

How Changes in Economic Projections Might Affect Budget Projections

The federal budget is highly sensitive to economic conditions. 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 with overall economic activity, although not necessarily in proportion. 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. Finally, spending for many mandatory programs is affected by inflation, either explicitly through cost-of-living adjustments or indirectly in other ways.

To show how the economic outlook can affect projections of the federal budget, the Congressional Budget Office has constructed simplified scenarios to illustrate rough “rules of thumb.” The rules provide a sense of how differences in individual economic variables would affect the budget totals. Changes in any single variable, however, would quite likely affect many other variables in ways that would depend crucially on the cause of the original change and on the general economic conditions prevailing at the time. Estimating that full set of effects would require a more comprehensive analysis that could not be summarized in a simple rule.

CBO has developed rules of thumb for three variables:

- Productivity growth, which affects gross domestic product (GDP) and other economic variables,
- Interest rates, and
- Inflation.

All three rules of thumb reflect alternative assumptions about economic conditions beginning in January 2017.

CBO’s first rule of thumb shows the effects of productivity growth that is 0.1 percentage point lower each year than in the agency’s economic projections, which translates into annual rates of economic growth that are about 0.1 percentage point lower than those that underlie its baseline budget projections.¹ (The budget projections are summarized in Chapter 1, and the economic projections are described in Chapter 2.) The rule of thumb for interest rates shows the effects of rates that are 1 percentage point higher each year than the rates used in the baseline. (In this scenario, inflation is held equal to the rate underlying the baseline, so the rule shows the effects of higher *real* interest rates.) Finally, the rule of thumb for inflation shows the effects of inflation that is 1 percentage point higher each year than in the baseline.

Each rule of thumb is roughly symmetrical. Thus, if productivity growth was 0.1 percentage point higher than in CBO’s baseline, or if interest rates or inflation were 1 percentage point lower, the effects would be about the same as those shown here, but with the opposite sign.²

In addition to being symmetrical, the rules are also roughly scalable for moderate differences in growth rates. For example, a difference in inflation of 1.1 percentage points in each year, rather than 1 percentage point, would increase the change in the deficit by about 10 percent—

1. In previous years, CBO analyzed a potential change in the rate of real economic growth, relative to its baseline projections, without characterizing the underlying cause of such a change or incorporating effects on other economic variables. This year, CBO examined a more complex (but still simplified) scenario—one in which a change in productivity growth affects GDP, income (including wages), and interest rates.

2. Interest rates on short-term Treasury securities are unlikely to be much lower in the near term. Rates on 3-month Treasury securities were 0.30 percent in the last quarter of 2016, and CBO forecasts that they will remain below 1 percent through most of this calendar year.

but such a calculation would be less useful for a substantially different rate of inflation.

CBO chose variations of 0.1 percentage point for productivity and 1 percentage point for inflation and interest rates solely for simplicity. Those differences do not necessarily indicate the extent to which actual economic performance might differ from CBO's projections. For example, CBO 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 1.4 percentage points above or below the forecast rate. Similarly, there is about a two-thirds chance that the average annual rate of inflation (as measured by the consumer price index for all urban consumers) over the next five years will be within 0.6 percentage points—and the average interest rate (on 3-month Treasury bills, in real terms), within 1.7 percentage points—of the rate in CBO's forecast.³

Slower Growth of Productivity

Productivity is an important determinant of economic output. Higher productivity leads to stronger economic growth, which in turn improves the budget's bottom line, whereas lower productivity reduces GDP, thereby worsening the budget outlook.

The first rule of thumb illustrates the budgetary effects of slightly weaker growth in productivity than expected. Specifically, if productivity grew at a rate that was 0.1 percentage point lower each year than in CBO's baseline projections, annual deficits would be larger by amounts that would climb to \$56 billion by 2027, CBO estimates. The cumulative deficit from 2018 through 2027 would be \$273 billion higher (see Table B-1).

In this simplified analysis, CBO examined how slower growth of total factor productivity (that is, real output per unit of combined labor and capital services) might affect GDP, income (including wages), and interest rates.⁴ CBO found that lower-than-projected productivity growth would lead to slower growth in GDP because both labor and capital would be producing less than they

are currently projected to produce in CBO's baseline. If workers produced less, they would earn less, so total wages and labor income would be lower. Meanwhile, if capital production was lower, the returns on that capital would also decline. Because Treasury securities compete with other investments for investors' money, lower private returns imply that rates on Treasury securities would also be lower. Other variables, such as the allocation of taxable income, unemployment, and inflation, could also be affected; however, this rule of thumb does not include the effects of changes in those variables.

CBO estimates that if actual productivity growth was about 0.1 percentage point lower each year than it is projected to be, GDP growth and income growth would also be about 0.1 percentage point lower each year. Meanwhile, interest rates would be about 1 basis point below CBO's forecast for 2017; that difference would increase by 1 additional basis point in each subsequent year.⁵ By the end of the 10-year period, GDP and total income would be 1.1 percent lower than they are in the baseline, and interest rates would be about 10 basis points lower.

If economic growth slowed in each year as a result of that lower productivity, taxable income would also grow more slowly than projected, and tax revenues would be lower—\$2 billion less than in the baseline in 2017 and \$63 billion less in 2027. Over the 2018–2027 period, the drop in revenues stemming from the slower growth in income would increase deficits by a total of \$315 billion. Slower growth in income would also lead to \$5 billion less in mandatory outlays: Reductions to Social Security payments that resulted from lower earnings and other similar, but smaller, effects would reduce mandatory spending by \$11 billion, but \$6 billion of that amount would be offset by an increase in outlays for the refundable portions of the earned income and child tax credits.⁶

3. Those prediction ranges are based on analysis of CBO's forecasting accuracy over the past four decades for GDP and since 1983 for inflation and interest rates. For related discussion, see Congressional Budget Office, *CBO's Economic Forecasting Record: 2015 Update* (February 2015), www.cbo.gov/publication/49891.

4. For further discussion about growth in productivity, its relationship to GDP, and the uncertainty of projections of such growth, see Congressional Budget Office, *The 2016 Long Term Budget Outlook* (July 2016), pp. 80–82, www.cbo.gov/publication/51580.

5. A basis point is equal to one one-hundredth of a percentage point. For example, the difference between interest rates of 5.5 percent and 5.0 percent is 50 basis points.

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

Table B-1.

How Selected Economic Changes Might Affect CBO's Baseline Budget Projections

Billions of Dollars

	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	Total	
												2018- 2022	2018- 2027
Productivity Growth Is 0.1 Percentage Point Lower per Year													
Changes in Revenues	-2	-6	-10	-15	-20	-26	-32	-39	-47	-55	-63	-78	-315
Changes in Outlays													
Mandatory outlays	*	*	*	*	-1	-1	-1	-1	-1	-1	-1	-2	-5
Net interest													
Lower interest rates	*	-1	-1	-2	-4	-5	-7	-8	-10	-12	-14	-13	-63
Debt service	*	*	*	*	1	2	2	3	5	6	8	3	27
Subtotal, net interest	*	-1	-1	-2	-3	-3	-4	-5	-5	-6	-6	-10	-36
Total Change in Outlays	*	-1	-1	-2	-3	-4	-5	-5	-6	-6	-7	-12	-42
Increase (-) in the Deficit	-2	-5	-9	-13	-17	-22	-28	-34	-41	-48	-56	-67	-273
Interest Rates Are 1 Percentage Point Higher per Year													
Changes in Revenues	-19	-21	-16	-10	-7	-3	1	4	6	9	11	-58	-27
Changes in Outlays													
Higher interest rates	17	48	70	90	109	129	146	163	177	193	210	446	1,335
Debt service	1	2	4	8	13	19	26	34	43	52	63	46	264
Total Change in Outlays	17	49	74	98	122	148	172	197	220	246	272	492	1,599
Increase (-) in the Deficit	-36	-71	-90	-108	-130	-151	-171	-193	-214	-237	-262	-550	-1,626
Inflation Is 1 Percentage Point Higher per Year													
Changes in Revenues	1	33	75	118	163	212	265	325	387	455	528	601	2,561
Changes in Outlays													
Mandatory outlays	3	16	40	68	99	136	172	210	260	313	372	359	1,687
Discretionary outlays ^{a†}	0	1	2	3	4	12	23	36	50	65	82	22	278
Net interest													
Higher interest rates ^b	26	64	90	114	137	161	183	204	223	245	267	567	1,688
Debt service [†]	*	1	3	5	9	13	18	24	31	40	49	32	194
Subtotal, net interest [†]	26	66	93	119	146	174	201	228	255	284	316	599	1,882
Total Change in Outlays [†]	29	83	135	190	249	322	396	474	565	663	769	980	3,847
Increase (-) in the Deficit[†]	-28	-50	-60	-72	-86	-110	-131	-150	-178	-208	-241	-378	-1,286
Memorandum:													
Deficit in CBO's													
January 2017 Baseline	-559	-487	-601	-684	-797	-959	-1,000	-1,027	-1,165	-1,297	-1,408	-3,528	-9,426

Source: Congressional Budget Office.

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

- a. 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.
- b. 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.

[†Values corrected on March 15, 2017]

Because slower productivity growth also lowers interest rates, the amount of interest that the federal government would pay on its debt would decrease by \$63 billion over the 2018–2027 period. However, if revenues were reduced by the amounts indicated above, the federal government would need to borrow more to finance the resulting net increase in the deficit. That additional borrowing would add \$27 billion to interest payments over the period. On net, CBO estimates, those effects would result in interest outlays that were \$36 billion less over the 10-year period than in the agency’s baseline.

Higher Interest Rates

The second rule of thumb illustrates the sensitivity of the budget to changes in interest rates, which affect the flow of interest payments to and from the federal government. When the budget is in deficit, the Treasury must borrow additional funds from the public to cover the shortfall. Moreover, each year the Treasury refinances a substantial portion of the nation’s outstanding debt at market interest rates. Those rates also help determine how much the Federal Reserve remits to the Treasury. Changes in interest rates could affect economic growth, taxable income, unemployment, and inflation; however, this rule of thumb does not include the effects of changes in those variables.

CBO estimates that if interest rates were 1 percentage point higher than projected in the baseline and all other economic variables were unchanged, the deficit would progressively worsen over the projection period by amounts increasing from \$36 billion in 2017 to \$262 billion in 2027. The cumulative deficit for the 2018–2027 period would be \$1.6 trillion higher (see Table B-1).

Most of that difference would arise because the government’s interest costs would be substantially larger. The difference in interest costs would amount to only \$17 billion in 2017 because most marketable government debt is in the form of securities that have maturities greater than one year. As the Treasury replaced maturing securities and increased borrowing to cover future deficits, however, 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 \$210 billion in 2027 and would total \$1.3 trillion over the 2018–2027 period.

As part of its conduct of monetary policy, the Federal Reserve buys and sells Treasury and other securities. It also pays interest on reserves (deposits that banks hold at the central bank). The interest that it 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 all interest rates were 1 percentage point higher for the coming decade than CBO projects, the Federal Reserve’s remittances would be smaller for several years because higher interest payments on reserves would outstrip additional interest earnings on its portfolio. Over time, however, the current holdings in the portfolio would mature and be replaced with higher-yielding investments. CBO projects that by 2023 the Federal Reserve’s remittances would be larger if interest rates were higher than projected. Overall, rates that were 1 percentage point higher than in CBO’s baseline (all else being equal) would cause revenues from the Federal Reserve’s remittances to be \$27 billion smaller between 2018 and 2027.

The larger deficits generated by the increase in interest rates would require the Treasury to borrow more than it is projected to borrow in the baseline. That additional borrowing would raise the cost of servicing the debt by amounts that would reach \$63 billion in 2027 and total \$264 billion over the 2018–2027 period.

Higher Inflation

The third rule of thumb shows the budgetary effects of inflation that is 1 percentage point higher, for all price and wage indexes, than in CBO’s baseline each year—with no differences in other economic variables except for interest rates, as described below. Although higher inflation increases both revenues and outlays, the impact on outlays would be greater, and the net effect would be substantially larger budget deficits. Changes in inflation could also lead to changes in economic growth and unemployment; however, this rule of thumb does not include the effects of changes in those variables.

If each year inflation was 1 percentage point higher than the rate underlying CBO’s baseline, total revenues over the 10-year period would be about 6 percent greater than in the baseline, and total outlays, about 7 percent greater, CBO estimates. The cumulative deficit for the 2018–2027 period would be \$1.3 trillion higher (see Table B-1).†

[†Value corrected on March 15, 2017]

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. The parameters in the individual income tax system that affect most taxpayers—including the income thresholds for both the regular and the alternative minimum tax brackets, the standard deduction, and personal exemptions—are 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, some parameters of the individual income tax system are not 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 higher inflation, the surtax would apply to a larger share of taxpayers' income.

For the payroll tax, rates are mostly the same across income levels, and the maximum amount of earnings subject to the Social Security tax rises (after a lag) with average wages in the economy; therefore, higher wage inflation leads to a roughly proportional increase in payroll tax revenues. Similarly, although the brackets for the corporate income tax are not indexed for inflation, nearly all corporate profits are taxed at the top rate. Consequently, an increase in profits resulting from higher inflation generates a roughly proportional increase in corporate tax revenues. All told, inflation that was 1 percentage point higher each year than CBO projects would add \$2.6 trillion to projected revenues in CBO's baseline between 2018 and 2027.

Effects on Mandatory Spending

Higher inflation would also increase the cost of a number of mandatory spending programs, adding \$1.7 trillion to projected spending. 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, the refundable portion of the earned income tax credit, and the child nutrition programs, among others, are adjusted (with a lag) for changes in the consumer price index, one of its components, or other measures 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 price changes but tends to grow with inflation because the costs of providing benefits under those programs increase as prices rise. In addition, to the extent that initial benefit payments to participants in retirement and disability programs are linked to wages, increases in nominal wages resulting from higher wage inflation boost future outlays for those programs.

Effects on Discretionary Spending

Higher inflation would raise CBO's baseline projections of spending for discretionary programs in two main ways. First, higher inflation would increase CBO's baseline projections of outlays for most discretionary programs after 2021. The Budget Control Act of 2011 (Public Law 112-25), as modified by subsequent legislation, imposed caps on most discretionary budget authority through 2021, and CBO's baseline incorporates the assumption that 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 constrained by those limits. However, for the years following 2021—when, under current law, caps will no longer be in place—CBO's baseline projections incorporate the assumption that the discretionary funding that is currently subject to the caps will increase with inflation from the 2021 amount. As a result, inflation that was 1 percentage point higher than in the baseline each year would boost projected outlays from 2022 through 2027 by a total of \$225 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 fixed caps.⁷ If, over time, higher inflation led lawmakers to adjust the discretionary caps, the effect on spending and on the deficit would be greater.

Second, higher inflation would increase discretionary outlays in CBO's baseline over the 2018–2027 period because the law specifies that the caps may be adjusted to accommodate appropriations for certain purposes. In 2017, those adjustments include \$84 billion designated for overseas

7. In CBO's baseline, the cap for 2018 is slightly lower than the cap for 2017. From 2019 through 2021, the caps grow by about 2.5 percent each year.

[†Value corrected on March 15, 2017]

contingency operations (war-related activities, primarily in Afghanistan), \$8 billion in funding provided for disaster relief, \$2.7 billion in funding for emergencies, and \$1.5 billion for initiatives aimed at enhancing program integrity by reducing improper payments from certain benefit programs. In its baseline, CBO generally extrapolates the funding provided for those purposes in future years based on the amounts appropriated for 2017, with adjustments for inflation. If inflation was 1 percentage point higher each year, projected outlays for those purposes would increase by \$53 billion between 2018 and 2027. All told, CBO's projections of discretionary outlays for the 10-year period would rise by \$278 billion.†

Effects on Net Interest Costs

Inflation also has an impact on outlays for net interest because it affects interest rates. If inflation was

1 percentage point higher than CBO projects, for example, then interest rates would be 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 (as explained above in the section on higher interest rates). The direct effect of such higher rates would be to add \$1.7 trillion in interest costs to CBO's baseline projection of outlays. Moreover, the effects of higher inflation would increase debt by a little more than \$1 trillion over the 10-year period, boosting interest costs by an additional \$194 billion.†

[†Values corrected on March 15, 2017]