

## C

## How Changes in Assumptions Can Affect Budget Projections

**T**he federal budget is highly sensitive to economic conditions. Sources of revenues depend on taxable income—including wages and salaries, interest and other nonwage income, and corporate profits—which generally moves in step with overall economic activity. The benefits of many entitlement programs are pegged to inflation either directly (like Social Security) or indirectly (like Medicaid) or may be affected by unemployment rates. In addition, the Treasury regularly refinances portions of the government’s debt at market rates, so the level of federal spending for interest on that debt is directly tied to such market rates.

To illustrate how assumptions about certain key economic factors can affect federal budget projections, the Congressional Budget Office (CBO) uses what it terms rules of thumb. Those rules are rough orders of magnitude for gauging how changes in individual economic variables, taken in isolation, will affect the budget’s totals.

The variables that figure in this illustration are real (inflation-adjusted) growth, interest rates, and inflation. For real growth, CBO’s rule shows the effects of a rate that is 0.1 percentage point lower each year, beginning in January 2003, than the assumed rate of growth underlying the agency’s baseline projections for the economy (outlined in Chapter 2). The rules for interest rates and inflation assume an increase of 1 percentage point over the rates in the baseline, also starting in January 2003. Each rule is roughly symmetrical. Thus, the effects of higher growth, lower interest rates, or lower inflation would have about the same magnitude as the effects shown in this appendix, but with the opposite sign.

The calculations that appear in this appendix are merely illustrative of the impact that changes in assumptions can have. CBO uses variations of 0.1 percentage point or 1 percentage point for the sake of simplicity; they should not be viewed as typical forecasting misestimates. Furthermore, extrapolating from small, incremental rule-of-thumb calculations to much larger changes would be inadvisable, because the magnitude of the effect of a larger change is not necessarily a multiple of a smaller change. Moreover, budget projections are subject to other kinds of inaccuracies that are not directly related to economic forecasting.

In addition to the rules of thumb related to economic projections, CBO presents two other rules that affect the levels of projected surpluses or deficits. The first illustrates the impact on projections of discretionary spending of adding \$10 billion to CBO’s estimate of budget authority for 2003. The second shows the effect on net interest payments of borrowing \$10 billion less than anticipated.

### Lower Real Growth

Strong economic growth improves the federal budget’s bottom line, and weak economic growth worsens it. The first economic rule of thumb outlines the budgetary impact of economic growth that is slightly weaker than CBO assumes in its baseline. Specifically, the rule illustrates the effects of growth rates for real gross domestic product (GDP) that are lower by 0.1 percentage point every year from January 2003 through 2013.

**Table C-1.****Estimated Effects of Selected Economic Changes on CBO's Budget Projections**

(In billions of dollars)

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Total, 2004- 2008	Total, 2004- 2013
<b>Growth Rate of Real GDP Is 0.1 Percentage Point Lower per Year</b>													
Change in Revenues	-1	-3	-6	-9	-13	-17	-21	-26	-31	-38	-44	-49	-208
Change in Outlays													
Net interest (Debt service)	*	*	*	1	1	2	4	5	7	9	12	5	41
Mandatory spending	<u>*</u>	<u>*</u>	<u>*</u>	<u>*</u>	<u>*</u>	<u>*</u>	<u>*</u>	<u>*</u>	<u>*</u>	<u>-1</u>	<u>-1</u>	<u>*</u>	<u>-2</u>
Total	*	*	*	1	2	2	3	5	6	8	11	5	39
<b>Change in Surplus or Deficit</b>	<b>-1</b>	<b>-4</b>	<b>-7</b>	<b>-10</b>	<b>-14</b>	<b>-19</b>	<b>-24</b>	<b>-30</b>	<b>-38</b>	<b>-46</b>	<b>-55</b>	<b>-54</b>	<b>-247</b>
<b>Interest Rates Are 1 Percentage Point Higher per Year</b>													
Change in Revenues	0	0	0	0	0	0	0	0	0	0	0	0	0
Change in Outlays													
Higher rates	7	18	24	27	29	30	31	30	29	27	23	128	268
Debt service	<u>*</u>	<u>1</u>	<u>2</u>	<u>4</u>	<u>6</u>	<u>9</u>	<u>11</u>	<u>14</u>	<u>17</u>	<u>20</u>	<u>22</u>	<u>22</u>	<u>105</u>
Total	7	19	26	31	35	39	42	44	46	47	45	150	374
<b>Change in Surplus or Deficit</b>	<b>-7</b>	<b>-19</b>	<b>-26</b>	<b>-31</b>	<b>-35</b>	<b>-39</b>	<b>-42</b>	<b>-44</b>	<b>-46</b>	<b>-47</b>	<b>-45</b>	<b>-150</b>	<b>-374</b>
<b>Inflation Is 1 Percentage Point Higher per Year</b>													
Change in Revenues	12	36	64	94	130	169	212	259	306	369	434	493	2,072
Change in Outlays													
Higher rates	8	20	26	29	31	32	33	32	31	29	24	139	289
Debt service	*	*	-1	-1	-3	-5	-9	-13	-20	-28	-39	-10	-119
Discretionary spending	0	4	11	19	27	36	45	55	66	77	89	97	430
Mandatory spending	<u>1</u>	<u>8</u>	<u>19</u>	<u>32</u>	<u>46</u>	<u>61</u>	<u>78</u>	<u>96</u>	<u>116</u>	<u>138</u>	<u>163</u>	<u>166</u>	<u>756</u>
Total	9	32	56	79	101	124	147	170	194	216	237	392	1,356
<b>Change in Surplus or Deficit</b>	<b>3</b>	<b>4</b>	<b>8</b>	<b>16</b>	<b>29</b>	<b>45</b>	<b>65</b>	<b>89</b>	<b>112</b>	<b>153</b>	<b>196</b>	<b>101</b>	<b>715</b>

Source: Congressional Budget Office.

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

Those effects differ from the effects of a cyclical change, such as a recession, which are much shorter-term in nature. (For scenarios involving cyclical economic changes, see Chapter 5.) Moreover, CBO's rule for GDP uses 0.1 percentage point—rather than the full percentage point used in the interest rate and inflation rules—because projected real growth is unlikely to differ from actual growth by such a large amount over the next 10 years. A difference as large as 1 percentage point might occur for a few years, however, as a result of a cyclical change.

The baseline reflects an assumption that real GDP grows by an average of about 3.0 percent a year (see Chapter 2). Subtracting 0.1 percentage point from that rate each year means that the level of GDP would fall roughly 1 percent below CBO's baseline by 2013.

A lower rate of growth for GDP would have a number of budgetary implications. For example, it would suggest lower growth of taxable income, leading to losses in revenues that would mount from \$1 billion in 2003 to \$44 billion in 2013 (see Table C-1). Cumulatively, reve-

**Table C-2.**

## Estimated Effects on CBO's Baseline of Increasing Discretionary Budget Authority by \$10 Billion in 2003

(In billions of dollars)

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Total, 2004- 2008	Total, 2004- 2013
Budget Authority	10	10	10	11	11	11	12	12	12	13	13	54	116
Outlays	6	9	10	10	11	11	11	12	12	12	13	51	112

Source: Congressional Budget Office.

Note: CBO assumes that budget authority grows at the rates of inflation specified in the Deficit Control Act (the GDP deflator and employment cost index for wages and salaries).

nue losses would total \$208 billion over the 2004-2013 period. Lower revenues would mean that the government borrowed more and incurred greater interest costs. Debt service would be minimally affected during the first few years of the period, but in later years, those costs would gradually rise, reaching \$12 billion in 2013. Altogether, those changes (along with small effects on the earned income tax credit and Medicare) would reduce the projected surplus for 2013 by \$55 billion. Growth in real GDP that was 0.1 percentage point a year lower than the rate assumed in CBO's baseline would reduce surpluses by a total of \$54 billion over the 2004-2008 period and by \$247 billion over the 2004-2013 period.

### 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 to and from the federal government. When the budget has a surplus, the Treasury uses some of its income to reduce debt held by the public, but it also refinances some debt at market interest rates. When the budget has a deficit, the Treasury must borrow additional funds from the public to cover any shortfall.

Under the assumption that interest rates are 1 percentage point higher than in the baseline for all maturities every year and that all other economic variables are unchanged, interest costs would be approximately \$7 billion higher in 2003 (see Table C-1). That initial boost in interest costs would be fueled largely by the extra costs of refinancing the government's short-term Treasury bills (securities

with maturities of one year or less), which make up about 28 percent of the marketable debt. More than \$888 billion of Treasury bills are currently outstanding, all of them maturing within the next six months.

The bulk of marketable debt, however, consists of medium-term notes and long-term bonds, which were issued with initial maturities of two to 10 years. As those longer-term securities mature, they will be replaced with new issues (the Treasury issues two-, five-, and 10-year notes). Thus, the budgetary effects mount; the effect of interest rates that are 1 percentage point higher than in the baseline would peak at \$31 billion in 2009.

After 2009, however, the effect of higher interest rates would diminish. In the projected baseline, when surpluses appear, debt held by the public declines; hence, fewer securities are expected to roll over each year. By 2013, the effect of higher interest rates would drop to \$23 billion, but the effect of increased debt over the 10-year period would add another \$22 billion in interest costs in that year. In sum, if interest rates were 1 percentage point higher each year, the cumulative surplus would decline by \$150 billion from 2004 through 2008 and by \$374 billion from 2004 through 2013.

### Higher Inflation

The third rule of thumb shows the budgetary impact of inflation that is 1 percentage point higher than assumed for the baseline. The effects of inflation on federal revenues and outlays partly offset each other. On the one

**Table C-3.****Estimated Savings in Net Interest from Borrowing \$10 Billion Less**

(In billions of dollars)

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Total, 2004- 2008	Total, 2004- 2013
Savings from Borrowing \$10 Billion Less in 2003 Only	-0.1	-0.3	-0.4	-0.5	-0.6	-0.6	-0.7	-0.7	-0.7	-0.8	-0.8	-2.4	-6.0
Savings from Borrowing \$10 Billion Less Each Year	-0.1	-0.5	-1.2	-1.9	-2.5	-3.2	-4.0	-4.7	-5.5	-6.4	-7.3	-9.2	-37.1

Source: Congressional Budget Office.

hand, higher inflation and its effects on wages and other income lead to greater revenues. On the other hand, it would also increase spending for many benefit programs (although with a lag), as well as discretionary spending. In deriving this rule of thumb, CBO also assumes that nominal interest rates rise in step with inflation, thus increasing the cost of financing the government's debt.

An increase of 1 percentage point per year in projected inflation from 2003 through 2013 would boost revenues by \$434 billion and outlays by \$237 billion in 2013 (*see Table C-1*). The combined effect of those changes is an improvement in the budgetary outlook that would reach \$196 billion in 2013. Over the 2004-2008 period, the surplus would grow by \$101 billion; over the 2004-2013 period, it would increase by \$715 billion.

**Higher Discretionary Budget Authority**

Discretionary spending is not directly related to economic conditions but rather to the level of appropriations provided by law and the rate at which the appropriations are spent. CBO's baseline projections assume that appropriations for the current year—in this case, 2003—grow at the rate of inflation in the years to follow (as specified by the Balanced Budget and Emergency Deficit Control Act of 1985). But the total amount of appropriations for 2003 has not yet been determined. As this report was being written, many of the 13 regular appropriation bills were yet to be enacted. Furthermore, the possibility of supplemental appropriations provided later in the year always exists. Subsequent baseline projections will reflect

the differences between enacted appropriations and the \$751 billion in budget authority assumed for this report.

Budget authority is the legal authority to incur financial obligations that will result in immediate or future outlays of federal government funds. The Congress appropriates such budget authority for discretionary programs annually in appropriation acts; outlays from that authority may occur in the year that the authority is granted, or they may occur in subsequent years. Activities such as meeting payrolls or directly providing services generally expend most of their budget authority in the year that it is granted; other activities such as procuring weapons or building roads and other infrastructure spend their authority over a longer period of time.

As a result, changes in budget authority for different activities do not immediately translate into equal changes in outlays. CBO estimates that, on average, approximately 60 percent of budget authority for discretionary spending is spent in the year that it is granted. Therefore, an additional \$10 billion in budget authority in 2003 would, on average, lead to \$6 billion more in outlays that year. The remaining \$4 billion would be spent over the following few years. The timing of such outlays could be somewhat delayed if the additional \$10 billion is provided in supplemental appropriations late in the year.

Under the rules specified for the construction of CBO's baseline, providing \$10 billion more in budget authority in 2003 would lead to an increase in projected budget authority in each year (*see Table C-2*). Spending that ad-

ditional budget authority would lead to \$51 billion in additional outlays between 2004 and 2008 and \$112 billion over the 2004-2013 period.

### **Increase in the Surplus or Decrease in the Deficit**

CBO's projections of net interest costs are based on its projections of future interest rates and debt held by the public. Changes from year to year in debt held by the public depend mostly on the size of the surplus or deficit. If surpluses or deficits differ from those projected in the baseline—for whatever reason—interest costs would also change.

A one-time decrease of \$10 billion in the deficit in 2003 (excluding interest costs) would enable the Treasury to redeem an additional \$10 billion in debt in that year, compared with the assumption in CBO's baseline. Removing that debt from the outstanding stock would reduce interest costs by \$0.1 billion in 2003 and nearly \$1 billion a year by 2013 (*see Table C-3*). (Savings in later years would stem from the compounding effect of debt reduction in 2003.)

Interest savings would be even greater if the \$10 billion decrease in borrowing was sustained in every year through 2013. In that case, savings from additional debt reduction and the compounding effect of such savings would further increase the projected surplus in 2013 by \$7.3 billion.