
ECONOMIC AND BUDGET ANALYSES

2. ECONOMIC ASSUMPTIONS AND OVERVIEW

This chapter presents the economic assumptions that underlie the Administration’s 2022 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 to forecasts prepared by other prominent institutions, and discusses the unavoidable uncertainty inherent in providing long-term forecasts.

This chapter proceeds as follows:

The first section provides an overview of the recent functioning of the U.S. economy, examining the performance of a broad array of key economic indicators.

The second section presents a detailed exposition of the Administration’s economic assumptions underlying the 2022 Budget, discussing how key macroeconomic variables are expected to evolve over the years 2021 to 2031.

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, and the Blue Chip panel of private-sector 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 panel of private 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 Performance²

The onset of the COVID-19 pandemic was marked by a sharp recession with steep declines across all prominent U.S. economic indicators. Unlike a typical recession, the effects of the recession were most acutely felt by those in the service and retail sectors, where social distancing behavior limited overall spending and activity. The economy plunged in the second quarter of 2020 and has partially rebounded in the quarters since, yet GDP remains below its pre-pandemic peak. Gains continue to be made in labor force participation while employers have added over 1.5 million jobs since the beginning of 2021.

Looking forward, consumers and businesses alike are showing increasing optimism following the passage of the American Rescue Plan Act of 2021 and significant progress in controlling the pandemic. Both the University of Michigan and Conference Board indicators for consumer sentiment and consumer confidence, respectively, have increased substantially over the past few months. Improvements in consumer sentiment signal increased consumer spending heading into the summer months. Businesses are also exhibiting optimism, as seen in the recent high levels of the ISM Purchasing Managers Index, a survey of business activity at manufacturing companies.

Labor Markets—The headline unemployment rate (U3) spiked to 14.8 percent in April 2020 and has gradually declined to 6.1 percent as of April 2021. While the

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).

² The statistics in this section are based on information available in April 2021.

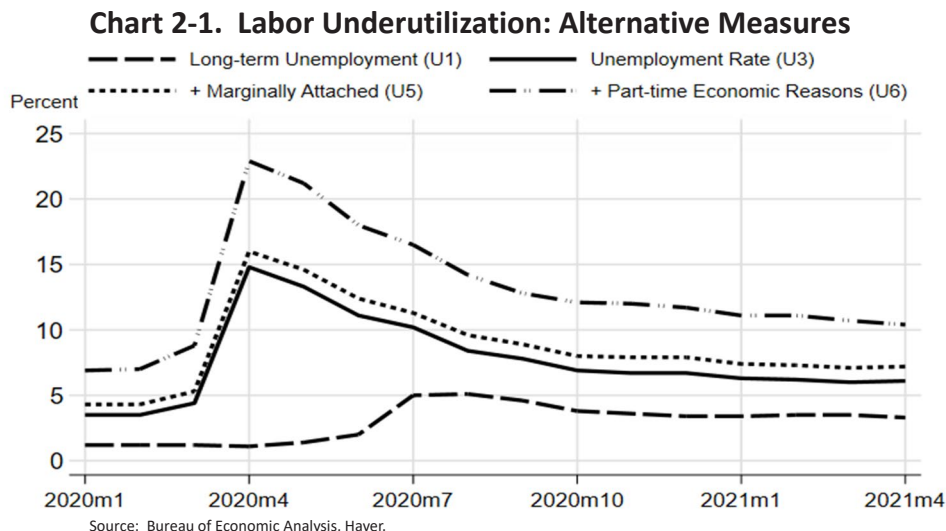
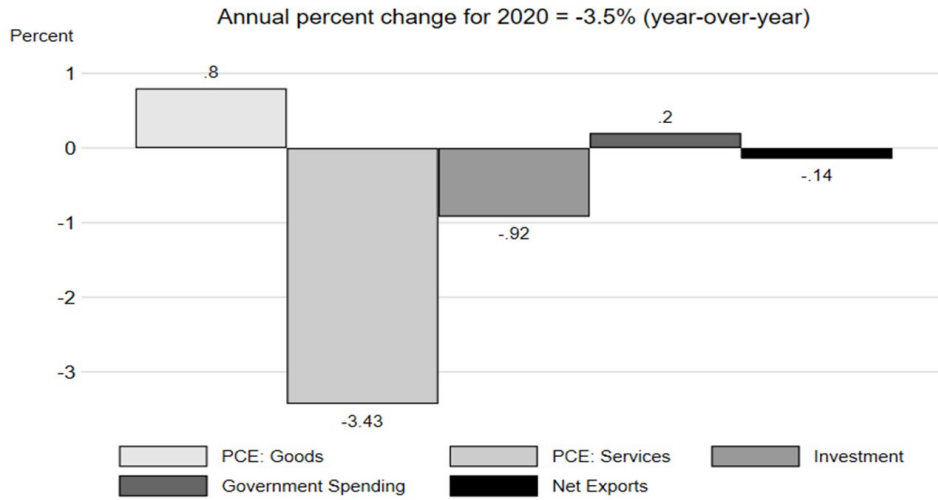


Chart 2-2. Contributions to Percent Change in 2020 Real GDP



decline in the unemployment rate is a positive sign for the economy, and the Blue Chip panel of professional forecasters projects that the unemployment rate will fall to an average of 4.7 percent during 2022, several important labor market indicators still show signs of weakness.

By looking at alternative measures of labor underutilization (Chart 2-1), we can get a clearer picture of the state of employment. The U5 unemployment rate, which includes those workers who identify as marginally attached to the workforce, is 7.2 percent as of April.³ Including workers who are working part-time for economic reasons (U6), the rate is 10.4 percent. Additionally, not only do millions of Americans remain unemployed—9.8 million as of April, a 72.0 percent increase from February 2020—but the duration of unemployment remains elevated as well.

³ The BLS defines marginally attached workers as persons who are not in the labor force, want and are available for work, and had looked for a job sometime in the prior 12 months. They are not counted as unemployed because they had not searched for work in the prior 4 weeks.

The long-term unemployment rate (U1), which measures the percent of the labor force unemployed for 15 weeks or longer, is 3.3 percent as of April; this is almost three times as high as the pre-pandemic rate of 1.2 percent from February 2020. Moreover, the median duration of unemployment in April was 19.8 weeks, which is the highest this indicator has been since October 2012.

Consumption—Consumption by private households is the largest component of the country’s economy, accounting for over two-thirds of output in 2019. Because of its large share of GDP, consumer spending growth is essential to economic growth in the United States. Real personal consumption expenditures (PCE) declined sharply at the onset of the pandemic (6.9 and 33.2 percent at an annual rate in 2020 Q1 and Q2, respectively), and following a large increase in Q3 (41.0 percent), progress has continued (2.3 percent in Q4 and 10.7 percent in 2021 Q1). As of 2021 Q1, real PCE is only 0.2 percent below where it was at the end of 2019.

Chart 2-3. Components of Real Personal Consumption Expenditures

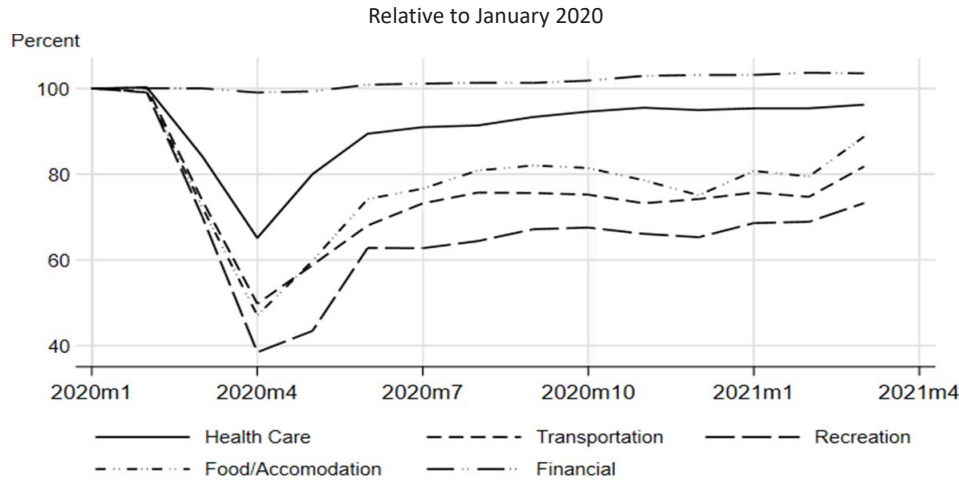


Table 2-1. ECONOMIC ASSUMPTIONS¹
(Calendar Years, Dollar Amounts In Billions)

	Actual 2019	Projections											
		2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Gross Domestic Product (GDP)													
Levels, Dollar Amounts in Billions:													
Current Dollars	21,433	20,933	22,411	23,799	24,808	25,778	26,767	27,794	28,860	29,986	31,166	32,414	33,723
Real, Chained (2012) Dollars	19,092	18,423	19,375	20,200	20,652	21,039	21,418	21,803	22,196	22,609	23,039	23,491	23,961
Chained Price Index (2012=100), Annual Average ..	112	114	116	118	120	123	125	128	130	133	135	138	141
Percent Change, Fourth Quarter over Fourth Quarter:													
Current Dollars	4.0	-1.2	7.1	5.2	4.0	3.8	3.8	3.8	3.8	3.9	3.9	4.0	4.0
Real, Chained (2012) Dollars	2.3	-2.5	5.2	3.2	2.0	1.8	1.8	1.8	1.8	1.9	1.9	2.0	2.0
Chained Price Index (2012=100)	1.6	1.3	1.8	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Incomes, Billions of Current Dollars													
Domestic Corporate Profits	1,745	1,616	1,529	1,725	1,795	1,861	1,880	1,854	1,828	1,825	1,849	1,900	1,955
Employee Compensation	11,432	11,489	12,247	12,907	13,416	13,909	14,435	15,018	15,642	16,305	17,002	17,730	18,491
Wages and Salaries	9,309	9,369	10,047	10,491	10,918	11,383	11,818	12,296	12,812	13,352	13,930	14,526	15,159
Nonwage Personal Income	5,413	5,409	5,324	5,522	5,806	6,096	6,436	6,747	7,094	7,371	7,650	7,984	8,265
Consumer Price Index (All Urban)³:													
Level (1982-1984 = 100), Annual Average	249	252	258	263	269	275	281	287	294	301	307	314	321
Percent Change, Fourth Quarter over Fourth Quarter	1.9	1.3	2.0	2.1	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
Unemployment Rate, Civilian, Percent													
Annual Average	3.7	8.1	5.5	4.1	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8
Interest Rates, Percent													
91-Day Treasury Bills ²	2.1	0.4	0.1	0.2	0.4	0.8	1.2	1.5	1.6	1.7	1.8	2.1	2.3
10-Year Treasury Notes	2.1	0.9	1.2	1.4	1.7	2.1	2.4	2.6	2.7	2.8	2.8	2.8	2.8

¹ Based on information available as of mid-February 2021

² Average rate, secondary market (bank discount basis)

³ Seasonally Adjusted

A prominent story of the pandemic has been the extent of the economic damage in specific sectors, particularly services. Chart 2-2 illustrates that a decline in the combined consumption of goods and services accounted for 75 percent of the total decline in real GDP for the year as a whole in 2020. Looking at the composition of services consumption, Chart 2-3 shows that several prominent service sectors are still considerably below pre-pandemic levels.

Nonresidential Fixed Investment—Real nonresidential fixed investment declined at an annual rate of 4.0 percent in 2020 (year-over-year). Equipment and intellectual property investment have recovered strongly in recent quarters, although business structures investment remains slow.

The Government Sector—Topline real government expenditures on consumption and investment increased 1.1 percent in 2020 (year-over-year), which includes a 4.3 percent increase in Federal spending partially offset by a 0.8 percent decline in State and Local spending. Within the Federal spending category, nondefense spending rose 5.6 percent while defense spending increased 3.5 percent.

Federal Reserve Policy—The Federal Reserve's response to the COVID-19 pandemic can be grouped into three main categories: lowering the policy rate, stabilizing financial markets, and supporting the flow of credit in the economy.⁴ First, the Fed's monetary policymaking

body—the Federal Open Market Committee (FOMC)—quickly lowered the target range for the federal funds rate. The federal funds rate, which serves as the FOMC's policy interest rate, is the rate that banks charge each other for overnight loans. In an effort to forestall negative economic impacts from the pandemic, the FOMC rapidly lowered the federal funds rate from an average of 1.59 in January 2020 to 0.08 by the end of March 2020, and this rate currently sits within the target range of 0 to 0.25 percent as of April 2021. This step helped reduce borrowing costs for households and businesses.

During its March 2021 meeting the FOMC announced it would maintain the target range for the federal funds rate at 0 to 0.25 percent. In its accompanying statement, the Committee repeated that it will not raise the federal funds rate target range “until labor market conditions have reached levels consistent with the Committee's assessments of maximum employment and inflation has risen to 2 percent and is on track to moderately exceed 2 percent for some time.”

Second, the Fed took a number of steps to unfreeze key financial markets and to help them run smoothly. In many cases this involved the purchases of securities and assets that were otherwise difficult to sell. These purchases con-

Fed's policy response to the pandemic: <https://www.stlouisfed.org/open-vault/2020/august/fed-response-covid19-pandemic>

⁴ See the following Fed blog post for a more detailed description of the

veyed to the public that the Fed stands ready to assist important parts of the financial system.

Third, the Fed introduced several temporary lending and funding facilities to support the flow of credit to businesses and households. Overall, the Fed has introduced multiple temporary facilities to support various types of funding and credit markets. Two of the commonly discussed facilities are the Paycheck Protection Program Liquidity Facility, established to help small businesses keep workers on the payroll, and the Main Street Lending Program (a set of five facilities), established to support lending to both small and mid-sized businesses and non-profit organizations.

Economic Projections

The Administration's forecast was finalized on February 19, with the parameters of that forecast close to the consensus prevailing at that date. The forecast informs the 2022 Budget and assumes implementation of the Administration's policy proposals. Importantly, however, the projections described below were formulated before the details of the American Jobs Plan (AJP) and American Families Plan (AFP) were finalized and therefore do not incorporate the full impact of these policies. The Administration's projections are reported in Table 2-1 and summarized below.

Real GDP—In 2021, as the economy recovers from the COVID-19 pandemic, the Administration forecast assumes a strong recovery in civilian employment, associated with a rebound at a fourth quarter-over-fourth quarter rate of 5.2 percent. As noted below, growth to date in 2021 has been strong, and private forecasters

now project somewhat more rapid 2021 growth than in the Administration forecast. As the economy continues to recover and the employment picture improves, growth is projected to be 3.2 percent in 2022. Real GDP is projected to return to its long-run "potential" level by 2023 and is forecasted to grow at an average of 1.9 percent between 2024 and 2031.

Unemployment—As of December 2020, the unemployment rate stood at 6.7 percent, a substantial recovery from the peak rate of 14.8 percent in April 2020 but still high relative to historical levels. The Administration expects a rapid and strong recovery in unemployment coinciding with progress in controlling the pandemic, with the unemployment rate dropping to 4.7 percent by the end of 2021. The Administration then forecasts unemployment rates will drop to 4.1 percent by 2022 before leveling out at 3.8 percent from 2023-2031.

Interest Rates—Interest rates are expected to rise as the economy recovers from the recession and as inflation rises and then stabilizes around the Federal Reserve target rate of 2 percent. The 91-day Treasury bill rate is expected to steadily rise from an average of 0.1 percent in 2021 to 1.2 percent in 2025, then gradually increase to a terminal rate of 2.3 percent. The 10-year rate follows a similar path as it increases from 1.4 percent in 2021 to 2.4 percent by 2025, reaching 2.8 percent at the end of the budget window, which reflects both the increase in short-term rates and an increase in the term premium for investors committing to holding long-term securities.

General Inflation—The Administration's forecast assumes that inflation will return to a long run trend. Specifically, the Administration's forecast assumes that the Consumer Price Index for all Urban Consumers

Table 2-2. COMPARISON OF ECONOMIC ASSUMPTIONS IN THE 2021 AND 2022 BUDGETS

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Real GDP (Percent Change)¹:												
2021 Budget Assumptions	2.5	2.5	3.1	3.0	3.0	3.0	3.0	2.9	2.8	2.8	2.8	2.8
2022 Budget Assumptions	2.3	-2.5	5.2	3.2	2.0	1.8	1.8	1.8	1.8	1.9	1.9	2.0
GDP Price Index (Percent Change)¹:												
2021 Budget Assumptions	2.3	1.8	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
2022 Budget Assumptions	1.6	1.3	1.8	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Consumer Price Index (All-Urban; Percent Change)¹:												
2021 Budget Assumptions	2.2	1.9	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
2022 Budget Assumptions	1.9	1.3	2.0	2.1	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3
Civilian Unemployment Rate (Percent)¹:												
2021 Budget Assumptions	3.9	3.7	3.5	3.6	3.8	4.0	4.0	4.0	4.0	4.0	4.0	4.0
2022 Budget Assumptions	3.7	8.1	5.5	4.1	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8
91-Day Treasury Bill Rate (Percent)²:												
2021 Budget Assumptions	1.9	2.1	1.4	1.5	1.5	1.6	1.7	2.0	2.2	2.4	2.5	2.5
2022 Budget Assumptions	2.1	0.4	0.1	0.2	0.4	0.8	1.2	1.5	1.6	1.7	1.8	2.1
10-Year Treasury Note Rate (Percent)²:												
2021 Budget Assumptions	2.9	2.2	2.0	2.2	2.5	2.7	3.0	3.1	3.1	3.1	3.2	3.2
2022 Budget Assumptions	2.1	0.9	1.2	1.4	1.7	2.1	2.4	2.6	2.7	2.8	2.8	2.8

¹ % Change 4Q

² Calendar Year Average

Table 2–3. COMPARISON OF ECONOMIC ASSUMPTIONS¹

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Real GDP (Year-over-Year):												
2022 Budget	-3.5	5.2	4.3	2.2	1.9	1.8	1.8	1.8	1.9	1.9	2.0	2.0
CBO	-3.4	4.6	2.9	2.2	2.3	2.3	1.9	1.6	1.6	1.6	1.5	1.6
Blue Chip ²		4.9	3.8	2.3	2.4	2.0	2.0	1.9	1.9	1.9	1.9	1.9
Real GDP (Fourth-Quarter-over-Fourth-Quarter):												
2022 Budget	-2.5	5.2	3.2	2.0	1.8	1.8	1.8	1.8	1.9	1.9	2.0	2.0
Federal Reserve ³	-2.4	4.2	3.2	2.4	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
Consumer Price Index (CPI-U) (Fourth-Quarter-over-Fourth-Quarter):												
2022 Budget	1.3	2.0	2.1	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
CBO	1.1	1.9	2.2	2.3	2.3	2.4	2.4	2.5	2.5	2.4	2.4	2.3
Blue Chip ^{2,4}		2.3	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Federal Reserve, PCE ^{3,5}	1.2	1.8	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Unemployment Rate: (annual averages)												
2022 Budget	8.1	5.5	4.1	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8
CBO	8.1	5.7	5.0	4.7	4.4	4.1	3.9	3.9	4.0	4.1	4.3	4.3
Blue Chip ²		5.8	4.7	4.8	4.5	4.3	4.4	4.3	4.3	4.3	4.3	4.3
Federal Reserve ^{3,6}	6.7	5.0	4.2	3.7	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
Interest Rates:												
91-Day Treasury Bills (discount basis):												
2022 Budget	0.4	0.1	0.2	0.4	0.8	1.2	1.5	1.6	1.7	1.8	2.1	2.3
CBO	0.4	0.1	0.1	0.2	0.3	0.6	1.0	1.4	1.6	1.9	2.2	2.3
Blue Chip ²		0.1	0.2	0.6	0.9	1.1	1.3	1.7	1.7	1.7	1.7	1.7
10-Year Treasury Notes												
2022 Budget	0.9	1.2	1.4	1.7	2.1	2.4	2.6	2.7	2.8	2.8	2.8	2.8
CBO	0.9	1.1	1.3	1.5	1.8	2.1	2.5	2.7	3.0	3.2	3.3	3.4
Blue Chip ²		1.2	1.6	1.7	2.0	2.2	2.3	2.5	2.5	2.5	2.5	2.5

Sources: Administration; CBO, The Budget and Economic Outlook: 2021 to 2031, February 2021; October 2020 and February 2021 Blue Chip Economic Indicators, Aspen Publishers, Inc.; Federal Reserve Open Market Committee, December 16, 2020

¹ Calendar Year

² 2028-2031 are 5 year averages; 2023-2031 values derived from October 2020 report

³ Median Projection

⁴ Year-over-Year

⁵ Personal Consumption Expenditures

⁶ Average rate during 4th quarter

(CPI-U) will rise from 1.2 percent in 2020 on a fourth quarter-over-fourth quarter basis to 2.0 percent in 2021 and stabilize at 2.3 percent from 2024 to 2031, a rate consistent with the Federal Open Market Committee's inflation target for a slightly different inflation measure.

Comparison with Other Forecasts

For perspective on the Administration's forecast, this section compares it with forecasts prepared around the same time by the CBO, the Federal Open Market Committee of the Federal Reserve (FOMC), and the Blue Chip panel of private-sector forecasters. There are important differences that should inform such comparisons.

The most important difference between these forecasts is that they make different assumptions about the implementation of the Administration's proposed policies. As

already noted, the Administration's forecast assumes impacts of Administration policies, including the American Rescue Plan and components of the American Jobs and American Families Plans. In contrast, the CBO forecast assumes no changes to current law and was formulated prior to passage of the American Rescue Plan. 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 the contribution of those policies to economic growth.

A second 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 in February, the Blue Chip forecasts are drawn from the February survey for 2021 and 2022 values and from the October 2020 survey for the long-term forecast (2023-2031). These were the latest Blue Chip forecasts available at the time the Administration finalized its forecast. In addition, the FOMC projections were released in mid-March, and the CBO forecast was published in early February based on data available in January. During the months that have elapsed since the Administration's forecast was finalized, macroeconomic, policy, and pandemic developments have been mostly positive. Consumer spending has outpaced earlier projections, the Congress has passed the American Rescue Plan, and over one hundred million Americans have been vaccinated. These subsequent developments should be considered when comparing the Administration's forecast with more recent forecasts such as the Blue Chip panel of professional economic forecasters. For example, between February and May of 2021, the Blue Chip panel revised upwards their consensus forecast for 2021 (year-over-year) real GDP growth, from 4.9 percent to 6.6 percent. Likewise, the Blue Chip consensus forecast for the average 2021 unemployment rate was revised downwards from 5.8 to 5.4 percent.

In spite of differences across forecasters, the forecasts are similar in several aspects. All of them project a continued economic recovery and improving labor markets. Interest rates across these various projections are consistent with an environment in which the Federal Reserve holds off on raising its policy rate until late 2022 or early 2023. Rates of inflation are also expected to rise but to remain in line with the Federal Reserve's mandate on low and stable inflation. See Table 2-3 for a comparison.

Real GDP—The Administration forecasts a higher path for real GDP growth than the CBO, a 2.4 percent per year average over the forecast window versus CBO's 2.2 percent average, though consistent with the 2.4 percent average from Blue Chip. The Administration's forecast reflects partial effects of the Administration's proposed policies, while the CBO is required to assume a continuation of current law in its forecast. The Administration's forecast has the same average growth rate over the forecast window as the FOMC although the Fed's forecast assigns more growth in 2021 than the Administration (6.5 percent compared with 5.2 percent) and slightly slower growth over the out-years of the forecast.

Unemployment—On the unemployment rate, the Administration's expectations are largely aligned with those of the other forecasters. In particular, all forecasters expect unemployment to decrease over the forecast window. One minor difference is that the Administration's forecast for unemployment plateaus at 3.8 percent as compared with 4.0 and 4.1 percent for the other projections. Although slightly lower for 2021 through 2023 than the CBO and Blue Chip, the Administration's forecast is slightly higher than the Federal Reserve's forecast during this window.

Interest Rates—The Administration's 91-day interest rate forecast is broadly consistent with the Blue Chip forecast for 2022-2025 and is slightly higher than the

CBO's forecast. The Administration expects short-term rates to pick up slowly in 2022 and 2023 and rise from 1.2 to 1.6 percent between 2025-2027. The Blue Chip expects a rise from 1.1 to 1.7 percent, and the CBO expects a rise from 0.4 to 1.7 percent over this period. For both short- and long-term rates, all forecasters agree that they will tend to rise modestly over the coming few years.

General Inflation—Assumptions for CPI-U inflation are similar across the Administration, the CBO, and the Blue Chip. The CBO assumes a CPI-U inflation rate of 2.4 percent in the long run, while the Administration and the Blue Chip are not significantly different at 2.3 and 2.2 percent long-run rates. The Federal Reserve does not predict CPI-U but rather PCE inflation. The Federal Reserve expects PCE inflation to reach the Fed's target of 2.0 percent by 2023 and remain stable thereafter. PCE inflation tends to be lower than CPI-U inflation.

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:

1. 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 2021 that is followed by a subsequent recovery in 2022 and 2023. 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	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	Total of Budget Effects: 2021-2031
Real Growth and Employment:												
Budgetary effects of 1 percentage point lower real GDP growth:												
(1) For calendar year 2021 only, with real GDP recovery in 2022-2031:¹												
Receipts	-15.4	-24.4	-12.3	-1.9	0.2	0.2	0.2	0.2	0.2	0.2	0.2	-52.4
Outlays	18.2	25.4	9.7	0.7	1.1	1.3	1.5	1.5	1.6	1.9	2.1	64.9
Increase in deficit (+)	33.6	49.8	22.0	2.6	0.8	1.1	1.2	1.3	1.4	1.7	1.9	117.3
(2) For calendar year 2021 only, with no subsequent recovery:¹												
Receipts	-15.4	-32.3	-37.5	-39.2	-40.7	-42.5	-44.3	-45.9	-47.6	-49.4	-51.2	-446.0
Outlays	18.2	31.0	29.1	31.6	34.5	37.6	40.3	44.0	47.2	51.8	56.6	421.9
Increase in deficit (+)	33.6	63.3	66.7	70.8	75.2	80.1	84.6	89.8	94.8	101.2	107.9	867.9
(3) Sustained during 2021-2031, with no change in unemployment:												
Receipts	-15.4	-48.5	-88.7	-132.5	-178.7	-229.6	-283.5	-339.3	-398.9	-462.4	-529.9	-2,707.5
Outlays	-1.9	-0.6	-0.3	0.2	1.8	3.7	6.0	7.6	10.6	17.7	26.0	70.7
Increase in deficit (+)	13.5	47.9	88.5	132.7	180.5	233.3	289.5	346.9	409.5	480.1	555.9	2,778.2
Inflation and Interest Rates:												
Budgetary effects of 1 percentage point higher rate of:												
(4) Inflation and interest rates during calendar year 2021 only:												
Receipts	16.9	33.1	34.9	35.0	36.3	37.9	39.4	40.8	42.3	43.8	45.5	405.9
Outlays	44.5	78.8	55.4	55.7	55.8	57.1	55.9	58.6	55.6	59.4	61.8	638.6
Increase in deficit (+)	27.6	45.7	20.6	20.7	19.5	19.2	16.5	17.8	13.3	15.6	16.3	232.7
(5) Inflation and interest rates, sustained during 2021-2031:												
Receipts	16.9	50.8	88.4	128.2	170.9	218.6	269.8	323.4	381.4	444.1	511.7	2,604.2
Outlays	43.3	148.9	227.8	301.8	379.9	461.3	543.3	639.7	717.4	826.3	937.9	5,227.6
Increase in deficit (+)	26.4	98.1	139.4	173.6	209.0	242.8	273.6	316.3	336.0	382.2	426.2	2,623.4
(6) Interest rates only, sustained during 2021-2031:												
Receipts	1.2	2.5	2.9	3.1	3.3	3.6	4.0	4.3	4.5	4.8	5.0	39.2
Outlays	26.3	106.2	154.4	194.0	230.2	267.4	299.7	332.9	363.7	398.3	435.8	2,808.8
Increase in deficit (+)	25.1	103.7	151.5	190.9	226.9	263.8	295.7	328.7	359.2	393.5	430.8	2,769.6
(7) Inflation only, sustained during 2021-2031:												
Receipts	15.7	48.3	85.4	125.1	167.5	214.8	265.5	318.8	376.5	438.8	506.1	2,562.5
Outlays	17.0	42.7	73.5	108.0	149.8	194.1	244.0	307.5	354.8	429.3	503.6	2,424.3
Decrease in deficit (-)	1.3	-5.5	-11.9	-17.1	-17.7	-20.6	-21.5	-11.3	-21.8	-9.6	-2.5	-138.2
Interest Cost of Higher Federal Borrowing:												
(8) Outlay effect of 100 billion increase in borrowing in 2021	0.1	0.1	0.3	0.6	1.2	1.5	1.7	1.9	2.0	2.3	2.5	14.1

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

point higher in 2021 before returning to the baseline level in 2022 and 2023.

- The next panel in the table reports the effect of a reduction of one percentage point in real GDP growth in 2021 that is not subsequently made up by faster growth in 2022 and 2023. Consistent with this out-pat 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 were 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 2021. Both inflation and interest rates return to their assumed levels in 2022. This would result in a permanently higher price

Table 2-5. FORECAST ERRORS, 2002-PRESENT

REAL GDP ERRORS			
	Administration	CBO	Blue Chip
2-Year Average Annual Real GDP Growth			
Mean Error	1.0	0.5	0.7
Mean Absolute Error	1.1	0.7	0.8
Root Mean Square Error	1.5	1.2	1.2
6-Year Average Annual Real GDP Growth			
Mean Error	1.6	1.4	1.2
Mean Absolute Error	1.6	1.4	1.2
Root Mean Square Error	1.7	1.5	1.4
INFLATION ERRORS			
	Administration	CBO	Blue Chip
2-Year Average Annual Change in the Consumer Price Index			
Mean Error	-0.2	-0.2	-0.0
Mean Absolute Error	0.7	0.6	0.6
Root Mean Square Error	0.8	0.8	0.7
6-Year Average Annual Change in the Consumer Price Index			
Mean Error	0.1	0.0	0.3
Mean Absolute Error	0.4	0.3	0.4
Root Mean Square Error	0.5	0.4	0.5
INTEREST RATE ERRORS			
	Administration	CBO	Blue Chip
2-Year Average 91-Day Treasury Bill Rate			
Mean Error	0.5	0.5	0.7
Mean Absolute Error	0.8	0.6	0.8
Root Mean Square Error	1.1	1.0	1.2
6-Year Average 91-Day Treasury Bill Rate			
Mean Error	2.1	2.2	2.3
Mean Absolute Error	2.1	2.2	2.3
Root Mean Square Error	2.3	2.4	2.6

- 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.
 - Finally, the table shows the effect on the budget deficit if the Federal Government were to borrow an additional \$100 billion in 2021, 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 projections and are subject to error because they are based on a set of assumptions about the underlying milieu comprising social, political, and global conditions. It

Table 2-6. DIFFERENCES BETWEEN ESTIMATED AND ACTUAL SURPLUSES OR DEFICITS FOR FIVE-YEAR BUDGET ESTIMATES SINCE 1985
(As a Percent of GDP)

	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	-0.8	0.2	1.1	1.7	2.4	2.7
Mean Absolute Error	1.2	1.5	2.2	2.7	3.5	3.7
Root Mean Squared Error	1.4	2.1	3.0	3.5	4.5	4.6

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 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 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. Finally, the table 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.

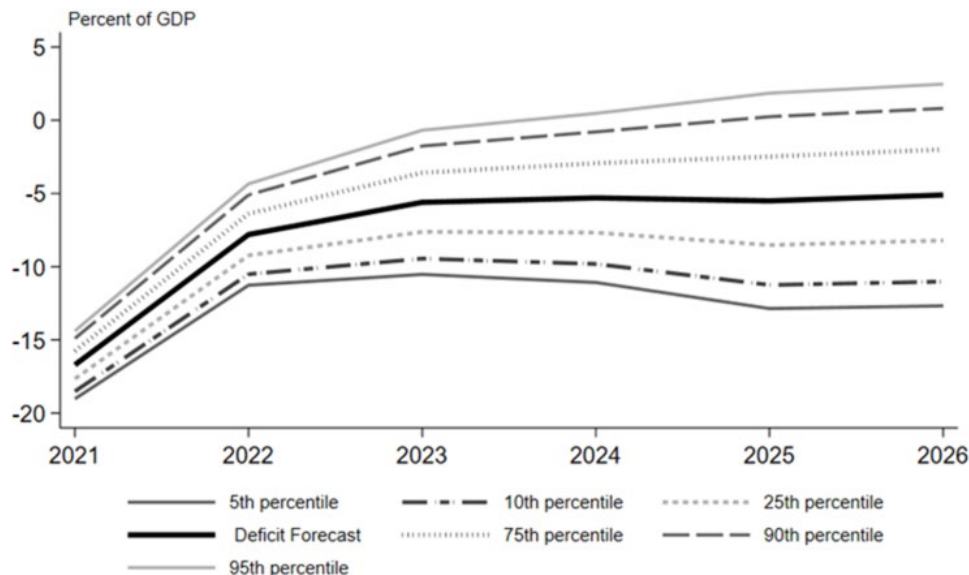
Past Administrations have forecast 2-year real GDP growth and interest rates that were higher than actually realized, on average, by 1.0 percentage points and 0.5 percentage points, respectively. This is partly due to the assumption that Administration policy proposals contained in the Budget will be enacted, which has not always come to pass. The 2-year average forecast error for inflation is smaller, -0.2 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,

Chart 2-4. Range of Uncertainty for the Budget Deficit



overstate the deficit) by an average of 0.8 percent of GDP. For the budget year, however, the historical pattern has been for the budget to understate the deficit by an average of 0.2 percent of GDP.⁵ 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 four years after the budget year. Chart 2-4 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 2021 to 2026, 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.

⁵ Additionally, the CBO has historically forecasted smaller deficits, on average, than actually materialized.