

How Changes in Economic Conditions Might Affect the Federal Budget

Overview

Some of the uncertainty in budget projections stems from the fact that the federal budget is highly sensitive to economic conditions, which are difficult to predict. If conditions differed from those in the Congressional Budget Office’s economic forecast, budgetary outcomes could diverge from those in the agency’s baseline budget projections. To show how variations in economic conditions might affect the budget, CBO analyzed how the budget might change if values of the following key economic variables differed from those in the agency’s forecast:

- The growth of productivity and, consequently, the growth of real (inflation-adjusted) gross domestic product (GDP);
- Labor force growth and, in turn, real economic growth;
- Interest rates; and
- Inflation.

To illustrate the budgetary effects of economic changes, CBO created and analyzed four scenarios to develop “rules of thumb” for those variables. The scenarios reflect the following changes from the agency’s current economic forecast: slower growth of productivity, slower growth of the labor force, higher interest rates, and higher inflation. Each of those changes would increase deficits above the amounts in CBO’s baseline budget projections; however, the values of any of the variables could be higher or lower than they are in CBO’s forecast. The rules of thumb are roughly symmetrical, so if productivity or the labor force instead increased more quickly than projected, or if interest rates or inflation were lower than projected, deficits would be smaller than they are in the agency’s baseline budget projections.

Background

When economic conditions differ from those in the agency’s forecast, actual federal spending and revenues are likely to differ from CBO’s projections because economic conditions affect federal revenues and outlays in several ways. Revenues depend on the total amount of income that is subject to taxation, including wages and salaries, other income received by individuals, and corporate profits. Those types of income generally rise or fall (though not necessarily proportionally) in response to changes in economic growth and inflation. In addition, the Treasury regularly refinances portions of the government’s outstanding debt—and issues more debt to finance new deficits—at market interest rates. Thus, the amount that the federal government spends to pay interest on its debt is directly tied to those rates. Spending for many mandatory programs is also affected by economic growth and inflation—either explicitly (for example, through cost-of-living adjustments) or indirectly. Finally, although actual spending for discretionary programs is determined solely by Congressional action, CBO’s projections of such spending are affected by changes in inflation when the spending is not constrained by the caps on discretionary budget authority that are in place under current law.¹

The Economic Variables That CBO Examined

CBO examined how differences in key economic variables would affect the budget projections by analyzing four illustrative economic scenarios; those simplified scenarios underlie the agency’s rules of thumb. In each of those scenarios, the values of economic variables differ from those in the agency’s forecast by 0.1 percentage point each year starting in January 2019. The first

1. The Bipartisan Budget Act of 2018 (Public Law 115-123) increased the limits on discretionary funding that were in place under the Budget Control Act of 2011 (P.L. 112-25) for 2019 but did not change them for 2020 or 2021. Overall limits on discretionary budget authority total \$1,244 billion in 2019, falling to an estimated \$1,118 billion in 2020 and rising to \$1,145 billion in 2021.

two scenarios—involving slower productivity growth and slower labor force growth—incorporate changes to variables that directly affect real economic growth. Those changes would cause such growth to be slower than it is in CBO’s forecast, thereby affecting other economic variables as well. The third and fourth scenarios—involving higher interest rates and higher inflation—differ from the first two in that they do not incorporate any changes in real economic growth. CBO has produced a workbook in which users can create their own alternative scenarios for productivity growth, labor force growth, interest rates, and inflation to see how revenues, outlays, and deficits might differ from CBO’s baseline budget projections.²

For simplicity, CBO constructed the scenarios such that the values for the four economic variables differed from those in the agency’s forecast by 0.1 percentage point in the direction that would worsen the budget outlook. The scenarios are not intended to indicate the extent to which, or the direction in which, actual economic conditions might differ from those in CBO’s projections. For example, the agency estimates that there is roughly a two-thirds chance that the average annual growth rate of real GDP over the next five years will be within 1.3 percentage points above or below the projected rate. Similarly, there is about a two-thirds chance that the average annual rate of inflation (as measured by the GDP price index) over the next five years will be within 0.8 percentage points of the rate in CBO’s forecast in either direction, and there is the same probability that the average interest rate (on 10-year Treasury notes, in real terms) will be within 0.9 percentage points of the forecast rate.³

Economic conditions could differ from those in CBO’s forecast for a variety of reasons. Shifts in economic trends are difficult to identify, and until forecasters can identify those trends, they may make incorrect inferences about the future trajectory of the economy. For example, CBO and other forecasters only slowly appreciated

recent shifts in trends in interest rates and productivity growth. Changes in policy can also cause economic outcomes to differ from CBO’s projections. As one of many examples, future changes in immigration policy could have significant implications for growth in the labor force. Furthermore, the full effect of those policy changes may not be immediately apparent, so actual conditions may diverge from CBO’s projections even if the projections are intended to account for those policy changes. Finally, sometimes changes in economic conditions, such as turning points in the business cycle, simply cannot be predicted on the basis of available information.

Productivity Growth. In this scenario, productivity growth is 0.1 percentage point lower each year than it is in CBO’s economic forecast, causing real GDP to be about 1.4 percent lower in 2029 than forecast (see Table B-1). The slowdown in productivity growth, in turn, affects other economic variables, such as the size of the labor force, wage rates, and interest rates.

Labor Force Growth. In the second scenario, the rate of growth in the labor force is 0.1 percentage point lower each year than the rate in the agency’s economic forecast, causing real GDP to be about 0.7 percent lower than forecast for 2029. If the population grew at the rate that CBO projects, the slower growth of the labor force would cause the labor force participation rate to fall below the agency’s current estimates by roughly equal amounts each year until it was about 0.6 percentage points lower in 2029 than forecast. Like slower productivity growth, slower labor force growth affects other economic variables as well.

Interest Rates. In the third scenario, interest rates are 0.1 percentage point higher each year than those in CBO’s forecast. Inflation is held equal to the forecast rate in this scenario, so the corresponding rule of thumb shows the effects of higher real interest rates. Unlike the other scenarios, this scenario does not include any changes to the projected amounts of interest payments made or received by individuals or businesses in CBO’s economic forecast.

Inflation. In the fourth scenario, inflation is 0.1 percentage point higher each year than it is in the agency’s economic forecast. All economic indicators measured as nominal values, such as taxable income and interest rates, increase in response to higher inflation, but indicators

2. Congressional Budget Office, “Workbook for How Changes in Economic Conditions Might Affect the Federal Budget, January 2019,” www.cbo.gov/publication/54934.
3. CBO estimated those ranges on the basis of an analysis of its forecasting accuracy over the past four decades for GDP and since 1984 for inflation and interest rates. For more on the uncertainty underlying economic forecasts, see Congressional Budget Office, *CBO’s Economic Forecasting Record: 2017 Update* (October 2017), www.cbo.gov/publication/53090.

Table B-1.

Differences Between the Illustrative Scenarios and CBO's Economic Forecast in 2029

	Level of Real GDP (Percent)	Level of Nominal GDP (Percent)	Labor Force (Percent)	Interest Rate on 10-Year Treasury Notes (Percentage points)	Level of the GDP Price Index (Percent)	Level of the Employment Cost Index ^a (Percent)
Slower Productivity Growth	-1.4	-1.4	-0.2	-0.10	0	-1.2
Slower Labor Force Growth	-0.7	-0.7	-1.0 ^b	-0.05	0	0.4
Higher Interest Rates	0	0	0	0.10	0	0
Higher Inflation	0	1.1	0	0.10	1.1	1.1

Source: Congressional Budget Office.

Real values are nominal values that have been adjusted to remove the effects of changes in prices.

Each rule of thumb is roughly symmetrical. CBO based its rules of thumb on scenarios in which economic variables differed from those in the agency's forecast in the direction that would worsen the budget outlook, but those variables could be higher or lower than forecast. If, for example, productivity growth was faster than CBO projected, real GDP would be higher than it is in the agency's economic forecast rather than lower, as it is in the table.

GDP = gross domestic product.

a. The employment cost index for wages and salaries of workers in private industry.

b. Although CBO used a growth rate of the labor force for this scenario that was 0.1 percentage point lower than it is in the agency's economic forecast each year, the resulting reduction in the size of the labor force in 2029 is only 1.0 percent (rather than 1.1 percent, as might be expected from 11 years of growth that was 0.1 percentage point slower) because the initial decline in the labor force is slightly offset by an increase in the supply of labor resulting from higher wage rates.

measured as real values, such as real GDP, are the same as in CBO's economic forecast.

Applying the Rules of Thumb

CBO's rules of thumb provide a rough sense of how changes in those economic variables would affect revenues and outlays. The rules of thumb are roughly symmetrical and scalable, which means that they can be used to analyze a number of scenarios in which values for those variables differ from the ones presented here, although there are some caveats.

Symmetry. Each rule of thumb is roughly symmetrical. Thus, if the growth of productivity or the labor force was instead 0.1 percentage point higher than in CBO's baseline or if interest rates or inflation were 0.1 percentage point lower than in CBO's baseline, the effects would be about the same as those shown here, but with the opposite sign.

Scalability. In addition to being symmetrical, the rules of thumb are also roughly scalable—that is, an increase or decrease in the value of a given economic variable will produce a roughly proportional increase or decrease in

the resulting budgetary effects. For example, if productivity growth was 0.2 percentage points lower each year than it is in CBO's economic forecast rather than 0.1 percentage point lower as it is in the scenario discussed here, the increase in the deficit would roughly double.

However, the scalability of the rules of thumb is limited. The more the values of economic variables differ from those in CBO's forecast, the less accurate the estimates produced using the rules of thumb are likely to be. Although two of the illustrative scenarios incorporate a broad set of interactions between several economic variables, all four rules of thumb are nevertheless simplified and do not account for more complex interactions among variables—such as those among growth in real GDP, inflation, and the unemployment rate. That limitation becomes more pertinent as the difference between the value of an economic variable in a given scenario and in CBO's forecast increases. Certain elements of the tax code and some provisions relating to mandatory outlays also make it likely that as such differences increase, estimates produced using the rules of thumb will become less and less accurate.

Moreover, the rules of thumb are based on scenarios in which the values of variables differ from the values in CBO's economic forecast by the same amount each year. The rules of thumb can be applied to scenarios in which the differences vary somewhat from year to year, but they cannot be used to accurately estimate the budgetary effects of significant variations in those differences over the 10-year period. For example, if the rate of labor force growth differed from the value in CBO's forecast by 0.5 percentage points in 2029 but was the same as the forecast value in all other years, the average annual difference would be a bit below 5 basis points (that is, 0.05 percentage points).⁴ CBO's estimate of the budgetary effect over the decade would not, however, be one-half the amount shown for the scenario for slower labor force growth (a difference of 0.1 percentage point each year), nor would the agency's estimate of the budgetary effect in 2029 be five times greater than the value for that year under the illustrative scenario. Both estimates would be considerably smaller than those ratios.

To assess the scalability of the rules of thumb, CBO compared estimates produced by means of the simplified calculations in its online workbook with estimates made by means of a broader set of models that the agency uses to assess the effects of economic changes on the budget. CBO found that the four rules of thumb produced approximations of the estimates generated using CBO's economic and budget models as long as the values for each of the variables did not differ from the forecast values by more than a certain amount. Specifically, the rules of thumb were scalable as long as the annual differences from the forecast values were within the following ranges:

- For productivity growth, between -0.5 percentage points and 0.5 percentage points,
- For labor force growth, between -0.75 percentage points and 0.75 percentage points,
- For interest rates, between -1.0 percentage point and 1.0 percentage point, and
- For inflation, between -1.0 percentage point and 1.0 percentage point.

4. One basis point is equivalent to one-hundredth of a percentage point, or 0.01 percentage points. Basis points are commonly used as a unit of measure for percentage differences of less than 1 percentage point.

In general, differences outside those ranges in any given year would generate budgetary effects that could not be reasonably approximated by the rules of thumb and therefore would require a more detailed analysis using CBO's comprehensive models.

Caveats. If economic conditions changed in such a way that they reflected the changes incorporated in two or more of the scenarios, the budgetary effects would most likely differ from the sum of the estimates calculated using the individual rules of thumb. For example, if rates of productivity growth and labor force growth were both lower than they are in CBO's economic forecast, the two effects would interact and lower output growth by more than would be suggested by simply adding those effects.

The rules of thumb capture the budgetary effects of specified changes in the economy, but they do not account for the source of those changes, which could include changes in fiscal policy. They can be used to make estimates that approximate the estimates of macroeconomic feedback to the federal budget that CBO would produce by using its full set of models in "dynamic analyses" of certain legislative proposals. However, the rules of thumb do not include the direct budgetary effects of any change in fiscal policy. In addition, changes in fiscal policy would probably have broader economic effects than those included in the simplified scenarios considered here. For example, a proposal might call for a change in government spending that would affect inflation. CBO's dynamic analysis of such a proposal would include estimates of changes in inflation that could be reasonably approximated by using the rule of thumb for inflation. Nonetheless, such a change to government spending would have direct effects on the budget, as well as additional effects on the economy, that are not captured by that rule of thumb. Similarly, a new tax policy that changed effective tax rates would probably alter the relationship between changes in the economy and revenues, which would cause its budgetary effects to differ from those that would be estimated using the rules of thumb.

Changes in Productivity Growth and Labor Force Growth

The growth of productivity and the growth of the labor force are important determinants of real economic growth. All else being equal, faster productivity growth and faster labor force growth both lead to greater economic growth and thus reduce budget deficits. Slower productivity growth and slower labor force growth both

reduce the growth of GDP, thereby worsening the budget outlook.⁵

Slower Growth of Productivity

The first rule of thumb illustrates the budgetary effects of growth in productivity that is slightly weaker than CBO currently anticipates. Specifically, if productivity grew at a rate that was 0.1 percentage point lower each year than the rate in the agency's economic forecast, annual deficits would be larger than projected by amounts that would climb to \$65 billion by 2029, CBO estimates. Between 2020 and 2029, the cumulative deficit would be \$307 billion larger than it is in CBO's baseline projections (see Table B-2).

In this analysis, CBO examined how the slower growth of total factor productivity (that is, real output per unit of combined labor and capital services) might affect GDP, income, and interest rates. The agency found that slower-than-anticipated productivity growth would lead to slower growth in GDP because both labor and capital would be producing less than projected in CBO's current economic forecast. If workers produced less, the hourly wage rate would be lower; therefore, the supply of labor would also decline. As a result, total labor income would be lower. Meanwhile, if capital produced less output, the returns on that capital would also decline, further decreasing total taxable income. Lower returns on capital would also cause private investment to be lower. Treasury securities compete with other investments for investors' money, so those lower rates of return on private investments imply that rates on Treasury securities would also be lower. Other variables, such as the unemployment rate and inflation, could be affected as well; however, this simplified scenario does not include the effects of changes in those variables.

If actual productivity growth was 0.1 percentage point lower each year than it is projected to be, by the end of 2029, GDP and total income would be about 1.4 percent lower than they are in CBO's forecast, CBO estimates. Meanwhile, interest rates would be about 1 basis point below those in the agency's forecast for 2019, and that difference would increase by roughly 1 additional

basis point in each subsequent year. By the end of 2029, interest rates would be about 10 basis points lower than in the forecast (see Table B-1 on page 123).

If economic growth slowed in each year as a result of lower productivity growth, taxable income would also grow more slowly than projected, and tax revenues would be lower by increasing amounts over time, resulting in a shortfall of \$84 billion in 2029. Between 2020 and 2029, the drop in revenues stemming from the slower growth in income would increase deficits by a total of \$405 billion.

Slower growth in income would also lead to a \$34 billion net decrease in mandatory outlays for programs whose spending is either explicitly or implicitly linked to wage growth. Outlays for Medicare, Medicaid, unemployment insurance, and Social Security would see a decrease of \$40 billion, which would be partially offset by a \$6 billion increase in outlays for the refundable portions of the earned income tax credit, the child tax credit, and the American Opportunity Tax Credit.⁶

Because slower productivity growth would push interest rates down, the amount of interest that the federal government would pay on the debt projected in CBO's baseline would decrease by \$96 billion between 2020 and 2029. However, if revenues were reduced by the amounts indicated above, the federal government would need to borrow more than projected to finance the resulting net increase in the deficit. That additional borrowing would add \$32 billion to interest payments between 2020 and 2029. Together, those effects would result in net interest outlays that were \$64 billion less than the amount in the agency's baseline projections over the 2020–2029 period.

Slower Growth of the Labor Force

The second rule of thumb illustrates the budgetary effects of the labor force's growing slightly more slowly than CBO anticipates. Specifically, if the unemployment rate remained unchanged and annual growth in the labor force was 0.1 percentage point slower than in CBO's economic forecast, annual deficits would be larger than those in the agency's baseline budget projections by amounts that would grow each year and reach \$33 billion by 2029, CBO estimates. The cumulative deficit

5. For further discussion of how changes in the labor force participation rate (which lead to changes in labor force growth) and changes in productivity affect GDP, as well as of the uncertainty of such projections, see Chapter 7 in Congressional Budget Office, *The 2016 Long-Term Budget Outlook* (July 2016), www.cbo.gov/publication/51580.

6. Tax credits reduce a taxpayer's income tax liability. If a refundable credit exceeds a taxpayer's liability, all or a portion of the excess is refunded to the taxpayer and recorded as an outlay in the budget.

Table B-2.

How Changes in Productivity Growth and Labor Force Growth Might Affect CBO's Baseline Budget Projections

Billions of Dollars

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	Total	
												2020–2029	2020–2029
Productivity Growth Is 0.1 Percentage Point Lower per Year													
Changes in Revenues	-3	-8	-13	-19	-25	-32	-40	-51	-61	-72	-84	-96	-405
Changes in Outlays													
Mandatory outlays	*	-1	-1	-1	-2	-3	-3	-4	-5	-6	-7	-8	-34
Net interest													
Lower rates	*	-2	-3	-4	-6	-8	-10	-12	-14	-17	-20	-23	-96
Debt service	*	*	*	1	1	2	3	4	5	7	9	5	32
Subtotal, net interest	*	-2	-3	-4	-4	-6	-7	-8	-9	-11	-12	-18	-64
Total Change in Outlays	-1	-2	-4	-5	-6	-8	-10	-12	-14	-17	-19	-25	-98
Increase (-) in the Deficit	-2	-5	-9	-14	-19	-24	-30	-38	-47	-55	-65	-71	-307
Labor Force Growth Is 0.1 Percentage Point Lower per Year													
Changes in Revenues	-1	-3	-5	-7	-10	-13	-16	-20	-24	-29	-34	-38	-161
Changes in Outlays													
Mandatory outlays	*	*	*	*	1	1	1	2	2	3	5	2	16
Net interest													
Lower rates	*	-1	-2	-2	-3	-3	-4	-5	-7	-8	-10	-12	-45
Debt service	*	*	*	*	1	1	1	2	2	3	4	2	15
Subtotal, net interest	*	-1	-2	-2	-2	-3	-3	-4	-4	-5	-5	-10	-31
Total Change in Outlays	*	-1	-2	-2	-2	-2	-2	-2	-2	-1	-1	-8	-15
Increase (-) in the Deficit	-1	-2	-4	-6	-8	-11	-14	-18	-22	-27	-33	-30	-146

Source: Congressional Budget Office.

The rules of thumb capture the budgetary effects of specified changes in the economy, but they do not account for the source of those changes. The source may or may not be a change in fiscal policy, which would have additional budgetary effects. In addition, such a change in fiscal policy would probably have broader economic effects than those underlying the budgetary estimates shown here.

Each rule of thumb is roughly symmetrical. If, for example, productivity growth was 0.1 percentage point lower each year than it is in CBO's economic forecast, deficits would be reduced by about the same amount that they are increased each year in the table above.

* = between -\$500 million and \$500 million.

between 2020 and 2029 would be \$146 billion larger than it is in the agency's baseline budget projections (see Table B-2). The budgetary effects under this scenario are considerably smaller than those under the scenario for slower productivity growth because the resulting economic effects are smaller (see Table B-1 on page 123).

To arrive at this rule of thumb, CBO began by analyzing how the slower growth of the labor force under the illustrative scenario might affect GDP, income, and interest rates. Slower-than-projected growth in the labor force would push the wage rate above CBO's current estimate.

Those higher wage rates would bring about a small boost in labor income and in the supply of labor, which would partially offset the effects of the initial decline in labor force growth. Despite those effects, total labor income would be lower than it is in CBO's baseline. Meanwhile, the number of workers using a given amount of capital would fall below the number projected in CBO's economic forecast, so the returns on that capital would decline as well. As described above, the resulting decline in the rates of return on private investment would imply that interest rates on Treasury securities would be lower than they are in CBO's economic forecast. Although

other variables—including the unemployment rate, inflation, the distribution of labor income, and rates of retirement—could also be affected by the labor force’s growing more slowly than projected, this rule of thumb does not incorporate the effects of such changes.

In CBO’s estimation, if the rate of growth in the labor force was 0.1 percentage point slower than anticipated, GDP growth would also be slower each year. Meanwhile, interest rates would be slightly lower than forecast for 2019, and that difference would increase in each subsequent year. By the end of 2029, GDP and labor income would be 0.7 percent lower than they are in CBO’s forecast, and interest rates would be about 5 basis points lower (see Table B-1 on page 123).

The slower economic growth would cause taxable labor income and profits to grow more slowly than projected, resulting in tax revenues that were less than the amounts in CBO’s baseline projections. The shortfall would increase over time, reaching \$34 billion in 2029. Also, the higher-than-projected wage rates and the smaller-than-projected number of workers, would, on net, add a total of \$16 billion to mandatory outlays between 2020 and 2029. Specifically, because outlays for Medicare, Medicaid, and Social Security are linked to wage growth, mandatory spending on those programs would increase by about \$19 billion. But because there would be fewer workers and higher wages, \$3 billion of that amount would be offset by a decrease in outlays for unemployment insurance benefits and the refundable portions of the earned income tax credit, the child tax credit, and the American Opportunity Tax Credit.

Between 2020 and 2029, the lower interest rates that resulted from the slower growth of the labor force would reduce the amount of interest that the federal government would pay on the debt projected in CBO’s baseline by about \$45 billion. However, the reduction in revenues and slight increase in mandatory spending would increase the deficit, requiring the federal government to borrow more than projected. That additional borrowing would add a little less than \$15 billion to interest payments. Overall, CBO estimates that net interest outlays between 2020 and 2029 would be \$31 billion less than they are in the agency’s baseline projections.

Changes in Interest Rates and Inflation

Changes in interest rates and inflation affect the federal budget. Higher interest rates would increase the flow of

interest payments to and from the federal government, and higher inflation rates would raise both revenues and outlays, though the effect on outlays would be larger. Lower interest rates and inflation would have the opposite effects.

Higher Interest Rates

The third rule of thumb illustrates the sensitivity of the budget to an increase in interest rates when all other economic variables are left unchanged. In the illustrative scenario, all interest rates—including both the rate on 3-month Treasury bills and the rate on 10-year Treasury notes—are 0.1 percentage point higher each year than they are in CBO’s economic forecast. Under that scenario, in CBO’s estimation, deficits would increase progressively over the projection period by amounts that rose to \$29 billion in 2029. The cumulative deficit between 2020 and 2029 would be \$182 billion larger than it is in the agency’s baseline projections (see Table B-3).

Most of that difference would arise because the government’s interest costs would be larger. As the Treasury replaced maturing securities and increased its borrowing to cover future deficits, the budgetary effects of higher interest rates would mount. Under this scenario, the added costs of higher interest rates on the debt projected in CBO’s baseline would reach \$25 billion in 2029 and would total \$161 billion between 2020 and 2029.

As part of conducting monetary policy, the Federal Reserve buys and sells Treasury and other securities. The Federal Reserve also pays interest on reserves (deposits that banks hold at the central bank). The interest that the Federal Reserve earns on its portfolio of securities and the interest that it pays on reserves affect its remittances to the Treasury, which are counted as revenues. If, over the next 10 years, all interest rates were 0.1 percentage point higher than CBO projects, the Federal Reserve’s remittances over the next few years would be smaller than projected because higher interest payments on reserves would outstrip the additional earnings from interest on its portfolio. Over time, however, the current holdings in the portfolio would mature and be replaced with higher-yielding investments; as a result, by 2023, the Federal Reserve’s remittances would be larger. Overall, rates that were 0.1 percentage point higher than those in CBO’s economic forecast would (all else being equal) cause revenues from the Federal Reserve’s remittances over the 2020–2029 period to be \$3 billion more than projected.

Table B-3.

How Changes in Interest Rates and Inflation Might Affect CBO's Baseline Budget Projections

Billions of Dollars

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	Total	
												2020–	2020–
												2024	2029
Interest Rates Are 0.1 Percentage Point Higher per Year													
Changes in Revenues	-1	-1	-1	*	*	*	1	1	1	1	1	-2	3
Changes in Outlays													
Higher rates	2	5	8	11	13	16	18	20	22	23	25	53	161
Debt service	*	*	1	1	1	2	2	3	4	5	6	5	25
Total Change in Outlays	2	5	8	12	15	18	21	23	26	28	30	58	185
Increase (-) in the Deficit	-3	-7	-9	-12	-15	-17	-20	-22	-24	-27	-29	-60	-182
Inflation Is 0.1 Percentage Point Higher per Year													
Changes in Revenues	1	5	9	14	18	23	29	35	42	49	56	70	282
Changes in Outlays													
Mandatory spending	*	3	4	7	10	13	17	21	24	30	34	37	162
Discretionary spending ^a	0	*	*	1	2	3	5	6	7	9	11	6	44
Net interest													
Higher rates ^b	4	5	9	12	15	17	19	21	23	25	26	59	174
Debt service	*	*	*	*	1	1	1	2	2	3	4	3	15
Subtotal, net interest	4	6	10	13	16	18	21	23	25	27	30	62	189
Total Change in Outlays	4	8	14	21	27	34	42	50	57	66	74	105	394
Increase (-) in the Deficit	-3	-3	-5	-7	-9	-11	-13	-14	-15	-17	-18	-35	-113

Source: Congressional Budget Office.

The rules of thumb capture the budgetary effects of specified changes in the economy, but they do not account for the source of those changes. The source may or may not be a change in fiscal policy, which would have additional budgetary effects. In addition, such a change in fiscal policy would probably have broader economic effects than those underlying the budgetary estimates shown here.

Each rule of thumb is roughly symmetrical. If, for example, interest rates were 0.1 percentage point lower each year than they are in CBO's economic forecast, deficits would be reduced by about the same amount that they are increased each year in the table above.

* = between -\$500 million and \$500 million.

- Most discretionary spending through 2021 is governed by caps established by the Budget Control Act of 2011; in CBO's baseline, that spending would not be affected by changes in projected inflation.
- The change in outlays attributable to higher interest rates in this scenario differs from the estimate in the rule of thumb for interest rates because the principal of inflation-protected securities issued by the Treasury grows with inflation.

The larger deficits generated by the increase in interest rates would require the Treasury to borrow more than it is projected to borrow in CBO's baseline. That additional borrowing would raise the cost of servicing the debt by amounts that increased each year and reached \$6 billion in 2029. Between 2020 and 2029, the additional borrowing would add a total of \$25 billion to the cost of servicing the federal debt.

Higher Inflation

The fourth rule of thumb shows the budgetary effects of inflation that is 0.1 percentage point higher each year than it is in CBO's baseline when all other economic variables—except for interest rates, which are addressed below—are left unchanged. All wage and price indexes, including the GDP price index, the consumer price index for all urban consumers (CPI-U), the chained CPI-U, and the employment cost index for wages and

salaries of workers in private industry, would rise by 0.1 percentage point more each year than they do in CBO's economic forecast. Although higher inflation would increase both revenues and outlays, the impact on outlays would be greater, resulting in larger budget deficits on net. Changes in inflation could also lead to changes in real economic growth and unemployment; however, only the effects of changes in inflation are examined in this scenario.

Under this scenario, total revenues between 2020 and 2029 would be \$282 billion higher than they are in the agency's baseline budget projections, and total outlays would be \$394 billion higher, CBO estimates. The cumulative deficit for the 2020–2029 period would be \$113 billion larger than projected (see Table B-3).

Effects on Revenues. Larger increases in wage rates and prices generally lead to greater labor income, profits, and other income, which in turn generate larger collections of individual income taxes, payroll taxes, and corporate income taxes. Many provisions in the individual income tax system—including the income thresholds for the tax brackets—are adjusted, or indexed, for inflation. Therefore, the share of taxpayers' income that is taxed at certain rates does not change very much when income increases because of higher inflation, so tax collections tend to rise roughly proportionally with income under those circumstances. However, not all parameters of the individual income tax system are indexed for inflation. For example, the income thresholds for the surtax on investment income are fixed in nominal dollars, so if income rose because of inflation, the surtax would apply to a larger share of taxpayers' income.

For the payroll tax, rates are mostly the same for all income levels, and the maximum amount of earnings subject to the Social Security tax rises (after a lag) with average wages in the economy. Higher wage inflation therefore leads to a roughly proportional increase in payroll tax revenues. Similarly, nearly all corporate profits are taxed at a single 21 percent statutory rate. Consequently, an increase in profits resulting from higher inflation generates a roughly proportional increase in corporate tax revenues. All told, inflation that was 0.1 percentage point higher than forecast each year would add \$282 billion in revenues to the amounts in the agency's baseline budget projections between 2020 and 2029.

Effects on Mandatory Spending. Higher inflation would also increase the cost of a number of mandatory spending programs, adding \$162 billion to projected spending, CBO estimates. Benefits for many mandatory programs are automatically adjusted each year to reflect increases in prices. Specifically, benefits paid for Social Security, federal employees' retirement programs, disability compensation for veterans, the Supplemental Nutrition Assistance Program, Supplemental Security Income, child nutrition programs, and the refundable portion of the earned income tax credit, among others, are adjusted (with a lag) for changes in the consumer price index, one of its components, or another measure of inflation. Many of Medicare's payment rates are also adjusted annually for inflation. Spending for some other programs, such as Medicaid, is not formally indexed to changes in prices but nevertheless tends to grow with inflation because the costs of providing benefits under those programs increase as nominal wages and prices rise. In addition, to the extent that benefit payments in retirement and disability programs are linked to participants' pre-enrollment wages, increases in nominal wages resulting from higher wage inflation would boost future outlays for those programs.

Effects on Discretionary Spending. Higher inflation would raise CBO's projections of spending for discretionary programs in two main ways. First, higher inflation would increase projected outlays for most discretionary programs after 2021. The Budget Control Act of 2011, as modified by subsequent legislation, imposed caps on most discretionary budget authority through 2021, and CBO's baseline incorporates the assumption that total appropriations for most purposes will equal those caps. Higher inflation would not alter the statutory caps and thus would have no effect on CBO's projections of spending that is constrained by those limits. However, for the years after 2021—when, under current law, the caps will no longer be in place—CBO's baseline projections incorporate the assumption that the discretionary funding currently subject to the caps will increase with inflation from the 2021 amount. As a result, inflation that was 0.1 percentage point higher each year than the rates underlying CBO's economic forecast would boost projected outlays for the 2022–2029 period by a total of \$40 billion.

Although the caps on discretionary appropriations are not indexed for inflation, higher inflation would diminish the amount of goods that could be acquired and the benefits and services that could be provided under those

caps.⁷ If higher inflation led lawmakers to adjust the discretionary caps, the effect on spending and on deficits would be greater.

The second way in which higher inflation would increase CBO's projections of discretionary outlays for the 2020–2029 period is through its effect on spending that is not constrained by the caps. By law, adjustments to the caps are made to accommodate appropriations for certain purposes. For 2019, CBO's baseline includes adjustments of \$81 billion designated for overseas contingency operations (war-related activities, primarily in Afghanistan), \$7 billion in funding for disaster relief, \$2 billion in funding for emergency requirements, and \$2 billion for initiatives aimed at enhancing program integrity by reducing improper payments from certain benefit programs.⁸ Because the funding for those activities is not constrained by the caps in 2020 and 2021, it is projected to increase with inflation in those years and over the rest

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7. By CBO's estimate, the caps on discretionary spending for 2020 and 2021 are about 10 percent lower and 8 percent lower, respectively, than the cap for 2019.
 8. The extent to which the discretionary caps for the funding of program integrity initiatives can be adjusted is limited by other statutory provisions.

of the period. As a result, if inflation was 0.1 percentage point higher each year than forecast, CBO's projections of such outlays for the 2020–2029 period would increase by a total of \$4 billion.

All told, CBO's projections of discretionary outlays through 2029 would be \$44 billion greater than the amounts in the agency's current baseline budget projections.

Effects on Net Interest Costs. Inflation also has an impact on outlays for net interest because it affects nominal interest rates. If inflation was 0.1 percentage point higher than CBO projects, then interest rates would be 0.1 percentage point higher (all else being equal). As a result, new federal borrowing would incur higher interest costs, and outstanding inflation-indexed securities would be more costly for the federal government. In addition, higher interest rates would first reduce and then increase revenues from the Federal Reserve's remittances to the Treasury. The direct effect of such higher rates would be to add \$174 billion in interest costs to CBO's baseline projections of outlays. Moreover, the effects of higher inflation would increase federal debt between 2020 and 2029, boosting interest costs by an additional \$15 billion.