ECONOMIC ANALYSES

2. ECONOMIC ASSUMPTIONS

This chapter presents the economic assumptions that underlie the Administration's 2024 Budget.[1] It provides an overview of the recent performance of the American economy, presents the Administration's projections for key macroeconomic variables, compares them with forecasts prepared by other prominent institutions, and discusses the unavoidable uncertainty inherent in providing an eleven-year forecast.

The chapter proceeds as follows. The first section provides an overview of the recent performance of the U.S. economy based on a broad array of key economic indicators. The second section presents a detailed exposition of the Administration's economic assumptions underlying the 2024 Budget and how key macroeconomic variables are expected to evolve over the years 2023 to 2033. The third section compares the forecast of the Administration with those of the Congressional Budget Office (CBO), the Federal Open Market Committee of the Federal Reserve (FOMC), and the Blue Chip Economic Indicators panel of professional forecasters. The fourth section discusses the sensitivity of the Administration's projections of Federal receipts and outlays to alternative paths of macroeconomic variables. The fifth section considers the errors in past Administrations' forecasts, comparing them with the errors in forecasts produced by the CBO and the Blue Chip Economic Indicators panel of professional forecasters. The sixth section uses information on past accuracy of Administration forecasts to provide understanding and insight into the uncertainty associated with the Administration's current forecast of the budget balance.

Recent Economic Performance

The Administration has made real progress on the President's top economic priority—transitioning to steady, stable economic growth with lower inflation and while maintaining a robust labor market—and the 2022 economy is proof that the President's plan to build an economy from the bottom up and middle out is showing results: the rate of inflation is declining, the economy is growing and adding jobs, and unemployment has fallen to a 50-year low.

The Labor Market

Employment—The labor market was a point of strength for the economy in 2022. After averaging 8.1 percent during 2020 and 5.4 percent in 2021, the unemployment rate remained at or below 4 percent for the entirety of 2022, averaging 3.6 percent for the year overall. Other metrics of labor market health also showed signs of strength during 2022: the long-term unemployment rate steadily declined, there were fewer marginally attached and discouraged workers, and a smaller share of the labor force worked part-time for economic reasons such as not being able to find full-time employment.

The labor market also crossed an important milestone during 2022, as the total number of jobs surpassed its pre-pandemic high from early 2020. Notably, the economy added an average of 400,000 jobs per month during the 12 months of 2022. The prime-age labor force participation is now only 0.3 percentage points below its pre-pandemic rate. Looking ahead, growing the labor force, including through a range of policy measures the Administration has proposed, will remain an important economic priority.

Wages—As of 2022:Q4, average hourly earnings (AHE) increased 4.9 percent among total private workers from one year prior, while the AHE for production and nonsupervisory workers grew at an even faster rate of 5.6 percent over that same period. Between December 2021 and 2022, civilian hourly compensation as measured by the Employment Cost Index (ECI)—which adjusts for compositional effects that can arise from hiring and firing—grew by 5.1 percent. Furthermore, real wages increased over the second half of 2022, as gas prices fell, inflation moderated, and the labor market remained solid.

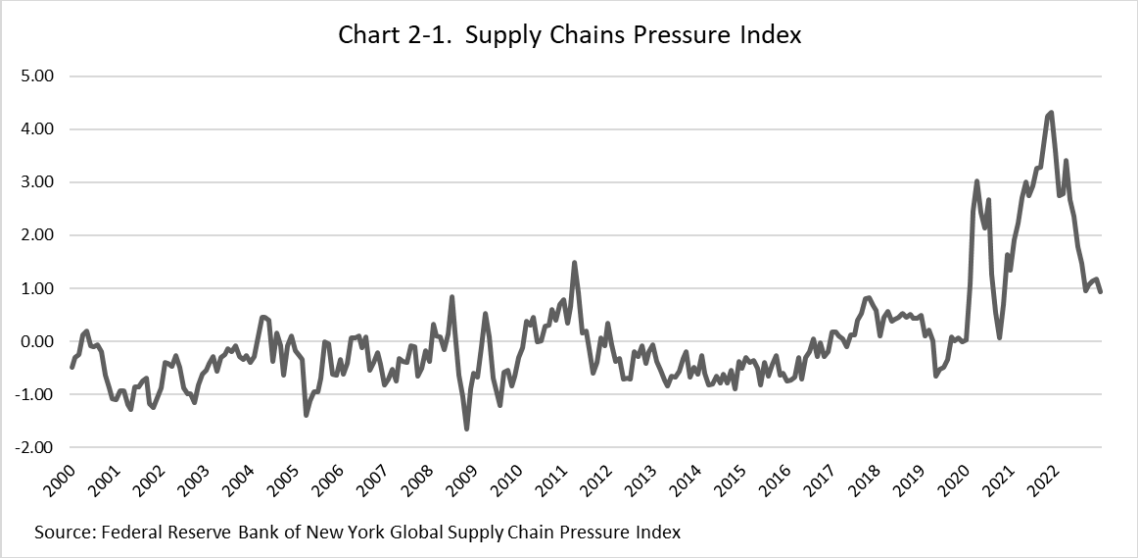
Gross Domestic Product

Consumption—Household consumption of goods and services accounts for two-thirds of U.S. GDP. As the largest source of spending, it greatly affects U.S. GDP growth. Real personal consumption expenditures (PCE), which adjusts for inflation, increased by 1.8 percent during the four quarters of 2022.

A prominent feature of the pandemic was the extent of the economic damage in specific sectors. While the service sector experienced the largest losses during the initial stages of the pandemic, supply-chain disruptions and reductions in purchasing power held back spending on goods over the past year. Following rapid growth during the four quarters of 2021, real spending on durable goods during 2022 grew at (a subdued) 0.5 percent, while spending on nondurable goods declined by 1.7 percent. Encouragingly, supply-chain difficulties have greatly abated over the course of 2022 according to the Federal Reserve Bank of New York's Global Supply Chains Pressure Index (see Chart 2-1). As improvements in supply chains can be expected to work through the economy with a lag, this is a promising development for the resiliency of the economy going forward.

Nonresidential Fixed Investment—After declining at an annual rate of 3.5 percent in 2020 (fourth-quarter-over-fourth-quarter), real nonresidential fixed investment increased 5.0 and 4.3 percent in 2021 and 2022, respec-

[1] Economic performance, unless otherwise specified, is discussed in terms of calendar years (January-December). Budget figures are discussed in terms of fiscal years (October-September).



tively. Equipment and intellectual property investment increased 4.0 and 8.5 percent, respectively, during 2022, while business structures investment declined for the third consecutive year (-3.3 percent).

The Government Sector—Real Government expenditures on consumption and investment increased 0.8 percent in the four quarters ending 2022:Q4, which includes a 0.1 percent increase in Federal spending and a 1.3 percent increase in State and Local spending. Within the Federal spending category, nondefense spending increased 0.5 percent while defense spending decreased 0.2 percent.

Trade—Real exports of goods and services increased 5.2 percent in the four quarters ending 2022:Q4, generated by increases of 4.0 percent in goods and 7.8 percent in services. Real imports increased 1.8 percent over the same period, generated by increases of 0.9 percent in goods and 6.5 percent in services.

Economic Projections

The Administration's forecast was finalized in late November 2022, with the parameters of that forecast close to the consensus prevailing at that date. Since late November, data for 2022 has come in better than expected: real GDP has been higher than expected while inflation and unemployment were lower than expected. Specifically, the labor market has remained strong, with the unemployment rate falling from 3.6 percent to 3.4 percent. Economic activity has also remained solid, with upward revisions to third quarter GDP and the second estimate of fourth quarter GDP at 2.7 percent. Further, price pressures have continued to ease, with three-month annualized CPI inflation falling from 4.6 percent in October to 3.3 percent at the end of the year and three-month annualized core CPI inflation falling from 6.1 percent in October to 4.3 percent at the end of the year. In light of the new data available since these assumptions were formulated, a forecast assembled today would, of course, differ in various ways, and would likely include higher growth rates and lower unemployment, just as many other forecasts have improved since last Fall.

The forecast informs the 2024 Budget and assumes implementation of the Administration's policy proposals. The Administration's projections are reported in Table 2-1 and summarized below. Note that, for 2022, the table reflects the projections finalized in November. As discussed below, reported data for 2022, which are available at the time of this writing, reflected better economic outcomes than the Administration's projections.

Real GDP—The Administration's economic assumptions project real GDP growth of 0.2 percent for the four quarters of 2022; subsequently released data show that actual real GDP growth over that period was 0.9 percent. Real GDP is expected to increase 0.4 percent in 2023, to average 2.1 percent growth between 2024-2028, and to average 2.2 percent growth during 2029-2033.

Unemployment—The Administration's economic assumptions project a 3.7 percent unemployment rate on average over 2022; subsequently released data show that the actual average over that period was 3.6 percent. The unemployment rate is projected to rise modestly during 2023 and 2024, before declining over the forecast horizon to a long-run rate of 3.8 percent by 2031.

Interest Rates—Interest rates are expected to rise over the near-term, a continuation of a trend started in 2022. The 91-day Treasury bill rate is expected to steadily rise from an average of 0.04 percent in 2021 to 4.9 percent in 2023. Thereafter, it is expected to gradually converge to a terminal rate of 2.5 percent. The 10-year rate follows a similar path as it is projected to increase from 1.4 percent in 2021 to 3.8 percent in 2023, reaching 3.4 percent at the end of the budget window, reflecting both the increase in expected short-term rates and an increase in the term premium.

General Inflation—The Administration's forecast reflects a background of elevated inflation during 2022, which is expected to decline through 2023 and return

Table 2–1. ECONOMIC ASSUMPTIONS[1]
(Calendar Years, Dollar Amounts in Billions)

	Actual 2021	Projections 2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Gross Domestic Product (GDP)													
Levels, Dollar Amounts in Billions:													
Current Dollars	23,315	25,409	26,544	27,523	28,750	29,981	31,224	32,516	33,884	35,342	36,880	38,483	40,157
Real, Chained (2012) Dollars	19,610	19,971	20,092	20,385	20,852	21,300	21,726	22,160	22,617	23,106	23,615	24,134	24,665
Chained Price Index (2012=100), Annual Average	119	127	132	135	138	141	144	147	150	153	156	160	163
Percent Change, Fourth-Quarter-over-Fourth-Quarter:													
Current Dollars	12.2	6.7	3.2	4.3	4.6	4.1	4.1	4.1	4.2	4.3	4.4	4.3	4.3
Real, Chained (2012) Dollars	5.7	0.2	0.4	2.1	2.4	2.0	2.0	2.0	2.1	2.2	2.2	2.2	2.2
Chained Price Index (2012=100)	6.1	6.6	2.8	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
Incomes, Billions of Current Dollars													
Domestic Corporate Profits	2,359	2,576	2,626	2,533	2,576	2,702	2,879	3,040	3,183	3,310	3,445	3,592	3,747
Employee Compensation	12,538	13,582	14,312	14,989	15,694	16,419	17,161	17,936	18,736	19,583	20,481	21,419	22,401
Wages and Salaries	10,290	11,205	11,812	12,358	12,938	13,532	14,136	14,768	15,424	16,118	16,850	17,634	18,484
Nonwage Personal Income	5,680	6,055	6,593	6,596	6,814	7,123	7,455	7,794	8,145	8,537	8,914	9,335	9,849
Consumer Price Index (All Urban)[2]:													
Level (1982–1984=100), Annual Average	271.0	293.0	305.7	313.0	320.3	327.6	335.2	342.9	350.7	358.8	367.1	375.5	384.2
Percent Change, Fourth-Quarter-over-Fourth-Quarter	6.7	7.6	3.0	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
Unemployment Rate, Civilian, Percent													
Annual Average	5.4	3.7	4.3	4.6	4.4	4.3	4.2	4.1	4.0	3.9	3.8	3.8	3.8
Q4 Level	4.2	3.8	4.6	4.5	4.4	4.3	4.2	4.1	4.0	3.8	3.8	3.8	3.8
Interest Rates, Percent													
91-Day Treasury Bills	0.0	2.0	4.9	3.8	3.0	2.5	2.3	2.2	2.3	2.4	2.4	2.5	2.5
10-Year Treasury Notes	1.4	3.0	3.8	3.6	3.5	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4

[1] Based on information available as of November 2022.
[2] Seasonally Adjusted

to a rate consistent with the Federal Reserve target in 2024. Specifically, the assumptions anticipate that, after peaking at a projected 7.6 percent rate on a fourth quarter-over-fourth quarter basis in 2022, the Consumer Price Index for all Urban Consumers (CPI-U) is forecasted to increase 3.0 percent in 2023 and 2.3 percent in 2024. For context, the forecast was finalized before the release of November and December CPI data. The Administration's CPI inflation forecast for 2022 (7.6 percent) turned out higher than what was later reported (7.1 percent). Note that 2.3 percent is the rate of CPI-U inflation that is consistent with the Federal Reserve's 2.0 percent inflation target for the Personal Consumption Expenditures Price Index.

Changes in Economic Assumptions from Last Year's Budget—Table 2-2 compares the Administration's forecast for the 2024 Budget with that from the 2023 Budget. Compared with the 2023 Budget forecast, the Administration's expectations for the outyears of the forecast are little changed. Revisions to the near-term largely reflect the economic data at the time these assumptions were finalized. As noted above, a forecast formulated today would likely look different along several dimensions.

Comparison with Other Forecasts

This section compares the Administration's forecast with the then-available forecasts from CBO, the FOMC, and the Blue Chip panel of professional forecasters.

There are important methodological differences across these forecasts. The most important difference is that different forecasts make different assumptions about the implementation of the Administration's proposed policies. As already noted, the Administration's forecast assumes impacts of proposed Administration policies. In contrast, the CBO forecast assumes no changes to current law. It is not clear to what extent FOMC participants and Blue Chip panelists incorporate policy implementation expectations in their respective outlooks. The Blue Chip panel, in particular, comprises a large number of private-sector forecasters, who have different expectations about the enactment of the Administration's proposed policies and different views about how those policies might affect economic growth.

A second key difference is that the various forecasts were published on different dates. For example, while the forecast published by the Administration is based on data available as of late November 2022, the Blue Chip forecasts are drawn from a survey administered in early November. In addition, the Federal Reserve's FOMC projections were released in mid-September and the CBO forecast was published in May 2022.

Table 2–2. COMPARISON OF ECONOMIC ASSUMPTIONS IN THE 2023 AND 2024 BUDGETS

	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
(fourth-quarter-over-fourth-quarter percent change)											
Real GDP:											
2023 Budget Assumptions	3.8	2.5	2.1	2.0	2.0	2.0	2.1	2.2	2.3	2.3	2.3
2023 MSR Assumptions	1.4	1.8	2.0	2.0	2.0	2.0	2.1	2.2	2.3	2.3	2.3
2024 Budget Assumptions	0.2	0.4	2.1	2.4	2.0	2.0	2.0	2.1	2.2	2.2	2.2
GDP Price Index:											
2023 Budget Assumptions	2.4	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
2023 MSR Assumptions	6.3	2.6	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
2024 Budget Assumptions	6.6	2.8	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
Consumer Price Index (All-Urban):											
2023 Budget Assumptions	2.9	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
2023 MSR Assumptions	6.6	2.8	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
2024 Budget Assumptions	7.6	3.0	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
(calendar year average)											
Civilian Unemployment Rate:											
2023 Budget Assumptions	3.9	3.6	3.7	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8
2023 MSR Assumptions	3.7	3.7	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8
2024 Budget Assumptions	3.7	4.3	4.6	4.4	4.3	4.2	4.1	4.0	3.9	3.8	3.8
91-Day Treasury Bill Rate:											
2023 Budget Assumptions	0.2	0.9	1.6	1.9	2.1	2.2	2.3	2.3	2.3	2.3	2.3
2023 MSR Assumptions	1.6	3.0	2.9	2.7	2.6	2.5	2.5	2.4	2.4	2.4	2.4
2024 Budget Assumptions	2.0	4.9	3.8	3.0	2.5	2.3	2.2	2.3	2.4	2.4	2.5
10-Year Treasury Note Rate:											
2023 Budget Assumptions	2.1	2.5	2.7	2.8	3.0	3.1	3.1	3.2	3.2	3.2	3.3
2023 MSR Assumptions	2.7	3.2	3.2	3.2	3.2	3.3	3.3	3.3	3.3	3.3	3.4
2024 Budget Assumptions	3.0	3.8	3.6	3.5	3.4	3.4	3.4	3.4	3.4	3.4	3.4

Real GDP—The Administration forecasts an average real GDP growth rate of 2.0 percent (fourth-quarter-over-fourth-quarter) during the 11 years 2023-2033, modestly higher than the 1.7 percent average for each of Blue Chip, CBO, and the FOMC over the same window. Over the near term, the Administration forecasts an average growth rate of 1.3 percent during 2023-2024, which is above the 0.8 percent average for Blue Chip and below the 1.9 and 1.5 percent forecast average from CBO and the FOMC, respectively.

Unemployment—The Administration, Blue Chip, and FOMC all forecast that the average unemployment rate during 2023 will be slightly elevated compared with 2022, while the CBO forecast from May 2022 projects a mild decrease in unemployment for 2023. Over the near-term (2023-2025), the Administration forecasts that the unemployment rate will average 4.4 percent, compared with CBO, Blue Chip, and Federal Reserve averages of 3.7, 4.3, and 4.4 percent during that window, respectively. Over the long run, the Administration projects a terminal unemployment rate 3.8 percent, compared with 4.1 percent for Blue Chip, 4.0 percent for the FOMC, and 4.5 percent for CBO.

Interest Rates—The Administration's 91-day interest rate forecast is qualitatively consistent with the Blue Chip forecast over the forecast horizon, though modestly higher in magnitude during most years. The Administration, CBO, and Blue Chip all expect short-term rates to rise meaningfully over the 2023-2025 period, with the Administration forecasting a faster rise over the coming few years than CBO and Blue Chip. Short-term rates are then expected to plateau in the 2.3-2.5 percent range over the remainder of the horizon. For 10-year rates, the Administration forecasts a gradual fall to a 3.4 percent terminal rate, compared with Blue Chip and CBO forecasts of 3.1 and 3.8 percent, respectively.

General Inflation—The Administration's forecast for CPI-U inflation (on a fourth-quarter-over-fourth-quarter basis) is broadly consistent with outside forecasters throughout the budget window. The Administration, CBO, Blue Chip, and the FOMC all project that inflation will continue to moderate over the course of 2023 and into 2024. The Administration's projection for the long-term CPI inflation rate of 2.3 percent equals CBO's long-term projection, is 0.1 percentage points higher than Blue Chip's long-term projection, and is consistent with the FOMC's 2.0 percent target for PCE inflation.

Table 2–3. COMPARISON OF ECONOMIC ASSUMPTIONS [1]

	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
(fourth-quarter-over-fourth-quarter percent change)												
Real GDP:												
2024 Budget (November 2022)	0.2	0.4	2.1	2.4	2.0	2.0	2.0	2.1	2.2	2.2	2.2	2.2
Blue Chip [2] (November 2022)	0.2	0.1	1.5	2.1	2.1	1.9	1.9	1.9	1.9	1.9	1.9	1.9
CBO (May 2022)	3.1	2.2	1.5	1.6	1.4	1.7	1.8	1.8	1.8	1.7	1.7	.....
Federal Reserve [3] (September 2022)	0.2	1.2	1.7	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
Consumer Price Index (CPI-U):												
2024 Budget (November 2022)	7.6	3.0	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
Blue Chip [2] (November 2022)	7.6	3.0	2.4	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
CBO (May 2022)	4.7	2.7	2.3	2.3	2.3	2.3	2.4	2.4	2.4	2.3	2.3	.....
Federal Reserve [3,4] (September 2022)	5.4	2.8	2.3	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
(calendar year average)												
Unemployment Rate:												
2024 Budget (November 2022)	3.7	4.3	4.6	4.4	4.3	4.2	4.1	4.0	3.9	3.8	3.8	3.8
Blue Chip [2] (November 2022)	3.7	4.4	4.5	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
CBO (May 2022)	3.8	3.5	3.7	3.9	4.0	4.2	4.5	4.5	4.6	4.5	4.5	.....
Federal Reserve [3,5] (September 2022)	3.8	4.4	4.4	4.3	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
91-Day Treasury Bills (discount basis):												
2024 Budget (November 2022)	2.0	4.9	3.8	3.0	2.5	2.3	2.2	2.3	2.4	2.4	2.5	2.5
Blue Chip [2] (November 2022)	2.2	4.5	3.2	2.6	2.4	2.4	2.4	2.3	2.3	2.3	2.3	2.3
CBO (May 2022)	0.9	2.0	2.5	2.6	2.5	2.3	2.3	2.3	2.3	2.3	2.3	.....
10-Year Treasury Notes:												
2024 Budget (November 2022)	3.0	3.8	3.6	3.5	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
Blue Chip [2] (November 2022)	3.1	3.8	3.3	3.2	3.1	3.2	3.1	3.1	3.1	3.1	3.1	3.1
CBO (May 2022)	2.4	2.9	3.1	3.2	3.5	3.7	3.8	3.8	3.8	3.8	3.8	.....

Sources: Administration; CBO, The Budget and Economic Outlook: 2022 to 2032, May 2022; October 2022 and November 2022 Blue Chip Economic Indicators, Aspen Publishers, Inc.; Federal Reserve Open Market Committee, September 22, 2022

[1] Calendar Year

[2] Values for 2022–2023 based on November survey, and 2024–2033 based on October survey. Values for 2029–2033 are 5 year averages.

[3] FOMC Median Projection

[4] PCE Inflation

[5] Average rate during 4th quarter.

Sensitivity of the Budget to Economic Assumptions

Federal spending and tax collections are heavily influenced by developments in the economy. Income tax receipts are a function of growth in incomes for households and firms. Spending on social assistance programs may rise when the economy enters a downturn, while increases in nominal spending on Social Security and other programs are dependent on consumer price inflation. A robust set of projections for macroeconomic variables assists in budget planning, but unexpected developments in the economy have ripple effects for Federal spending and receipts. This section seeks to provide an understanding of the magnitude of the effects that unforeseen changes in the economy can have on the budget.

To make these assessments, the Administration relies on a set of heuristics that can predict how certain spending and receipt categories will react to a change in a given subset of macroeconomic variables, holding almost everything else constant. These sensitivity analyses provide a sense of the broad changes one would expect after a given development, but they cannot anticipate how policy makers would react and potentially change course in such an event. For example, if the economy were to suffer an unexpected recession, tax receipts would decline and spending on programs such as unemployment insurance would rise. In such a situation, however, policy makers might enact policies that stimulate the economy, leading to secondary and tertiary changes that are difficult to predict. Another caveat is that it is often unrealistic to suppose that one macroeconomic variable might change while others would remain constant. Most macroeconomic variables interact with each other in complex and subtle ways. These are important considerations to bear in mind when examining Table 2-4.

For real GDP growth and employment:

- The first panel in the table illustrates the effect on the deficit resulting from a one percentage point reduction in real GDP growth, relative to the Administration's forecast, in 2022 that is followed by a subsequent recovery in 2023 and 2024. The unemployment rate is assumed to be half a percentage

Table 2–4. SENSITIVITY OF THE BUDGET TO ECONOMIC ASSUMPTIONS

(Fiscal Years; In Billions Of Dollars)

Budget Effect	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	Total of Budget Effects: 2023–2033
Real Growth and Employment:												
Budgetary effects of 1 percentage point lower real GDP growth:												
(1) For calendar year 2023 only, with real GDP recovery in 2024–2033: [1]												
Receipts	–19.3	–30.3	–15.4	–2.7	–0.2	–0.2	–0.2	–0.2	–0.2	–0.2	–0.3	–69.2
Outlays	13.5	26.1	13.4	3.4	2.7	2.5	2.5	2.6	2.7	2.8	2.8	74.9
Increase in deficit (+)	32.8	56.4	28.9	6.0	2.9	2.7	2.7	2.8	2.9	3.0	3.1	144.2
(2) For calendar year 2023 only, with no subsequent recovery:												
Receipts	–19.3	–40.2	–46.6	–49.1	–51.4	–53.4	–55.5	–57.8	–60.1	–62.6	–65.3	–561.4
Outlays	13.5	31.6	34.9	38.6	41.8	45.3	50.3	56.9	63.2	68.1	73.6	517.8
Increase in deficit (+)	32.8	71.8	81.5	87.6	93.1	98.7	105.8	114.7	123.4	130.7	138.9	1,079.2
(3) Sustained during 2023–2033, with no change in unemployment:												
Receipts	–19.3	–59.7	–107.7	–160.8	–217.8	–277.6	–341.6	–409.8	–483.0	–561.2	–645.7	–3,284.3
Outlays	0.2	1.5	3.1	5.0	7.2	10.0	14.5	20.1	26.6	33.4	40.9	162.6
Increase in deficit (+)	19.5	61.2	110.9	165.8	225.0	287.6	356.1	429.9	509.6	594.7	686.6	3,446.9
Inflation and Interest Rates:												
Budgetary effects of 1 percentage point higher rate of:												
(4) Inflation and interest rates during calendar year 2023 only:												
Receipts	20.1	39.2	41.0	41.4	43.3	44.9	46.7	48.6	50.6	52.6	54.9	483.3
Outlays	34.7	73.0	61.5	62.8	62.6	65.0	62.9	66.1	66.7	70.0	73.6	698.9
Increase in deficit (+)	14.5	33.8	20.5	21.4	19.3	20.1	16.2	17.6	16.1	17.4	18.7	215.7
(5) Inflation and interest rates, sustained during 2023–2033:												
Receipts	20.1	60.5	105.2	153.6	206.2	262.1	322.6	388.0	459.4	536.1	620.2	3,134.0
Outlays	39.1	141.5	231.8	318.6	405.6	504.1	591.4	701.0	812.0	933.7	1,078.2	5,757.1
Increase in deficit (+)	19.0	81.0	126.6	165.0	199.3	242.0	268.7	312.9	352.6	397.7	458.1	2,623.1
(6) Interest rates only, sustained during 2023–2033:												
Receipts	1.6	3.7	4.5	4.8	5.1	5.4	5.6	5.8	6.1	6.3	6.7	55.5
Outlays	21.8	92.7	146.5	190.4	229.6	269.8	308.8	346.3	383.6	423.4	462.4	2,875.3
Increase in deficit (+)	20.1	89.0	142.0	185.6	224.5	264.5	303.3	340.5	377.5	417.1	455.7	2,819.8
(7) Inflation only, sustained during 2023–2033:												
Receipts	18.5	56.8	100.6	148.6	200.9	256.4	316.7	381.8	452.8	529.2	612.8	3,075.0
Outlays	17.4	49.1	85.9	129.0	177.1	235.8	284.4	357.0	431.2	513.4	619.0	2,899.3
Decrease in deficit (–)	–1.1	–7.7	–14.7	–19.6	–23.8	–20.7	–32.3	–24.8	–21.6	–15.8	6.2	–175.8
Interest Cost of Higher Federal Borrowing:												
(8) Outlay effect of 100 billion increase in borrowing in 2023	2.5	4.7	3.8	3.2	2.9	2.8	2.9	3.1	3.3	3.5	3.6	36.4

[1] The unemployment rate is assumed to be 0.5 percentage points higher per one percent shortfall in the level of real GDP.

point higher in 2022 before returning to the baseline level in 2023 and 2024.

- The next panel in the table reports the effect of a reduction of one percentage point in real GDP growth in 2022 that is not subsequently made up by faster growth in 2023 and 2024. Consistent with this output path, the rate of unemployment is assumed to rise by half a percentage point relative to that assumed in the Administration's forecasts.
- The third panel in the table shows the impact of a GDP growth rate that is permanently reduced by one percentage point, while the unemployment rate is not affected. This is the sort of situation that would arise if, for example, the economy was to experience a permanent decline in productivity growth.

For inflation and interest rates:

- The fourth panel in Table 2-4 shows the effect on the budget in the case of a one percentage point higher rate of inflation and a one percentage point higher nominal interest rate in 2022. Both inflation and interest rates return to their assumed levels in 2023. This would result in a permanently higher price

Table 2–5. FORECAST ERRORS, 2002-PRESENT

REAL GDP ERRORS			
2-Year Average Annual Real GDP Growth	Administration	CBO	Blue Chip
Mean Error	1.1	0.5	0.7
Mean Absolute Error	1.2	0.8	0.8
Root Mean Square Error	1.5	1.1	1.2
6-Year Average Annual Real GDP Growth			
Mean Error	1.5	1.3	1.2
Mean Absolute Error	1.6	1.3	1.2
Root Mean Square Error	1.6	1.4	1.3
INFLATION ERRORS			
2-Year Average Annual Change in the Consumer Price Index	Administration	CBO	Blue Chip
Mean Error	-0.1	-0.2	-0.0
Mean Absolute Error	0.6	0.6	0.6
Root Mean Square Error	0.7	0.8	0.7
6-Year Average Annual Change in the Consumer Price Index			
Mean Error	0.1	0.1	0.3
Mean Absolute Error	0.4	0.3	0.5
Root Mean Square Error	0.5	0.4	0.5
INTEREST RATE ERRORS			
2-Year Average 91-Day Treasury Bill Rate	Administration	CBO	Blue Chip
Mean Error	0.6	0.6	0.8
Mean Absolute Error	0.8	0.8	0.9
Root Mean Square Error	1.1	1.1	1.2
6-Year Average 91-Day Treasury Bill Rate			
Mean Error	2.0	2.1	2.2
Mean Absolute Error	2.0	2.1	2.2
Root Mean Square Error	2.2	2.6	2.4

level and nominal GDP level over the course of the forecast horizon.

- The fifth panel in the table illustrates the effects on the budget deficit of a one percentage point higher inflation rate and interest rate than projected in every year of the forecast.
- The sixth panel reports the effect on the deficit resulting from an increase in interest rates in every year of the forecast, with no accompanying increase in inflation.
- The seventh panel in the table reports the effect on the budget deficit of a one percentage point higher inflation rate than projected in every year of the forecast window, while the interest rate remains as forecast.
- The table also shows the effect on the budget deficit if the Federal Government were to borrow an additional $100 billion in 2022, while all of the other projections remain constant.
- These simple approximations that inform the sensitivity analysis are symmetric. This means that the effect of, for example, a one percentage point higher rate of growth over the forecast horizon would be of the same magnitude as a one percentage point reduction in growth, though with the opposite sign.

Forecast Errors for Growth, Inflation, and Interest Rates

As with any forecast, the Administration's projections are inherently uncertain because they are based on underlying assumptions about social, political, and global conditions. It is impossible to foresee every eventuality over a one-year horizon, much less over ten or more years. This section evaluates the historical accuracy of the past Administrations' forecasts for real GDP growth, inflation, and short-term interest rates from 2002 to the present day, especially relative to the accuracy of forecasts produced by the CBO and Blue Chip panel. For this exercise, forecasts produced by all three entities are compared with realized values of these variables.

The results of this exercise are reported in Table 2-5 and contain three different measures of accuracy. The first is the average forecast error. When a forecaster has an average forecast error of zero, it may be said that the forecast has historically been unbiased, in the sense that realized values of the variables have not been systematically above or below the forecasted value. The second is

Table 2–6. DIFFERENCES BETWEEN ESTIMATED AND ACTUAL SURPLUSES OR DEFICITS FOR FIVE-YEAR BUDGET ESTIMATES SINCE 1985

	Current Year Estimate	Budget Year Estimate	Estimate for Budget Year Plus:			
			One Year (BY + 1)	Two Years (BY + 2)	Three Years (BY + 3)	Four Years (BY + 4)
Mean Error	–0.5	0.7	1.6	2.2	2.6	2.9
Mean Absolute Error	1.5	1.9	2.6	3.1	3.6	3.9
Root Mean Squared Error	2.4	3.0	3.6	4.3	4.7	4.8

the average absolute value of the forecast error, which offers a sense of the magnitude of errors. Even if the past forecast errors average to zero, the errors may have been of a very large magnitude, with both positive and negative values. The table also reports the square root of the mean of squared forecast error (RMSE). This metric applies a harsher penalty to forecasts exhibiting large errors. The table reports these measures of accuracy at both the 2-year and the 6-year horizons, thus evaluating the relative success of different forecasts in the short run and in the medium run.

Past Administrations have forecast 2-year real GDP growth and average annual interest rates that were higher than actually realized, on average, by 1.1 percentage points and 0.6 percentage points, respectively. This is partly due to the assumption that Administration policy proposals contained in the Budget will be enacted, which has not always come to pass. The 2-year average forecast error for inflation is smaller, -0.1 percentage points, and similar to other forecasts.

Uncertainty and the Deficit Projections

This section assesses the accuracy of past budget forecasts for the deficit or surplus, measured at different time horizons. The results of this exercise are reported in Table 2-6, where the average error, the average absolute error, and the RMSE are reported.

In Table 2-6, a negative number means that the Federal Government ran a larger surplus or a smaller deficit than was expected, while a positive number in the table indicates a smaller surplus or a larger deficit. In the current year in which the budget is published, the Administration has tended to understate the surplus (or, equivalently, overstate the deficit) by an average of 0.5 percent of GDP. For the budget year, however, the historical pattern has been for the budget to understate the deficit by an average of 0.7 percent of GDP.[2] One possible reason for this is that past Administrations' policy proposals have not all been implemented. The forecast errors tend to grow with the time horizon, which is not surprising given that there is much greater uncertainty in the medium run about both the macroeconomic situation and the specific details of policy enactments.

A probabilistic range of outcomes for the deficit over the budget window can be calculated by building off of the historical forecast errors summarized in Table 2-6. This is accomplished by taking the RMSE of previous forecast errors and assuming that these errors are drawn from a normal distribution. This exercise is undertaken at every forecast horizon from the current year through fours year after the budget year. Chart 2-2 displays the projected range of possible deficits. In the chart, the middle line represents the Administration's expected fiscal balance and represents the 50th percentile outcome. The rest of the lines in the chart may be read in the following fashion. The top line reports the 95th percentile of the distribution of outcomes over 2023 to 2028, meaning that there is a 95 percent probability that the actual balance in those years will be more negative than expressed by the line. Similarly, there is a 95 percent probability that the balance will be more positive than suggested by the bottom line in the chart.

[2] Additionally, the CBO has historically forecasted smaller deficits, on average, than actually materialized.

Chart 2-2. Range of Uncertainty for the Budget Deficit