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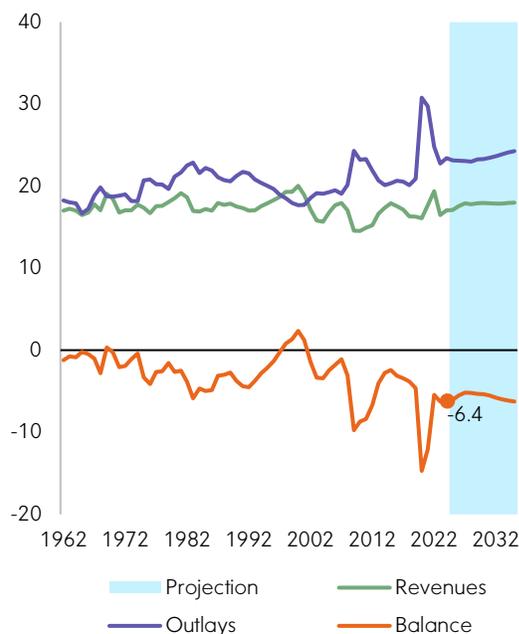
# Is the Bad News Worse Than You Think?

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The Congressional Budget Office (CBO) recently published its periodic public service announcement that the federal budget is on an unstable trajectory. With the deficit running now at 6.4% of nominal GDP, its *Long-Term Budget Outlook* predicts that the footprint of debt in the hands of the public grows from 98% of national income to 118% by 2035, as shown in the chart “Debt in the Hands of the Public.” The reader is left to ponder who will be the marginal buyer of Treasuries beyond \$50 trillion—and what yield will be required to attract them.<sup>1</sup>

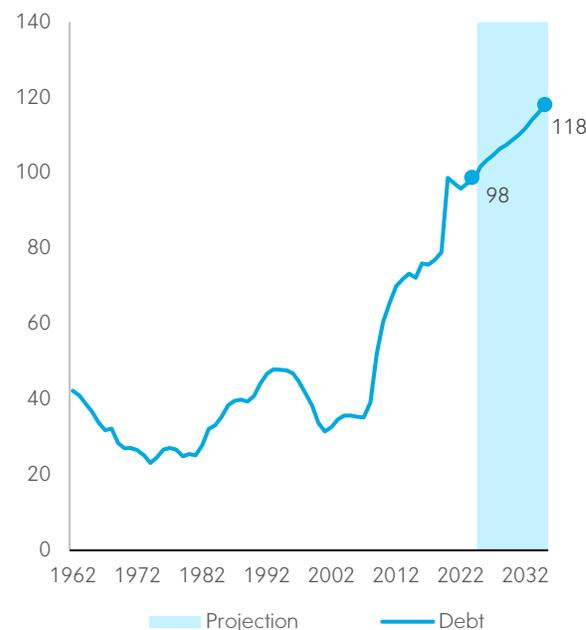
### Federal Budget

Relative to nominal GDP, percent



### Debt in the Hands of the Public

Relative to nominal GDP, percent



Source: Congressional Budget Office, The Budget and Economic Outlook: 2025 to 2035. Firm analysis, 2/2/25.

The analysis in this note will show that we believe this to be a rosy scenario.

**It’s worse than that.** The January 2025 nonpartisan CBO report assumes that “current laws governing taxes and spending generally remain unchanged.” (Ibid.) They don’t, as the relative size of the government and its responsiveness to adverse events have grown over time. On the rationale that fiscal outcomes respond to macroeconomic ones, our alternative is to estimate reduced-form explanations of the components of the budget from 1962 to 2024.

**The trend is not our friend.** Those estimates indicate that revenues relative to GDP have drifted slightly lower over time, and that outlays net of interest have been increasing significantly faster than nominal GDP. After accounting for interest compounding, rising deficits and debt are hard-wired into the dynamics.

**We don't save for a rainy day.** Revenues and noninterest outlays respond to the output gap, presumably because automatic stabilizers are in place and politicians react to the distress of the voting public. However, the responses are asymmetric, leading deficits to widen relative to income when there is slack; however, they don't narrow, let alone turn to surplus, when aggregate demand is above potential output. This is a one-way addition to the path of the debt.

**Economic growth doesn't save us.** A popular argument has gained traction that deficits and debt are not threatening if income grows at a faster rate than interest accrues. No doubt, this tempers the trajectory of government debt. However, a steady debt-to-income ratio starting from a deficit presupposes steady ratios of taxes and spending to income. Based on our results, they're not.

The upward flight of debt in the CBO's 10-year projection places the nation's fiscal position in an unprecedented region. But we think it is a lower bound on potential outcomes.

**The nonpartisan problem.** Since its establishment in 1974, the CBO has been judged by its Congressional overseers for professional competence and nonpartisanship. However, a budget forecast is about the political economy, with an emphasis on the modifier. Staff can't build future legislation into the outlook, both because political action is inherently uncertain and because that might seem to favor a proposal on one side or the other of the Congressional aisle.<sup>2</sup> The CBO process captures some cyclical forces because of its modeling of automatic stabilizers and structural trends, importantly including the strain on health care expenses as the population ages. Absent, though, is the growing tolerance of debt and the increased willingness to use deficits countercyclically by elected officials. That is, deficits have widened over time by political decisions that a nonpartisan organization cannot extrapolate.

**A reduced-form alternative.** Our reduced-form alternative is to capture macroeconomic regularities in budgetary outcomes and extrapolate them forward. At a high level of abstraction, the budget balance is revenue less the sum of noninterest outlays and interest expense, which is then compounded by a chain rule of debt dynamics. Of interest, and probably more stably related to behavior over time, is the relative size of the government, so we model these pieces as ratios of nominal GDP. Our data is annual from the CBO from 1962 to 2024, some of which appeared in the first charts.

The regression results are presented in the table on the next page.

The first column uses only one explanatory variable, a time trend, to identify the gross regularities in revenue and spending. Revenue is essentially trendless, holding around 17.75% of nominal GDP for 62 years. Noninterest outlays exhibit a pronounced upward trend, increasing 7 basis points (bps) per year. After six decades, that's sufficient to raise its level 4 percentage points.

The second column adds the output gap, estimated by the CBO, as an explanatory variable to consider the cyclicity of the budget. In such an event, revenues are positively related to the gap, and outlays are negatively related to the gap. Some of this association owes to the role of automatic stabilizers, including a progressive income tax and the provision of unemployment insurance, and some is owed to the adjustment of discretionary fiscal policy to the current state of the economy.

**Estimated Economic Determinants of the Federal Budget**

Relative to nominal GDP, annually

	1	2		3	4
<b>Revenue</b>					
	1962 - 2024				2001 - 2024
Constant	17.7	17.6		18.0	17.4
	64.4	66.4		52.8	10.8
Trend	-0.01	-0.01		-0.01	0.0
	-1.6	-1.0		-1.3	0.1
Output gap		0.17	When positive	-0.04	-0.22
		2.5		-0.03	-0.4
			When negative	0.30	0.59
				2.8	3.3
R <sup>2</sup>	0.04	0.13		0.42	0.42

	1	2		3	4
<b>Outlays Less Interest Expense</b>					
	1962 - 2024				2001 - 2024
Constant	16.6	16.8		16.1	3.6
	30.5	33.3		25.0	1.0
Trend	0.07	0.05		0.06	0.30
	4.3	3.7		4.1	4.2
Output gap		-0.43	When positive	0.00	-0.13
		-3.5		0.0	-0.1
			When negative	-0.71	-1.01
				-3.6	-2.5
R <sup>2</sup>	0.23	0.36		0.39	0.55

Source: Data from Congressional Budget Office, The Budget and Economic Outlook: 2025 to 2035. Estimated using annual data, and firm analysis, 2/2/25.

an average maturity of Treasury securities varying around five years, a good portion of the debt pays coupons linked to earlier financial market conditions. New debt can have maturities up to 30 years, and therefore reflects expected future financial market conditions. As a backward- and forward-looking average of the overnight rate, the effective cost of the debt does not get as low or nearly as high as the monetary policy rate because variations in the latter revert toward its mean.

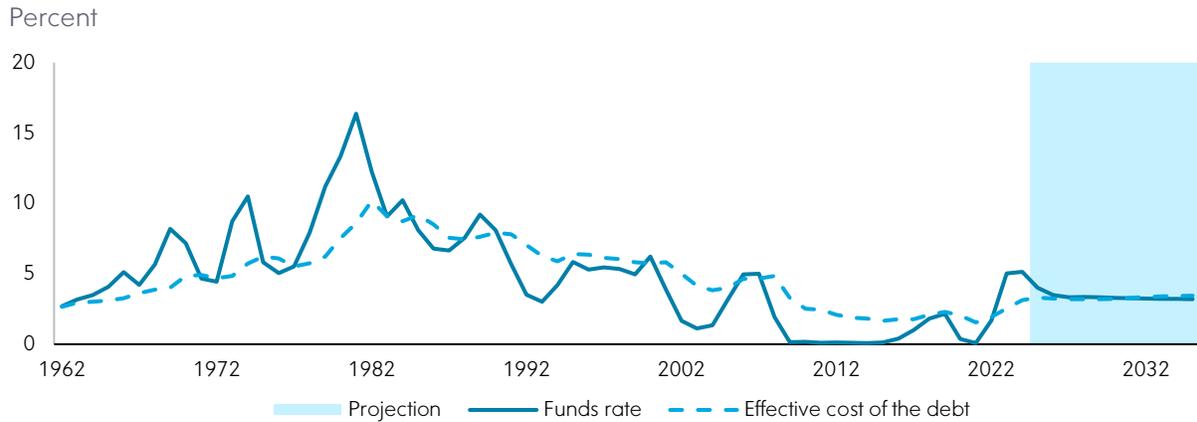
The third column, our preferred specification, splits the output gap into episodes of resource slack (when it is negative) and excess (when it is positive). The role of the trend remains, although it is numerically larger, and the response to the business cycle emerges as asymmetric. Revenues and noninterest outlays move systematically when there is slack but not when output is operating above its potential level. The effect in the third column is large enough during downturns to dominate the estimation sample when we didn't differentiate between the ups and downs of the cycle, as we did in the second column.

As a robustness check, the last column repeats the preferred specification using the last 24 years of data. Revenue remains trendless, but the arrow of expenditure arcs more sharply upward. Both respond more forcefully to economic slack but neither to excess.

The last portion of the budget balance is interest expense. We approximated the effective cost of the debt by dividing total interest expense in a year by the stock of debt from the previous year.<sup>3</sup> As in the chart shown at the top of page 5, the effective interest cost of the debt varies in a narrower range than the overnight monetary policy rate. With

These two-sided dynamics argue for explaining the effective cost of the debt with lags and leads of the policy rate. However, to keep the analysis tractable while capturing the asymmetric relationship between the two, our explanatory variable is a transformation of the policy rate (the natural logarithm of its level plus two).

### Effective Cost of the Debt and the Federal Funds Rate



Source: Congressional Budget Office, The Budget and Economic Outlook: 2025 to 2035. Firm analysis, 2/2/25.

The results as estimated from 1962 to 2024 are presented in the table below. The policy rate is a statistically significant influence on the effective cost of the debt, but there is no significant premium between the two (the constant term). As seen in the chart “Predicted Funding Cost and the Policy Rate,” predictions roughly track the transformed policy rate, and there is a nonlinear relationship between the cost and the untransformed policy rate, plotted at the upper right. The effective cost of the debt is higher than the policy rate at low levels of the latter but then flattens out as it rises, in keeping with the cost of long-maturity Treasury debt averaging the overnight-policy-rate cycle.

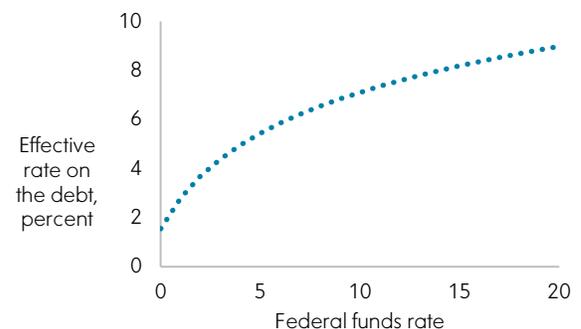
### Estimated Relationship Between the Effective Cost of the Debt and the Policy Rate

1962 to 2024

	Estimated coefficient	Standard error	t-statistic
Constant	-0.60	0.57	-1.04
Trend	3.10	0.31	10.08
R <sup>2</sup>		0.62	
Number of observations		63	

### Predicted Funding Cost and the Policy Rate

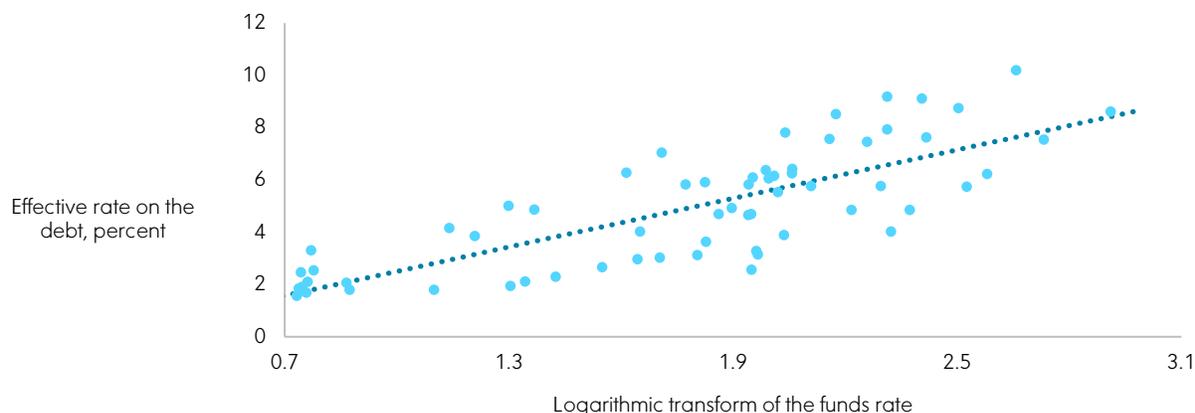
Percent



Source: Data from Congressional Budget Office, The Budget and Economic Outlook: 2025 to 2035, (ibid.), estimated using annual data. The explanatory variable is a transformation of the policy rate,  $\ln(2+rate)$ . Firm analysis, 2/2/25.

### Effective Cost of the Public Debt and the Monetary Policy Rate

1962 to 2024, percent



Source: Data from Congressional Budget Office, The Budget and Economic Outlook: 2025 to 2035, (ibid.), estimated using annual data. The explanatory variable is a transformation of the policy rate,  $\ln(2+\text{rate})$ . Firm analysis, 2/2/25.

**A chain rule.** The accounting identity driving dynamics links flows (the budget balance, or revenue less expenditure) to the change in the stock of debt.

$$\Delta D = -(Revenues - Outlays).$$

That is, someone spending more than they take in accumulates debt.<sup>4</sup> We've broken outlays into two pieces, noninterest and interest spending and care about magnitudes relative to GDP. The latter for debt changes over time as:

$$\Delta \frac{D}{y} = \frac{\Delta D}{y} - D_{-1} \frac{\Delta y}{y},$$

and we can plug in the former to get:

$$\Delta \frac{D}{y} = \frac{\text{Noninterest outlays}}{y} - \frac{\text{Revenue}}{y} + \left( \text{Effective rate} - \frac{\Delta y}{y} \right) \frac{D_{-1}}{y}.$$

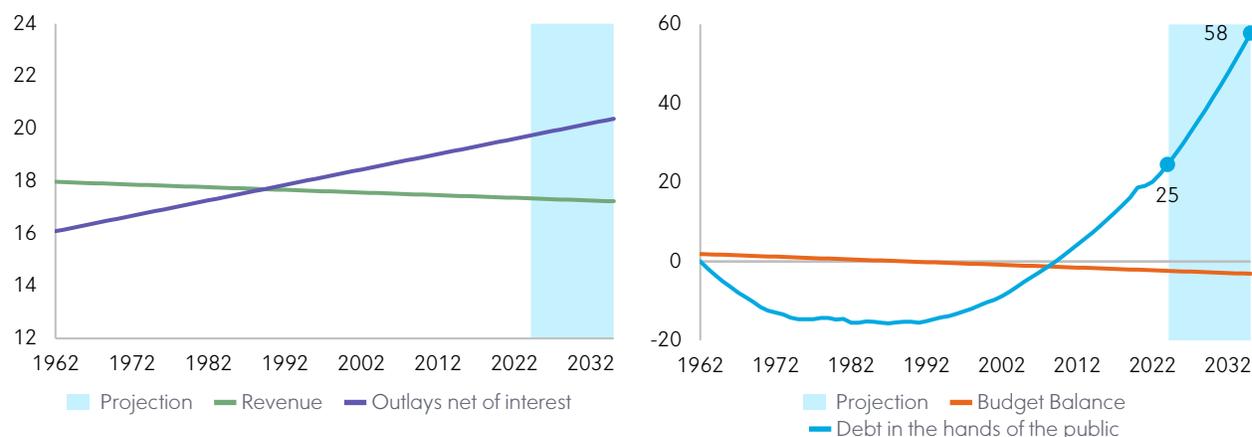
A debt projection lets this machinery run recursively.

Because our explanations for the behavioral bits, revenue and noninterest spending, are both linear, we can run the machine separately to determine the independent roles of the trend and the responsiveness to the output gap for debt over time. We will explore this in greater detail next.

The deterministic parts of our explanation for revenue and noninterest outlays are the estimated constant terms and the coefficients on the time trend in column 3 of “Estimated Economic Determinants of the Federal Budget,” found on page 4. They plot out the lines in the left half of the “Deterministic Effects on the Budget” chart below. Revenue tilts slightly down over time because, while the estimated coefficient does not differ significantly from zero, it is numerically less than zero. That small negative cumulates to predict a 0.7 percentage point lower ratio of revenue to GDP in 2024 compared with the starting point in 1962. The estimated trend to noninterest outlays is not small, hence that line moves up about 4 percentage points over the sample.

### Deterministic Effects on the Budget

Relative to nominal GDP, percent



Source: Data from the Congressional Budget Office, *The Budget and Economic Outlook: 2025 to 2035*, (ibid.). The left panel considers the effects only of the deterministic components of the estimated relationships of revenues and outlays net of interest, the constant and trend terms. The projection of debt in the right panel follows the chain rule for determining its evolution, compounding the effects of the estimated interest cost and actual nominal GDP growth on debt to income. Firm analysis, 2/2/25.

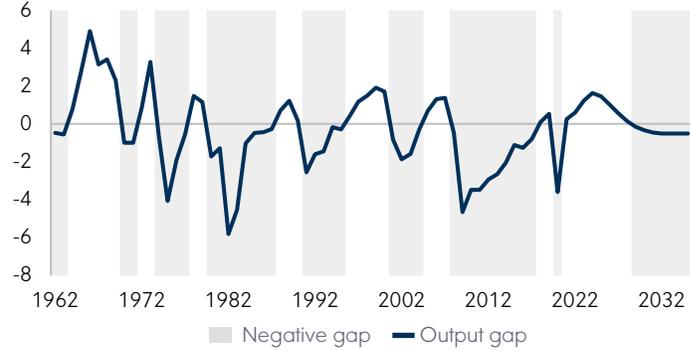
### The Trend Is Not Our Friend

The regression constants of 18% and 16%, respectively, for revenue and noninterest outlays relative to GDP put the initial budgetary position solidly in surplus, as in the right chart above. These deterministic forces allow the debt to be paid down, on net, before bottoming out at around 15% of GDP in the mid-1980s. The differential trends, however, hardwire a swing to deficit that reverses those debt redemptions and starts adding to debt, on net, by 2009. Interest compounding, working now in the same direction as the deterministic element, mounts and debt owing just to trend is about 25% of GDP by 2024. In the projection period, debt tracks the launch of a SpaceX heavy lifter to more than double relative to income in ten years.

We applied the same machinery to assess the cumulative effect of the behavioral part of our explanations of revenue and noninterest outlays, demonstrating their sensitivity to the business cycle. Our proxy for the cycle is the CBO’s estimate of output relative to its potential, plotted in “Business Cycle Fluctuations of the Output Gap” on the following page. The CBO estimates potential output from the supply side, measuring the levels and productivity of inputs to production and then calculating output at the full employment of resources, explained in the August 2001 *CBO’s Method for Estimating Potential Output: An Update*.<sup>5</sup> This isn’t a trend-fitting exercise, which is why the estimated gap does not average zero over the sample.

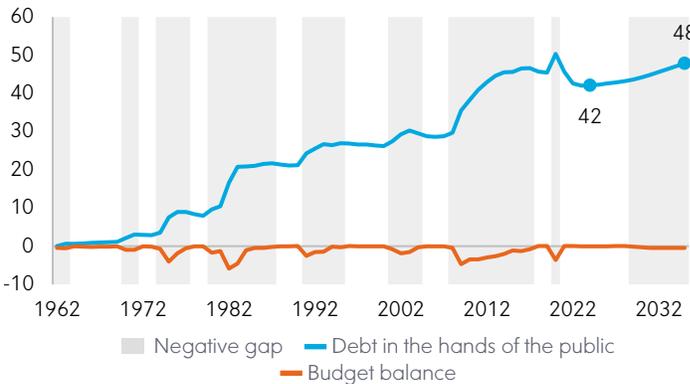
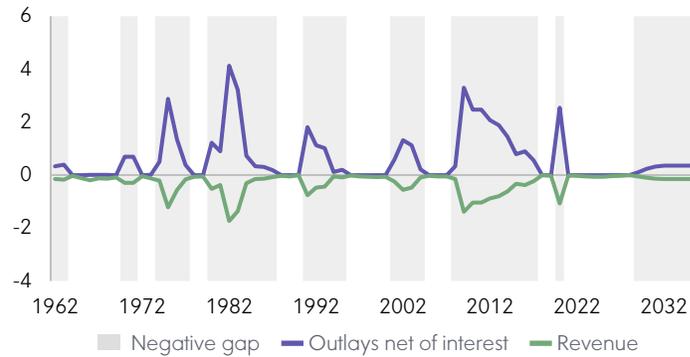
**Business Cycle Fluctuations of the Output Gap**

Actual relative to potential GDP, percent



**Cyclical Effects on the Budget**

Relative to nominal GDP, percent



Source: Data from the Congressional Budget Office, The Budget and Economic Outlook: 2025 to 2035. The upper panel gives the output gap as estimated by the CBO. The middle panel gives the effect of the gap on flows given the estimated relationships of revenue and outlays net of interest. The bottom panel gives the effect on the stock of debt, taking account of the compounding of interest. Firm analysis, 2/2/25.

As shown in the middle “Cyclical Effects on the Budget,” revenue and noninterest outlays are estimated to asymmetrically respond to that gap, respectively, falling (the green line) and rising (the purple line) when resources are slack (the shaded areas). As shown in the bottom panel, the differential response is mirrored in the deficit attributable to the behavioral effect (the orange line), which widens with slack but is unchanged when there is excess. That is, we don’t save for a rainy day to make up for some of the bills incurred with slack. This is a one-sided addition to debt seen as the escalating ratio of debt to income. The ascent is not smooth, as the force is not at work when the economy is above its potential, and compounding depends on the interest rate and the growth of GDP.

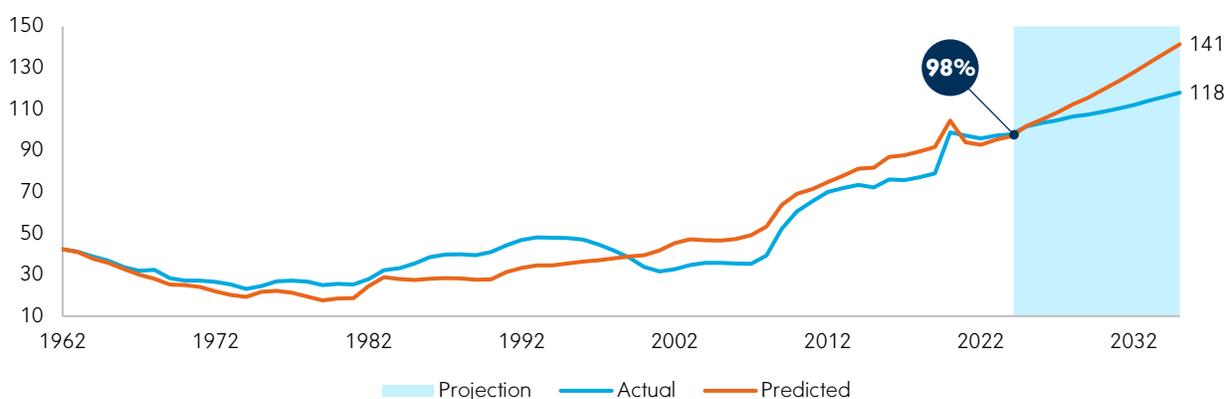
All told, our national failure to save for a rainy day added 42 percentage points to the debt load from 1962 to 2024. According to the CBO, aggregate demand won’t keep up with aggregate supply over the next ten years, implying another 6 percentage points will be added to the debt-to-income ratio to reach 48 percentage points by 2032.

We lastly put these pieces together for a reduced-form explanation for the path of the debt. However, a little technical work is required first. As noted in the discussion of the calculation of the effective cost of the debt, the average of the product of variables doesn’t necessarily equal the product of the averages of these variables. This applies to the chain-rule of debt accumulation, too. The intra-yearly pattern of deficits and interest rates, as well as the occasional off-budget accounting scheme, implies that annual deficits do not map exactly into the actual debt-to-income ratio, even after accounting for the change in nominal GDP.

This isn't an estimation issue but rather accounting. We calculated the annual discrepancy in the chain rule explanation of the change in the debt-to-GDP ratio when applied to the CBO's actual data on revenue and outlays year by year and compared to its debt-to-income ratio. This wedge was then added to our estimate budget balance when calculating the dynamic path for debt to GDP. The result is shown as the orange line in the chart, along with the actual debt-to-income ratio, plotted as the blue line. While there are good-sized deviations of the predicted from the actual, which is estimation error, we track reality upward. Indeed, at the end of the sample, the predicted ratio of debt to GDP after letting the recursion rip for more than sixty years is the same as its actual value of 98%, which is where the two lines intersect.

### Debt in the Hands of the Public: Actual and Predicted

Relative to nominal GDP, percent



Source: Data from the Congressional Budget Office, The Budget and Economic Outlook: 2025 to 2035. The projection of debt uses the estimated relationships for revenues and outlays with the actual data on the output gap and policy rate and the chain rule for determining its evolution. Firm analysis, 2/3/25.

The most considerable difference, however, is in the projection period. The CBO dutifully holds the current taxing and spending regime in place, as written into existing legislation. History, as captured in the reduced form, counsels that won't likely be the case. If new politicians act as their predecessors, executive action and new legislation will keep trends in place and respond asymmetrically to the business cycle. If so, we'll add almost 25 percentage points to the debt-to-income ratio than what is currently in the CBO's discouraging warning.

A more optimistic note has been sounded by those who point out that the effective cost of the debt has often been below the rate of growth of income.<sup>6</sup> As the last term in the chain rule provided earlier shows, this tempers debt over time. Indeed, debt relative to income can level out permanently with a steady primary-deficit-to-income ratio if the cost of debt is below the rate of growth of income.<sup>7</sup> It's an attractive resolution, but, unfortunately, the precondition doesn't hold empirically. Politicians have put adverse trends into revenue and outlays and respond asymmetrically to the business cycle. If the primary deficit isn't steady relative to income, debt won't be stable relative to income, regardless of the configuration of interest rates and nominal income growth.

There must be a conversation prior to the one about the level of debt to income, however attractive it might be to consider whether a primary deficit is consistent with a steady debt ratio. What do we do as a nation to stop the deficit growing relative to the size of the economy over time? This analysis suggests that the conversation would have two parts.

1. What can arrest the adverse trends to revenue and spending?
2. Can protection from adverse economic events be combined with the accumulation of resources during good times?



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Chief Economist & Macro Strategist

Vincent is the firm's Chief Economist and Macro Strategist. In this role, he is responsible for developing views on the global economy and making relative value recommendations across global bond markets, currencies and sectors.

Previously, Vincent served as the Chief US Economist and a managing director at Morgan Stanley. For the prior four years, he was a resident scholar at the American Enterprise Institute (AEI). Vincent also spent 24 years at the Federal Reserve, holding several roles including Director of the Division of Monetary Affairs and Secretary and Economist of the Federal Open Market Committee (FOMC). His responsibilities at the Federal Reserve included directing research and analysis of monetary policy strategies and the conduct of policy through open market operations, discount window lending and reserve requirements. Prior to these roles, he was the principal liaison with the domestic desk at the Federal Reserve Bank of New York and was responsible for preparing a document outlining policy alternatives for each FOMC meeting. He was Deputy Director in the Division of International Finance and Associate Economist of the FOMC and spent five years at the Federal Reserve Bank of New York in both the domestic and international research departments.

His academic publications primarily concern the conduct of policy and issues related to the monetary transmission mechanism as well as an analysis of alternative auction techniques and Treasury debt management. After an undergraduate training at Fordham University, he received graduate degrees in economics at Columbia University.

## Endnotes

- <sup>1</sup> According to the CBO, debt in the hands of the public will total \$52,056,000,000,000 in 2035. Deterministic Effects on the Budget chart. Congressional Budget Office, *The Budget and Economic Outlook: 2025 to 2035*, January 17, 2025 Report.
- <sup>2</sup> The CBO does fold in expected technical fixes to legislation, as that is about process. The Fed is in this same bind about providing guidance about its outlook, a risk elevated during the early days of an administration, as discussed in our recent "Fed Thoughts: Knock on Wood" white paper.
- <sup>3</sup> This is an approximation because interest outlays depend on the time profiles of the debt and interest cost within the two years. Interest expenditure is the product of the two, so average expense need not equal the average debt stock times the average debt cost. (The average of a product does not necessarily equal the product of the averages.)
- <sup>4</sup> As a bit of nomenclature,  $\Delta D = D - D - 1$ . Also, as a reminder, the noninterest part of the budget balance, Revenue-Noninterest Outlays, is often referred to as the primary balance.
- <sup>5</sup> Congressional Budget Office, A CBO Paper, August 2001. *CBO's Method for Estimating Potential Output: An Update*.
- <sup>6</sup> Blanchard, Olivier. *Fiscal Policy Under Low Interest Rates: A Draft for Open Review*. MIT Press, April 2022.
- <sup>7</sup> Just set the change in  $D/y$  in the chain rule to zero to find this long-run ratio, as in:

$$\frac{\bar{D}}{y} = \frac{\text{Revenue-Noninterest outlays}}{\text{Effective rate} - \frac{\Delta y}{y}}$$

Except, it's more complicated than this simple relationship. As explained by Reis in *Debt Revenue and the Sustainability of Public Debt* (American Economic Association, *Journal of Economic Perspectives*, Ricardo Reis, Fall 2022), forward sums required to ensure debt sustainability don't make mathematical sense if the discount rate is below the growth rate of income. The better way to think about it is that the government enjoys a premium on its debt issuance (because of safety and liquidity, say) that pulls the effective cost of the debt below the discount rate. This premium is an uncounted source of revenue to the budget (essentially insurance payments from investors to the Treasury). The math then works, but it is incumbent on the modeler to explain the source and sustainability of this premium.

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