CONGRESSIONAL BUDGET OFFICE
U.S. Congress
Washington, DC 20515

Phillip L. Swagel, Director

March 2, 2022

Honorable Mike Crapo
Ranking Member
Committee on Finance
United States Senate
Washington, DC 20510

Re: Budgetary Effects of Higher Inflation and Interest Rates

Dear Senator:

This letter responds to your request for a description of the budgetary effects of higher inflation and interest rates. In general, if inflation was persistently higher than it is in the Congressional Budget Office's economic forecast and if interest rates were also significantly higher but all other inputs to the budget projection process were unchanged, then projected budget deficits and debt would be larger in dollar terms, on net, throughout the 2022–2031 period. The effects on deficits and debt as a percentage of gross domestic product (GDP) would depend on the specifics of the changes in inflation and interest rates.

Budget Projections With Higher Inflation and Interest Rates

To provide an illustrative estimate, CBO adapted its "rules of thumb" that provide a sense of how changes in key economic variables would affect its budget projections. The agency analyzed how such projections from February 2021 would have changed if it had used higher paths for inflation and interest rates but all other inputs to those projections were unchanged.

- The projected deficit would be larger by $2.3 trillion from 2022 to 2031 under the high-rate scenario than in the baseline.

- Despite a greater amount of debt, federal debt held by the public as a percentage of GDP would be smaller at the end of 2031 under the high-rate scenario (105 percent) than in the agency's baseline projections (107 percent) because debt would increase at a slower rate than nominal GDP.

The larger budget deficits would arise primarily because the government's net interest costs would be higher, in CBO's assessment, as the Treasury replaced maturing securities and issued more debt to finance new deficits—all at higher market interest rates. Revenue increases would be roughly as large as increases in noninterest spending, CBO estimates, so the resulting primary deficit (that is, the deficit excluding net interest costs) would not differ much from the agency's projections.

Higher Paths for Inflation and Interest Rates. CBO constructed a high-rate scenario using the actual data for 2021 and the average of the 10 highest forecasts for inflation and interest rates projected by about 45 private-sector economists and published in the *Blue Chip Economic Indicators* for later years (see Table 1). All variables other than inflation and interest rates were unchanged from CBO's February 2021 baseline projections.

For inflation, CBO used the average of the 10 highest forecasts of the growth of the GDP price index in the *Blue Chip Economic Indicators*, because GDP is a key variable in this analysis. In 2022, for example, that average is 5.1 percent. By comparison, that rate was 1.9 percent in CBO's February 2021 baseline projection. In the high-rate scenario, all wage and price indexes—including 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—grow faster by the same amounts in percentage points than they do in CBO's economic forecast. Those increments were calculated using the GDP price index.

For interest rates, CBO estimated a yield curve with interest rates for all maturities using the average of the 10 highest forecasts of 3-month Treasury bills and 10-year Treasury notes in the *Blue Chip Economic Indicators* as a basis. In 2022, for example, the average interest rate on 10-year Treasury notes is 2.4 percent in the high-rate scenario and 1.3 percent in the baseline. The average interest rate on all federal debt held by the public was estimated by dividing net interest payments in the current fiscal year by debt held by the public at the end of the previous fiscal year. Those interest payments were projected using information about the stock of existing debt, CBO's projection of types of Treasury securities with different maturities that would be issued during the projection period, and the interest rates under the high-rate scenario. Because the average interest rate on all federal debt held by the public depends only partially on newly issued debt, it is projected to change more slowly than the 3-month and 10-year rates.

Deficits and Debt. Under CBO's high-rate scenario, primary deficits do not differ much from CBO's February 2021 baseline projections. Those projections were based on the assumption that laws governing revenues and spending would generally have remained in place. Changes in revenues and noninterest outlays under the high-rate scenario relative to the baseline roughly offset each other (see Table 2). Revenues increase mainly because of higher taxable income. Spending increases largely because of cost-of-living adjustments for benefit programs and higher prices for purchases of goods and services.

Net interest costs are higher primarily because of the higher interest rates on debt issued by the Treasury. Those higher net interest costs result in larger budget deficits each year, pushing the debt that the Treasury issues to the public higher than in CBO's baseline budget projections (see Table 3). Despite a greater amount of debt in dollar terms, federal debt held by the public as a percentage of GDP would be smaller at the end of 2031 under the high-rate scenario than in the agency's baseline projections. That occurs because higher interest rates and inflation boost debt at a slower rate than higher inflation boosts nominal GDP in this analysis.

Higher inflation affects not only the amount of debt but also how burdensome that debt is. When inflation exceeds the rates expected when debt was issued at a fixed interest rate, some of the value of that debt (and its purchasing power) is transferred from lenders to borrowers. Borrowers can spend a smaller share of their income on repayment of money borrowed in the past when income rises with inflation, as it does in this analysis. Similarly, the federal government, as a borrower, can use a smaller share of revenue collected to pay holders of Treasury securities that mature, without changing tax rates. In that sense, the debt burden is smaller when inflation is higher.

The Economy. When CBO uses its rules of thumb to assess how changes in inflation and interest rates would affect its budget projections, real economic growth—that is, growth adjusted to remove the effects of inflation—remains unchanged to simplify the analysis. In CBO's high-rate scenario, nominal interest rates follow a specified path, and the nominal values of all other economic indicators, such as GDP and taxable income, increase only in response to higher inflation. Thus, almost all variables that are measured as real values, such as real taxable income, remain unchanged. For interest rates, since the change in inflation specified in the high-rate scenario is larger than the change in interest rates in the first few years, the scenario initially has lower *real* interest rates than those in

CBO's forecast. In later years, real interest rates are higher than those in the agency's forecast.

Scope of the Analysis. Because this analysis is focused solely on the budgetary effects of changes in inflation and interest rates relative to those projected in February 2021, it does not explicitly account for the budgetary effects that might stem from the sources of those changes. Those sources include factors affecting the supply of goods and services produced and legislation enacted during the past year, such as the American Rescue Plan Act of 2021.

CBO expects to incorporate such factors, as well as other relevant data, in its rules of thumb about how changes in economic variables affect the budget when the agency develops those rules for the baseline projections that it will issue this spring. (CBO did not develop rules of thumb for its July 2021 baseline projections.) With those new rules of thumb, the projected debt-to-GDP ratio in a high-rate scenario could be higher or lower than that reported here.

Uncertainty. The budgetary effects of higher inflation and interest rates are highly uncertain. Inflation and interest rates themselves could be higher or lower than the values specified in the high-rate scenario. For example, if market participants expected inflation to be higher than the path used in this analysis, interest rates could also be higher—with correspondingly larger budgetary effects.

In this analysis, changes in revenues and noninterest outlays roughly offset each other for a given change in inflation, so primary deficits are not very sensitive to changes in inflation. However, the change in primary deficits could be larger or smaller than CBO estimates for a given change in inflation—depending, for example, on the types of goods and services for which inflation is strongest and how taxable income may change as a result.

In addition, how interest rates respond to higher inflation is highly uncertain. Moreover, the Treasury could issue debt with a different mix of maturities than CBO projected—for example, issuing more 3-month bills and fewer 10-year notes. Because the government's net interest costs are very sensitive to changes in interest rates and depend on the maturities of the securities issued, the response of interest rates to higher inflation could cause net interest costs to be much higher or lower.

Actions of the Federal Reserve could make a big difference. If inflation decreases soon, the Federal Reserve could boost short-term interest rates by

less than the change in rates considered in the high-rate scenario. Alternatively, the Federal Reserve might raise short-term interest rates by more if inflation is persistently high.

Furthermore, changes in monetary policy would probably affect many real variables that remain unchanged in the illustrative scenario. For example, higher interest rates would reduce private investment and real GDP, in CBO's assessment. There is also a risk that a recession could occur. Any potential changes in real variables compound the uncertainty of the budgetary effects of higher inflation and interest rates.

Basis of CBO's Estimates

For this letter, the agency adapted its most recently published rules of thumb to the high-rate scenario described above.[1] Those rules of thumb were defined relative to the February 2021 baseline budget projections. CBO augmented those rules using its baseline projection method for net interest costs, which allowed it to estimate the effects of larger changes in projections of short-term interest rates than long-term interest rates. That analysis indicates how the budget would differ under alternative paths for inflation and interest rates:

- 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 prices and wages.

- Spending for many mandatory programs is also affected by changes in prices and wages. Some effects are explicit—such as those working through cost-of-living adjustments. Others are implicit—such as those working through health care prices.

- Although actual spending for discretionary programs is determined solely by Congressional action, CBO's projections of such spending are affected by changes in prices and wages.

[1] Those rules of thumb were described most recently in Congressional Budget Office, *How Changes in Economic Conditions Might Affect the Federal Budget: 2020 to 2030* (February 2020), www.cbo.gov/publication/56096. For the most recent workbook that uses those rules, see Congressional Budget Office, *Workbook for How Changes in Economic Conditions Might Affect the Federal Budget* (June 2021), www.cbo.gov/publication/57191.

- In addition, the Treasury regularly issues new debt (at market interest rates) to replace maturing securities and to finance new deficits. Thus, the amount that the federal government spends to pay interest on its debt is directly tied to those rates. Treasury inflation-protected securities are also affected by changes in inflation.

Effects on Revenues. Larger increases in wage rates and prices generally lead to greater labor income, profits, and other nominal income, which in turn generate larger collections of individual income taxes, payroll taxes, and corporate income taxes. Revenues from the Federal Reserve's remittances to the Treasury are affected by changes in interest rates.

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 mostly stay the same when earnings change, with two main exceptions—when earnings reach the maximum amount subject to the Social Security tax (although that maximum rises, after a lag, with average wages in the economy) and when they reach the threshold for the additional Medicare tax. Higher wage growth thus leads to a roughly proportional increase in payroll tax revenues, CBO estimates.

Similarly, nearly all corporate profits are taxed at a single statutory rate of 21 percent. Consequently, an increase in profits resulting from higher inflation generates a roughly proportional increase in corporate tax revenues.

Finally, higher nominal interest rates would first reduce and then increase revenues from the Federal Reserve's remittances to the Treasury. If, over the next 10 years, all interest rates were higher than CBO projects, the Federal Reserve's remittances over the next few years would be smaller than projected because higher interest payments on deposits that banks hold at the central bank would outstrip the additional earnings from interest on its Treasury holdings. Over time, however, the current holdings in the

portfolio would mature and be replaced with higher-yielding investments; as a result, the Federal Reserve's remittances would be larger in later years.

Effects on Mandatory Spending. Higher inflation would increase the cost of several mandatory spending programs, 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 when inflation rises because the costs of providing benefits under those programs increase as wages and prices rise. In addition, to the extent that benefit payments in retirement and disability programs are linked to participants' preenrollment wages, higher wages would boost future outlays for those programs.

Effects on Discretionary Spending. As specified in law, CBO's projections of spending for discretionary programs reflect the assumption that discretionary budget authority provided in appropriation acts in future years will match current funding, with adjustments for inflation. Hence, higher inflation would increase CBO's projections of such spending. The agency estimated the increase by adjusting discretionary budget authority to account for changes in wage and price indexes. Congressional decisions about annual appropriations would ultimately determine spending for discretionary programs.

Effects on Net Interest Costs. Higher inflation and interest rates would boost net interest spending in dollar terms. As the Treasury replaced maturing securities and increased its borrowing to cover deficits, the budgetary effects of higher interest rates would mount. Higher inflation would also make outstanding inflation-indexed securities more costly for the federal government. Moreover, greater deficits would increase federal debt, boosting interest costs further.

To estimate net interest spending in this analysis, CBO used its baseline projection method. The stock of federal debt at the beginning of a projection period, along with the additional debt (generally the amount of annual projected deficits), substantially determined the amount of

outstanding debt in each year. In addition, CBO projected the characteristics of debt that the Treasury would issue to finance annual deficits—for example, the time to maturity, whether interest rates are fixed or floating, and whether the interest payments include an adjustment for inflation. Estimates of interest rates related to those characteristics determined the amounts of interest that the Treasury would pay on outstanding debt.

I hope this information is helpful. Please contact me if you have any questions.

Sincerely,

Phillip L. Swagel
Director

cc: Honorable Ron Wyden, Chairman, Senate Committee on Finance; Honorable Bernie Sanders, Chairman, Senate Committee on the Budget; Honorable Lindsey Graham, Ranking Member, Senate Committee on the Budget; Honorable John Barrasso; Honorable Richard Burr; Honorable Bill Cassidy; Honorable John Cornyn; Honorable Steve Daines; Honorable Chuck Grassley; Honorable James Lankford; Honorable Rob Portman; Honorable Ben Sasse; Honorable Tim Scott; Honorable John Thune; Honorable Pat Toomey; Honorable Todd Young

Table 1.

Inflation and Interest Rates

Percent

	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Inflation[a]											
February 2021 baseline	1.6	1.9	2.0	2.1	2.1	2.2	2.2	2.2	2.1	2.1	2.1
High-rate *Blue Chip* scenario	4.2	5.1	3.2	2.9	2.5	2.4	2.4	2.3	2.3	2.3	2.3
Interest Rate on 3-Month Treasury Bills[b]											
February 2021 baseline	0.1	0.1	0.2	0.3	0.6	1.0	1.4	1.6	1.9	2.2	2.3
High-rate *Blue Chip* scenario	*	0.9	2.1	2.2	2.2	2.5	2.7	2.7	2.7	2.7	2.7
Interest Rate on 10-Year Treasury Notes[b]											
February 2021 baseline	1.1	1.3	1.5	1.8	2.1	2.5	2.7	3.0	3.2	3.3	3.4
High-rate *Blue Chip* scenario	1.4	2.4	3.1	3.2	3.3	3.5	3.6	3.6	3.6	3.6	3.6
Average Interest Rate on All Federal Debt Held by the Public[c]											
February 2021 baseline	1.4	1.3	1.2	1.2	1.2	1.4	1.6	1.8	2.0	2.2	2.4
High-rate *Blue Chip* scenario	1.6	1.6	1.8	2.1	2.2	2.4	2.6	2.8	2.9	2.9	3.0

Data sources: Congressional Budget Office; Bureau of Economic Analysis; Federal Reserve; Wolters Kluwer, *Blue Chip Economic Indicators*, vol. 47, no. 2 (February 11, 2022); and Wolters Kluwer, *Blue Chip Economic Indicators*, vol. 46, no. 7 (October 11, 2021).

For information about CBO's baseline economic projections, see Congressional Budget Office, *Additional Information About the Economic Outlook: 2021 to 2031* (February 2021), www.cbo.gov/publication/56989.

For inflation and interest rates on Treasury bills and notes, CBO used actual data for 2021. For the high-rate *Blue Chip* scenario, CBO used the average of the 10 highest forecasts of about 45 private-sector economists that were published in the *Blue Chip Economic Indicators*. For 2022 and 2023, CBO used values published in February 2022. For 2025 to 2027, CBO used the most recent values available, published in October 2021. For 2028 to 2031, CBO used the five-year average reported for 2028 to 2032, also published in October 2021. For 2024, CBO used the average of the 2023 and 2025 values to smooth the connection between the shorter-term and longer-term forecasts. (The *Blue Chip*'s longer-term forecasts will be updated on March 10, 2022.) Data are for calendar years.

For the interest rate on all federal debt held by the public, CBO estimated values under the high-rate *Blue Chip* scenario. Data are for fiscal years.

* = between zero and 0.05 percent.

a. Measured using the gross domestic product (GDP) price index. Although all wage and price indexes change in this scenario, only the projections based on the GDP price index are shown.

b. Although all interest rates change in this scenario, only the projections of the interest rates on 3-month Treasury bills and 10-year Treasury notes are shown.

c. The interest rate on all federal debt held by the public equals net interest payments in the current fiscal year divided by debt held by the public at the end of the previous fiscal year.

Table 2.

Budgetary Effects of Higher Inflation and Interest Rates

Billions of Dollars

	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	Total 2022–2026	Total 2022–2031
Changes in Revenues	21	94	190	257	304	351	387	416	443	473	505	1,195	3,419
Changes in Outlays													
Mandatory outlays	5	63	127	167	202	228	252	279	295	324	353	787	2,291
Discretionary outlays	0	27	56	76	90	101	111	118	126	134	142	350	980
Net interest	43	73	150	230	259	284	306	314	306	289	267	996	2,478
Total Change in Outlays	49	163	333	473	551	613	668	711	727	747	763	2,133	5,749
Increase (-) in the Deficit Relative to CBO's Baseline	**-27**	**-69**	**-143**	**-216**	**-247**	**-262**	**-281**	**-295**	**-284**	**-274**	**-258**	**-938**	**-2,330**

Data source: Congressional Budget Office.

Estimates are for the budgetary outcomes under the high-rate scenario for inflation and interest rates described in Table 1 relative to CBO's baseline projections in February 2021. For related information about how CBO prepared those estimates, see Congressional Budget Office, *Workbook for How Changes in Economic Conditions Might Affect the Federal Budget* (June 2021), www.cbo.gov/publication/57191. For CBO's 2021 baseline budget projections, see Congressional Budget Office, *The Budget and Economic Outlook: 2021 to 2031* (February 2021), www.cbo.gov/publication/56970, and *Additional Information About the Budget Outlook: 2021 to 2031* (March 2021), www.cbo.gov/publication/56996. Data are for fiscal years.

Table 3.

Deficits and Debt in CBO's Baseline and With Higher Paths for Inflation and Interest Rates

	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	Total 2022–2026	Total 2022–2031
							In Billions of Dollars						
Primary Deficit (-) or Surplus													
February 2021 baseline	-1,955	-774	-684	-621	-731	-664	-613	-837	-749	-956	-1,084	-3,474	-7,712
High-rate *Blue Chip* scenario	-1,940	-770	-677	-607	-719	-642	-588	-818	-727	-941	-1,074	-3,416	-7,564
Total Deficit (-) or Surplus													
February 2021 baseline	-2,258	-1,056	-963	-905	-1,037	-1,026	-1,048	-1,352	-1,346	-1,650	-1,883	-4,986	-12,266
High-rate *Blue Chip* scenario	-2,286	-1,125	-1,106	-1,122	-1,284	-1,288	-1,329	-1,647	-1,630	-1,924	-2,141	-5,924	-14,596
Debt Held by the Public													
February 2021 baseline	22,461	23,541	24,547	25,488	26,559	27,596	28,702	30,162	31,593	33,331	35,304	n.a.	n.a.
High-rate *Blue Chip* scenario	22,488	23,637	24,787	25,944	27,263	28,562	29,948	31,703	33,419	35,430	37,661	n.a.	n.a.
							As a Percentage of GDP						
Primary Deficit (-) or Surplus													
February 2021 baseline	-8.9	-3.4	-2.8	-2.5	-2.8	-2.4	-2.2	-2.8	-2.4	-3.0	-3.3	-2.8	-2.8
High-rate *Blue Chip* scenario	-8.7	-3.2	-2.6	-2.2	-2.5	-2.2	-1.9	-2.5	-2.2	-2.7	-3.0	-2.5	-2.5
Total Deficit (-) or Surplus													
February 2021 baseline	-10.3	-4.6	-4.0	-3.6	-4.0	-3.7	-3.7	-4.6	-4.4	-5.2	-5.7	-4.0	-4.4
High-rate *Blue Chip* scenario	-10.2	-4.6	-4.3	-4.2	-4.5	-4.3	-4.3	-5.1	-4.9	-5.6	-5.9	-4.4	-4.8
Debt Held by the Public													
February 2021 baseline	102.3	102.0	102.0	101.4	101.2	100.9	101.0	102.2	103.2	105.0	107.2	n.a.	n.a.
High-rate *Blue Chip* scenario	100.6	97.6	96.6	96.0	96.1	96.4	97.1	98.8	100.2	102.3	104.6	n.a.	n.a.
Memorandum: GDP													
February 2021 baseline	21,951	23,082	24,066	25,127	26,249	27,359	28,425	29,506	30,623	31,751	32,933	125,883	279,121
High-rate *Blue Chip* scenario	22,364	24,213	25,663	27,023	28,357	29,634	30,855	32,075	33,338	34,630	35,996	134,890	301,784

Data source: Congressional Budget Office.

GDP = gross domestic product; n.a. = not applicable.

For CBO's 2021 baseline budget projections, see Congressional Budget Office, *The Budget and Economic Outlook: 2021 to 2031* (February 2021), www.cbo.gov/publication/56970, and *Additional Information About the Budget Outlook: 2021 to 2031* (March 2021), www.cbo.gov/publication/56996. For information related to CBO's preparation of estimates under the high-rate scenario for inflation and interest rates described in Table 1, see Congressional Budget Office, *Workbook for How Changes in Economic Conditions Might Affect the Federal Budget* (June 2021), www.cbo.gov/publication/57191. GDP in the high-rate scenario is projected using baseline GDP adjusted only to remove the effects of inflation projected under the baseline and to include those projected under the scenario. Data are for fiscal years.