CBO Explains Common Sources of Uncertainty in Cost Estimates for Legislation

The Congressional Budget Act of 1974 requires the Congressional Budget Office to prepare a cost estimate for nearly every bill that is approved by a full committee of either the House or Senate. For those estimates, CBO produces a point estimate—that is, a specific amount—rather than a range. The estimates specify the legislation's likely effects on federal outlays and revenues compared with the agency's projections of what would occur under current law over a 10-year period (projections often referred to as CBO's baseline). Lawmakers can use CBO's cost estimates to inform their deliberations and enforce budgetary rules. Those estimates generally reflect the middle of the distribution of the most likely budgetary outcomes that would result if a piece of legislation was enacted. Though representing the agency's best assessment of the legislation's budgetary effects, estimates can be subject to uncertainty arising from various sources. This document describes how CBO addresses the most common sources of uncertainty in its cost estimates.

Although uncertainty has many sources, this document addresses six.

- Broad legislative language
- Insufficient data or research material
- Behavioral responses
- Budget projections under current law
- Varied eligible population
- Dependence on a future event

Note: This document is one in a series of primers explaining elements of CBO's work to support the budget process and to help the Congress make budget and economic policy. Those primers include *CBO Describes Its Cost-Estimating Process* (www.cbo.gov/publication/59003) and *CBO Explains How It Develops the Budget Baseline* (www.cbo.gov/publication/58916). All primers in the series are available at www.cbo.gov/topics/budget/budget-concepts-and-process. For more on uncertainty in CBO's analyses, see Congressional Budget Office, "Transparency" (accessed February 10, 2025), www.cbo.gov/about/transparency.

Contents

Broad Legislative Language

Legislative language that leaves an agency broad discretion on implementation can pose challenges for CBO in preparing estimates. Such language often leaves key decisions to the executive branch, which can lead to policies that are implemented differently from the assumptions in CBO's estimate.

Example. H.R. 865, the Rebuild America's Schools Act of 2019, would have directed the Department of Education to comprehensively study the physical condition of all U.S. public schools. The work's cost would have depended largely on how the department structured the required study. Given the broad legislative language, CBO expected that the department could exercise considerable judgment in designing and conducting the study. For example, the department could aggregate information and use sampling or could conduct extensive site visits.

Approach. CBO used information from experts to determine the likely method that the Department of Education would use to conduct the study. On the basis of those discussions, CBO anticipated that the department would conduct the study by aggregating available information and augmenting data with survey results and inspections at a sample of U.S. schools. If CBO had instead projected that the department would conduct extensive site visits, the estimated federal cost to implement the study would have been higher.

Example. S. 210, the Tribal Law and Order Reauthorization and Amendments Act of 2019, would have clarified that the Indian Health Service (IHS) is responsible for the medical care of all Native Americans detained or incarcerated in a Bureau of Indian Affairs (BIA) or tribal detention or correctional center regardless of their place of residence. BIA reports that IHS, part of the Department of Health and Human Services, routinely performs various medical services for incarcerated Native Americans. Confusion occasionally arises regarding whether a local IHS clinic must treat someone from outside the local tribal area, which can result in delays in receiving care for some people. IHS indicated that the bill could have required it to offer significantly more care to inmates of BIA detention centers than it currently did and could have required more clinic hours and medical personnel.

Approach. CBO considered information from Congressional committee staff and BIA, as well as IHS's interpretation of the language. CBO concluded that the bill would resolve the confusion over IHS's responsibility to care for nonlocal inmates and prevent delays in that care and would not have required IHS to offer more care. On that basis, CBO estimated that the provision would have no significant cost because delays in care stemming from any confusion do not affect many people. Had CBO interpreted the bill's language as IHS did, the estimated cost to implement the bill would have been higher.

Insufficient Data or Research Material

When preparing cost estimates, CBO may use historical data from the affected or similar programs.[1] In certain situations, particularly for new programs, accurate projections of costs are harder to generate because insufficient data are available. Limited data can arise for several reasons, such as lack of data collection, measurement errors, small sample sizes, or the absence of extensive historical data for new and emerging technologies.

To fill information gaps, CBO may rely on information from multiple sources. Even with enough data, volatility in historical patterns can make the range of responses to proposed changes in a program hard to estimate.

Example. H.R. 2579, the Hardrock Leasing and Reclamation Act of 2019, would have established a royalty on the production value (the product of price

---

1. Under the Congressional Budget Act, CBO has the authority to obtain "information, data, estimates, and statistics" from federal agencies. See Congressional Budget Office, *The Congressional Budget Office's Access to Data From Federal Agencies* (June 2021), www.cbo.gov/publication/57150.

and quantity) of hardrock minerals—nonfuel minerals such as gold, silver, and copper—under mining claims on federal land. The amount of receipts that would result was uncertain, however, because the federal government does not collect comprehensive information from mining-claim holders about the quantity of hardrock minerals produced from federal land.

Approach. CBO estimated the amount of production on federal land by combining information from several sources, including a report from the Department of the Interior estimating gold production in Nevada, national mineral production data from the U.S. Geological Survey, and maps of hardrock mine locations.

Behavioral Responses

Anticipating behavioral responses is often uncertain. For example, challenges can arise in anticipating how and to what extent states would implement an optional change in Medicaid policy and whether people eligible for a new benefit would decide to claim it. Those choices can depend on individual circumstances, economic incentives in the legislation itself, and other factors. To estimate behavioral responses, CBO often relies on research or looks at responses to similar activities. However, that information is sometimes limited.

Example. In 2012, the Supreme Court issued a ruling in *National Federation of Independent Business v. Sebelius* that effectively made expanding the Medicaid program under the Affordable Care Act (ACA) optional for states. Just as it would for a cost estimate for authorization legislation, CBO estimated the budgetary effects resulting from that ruling.[2] In doing so, the agency updated its projection of Medicaid coverage under current law. As enacted, the ACA required states to offer Medicaid to most adults younger than 65 with income up to 138 percent of the federal poverty guidelines, and CBO had initially projected an increase in Medicaid enrollment on that basis. However, the Supreme Court ruled that the federal government could not condition all Medicaid funds on states' expanding Medicaid to that group of adults, effectively making Medicaid expansion optional

for states. The agency had to revise its projections of Medicaid enrollment by trying to estimate how many states would adopt the expansion after the court's ruling.

Approach. In updating its estimates, CBO did not rely on state-by-state predictions about Medicaid expansions under the ACA. Instead, the agency estimated the approximate shares of the affected population residing in states that fell into broad categories—ranging from no expansion to an expansion encompassing the ACA-established income threshold. CBO considered that states faced various costs and benefits from expanding their Medicaid programs and had different preferences about whether or to what degree to do so. The analysis included considering states' previous behavior and decision-making with respect to covering other optional Medicaid eligibility categories and the income eligibility thresholds. Moreover, how flexible executive branch agencies would be regarding the choices that states had was unclear—particularly states' options for implementing partial expansions. As a result, CBO's estimates reflected an assessment of the probabilities of various outcomes that aimed to be in the middle of the distribution of the most likely outcomes.

Example. S. 4511, the Veteran Benefits Enhancement and Expansion Act of 2020, would have given members of the armed forces more time to decide whether to make financial contributions that are required for eligibility for certain education benefits administered by the Department of Veterans Affairs. In particular, under current law, eligibility for one benefit had required service members to decide to participate soon after starting basic training. That need to commit early may have caused some service members to choose to participate to avoid missing the opportunity, even if other benefits would have been more useful or have better met their needs.

Approach. CBO used limited information from federal agencies to estimate how veterans' behavior changed when they had more time to decide on their contributions.

The limited information available indicated that the advantages of participating outweighed the financial savings of not making the contribution required for eligibility. Therefore, the agency estimated that 75 percent of service members would participate and that 25 percent would forgo making contributions if delaying their decision.

---

2. For more about how CBO updates its baseline and estimates to account for legal action, see Congressional Budget Office, *CBO Explains How It Incorporates Administrative and Judicial Actions When Updating Its Baseline Projections and Preparing Cost Estimates* (December 2024), www.cbo.gov/publication/60846.

Budget Projections Under Current Law

CBO prepares a 10-year baseline for all federal spending and revenues—a benchmark that the agency uses to estimate the budgetary effects of proposed legislation in comparison with current law. Cost estimates for legislation that would affect direct spending or revenues are measured against those baselines. Uncertainty in the underlying budget and economic projections can increase uncertainty in cost estimates.

Several factors contribute to uncertainty in the baseline. For example, the size of the economy at least partly drives spending for certain programs and amounts of revenue collections, which are thus sensitive to changes in macroeconomic activity. Many factors that affect economic activity, such as recessions and the magnitude and timing of recoveries, are hard to predict.

The ways in which programs operate and the factors that affect their operations also contribute to uncertainty in the baseline. Whereas direct spending for some programs is relatively stable over time, spending for other programs varies significantly from year to year. For example, baseline projections for programs with a stable number of participants, well-defined benefits, and consistent program rules, such as Social Security, have relatively predictable spending. Projections for such programs tend to be more accurate than projections for federal insurance programs for banks and credit unions, which consider the financial institutions' capital position and volatility in the value of their assets. Spending on those insurance funds is tied to fluctuations in the financial markets, which are themselves volatile and thus harder to forecast.

Changes in the economy, especially in inflation and unemployment, can affect estimates. CBO's economic projections incorporate the average probability of recession during the forecast horizon. However, because the agency's economic projections do not include the timing of specific recessions, errors in estimates could be larger in any given year if a recession occurred. Errors also could be larger in years when price changes or economic growth differs significantly from the projection. Moreover, the real-world background against which CBO estimates the budgetary effects of legislation is itself uncertain. For example, the effects of the coronavirus pandemic significantly altered the context within which the agency estimated many bills, and CBO had to develop its baseline projections of unemployment and other key indicators in light of a rapidly changing economy.

Because of the resulting uncertainty in the baseline, estimates for legislation are the difference between two uncertain elements: What would happen under current law—represented by the baseline—is uncertain, as is the impact of enacted legislation.

Example. H.R. 8467, the Farm, Food, and National Security Act of 2024, would amend and reauthorize through 2029 the Supplemental Nutrition Assistance Program (SNAP), whose benefits help people in low-income households buy food. A provision in the bill would cap annual increases in the cost of the Thrifty Food Plan (TFP) at the rate of growth in the consumer price index for all urban consumers. The TFP is a basket of foods selected by the Department of Agriculture (USDA) to supply a nutritious diet for a household of a particular size. The maximum SNAP benefit depends on the number of people in the household and the cost of the TFP for a group of that size.

Approach. Current law requires USDA to reevaluate the TFP every five years to account for food prices (separate from the annual adjustment for inflation) and for data on food composition, consumption patterns, and dietary guidance—all of which could combine to increase, decrease, or leave unchanged the TFP's cost. A reevaluation for 2022, combined with the annual adjustment for inflation, increased the cost of the TFP by about 23 percent over the year before, leading to an increase in benefits for 2022 and every year after. CBO expects that the scheduled reevaluations for 2027 and 2032 will increase the TFP's cost, and the agency's budget projections under current law for the cost of SNAP incorporate those expected increases. To the extent that future reevaluations under current law differ from CBO's expectations, the budgetary effects of the proposal for capping adjustments would differ from the agency's estimate.

Example. H.R. 5616, the BRIDGE Production Act of 2023, would have required the Bureau of Ocean Energy Management to sell offshore oil and gas leases on the Outer Continental Shelf (OCS). Federally owned energy resources are developed under a leasing system that requires companies to bid on tracts of OCS land. Winning bidders make payments called bonus bids when leases are issued, pay annual rent on nonproducing leases, and pay royalties or fees on the value of any oil and gas produced from the leased land.

Approach. CBO's estimates of royalties and bonus payments for offshore leases depend on future oil and gas prices, which in turn depend on uncertain market conditions, and are incorporated into the agency's baseline projections of receipts from lease sales under current law. To forecast oil prices, CBO uses information on futures prices for oil and natural gas in international markets and on expectations of price growth and inflation. To the extent that those prices underlying the projections are uncertain, so too are the prices that the agency uses to estimate the results of legislation mandating more sales. As CBO's baseline changes—in light of more information about real-world changes in oil and gas prices—the agency incorporates those changes into estimates. Periodically, CBO compares the accuracy of its forecasts of crude oil prices with actual outcomes and discusses the sources of its errors.[3]

Varied Eligible Population

Some federal programs give financial benefits directly to people who meet certain criteria. The size and composition of the pool of eligible recipients partly drive the cost of changing such programs. Thus, estimating the size of a benefit-eligible population is an essential part of the overall cost estimate. Even for proposed programs with well-defined eligibility criteria, the size of the affected group can be hard to estimate.

Example. H.R. 299, the Blue Water Navy Vietnam Veterans Act of 2019, enacted on June 25, 2019, increased disability compensation and expanded health care for more veterans who served in the seas near Vietnam during the Vietnam War. If veterans served during specified periods in designated areas where Agent Orange was used, related illnesses are presumed to be connected to the veterans' service. Veterans need only show evidence of having been in the designated areas at the specified times. The bill expanded the designated location in the seas near Vietnam to an area within 12 nautical miles seaward of a line of interconnected coordinates.

Approach. CBO had information from the Department of Defense about the number of veterans who served in that area during the Vietnam War. To narrow the number down to those who might newly receive benefits, CBO made several estimates: the number of those veterans who had an illness or disability that the Department of Veterans Affairs presumes to have been caused by exposure to Agent Orange, the number of those still alive, the number who already have a disability payment that might be increased, and the number newly eligible for disability compensation.

Dependence on a Future Event

Legislation may create programs or benefits that would be triggered by unpredictable events, such as natural disasters, emergencies, or crop failures. In such cases, CBO can use historical data to estimate budgetary effects by determining the likelihood that a given event will occur. When historical data are not available, the timing or frequency of trigger events can be especially hard to predict.

Example. S. 576, the Railway Safety Act of 2023, would have created a revolving fund to reimburse communities for the cost of responding to accidental spills of hazardous materials caused by motor or rail carriers. The costs would be paid either under an agreement with the responsible party or in the form of federal payments.

Approach. The agency's estimate of spending for the emergency response assistance program depended largely on estimates of the frequency and severity of certain hazardous-materials spills, which are hard to predict because of their rarity. Using information from the Department of Transportation on the cost and occurrence of such incidents, CBO estimated that about 80 incidents, on average, would occur each year over the 2024–2033 period and that the average cost to respond to each one would be about $230,000. The agency expects that the cost to respond to most incidents would probably be less than $230,000 but could be several times more for the most severe.

---

3. For details, see Ron Gecan, *CBO's Oil Price Forecasting Record*, Working Paper 2020-03 (Congressional Budget Office, May 2020), www.cbo.gov/publication/56356.