the budget lab

How the Budget Lab Small Macro Model Helps Explore Possible Fiscal Futures

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Key Takeaways

1. A new macro model from The Budget Lab allows users to explore new fiscal scenarios and economic assumptions
2. Risks to the fiscal and economic outlook—as from AI adoption, persistent inflation, or fiscal crises—can be better understood with scenario modeling
3. Differences in economic baseline assumptions between CBO and external forecasters are relatively small compared to differences across scenarios

Forecasting is all about structured storytelling. A useful prediction about the future connects what we know about the world today with a view of how things could evolve tomorrow. While economic intuition can provide a useful starting point for such stories, tracing out the full, quantitative implications of a particular scenario for all the economic variables that policymakers care about is a tall order. Forecasting without some structure to guide and discipline can lead to a story whose individual strands fail to hang together.

Macroeconomic models can provide the framework needed to turn stories into useful, quantitative predictions. These models encode how economic variables interact and respond to shocks over time, letting forecasters see, for example, how output and interest rates would respond to an inflation shock. A model's structure forces users to be explicit about their assumptions and follow them through to their logical conclusions. By using a model, forecasters can construct a self-contained, internally consistent narrative—and then judge the likelihood of each narrative—to help policymakers understand the balance of risks and assess their options for action in specific scenarios.

Below, we show how The Budget Lab Small Macro Model (BLSMM) can be helpful in doing exactly this. The model, released today, is freely available here as an interactive tool. Documentation on how it works is available here.[1] This is a preliminary and initial version, which Budget Lab expects to modify in response to feedback. For that reason and also because the scenarios are intended to be merely illustrative, the figures below should be understood as stylized demonstrations of possible scenarios, none of which constitute a Budget Lab forecast.

Many scenarios are of course worth considering, but we select just a few:

- a scenario consistent with market expectations,
- an AI adoption scenario (described in greater detail in a companion article),
- a persistent inflation scenario,
- a fiscal unsustainability scenario, and
- a military conflict scenario.

Together, they show the range of BLSMM's capabilities and the range of outcomes to expect from a wide variety of different possible futures. In the interactive tool itself, users can explore several of the scenarios below as well as any of their own choosing.

Alternative forecaster expectations for the fiscal and economic outlook

The BLSMM interactive tool is anchored on the CBO baseline, incorporating (as a default) fiscal and economic assumptions that CBO makes in its February 2026 Budget and Economic Outlook.[2] The interactive makes it easy to see how these assumptions play out over the ten-year budget window: for example, the unemployment rate declines over time, the average interest rate on federal debt rises, and budget deficits remain large.

However, expectations of market participants differ from CBO assumptions in some respects. One potential reason for this is that CBO is directed by Congress to assume that current law is in place going forward—an assumption that may not be shared by others. To show how differences in assumptions could affect the BLSMM baseline, we make use of the Federal Reserve Bank of Philadelphia's Survey of Professional Forecasters (SPF). This survey gives us alternative forecasts for a subset of BLSMM's variables, including output, inflation, unemployment, and interest rates.[3]

One takeaway from this exercise, shown in Table 1, is that differences between CBO's economic assumptions and the expectations of forecasters are fairly small, with incremental impacts on the overall fiscal and macroeconomic trajectory.[4] This is true for the directly surveyed items such as inflation as well as the BLSMM-inferred ones like debt-to-GDP. For example, survey respondents appear to expect somewhat lower Treasury rates and higher growth over the longer run than does CBO, which is reflected in slightly lower net interest costs and a lower level of debt-to-GDP at the end of the budget window, all else equal.

Table 1. BLSMM/CBO and forecaster expectations for selected fiscal and economic outcomes

	BLSMM/CBO Baseline	SPF–Consistent Baseline
Assumptions		
Real GDP growth (%)	1.8	2.1
Unemployment rate (%)	4.2	4.3
GDP inflation (%)	2.0	2.2
Treasury bills, 3-month (%)	3.1	2.9
10-year Treasury note yield (%)	4.4	4.0
Equilibrium Outcomes (BLSMM Simulation)		
Primary budget balance (% of GDP)	−2.0	−1.9
Total budget balance (% of GDP)	−6.2	−5.8
Debt/GDP (%, 2035)	118	112
Average effective interest rate on debt (%)	3.8	3.6

All values are averaged over 2031–2035. For the CBO baseline implemented in BLSMM, the 3-month Treasury bill yield is proxied by the federal funds rate less 21 basis points.

Table: The Budget Lab • Source: Congressional Budget Office; Blue Chip Economic Indicators; BLSMM v1.0, The Budget Lab analysis • Created with Datawrapper

Aligning with forecaster expectations, rather than CBO assumptions, has a limited impact. But future events may depart significantly from both. In what follows, we consider some stylized scenarios, informed where possible by external estimates of how a scenario might play out. Each scenario is implemented using the same model, with a small number of scenario-specific deviations from the BLSMM (CBO-anchored) baseline. The simplicity of this approach helps make it clear what is driving model outputs.

AI adoption generates a productivity boom

Of all the macroeconomically significant events of the last few years, the one that has simultaneously generated the most excitement and anxiety is artificial intelligence and sophisticated large-language models (LLMs). On the one hand, economic integration of LLMs has tremendous potential to boost productivity and living standards. On the other hand, LLMs could cause large-scale labor market and other disruptions as they do so. We flesh all this out in more detail in a companion article.

For our purposes in this article, we want to show what a specific AI adoption scenario could mean for the fiscal and economic outlook. Rather than construct our own forecast, we look to a recent survey of economists' expectations for labor productivity growth in a "moderate AI adoption" scenario (Karger et al. 2026).[5] The median economist surveyed (and asked about that scenario) expected labor productivity growth to be 2.5% starting in

2026.[6] They also predicted a sizable decline in labor force participation, which we implement along with the productivity growth increase—partially offsetting the improvement in terms of real output growth.[7] We implement this scenario with just those two deviations from the baseline—higher productivity growth and slower labor force growth.

Figure 1 shows how this scenario plays out for fiscal and economic outcomes generated by BLSMM.[8] For each outcome, the BLSMM baseline (anchored to CBO's Outlook) is shown with a dashed line; the scenario outcome is shown with a solid line.

This analytical exercise has a few key implications. First, the budget deficit and debt trajectory are more sustainable in this scenario than in the baseline. Even with diminished labor force participation, and with the higher interest rates that occur in equilibrium with faster productivity growth, a productivity boom of this magnitude leads to more rapid GDP growth and a more-manageable deficit and debt burden. (See the section How We Calculate Scenario Forecasts for more details that apply here and in subsequent scenarios.) But as with all of our scenarios, this is neither a forecast nor a comprehensive assessment of how a large AI shock would transform the economy. In the future, The Budget Lab intends to follow this work with a more detailed investigation of how AI could affect fiscal outcomes, including reductions in revenues that could be expected were the income mix to shift from labor to capital.

Inflation surprises to the upside

Other possible macroeconomic futures are less sweeping in their implications, but more commonly experienced in the historical record. We consider one such possibility here: inflation remains elevated and takes longer than anticipated to return to the Federal Reserve's 2% target. This could occur for several reasons: recent examples include conflict in the Middle East disrupting energy markets and tariffs continuing to boost prices. The stylized scenario is implemented with unexpected shocks to inflation that keep it elevated at around 2.5% through 2029.

The impacts of this transitory inflation shock play out over several years, with inflation converging to 2.0% only in the early 2030s as shown in Figure 2.[9] In this scenario we assume that the Federal Reserve remains credibly committed to its target. In that world, the inflation is temporary and has only small effects on interest rates and the debt trajectory: it slightly erodes the debt with the additional inflation, offset only partially by higher borrowing costs.[10]

Financial markets become pessimistic about fiscal sustainability

Yet another scenario, alternately dismissed or feared by economists over the years, is one in which financial markets become pessimistic about the ability or inclination of federal policymakers to put fiscal policy on a sustainable path. In our baseline, the anticipated path of fiscal and macroeconomic outcomes depends on the continued patience of financial markets. To remain patient, investors must believe that, eventually, deficits and debt stabilize as a share of GDP.

Supposing this patience diminishes in the near future, we could expect (among many other potential consequences) an immediate rise in the term premium, a persistent rise in inflation expectations, and disruption in

Treasury markets that leads to rising government financing costs. In other words, investors would require a higher return on government bonds in exchange for the risk of not being repaid in the future. In this highly stylized and limited scenario, we implement such a crisis as a persistent 100 basis point increase in the term premium and a persistent 50 basis point shock to inflation expectations. To reflect disruptions to normal Treasury market functioning, we also add a transitory wedge of 50 basis points that the government must pay on new debt above and beyond prevailing market rates.[11]

The immediate impact of the crisis is tightening of financial conditions via a rise in the 10-year Treasury yield. This change both raises the cost of rolling over government debt and triggers a recession. As net interest payments rise and revenues fall, the debt trajectory deteriorates. The Federal Reserve cuts the policy rate aggressively at first to soften the hit to output but eventually tightens to bring down expected inflation. This rise in expected short-term rates leads long-term Treasury yields to continue to rise after the initial crisis. The average effective rate on government debt ratchets up quickly due to the effects of Treasury market dysfunction. This rate continues to grow throughout the forecast window as new debt is issued and old debt is rolled over at higher prevailing yields, even after Treasury markets return to normal.

Of course, this is merely illustrative: an even more disruptive scenario could occur in which risk premiums on government debt instruments rise by considerably more than shown here, or in which fiscal responses are amplified through mechanisms not present in BLSMM. For example, we do not capture other potential dynamics that would likely exacerbate such a shock, like financial stability concerns.[12]

Military conflict necessitates more spending

Federal non-interest outlays are also subject to uncertainty, especially in moments of crisis: the COVID-19 pandemic and the Great Recession both led to large, albeit temporary rises in spending. Military conflict can play a similar role in the federal budget, as it did in the mid-2000s and (to a lesser extent) as of this writing in early 2026. Given the increasingly dangerous international environment, shocks to defense outlays seem ever more likely.

To model this scenario, we use the Trump Administration's 2027 budget request. As a share of GDP, it calls for increased defense spending of 1.5 percentage points in 2027 and 0.5-0.8 percentage points through the rest of the budget window.[13] When we implement this increase in BLSMM, we see sharply larger deficits and debt and moderately higher interest rates and inflation. To be clear, our scenario is a limited one in the sense that it does not attempt to comprehensively model the effects of a conflict; it focuses exclusively on direct implications of a rise in defense outlays.

How we calculate scenario forecasts

The modeled trajectories in Figures 2-4 are all outcomes of the brand-new Budget Lab Small Macro Model (BLSMM). It is freely available here as an interactive tool. Documentation on how it works is available here. This is a preliminary version, which Budget Lab expects to modify in response to feedback. As such, figures like those above should be regarded as illustrative demonstrations of stylized scenarios, rather than authoritative forecasts.

Intuitively, what BLSMM does is take fiscal and monetary policy as inputs, along with other user-specified values like the paths of productivity growth and labor force participation, and delivers model-consistent paths for a variety of key outcomes. Those outcomes include real GDP; unemployment; inflation; 10-year Treasury rates; outlays, receipts, and debt; the primary and total budget deficits; the debt-to-GDP ratio; the average interest rate on federal debt; and the federal funds rate.

In so doing, it generates an internally consistent economic and fiscal narrative that embodies key macroeconomic relationships. For example, BLSMM includes an expectations-augmented Phillips Curve and an Okun's Law relationship between unemployment and GDP. This framework means that inflation is anchored to the Fed's target but evolves in the short run as shocks hit the economy and unemployment fluctuates. In turn, unemployment is closely connected to the output gap; above-potential GDP is associated with low unemployment, and vice versa. Monetary policy is implemented with a Taylor-type policy rule: the Fed tightens when inflation is high (or unemployment is low) and loosens when inflation is low (or unemployment is high). Some of the details of this rule can be modified by users.

Where possible, the BLSMM implementation follows CBO and standard practice, as in the case of the relationship between federal debt and the real neutral interest rate (often referred to as r*), where we assume that a one percentage point increase in the debt (as a share of potential GDP) causes r* to rise by 2 basis points. Some of BLSMM's other relationships are implemented with so-called rules of thumb from CBO. Those rules of thumb imply that higher productivity and labor force growth lead to substantial reductions in outlays as a share of output; by contrast, receipts as a share of output are minimally affected.[14] For all of these assumptions, alternative choices could also be reasonable.

BLSMM was designed to be parsimonious, especially relative to the large macro models commonly used by Budget Lab and others. This has important virtues, chiefly simplicity and transparency. It is much easier to understand what is driving a given equilibrium response in BLSMM than in a larger model that functions to some extent as a black box. However, it also comes with downsides: some important macroeconomic dynamics are not captured by the current version of the model. For example, the financial sector in BLSMM is very limited, and does not feature asset values that could be used to generate wealth effects of macro or fiscal shocks. The model has no international dimension, and so does not include trade or capital flows.

In some cases, these limitations may mean that BLSMM generates outcomes that conflict with users' macroeconomic intuition. The Budget Lab expects to reevaluate these limitations in the future, balancing them against the overall complexity of the model.

The value of thinking about scenarios

When The Budget Lab assesses fiscal policies, it is often essential to understand the macroeconomic context and (in some cases) the macroeconomic changes caused by the policies themselves. Typically, this is done by bringing the best evidence we have about the current state of the economy and the "central tendency" of any policy effects, i.e., our best single estimate of what will transpire.

But sometimes this isn't enough to provide the full picture. Uncertainty about the future state of the economy can extend beyond small variation around a central estimate, encompassing fundamentally different economic narratives. Modeling these different narratives has value for researchers and policymakers. Indeed, the Federal Reserve does exactly this when it considers "Alternative Scenarios" in its Tealbook. In a recently published

Tealbook, Fed economists in late 2020 were considering different scenarios for pandemic spread and social distancing, vaccination rollout, and inflationary pressures, for example.

The Budget Lab hopes that its publicly accessible small macro model will help a variety of users to think through potential economic and fiscal futures. Though certainly not appropriate for every use case, BLSMM can illuminate key macroeconomic and fiscal dynamics, which in turn help discipline thinking about fiscal policy options.

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Footnotes

1 The technical documentation contains detailed descriptions of how the model's internally -determined (endogenous) variables such as output and inflation relate to each other and react to the externally -specified (exogenous) variables such as productivity growth.

2 See the technical documentation for an overview of how BLSMM is calibrated to match external baseline forecasts such as the CBO's Budget and Economic Outlook.

3 While the survey does not provide direct forecasts of fiscal quantities like the deficit, the structure of BLSMM allows us to construct survey-consistent forecasts for these and other unsurveyed variables.

4 Year-by-year BLSMM/CBO baseline values are available in the online interactive tool.

5 Economist respondents consisted of "(i) economists working on AI-related topics, (ii) economists working on economic growth and technological changes more broadly, and (iii) well-known economists, such as Nobel prize winners."

6 The labor productivity concept presented to survey respondents was a "per-hour" and nonfarm business concept, rather than the "per-employee" and total economy value used in BLSMM. We assume here that those are identical in the forecast.

7 We reduce labor supply growth in the model such that LFPR reaches the 2030 labor force participation forecast from Karger et al. (2026); subsequently, we exponentially interpolate between the 2030 and 2050 Karger et al. (2026) forecasts.

8 One might reasonably expect other, related shocks in this type of scenario, like changes in equity valuations. These are not modeled in BLSMM. It is also possible that BLSMM relationships, like the relationship between potential GDP growth and real interest rates, would be different in reality than assumed in BLSMM.

9 A relevant simplification in BLSMM is that the increase in interest rates does not affect potential growth.

10 In BLSMM, positive effects of the excess inflation on receipts and primary outlays are offsetting.

11 Note that the initial version of the associated interactive tool does not allow users to adjust all the parameters that give rise to this scenario.

12 In BLSMM, potential GDP growth is unaffected by the term premium increase, limiting the real impacts of the shock relative to what could happen in reality.

13 These increases are calculated using the budget request's projections for discretionary defense outlays and include the additional $350 billion of mandatory spending in 2027.

14 BLSMM also assumes that a one percentage point deviation of potential GDP growth from baseline will raise the real neutral federal funds rate by two thirds of a percentage point. See BLSMM's technical documentation for more details.