82	4.95	5.69	6.29	6.19	5.24																		
1990	59.31	4.64	5.18	5.49	5.16	4.18	3.14																	
1995	66.93	4.31	4.72	4.88	4.48	3.60	2.79	2.45																
2000	72.71	3.97	4.28	4.34	3.91	3.11	2.42	2.06	1.67															
2005	81.54	3.78	4.03	4.05	3.64	2.95	2.39	2.14	1.99	2.32														
2010	89.62	3.59	3.79	3.78	3.39	2.78	2.30	2.09	1.96	2.11	1.91													
2011	91.47	3.56	3.75	3.73	3.36	2.76	2.29	2.08	1.97	2.11	1.93	2.06												
2012	93.18	3.52	3.71	3.69	3.31	2.73	2.27	2.07	1.96	2.09	1.92	1.97	1.87											
2013	94.79	3.49	3.67	3.64	3.27	2.70	2.25	2.06	1.95	2.06	1.90	1.89	1.80	1.73										
2014	96.44	3.46	3.63	3.60	3.23	2.67	2.23	2.05	1.94	2.04	1.88	1.85	1.78	1.73	1.74									
2015	97.28	3.41	3.58	3.54	3.17	2.62	2.19	2.00	1.89	1.96	1.78	1.65	1.55	1.45	1.31	0.87								
2016	98.21	3.36	3.52	3.48	3.12	2.57	2.15	1.96	1.84	1.90	1.71	1.54	1.43	1.32	1.19	0.91	0.96							
2017	100.00	3.33	3.49	3.45	3.09	2.55	2.14	1.95	1.84	1.89	1.72	1.58	1.50	1.42	1.35	1.22	1.39	1.82						
2018	102.29	3.32	3.47	3.42	3.07	2.54	2.14	1.97	1.86	1.91	1.76	1.67	1.61	1.57	1.54	1.48	1.69	2.06	2.29					
2019	103.98	3.29	3.43	3.39	3.04	2.52	2.13	1.96	1.85	1.90	1.75	1.67	1.62	1.58	1.56	1.52	1.68	1.92	1.97	1.65				
2020	105.38	3.25	3.40	3.34	3.00	2.49	2.11	1.93	1.83	1.87	1.72	1.63	1.59	1.55	1.53	1.49	1.61	1.78	1.76	1.50	1.35			
2021	110.17	3.28	3.42	3.37	3.03	2.54	2.17	2.02	1.94	2.00	1.90	1.89	1.88	1.88	1.90	1.92	2.10	2.33	2.45	2.51	2.93	4.55		
2022	118.04	3.34	3.48	3.44	3.12	2.65	2.30	2.17	2.12	2.23	2.20	2.32	2.35	2.39	2.47	2.56	2.80	3.11	3.37	3.65	4.32	5.84	7.14	
2023	122.27	3.34	3.48	3.44	3.13	2.67	2.34	2.22	2.18	2.29	2.28	2.42	2.45	2.50	2.58	2.67	2.90	3.18	3.41	3.63	4.13	5.08	5.35	3.58

2.7 Appendix

OCACT adjustments to the published CPI-W annual growth rates. Between 1978 and 2019, OCACT set the annual growth rate in the adjusted CPI-W to the growth rate in the published CPI-W plus an annual growth rate differential, defined as the growth rate in the CPI-U "Research Series" (CPI-U-RS) less the growth rate in the published CPI-U. BLS constructs the CPI-U-RS by recalculating the CPI-U back to 1978 using present methodology (see https://www.bls.gov/cpi/research-series/home.htm). An exception to this specification was made because BLS introduced an improvement for "rental equivalence" in 1983 for the CPI-U, but not until 1985 for the CPI-W. Thus, for 1983 and 1984, the annual percent change in the adjusted CPI-W is defined as the percent change in the CPI-U-RS less 0.1 percentage point. This adjustment reflects the belief that, had the introductions been simultaneous in 1983, the observed differences in growth between the two inflation measures would have been equal to their published compound average annual difference (0.1 percentage point) over the post-1985 period.

Between 1967 and 1977, the annual growth rate in the adjusted CPI-W was set to the growth rate in the published CPI-W less 0.2 percentage point plus an annual growth rate differential, defined as the growth rate in the CPI-U-X1 (a BLS "experimental series" that incorporates the improvement for rental equivalence into the historical CPI-U) less the growth rate in the actual published CPI-U. The 0.2 percentage point adjustment reflects a BLS estimate of the effect of introducing an improved geometric weighting formula into the CPI-W beginning in January 1999. Finally, for 1966 and earlier, the annual growth rate in the adjusted CPI-W was set to the growth rate in the published CPI-W less the 0.2 percentage point adjustment for the improved geometric formula.

OCACT adjustments to the published PGDP and real GDP (and therefore productivity) annual growth rates. As mentioned above, starting in January 1999, BLS introduced a new geometric weighting formula to the CPI, estimating that it would lower the future annual growth rate in the CPI by about 0.2 percentage point. BEA estimates that this change would have had a 50.0 percent "feed-through" effect on the aggregate annual PGDP growth rate in the past. Thus, due to BLS' introduction of an improved geometric weighting formula to the CPI, BEA lowered the annual growth rate in the aggregate PGDP by about 0.1 percentage point (0.2 * 50.0%). In addition, since the BLS improvement to the CPI does not alter the historical path of nominal GDP, BEA raised the annual real growth rate in the GDP by about 0.1 percentage point. However, BEA made these adjustments only back to 1978. Thus, to improve consistency, OCACT added the effect of this BLS improvement to the earlier data. That is, for 1978 and each earlier year, OCACT lowered the annual growth rate in the CPI by 0.2 percentage point, lowered the annual growth rate in the aggregate PGDP index by 0.1 percentage point, and raised the annual real growth rate in GDP, and therefore productivity, by 0.1 percentage point. Furthermore, a change in the CPI growth rate affects the PGDP through about 85.0% of the prices used to determine one of the components of the PGDP, that is, the GDP deflator for consumption (PGDP_C). Hence, the annual growth rate for the PGDP_C in 1978 and earlier was lowered by about 0.17 percent (0.2 * 0.85).

3. REAL GROWTH IN AVERAGE OASDI COVERED WAGE

THE 2025 TRUSTEES REPORT
OFFICE OF THE CHIEF ACTUARY, SOCIAL SECURITY ADMINISTRATION

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3 Real Growth in Average OASDI Covered Wage

3.1 Summary

For the 2025 Trustees Report, over the 65-year period from 2034 to 2099, the annual nominal growth rate in the average OASDI covered wage is assumed to be 4.78 percent, 3.56 percent, and 2.34 percent for alternatives I, II, and III, respectively (Table 3.1). [43] Also for the 2025 Trustees Report, the assumed ultimate annual rates of increase in the CPI-W are 3.00 percent, 2.40 percent, and 1.80 percent for alternatives I, II, and III, respectively (Table 2.1). Thus, for the 2025 Trustees Report, the annual real growth rate in the average OASDI covered wage, over the 65-year period from 2034 to 2099, is assumed to be 1.73 percent (104.78 / 103.00 – 1), 1.13 percent (103.56 / 102.40 – 1), and 0.53 percent (102.34 / 101.80 – 1) for alternatives I, II, and III, respectively. The real growth rates for alternatives I and II are slightly lower than was assumed in the 2024 report, while the real growth rate for alternative III is unchanged from that assumed in the 2024 Trustees Report.

Table 3.1: Assumed Growth Rates in Average OASDI Covered Wage

Measure (growth rates shown for last 65 years of projection period)	2025 Trustees Report Alternative			2024 Trustees Report Alternative			2025 Trustees Report Less 2024 Trustees Report		
	I	**II**	**III**	**I**	**II**	**III**	**I**	**II**	**III**
Annual Nominal Growth in Average OASDI Covered Wage	4.78	3.56	2.34	4.79	3.57	2.34	-0.01	-0.01	0.00
Adjusted for: CPI-W	3.00	2.40	1.80	3.00	2.40	1.80	0.00	0.00	0.00
Equals: Annual Real Growth in Average OASDI Covered Wage	1.73	1.13	0.53	1.74	1.14	0.53	-0.01	-0.01	0.00

3.2 Definitions

The average OASDI covered wage is defined as the ratio of total OASDI covered wages in a year to the number of workers with any OASDI covered wages during the year. The average real (i.e., inflation-adjusted) growth rate in the average OASDI covered wage, over a period from the beginning year *by* to the end year *ey*, is computed as

$$ARGAW_{by,ey} = \left(\frac{AW_{ey}}{AW_{by}} \cdot \frac{CPIW_{by}}{CPIW_{ey}}\right)^{\frac{1}{ey-by}} - 1$$

Where

$ARGAW_{by,ey}$ = average annual real growth rate in the average OASDI covered wage from beginning year *by* to end year *ey*;
AW_y = average nominal wage in year *y*;
$CPIW_y$ = annual average of CPI-W in year *y*.

[43] The 65-year period begins with the last year of the 10-year (2025 to 2034) short-range projection period and ends with the last year of the 75-year (2025 to 2099) long-range projection period.

Both the income to the Social Security program and the benefits paid are related to total OASDI covered earnings (i.e., the combination of OASDI covered wages and OASDI covered net earnings from self-employment). For this reason, the growth in average earnings, not average wages, is the subject of the balance of this section. The future real growth rates in average U.S. earnings, average U.S. wages, and the average OASDI covered wage are expected to be similar, with the sources of minor differences described below.

For the 2025 Trustees Report, the average annual rate of increase in average real OASDI covered earnings, over the 65-year period from 2034 to 2099, is assumed to be 1.73 percent, 1.14 percent, and 0.54 percent for alternatives I, II, and III, respectively. The values for alternatives I and III are slightly lower than in the 2024 Trustees Report and the value for alternative II is unchanged from that in the 2024 Trustees Report.

3.3 Measures of Real Growth: Economy-Wide and OASDI Covered Earnings

Average real earnings in the total U.S. economy are defined as the ratio of total nominal earnings (wage and salary disbursements and net proprietors' income) to total adjusted average weekly civilian employment (see Section 3.5 Appendix A) and U.S. Armed Forces, divided by the adjusted CPI-W. BEA estimates historical values for nominal earnings as part of its broader responsibility of maintaining the NIPA for the U.S. economy. BLS estimates the CPI-W from its sample of prices and the civilian employment from its monthly CPS data. Because CPS data for the U.S. represent average weekly employment, the growth in average earnings for the total U.S. economy represents the growth in average weekly earnings for those employed.

Average real earnings of OASDI covered workers differ from average U.S. earnings in two ways: the types of workers covered and the types of compensation reported.

The types of workers covered by the OASDI program have changed in the past as a result of changes in the law and shifts in employment. Even without further changes in the law, the proportion of federal civilian government employees covered under the OASDI program will continue to increase toward 100 percent. All federal civilian government employees hired after 1983 are covered under OASDI, while some of those hired earlier are not. Virtually all federal civilian government employees will be covered around 2030. As a result, the composition of OASDI covered employment, which has varied since 1940, will stabilize around 2030.

The types of compensation reported for the two measures differ primarily because employee-paid premiums for employer-sponsored group health insurance within cafeteria plans under Section 125 of the Internal Revenue Code are counted in the NIPA definition of U.S. earnings, but not reported as earnings for OASDI purposes. Like the employer-paid premiums, employee-paid premiums are projected to continue to grow faster than compensation. As a result, OASDI covered wages are projected to grow at a slightly lower rate than U.S. wages and, similarly, OASDI covered earnings are projected to grow at a slightly lower rate than U.S. earnings.

Average real weekly earnings in the total U.S. economy increased at an average annual rate of 0.92 percent over the last six complete economic cycles (1969-2019), 0.83 percent over the last

five cycles (1973-2019), 1.03 percent over the last four cycles (1979-2019), 1.23 percent over the last three cycles (1990-2019), 0.69 percent over the last two cycles (2001-2019), and 0.77 percent over the last complete cycle (2007-2019). The average annual real earnings of OASDI covered workers increased at an average annual rate of 0.95 percent over the last six complete economic cycles, 0.88 percent over the last five cycles, 0.93 percent over the last four cycles, 1.06 percent over the last three cycles, 0.72 percent over the last two cycles, and 0.67 percent over the last complete cycle (see Table 3.2 below). Since the end of the last complete cycle, from 2019 to 2023, average real weekly earnings increased by 0.63 percent a year and the average real earnings of OASDI covered workers increased by 0.54 percent a year.

As the proportion of workers covered by OASDI is expected to change much less in the future than it has in the past, it is reasonable to evaluate the 1.13 percent assumed average real rate of increase for average OASDI covered earnings for alternative II in relation to the historical real growth rate in average earnings for all workers in the total economy. The other difference between the average-weekly total economy and average-annual OASDI covered earnings measures is fluctuation in average weeks worked per year, which is mitigated by considering growth over complete economic cycles. Therefore, the balance of this section focuses on the past trends for average earnings in the U.S. economy.

Considering complete economic cycles, the average annual real growth rate in earnings for all workers in the total U.S. economy was 1.93 percent from 1969 to 1973 (4 years), -0.44 percent from 1973 to 1979 (6 years), 0.49 percent from 1979 to 1990 (11 years), 2.12 percent from 1990 to 2001 (11 years), 0.54 percent from 2001 to 2007 (6 years), and 0.77 percent from 2007 to 2019 (12 years).[44] The 1.13 percent assumed average future annual real growth rate in average OASDI covered earnings is between the historical average annual real growth rates in average U.S. earnings over the last four complete cycles (1.03 percent) and over the last three complete cycles (1.23 percent).

[44] Peaks in economic cycles roughly follow the NBER cycle dating, except for short recoveries such as 1980-1981, which are not counted as separate cycles.

Table 3.2: Average Annual Real Percentage Change in Average Earnings: Comparison of the U.S. Economy to OASDI Covered

	Average Real Earnings for U.S. Economy (1)	Total Links (2)	Ratio of Employed Labor Force to OASDI Covered Workers (3)	Ratio of OASDI Covered Earnings to U.S. Earnings (4)	Average Real Earnings for OASDI Covered (5)
Long-Term Historical Averages:					
1958-2023 (65 years)	1.20	-0.02	-0.09	0.06	1.18
1973-2023 (50 years)	0.82	0.04	0.01	0.02	0.86
1973-1998 (25 years)	0.75	0.19	0.09	0.09	0.94
1998-2023 (25 years)	0.88	-0.11	-0.06	-0.05	0.77
By Economic Cycle:					
1969-1973	1.93	-0.25	-0.15	-0.10	1.68
1973-1979	-0.44	1.00	0.46	0.53	0.56
1979-1990	0.49	0.11	0.09	0.02	0.60
1990-2001	2.12	-0.49	-0.23	-0.26	1.62
2001-2007	0.54	0.27	0.09	0.18	0.81
2007-2019	0.77	-0.09	0.05	-0.14	0.67
2019-2023 (incomplete cycle)	0.63	-0.09	-0.40	0.31	0.54
By Multiple Complete Cycles:					
Last Six: 1969-2019 (50 years)	0.92	0.02	0.03	-0.01	0.95
Last Five: 1973-2019 (46 years)	0.83	0.05	0.05	0.00	0.88
Last Four: 1979-2019 (40 years)	1.03	-0.09	-0.01	-0.08	0.93
Last Three: 1990-2019 (29 years)	1.23	-0.17	-0.05	-0.12	1.06
Last Two: 2001-2019 (18 years)	0.69	0.03	0.06	-0.03	0.72

The real growth rate in average earnings of all workers in the economy was depressed for the 1973-1979 and 1979-1990 cycles in a way not expected to be repeated in the future. During this period, the baby boom generation reached working age and the proportion of women in the labor force increased dramatically. As a result, the economy accommodated an extraordinary number of relatively low-paid (inexperienced and young) workers, thus depressing real growth in overall average earnings. However, the inclusion of baby boomers in the labor force ended in the mid-1980s, and the increasing percentage of women under age 60 in the labor force stabilized more recently.

The rapid increase in average earnings during the economic cycle from 1990 to 2001 was likely due in part to maturation of the baby boomers and women in the labor force. The large number of baby boomers and women in the labor force have been reaching prime working ages and thus boosted growth since 1990. This kind of swing in demographic trends is not projected to occur in the future, so consideration of the longer period of the last four complete economic cycles seems appropriate. This approach averages out the effects of past demographic trends, which initially depressed and later boosted average earnings growth.

Additional changing conditions contributing to the potential future growth of average earnings are discussed in the next two sections on productivity growth and earnings links to productivity.

3.3.1 Productivity

Total-economy productivity growth ultimately affects the growth of real earnings. Total-economy productivity is defined as the ratio of real GDP to total hours worked in the U.S. economy. For the 2025 Trustees Report, the assumed ultimate annual rates of increase in total-economy productivity are 1.93 percent, 1.63 percent, and 1.33 percent for alternatives I, II, and III, respectively. These ultimate rates of increase for total-economy productivity are consistent with ultimate annual rates of increase in nonfarm business productivity of 2.36 percent, 2.00 percent, and 1.63 percent for alternatives I, II, and III, respectively (see Section 1).

3.3.2 Other Components: Links between Real Earnings and Productivity

Not all of the historical gains in productivity have resulted in proportional increases in average real earnings. For example, over the last five complete economic cycles (1973-2019), average real earnings increased at an average annual rate of only 0.83 percent per year, while productivity for the total U.S. economy increased at 1.52 percent per year. The approximate difference of -0.67 percent per year was due to changes in the links, that is, factors that connect productivity to average real earnings in a multiplicative fashion. Table 3.3 summarizes the U.S. experience over the last six complete economic cycles for each of those factors.[45]

Those factors include the ratio of compensation to nominal GDP, the ratio of earnings to compensation, the ratio of total hours worked to total average weekly employment, and the ratio of the gross domestic product implicit price deflator (PGDP) to the CPI-W. Each of those links is discussed separately below.

[45] This section calculates values for productivity, hours per week, price differential, and average real earnings using adjusted data for the CPI, PGDP, real GDP, and employment (weeks worked). Hence, Table 3.3 contains adjusted productivity values, which may not equal the unadjusted productivity values in Table 1.4 in Section 1. Adjustments to the CPI, PGDP, and real GDP are described in Section 2.7 Appendix. Adjustments to employment are described in Section 3.5 Appendix.

Table 3.3: Average Annual Real Percentage Change in Average Earnings: Total U.S. Economy and Its Components

	Productivity (1)	Total Links (2)	Compensation to GDP (3)	Earnings to Compensation (4)	Hours per Week (5)	PGDP to CPI-W (6)	Residual (7)	Average Real Earnings (8)
Long-Term Historical Averages:								
1958-2023 (65 years)	1.80	-0.59	-0.16	-0.13	-0.15	-0.14	0.00	1.20
1973-2023 (50 years)	1.51	-0.68	-0.20	-0.09	-0.12	-0.28	0.00	0.82
1973-1998 (25 years)	1.39	-0.63	-0.12	-0.20	-0.06	-0.25	0.00	0.75
1998-2023 (25 years)	1.63	-0.73	-0.28	0.02	-0.18	-0.30	0.00	0.88
By Economic Cycle:								
1969-1973	2.74	-0.79	-0.04	-0.34	-0.87	0.47	0.00	1.93
1973-1979	1.14	-1.56	-0.48	-0.43	-0.53	-0.13	0.00	-0.44
1979-1990	1.40	-0.90	-0.16	-0.29	-0.09	-0.35	0.00	0.49
1990-2001	1.84	0.28	0.43	0.05	0.17	-0.36	0.00	2.12
2001-2007	2.17	-1.60	-0.95	-0.18	-0.37	-0.11	0.00	0.54
2007-2019	1.19	-0.42	-0.12	0.04	-0.15	-0.19	0.00	0.77
2019-2023 (incomplete cycle)	1.45	-0.81	-0.68	0.35	0.10	-0.58	0.00	0.63
By Multiple Complete Cycles:								
Last Six: 1969-2019 (50 years)	1.61	-0.68	-0.15	-0.15	-0.20	-0.19	0.00	0.92
Last Five: 1973-2019 (46 years)	1.52	-0.67	-0.16	-0.13	-0.14	-0.25	0.00	0.83
Last Four: 1979-2019 (40 years)	1.57	-0.54	-0.11	-0.08	-0.08	-0.27	0.00	1.03
Last Three: 1990-2019 (29 years)	1.64	-0.40	-0.09	0.00	-0.07	-0.24	0.00	1.23
Last Two: 2001-2019 (18 years)	1.52	-0.82	-0.40	-0.04	-0.22	-0.16	0.00	0.69
Future Average Annual Rates of Increase for the 2025 Trustees Report (2034-2099)								
I	1.93	-0.19	0.00	0.00	0.05	-0.24	0.00	1.74
II	1.63	-0.48	0.00	-0.09	-0.05	-0.34	0.00	1.15
III	1.33	-0.77	0.00	-0.18	-0.15	-0.44	0.00	0.56

Note: Total links may not match the relative growth rate of average real earnings to productivity, due to slight discrepancies in the PGDP and GDP values reported by BEA.

3.3.2.1 Ratio of Compensation to Nominal GDP

The first link is the ratio of total compensation to nominal GDP, or the total compensation ratio (CR). The CR is the ratio of the sum of employee compensation and self-employed (proprietors') income to nominal GDP. For the 2025 Trustees Report, the assumed ultimate annual rate of change in the CR is 0.0 percent for alternatives I, II, and III. The CR is closely related to the labor share of total output. The Trustees believe that the shares of total output going to the various factors of production tend toward stable proportions in the long run. Therefore, it is assumed that the CR will be constant over the last 65 years of the long-range period.

3.3.2.2 Ratio of Earnings to Compensation

The second link is the ratio of total worker earnings to compensation. Worker earnings differ from compensation because part of compensation comes in the form of employer contributions to employee pension plans, health and other insurance premiums, and government social insurance programs. Using NIPA definitions, total worker earnings are the sum of total wage and salary disbursements and total proprietors' income. Total compensation is the sum of employee compensation and total proprietors' income. Total employee compensation is the sum of total wage and salary disbursements, employer contributions for employee pension and insurance funds, and employer contributions to government social insurance programs. Employer contributions to government social insurance programs include payments for public insurance and publicly mandated insurance such as for unemployment, workers' compensation, Medicare, and Social Security.

The average annual rate of change for the ratio of earnings to compensation was 0.00 percent over the last three complete economic cycles, from 1990 to 2019. The ratio had declined at an average annual rate of -0.34 percent, over the previous three complete economic cycles, from 1969 to 1990, a period characterized by increasing statutory rates for contributions to government social insurance programs, and steeply rising costs of health insurance. Combining those periods, the average annual rate of change for the ratio was -0.15 percent from 1969 to 2019, a 50-year period that covers the last six complete economic cycles.

Statutory employer payroll tax rates in 1969 were 4.2 percent for OASDI and 0.6 percent for Medicare Hospital Insurance (HI). The OASDI rate increased to its current level of 6.2 percent by 1990, and the HI rate reached its current level of 1.45 percent in 1986. As a consequence of rate changes combined with changes in maximum taxable earnings, employer contributions to government social insurance programs increased from 3.9 percent of compensation in 1969 to 6.2 percent of compensation in 1990. This change in the tax law by itself caused a -0.12 percent annual change in the ratio of wages to compensation over the period from 1969 to 1990. Payroll tax rates for employers have not changed since 1990 and are not scheduled to change in the future under current law.

Most employer contributions to pensions are for employees in the private sector and are composed of contributions to defined-benefit (DB) and defined-contribution (DC) plans. The ratio of pension contributions to total compensation has exhibited no significant trend since the early 1970s, staying within a fairly narrow range (between 4.5 and 5.6 percent) throughout that period. Many factors affected this ratio, including the changing age distribution of the population, the rise and decline of DB pensions, and stock market booms and crashes, but their effects largely offset each other. OCACT expects that multiple factors will continue to affect this ratio in generally offsetting ways.

The growth of contributions to employer-sponsored group health insurance (ESI) has also decelerated in recent decades. It grew from 1.7 percent of compensation in 1969 to 5.3 percent in 1990, contributing the most to the change in the ratio of wages to compensation in that period. It grew somewhat slower in the subsequent two decades, reaching 7.1 percent in 2009. Since then,

however, the historical trend in ESI cost as a share of compensation has flattened, to the point that it was lower as a percent of compensation in 2020 through 2023 than in 2009 through 2015.

Continued expected growth of ESI was a major contributor to the assumed 0.2 percent annual decline in the ratio of earnings to compensation in the 2009 Trustees Report. Provisions of the Affordable Care Act (ACA), enacted in 2010, affected expectations of future growth of ESI and thus led to a higher (less negative) assumed future rate of change in the ratio of earnings to compensation for the 2010 through 2019 Trustees Reports. However, a major provision of the ACA affecting the projected growth in ESI—the excise tax on ESI premiums (commonly referred to as the "Cadillac Tax")—was repealed in December 2019. As a result, beginning with the 2020 Trustees Report, the Trustees have assumed ESI premiums would increase faster, and wages therefore more slowly, than was assumed in the 2019 and several previous reports. On the other hand, the flattening of the observed historical trend in ESI cost, as well as other factors, contribute to a lower projected ESI cost than before the passage of the ACA. The Centers for Medicare and Medicaid Services (CMS) develops long-range projections of ESI premium growth. CMS's projected average growth rates have gradually declined over time, consistent with recent experience, but also due to methodological changes. For example, in September 2024, CMS projected that ESI would be 7.3 percent of GDP in 2085, compared to 12.7 percent projected for 2085 just before the passage of the ACA in 2010.

It is reasonable to assume that the ratio of wages to compensation will decrease in the intermediate alternative, but not as fast as over the last six complete cycles, because the period from 1969 to 1990 was characterized by trends that have not persisted and are unlikely to be repeated in the future.

For the 2025 Trustees Report, the annual rate of change in the ratio of wages to employee compensation over the last 65 years of the projection horizon (2034 to 2099) is assumed to be 0.00, -0.10, and -0.20 percentage point for alternatives I, II, and III, respectively. These rates are unchanged from those used in the 2024 Trustees Report. Consistent with this, the assumed average annual rate of change in the ratio of earnings to total compensation over the last 65 years of the projection horizon (2034 to 2099) is approximately 0.00, -0.09, and -0.18 percentage point for alternatives I, II, and III, respectively. These rates are unchanged from those used in the 2024 Trustees Report.

3.3.2.3 Average Hours Worked

The third link is average hours worked per week (AHW), defined as the ratio of total hours worked to total employment in the U.S. economy. Its compounded annual rate of change is shown in Table 3.4. Total hours worked in the U.S. economy is provided by BLS, based mostly on the Current Employment Statistics (CES), which surveys establishments. Total employment is the sum of civilian average weekly employment and the U.S. Armed Forces. BLS publishes total civilian employment from the Current Population Survey (CPS), which surveys households. The Census Bureau provides estimates for the U.S. Armed Forces. For the 2025 Trustees Report, the assumed ultimate annual rate of change in average hours worked is +0.05 percent, -0.05 percent and -0.15 percent in alternatives I, II, and III, respectively. These rates of change are the same as those used in the 2024 Trustees Report.

The average annual rate of change in AHW was -0.20 percent over the last six complete economic cycles, a 50-year period from 1969 to 2019, and -0.08 percent over the last four cycles, from 1979 to 2019. Looking at individual cycles, the average annual rate of change in AHW was -0.87 percent, -0.53 percent, -0.09 percent, 0.17 percent, -0.37, and -0.15 percent, over the 1969-1973, 1973-1979, 1979-1990, 1990-2001, 2001-2007, and 2007-2019 periods, respectively. The average annual rate of change from 2019 to 2023 (since the end of the last complete cycle) was a 0.10 percent increase.

The historical pattern of AHW is also affected by the difference between CES and CPS employment measures. While CES estimates the number of jobs in the economy, CPS estimates the number of employed persons. Furthermore, CPS estimates are controlled to population annually between censuses. This causes the ratio of the two measures to change over time. BLS publishes a regularly updated file of the total hours worked and the employment estimate on which it is based.[46] The ratio between the employment measure implicit in the BLS measure of total hours worked and the total employment measure used in this section (i.e., CPS-based civilian employment plus the Census estimate of armed forces) has fluctuated between about 1.03 and 1.08. Notably, it was rising in the 1990s, achieving its highest annual value in 1999, followed by a decline to its lowest annual value in 2010. The average annual rate of change in the average weekly hours implicit in the BLS calculation of total hours worked was -0.56 percent, -0.47 percent, -0.10 percent, -0.02 percent, -0.12 percent, and -0.07 percent, over the 1969-1973, 1973-1979, 1979-1990, 1990-2001, 2001-2007, and 2007-2019 economic cycles, respectively. The average annual rate of change was -0.16 percent over the last six complete economic cycles (1969 to 2019), and -0.07 percent over the last four cycles (1979 to 2019), both of which are very close to the corresponding average rates of change calculated using the CPS-based employment measure.[47]

The average annual rate of change in AHW was -0.37 percent over the 6-year economic cycle from 2001 to 2007, suggesting a return to the steep declines seen over the period from 1969 to 1979. Accordingly, the Trustees lowered the assumed ultimate annual rate of change in AHW to -0.05 percent starting with the 2012 report, or approximately equal to the average annual rate of change of -0.04 percent over the previous three complete economic cycles, a 28-year period from 1979 to 2007.[48] In the last complete cycle, the decline in AHW has slowed down. The average rate of change in AHW over the period from 2007 to 2019 was -0.15 percent, or -0.07 percent using the alternative CES-based employment measure.

There are factors that may affect the future AHW in offsetting ways. On one hand, the assumed steady increases in productivity will allow workers to gradually increase leisure time while still maintaining increases in weekly and annual earnings. On the other hand, it is reasonable to

[46] https://www.bls.gov/productivity/tables/total-economy-hours-employment.xlsx.

[47] One could further decouple the "average hours worked" link into two links, roughly corresponding to average hours per job and average jobs per worker. However, despite fluctuations over economic cycles and between censuses, the latter link seems to be very stable over longer time periods, so that such an additional step seems unnecessary for the purpose of deriving assumptions about the future.

[48] The corresponding value implicit in the BLS estimate of total hours worked is -0.07 percent.

assume that the assumed future increases in life expectancy will raise labor force participation rates for older workers and it may also raise AHW, holding other factors constant. The average projected changes in the education and age-sex distributions of the workforce are not expected to significantly affect the average annual rate of change in the AHW in the future. Thus, for the 2025 Trustees Report the assumed ultimate annual rate of change in AHW is -0.05 percent for alternative II.

3.3.2.4 Ratio of PGDP to CPI-W

The final link is the ratio of the PGDP to the CPI-W. Including this ratio is necessary because nominal earnings depend on nominal GDP (i.e., the product of real GDP and the PGDP), but are converted to real earnings using the CPI-W. The projected ratio is based on the assumed difference between the growth rates. For the 2025 Trustees Report, the assumed ultimate "price differential", that is, the average annual rate of increase in PGDP less the average annual rate of increase in CPI-W, is -0.25, -0.35, and -0.45 percentage point for alternative I, II, and III, respectively. For alternative II, the -0.35 percentage point price differential is the sum of a -0.30 percentage point computational difference and a -0.05 percentage point coverage difference (see Section 2.5). These assumed values are the same as those assumed in the 2024 Trustees Report.

3.3.2.5 Total Links

The average annual change in the total links was -0.54 percent over the last four complete economic cycles and -0.68 percent over the last six complete cycles. For the 2025 Trustees Report, the assumed average annual changes in the total links are approximately -0.19 percentage point, -0.48 percentage point, and -0.77 percentage point for alternatives I, II, and III, respectively.

3.4 Projections from Other Sources

At the time assumptions were developed, the following projections from other sources were available.

S&P Global provided projections through 2054 in its August 2024 30-year trend forecast (see *The 30-Year Focus, Third Quarter, August 2024*). S&P Global projected that the average annual real growth rate for average U.S. earnings would be 1.93 percent over the 20-year period from 2034 to 2054.[49] Moody's Analytics provided projections through 2054 in its September 2024 forecast. Over the 20-year period from 2034 to 2054, Moody's Analytics projected that the annual real growth rate for average U.S. earnings would average 2.04 percent.

The Office of Management and Budget (OMB) Mid-Session Review to the Fiscal Year 2025 Budget included projections through 2034. OMB projected that the annual real growth rate for average U.S. earnings would be about 1.6 percent for 2034. In *The Long-Term Budget Outlook: 2024 to 2054* published in March 2024, the Congressional Budget Office (CBO) included

[49] OCACT calculation estimated from S&P Global projections of wage and salary disbursements, nonfarm proprietors' income, and total nonfarm payrolls.

projections through 2054. CBO projected that the annual real growth rate for average U.S. earnings would average about 1.03 percent over the period from 2034 to 2054.

The Social Security Advisory Board's 2019 Technical Panel on Assumptions and Methods recommended reducing the assumed long-range average annual real rate of increase in average earnings from 1.18 percent in the 2019 Trustees Report, alternative II, to 1.08 percent. The prior technical panel, which met in 2015, recommended no changes to the long-range average annual real wage differential[50] of 1.17 percent in the 2015 Trustees Report, alternative II.

[50] In the 2022 and earlier Trustees Reports, the assumption representing a measure of average OASDI covered wage growth was presented as the real wage differential. The real wage differential for a year is defined as the annual percentage change from the prior year in the average OASDI covered wage minus the annual percentage change from the prior year in the CPI-W. The average real wage differential over any period is the arithmetic mean of annual real wage differentials over that period.

Table 3.4: Average Hours Worked per Week, Total U.S.: Compound Annual Rates of Change (%)

		From																					
To	Variable	1961	1965	1970	1975	1980	1985	1990	1995	2000	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
1961	38.22																							
1965	38.68	0.30																						
1970	37.41	-0.24	-0.66																					
1975	35.80	-0.46	-0.77	-0.87																				
1980	35.52	-0.39	-0.57	-0.52	-0.16																			
1985	35.44	-0.31	-0.44	-0.36	-0.10	-0.04																		
1990	35.45	-0.26	-0.35	-0.27	-0.07	-0.02	0.00																	
1995	36.04	-0.17	-0.24	-0.15	0.03	0.10	0.17	0.33																
2000	36.52	-0.12	-0.16	-0.08	0.08	0.14	0.20	0.30	0.27															
2005	35.33	-0.18	-0.23	-0.16	-0.04	-0.02	-0.02	-0.02	-0.20	-0.66														
2010	34.27	-0.22	-0.27	-0.22	-0.13	-0.12	-0.14	-0.17	-0.34	-0.63	-0.61													
2011	34.44	-0.21	-0.25	-0.20	-0.11	-0.10	-0.11	-0.14	-0.28	-0.53	-0.42	0.52												
2012	34.49	-0.20	-0.24	-0.19	-0.10	-0.09	-0.10	-0.13	-0.26	-0.48	-0.34	0.32	0.12											
2013	34.61	-0.19	-0.23	-0.18	-0.09	-0.08	-0.08	-0.10	-0.22	-0.41	-0.25	0.34	0.25	0.37										
2014	34.72	-0.18	-0.22	-0.17	-0.08	-0.07	-0.07	-0.09	-0.20	-0.36	-0.19	0.33	0.27	0.34	0.31									
2015	34.95	-0.17	-0.20	-0.15	-0.06	-0.05	-0.05	-0.06	-0.15	-0.29	-0.11	0.40	0.37	0.45	0.48	0.66								
2016	34.83	-0.17	-0.21	-0.16	-0.07	-0.05	-0.06	-0.07	-0.16	-0.30	-0.13	0.27	0.22	0.25	0.21	0.16	-0.34							
2017	34.70	-0.17	-0.21	-0.16	-0.07	-0.06	-0.07	-0.08	-0.17	-0.30	-0.15	0.18	0.12	0.12	0.06	-0.03	-0.37	-0.39						
2018	34.86	-0.16	-0.20	-0.15	-0.06	-0.05	-0.05	-0.06	-0.14	-0.26	-0.10	0.21	0.17	0.18	0.14	0.10	-0.09	0.04	0.47					
2019	34.72	-0.17	-0.20	-0.15	-0.07	-0.06	-0.06	-0.07	-0.16	-0.27	-0.12	0.15	0.10	0.10	0.05	0.00	-0.17	-0.11	0.03	-0.40				
2020	34.40	-0.18	-0.21	-0.17	-0.09	-0.08	-0.09	-0.10	-0.19	-0.30	-0.18	0.04	-0.01	-0.03	-0.09	-0.15	-0.32	-0.31	-0.28	-0.66	-0.91			
2021	34.70	-0.16	-0.19	-0.15	-0.07	-0.06	-0.06	-0.07	-0.15	-0.24	-0.11	0.11	0.07	0.07	0.03	-0.01	-0.12	-0.08	0.00	-0.15	-0.03	0.87		
2022	34.80	-0.15	-0.19	-0.14	-0.06	-0.05	-0.05	-0.06	-0.13	-0.22	-0.09	0.13	0.09	0.09	0.06	0.03	-0.06	-0.02	0.06	-0.04	0.08	0.58	0.29	
2023	34.86	-0.15	-0.18	-0.13	-0.06	-0.04	-0.04	-0.05	-0.12	-0.20	-0.07	0.13	0.10	0.10	0.07	0.04	-0.03	0.01	0.08	0.00	0.10	0.44	0.23	0.18

3.5 Appendix

BLS has introduced numerous changes to the Current Population Survey (CPS) concepts over the historical period, such that values for employment are not historically comparable (for more detail on noncomparability of CPS concepts, see http://www.bls.gov/cps/eetech_methods.pdf). To make the total employment series more comparable, OCACT adjusted the published values for the following:

1990 Census: BLS introduced 1990 Census-based population controls in January 1994, increasing employment levels for 1990 from the originally-published estimates by about 880,000 (0.7%). BLS later revised the 1990 to 1993 estimates, but not those for earlier years. Consequently, OCACT adjusted the CPS data for 1981 to 1989 using a linear interpolation of the 0.7% increase.

2000 Census: BLS introduced population controls based on Census 2000 results in January 2003. The revised employment series for 2000 was 1.27% (or 1.724 million persons) higher than the previously published series. BLS revised the CPS data only back to January 2000. OCACT adjusted the CPS data back to 1991 by linearly interpolating the 1.27% adjustment.

1994 CPS Methodology Change: In 1994, BLS introduced methodology changes and a complete redesign of its CPS. Because the survey redesign and methodology changes raised the aggregate employment for 1994, the series was not comparable with earlier years. Thus, OCACT applied a multiplicative-adjustment factor estimated by Polivka and Miller (1995)[51] to the series for years prior to 1994. The aggregate employment series was adjusted for 1993 and earlier years by a factor of 1.0053.

Population Controls since the 2000 Census: In January 2003, the U.S. Census Bureau introduced its updated population controls in the CPS estimates. The difference between the updated and originally published employment values for December 2002 is an increase of 576,000 persons. Data from December 2002 and earlier are not updated by BLS. OCACT adjusted the employment series back to 2000.

In January 2004, the U.S. Census Bureau reflected revised net international migration estimates in its updated population controls. The difference between the updated and originally published employment values for December 2003 is a decrease of 409,000 persons. Data from December 2003 and earlier are not updated by BLS. OCACT adjusted the employment series back to 2000.

In January 2005, the U.S. Census Bureau introduced updated population controls, which reflected updated vital statistics information, as well as revised estimates of net international

[51] Anne E. Polivka and Stephen M. Miller, "The CPS after the Redesign: Refocusing the Economic Lens," *Labor Statistics Measurement Issues; Studies in Income and Wealth Volume 60*, Edited by John Haltiwanger, Marilyn E. Manser and Robert Topel, National Bureau of Economic Research, 1998, Table 6. Also available at http://www.bls.gov/ore/pdf/ec950090.pdf. Polivka and Miller's adjustment factors are for employment-population ratios, not employment levels. Because the CPS methodology change affected the employment levels, but not the civilian noninstitutional population, their multiplicative employment-population ratio factors are used to adjust the employment levels.

migration. The difference between the updated and originally published employment values for December 2004 is a decrease of 45,000 persons. Data from December 2004 and earlier are not updated by BLS. OCACT adjusted the employment series back to 2000.

In January 2006, the U.S. Census Bureau introduced updated population controls, which reflected updated vital statistics information, as well as revised estimates of net international migration. The difference between the updated and originally published employment values for December 2005 is a decrease of 123,000 persons. Data from December 2005 and earlier are not updated by BLS. OCACT adjusted the employment series back to 2000.

In January 2007, the U.S. Census Bureau introduced updated population controls, which reflected revised estimates of net international migration and updated vital statistics information. The difference between the updated and originally published employment values for December 2006 is an increase of 153,000 persons. Data from December 2006 and earlier are not updated by BLS. OCACT adjusted the employment series back to 2000.

In January 2008, the U.S. Census Bureau introduced updated population controls, which reflected updated vital statistics information, as well as revised estimates of net international migration and the institutional population. The difference between the updated and originally published employment values for December 2007 is a decrease of 598,000 persons. Data from December 2007 and earlier are not updated by BLS. OCACT adjusted the employment series back to 2000.

In January 2009, the U.S. Census Bureau introduced updated population controls, reflecting revised net international migration and vital statistics information. The difference between the updated and originally published employment values for December 2008 is a decrease of 407,000 persons. Data from December 2008 and earlier are not updated by BLS. OCACT adjusted the employment series back to 2000.

In January 2010, the U.S. Census Bureau introduced updated population controls, reflecting updated vital statistics information, revised estimates of net international migration, as well as methodological changes in the population estimation process. The difference between the updated and originally published employment values for December 2009 is a decrease of 243,000 persons. BLS does not update data from December 2009 and earlier. OCACT adjusted the employment series back to 2000.

In January 2011, the U.S. Census Bureau introduced updated population controls, reflecting revised net international migration, vital statistics information, and some methodological changes in the population estimation process. The difference between the updated and originally published employment values for December 2010 is a decrease of 472,000 persons. BLS does not update data from December 2010 and earlier. OCACT adjusted the employment series back to 2000.

In January 2012, the U.S. Census Bureau incorporated the Census 2010 population base, as well as adjustments for net international migration, updated vital statistics information, and methodological changes in the population estimation process. The difference between the

updated and originally published employment values for December 2011 is an increase of 216,000 persons. BLS does not update data from December 2011 and earlier. OCACT adjusted the employment series back to 2000.

In January 2013, the U.S. Census Bureau introduced updated population controls, reflecting net international migration adjustments, updated vital statistics information, and some methodological changes in the population estimation process. The difference between the updated and originally published employment values for December 2012 is an increase of 127,000 persons. BLS does not update data from December 2012 and earlier. OCACT adjusted the employment series back to 2000.

In January 2014, the U.S. Census Bureau updated their population controls, reflecting net international migration adjustments, updated birth and death statistics and other information, and some methodological changes in the population estimation process. The difference between the updated and originally published employment values for December 2013 is an increase of 22,000 persons. BLS does not update data from December 2013 and earlier. OCACT adjusted the employment series back to 2000.

In January 2015, the U.S. Census Bureau updated their population controls, reflecting net international migration adjustments, updated birth and death statistics and other information, and some methodological changes in the population estimation process. The difference between the updated and originally published employment values for December 2014 is an increase of 324,000 persons. BLS does not update data from December 2014 and earlier. OCACT adjusted the employment series back to 2000.

In January 2016, the U.S. Census Bureau updated their population controls, reflecting net international migration adjustments, updated birth and death statistics and other information, and some methodological changes in the population estimation process. The difference between the updated and originally published employment values for December 2015 is an increase of 265,000 persons. BLS does not update data from December 2015 and earlier. OCACT adjusted the employment series back to 2000.

In January 2017, the U.S. Census Bureau updated their population controls, reflecting net international migration adjustments, updated birth and death statistics and other information, and some methodological changes in the population estimation process. The Census Bureau's methodological improvements included changes in the estimation of the foreign-born emigration subcomponent of net international migration. These method changes resulted in higher foreign-born emigration and lower overall net international migration than previously estimated. The difference between the updated and originally published employment values for December 2016 is a decrease of 831,000 persons. BLS does not update data from December 2016 and earlier. OCACT adjusted the employment series back to 2000.

In January 2018, the U.S. Census Bureau updated their population controls, reflecting net international migration adjustments, updated birth and death statistics and other information, and some methodological changes in the population estimation process. The difference between the updated and originally published employment values for December 2017 is an increase of

318,000 persons. BLS does not update data from December 2017 and earlier. OCACT adjusted the employment series back to 2000.

In January 2019, the U.S. Census Bureau updated their population controls, reflecting net international migration adjustments, updated birth and death statistics and other information, and some methodological changes in the population estimation process. The difference between the updated and originally published employment values for December 2018 is a decrease of 488,000 persons. BLS does not update data from December 2018 and earlier. OCACT adjusted the employment series back to 2000.

In January 2020, the U.S. Census Bureau updated their population controls, reflecting net international migration adjustments, updated birth and death statistics and other information, and some methodological changes in the population estimation process. The difference between the updated and originally published employment values for December 2019 is a decrease of 507,000 persons. BLS does not update data from December 2019 and earlier. OCACT adjusted the employment series back to 2000.

In January 2021, the U.S. Census Bureau updated their population controls, reflecting net international migration adjustments, updated birth and death statistics and other information, and some methodological changes in the population estimation process. The difference between the updated and originally published employment values for December 2020 is a decrease of 180,000 persons. BLS does not update data from December 2020 and earlier. OCACT adjusted the employment series back to 2000.

In January 2022, the U.S. Census Bureau updated their population estimates, primarily reflecting the change in the base population from Census 2010 to the blended Census 2020 base, and also net international migration adjustments, updated birth and death statistics and other information, and some methodological changes in the population estimation process. The difference between the updated and originally published employment values for December 2021 is an increase of 1,471,000 persons. BLS does not update data from December 2021 and earlier. OCACT adjusted the employment series back to 2000.

In January 2023, the U.S. Census Bureau updated their population estimates, reflecting the blended Census 2020 base, new estimates of net international migration (which accounted for the majority of the overall population level change), updated birth and death statistics and other information, and some methodological changes. The difference between the updated and originally published employment values for December 2022 is an increase of 954,000 persons. BLS does not update data from December 2022 and earlier. OCACT adjusted the employment series back to 2000.

In January 2024, the U.S. Census Bureau updated their population estimates, reflecting new estimates of net international migration, updated vital statistics, and some methodological changes. The difference between the updated and originally published employment values for December 2023 is a decrease of 270,000 persons. BLS does not update data from December 2023 and earlier. OCACT adjusted the employment series back to 2000.

4. UNEMPLOYMENT RATE

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4 Unemployment Rate

4.1 Summary

For the 2025 Trustees Report, the ultimate aggregate civilian unemployment rates (adjusted to the age and sex distribution of the 2020 civilian labor force, which is the most recent Census year) are assumed to be 3.5 percent, 4.5 percent, and 5.5 percent for alternatives I, II, and III, respectively (Table 4.1). These assumptions are equal to those used for the 2024 Trustees Report.

Table 4.1: Assumed Ultimate Aggregate Civilian Unemployment Rate

	2025 Trustees Report Alternative			2024 Trustees Report Alternative			2025 Trustees Report Less 2024 Trustees Report		
Measure	**I**	**II**	**III**	**I**	**II**	**III**	**I**	**II**	**III**
Civilian Unemployment Rate	3.5	4.5	5.5	3.5	4.5	5.5	0.0	0.0	0.0

4.2 Past Experience

BLS publishes civilian unemployment rates, defined as the proportion of unemployed persons in the civilian labor force, by sex and age group as part of its Current Population Survey. The ultimate civilian unemployment rate assumptions are based on analysis of historical experience and expected future conditions and trends. Because the aggregate unemployment rate is sensitive to changes in the age-sex composition of the civilian labor force, OCACT constructed an age-sex-adjusted unemployment rate by weighting the unadjusted age-sex unemployment rates by the age-sex distribution of the 2020 civilian labor force.

Since the civilian unemployment rate varies significantly over an economic cycle, it is useful to look at averages over complete economic cycles or long periods (decades). Table 4.2 shows average civilian unemployment rates (unadjusted and age-sex-adjusted) over complete (peak-to-peak) economic cycles. The age-sex-adjusted unemployment rate averaged 5.5 percent over the last six complete economic cycles (1969 through 2019), 5.7 percent over the last five cycles (1973 through 2019), 5.7 percent over the last four cycles (1979 through 2019), 5.6 percent over the last three cycles (1990 through 2019), and 5.8 percent over the last two cycles (2001 through 2019).[52] Table 4.3 shows annual values for both the unadjusted and age-sex-adjusted civilian unemployment rates.

[52] Peaks in economic cycles roughly follow the NBER cycle dating, except for short recoveries such as 1980-1981, which are not counted as separate cycles.

Table 4.2: Civilian Unemployment Rates Over Complete Economic Cycles (Peak-to-Peak)[53]

	Unadjusted Rate	Age-Sex Adjusted Rate
By Economic Cycles:		
1969-1972	5.0	4.2
1973-1978	6.6	5.4
1979-1989	7.1	6.1
1990-2000	5.6	5.1
2001-2007	5.2	4.9
2008-2019	6.4	6.4
2020-2023 (incomplete cycle)	5.2	5.2
By Multiple Complete Cycles:		
Last Six: 1969-2019 (50 years)	6.2	5.5
Last Five: 1973-2019 (46 years)	6.2	5.7
Last Four: 1979-2019 (40 years)	6.2	5.7
Last Three: 1990-2019 (29 years)	5.8	5.6
Last Two: 2001-2019 (18 years)	6.0	5.8

It is also useful to look at unemployment rates over specific periods. Beginning around 1975, and lasting through about 1994, the U.S. experienced generally high unemployment rates. One factor contributing to this may have been rapid changes in technology and increased global competition, which made job searches and retraining more frequent and longer-lasting. Another contributing factor was the huge influx of women and baby boomers into the labor market, which likely increased the quantity of labor supplied relative to the quantity demanded in the 1970s and 1980s.

Between 1997 and 2000, rapid economic expansion reduced unemployment rates to levels not seen since the 1960s. Although interrupted by a mild recession, rates returned to levels below long-run average and remained relatively low until 2007. The recession of 2007-2009 resulted in rates that were well above the long-run average level for several years.

Near the peak of the last economic cycle in 2019, the unemployment rate was at an extraordinarily low level of 3.7 percent. At the same time, the aggregate labor force participation rate was lower than that projected by OCACT's model based on the observed unemployment rate and other factors. These deviations from historical patterns were largely offsetting, so that the

[53] Unlike historical tables in Sections 1–3, which show growth rates, Table 4.2 shows average levels over periods. Periods are labeled so that first and last years are included in averaging, and each year is counted in exactly one economic cycle.

resulting employment level predicted by the model was close to the observed employment level. In recent years, the relationship between unemployment rates and labor force participation rates has been different than in the past. The 2020 and 2021 Trustees Reports indicated the Trustees' belief that there has been a structural change that will persist in the foreseeable future. Accordingly, the Trustees lowered both the ultimate average unemployment rate and the labor force participation rates in those reports.

4.3 Future Expectations

For the 2021 Trustees Report, OCACT updated the labor force model, which is now estimated based on data including the latest complete economic cycle. The relationship between unemployment and labor force in the updated model is in closer alignment with the structural shift mentioned above.

A significant factor affecting future employment measures is the aging of the baby boom generation. As the baby boomers age and are replaced at working ages by the lower-birth-rate generations that followed, the working-age population is expected to grow more slowly, particularly in relation to the size of the total population. This demographic shift is expected to increase the demand for older workers. Meanwhile, the supply of potential older workers is expected to increase, as a significant portion of the baby boomers is expected to remain in the labor force, in many cases, out of necessity (as their life expectancies increase). Even with increases in labor supply from older workers, it is likely that the increasing aged dependency ratio will continue to exert downward pressure on the age-sex-adjusted unemployment rate.

The Trustees continue to believe that there are good reasons to assume that the future age-sex-adjusted unemployment rates will average somewhat lower than they did over the last six complete economic cycles. Therefore, the assumed ultimate average unemployment rate is 4.5 percent (age-sex adjusted to the 2020 labor force) for alternative II, 3.5 percent for the alternative I, and 5.5 percent for the alternative III. These rates are unchanged from those assumed in the 2024 report.

4.4 Projections from Other Sources

At the time assumptions were developed, the following projections from other sources were available.

S&P Global provided projections through 2054 in its August 2024 30-year trend forecast (see *The 30-Year Focus, Third Quarter, August 2024*). S&P Global projected the civilian unemployment rate would average 4.3 percent over the 20-year period for 2035 through 2054. Moody's Analytics in its September 2024 forecast showed a civilian unemployment rate averaging 3.9 percent for 2035 through 2054. Blue Chip's October 2024 Economic Indicators report of top analysts' forecasts provides a consensus projected civilian unemployment rate of 4.3 percent for 2025, declining to 4.0 percent by 2028 and increasing to 4.1 percent for 2029 through 2035.

The Office of Management and Budget (OMB) Mid-Session Review to the 2025 Fiscal Year Budget included projections through 2034. OMB projected the civilian unemployment rate to be 3.8 percent in 2034. In *The Long-Term Budget Outlook: 2024 to 2054* published in March 2024, the Congressional Budget Office (CBO) included projections through 2054. CBO projected a civilian unemployment rate averaging 4.2 percent for 2035 through 2054.

The Social Security Advisory Board's 2019 Technical Panel on Assumptions and Methods recommended assuming an ultimate civilian age-sex-adjusted unemployment rate of 4.8 percent for alternative II. The prior technical panel, which met in 2015, recommended no changes to the ultimate age-sex-adjusted unemployment rate of 5.5 percent, assumed in the 2015 Trustees Report, alternative II.

Table 4.3: Unadjusted and Age-Sex Adjusted Civilian Unemployment Rates Over Selected Intervals (%)

	Unadjusted Rate											Age-Sex Adjusted Rate										
	Average Annual Rate Over the Prior Period of the Following Length (in years):											Average Annual Rate Over the Prior Period of the Following Length (in years):										
Year	1	5	10	15	20	25	30	35	40	45	50	1	5	10	15	20	25	30	35	40	45	50
1961	6.7											6.3										
1965	4.5	5.5										3.9	5.0									
1970	5.0	3.9	4.7									4.2	3.3	4.2								
1975	8.5	6.1	5.0	5.2								7.1	5.0	4.2	4.5							
1980	7.2	6.8	6.4	5.6	5.6							5.8	5.5	5.3	4.6	4.7						
1985	7.2	8.3	7.5	7.1	6.3	6.1						6.2	7.1	6.3	5.9	5.2	5.2					
1990	5.6	5.9	7.1	7.0	6.8	6.2	6.1					5.0	5.2	6.1	5.9	5.7	5.2	5.2				
1995	5.6	6.6	6.3	6.9	6.9	6.7	6.3	6.2				5.1	6.0	5.6	6.1	5.9	5.7	5.3	5.3			
2000	4.0	4.6	5.6	5.7	6.4	6.4	6.4	6.0	6.0			3.7	4.2	5.1	5.1	5.6	5.6	5.5	5.2	5.2		
2005	5.1	5.4	5.0	5.5	5.6	6.2	6.3	6.2	6.0	5.9		4.9	5.2	4.7	5.1	5.1	5.5	5.5	5.4	5.2	5.2	
2010	9.6	6.8	6.1	5.6	5.9	5.9	6.3	6.3	6.3	6.0	6.0	9.5	6.6	5.9	5.3	5.5	5.4	5.7	5.7	5.6	5.3	5.3
2011	8.9	7.7	6.5	5.8	6.0	5.9	6.3	6.4	6.4	6.2	6.0	8.8	7.5	6.3	5.6	5.6	5.5	5.8	5.7	5.7	5.5	5.4
2012	8.1	8.3	6.8	6.1	6.0	6.0	6.3	6.4	6.5	6.3	6.1	8.0	8.2	6.6	5.8	5.7	5.7	5.8	5.8	5.8	5.6	5.4
2013	7.4	8.7	6.9	6.2	6.0	6.1	6.2	6.4	6.5	6.3	6.1	7.3	8.5	6.7	6.0	5.7	5.8	5.8	5.9	5.9	5.7	5.5
2014	6.2	8.0	7.0	6.4	6.0	6.1	6.1	6.5	6.5	6.4	6.1	6.1	7.9	6.8	6.2	5.8	5.8	5.7	5.9	5.9	5.7	5.5
2015	5.3	7.2	7.0	6.5	6.0	6.1	6.1	6.4	6.4	6.4	6.2	5.2	7.1	6.9	6.3	5.8	5.8	5.7	5.9	5.9	5.8	5.5
2016	4.9	6.3	7.0	6.5	6.0	6.0	6.0	6.3	6.4	6.4	6.2	4.8	6.3	6.9	6.3	5.8	5.8	5.7	5.9	5.8	5.8	5.5
2017	4.4	5.6	7.0	6.4	5.9	5.9	5.9	6.2	6.3	6.4	6.2	4.3	5.6	6.9	6.2	5.8	5.7	5.6	5.8	5.8	5.7	5.6
2018	3.9	4.9	6.8	6.2	5.9	5.8	5.9	6.0	6.3	6.3	6.2	3.9	4.9	6.7	6.1	5.7	5.6	5.6	5.6	5.8	5.7	5.6
2019	3.7	4.4	6.2	6.1	5.9	5.7	5.8	5.9	6.2	6.3	6.2	3.7	4.4	6.2	6.0	5.7	5.5	5.6	5.5	5.7	5.7	5.6
2020	8.1	5.0	6.1	6.3	6.1	5.8	5.9	5.9	6.2	6.3	6.3	8.1	5.0	6.0	6.2	6.0	5.6	5.7	5.6	5.8	5.8	5.7
2021	5.3	5.1	5.7	6.4	6.1	5.8	5.9	5.9	6.2	6.2	6.3	5.3	5.1	5.7	6.3	6.0	5.6	5.7	5.6	5.8	5.7	5.7
2022	3.6	4.9	5.3	6.3	6.0	5.7	5.7	5.8	6.0	6.2	6.2	3.6	4.9	5.2	6.2	5.9	5.6	5.5	5.5	5.6	5.7	5.7
2023	3.6	4.9	4.9	6.2	5.9	5.7	5.6	5.8	5.9	6.1	6.2	3.6	4.9	4.9	6.1	5.8	5.6	5.5	5.5	5.5	5.7	5.7

5. ANNUAL TRUST FUND NEW-ISSUE REAL INTEREST RATE

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5 Annual Trust Fund New-Issue Real Interest Rate

5.1 Summary

For the 2025 Trustees Report, the assumed ultimate real interest rates (effective annual real yields on special public debt obligations issuable to the trust funds by the U.S. Treasury) are 2.8 percent, 2.3 percent, and 1.8 percent for alternatives I, II, and III, respectively (Table 5.1). These assumed rates are the same as the ultimate rates used for the 2024 Trustees Report. The ultimate rates are assumed to be reached by the 20th projection year.

Table 5.1: Assumed Ultimate Real Interest Rates

	2025 Trustees Report Alternative			2024 Trustees Report Alternative			2025 Trustees Report Less 2024 Trustees Report		
Measure	**I**	**II**	**III**	**I**	**II**	**III**	**I**	**II**	**III**
Real Interest Rate	2.8	2.3	1.8	2.8	2.3	1.8	0.0	0.0	0.0

Since October 1960, interest rates on special public debt obligations issuable to the trust funds each month have been set equal to the average market yield on all marketable fixed-rate federal obligations that are not callable and do not mature within the next 4 years. As such, the rate on new issues to the trust funds represents a fair market return for longer-term, highly liquid, default-risk-free obligations. The real interest rate (real effective annual yield) on these obligations can be computed either as an expected yield (i.e., nominal effective annual yield less expected future inflation rate) or as the actual realized yield over some period after issue (i.e., nominal effective annual yield less the actual increase in price levels after issue). For the purpose of this analysis, actual realized yields over the year after issue are examined for obligations issuable each year. Real interest rates over periods of two or more years are computed as the average annual yield of an investment at the beginning of the period that is reinvested annually at the new issue rate.

5.2 Past Experience

Tables 5.2 and 5.3 show the average annual real interest rates over various decades and economic cycles, using the CPI-W provided by BLS.[54]

The average annual real interest rate on trust fund assets over the last six complete economic cycles was 2.43 percent (computed as the average annual return for investments in 1969 that were reinvested annually at the new issue rates for years 1969 through 2019). Annual real interest rates for individual years within this period varied substantially from this average of 2.43 percent. Even the average rates of 1.56, -1.00, 5.08, 4.05, 1.96 and 0.85 percent for each economic cycle beginning with the 1969-1973 cycle, respectively, differed substantially from

[54] Peaks in economic cycles roughly follow the NBER cycle dating, except for short recoveries such as 1980-1981, which are not counted as separate cycles.

one another. The large differences among these periods indicate substantially different conditions across these cycles.

Table 5.2: Average Annual Real Interest Rate (calculated using CPI-W)

	Average Annual Real Interest Rate (percent)
Long-Term Historical Averages:	
1973-2023 (50 years)	2.09
1973-1998 (25 years)	3.38
1998-2023 (25 years)	0.82
By Economic Cycle:	
1969-1973	1.56
1973-1979	-1.00
1979-1990	5.08
1990-2001	4.05
2001-2007	1.96
2007-2019	0.85
2019-2023 (incomplete cycle)	-2.64
By Multiple Complete Cycles:	
Last Six: 1969-2019	2.43
Last Five: 1973-2019	2.51
Last Four: 1979-2019	3.05
Last Three: 1990-2019	2.28
Last Two: 2001-2019	1.22

After experiencing negative real yields in investments in U.S. Treasury securities for 1973 through 1975 and 1978 through 1980, caused largely by higher-than-expected price inflation, investors demanded higher interest rates to protect their investments. Real interest rates on new-issue trust fund securities exceeded 7 percent every year for 1982 through 1986. Even as the rate of inflation declined from the highs of the 1970s and early 1980s and remained stable, the real interest rate remained relatively high, exceeding 4 percent in all but two years through 1998. Sustained high real interest rates in the years after 1981 resulted from the following factors: constrained money supply growth, increased borrowing by businesses, reduced savings rates in the U.S. economy, deregulation of banks and other financial institutions, and lower than expected inflation in the beginning of that period.

Beginning in the late 1990s, the interest rate environment changed rapidly. This change was initially precipitated by a combination of budgetary surpluses caused by tighter fiscal policy and higher growth of productivity and investors' confidence in continued low rates of inflation. The real interest rate declined from 5.30 percent in 1998 to 2.37 percent in 2000. In October 2001, the federal government, in response to its favorable budget situation, suspended the sale of 30-year Treasury securities (leaving the 10-year notes as the longest duration being issued). Since then, the federal budget has fallen back into deficit and, beginning in February 2006, the Treasury re-introduced regular semi-annual auctions of the 30-year nominal Treasury bond. Neither the budget deficits nor the federal funds rate hikes by the Federal Reserve between 2004 and 2006 resulted in a spike in real interest rates, due in part to foreigners' increased willingness

to accumulate Treasury securities. Instead, the real interest rate continued to trend downward, reaching 0.60 percent in 2008. Since 2008, the annual real interest rate has averaged -0.08 percent, largely due to slow economic growth, monetary policies such as quantitative easing, a global savings glut, and a strong demand for safe assets in order to satisfy regulatory requirements in the financial sector. More recently, effects related to the COVID-19 pandemic, including elevated inflation, have contributed to a further decline in real interest rates.

5.3 Future Expectations

Short-term nominal interest rates rose sharply in 2022 and early 2023 as the Federal Reserve took measures to bring down inflation; they then remained relatively stable through mid-2024. Long-term interest rates similarly rose in 2022 in anticipation of higher rates in the near future. In September 2024, the Federal Reserve cut the federal funds rate by half a percentage point, and nominal interest rates have fallen in response. If the Federal Reserve succeeds in maintaining inflation close to target without a recession, a likely result will be higher real interest rates over the near term than in recent years. If elevated rates of inflation return or the economy slips into a recession, the path of real interest rates is more uncertain.

Over the longer term, several factors are expected to result in a return to higher yields on Treasury securities. First, federal deficits were large during the pandemic and debt is expected to continue rising in the future. Federal Reserve Board Chairman Jerome Powell has said that federal debt has been on an unsustainable path,[55] as federal debt is growing faster than the economy In *The Long-Term Budget Outlook: 2024 to 2054* published in March 2024, CBO projects that the amount of publicly held debt will rise from 99 percent of GDP at the end of fiscal year 2024 to 166 percent in 2054. Such increases in debt will eventually lead to increases in the yields on Treasury securities, and such increases in yields could potentially happen suddenly, as seen in the past.

Second, the Federal Reserve's flexible inflation targeting policy should not be presumed to last indefinitely, given their explicit indication that they will review all aspects of their monetary policy every five years.[56] This will likely lead to occasional changes in monetary policy. The worsening fiscal situation has been alleviated by recent low interest rates. It is unlikely that such an environment of increasing debt and low interest rates can persist in the long run. Elevated inflation prompted the Federal Reserve to raise the short-term nominal interest rate starting in March of 2022. In September of 2024, the Federal Reserve cut the short-term nominal interest rate by half a percentage point. The outcome of the Federal Reserve's efforts to control inflation may impact future monetary policy following what has been experienced since 2021.

The low interest rates experienced in the last economic cycle from 2007 to 2019 (averaging 0.85 percent) do not make a compelling case for further changing the ultimate assumption, which has been lowered from 2.7 percent to 2.5 percent for the 2019 Trustees Report and from 2.5 percent to 2.3 percent for the 2020 Trustees Report. It remains to be seen for how long the

[55] For example, see https://www.npr.org/2020/09/04/909590044/transcript-nprs-full-interview-with-fed-chairman-jerome-powell.

[56] See https://www.federalreserve.gov/monetarypolicy/review-of-monetary-policy-strategy-tools-and-communications-statement-on-longer-run-goals-monetary-policy-strategy.htm.

current monetary policy regime can co-exist with the increasing federal debt. Additionally, the experience since 2022 shows that periods of temporarily higher interest rates in the future are possible. Thus, the Trustees maintain the ultimate real interest rate assumption at 2.3 percent for alternative II.

5.4 Projections from Other Sources

At the time assumptions were developed, the following projections from other sources were available.

S&P Global provided projections through 2054 in its August 2024 30-year trend forecast (see *The 30-Year Focus, Third Quarter, August 2024*). They projected real yields on 10-year U.S. Treasury notes to rise from 0.95 percent in 2024 to 2.03 percent for2025, fall to 0.87 percent for 2029, increase to 1.22 percent by 2036, and then fall to 0.94 percent by 2054. Moody's Analytics' September 2024 forecast projected real yields on 10-year U.S. Treasury notes to rise from 1.07 percent in 2024 to 1.94 percent in 2033 and then fall to 1.20 percent by 2054. Blue Chip's October 2024 Economic Indicators report of top analysts' forecasts provides a consensus projection of 1.6 percent for real yields on 10-year U.S. Treasury notes in 2035.

The Office of Management and Budget (OMB) Mid-Session Review to the Fiscal Year 2025 Budget projected the real yield on the trust funds' special-issue securities to reach 1.6 percent by 2034. In *The Long-Term Budget Outlook: 2024 to 2054* published in March 2024, the Congressional Budget Office (CBO) included projections through 2054. CBO projected real yields on 10-year Treasury notes to rise from 1.37 percent in 2024 to 2.27 percent in 2026, fall to 1.55 percent in 2028, and rise to 2.17 percent by 2054.

The Social Security Advisory Board's 2019 Technical Panel on Assumptions and Methods recommended lowering the alternative II real interest rate assumption to 2.3 percent, a level to be reached in 25 years. The prior technical panel, which met in 2015, recommended lowering the alternative II real interest rate assumption to 2.5 percent.

Table 5.3: Real Interest Rates for OASDI Trust Fund New Issues and the Compound Average Real Yield Over Selected Intervals

		Average Annual Percentage Change Over the Prior Period of the Following Length (in years):										
To	RYINDEX	1	5	10	15	20	25	30	35	40	45	50
1961	28.92											
1965	32.08	2.53										
1970	33.76	0.96	1.03									
1975	33.77	-1.32	0.01	0.52								
1980	32.29	-3.60	-0.89	-0.45	0.04							
1985	45.07	8.98	6.90	2.93	1.94	1.71						
1990	57.80	3.44	5.10	5.99	3.65	2.72	2.38					
1995	71.42	4.17	4.32	4.71	5.43	3.82	3.04	2.70				
2000	86.42	2.37	3.89	4.10	4.44	5.05	3.83	3.18	2.87			
2005	97.51	0.77	2.44	3.16	3.55	3.93	4.52	3.60	3.08	2.82		
2010	106.46	0.85	1.77	2.11	2.70	3.10	3.50	4.06	3.33	2.91	2.70	
2011	105.66	-0.75	1.39	1.68	2.38	2.83	3.10	4.00	3.26	2.82	2.65	2.63
2012	106.00	0.32	1.06	1.33	2.11	2.60	2.93	3.76	3.25	2.76	2.62	2.57
2013	106.10	0.09	0.96	1.07	1.77	2.39	2.76	3.44	3.27	2.77	2.60	2.53
2014	106.50	0.38	0.18	0.96	1.56	2.23	2.61	3.20	3.36	2.88	2.61	2.48
2015	109.38	2.71	0.54	1.16	1.58	2.15	2.58	3.00	3.55	2.98	2.65	2.48
2016	110.53	1.04	0.90	1.15	1.42	2.01	2.45	2.73	3.55	2.96	2.60	2.48
2017	110.20	-0.30	0.78	0.92	1.14	1.78	2.23	2.57	3.33	2.94	2.54	2.43
2018	109.95	-0.22	0.72	0.84	0.95	1.50	2.05	2.42	3.05	2.94	2.54	2.41
2019	111.28	1.20	0.88	0.53	0.94	1.39	1.96	2.32	2.87	3.05	2.65	2.43
2020	112.40	1.00	0.54	0.54	0.95	1.32	1.83	2.24	2.65	3.17	2.71	2.43
2021	107.84	-4.05	-0.49	0.20	0.60	0.94	1.50	1.95	2.26	3.04	2.57	2.29
2022	100.82	-6.51	-1.76	-0.50	0.02	0.41	1.06	1.55	1.94	2.68	2.40	2.10
2023	100.00	-0.81	-1.88	-0.59	-0.08	0.24	0.82	1.39	1.79	2.42	2.40	2.09

Note: The index for each year is the accumulated value in that year of an investment made in the prior year in the amount of the prior year's index, with interest paid at the average rate for special public debt obligations issuable to the OASI and DI Trust Funds during the prior year.

6. RATIO OF OASDI TAXABLE PAYROLL TO COVERED EARNINGS

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6 Ratio of OASDI Taxable Payroll to Covered Earnings

6.1 Summary

For the 2025 Trustees Report, the assumed ratios of OASDI effective taxable payroll to covered earnings (taxable ratio) for 2034 (the tenth year of the projection period), are 84.0 percent, 82.5 percent, and 81.0 percent for alternatives I, II and III, respectively (Table 6.1). These assumed ratios for the tenth year of the projection period are the same as those used for the 2024 Trustees Report. The overall taxable earnings ratio varies slightly after 2034 due to changes in the taxable ratio for self-employment earnings.

Table 6.1: Assumed Taxable Earnings Ratios Reached in Tenth Year of Projection Period

	2025 Trustees Report Alternative			2024 Trustees Report Alternative			2025 Trustees Report Less 2024 Trustees Report		
Measure	**I**	**II**	**III**	**I**	**II**	**III**	**I**	**II**	**III**
Taxable Ratio (percent)	84.0	82.5	81.0	84.0	82.5	81.0	0.0	0.0	0.0

The OASDI taxable payroll for a year is computed as the amount of earnings which, when multiplied by the combined OASDI employee-employer payroll tax rate for that year, yields the total amount of payroll taxes due from wages paid and self-employment net earnings for the year. Taxable wages for an employee are the total OASDI covered wages from all wage employment up to the taxable maximum (also known as the contribution and benefit base). Taxable wages for an employer are the sum of all OASDI covered wages paid to each employee up to the taxable maximum. Employees with multiple jobs whose total wages exceed the taxable maximum are eligible for a refund of excess employee taxes withheld; employers are not eligible for a refund on this basis. For self-employed workers with no taxable wages, taxable earnings are the amount of OASDI covered self-employment net earnings up to the taxable maximum. For self-employed workers with taxable wages, OASDI covered self-employment net earnings are taxable to the extent that they do not exceed the taxable maximum when added to taxable wages for the year. The taxable ratio is essentially the proportion of OASDI covered earnings that is at or below the taxable maximum.

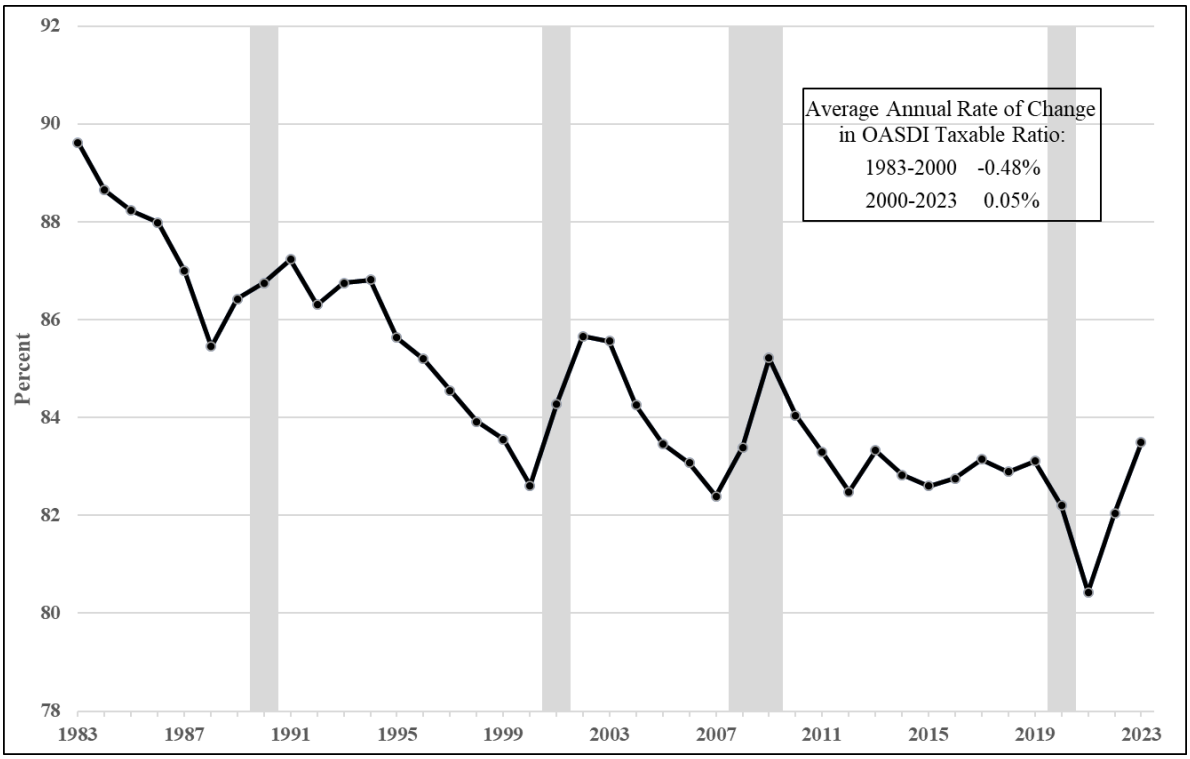
6.2 Past Experience

Table 6.2 shows historical values for the taxable ratio from 1983 through 2023. The taxable ratio fell from over 89 percent in 1983 to 82.6 percent in 2000, resulting in an average annual rate of change in the taxable ratio over this period of about -0.48 percent (see Figure 6.1). The decline was related to several factors that increased the concentration of earnings among the very high earners compared to all other earners. Some of the drop in the taxable ratio in the late 1980s was due to the Tax Reform Act of 1986, which lowered the top marginal income tax rate from 50 percent in 1986 to 28 percent in 1988. The drop in the income tax rate induced some high earners to shift some non-covered income to OASDI covered earnings, thereby lowering the

taxable ratio. In the 1990s, the growth in the use of stock options[57] in the pay packages of the very high earners, combined with a rapid increase in stock prices, contributed to the drop in the taxable ratio. An unprecedented expansion of the financial sector in the 1980s and 1990s also contributed to the concentration of very high earnings.

Between 2000 and 2023, the taxable ratio has varied with the business cycle, generally rising during economic downturns and falling during economic recoveries. The average annual rate of change in the taxable ratio between 2000 and 2019 was 0.03 percent, and the ratio was equal to 83.1 percent in 2019, the peak of the most recent economic cycle.

Figure 6.1: Percentage of OASDI Covered Earnings Below the Taxable Maximum: 1983 to 2023



Note: Shaded areas on the chart indicate U.S. recessions.

In 2020, the taxable ratio fell, atypically for a period of recession, to 82.2 percent, in part due to the disproportionate loss of earnings among lower-paid workers during the pandemic-induced recession. For 2021, the ratio dropped even further, to 80.4 percent, but it has since recovered, reaching 82.0 percent for 2022 and 83.5 percent for 2023. The increase in the taxable ratio in 2023 was driven, in part, by a significant increase in the OASDI taxable maximum for that year. The taxable maximum increased by almost 9 percent, from $147,000 for 2022 to $160,200 for

[57] Nonqualified stock options are subject to the OASDI tax. For more information on the tax treatment of stock options, see publication by Grant Thornton's G. Edgar Adkins, Jr., entitled "Taxation of Stock Options and Restricted Stock: the Basics and Beyond" (https://www.grantthornton.com/~/media/content-page-files/tax/pdfs/white-papers-survey-reports-articles/2013/Taxation-of-stock-options-Adkins.ashx).

2023, based on the increase in the average wage index for 2021.[58] At the same time, average wage growth in 2023 was significantly below the 9 percent increase in the taxable maximum, contributing to a rise in the taxable ratio.

Except for the unusual experience since 2020, the taxable ratio has remained largely at or above the low level of 82.6 percent experienced for 2000, roughly stabilizing since 2012.

6.3 Future Expectations

In spite of ten years of economic expansion since 2009 and record stock prices as measured by the S&P 500 index, which have been positively correlated with the share of income reported by the very high earners, the taxable ratio through 2019 did not fall below the lows reached in previous economic cycle peaks. In fact, between 2000 and 2019, the average annual rate of change in the taxable ratio was slightly positive, at 0.03 percent, compared to the rate of -0.48 percent for the period 1983 to 2000, and the ratio has been relatively stable between 2012 and 2019.

As mentioned above, following the unusually low level of the taxable ratio during the COVID-19 pandemic and its aftermath, the taxable ratio for 2023 has reached 83.5 percent. The Trustees believe that the forces that contributed to the high level of the taxable ratio in 2023 are temporary, and assume that the taxable ratio will converge to 82.5 percent by the end of 2034 for the alternative II assumption. Thereafter, the wage taxable ratio is assumed to remain constant. For self-employed workers, the taxable ratio is expected to drift slightly lower, because the taxable maximum is driven by the growth in the average wage, which is projected to grow more slowly than average self-employment earnings. As the share of self-employment earnings above the taxable maximum grows over time, the overall taxable earnings ratio will drift downward.

6.4 Projections from Other Sources

At the time assumptions were developed, the following projections from other sources were available.

In *The Long-Term Budget Outlook:2024 to 2054* published in March 2024, the Congressional Budget Office (CBO) projected the taxable ratio to increase from 82.9 percent in 2023 to 83.0 percent in 2024 and to gradually decline to 80.8 percent by 2054.

The Social Security Advisory Board's 2019 Technical Panel on Assumptions and Methods recommended lowering the alternative II long-range taxable ratio from 82.5 percent to about 80.8 percent, to be reached by the 25th year of the projection period. The 2015 Technical Panel recommended long-range taxable ratios of 84.0 percent, 82.2 percent and 79.0 percent for alternatives I, II, and III, respectively.

[58] The taxable maximum (also known as the contribution and benefits base) is adjusted annually based on the changes in the national average wage index for the year two years prior. The formula for determining the contribution and benefit base is set by law; see https://www.ssa.gov/OACT/COLA/cbbdet.html and https://www.ssa.gov/OACT/COLA/cbb.html.

Table 6.2: OASDI Taxable Ratio, 1983 to 2023

Year	OASDI Taxable Ratio (percent)
1983	89.6
1984	88.6
1985	88.2
1986	88.0
1987	87.0
1988	85.5
1989	86.4
1990	86.8
1991	87.2
1992	86.3
1993	86.8
1994	86.8
1995	85.6
1996	85.2
1997	84.6
1998	83.9
1999	83.6
2000	82.6
2001	84.3
2002	85.7
2003	85.6
2004	84.3
2005	83.5
2006	83.1
2007	82.4
2008	83.4
2009	85.2
2010	84.0
2011	83.3
2012	82.5
2013	83.3
2014	82.8
2015	82.6
2016	82.8
2017	83.1
2018	82.9
2019	83.1
2020	82.2
2021	80.4
2022	82.0
2023	83.5