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Key Methods That CBO Used to Estimate the Macroeconomic Effects of the 2025 Reconciliation Act

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Abstract

Public Law 119-21, referred to here as the 2025 reconciliation act, included a wide range of provisions that affect policies governing federal revenues and spending. This paper describes the key methods that the Congressional Budget Office used to estimate the law's macroeconomic effects. For each of the law's provisions, CBO identified key channels through which the U.S. economy would be affected and then translated those effects into inputs for its analytical models. For cases in which those inputs could be incorporated into CBO's existing modeling approaches, this paper refers readers to the agency's previous work describing those approaches. For cases in which new methods were needed to evaluate the law's macroeconomic effects, those methods are described in greater detail.

Keywords: investment, fiscal policy, multiplier, labor supply, interest rates, federal budget

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Introduction

Public Law 119-21 was enacted on July 4, 2025. Referred to here as the 2025 reconciliation act, that law is the most significant legislative change that occurred during the year that followed the publication of the Congressional Budget Office’s January 2025 baseline projections.¹ In July 2025, CBO and the staff of the Joint Committee on Taxation (JCT) published a conventional estimate of the law’s budgetary effects over the 2025–2034 period (CBO 2025e). That estimate—like all of CBO and JCT’s conventional estimates—did not account for changes to net outlays for interest or budgetary feedback from macroeconomic changes. (Budgetary feedback occurs when changes in the behavior of consumers and businesses affect the size of the economy and, in turn, those macroeconomic changes affect the government’s revenues and outlays.) In the most recent edition of *The Budget and Economic Outlook* (CBO 2026), CBO provides estimates of the overall effects of the reconciliation act on the federal budget for that same period; those estimates were developed in relation to the agency’s January 2025 baseline and include changes to net outlays for interest and the effects of budgetary feedback from macroeconomic changes.²

In this paper, CBO describes the key methods that the agency used to estimate the macroeconomic effects of the 2025 reconciliation act. The paper focuses on the new analytical approaches that were developed for that purpose. In doing so, it reflects CBO’s ongoing commitment to enhance the transparency of its work. In addition, by emphasizing connections between that work and the research of experts outside the agency, the paper aims to elicit feedback from the research community that can help improve and refine the methods described here.

The 2025 reconciliation act included a wide range of provisions that affect—in some cases substantially—many policies governing federal revenues and spending. For each provision, CBO attempted to identify the main channels through which the U.S. economy would be affected and then translated those effects into inputs suitable for use in the agency’s analytical models.

In most cases, those inputs could be incorporated into models that CBO uses on a regular basis. For example, the macroeconomic effects of the reconciliation act’s provisions were generally estimated using the agency’s standard suite of macroeconomic models (CBO 2014b), such as the short-term model (Reichling and Whalen 2012), the policy growth model (CBO 2021b), and the

¹ For details about CBO’s January 2025 baseline projections, see CBO (2025i) and CBO (2025j). Like all of CBO’s baseline projections, those January 2025 projections were developed under the assumption that the laws then in place governing revenues and spending would generally remain unchanged.

² See the estimates in Appendix A of CBO (2026). Those estimates were developed in relation to CBO’s January 2025 baseline, updated to reflect judicial decisions and administrative actions through April 10, 2025. Developments that have occurred later, including changes to tariff rates and immigration policy, interact with the provisions of the 2025 reconciliation act and will have an impact on those provisions’ budgetary and macroeconomic effects. As a result, actual outcomes will deviate from the estimates reported in Appendix A, which account for only the impact of the reconciliation act.

factor model for forecasting interest rates (Gamber 2020). In other cases, the inputs could be incorporated into modeling approaches that CBO uses less frequently. That was true, for example, when CBO assessed the effects of immigration enforcement provisions on the number of workers in science, technology, engineering, and mathematics (STEM) fields, which were estimated using a method similar to one the agency had used before (CBO 2024b). In still other cases, new methods were needed to evaluate the law’s macroeconomic effects; the economic effects of changes in spectrum auctions are one example.³ The resulting estimates were then integrated into CBO’s large-scale macroeconometric model (Arnold 2018) to inform the agency’s economic projections. By law, those projections reflect the assumption that current laws governing federal spending and revenues will generally remain in place.

Taken together, the reconciliation act’s provisions are projected to increase economic activity in relation to CBO’s January 2025 baseline projections. In the short term, that increase mainly reflects a boost to overall demand for goods and services resulting from the lower taxes and increased spending that are the law’s most significant initial budgetary effects. Those demand effects put upward pressure on prices, thereby increasing inflation and reducing the unemployment rate.

In the longer term, the increase in economic activity reflects the act’s positive effects on real potential output, which depends on the supply of labor, the capital stock, and potential total factor productivity (TFP).⁴ The act is also projected to increase interest rates throughout the 2025–2034 period, mainly because of the Federal Reserve’s anticipated response to stronger economic conditions in the near term and an increase in the ratio of federal debt to gross domestic product (GDP) in later years.

CBO’s estimates of the macroeconomic effects of the 2025 reconciliation act are subject to significant uncertainty. To estimate those effects, the agency relied on a combination of research, data, consultation with experts, and its understanding of federal programs. The breadth and depth of the evidence that informed CBO’s estimates differed for the various legislative provisions that were analyzed; areas in which additional data and research would be particularly helpful in informing CBO’s future analytical work are discussed at the end of this paper.

³ Administered by the Federal Communications Commission, spectrum auctions are auctions of licenses and permits for the commercial use of the electromagnetic spectrum.

⁴ Real potential output is the economy’s maximum sustainable level of production, adjusted to remove the effects of changes in prices. The capital stock is the stock of tangible and intangible productive assets used to produce goods and services. Potential total factor productivity is the average real output per unit of combined labor and capital services, excluding the effects of cyclical changes in the economy. In CBO’s policy growth model, potential TFP is the average real output per unit of combined labor and capital services for *all* sectors of the U.S. economy. Although other measures of TFP are commonly cited for the nonfarm business sector, the policy growth model is a simplified representation of the economy that treats the entire U.S. economy as one sector (businesses, nonprofits, and governments).

Short-Term Effects

To analyze the short-term macroeconomic effects of the 2025 reconciliation act, CBO augmented its standard analytical methods with information from the research literature. That process allowed for a more nuanced analysis in which those short-term effects reflect greater sensitivity to differences among the households affected by the legislation.

CBO assesses the short-term macroeconomic effects of changes in federal policies by estimating the impact of those policies on the overall demand for goods and services (CBO 2014b)—which affects output, or GDP, in relation to its potential—and combining those results with estimates of the policies’ impact on the supply of labor. That approach is the basis for CBO’s assessment of the short-term effects of the 2025 reconciliation act. By contrast, the law’s longer-term macroeconomic effects—and the associated macroeconomic feedback to the federal budget—are mainly driven by changes in incentives to work and invest, which affect the overall supply of goods and services, as reflected in potential output. (Those longer-term effects are subsequently discussed in greater detail.)

To quantify the effects on aggregate demand, CBO uses its short-term model to estimate an output multiplier, which is the product of a policy’s direct and indirect effects on aggregate demand. A policy’s direct effects—the immediate or “first-round” effects on aggregate demand—reflect the changes in purchases by federal, state, and local governments and by people and organizations receiving federal payments or paying federal taxes (including changes in states’ spending or tax policies in response to federal policy). The magnitude of many direct effects depends on whether the change is permanent or temporary and on the financial circumstances of the households or businesses affected by the policy. For example, a temporary reduction in taxes generally has a smaller effect on households’ purchases than a permanent reduction because a temporary reduction has a smaller effect on households’ lifetime disposable (after-tax) income.

A policy’s indirect effects enhance or diminish the initial change in aggregate demand as the policy’s direct (first-round) effects on aggregate demand propagate throughout the economy. The indirect effects on output can be summarized by a demand multiplier, which is defined as the total change in output for each dollar of increase in aggregate demand that results from the policy’s first-round effects. Using that approach, the total change in output, ΔY , arising from a change in federal policy that directly increases aggregate demand by ΔD dollars can be written in its simplest form in the following way.⁵

$$\Delta Y = \Delta D \cdot (\text{demand multiplier})$$

⁵ Throughout this paper, Δ denotes the change from CBO’s January 2025 baseline projections rather than more generally denoting a change from a preceding period.

In CBO’s short-term model, the effects of different policies on output vary because the size of the direct effect on aggregate demand, ΔD , varies by policy, whereas the demand multiplier is the same across policies. The size of the demand multiplier, however, depends on economic conditions. In CBO’s assessment, indirect effects are largest when the federal funds rate is near zero, a situation in which the Federal Reserve’s response to changes in aggregate demand is likely to be limited.⁶ When the federal funds rate is *not* near zero, the Federal Reserve is likely to respond more strongly to the effects of federal policies on inflation and the labor market, thus reducing the indirect effects on output. Under those conditions, CBO’s central estimate of the demand multiplier has a cumulative effect on output of 1.15 over four quarters and 0.50 over eight quarters (see [Table 1](#)). CBO used those demand multipliers in its analysis of the 2025 reconciliation act because the federal funds rate was not near zero in the agency’s January 2025 economic projections.

The direct effect of a policy change on aggregate demand, ΔD , is mainly determined by the amount by which households increase their spending in response to an additional dollar of income or resources attributable to the policy change. When households receive additional resources, the effect of those resources on their consumption—and thus on aggregate demand—varies depending on the households’ income because households differ in their ability to borrow and save. (Specifically, a larger share of lower-income households are constrained in their ability to borrow and save, as discussed in detail in the next section.) In the case of government purchases, a \$1 increase in purchases by federal, state, or local governments directly increases aggregate demand by \$1.

CBO’s short-term model also takes account of the effects of federal policies that alter the incentives to invest (such as changes in business expensing), which affect business investment and thereby directly affect aggregate demand. Changes in policies that affect incentives to invest alter the user cost of capital—the gross before-tax return on an investment that is necessary to provide the required after-tax return to investors after accounting for taxes and depreciation. Changes in the user cost of capital affect business investment; changes in business investment have a direct, one-to-one impact on aggregate demand.

⁶ The federal funds rate is the interest rate that financial institutions charge each other for overnight loans of their monetary reserves, which affects interest rates throughout the economy. The Federal Reserve sets a target range for the federal funds rate to conduct monetary policy. When the federal funds rate is near zero, the Federal Reserve is not expected to make adjustments to monetary policy in response to federal policies’ effect on inflation and the labor market. In that case, CBO uses higher demand multipliers, as discussed in Whalen and Reichling (2015) and Reichling and Whalen (2012).

Table 1.

Demand Multipliers

The effect of a \$1 increase in aggregate demand on output			
Quarter	Low estimate	Central estimate	High estimate
1	0.50	0.97	1.43
2	-0.03	0.23	0.48
3	-0.04	0.03	0.10
4	-0.05	-0.08	-0.10
5	-0.06	-0.18	-0.30
6	-0.06	-0.17	-0.28
7	-0.05	-0.15	-0.25
8	-0.05	-0.15	-0.25
Addendum:			
Cumulative effect over four quarters	0.38	1.15	1.90
Cumulative effect over eight quarters	0.17	0.50	0.83

Data source: Congressional Budget Office.

There are no effects after eight quarters.

In addition, CBO’s short-term model incorporates the effect on output of changes in the supply of labor (for example, changes stemming from lower effective marginal tax rates on labor income or work requirements), but the magnitude of that effect depends on the state of the economy. When unemployment is high and output is far from its potential—that is, when the economy has considerable unused labor and capital resources, or “slack”—a policy that increases or decreases the supply of labor will generally have little effect on output. In those circumstances, if a policy leads some people to leave the labor force (which means that they are neither employed nor looking for work), the jobs they vacate or could have filled will probably be filled by other people who would otherwise be unemployed; if a policy causes some people to join the labor force, those people will probably be unable to find a job (or, if they find a job, other people will become unemployed).

In CBO’s assessment, when unemployment is low and output is at or near its potential, changes in the labor supply stemming from policies’ effects on the incentives to work translate fully into changes in employment and output in the short term. Under those conditions, CBO estimates the effect on output from changes in the labor supply by combining the estimated effect on potential output from the change in the labor supply with the effect on the output gap—the difference between output and potential output. The change in the output gap is estimated using the multipliers approach described above. In CBO’s analysis of the reconciliation act, because unemployment is low and output is at or near its potential, changes in the labor supply translate fully into changes in employment and output in the short term.

Estimates of the reconciliation act's impact on real GDP for 2025 and 2026 were based entirely on CBO's short-term model; to develop such estimates for 2027, 2028, and 2029, CBO placed weights of 0.75, 0.50, and 0.25, respectively, on the effects in the short-term model and the remaining weights on the effects in CBO's policy growth model (as subsequently discussed in the section about longer-term effects).

MPCs and the Share of Constrained and Unconstrained Households

In CBO's analysis of the 2025 reconciliation act, the changes in households' consumption in response to additional resources are modeled using the underlying marginal propensity to consume (MPC) for two types of households: those that are constrained in their ability to borrow and save, and those that are not. Constrained households (sometimes referred to as non-Ricardian, or hand-to-mouth, households) cannot smooth consumption over time and thus are estimated to spend the full amount of the change in their current income (or resources) in the year in which that change occurs (an MPC of 1.0 based on the change in current income).⁷ By contrast, unconstrained households are estimated to spend \$0.02 of each \$1 change in the present value of their projected lifetime income (an MPC of 0.02 based on the change in that income).⁸

For example, consider a policy that reduces all households' income in the current year but increases it by the same amount (in present value) the following year. Because the present discounted value of households' projected lifetime income is unchanged, an unconstrained household would borrow in the current year to maintain consumption in that year and would then repay the borrowed amount when income rises the following year—thus leaving the households' consumption (and therefore aggregate demand) unchanged each year. By contrast, a constrained household would reduce consumption in the current year and increase it by the same amount (in present value) the following year because, in CBO's assessment, a constrained household cannot borrow or save to smooth consumption over time. Thus, even though the year-by-year income change and the present discounted value of projected lifetime incomes are the same for all households, the year-by-year magnitude of the direct effect on aggregate demand depends on the share of affected households that are constrained in their ability to borrow and save.

To determine the shares of constrained and unconstrained households in different income groups, CBO used estimated MPCs that vary across income terciles (thirds) to reflect the variation in households' consumption responses. On the basis of the research literature, CBO assesses that a

⁷ Current income (or current resources) refers to a household's disposable income or resources in the current period.

⁸ A present value is a single number that expresses a flow of current and future income (or resources) in terms of an equivalent lump sum received or paid at a specific time. The present value of future cash flows depends on the discount rate used to convert those cash flows into their equivalent value at a given time. The present discounted value of projected lifetime income here refers to the present discounted value of the stream of current and expected future changes in households' resources attributable to the policy change. It is calculated by discounting each year's change in current income (or current resources) back to the present using a 4 percent annual nominal discount rate and then summing those discounted amounts over the projection period.

temporary one-time increase in resources of \$1 would lead to additional consumption, on average, of \$0.85 for households in the lowest third of the income distribution, \$0.40 for those in the middle third, and \$0.29 for those in the upper third. (Those estimates are informed by the recent research of Ramey 2025, which indicates smaller consumption responses to temporary changes in disposable income than those used in earlier CBO analyses, including CBO 2018, which reflected the findings of Parker and others 2013.) As a result, the effects of federal policy changes on aggregate demand depend on which income groups are affected. Policy changes that increase the resources of lower-income households tend to generate relatively larger direct increases in aggregate demand because those households are more likely to be constrained in their ability to borrow and save and thus exhibit higher MPCs than higher-income households.

Because CBO does not have information about the consumption patterns of households with differing amounts of income *within* each tercile, the agency models the average response for each tercile. In CBO’s assessment, the tercile-based MPCs represent the weighted average of the two underlying MPCs used for constrained households (which have an underlying MPC of 1.0 based on changes in current income) and unconstrained households (which have an MPC of 0.02 based on changes in the present discounted value of their lifetime income). Therefore, for a temporary one-time increase of \$1 in resources for all households in tercile j , which increases current income and the present discounted value of their projected lifetime income by \$1 for all households, the resulting change in consumption (or direct aggregate demand), on average, within the current period equals the tercile-based MPC:

$$\text{MPC}_j = \omega_j \cdot 1.0 \cdot \$1 + (1 - \omega_j) \cdot 0.02 \cdot \$1$$

wherein ω_j is the share of constrained households in tercile j . (In CBO’s analysis, the shares of constrained and unconstrained households within each tercile and their respective MPCs are held constant over time and do not depend on economic conditions.) CBO then relied on its estimates of tercile-based MPCs to infer the share of constrained and unconstrained households within each tercile:

$$\omega_j = \frac{\text{MPC}_j - 0.02}{0.98}$$

Therefore, using CBO’s tercile-based MPCs, which summarize the average consumption response within each tercile, the implied share of constrained households is about 85 percent in the lowest third of the income distribution, about 39 percent in the middle third, and about 28 percent in the upper third. The estimated share of constrained households within each tercile was then interpolated and extrapolated to deciles (tenths) to align with CBO’s reported distributional estimates of the 2025 reconciliation act’s effects on households’ resources. That step resulted in estimated shares of constrained households that range from 95 percent for the lowest decile to 8 percent for the highest (see [Table 2](#)).

Table 2.

Shares of Constrained Households

Decile (k)	Estimated share of constrained households (ω_k)
1 (lowest)	95%
2	86%
3	73%
4	59%
5	46%
6	37%
7	34%
8	30%
9	25%
10 (highest)	8%

Data source: Congressional Budget Office.

Over the entire distribution of household income, about half of all households are estimated to be constrained using that approach. That estimate is roughly consistent with the findings reported in Aguiar, Bills, and Boar (2025).

Once the share of constrained households in each decile is determined, a change in federal policy that alters the current and present discounted values of households' projected lifetime income generates a direct increase in aggregate demand in the current period equal to:

$$\Delta D = \sum_{k=1}^{10} [\omega_k \cdot 1.0 \cdot \Delta(\text{current income})_k + (1 - \omega_k) \cdot 0.02 \cdot \Delta(\text{present discounted value of lifetime income})_k]$$

wherein k indexes the decile. As a result, the short-term demand effects of federal policy changes depend on which income groups receive additional income (or resources).

For example, if a policy reduced the income of all households in the lowest decile in the current year by \$100 but increased it by \$104 the following year (with an annual nominal discount rate of 4 percent, the \$104 in the following year equals \$100 in present value), the present discounted value of projected lifetime income for the average household in that decile would be unchanged. But the direct effect on aggregate demand would be a decline of about \$95 for each affected household in the current year and an increase of about \$99 for each affected household in the second year because the vast majority of households in the lowest decile are constrained in their

ability to borrow or save.⁹ By contrast, if that policy change only affected households in the highest decile, the direct effect on aggregate demand would be a decline of about \$8 in the first year and an increase of about \$8 in the second year because very few households in the highest decile are estimated to be constrained in their ability to borrow.

Distributional Effects

The direct effect of a policy change on aggregate demand largely depends on how the change affects household income after taxes and transfers. Therefore, to calculate the direct effect on aggregate demand stemming from policy changes in the 2025 reconciliation act, CBO combined its year-by-year distributional changes for deciles that are based on *cash* income with its estimates of constrained and unconstrained households within each decile and their respective MPCs. (For details about how CBO creates those income-based deciles, see Habib and Heller 2022.) The year-by-year distributional changes in households' resources are based on the conventional cost estimates prepared by CBO and JCT and were allocated to households to determine how resources would change across the income distribution (see CBO 2025b and CBO 2025c).¹⁰ Those year-by-year changes are used to measure the annual change in resources applied to constrained households and to calculate the change in the present discounted value of projected lifetime income applied to unconstrained households.

Before determining those annual changes in resources and present-value changes within each decile, CBO made two adjustments to its year-by-year distributional estimates of the 2025 reconciliation act's effects on households' resources. The first adjustment was to isolate the changes in households' resources that were allocated as if they were public goods in CBO's distributional analysis.¹¹ Those changes include states' spending on administrative expenses and all federal outlays other than social insurance benefits and means-tested transfers, such as

⁹ The economywide change in aggregate demand would depend on the number of affected households. For example, if there were N households in the economy, and that number did not change over time, then there would be $N/10$ households in each decile. The total direct effect on aggregate demand would be a decline of $\$95 \cdot (N/10)$ in the current year and an increase of about $\$99 \cdot (N/10)$ in the second year.

¹⁰ The deciles used in those analyses by CBO ranked households by income after taxes and transfers rather than by cash income, which is used in this analysis. Cash income is a narrower measure that excludes changes in tax liabilities and income received in the form of in-kind transfers (such as benefits from the Supplemental Nutrition Assistance Program, Medicare, Medicaid, and employer contributions for health insurance). It is used to evaluate macroeconomic effects because, in CBO's assessment, households' near-term spending behavior is more likely to be determined by their cash income than by the amount of their income after taxes and transfers.

¹¹ Public goods are goods and services with two main traits: First, if the goods and services are consumed by one person, the amount available to other people is not reduced. Second, preventing people from consuming the goods and services once they are available is difficult. In CBO's distributional analysis of the reconciliation act's effects on households' resources, all spending and revenues in the category "Other spending and revenues" were allocated as if they were public goods. A portion of "States' fiscal responses" were also allocated as if they were public goods. For a discussion of those allocations, see CBO (2025b) and CBO (2025c).

spending on defense, homeland security, and immigration-related activities. Because those categories of spending are almost all government purchases, they were assigned an MPC of 1.0.

The second adjustment was to isolate the overall change in federal and state spending on Medicaid. Rather than applying the MPCs of constrained and unconstrained households to such spending, CBO used the categories in its framework for allocating changes in Medicaid spending across the distribution of household income to determine which MPCs to apply. That way, the estimates would more accurately reflect how that spending is recorded in the Bureau of Economic Analysis' national income and product accounts. (The estimation of Medicaid MPCs is described in the next section.)

After making those two adjustments, CBO allocated the remaining changes in households' resources, by decile and by year, to the constrained and unconstrained households and applied the two corresponding MPCs to estimate the direct effect on aggregate demand. That approach yielded an overall MPC for those changes in households' resources, measured as the direct effect on demand divided by the total change in resources in each year, which ranged from 0.32 to 0.51 for various years in the 2025–2034 period.

MPCs Applied to Changes in Medicaid Policy

In recent years, CBO has devoted time and resources to modeling how changes to federal policies that affect health insurance, such as changes to Medicaid, can be integrated into the distributional framework described earlier in this paper. To assess the macroeconomic effects of the 2025 reconciliation act, CBO estimated the overall MPC associated with a change to Medicaid policy by identifying how the policy would affect health care consumption, households' resources, and administrative costs. The agency then applied MPCs to those components to determine their combined effect on GDP. Those changes were estimated using methods similar to methods used in CBO (2025b) and CBO (2025c), which decompose the total change in federal and state Medicaid spending into the net change in health care consumption, the change in out-of-pocket (OOP) spending and insurance premiums, and the change in administrative costs.¹² CBO assigned MPCs to each component according to its economic channel and used those component-specific MPCs to compute the overall MPC.

Changes in both government-funded and privately funded health care consumption contribute to GDP directly. Medicaid benefits are considered in-kind transfers, so the value of the benefits is realized only when enrollees receive medical goods or services. Medicaid spending mainly

¹² CBO's method for allocating changes in Medicaid spending across the distribution of household income is based on an adaptation of economic incidence. The approach reflects how policy changes alter the prices that health care providers are paid and the quantities of medical goods and services that Medicaid enrollees receive. A forthcoming CBO working paper will describe that approach in more detail.

finances the purchase of those goods and services, which contributes directly to GDP in the form of health care consumption.

Each dollar spent on Medicaid-financed medical goods or services therefore corresponds to a dollar of measured output in the health care sector. Changes in Medicaid coverage also affect GDP through households' own health payments because shifts in Medicaid enrollment are accompanied by opposite shifts in OOP spending and insurance premium payments. The net change in spending tied directly to providing medical goods and services—that is, the change in Medicaid-financed medical goods or services net of the offsetting change in spending financed through OOP payments and premiums—is therefore assigned an MPC of 1.0.

Changes in OOP spending on health care and insurance premiums also affect the resources available to households for purchasing other goods and services. When households gain Medicaid coverage, they no longer need to make certain medical payments, leaving them with additional resources for other consumption. In CBO's analysis, households' spending of those additional resources—stemming from lower spending on OOP costs and insurance premiums—is assigned an MPC of 0.87, reflecting the distribution of Medicaid enrollees affected by the policy changes. That distribution is consistent with the distributional estimates provided in CBO (2025b) and CBO (2025c).¹³

Some Medicaid payments, such as lump sum payments, are not directly related to the amount of goods or services provided to Medicaid enrollees and thus do not contribute directly to GDP. As a result, CBO treats those nonbase payments as income to health care providers rather than health care consumption. To reflect the portion of that income that providers use for other consumption, CBO applies an MPC of 0.30, consistent with the spending behavior of higher-income households and business owners.

Changes in administrative costs for Medicaid are not tied to purchases of medical goods and services. But those changes also contribute directly to GDP because they are classified as government consumption and are thus assigned an MPC of 1.0.

CBO also considers how changes to Medicaid policies would affect uncompensated care. Because changes in uncompensated care are not included in Medicaid outlays, they are not directly allocated to households using the Medicaid allocation framework; they do, however,

¹³ In CBO's framework for allocating changes in Medicaid spending across the distribution of household income, the allocation corresponds to the effects of the reconciliation act's various provisions on quantities of care and reimbursements to providers; also, the allocation accounts for changes in uncompensated care. Reductions in beneficiaries' resources represent about half of the changes, CBO estimates. The rest of the changes are accounted for by reductions in the resources of people who have ownership in or work for health care providers and insurers. (On the basis of the income shares in those sectors, about 71 percent of those reductions were allocated to labor income, and about 29 percent were allocated to capital income.) For more information, see Zhang and Zhu (2021), Finkelstein, Hendren, and Luttmer (2019), and Garthwaite, Gross, and Notowidigdo (2018).

influence GDP through their effect on the delivery of unpaid medical goods and services. When people gain or lose Medicaid coverage, the amount of care they obtain without payment can change as well, partially offsetting the change in Medicaid-financed health consumption. Under the accounting conventions used to develop the Bureau of Economic Analysis' national income and product accounts, uncompensated care received from nonprofit and government health care providers contributes directly to GDP because it is valued at its production cost, whereas uncompensated care from for-profit providers does not. On the basis of the share of nonprofit and government providers in the health care sector, CBO treats 77 percent of uncompensated care as directly affecting GDP with an MPC of 1.0 and the remaining 23 percent with an MPC of zero. The result is a weighted average MPC of 0.77, which is then assigned to changes in uncompensated care.

Taken together, the component-specific MPCs determine the overall MPC of a change to Medicaid policy, calculated as the ratio of the change in the direct effect on demand using the component-specific MPCs to the total change in federal and state Medicaid outlays. For the policies in the 2025 reconciliation act that affect Medicaid, the overall MPC ranged from 0.55 to 0.60 for various years in the 2025–2034 period. That range reflects the composition of changes in Medicaid-related spending stemming from the reconciliation act: In CBO's assessment, for each dollar by which Medicaid outlays change, roughly \$0.40 is associated with components that contribute directly to GDP and is assigned an MPC of 1.0, about \$0.30 is associated with changes in households' resources and is assigned an MPC of 0.87, and about \$0.30 is associated with payments to providers that do not correspond to recorded consumption and is assigned an MPC of 0.30. In addition, as a result of the reconciliation act, a \$1 decrease in Medicaid outlays, on average, is accompanied by an increase in uncompensated care of about \$0.20 per dollar; that increase is assigned an MPC of 0.77. The basis for assessing those allocations is discussed in footnote 13 and CBO (2025b). That publication describes how CBO allocates different components of Medicaid spending to different parties (for example, beneficiaries versus providers), which is an input into how the agency constructs the MPC relevant to each component.

Longer-Term Effects

In the longer term, changes to federal policies affect economic activity mainly by altering the supply of labor and investment, thereby changing potential output. To estimate the longer-term effects of the 2025 reconciliation act on potential output, CBO used its policy growth model, which produces a projection of potential output using an economywide Cobb-Douglas production function that is consistent with the projection of potential output underlying the agency's economic forecast. (The agency's forecasting growth model and its relationship to the policy growth model are described in Shackleton 2018). Specifically, in CBO's policy growth model, the level of real potential output, Y_t^* , is given by:

$$Y_t^* = A_t^* \cdot K_t^\alpha \cdot H_t^{*1-\alpha}$$

wherein A_t^* is an index of economywide potential TFP, K_t is the flow of services from nonfarm capital and owner-occupied residential housing, and H_t^* is an index of the labor supply defined in terms of economywide potential hours worked. The parameter α represents capital's factor share in the Cobb-Douglas production function and is calibrated to a value of 0.4 using the historical economywide average share of capital income. Under that specification, labor's factor share is given by $(1 - \alpha)$, which is 0.6 in CBO's analysis.

The growth rate of real potential output, y_t^* , can then be expressed (approximately) in terms of the growth rates of the three factors affecting production:

$$y_t^* \approx a_t^* + 0.4 \cdot k_t + 0.6 \cdot h_t^*$$

wherein a_t^* is the growth of potential TFP, k_t is the growth of capital services, and h_t^* is the growth of potential hours worked.

In CBO's estimates, the 2025 reconciliation act is projected to increase potential output by increasing the labor supply, the capital stock, and potential TFP over the projection period.

Effects on the Labor Supply

In CBO's estimates, the 2025 reconciliation act boosts the labor supply—as measured by potential hours worked—through increases in both the potential labor force and the average number of hours worked per worker.¹⁴ Changes to tax policy account for most of that increase—notably, the change that reduced effective marginal tax rates on labor income, which strengthens incentives to work. Other provisions also increase work incentives, including changes to Medicaid, the Supplemental Nutrition Assistance Program (SNAP), and certain policies affecting higher education. The increase in the potential labor force is partly offset by a reduction in the civilian noninstitutionalized population caused by higher federal spending on immigration enforcement and detention.

To model how changes to federal policies affect the labor supply, CBO draws heavily on the research literature. Much of the research on how the labor supply is affected by changes to

¹⁴ The potential labor force is CBO's estimate of how big the labor force would be if economic output and other key variables were at their maximum sustainable amounts. The labor force refers to the number of people age 16 or older in the civilian noninstitutionalized population who have jobs or are unemployed (available for work and either seeking work or expecting to be recalled from a temporary layoff). The civilian noninstitutionalized population excludes members of the armed forces on active duty and people in penal or mental institutions, detention facilities, or homes for the elderly or infirm. In estimating how the 2025 reconciliation act would affect the labor market, CBO assessed that about 75 percent of the increase in potential hours worked would stem from a larger potential labor force and the remainder would stem from an increase in average hours worked per worker. The basis for that estimate is particularly uncertain and is the subject of ongoing research.

SNAP and Medicaid policies focuses on measuring changes in the likelihood of employment. To allow changes in the labor supply to inform its policy growth model, CBO generally must translate such evidence into changes in aggregate potential hours worked, weighted by earnings—an outcome not typically reported directly in the research literature.

Changes to Taxes. To evaluate how changes to federal taxes affect the labor supply through changes in potential hours worked, CBO estimates how changes in after-tax wage rates and annual income affect the labor supply for a representative sample of taxpayers and applies projected average responses for taxpayers in each income decile.¹⁵ In those estimates, an increase in the after-tax wage rate increases potential hours worked because work becomes more valuable than other uses of time (which is known as the substitution effect), whereas an increase in after-tax annual income reduces potential hours worked because people can maintain the same standard of living while working fewer hours (which is known as the income effect).¹⁶ In CBO’s assessment, it takes time for people to respond to changes to tax policy; as a result, in the agency’s projections, labor supply responses are modeled as a three-year moving average of the estimated contemporaneous effects.

In CBO’s analysis of the 2025 reconciliation act, states’ fiscal responses also affect the supply of labor because CBO anticipates that states will adjust the rates at which they tax personal income in response to changes in federal policies that alter the states’ fiscal positions. (States’ fiscal responses are discussed below.) Although states’ responses will probably vary, CBO models them in the aggregate and incorporates their effects on the labor supply using a similar approach to the one used to estimate how changes in federal taxes affect the labor supply.

Supplemental Nutrition Assistance Program. The 2025 reconciliation act modified SNAP by expanding work requirements and making other changes that are projected to reduce program enrollment and benefit amounts. In CBO’s analysis, SNAP recipients are projected to increase the amount of labor they supply in response to those policy changes.

To estimate the effects on the labor supply of expanded SNAP work requirements, CBO relied on research about how such requirements would affect people of various ages. For example, Gray and others (2023) analyzed the labor force participation of older able-bodied adults living in Virginia without dependents. That work was based on a regression discontinuity design in

¹⁵ JCT has also evaluated the changes in the labor supply stemming from tax provisions in the 2025 reconciliation act and found similar effects. For a discussion of how JCT estimates changes in the labor supply in response to changes in federal tax provisions, see Joint Committee on Taxation (2024). For JCT’s analysis of the macroeconomic effects of the tax provisions of the reconciliation recommendations that were ordered reported by the House Committee on Ways and Means on May 14, 2025, see Joint Committee on Taxation (2025).

¹⁶ For information about how CBO estimates changes in the labor supply in response to changes in after-tax wage rates and annual income, see CBO (2012) and McClelland and Mok (2012). CBO continues to assess recent research, such as Hotchkiss, Moore, and Rios-Avila (2024), to inform the range of elasticities it uses.

which labor force participation was assessed for childless program participants just below and just above age 50, the age at which work requirements phased out at the time. On the basis of that research and related evidence, CBO uses a 4 percent increase in the labor supply as a starting point for estimating how changes to SNAP work requirements affect the labor supply (CBO 2022).

After differences in work incentives among the affected populations are accounted for, the reconciliation act's expansion of SNAP work requirements is projected to increase the labor supply among affected beneficiaries by slightly less than 4 percent, on average. That estimate reflects two main differences between the affected populations in CBO's analysis and in the research literature. First, CBO estimates that a greater share of the population in its analysis will meet the work requirements without increasing their labor supply, which implies that those requirements will incentivize work for fewer people. Second, the work requirements in the reconciliation act apply to some enrollees with children, whereas the research literature has generally analyzed effects on childless adults. In CBO's assessment, noncompliant enrollees with children would have smaller incentives to work than childless adults because the former would only lose the adult portion of the SNAP benefit, which represents a smaller portion of their total income.

To estimate the effects on the labor supply of the reconciliation act's other provisions affecting SNAP, CBO used a representative sample of SNAP recipients from the Current Population Survey to calculate how those provisions change recipients' incentives to work. The responses of the labor supply to changes in income (net of taxes and transfers) are consistent with the income and substitution elasticities used to evaluate the effect of changes to taxes on the labor supply, as discussed above.

Medicaid. The 2025 reconciliation act modified the Medicaid program by instituting a community engagement requirement and enacting other policies that are projected to reduce program enrollment and spending, on net.¹⁷ In CBO's analysis, those changes lead to increased earnings for the people they affect.¹⁸

As the starting point for estimating the effects on the labor supply from the reconciliation act's changes to Medicaid, CBO estimated a 2 percent increase in the labor supply among people who are projected to lose Medicaid coverage. That estimate is based mainly on results from research that examines how expanded Medicaid eligibility under the Affordable Care Act (ACA) affected the labor supply (Lavender and Johnston 2024, Aslim 2022, and Peng, Guo, and Meyerhoefer

¹⁷ The community engagement requirement directs states to require that certain Medicaid enrollees spend a fixed number of hours each month performing certain activities—such as work, job training, education, or community service—as a condition of eligibility.

¹⁸ A CBO working paper describing the method and estimates in more detail will be published later this year.

2020). CBO also considered earlier literature that examined changes implemented before the ACA became law (Baicker and others 2014 and Garthwaite, Gross, and Notowidigdo 2014). However, the agency placed less weight on those earlier estimates because the provision of subsidized coverage through the marketplaces established under the ACA provided people with an option for health insurance coverage that did not previously exist; thus, evidence about how people responded to changes in Medicaid coverage in that context is less relevant.

Given the focus of the research literature, the 2 percent increase in the labor supply is most relevant for estimating the labor supply response to a loss in Medicaid coverage among people in the expansion population—that is, nondisabled adults who gained Medicaid coverage through the expansion enacted in the ACA. When analyzing policies that change enrollment for different groups, CBO adjusts the 2 percent increase in employment for childless adults to account for differences in the relative value of Medicaid as a share of total income (see footnote 13) and for differences in Medicaid work disincentives due to variation in family size and potential earnings. Smaller family size and greater potential earnings are associated with larger work disincentives in Medicaid: Smaller households have lower income eligibility thresholds and thus can earn less before losing coverage, and workers with higher potential earnings will cross the eligibility thresholds and lose coverage with fewer hours of employment. In CBO’s assessment, policies that disenroll people from Medicaid will have a larger effect on the labor supply for individuals for whom Medicaid created larger work disincentives, as well as for individuals for whom Medicaid represents a larger share of their total income. On net, the Medicaid provisions in the 2025 reconciliation act—other than those related to work requirements—are projected to increase the labor supply among affected beneficiaries by less than 2 percent.

In CBO’s estimates, the new community engagement requirement in Medicaid also leads to an increase in the labor supply of less than 2 percent among people subject to the requirement. In addition to the previously discussed research on estimating the effects of expanded Medicaid coverage under the ACA, CBO considered the work of Gangopadhyaya and Karpman (2025) and Sommers and others (2020), who estimated the effect of similar requirements imposed on Medicaid enrollees in Arkansas. That estimate also reflects that such requirements only incentivize work for people who are not exempt from the requirements and are not already working enough hours, whereas eligibility policies change work incentives for all enrollees whose eligibility status is affected.

Higher Education. The 2025 reconciliation act introduced several changes to the federal financial aid program for postsecondary education including amending the terms of federal student loans to require borrowers to pay more, on average, and reducing the amount of federal aid available for certain groups of borrowers. In CBO’s analysis, those changes, in total, lead to lower college enrollment: Some students who otherwise would have pursued higher education forgo enrollment altogether, others opt for shorter programs, and some leave school earlier. To

quantify the effects on enrollment stemming from different types of changes to student loans, CBO relied on several avenues of research:

- To quantify effects from changes in repayment plans and changes in the Federal Pell Grant Program, CBO’s modeling approach was similar to the method the agency used when estimating the behavioral effects of a proposed repayment plan that became the Saving on a Valuable Education plan (CBO 2023): CBO estimated the change in the average lifetime cost of borrowing and then drew upon research linking changes in the cost of attending college to changes in enrollment (Dynarski, Page, and Scott-Clayton 2023, and Page and Scott-Clayton 2016).
- To quantify the impact of changes to borrowing limits, CBO estimated the number of students affected and then drew upon research about effects on enrollment among people experiencing such changes (Blanchard 2024, Black and others 2023, Kelchen 2020, and Kelchen 2019). On the basis of that research, CBO estimated that limits to loans made to parents would generate a reduction in undergraduate enrollment, whereas limits on loans made to graduate students would not change graduate enrollment.

In CBO’s estimates, because of changes to student loans in the 2025 reconciliation act, some people who would otherwise have been enrolled in educational programs instead decide to work or to work more hours, thereby increasing the overall supply of labor in the economy. Using data from the Current Population Survey, CBO estimates that people age 23 or younger who are in school earn about 50 percent less, on average, than people in that age range who are not in school; older people who are in school earn about 40 percent less, on average, than those who are not in school. (The reconciliation act’s provisions related to higher education also affect CBO’s estimates of potential TFP through their impact on earnings, as discussed below.)

Immigration Enforcement. In CBO’s estimates, the funding provided for immigration enforcement and detention in the 2025 reconciliation act reduces the size of the labor force. Specifically, that funding leads to additional removals of some people and the voluntary emigration of others, as well as an increase in the number of people held in detention facilities. To project the number of additional removals, for example, CBO estimated the law’s incremental effects on the number of arrests made by agents of Immigration and Customs Enforcement, the number of people held in immigration detention facilities, the number of cases heard in immigration court and resolved with a final order of removal, and the number of people removed from the country after receiving a final order of removal. For more information about those estimates, see Box 1 in CBO (2025a).

Effects on the Capital Stock

The 2025 reconciliation act is projected to boost real private investment, on net, and therefore to increase real potential output by increasing the stock of private capital—structures, equipment, intangible assets, and inventories—used to produce output. The reconciliation act affects private

investment through three channels: changes in incentives to invest, including changes to tax and energy-related policies; changes in economic activity; and crowding out (which occurs when increased federal borrowing raises interest rates and thus reduces the incentive to invest, as discussed in a separate section below).

Changes to Taxes. The 2025 reconciliation act affects private investment in the United States by changing taxes in ways that alter the user cost of capital and thus the incentives to invest. Several provisions in the act reduce the user cost of capital and therefore lower the minimum return that an investment must generate to be undertaken, which increases private investment. (For a discussion of CBO’s capital tax model, which the agency uses to estimate the effects that federal taxes have on incentives to invest in capital, see CBO 2024a and Burnham and Carloni 2022.) In CBO’s estimates, allowing full expensing for capital investments in new equipment and certain other assets is the main factor that reduces the user cost of capital over the 2025–2034 period; temporary full expensing for investment in certain structures provides additional reductions through 2028. Changes to the tax treatment of pass-through business income, domestic research expenditures, and interest income also modestly reduce the user cost of capital over that period. The effects of those provisions are slightly offset by reductions in energy-related tax credits and changes to individual income taxes that limit deductions for property taxes and mortgage interest and thereby increase the user cost of capital.

To evaluate how the reconciliation act affects the user cost of capital for various types of capital, CBO used methods similar to ones it used to analyze the effects of the 2017 tax act (P.L. 115-97), as described in CBO (2018).¹⁹ The changes in user costs were weighted by the shares of capital held by different types of businesses—C corporations, pass-through businesses, and others. For owner-occupied housing, the user cost of capital applies to homeowners. Provisions related to investments in research and development (R&D) were additionally modeled as affecting potential TFP (as discussed below).

In CBO’s analysis of the reconciliation act, states’ fiscal responses also affect investment because states are expected to adjust their business taxes in response to changes in federal policies that alter their fiscal positions. Although states’ responses will vary, CBO models them in the aggregate and estimates their effects on the user cost of capital using a similar approach to the one used to estimate the effects on the user cost of capital from changes to federal taxes.

Provisions Affecting the Production of Oil, Natural Gas, and Coal. Provisions of the 2025 reconciliation act affect the production of oil, natural gas, and coal through, for example, changes to leasing and royalty rates. Those provisions are projected to increase energy production. To estimate the macroeconomic effects of that increased energy production, CBO used an extension

¹⁹ JCT also evaluated how the tax provisions in the 2025 reconciliation act affect capital and found similar results.

of a model that the agency developed to evaluate the macroeconomic effects of producing oil and natural gas from shale resources (as described in CBO 2014a and updated in CBO 2025h).²⁰ In that modeling approach, three types of effects are analyzed: those on investment in the energy sector, those on the productivity of capital and labor attributable to the new energy supplies (that is, the effect on potential TFP, which is discussed below), and long-run responses of capital and labor to changes in such productivity. (The methods used for estimating changes in capital investment are discussed in this section of the paper; the methods used for estimating changes in TFP are discussed below.) The longer-term responses of capital and labor to those changes in productivity were modeled in a way that is consistent with CBO’s large-scale macroeconometric model.

To assess the reconciliation act’s effects on investment in oil and gas—and, in turn, on the capital stock—CBO first estimated the future amounts of oil and gas that would be produced under the act’s provisions. For example, for provisions that affect leasing, future production was estimated on the basis of recent outcomes from sales of oil and gas leases together with other evidence about how production from future leases and past leases may differ. CBO adjusted those estimates to account for lower domestic energy production elsewhere that would follow from the resulting decline in energy prices; the agency based its estimate of that associated decline in production on evidence from the research literature, such as Prest (2024). CBO then estimated the amount of investment in the oil and gas sector that would be required to support those increases in energy production. A portion of that new investment would be offset by lower investment elsewhere in the economy, but overall investment would increase and raise the capital stock. CBO’s extension of that modeling approach applied the same framework, in energy-equivalent terms, to coal.

Effects of Changes in Economic Activity on Business Investment. CBO’s analysis of the 2025 reconciliation act incorporates the feedback effects of changes in economic activity on real business investment through three channels. First, investment responds to the growth of real output through the accelerator effect: Businesses boost investment when aggregate demand increases (measured as an increase in the output gap), and they reduce investment when aggregate demand decreases (a decline in the output gap).

Second, the increased potential output attributable to increased capital (stemming from the reconciliation act’s incentive effects) leads to additional investment. On the demand side, increased output per worker raises the demand for capital; on the supply side, increased output

²⁰ The 2025 reconciliation act included changes in the formula determining the royalty rate relevant to solar and wind energy, but CBO assessed that those changes would not result in meaningful changes in investment in those sectors.

leads to the increased domestic saving needed to finance that capital. As the size of the economy grows, businesses also increase investment in the long run to replace capital that has depreciated.

Third, changes in economic activity affect investment through changes in the labor supply. As the supply of labor increases, businesses require more capital for those additional workers to use. Because businesses adjust their capital stock more gradually than they adjust their labor inputs, the effects on the labor supply through this channel increase investment over time as businesses expand their productive capacity.

To estimate how changes in the output gap, potential output, and the labor supply affect the level of real business investment, CBO used the modified neoclassical specification for business investment in its large-scale macroeconomic model. In the agency's analytical framework, as described in Lasky (2018), investment is a function of the growth of output and the levels of the cost of capital and labor productivity. The resulting effects of changes in economic activity on investment are then combined with other investment effects and incorporated into the policy growth model to determine their effects on the capital stock and, in turn, the effect on potential output.²¹

Effects on Potential Total Factor Productivity

In CBO's assessment, the reconciliation act slightly increases potential TFP, on net, over the 2025–2034 period, which in turn increases real potential output. The law's provisions related to energy, physical infrastructure, R&D, and spectrum auctions increase potential TFP. The provisions related to higher education reduce potential TFP. The provisions related to immigration enforcement increase potential TFP, on net.

Provisions Affecting the Production of Oil, Natural Gas, and Coal. The modeling framework that CBO used to estimate the effects of increased oil, natural gas, and coal production on investment (as described above) also takes account of how those new energy supplies affect the productivity of capital and labor and how those productivity gains lead to longer-run responses of capital and labor (CBO 2014a, updated in CBO 2025h).

In CBO's assessment, the provisions of the 2025 reconciliation act affecting the production of oil, natural gas, and coal affect potential TFP by increasing the productivity of the labor and capital inputs used to produce the new supplies of energy realized under the act. In a way that is consistent with CBO's prior work (CBO 2014a and updated in CBO 2025h), the agency measures that enhanced productivity of the factors producing the new energy supplies as the difference between the market price of those new supplies and the breakeven costs of producing

²¹ The demand multipliers that CBO uses to model the indirect effects on the economy from a shift in aggregate demand already include an implicit accelerator effect; therefore, the additional accelerator effects on business investment are applied only within the policy growth model.

them. And in a manner consistent with CBO’s estimation of how the 2025 reconciliation act affects investment, the agency applied that framework directly to oil and gas production and applied it indirectly, in energy-equivalent terms, to coal. CBO relied on information from the Energy Information Administration and other outside assessments to calculate the effect of the additional oil and gas supplies on their respective market prices (Energy Information Administration 2025, Energy Information Administration 2023, and Uría-Martínez and others 2018). For information about average breakeven costs of oil and gas production, CBO surveyed recently published studies, including Federal Reserve Bank of Dallas (2025) and Hart Energy (2023).

Federal Investment in Physical Infrastructure. The 2025 reconciliation act increases investment by providing federal funding for physical infrastructure. To evaluate how that funding would affect potential TFP, CBO identified the act’s provisions that affect federal infrastructure spending for nondefense purposes. (The largest amount of that spending was for air traffic control improvements.) The agency then applied its existing framework to estimate how federal investment in physical infrastructure affects the economy (CBO 2021a). In CBO’s policy growth model, a boost to federal investment in physical infrastructure (net of any changes in state investment in physical infrastructure in response to those changes in federal investment) is reflected as an increase in potential TFP, thus contributing to the growth of potential output. As described in CBO (2021a), the agency’s general assessment is that an additional dollar’s worth of public infrastructure capital is estimated to increase real potential output by \$0.124. CBO (2021a) also estimated the depreciation rate of those assets to be 3.2 percent, resulting in a net increase of \$0.092.

Research and Development. The reconciliation act increased federal spending on nondefense R&D and reduced the user cost of capital for private investment in R&D by altering the tax treatment of such investment. CBO modeled the economywide effects of changes in federal spending on nondefense R&D using methods similar to the ones it used in CBO (2025d). To model the direct effects of the change in the user cost of capital for private investment in R&D, CBO used methods similar to the ones the agency used to analyze the effects of the 2017 tax act (CBO 2018). The estimated change in the user cost of capital alters the incentives for private investment in R&D. In CBO’s assessment, the research literature suggests that the economywide economic effects of changes in private R&D investment exceed the economic effects of such investment that are appropriable by the private business making the investment. CBO modeled the economywide economic effects as a change to potential TFP using methods similar to those used to model the economywide effects of private R&D investment in CBO (2025d).

Immigration Enforcement. In CBO’s assessment, the immigration enforcement provisions in the 2025 reconciliation act have two opposite effects on potential TFP. (For a discussion of how immigration affects productivity, see CBO 2024b.) First, because people who exit the labor force as a result of the provisions have, on average, lower-than-average levels of education and

productivity, their removal increases potential TFP by shifting the composition of skills in the labor force toward more productive workers. Second, because some people who exit the labor force as a result of the provisions would have instead worked in STEM fields, their removal decreases potential TFP because workers in STEM fields generally help increase potential TFP by contributing to innovation.

Spectrum Auctions. In CBO’s estimates, the 2025 reconciliation act increases federal receipts from auctions to allocate licenses to nonfederal entities for the rights to use specific frequencies of the electromagnetic spectrum. To estimate the macroeconomic effects stemming from those auctions, CBO used a stylized framework in which the electromagnetic spectrum is treated as a factor of production. Making more of the spectrum available to businesses and households expands the economy’s productive capacity, mainly by increasing the output of final services, such as consumer wireless communications and intermediate wireless services used to produce other goods and services. In that sense, newly available spectrum for licensing is analogous to previously idle, nondepreciating capital that becomes newly employed, thus raising output without additional investment and producing effects similar to an increase in potential TFP.

In CBO’s framework for analyzing the macroeconomic effects of spectrum auctions, receipts from the auctions are modeled as the present discounted value of the after-tax returns on investment that businesses expect to earn from using the additional spectrum, minus the surplus that the winning bidder receives because of imperfect competition in the auction. Businesses participating in an auction estimate the value of the additional spectrum as the present value of those expected after-tax returns and are willing to pay an amount that does not exceed that value.

In theory, businesses stop bidding once the price exceeds their expected profits from obtaining a license (see, for example, Krishna 2009). CBO assesses that, on average, the second-highest bidder stops bidding at a price that is slightly above 80 percent of the winning bidder’s expected profits. CBO calculated the level of before-tax returns and associated economic activity over the life of the licenses that would produce a stream of after-tax income that has a present value equal to receipts from the auction. That level of before-tax returns was calculated using a 10 percent effective tax rate, roughly consistent with the rate on economic profits in CBO’s budgetary feedback model. (For a discussion of that model, see Frentz and others 2020.) The agency calculated the present value using an annual nominal discount rate of 10 percent based on the estimated weighted average cost of capital for businesses with spectrum licenses. Because the effects of spectrum auctions on the economy’s productive capacity are reflected in CBO’s estimate of potential TFP, the agency incorporated those effects by adjusting its productivity projections to reflect the additional economic activity consistent with the estimated before-tax returns from the auctions.

Higher Education. In CBO’s analysis, a reduction in college enrollment attributable to provisions in the 2025 reconciliation act has two additional effects on the economy beyond its

effect on the labor supply (which was described earlier). First, workers who forgo college because of the law have less education, and their subsequent labor income is less. In CBO’s projections, each additional one-year decrease in college enrollment reduces earnings by 10 percent, consistent with findings in the research literature (see, for example, Lovenheim and Smith 2023 and Card 1999).

Second, changes in college enrollment among a subgroup of the population may have spillover effects on the wages of other groups. CBO estimates that, on net, when a portion of the workforce attains less education, the productivity and wages of other workers are reduced. The magnitude of that reduction is estimated on the basis of the available research literature (Blomquist and others 2009, Rosenthal and Strange 2008, Yamarik 2008, and Moretti 2004). The size of the effect on overall earnings is projected to increase gradually. By 2034, overall earnings are projected to decrease by 7.5 basis points for every percentage-point decrease in the share of the population age 25 or older with a college degree. (A basis point is one-hundredth of a percentage point.)

Additional Methods

To analyze the macroeconomic effects of the 2025 reconciliation act, CBO updated its approach for modeling the relationship between interest rates and private investment and developed a new method to reflect the broader fiscal adjustments that states may make in response to changes in federal policies. The agency applied its standard framework for evaluating the budgetary feedback that results from the law’s macroeconomic changes.

Interest Rates, the User Cost of Capital, and Crowding Out

In CBO’s assessment, greater federal borrowing ultimately reduces private investment by boosting interest rates and thereby increasing the user cost of capital. When the government borrows, it does so from households and businesses whose savings would otherwise finance private investment. The 2025 reconciliation act’s effect on interest rates—and therefore on the degree of crowding out—depends on three things: the factors that determine the economy’s natural rate of interest (which is the short-term real return that balances the demand and supply of savings in equilibrium, absent fluctuations in the business cycle and other temporary factors); how the Federal Reserve adjusts the federal funds rate in response to short-term changes in economic conditions; and the way changes in interest rates affect the user cost of capital and, in turn, private investment.

To evaluate those effects, CBO took the following iterative approach:

- The agency used the initial round of macroeconomic effects from the reconciliation act to determine how the law affects the natural rate of interest.
- Those changes in the natural rate of interest were then combined with the estimated effects on inflation and the unemployment gap, which depend on changes in overall demand and

potential output (described above), to determine how the Federal Reserve would adjust the federal funds rate.

- The resulting changes in the federal funds rate were used to estimate how Treasury rates would change.
- Changes in Treasury rates were then translated into changes in the user cost of capital.
- Finally, the changes in the user cost of capital were used to estimate the effect on private investment (the crowding out channel). That change in investment, in turn, affects potential output, which feeds into the next iteration of the analysis.

That process is repeated until further rounds of changes in longer-term economic activity become sufficiently small.

Natural Rate of Interest. The natural rate of interest reflects slowly moving factors that determine equilibrium interest rates absent any fluctuations in the business cycle and other temporary factors. CBO’s method for estimating how the reconciliation act affects the natural rate of interest closely follows the agency’s method for forecasting interest rates in the medium term and long term as described in Appendix C of Gamber (2020). In CBO’s assessment, the spread, or difference, between the rate of return on Treasury rates and the rate of return on private capital did not change as a result of the reconciliation act, and the risk premium therefore did not change in the agency’s analysis.

To forecast interest rates in the medium term and long term, CBO projects changes in the natural rate of interest using a benchmark period, 1995 to 2004, in which monetary policy was estimated to have been neutral, on average—meaning that it neither stimulated nor restrained economic activity during that time. Conceptually, that method treats the natural rate of interest as a linear expansion around the balanced growth path that prevailed during the benchmark period. Changes in the natural rate of interest are then driven by changes in structural factors—potential TFP growth, growth of potential hours worked, the rate of private domestic and foreign saving, and capital’s share of income—using “impact parameters” similar to those reported in Gamber (2020). Those impact parameters map changes in the structural factors onto changes in the natural rate of interest. CBO also estimates that, in addition to those structural factors, the natural rate of interest increases by 1.5 basis points for each percentage point of increase in federal debt as a percentage of GDP.²²

Taken together, changes in structural factors and federal debt in CBO’s analysis of the reconciliation act change the natural rate of interest, r_t^* , in the following way (expressed in percentage points):

²² In the long run, CBO expects that a 1 percentage-point increase in federal debt as a percentage of GDP would raise the 10-year Treasury rate by nearly 2 basis points.

$$\Delta r_t^* = 2.45 \cdot \Delta a_t^* + 1.59 \cdot \Delta h_t^* - 0.61 \cdot \Delta s_t + 0.43 \cdot \Delta KS_t + 0.015 \cdot \Delta DY_t$$

The variables on the right-hand side represent the percentage-point change, relative to CBO’s January 2025 baseline projections, in the moving averages of the growth of economywide potential TFP (a_t^*); the growth of economywide potential hours worked (h_t^*); the private saving rate (s_t); and capital’s share of income (KS_t); as well as the contemporaneous change in federal debt held by the public as a percentage of GDP (DY_t).

Federal Funds Rate. In CBO’s analyses of changes in federal policies, movements in the federal funds rate reflect how those policies affect inflation, the unemployment gap (the difference between the actual unemployment rate and CBO’s estimate of the noncyclical rate of unemployment), and the natural rate of interest. Over the first few years of the 2025–2034 period, the reconciliation act is projected to affect interest rates mainly through the Federal Reserve’s adjustments to the federal funds rate in response to short-term deviations in inflation and economic activity, a relationship often referred to as the Taylor rule (see Taylor 1993 and Taylor 1999).

In CBO’s analysis of the reconciliation act’s effects, a Taylor rule with interest rate smoothing was used (see, for example, Woodford 2003 and Judd and Rudebusch 1998) to model how the Federal Reserve sets the federal funds rate, i_t , subject to a zero lower bound in response to short-term deviations in inflation from the Federal Reserve’s long-run goal and the unemployment gap. Specifically, in CBO’s estimates, the Federal Reserve’s target interest rate—which the federal funds rate approaches gradually because of interest rate smoothing—increases by one-half of a percentage point for each percentage-point increase in inflation relative to the Federal Reserve’s long-run goal for inflation and decreases by 1 percentage point for each percentage-point increase in the unemployment rate relative to the noncyclical rate of unemployment.²³ Those relationships are expressed in the following way (in which the associated max operator for the zero lower bound constraint is suppressed for simplicity):

$$i_t = 0.8 \cdot i_{t-1} + (1 - 0.8) \cdot [r_t^* + \pi_t + 0.5 \cdot (\pi_t - \pi_t^*) - 1.0 \cdot (u_t - u_t^*)]$$

wherein r_t^* is the natural rate of interest, π_t is inflation (as measured by changes in the core PCE price index—that is, prices for personal consumption expenditures excluding those for food and energy), π_t^* is the Federal Reserve’s long-run goal for inflation (set to 2 percent), u_t is the

²³ In CBO’s projections, such changes are implemented gradually as the Federal Reserve moves toward its target, reflecting interest rate smoothing. CBO models that behavior on a quarterly basis using an inertial policy rule with a speed of adjustment of 0.8—placing a weight of 0.8 on the federal funds rate in the previous quarter and a weight of 0.2 on the target rate implied by inflation and the unemployment rate gap. As a result, changes in the natural rate of interest pass through to the federal funds rate only gradually over several years.

unemployment rate, and u_t^* is CBO's estimate of the noncyclical rate of unemployment.²⁴ (In CBO's assessment, the noncyclical rate of unemployment is unaffected by the 2025 reconciliation act.) Note that inflation and the unemployment gap themselves depend on how the Federal Reserve adjusts the federal funds rate in response to short-run changes in economic activity.²⁵ Because the demand multipliers used in CBO's analysis implicitly incorporate the effects of that policy response, and because the agency uses an iterative approach to modeling the subsequent rounds of macroeconomic effects on potential output, the final projected paths for inflation, the unemployment gap, and the federal funds rate are consistent with one another within CBO's modeling framework.

In later years, after the short-term deviations in inflation and economic activity dissipate (that is, when inflation is close to 2 percent and the unemployment gap is near zero), the federal funds rate depends mainly on the factors that determine the natural rate of interest. In the longer run, changes in the natural rate of interest are eventually reflected on a one-to-one basis in the federal funds rate. Changes in the federal funds rate are projected to cause changes in interest rates on short- and long-term Treasury securities.

Treasury Rates. Interest rates on Treasury securities incorporate the expected trajectory of the federal funds rate and the compensation that investors require to hold longer-term securities. To link changes in the federal funds rate to Treasury rates, CBO estimates that each percentage-point increase in the federal funds rate increases rates on 3-month Treasury bills by 0.935 percentage points. Because changes in the natural rate of interest eventually pass through to the federal funds rate on a one-to-one basis, a 1 percentage-point increase in the natural rate of interest increases rates on 3-month Treasury bills by 0.935 percentage points in the longer term.

The change in the interest rate on 10-year Treasury notes is determined by the path of expected future rates on 3-month Treasury bills, as well as the term premium (the premium paid to bondholders for the extra risk associated with holding longer-term bonds). In CBO's modeling framework, a higher debt-to-GDP ratio increases 10-year Treasury rates in part through its effect on the expected interest rate on 3-month Treasury bills and in part through its effect on the term premium. CBO also estimates that a 1 percentage-point increase in federal debt held by the

²⁴ CBO specifies the Taylor rule using inflation measured by changes in the core PCE price index rather than the consumer price index for all urban consumers (CPI-U). That way, the agency's analysis is consistent with the Federal Reserve's stated long-run goal of 2 percent inflation as measured by the PCE price index. In the agency's analysis of the reconciliation act, deviations in inflation that is measured using the PCE price index, the core PCE price index, and the CPI-U are modeled as having similar deviations in relation to CBO's January 2025 economic projections.

²⁵ CBO models changes in quarterly inflation using a variant of a Phillips curve equation that relates inflation to the unemployment gap. Changes in the quarterly unemployment gap are modeled using an empirically estimated Okun's law that translates changes in the output gap into changes in the unemployment rate. Those equations and relationships are similar to those used in CBO's large-scale macroeconomic model.

public, measured as a percentage of GDP, boosts the 10-year term premium by 0.5 basis points. (Recent empirical evidence presented in Plante, Richter, and Zubairy 2025 suggests that the impact on the term premium may be sizeable.)

In CBO’s model, the percentage-point change in 10-year Treasury rates can be expressed as the sum of two parts: the change in the average expected Treasury rate on 3-month Treasury bills over 10 years (40 quarters) and the change in a maturity-specific term premium, which only depends on the debt-to-GDP ratio. That relationship (estimated on a quarterly basis) can then be written as:

$$\Delta i_t^{10yr} = \frac{1}{40} \sum_{j=0}^{40-1} \Delta i_{t+j}^{3mo} + 0.005 \cdot \Delta DY_t$$

wherein the variables on the right-hand side represent the percentage-point change, relative to CBO’s January 2025 baseline projections, in the projected rate on 3-month Treasury bills (i_{t+j}^{3mo}) over 40 quarters (inclusive of the current quarter), and in federal debt as a percentage of GDP (DY_t). The rest of the yield curve is modeled as a linear function of the federal funds rate, the 3-month Treasury rate, and the 10-year Treasury rate on the basis of their estimated historical relationships.

CBO estimates that a 1 percentage-point increase in federal debt held by the public, measured as a percentage of GDP, increases the natural rate of interest by 1.5 basis points. Over time, that increase flows through to the federal funds rate and to the interest rate on 3-month Treasury bills, boosting the latter by almost 1.5 basis points in the long run. That effect, combined with the term premium effect of 0.5 basis points, implies that in the long run, a 1 percentage-point increase in debt held by the public (measured as a percentage of GDP) raises the interest rate on 10-year Treasury notes by almost 2 basis points, consistent with the estimates described in Neveu and Schafer (2024).

The User Cost of Capital and Crowding Out. The user cost of capital reflects the influence of Treasury rates on the required return on new investment. In CBO’s assessment, increases in Treasury rates are expected to pass through to private borrowing rates and the cost of equity, raising the return that investors require on new capital. Because the user cost of capital reflects the gross before-tax rate of return necessary to cover those required returns, higher Treasury rates increase the user cost of capital and, in turn, reduce the desired level of business investment. Having considered research by Dupoyet, Jiang, and Zhang (2024), Collin-Dufresne, Goldstein, and Martin (2001), and Duffee (1998), CBO estimated that a 1 percentage-point increase in the 10-year Treasury rate increases private borrowing rates and the cost of equity by 0.8 percentage points. To determine how increases in private borrowing rates and the cost of equity affect the user cost of capital, CBO used estimates from its capital tax model, which indicates that a 1 percentage-point increase in the private borrowing rate and the cost of equity

increases the user cost of capital by 8.3 percent.²⁶ Taken together, those estimates suggest that a 1 percentage-point increase in the 10-year Treasury rate increases the user cost of capital by 6.6 percent.

Private investment responds to those changes in the user cost of capital: An increase in borrowing costs reduces, or crowds out, business investment. (When the changes in the user cost of capital result from modifications to tax policy, the effects on investment are called *incentive effects* instead of crowding out.) To evaluate how business investment responds to changes in the user cost of capital driven by higher government borrowing, CBO quantified how changes in interest rates affect the user cost of capital and, in turn, the level of private investment. In CBO's estimation, the increase in the user cost of capital resulting from a 1 percentage-point increase in the 10-year Treasury rate reduces private investment by 4.6 percent each year. A permanent 1 percentage-point increase in federal debt as a share of GDP is estimated to increase 10-year Treasury rates by almost 2 basis points in the longer term (because changes in the natural rate of interest take several years to fully pass through to Treasury rates). Therefore, in the longer term, a permanent 1 percentage-point increase in the ratio of debt to GDP reduces private investment by almost 0.1 percent each year (before accounting for any subsequent rounds of macroeconomic effects).

Although the responsiveness of private investment to a given change in the user cost of capital is not policy dependent, the effect of a policy on interest rates, and therefore on the user cost of capital, is policy dependent. Because interest rate responses depend on the change in federal policy, policies with identical effects on federal debt (before accounting for any budgetary feedback) can generate different degrees of crowding out.

In the short term, the Federal Reserve adjusts the federal funds rate in response to changes in inflation and economic activity. Policy changes that increase aggregate demand tend to reduce the unemployment rate and boost inflation, leading to higher interest rates in accordance with the Taylor rule. For a given change in federal debt (before accounting for any budgetary feedback), a policy change that mainly boosts aggregate demand, such as an increase in noninvestment government purchases, tends to generate larger short-term increases in interest rates and, as a result, greater crowding out of private investment than a policy change that mainly boosts potential output by altering the incentives to invest in capital and supply labor.

In the longer run, interest rates reflect changes in the natural rate of interest. Policies that have a larger net effect on the factors that drive the natural rate of interest have larger effects on the degree of crowding out, in the long run. For example, reductions in marginal tax rates increase potential output by boosting the labor supply and investment while increasing deficits and debt.

²⁶ The source code underlying CBO's capital tax model is available at github.com/US-CBO/captax.

The increase in potential output dampens the increase in the debt-to-GDP ratio in the longer term, thereby reducing some of the upward pressure on the natural rate of interest stemming from higher deficits and debt.

By contrast, increases in noninvestment government purchases do not directly raise potential output and therefore do not tend to mitigate the increase in the debt-to-GDP ratio in the longer term or the associated upward pressure on the natural rate of interest. Reductions in marginal tax rates can also increase the growth of potential hours worked, raising the natural rate of interest while increasing the private saving rate, which lowers the natural rate of interest. The net effect of those opposing forces influences the long-run response of interest rates and, consequently, the degree of crowding out.

States' Fiscal Responses

Changes in federal policies can prompt state (or local) governments to adjust their fiscal policies. For example, if a federal policy reduces the resources available to states for a particular program, states may choose to maintain that program by replacing some of the lost federal funding with state funds. However, to replace those funds, states would need to shift resources from other parts of their budget by reducing spending on other programs, raising taxes or fees, or drawing from savings. In the aggregate, CBO evaluates the overall change in states' fiscal positions on the basis of how changes in federal policy would affect states' resources, on net. When doing so, CBO expects that increases in states' spending on some programs would be offset by savings in other programs before any fiscal adjustments beyond the affected programs are made. For example, increased SNAP spending by states may be accompanied by reductions in their spending on other means-tested transfer programs, such as Medicaid. That scenario is consistent with the findings of Baicker (2001), which suggest that, on average, states tend to adjust their spending on programs for people with low income (such as low-income energy assistance) to offset changes in their Medicaid spending.

CBO's framework for evaluating the macroeconomic effects of states' fiscal responses to the 2025 reconciliation act models those responses and the resulting macroeconomic effects (as is the case in CBO 2025f). To determine how states would adjust their revenues, expenditures, and their other means of financing in response to an immediate change in their fiscal position, CBO relied on the findings in Rueben, Randall, and Boddupalli (2018), which followed a similar empirical approach to that of Clemens and Miran (2012) and Poterba (1994). That research suggests that if a change in federal policy alters a state's fiscal position in relation to what would occur under current law, the state's fiscal response would depend on whether the change in federal policy would have caused a surplus or deficit in the state's budget. In addition, in CBO's assessment, states' responses would also depend on timing: States may rely on short-term measures (such as a rainy-day fund) before adjusting revenues or spending more fully in the longer term. CBO estimates that in the longer term, states would respond to a change in their

fiscal position by splitting the change evenly between spending and revenues. Although states' responses would vary, CBO models them in the aggregate.

CBO's estimate of the macroeconomic effects of states' fiscal responses to the reconciliation act is based on the agency's estimates of the scale of the annual aggregate change in states' resources as a result of the law.²⁷ That initial change is allocated between spending and revenues over time on the basis of the approach outlined above. States' spending and revenues are then further allocated to types and, in turn, allocated across the distribution of household income using methods similar to those the agency used to analyze the effects of the immigration surge on the budgets of state and local governments (CBO 2025g).²⁸

Together, the composition and distribution of those (first-round) adjustments determine how states' responses affect economic activity—temporarily shifting aggregate demand in the short term and influencing supply-side factors, such as the labor supply and capital (as discussed above), in the longer term. Because CBO models states' fiscal responses in the aggregate rather than for each state individually, the agency's analysis does not account for the potential reallocation of workers and businesses that move from one state to another, as examined in Fajgelbaum and others (2019); that difference could affect the magnitude of the reconciliation act's macroeconomic effects.

Budgetary Feedback

To estimate the effects of budgetary feedback from the macroeconomic changes attributable to the 2025 reconciliation act, CBO first estimated changes in key variables, such as GDP, employment, wages and salaries, corporate profits, and interest rates. The agency then used methods similar to those reflected in its budgetary feedback model (see Frentz and others 2020) to calculate how those economic changes would affect federal revenues and outlays.

Uncertainty of CBO's Estimates

CBO's analysis of the macroeconomic effects of the 2025 reconciliation act drew upon a wide range of resources, including the agency's understanding of federal programs and revenue sources, research literature, analysis of data, and consultation with outside experts. Whenever possible, the agency's analytical methods relied on information provided by the research community. In cases in which there was little direct evidence about the macroeconomic effects

²⁷ For an example of how the overall change in states' fiscal positions was estimated, as well as a detailed description of how states' fiscal adjustments were allocated between spending and revenues over time, see CBO (2025f).

²⁸ For the estimated effects of states' fiscal responses to the resources available to households (including public goods) as a result of the 2025 reconciliation act, see the "States' fiscal responses" category in CBO (2025c).

of the policy changes enacted under the legislation, CBO relied on more disparate evidence and indirect assessments. Estimates constructed in that way are particularly uncertain.

Three examples of areas of particular uncertainty are:

- How changes to work requirements for beneficiaries of SNAP and Medicaid affect the economy;
- How changes to spectrum auctions affect the economy; and
- How changes in federal policies affect states' policies related to revenues and spending.

Additional research in those areas could improve CBO's analyses in the future.

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