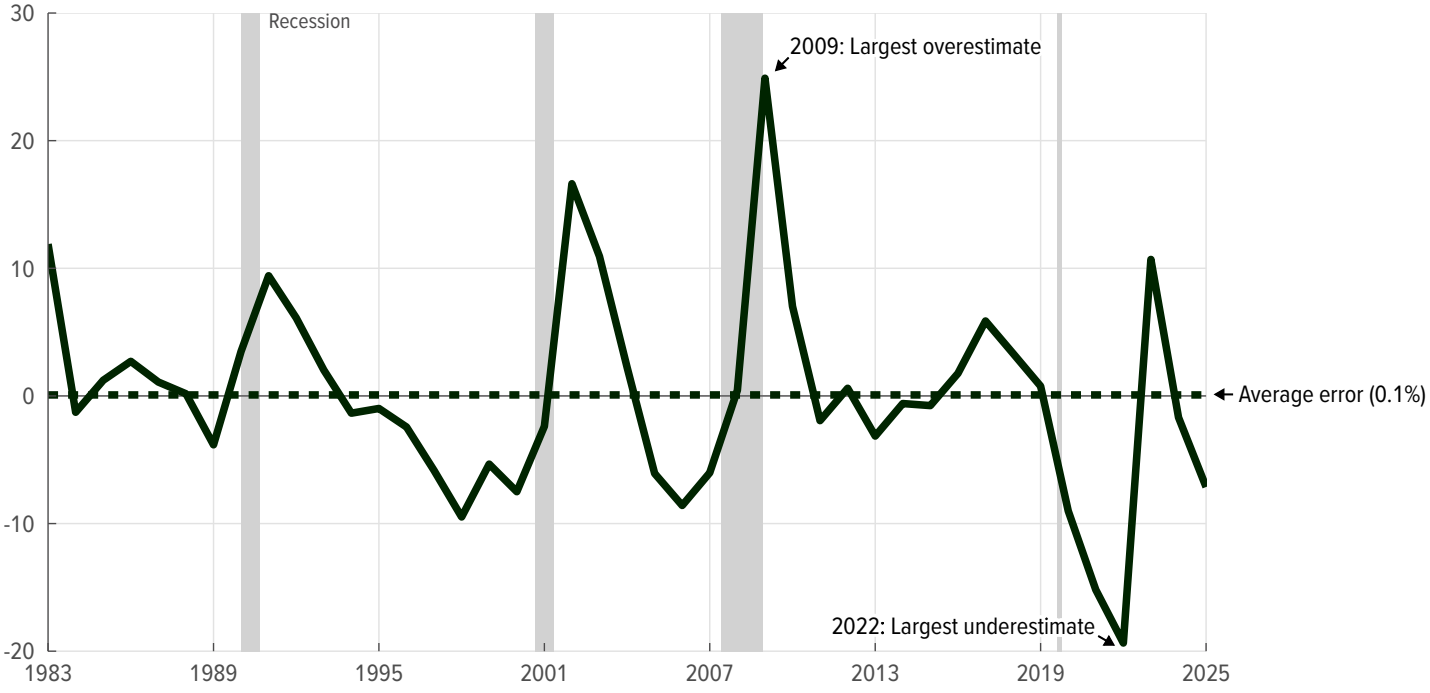
Congressional Budget Office
Nonpartisan Analysis for the U.S. Congress

An Evaluation of CBO's Projections of Revenues From 1982 to 2025

Differences Between CBO's Projections of Total Revenues in the Upcoming Fiscal Year and Actual Revenues

Percentage of actual revenues



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At a Glance

In this report, the Congressional Budget Office compares the projections of federal revenues it produced each winter from 1982 to 2025 with actual revenues. That comparison shows the following results:

- **Total revenues.** On the whole, CBO has tended to overestimate total revenues. Its projections for the upcoming fiscal year (known as the budget year) have tended to be more accurate than its projections for later years, mainly because of economic changes in later years that are difficult to anticipate. Factoring out changes in the economy significantly reduces the amount of error in CBO's revenue projections for periods further ahead.
- **Revenues by source.** The accuracy of CBO's revenue projections varies greatly for different sources of federal revenues. On average, CBO's projections of revenues from individual income taxes, payroll taxes, and excise taxes have been the most accurate, and its projections for other revenue sources have been less accurate. Because individual income taxes are the largest source of federal revenues, errors in projecting them contributed the most to the errors in CBO's projections of total revenues.
- **Revenues in recent years.** The period from 2020 to 2025 saw various unanticipated economic, legislative, and technical factors that significantly affected revenues. Those factors included the COVID-19 pandemic and lawmakers' responses to it, administrative actions that altered tariffs and regulations, and inflation that was higher than expected.
- **Comparison with the Administration's projections.** Since 1982, CBO and the Administration's Office of Management and Budget (OMB) have had similar errors in their revenue projections for the next budget year, on average. For revenue projections for the sixth year of a projection period, the errors in CBO's projections were smaller than those in OMB's projections.

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Unless this report indicates otherwise, all years referred to are federal fiscal years, which run from October 1 to September 30 and are designated by the calendar year in which they end.

Numbers in the text, tables, and figures may not add up to totals because of rounding.

Some of the figures in this report use shaded vertical bars to indicate recessions, which begin just after a peak in economic activity and run through the subsequent trough.

Supplemental data for this analysis are available at www.cbo.gov/publication/62552#data. Previous editions of this report and other evaluations of the accuracy of CBO's budget projections are available at www.cbo.gov/topics/budget/accuracy-projections.

An Evaluation of CBO's Projections of Revenues From 1982 to 2025

Summary

As required by law, the Congressional Budget Office regularly publishes baseline projections of what the federal budget and the economy would look like in the current year and over the next 10 years if current laws governing revenues and spending generally continued unchanged. CBO's baseline projections are not intended to predict budgetary outcomes. Rather, they are meant to provide a benchmark that lawmakers can use to assess the potential effects of policy decisions. CBO regularly compares its past projections with actual outcomes and analyzes past errors to improve the quality of its future projections.

In this report, CBO assesses the quality of the baseline projections of revenues that it produced each winter from 1982 to 2025. The assessment focuses on revenue projections made for the upcoming fiscal year—known as the budget year—as well as projections made for the 6th year, and in some cases the 11th year, of a projection period.

How CBO Evaluates the Quality of Its Revenue Forecasts

To assess the quality of its revenue projections, CBO measures three characteristics: centeredness, dispersion, and accuracy.

- **Centeredness** refers to the tendency of projections to be overestimates or underestimates. CBO measures centeredness by calculating the average error in its projections—that is, the average of the annual differences between projected revenues and actual revenues.
- **Dispersion** refers to how widely spread errors are. CBO measures dispersion as the two-thirds spread of errors—that is, as the range of errors that remains after removing the one-sixth of errors that are largest and the one-sixth of errors that are smallest.
- **Accuracy** refers to the amount by which actual values differ from projected ones. CBO measures accuracy using two metrics, the average absolute error and the root mean square error (RMSE). The average absolute error is the average of errors without regard to whether they are overestimates or underestimates. Negative signs are removed from underestimates before calculating the average absolute error, so errors in different directions do not offset each other. The RMSE also measures the size of errors after negative signs are removed. It is calculated by squaring the projection errors, averaging those squares, and taking the square root of the average. By squaring the errors, the RMSE places greater weight on larger deviations.

Sources of Projection Errors

Projection errors can stem from differences between CBO's economic forecasts, which are based on the laws in place when the projections are made, and actual economic outcomes. Errors can also result from other factors, referred to here as technical factors. (CBO adjusts its past revenue projections for later legislative changes before measuring projection errors.) Technical factors include such things as changes in the relationship between components of national income, as measured by the Bureau of Economic Analysis, and the associated tax bases; large swings in the realization of capital gains; differences between the actual effects of legislation and estimates of those effects made near the time the legislation was enacted (the estimates CBO uses to adjust its projections for legislative changes); and nonroutine administrative actions, which CBO does not try to predict.

The Quality of CBO's Forecasts of Total Revenues

On average, the projections of total revenues that CBO published from 1982 to 2025 have been too high, more so for the 6th year and the 11th year than for the budget year. CBO's projections of total revenues in the upcoming fiscal year exceeded actual revenues by 0.1 percent, on average, whereas its projections of total revenues in the 6th and 11th years of the projection period were too high by 3.1 percent and 6.9 percent, respectively (see Table 1).

Table 1.

Measures of the Quality of CBO's Projections of Total Revenues

	Projection year										
	Current year	Budget year	3rd year	4th year	5th year	6th year	7th year	8th year	9th year	10th year	11th year
Number of projections	44	43	42	41	40	39	24	23	22	21	20
Years covered by the projections	1982–2025	1983–2025	1984–2025	1985–2025	1986–2025	1987–2025	2002–2025	2003–2025	2004–2025	2005–2025	2006–2025
Measure (percentage of actual revenues)											
Centeredness (average error)	-0.5	0.1	0.9	1.6	2.3	3.1	3.1	3.9	4.6	5.7	6.9
Dispersion (two-thirds spread of errors)	6.5	12.2	17.5	22.9	22.4	25.3	23.4	25.0	28.6	32.8	30.7
Accuracy											
Average absolute error	2.8	5.7	7.2	8.8	9.8	10.1	10.0	11.3	13.2	14.0	14.5
Root mean square error	4.1	7.9	9.6	10.6	11.5	11.7	11.8	13.0	15.0	15.9	16.3

Data source: Congressional Budget Office. See www.cbo.gov/publication/62552#data.

The revenue projections included in this analysis are baseline projections published in calendar years 1982 to 2025 (typically in January or February). The first baseline used in the assessment of 7th-year to 11th-year projections was published in 1996; it was the first baseline to contain 11 years of projections and 11 years of data about the effects of legislative changes that had occurred since the previous baseline was released.

A projection year is the fiscal year for which a projection is made; in this analysis, it is identified by its position within the baseline projection period. The current year is the fiscal year during which the projection is made. The budget year is the year for which the next federal budget is being considered (usually the upcoming fiscal year).

Centeredness is the tendency of projections to be overestimates or underestimates. Dispersion is how widely spread errors are. (The two-thirds spread is the span of the middle two-thirds of errors, after the lowest one-sixth and highest one-sixth of errors are removed.) Accuracy is the amount by which actual values differ from projected values. (The average absolute error is the average of errors without regard to whether they are overestimates or underestimates, so positive and negative errors do not offset each other. The root mean square error is similar, but it places greater weight on larger errors because the errors are squared before they are averaged.)

The projections made further ahead were also less precise (the errors were more widely dispersed) and less accurate, because changes in the economy and other factors are more difficult to anticipate over longer horizons. The two-thirds spread of errors widened from 12.2 percent of actual revenues for budget year projections to more than 30 percent for 11th-year projections, and the RMSE increased from 7.9 percent to 16.3 percent.

Economic outcomes frequently differ from CBO's current-law economic projections. Removing some effects of those differences from CBO's revenue projections yields an alternative measure of projection errors that is more centered, less dispersed, and more accurate. That result suggests that differences between projected and actual values for economic factors, such as income and inflation, contribute to errors in CBO's revenue projections.

The Quality of CBO's Forecasts of Revenues by Source

The centeredness, dispersion, and accuracy of CBO's projections vary significantly among the seven types of federal revenues that CBO forecasts: revenues from individual income taxes, payroll taxes, corporate income taxes, excise taxes, customs duties, estate and gift taxes, and miscellaneous sources of receipts. CBO's projections for payroll and individual income taxes—the largest sources of federal revenues—exhibited smaller average errors, narrower two-thirds spreads, and lower RMSEs than the agency's projections for corporate income taxes, estate and gift taxes, and miscellaneous receipts.

Differences in accuracy largely reflect characteristics of the tax bases that produce those types of revenues. Wages and salaries (the main tax base for payroll and individual income taxes) are relatively stable from year to year, whereas corporate profits (the key determinant of corporate income tax revenues) fluctuate sharply with expansions and contractions in the economy.

Errors in CBO's projections of individual income tax revenues and payroll tax revenues are smaller when some effects of economic misestimates of the tax bases for those revenues are removed. That difference, which is especially apparent for 6th-year projections, indicates

Table 2.

An Example of CBO's Baseline Projection Period: January 2025 Baseline

Description	Fiscal year	Projection year
Prior year	2024	0
Current year	2025	1
Budget year	2026	2
	2027	3
	2028	4
	2029	5
6th year	2030	6
	2031	7
	2032	8
	2033	9
	2034	10
11th year	2035	11

Data source: Congressional Budget Office. See www.cbo.gov/publication/62552#data.

A projection year is the fiscal year for which a projection is made; in this analysis, it is identified by its position within the baseline projection period. The current year is the fiscal year during which the projection is made. The budget year is the year for which the next federal budget is being considered (usually the upcoming fiscal year).

that differences between CBO's economic forecasts and later economic outcomes contribute significantly to errors in the agency's projections of revenues from individual income and payroll taxes.

Revenues in Recent Years

Beginning in 2020, unexpected events—including the COVID-19 pandemic and legislative responses, higher-than-anticipated inflation, and administrative actions—caused budgetary and economic outcomes to differ significantly from what CBO had projected before those events. Such unanticipated factors significantly affected the quality of CBO's revenue projections from 2020 to 2025. Large underestimates of total revenues in that period in CBO's projections offset overestimates in earlier years, making CBO's revenue projections since 1982 appear more centered while reducing their overall accuracy. Errors in budget year projections mainly reflected technical factors, whereas errors in 6th-year projections reflected unexpected economic developments as well as technical factors.

Comparison With the Administration's Revenue Projections

One way to assess the quality of CBO's revenue forecasts is to compare their errors with those of other forecasters' projections. CBO's budget year projections of revenues showed similar degrees of centeredness, dispersion, and accuracy as budget year revenue projections made by the Administration's Office of Management and Budget. CBO's 6th-year projections were slightly more accurate than those of the Administration, as indicated by lower root mean square errors.

CBO's Efforts to Improve Its Revenue Projections

CBO regularly assesses the quality of its past projections and identifies factors that may have led to errors. When CBO prepares new baseline projections, it updates its models and estimating methods to incorporate policy changes, the most recent detailed information available from tax returns, and new economic data. It also refines its models and estimating methods when new information reveals persistent differences between projections and actual outcomes for tax collections, effects of legislation, or individuals' and businesses' responses to taxes.

CBO's Methods for Projecting Revenues

Federal revenues come from many sources, including taxes levied on individual and corporate income, employers' payrolls, the production and importation of specific goods, and transfers of estates and gifts. Other sources of receipts include remittances from the Federal Reserve System to the Treasury and miscellaneous fees and fines.

To produce its baseline projections of revenues, CBO models each revenue source separately. It then projects total revenues for each year of the 11-year projection period by summing the projections for each revenue source. (See Table 2 for an example of CBO's typical baseline projection period.)

The model CBO uses for a particular revenue source depends on the information available.[1] For example, individual income taxes are projected using a microsimulation model that reflects information about individuals

1. For more details, see Congressional Budget Office, *CBO Explains How It Develops the Budget Baseline* (April 2023), www.cbo.gov/publication/58916, and *How CBO Projects Corporate Income Tax Revenues* (October 2023), www.cbo.gov/publication/59436.

and households, including a sample of tax returns that is prepared by the Internal Revenue Service (IRS).[2] In other cases, revenues are projected by multiplying the projected tax base by the tax rate scheduled to occur under current law. For instance, to project revenues from customs duties, CBO projects the value of imports and multiplies it by the applicable tariff rates under current law. That current-law assumption has a particularly large impact when tariff rates on imports change frequently, as they did in 2025.

Each revenue projection also depends on CBO's economic forecast.[3] The agency's models use projections of economic variables that are closely related to the tax base for each revenue source. The most important of those variables include the following:

- Wages and salaries and proprietors' income, all of which affect revenues from individual income taxes and payroll taxes;
- Asset prices, which affect the base for individual income taxes (through capital gains realizations and distributions from tax-deferred retirement accounts) and the base for estate and gift taxes; and
- Corporate profits, which are the main determinant of corporate income tax revenues and which affect individual income tax revenues through pass-through income.[4]

CBO also incorporates information about past tax collections into its revenue projections. When tax collections from recent months differ from the amounts CBO estimated for the full year using its various models, the agency assesses whether the factors that may explain such discrepancies are temporary or are likely to persist. (Its practices for doing that are discussed near the end of this report, in the section titled "CBO's Efforts to Improve Its Revenue Projections.") Whether the identified factors actually were responsible for the discrepancies often cannot be confirmed until more detailed information becomes available in the future.

CBO's Methods for Assessing the Quality of Its Revenue Projections

Because CBO's baseline projections reflect the assumption that current laws will generally remain unchanged, they are intended not to predict budgetary outcomes but to provide a current-law benchmark that lawmakers can use to assess the potential effects of policy changes.[5] For that reason, CBO's baseline does not include forecasts of future changes in law.

As part of preparing its baseline, CBO regularly assesses the quality of its past projections of federal revenues, outlays, deficits, and debt, as well as its forecasts of the economic variables that help guide those budget projections. Such assessments help CBO refine its methods and improve the accuracy of future projections. The agency frequently updates its database of past budget projections and forecast errors.[6] In addition, it periodically publishes reports that provide a more comprehensive analysis of past inaccuracies in its projections.

This analysis updates CBO's previous assessment of its baseline revenue projections, which was published in 2020.[7] Like earlier assessments, this analysis focuses on revenue projections made for the budget year—which usually begins seven or eight months after a winter baseline is released—and on projections made for the 6th year of the baseline period. Unlike previous assessments, this analysis also evaluates revenue projections

2. Microsimulation modeling applies the rules of the tax system to each member of a representative sample of taxpayers. For more information about CBO's microsimulation model for individual income taxes, see Congressional Budget Office, *An Overview of CBO's Microsimulation Tax Model* (June 2018), www.cbo.gov/publication/54096.
3. For details about CBO's economic forecasting process, see Robert W. Arnold, *How CBO Produces Its 10-Year Economic Forecast*, Working Paper 2018-02 (Congressional Budget Office, February 2018), www.cbo.gov/publication/53537.
4. Income from pass-through businesses—including sole proprietorships, partnerships, S corporations, and other businesses in which profits are "passed through" to owners—are reported and taxed under the individual income tax.
5. Some exceptions exist to the assumption that current laws will generally remain unchanged. One such exception is the treatment of excise taxes that are dedicated to trust funds. By law, CBO's baseline projections must reflect the assumption that such taxes will continue in the future even if they are scheduled to expire under current law.
6. Congressional Budget Office, "Evaluating CBO's Projections of Components of the Federal Budget" (GitHub, updated February 2026), https://github.com/US-CBO/eval-projections.
7. Congressional Budget Office, *An Evaluation of CBO's Past Revenue Projections* (August 2020), www.cbo.gov/publication/56499.

made for the 11th year, the final year of CBO's typical baseline projection period (see Table 2 on page 3).[8]

To compare its past revenue projections with actual revenues, CBO first adjusts the projections to include the estimated effects of legislation enacted after the projections were made. (For details about how CBO does that, see the appendix.) Those effects reflect costs or savings that the staff of the Joint Committee on Taxation (JCT) or CBO estimated around the time the relevant legislation was enacted. Those estimates do not reflect the legislation's potential effects on the size of the economy or the impact of those economic effects on federal revenues.[9]

Next, CBO examines the differences between the adjusted revenue projections and actual revenues. Such differences are referred to in this report as projection errors. Those errors can be related to CBO's economic forecast or to other factors, which are categorized as technical factors. Because the effects of legislation may differ from the estimated effects CBO uses to adjust its projections, technical factors include differences between the actual effects of legislation and the estimated effects.

To analyze the quality of its revenue projections, CBO measures three characteristics of the projections: centeredness, dispersion, and accuracy. Those measures are calculated as a percentage of actual revenues, rather than as dollar amounts, to make them easier to compare over time.

Centeredness refers to the tendency of projections to be overestimates or underestimates. To measure centeredness, CBO calculates the average of its annual projection errors—referred to as the average error—over a given period. An annual projection error represents the difference between projected revenues (adjusted to include the effects of later legislation) and actual revenues, expressed as a percentage of actual revenues. A positive number indicates an overestimate.

Dispersion refers to the size of the spread of annual projection errors. To measure dispersion, CBO calculates the two-thirds spread of errors—that is, the difference between the endpoints of the range of errors after removing the one-sixth of errors farthest above the median (or midpoint) of the errors and the one-sixth farthest below the median. A larger two-thirds spread implies a more uncertain forecast, whereas a smaller two-thirds spread implies that the actual outcome is likely to be somewhere within a smaller range around the projected value.

Accuracy refers to the amount by which actual values differ from projected ones. CBO uses two measures to assess the accuracy of its forecasts: the average absolute error and the root mean square error. The average absolute error—the average of the forecast errors without regard for whether they are positive or negative numbers—is useful for determining the size of the average error, regardless of its direction. Because negative signs are removed from underestimates before averaging, errors in different directions do not offset each other, as they do in calculations of the average error.

The second accuracy metric, the RMSE, is CBO's main measure of the accuracy of its projections. The RMSE is calculated by taking the square root of the mean square error, which equals the square of a measure of centeredness, the average error, plus the square of a measure of dispersion, the standard deviation of the errors. (A standard deviation is a common measure used to describe the variability of a particular estimate.) As a result, the RMSE reflects both bias (the extent to which projections consistently overestimate or underestimate outcomes)

8. Before 1992, CBO's baseline usually covered 6 years: the year in progress when the projections were made (the current year) and the next 5 years. In 1992, CBO began publishing supplemental projections stretching 10 years beyond the current year. Baseline projections produced before 1996, however, lack detailed data about the effects of legislative changes since the previous baseline for the full 11 years. The first baseline with data about the effects of legislative changes for all 11 years of the projection period was released in 1996; it is the first baseline used in the assessment of 11th-year projections.

9. CBO's and JCT's estimates for legislation compare projections of federal mandatory spending and revenues under the proposed legislation with the amounts in the baseline. Those estimates reflect projected behavioral changes by individuals and businesses in response to changes in the economy that would result from the proposed legislation, but they do not reflect the assumption that those behavioral changes would alter the size of the U.S. economy. Those estimates are sometimes called conventional estimates. In certain circumstances, CBO and JCT include macroeconomic behavioral changes in addition to the behavioral responses included in conventional estimates. The estimates that include those macroeconomic behavioral changes are commonly called dynamic estimates. For more information, see Congressional Budget Office and staff of the Joint Committee on Taxation, letter to the Honorable August Pfluger and the Honorable Bruce Westerman about how CBO and Joint Committee staff prepare dynamic analyses (April 29, 2025), www.cbo.gov/publication/61346.

and the variability of forecast errors. It also places greater weight on instances in which projected values deviate significantly from actual values. As with the average absolute error, underestimates and overestimates do not offset each other in calculations of the RMSE.

Sources of Error

Errors in CBO's baseline revenue projections can stem from differences between economic outcomes and the agency's current-law economic forecast. Projection errors can also stem from technical factors, such as changes in the relationship between a particular government measure of income and its associated tax base, large swings in the amount of capital gains that taxpayers realize, differences between the estimated effects of legislation and the actual effects, and administrative actions by federal agencies that are difficult to predict.

Because CBO's main measures of projection errors are calculated as a percentage of actual revenues, they do not allow the agency to separate the contributions of economic factors and technical factors to an overall projection error. An alternative measure of error—calculated as a percentage of actual revenues relative to economic output or income—to some extent factors out differences between the economic forecast and economic outcomes. That measure allows for a clearer assessment of the contribution of technical factors to projection errors, which could offer insight into areas in which revenue projections might be improved for a given economic forecast (for more details, see the appendix).

Economic Changes

Revenues are sensitive to underlying economic conditions. Thus, CBO's forecast of the economy—particularly its outlook for nominal gross domestic income (GDI) and gross domestic product (GDP)—is a key input into the agency's revenue projections.[10] Differences between the economic forecast and actual outcomes mostly stem from how hard it can be to anticipate turning points in the cycle of expansion and contraction in the economy (known as the business cycle) or to recognize changes in fundamental economic relationships or long-term trends.[11] Those difficulties can lead to differences between forecasts of real economic growth (that is, growth adjusted to remove the effects of inflation) and actual outcomes.

Higher-than-anticipated inflation can also lead to errors in CBO's revenue projections, in two ways. First, higher inflation increases nominal income, and thus nominal revenues, above projected amounts. That would be the case even if the percentage of income collected in taxes did not change. Second, higher inflation increases the percentage of income collected in taxes—further pushing revenues above projected amounts—because of the way in which the tax system is indexed for inflation.

Some parameters of the individual income tax system, such as the income thresholds for ordinary income tax brackets, are indexed to increase with inflation. That indexing occurs with a lag, which can temporarily increase the share of income collected in taxes during periods of higher-than-expected inflation. Other parameters of the tax system, such as the income thresholds for the child tax credit, are not indexed for inflation. With those parameters, higher nominal income permanently increases the percentage of income collected in taxes (in the case of the child tax credit, by reducing the total size of the credit).

Differences between forecasts and outcomes for other components of CBO's economic forecast can also contribute to errors in the agency's revenue projections. The composition of GDI—as measured in the national income and product accounts compiled by the Bureau of Economic Analysis (BEA)—is important for revenue projections because each category of income is taxed at different effective rates.[12] For example, wages and salaries, which are subject to individual income taxes and payroll taxes, have high effective tax rates, meaning that they

10. Gross domestic income is a measure of the total income earned from production in the United States. Gross domestic product is a measure of the total output of goods and services produced in the United States. The two measures are conceptually equal, but measurement difficulties result in a statistical discrepancy between them. Nominal measures have not been adjusted to remove the effects of inflation.

11. Challenges in economic forecasting are not unique to CBO. The agency's economic forecasts tend to be slightly more accurate than comparable forecasts produced by the Administration or outside forecasters included in the *Blue Chip* consensus or the *Survey of Professional Forecasters*. See Congressional Budget Office, *CBO's Economic Forecasting Record: 2025 Update* (July 2025), www.cbo.gov/publication/61334.

12. An effective tax rate is the amount of taxes paid measured as a percentage of a given tax base (that is, the ratio of taxes paid to the tax base). It is a useful measure because the tax code's various exemptions, credits, deductions, and other provisions make actual ratios of taxes paid to income different from the tax rates specified in the tax code.

generate more revenues per dollar of income than other types of income. Corporate profits, although subject to lower effective tax rates than wages and salaries, vary more from year to year than other types of income and thus are especially difficult to forecast.

Errors in Projections of Tax Bases and Tax Rates

CBO's revenue projections depend on the projected growth of different tax bases. Even if a given component of GDI grows as projected, changes in the relationship between that component and the related tax base can result in errors in CBO's revenue projections.

For example, wages and salaries reported on tax returns are related to BEA's measure of wages and salaries, but they do not include the wages of workers who do not file tax returns or who misreport their wages. If BEA's measure of wages and salaries increases because of wage growth among workers who do not file tax returns or who misreport their wages, that growth will not translate into growth in the tax base. Similarly, taxable income reported on corporate tax returns may grow at a different rate than the measure of profits recorded in the national income accounts. One reason is that BEA calculates total profits by subtracting the losses of unprofitable businesses from the profits of profitable ones, but unprofitable businesses typically do not pay corporate income taxes. CBO tries to account for differences between components of national income and related tax bases by using data about their relationships in the past, but deviations from past patterns may introduce error into the projections.

Other factors can cause revenues as a percentage of GDP to deviate from CBO's projections. If, for example, the amount of wages and salaries that accrues to high-income taxpayers (who face the highest tax rates) is larger or smaller than CBO projects, total revenues will differ from the agency's projections. In past recessions, some volatile categories of taxable income—such as corporate profits and capital gains realizations—declined in relation to GDP, and the highest-earning taxpayers unexpectedly earned a smaller share of overall income, which pushed down effective tax rates.[13] Also, errors in projections of parts of a tax base that correspond to income from previous years, such as taxable distributions from pensions, contribute to errors in revenue projections.

Errors in Legislative Estimates

In many cases, the actual budgetary effects of legislation differ from the effects CBO and JCT estimated near the time the legislation was enacted. In this analysis, such differences are treated as errors in the baseline projections. Those errors may result from misestimates of the total revenue effects of legislation or from differences in the timing of the effects. In many cases, CBO cannot determine, even when detailed information from tax returns becomes available, what the true revenue effect was of a given piece of legislation. Revenues are also affected by how taxpayers respond to policy changes, which may differ from CBO's expectations.

Administrative Actions

Federal agencies undertake administrative actions each year to execute laws and implement programs under their jurisdiction. Those actions include rulemaking; issuing guidance, agency letters, directives, and notices; and similar activities. When CBO compares its baseline projections with actual outcomes, it adjusts its projections to account for the estimated budgetary effects of later legislation but does not adjust them to account for the estimated budgetary effects of administrative actions taken after the projections were made. As a result, such actions can contribute to projection errors.

In its baseline, CBO anticipates that federal agencies will undertake routine administrative actions as necessary, or as required by current law, to administer programs consistent with existing policy or to implement newly enacted legislation.[14] For example, the IRS regularly updates parameters of the tax system for inflation and issues detailed guidance to help taxpayers interpret and comply with tax laws.

However, CBO does not attempt to project the effects of nonroutine administrative actions or judicial rulings in its baseline. Nonroutine actions include those that signal a change in federal policy. For example, when an Administration uses the broad authority granted by Congress to change tariff policy, CBO updates its next baseline projections to account for those changes. In each

13. For more information about the uncertainty of CBO's projections of sources of household income, see Congressional Budget Office, *Projected Changes in the Distribution of Household Income, 2016 to 2021* (December 2019), p. 16, www.cbo.gov/publication/55941.

14. 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.

baseline update, CBO accounts for the effects of administrative actions as technical changes, meaning that those actions are treated as errors in CBO's projections—even though they simply reflect developments that took place after the projections were made and that would not be reflected in a forecast based on then-current law. As a result, the measure of errors used in this report includes the effects of judicial rulings and nonroutine changes in administrative policy that CBO, because it produces current-law baselines, did not incorporate in its projections.

Assessment of CBO's Projections of Total Revenues

Since 1982, on average, CBO has overestimated total revenues in the budget year by 0.1 percent of actual revenues (see Table 1 on page 2). For context, a budget year error of that size in CBO's February 2024 baseline projections would amount to $5 billion of the $5.0 trillion in total revenues CBO projected for 2025.[15] The average errors for the 6th and 11th years were larger overestimates, equal to 3.1 percent and 6.9 percent of actual revenues, respectively. (A smaller sample size makes the average error for the 11th year more uncertain than the average errors for the budget year and the 6th year.)

In calculations of the average error, overestimates and underestimates offset each other (see Figure 1). The small average error for the budget year reflects projections in which CBO overestimated total revenues by as much as 25 percent (for 2009, in its January 2008 baseline) or underestimated total revenues by as much as 20 percent (for 2022, in its February 2021 baseline).

In addition to having larger average errors, longer-term projections were less precise (with a wider spread of errors) and less accurate than shorter-term projections, because changes in the economy and a variety of other factors are more difficult to anticipate over longer periods. The two-thirds spread of errors in CBO's projections of total revenues widened from 12.2 percent of actual revenues for budget year projections to more than 30 percent for 11th-year projections. Measures of accuracy showed a similar pattern. The size of the typical error (measured by the average absolute error) increased, and large errors became more common. The root mean square error was 7.9 percent for budget year projections, 11.7 percent for 6th-year projections, and 16.3 percent for 11th-year projections. The decline in accuracy as measured by the RMSE for the 6th and 11th years largely resulted from increases in the dispersion of forecast errors rather than from increases in the upward bias (overestimates) of the projections, as reflected in the average error.

Grouping projections into cumulative measures for years 1 to 6 and years 1 to 11 of a baseline period can provide a broader view of forecast errors than an analysis that focuses on specific years in a projection period (see Table 3). Such grouping can also distinguish the effects of year-to-year volatility from more persistent, systematic shifts in the economy. The cumulative average error indicates whether there is a persistent bias in one direction across a projection period or whether the errors for various years generally offset each other. For both the 6-year period and the 11-year period, average errors were positive, suggesting a bias toward overestimation.

The dispersion of errors was similar for years 1 to 6 and for years 1 to 11, but the average absolute error and the RMSE increased with the length of the projection period. The average absolute error rose from 6.1 percent of actual revenues for the 6-year period to 7.9 percent for the 11-year period, and the RMSE rose from 7.4 percent to 9.4 percent. Those increases reflect the compounding effects of annual errors on longer-run accuracy, even when there is some offsetting of errors among years.

Errors in Projections of Total Revenues Relative to Projections of Economic Output

A portion of CBO's projection errors can be attributed to differences between the agency's economic forecasts—especially its forecasts of income, on which revenue projections depend—and actual economic outcomes. Separating the contributions of economic factors and other, technical factors to overall projection errors could provide insight into areas in which revenue projections might be improved for a given economic forecast.

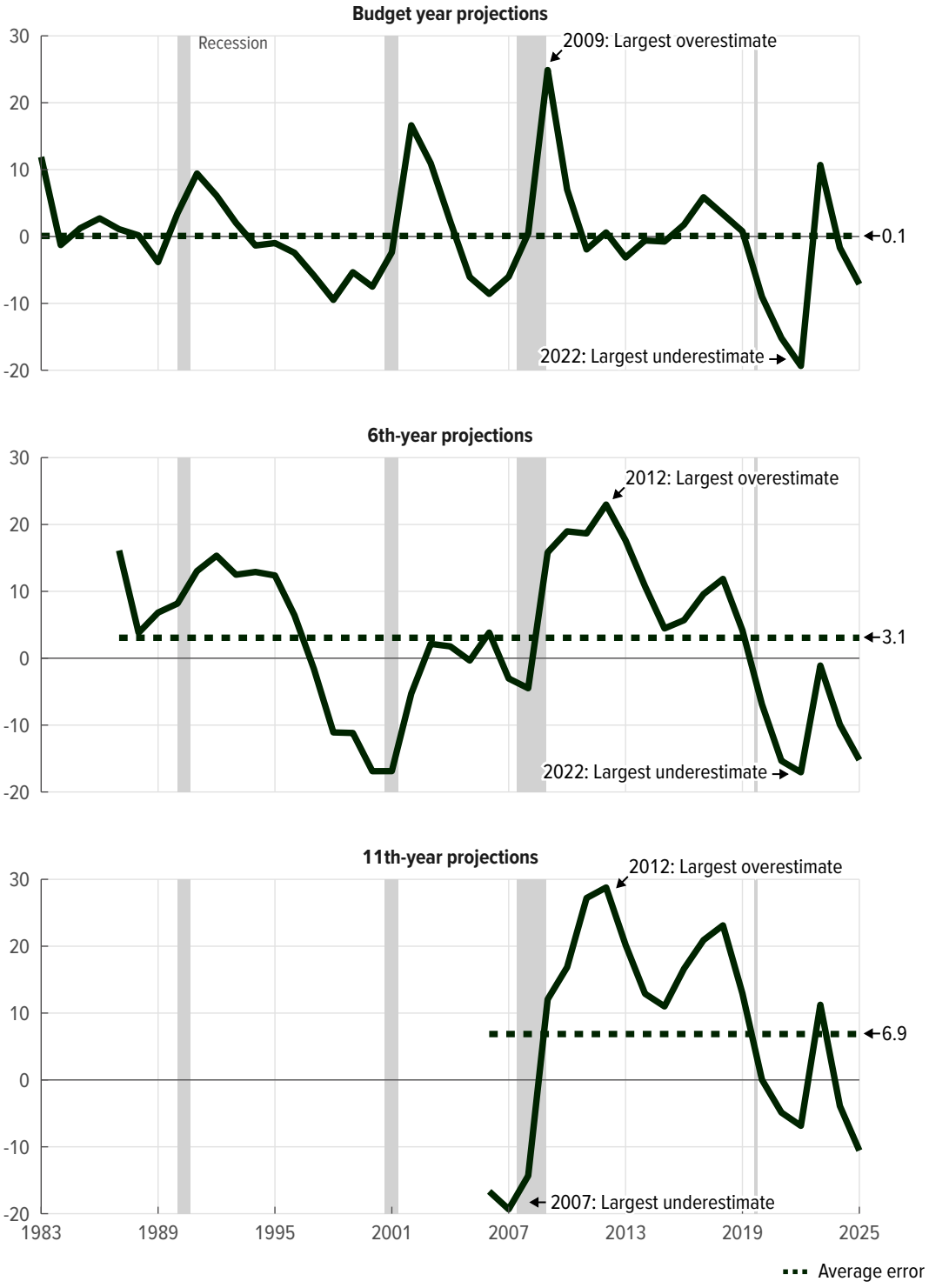
One way to get a sense of the relative contributions of economic and technical factors to projection errors is by using an economic variable that is highly correlated with revenues—such as nominal gross national product (GNP) or gross domestic product—to partially control

15. Congressional Budget Office, *The Budget and Economic Outlook: 2024 to 2034* (February 2024), www.cbo.gov/publication/59710.

Figure 1.

Errors in CBO's Projections of Total Revenues, as a Percentage of Actual Revenues

Percent



The average error in CBO's projections of total revenues in budget years 1983 to 2025 was close to zero.

The average error in revenue projections for the 6th year of the projection period was larger because changes in the economy are harder to anticipate over longer time frames.

The average error in 11th-year projections was even larger, but that number is more uncertain because it is based on a smaller sample of projections.

Data source: Congressional Budget Office. See www.cbo.gov/publication/62552#data.

A projection year is the fiscal year for which a projection is made; in this analysis, it is identified by its position within the baseline projection period. The budget year is the year for which the next federal budget is being considered (usually the upcoming fiscal year). Data are plotted by the fiscal year being projected rather than the year in which the projection was made.

The average error for a given projection year is the average of the annual projection errors for that year. An annual projection error represents the difference between projected revenues (adjusted to include the effects of later legislation) and actual revenues, expressed as a percentage of actual revenues.

Table 3.

Cumulative Measures of the Quality of CBO's Projections of Total Revenues

	Projection years	
	Current year to 6th year	Current year to 11th year
Number of projections	39	20
Measure (percentage of actual revenues)		
Centeredness (average error)	1.4	4.1
Dispersion (two-thirds spread of errors)	15.1	15.5
Accuracy		
Average absolute error	6.1	7.9
Root mean square error	7.4	9.4

Data source: Congressional Budget Office. See www.cbo.gov/publication/62552#data.

The revenue projections included in this analysis are baseline projections published in calendar years 1982 to 2025 (typically in January or February). The first baseline used in the assessment of 7th-year to 11th-year projections was published in 1996; it was the first baseline to contain 11 years of projections and 11 years of data about the effects of legislative changes that had occurred since the previous baseline was released.

A projection year is the fiscal year for which a projection is made; in this analysis, it is identified by its position within the baseline projection period. The current year is the fiscal year during which the projection is made.

Centeredness is the tendency of projections to be overestimates or underestimates. Dispersion is how widely spread errors are. (The two-thirds spread is the span of the middle two-thirds of errors, after the lowest one-sixth and highest one-sixth of errors are removed.) Accuracy is the amount by which actual values differ from projected values. (The average absolute error is the average of errors without regard to whether they are overestimates or underestimates, so positive and negative errors do not offset each other. The root mean square error is similar, but it places greater weight on larger errors because the errors are squared before they are averaged.)

for error in an economic forecast.[16] Analyzing projections of total revenues in relation to projections of economic output (as measured by GNP or GDP) yields an alternative measure of projection error that removes some of the effects of economic forecast error, including misestimates of real income growth and inflation. (For details about how CBO assesses its projections in relation to economic output, see the appendix.) That alternative measure of projection error is typically more centered, less dispersed, and more accurate than projection error as a percentage of actual revenues.

The largest difference between the two measures is in centeredness. Rather than increasing with each projection year, the average error measured as a percentage of actual revenues relative to GNP or GDP stabilizes after the third year (see Table 4). That difference suggests that misestimates of output contribute to the overestimates in revenue projections. Errors are also less dispersed in the alternative measure because the effect of uncertainty about the overall economy does not compound over the projection period. Similarly, the RMSE grows more slowly because large forecast errors are less frequent when unanticipated economic changes, which can cause actual revenues to deviate significantly from projections, are factored out.

The differences between the main measure and the alternative measure are larger for the 6th-year revenue projections than for the budget year projections (see Figure 2) because economic misestimates are smaller in near-term forecasts. For the 6th-year projections, the average error relative to actual revenues was 3.1 percent. An error of that size in CBO's February 2024 baseline projections would amount to $149 billion of the $4.9 trillion in total revenues CBO projected for 2025 (adjusted to include the effects of later legislation). Measured in relation to output, the average error of 6th-year projections was roughly 80 percent smaller: 0.7 percent of actual revenues as a percentage of GNP or GDP. An error of that size in the February 2024 baseline projections would correspond to a difference of 0.1 percentage point in revenues as a percentage of GDP in 2025 (16.7 percent, versus CBO's projection of 16.6 percent), or $36 billion of the $29 trillion in GDP that CBO projected for 2025.[17]

The effects of turning points in the business cycle are quickly incorporated into budget year projections but can lead to several years of large errors in 6th-year projections. For example, CBO overestimated revenues in

16. Gross national product is the total market value of goods and services produced in a given period by labor and capital supplied by residents of a country, regardless of where the labor and capital are located. It differs from GDP mainly by including payments received by a country's residents for labor and capital that they supply abroad and excluding payments that nonresidents receive for supplying labor and capital within the country. Before 1992, CBO forecast GNP but not GDP; since 1992, the agency has forecast both variables. When assessing total revenue projections as a percentage of projected economic output, CBO used its forecasts of GNP for years before 1992 and its forecasts of GDP for later years.

17. CBO did not calculate errors in projected revenues as a percentage of output for 11th-year projections, because records of the economic forecast over that longer projection period are limited before 2000.

Table 4.

Measures of the Quality of CBO's Projections of Total Revenues and of Total Revenues Relative to Economic Output

	Projection year					
	Current year	Budget year	3rd year	4th year	5th year	6th year
Number of projections	44	43	42	41	40	39
Years covered by the projections	1982–2025	1983–2025	1984–2025	1985–2025	1986–2025	1987–2025
Measure						
Centeredness (average error)						
As a percentage of actual revenues	-0.5	0.1	0.9	1.6	2.3	3.1
As a percentage of actual revenues relative to economic output	-0.2	0.2	0.6	0.7	0.7	0.7
Dispersion (two-thirds spread of errors)						
As a percentage of actual revenues	6.5	12.2	17.5	22.9	22.4	25.3
As a percentage of actual revenues relative to economic output	5.3	8.9	14.1	16.0	16.1	12.7
Accuracy						
Average absolute error						
As a percentage of actual revenues	2.8	5.7	7.2	8.8	9.8	10.1
As a percentage of actual revenues relative to economic output	2.6	4.5	5.5	6.0	5.9	5.4
Root mean square error						
As a percentage of actual revenues	4.1	7.9	9.6	10.6	11.5	11.7
As a percentage of actual revenues relative to economic output	4.0	6.3	7.1	7.3	7.1	6.8

Data source: Congressional Budget Office. See www.cbo.gov/publication/62552#data.

The revenue projections included in this analysis are baseline projections published in calendar years 1982 to 2025 (typically in January or February). A projection year is the fiscal year for which a projection is made; in this analysis, it is identified by its position within the baseline projection period. The current year is the fiscal year during which the projection is made. The budget year is the year for which the next federal budget is being considered (usually the upcoming fiscal year).

Centeredness is the tendency of projections to be overestimates or underestimates. Dispersion is how widely spread errors are. (The two-thirds spread is the span of the middle two-thirds of errors, after the lowest one-sixth and highest one-sixth of errors are removed.) Accuracy is the amount by which actual values differ from projected values. (The average absolute error is the average of errors without regard to whether they are overestimates or underestimates, so positive and negative errors do not offset each other. The root mean square error is similar, but it places greater weight on larger errors because the errors are squared before they are averaged.)

For economic output, CBO used its forecasts of gross national product for years before 1992 and its forecasts of gross domestic product for later years.

its 6th-year projections for 2009 to 2014 (made from 2004 to 2009) because it did not anticipate the 2007–2009 recession and the slowdown in productivity growth and low inflation that followed. Those overestimates are smaller when measured as a percentage of revenues relative to output because that measure removes some of the effect of the unanticipated economic downturn.

Similarly, CBO did not anticipate the high inflation that began in March 2021, resulting in underestimates of revenues for the years immediately after that. With revenue projections for 2022, measuring errors in relation to revenues as a percentage of output produces a smaller underestimate than measuring errors in relation to revenues for both the budget year projection (made in 2021) and the 6th-year projection (made in 2017); the reduction in the underestimate is greater for the 6th-year projection.

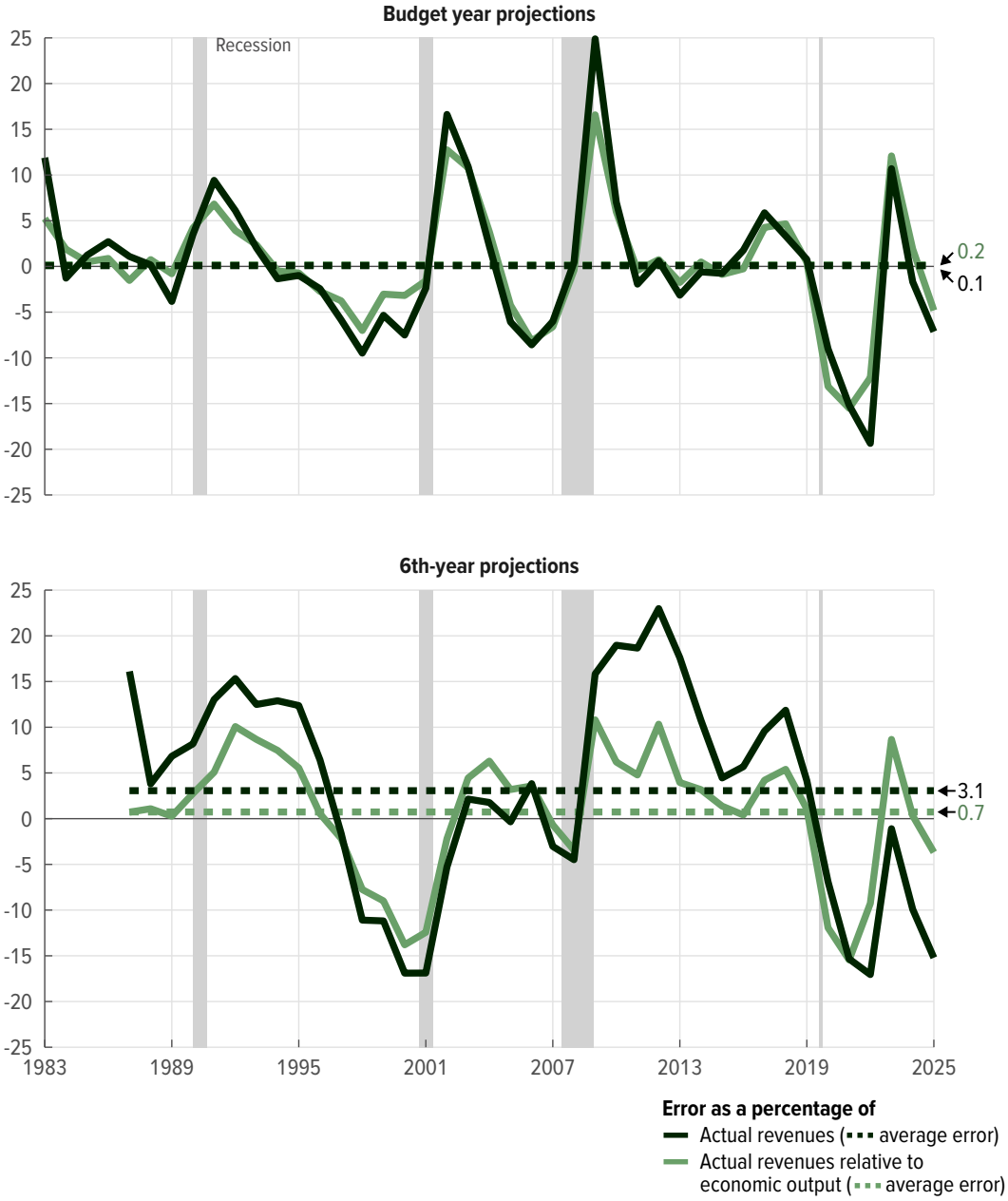
Assessment of CBO's Projections of Revenues by Source

The centeredness, dispersion, and accuracy of revenue projections vary significantly among the seven categories into which CBO divides federal revenues (see Table 5). Projections of receipts from individual income and payroll taxes, the largest revenue sources, exhibited smaller average errors, narrower two-thirds spreads, and lower RMSEs for both budget year and 6th-year projections

Figure 2.

Errors in CBO's Projections of Total Revenues and of Total Revenues Relative to Economic Output, as a Percentage of Actual Values

Percent



Analyzing projections of total revenues in relation to projections of economic output yields an alternative measure of error that removes some of the effects of differences between CBO's current-law economic forecasts and later economic outcomes. For projections beyond the budget year, the average errors in CBO's revenue projections are smaller by that measure than they are when measured as a percentage of actual revenues.

Data source: Congressional Budget Office. See www.cbo.gov/publication/62552#data.

A projection year is the fiscal year for which a projection is made; in this analysis, it is identified by its position within the baseline projection period. The budget year is the year for which the next federal budget is being considered (usually the upcoming fiscal year). Data are plotted by the fiscal year being projected rather than the year in which the projection was made.

The average error for a given projection year is the average of the annual projection errors for that year. An annual projection error represents the difference between projected revenues (adjusted to include the effects of later legislation) and actual revenues, expressed as a percentage of actual revenues or of actual revenues relative to economic output.

For economic output, CBO used its forecasts of gross national product for years before 1992 and its forecasts of gross domestic product for later years.

Table 5.

Measures of the Quality of CBO's Projections of Revenues by Source, as a Percentage of Actual Revenues From That Source

Percent

			Accuracy	
	Centeredness (average error)	Dispersion (two-thirds spread)	Average absolute error	Root mean square error
		Budget year projections		
Individual income taxes	-0.7	16.3	8.2	11.1
Payroll taxes	0.8	6.4	2.6	3.5
Corporate income taxes	5.7	31.6	17.8	27.0
Excise taxes	4.5	13.1	6.9	9.8
Customs duties	-0.7	17.2	9.6	14.8
Estate and gift taxes	-6.4	28.0	13.7	17.3
Miscellaneous receipts	-3.3	21.4	12.2	17.6
Total revenues	**0.1**	**12.2**	**5.7**	**7.9**
		6th-year projections		
Individual income taxes	2.4	33.6	12.8	15.4
Payroll taxes	4.5	15.8	7.7	9.3
Corporate income taxes	11.2	66.2	28.2	34.4
Excise taxes	14.4	21.8	15.3	19.8
Customs duties	-2.9	47.0	17.1	22.1
Estate and gift taxes	-12.7	51.1	30.5	37.7
Miscellaneous receipts	2.7	59.8	32.5	49.3
Total revenues	**3.1**	**25.3**	**10.1**	**11.7**

Data source: Congressional Budget Office. See www.cbo.gov/publication/62552#data.

The revenue projections included in this analysis are baseline projections published in calendar years 1982 to 2025 (typically in January or February). A projection year is the fiscal year for which a projection is made; in this analysis, it is identified by its position within the baseline projection period. The budget year is the year for which the next federal budget is being considered (usually the upcoming fiscal year).

Centeredness is the tendency of projections to be overestimates or underestimates. Dispersion is how widely spread errors are. (The two-thirds spread is the span of the middle two-thirds of errors, after the lowest one-sixth and highest one-sixth of errors are removed.) Accuracy is the amount by which actual values differ from projected values. (The average absolute error is the average of errors without regard to whether they are overestimates or underestimates, so positive and negative errors do not offset each other. The root mean square error is similar, but it places greater weight on larger errors because the errors are squared before they are averaged.)

than did projections for other revenue sources, particularly corporate income taxes, estate and gift taxes, and miscellaneous receipts. (Those errors were measured as a percentage of actual revenues of a given type.)

The projections for specific revenue sources that contribute the most to errors in projections of total revenues are not necessarily those with the largest relative errors. A small error in CBO's projection for a large source of federal revenues can contribute more to the error in the projection of total revenues than can a much larger relative error for a smaller source. To determine which source-specific projections have contributed the most to errors in its projections of total revenues, CBO calculated the RMSE for budget year projections for each revenue source as a percentage of total revenues, rather than as a percentage of revenues from that source alone (see Table 6).[18]

In the case of budget year projections of individual income tax receipts, those projections had an RMSE in the middle of the range for the seven revenue categories when measured as a percentage of revenues from that

18. The RMSE of projections for a single revenue source as a percentage of total revenues can be approximated by multiplying the RMSE of the projections for that source by the source's average share of total revenues over the period of the analysis. However, the more that a revenue source's share of total revenues varies over the period, the less precise that approximation will be. The estimates in this report use the precise calculation.

Table 6.

Size of Revenue Sources and Errors in CBO's Projections of Them Relative to Total Revenues

	Percentage of total revenues, 1982–2025	Root mean square error of budget year projections (as a percentage of total revenues)
Individual income taxes	47.4	5.2
Payroll taxes	35.2	1.3
Corporate income taxes	9.5	2.3
Excise taxes	3.0	0.4
Customs duties	1.5	0.4
Estate and gift taxes	0.9	0.2
Miscellaneous receipts	2.6	0.5
Total revenues	**100.0**	**7.9**

Data source: Congressional Budget Office. See www.cbo.gov/publication/62552#data.

The revenue projections included in this analysis are baseline projections published in calendar years 1982 to 2025 (typically in January or February). A projection year is the fiscal year for which a projection is made; in this analysis, it is identified by its position within the baseline projection period. The budget year is the year for which the next federal budget is being considered (usually the upcoming fiscal year).

The root mean square error is a measure of the average of errors without regard to whether they are overestimates or underestimates, so positive and negative errors do not offset each other. It places greater weight on larger errors because the errors are squared before they are averaged.

source. But they had the highest RMSE when measured as a percentage of total revenues—meaning they contributed the most to CBO's projection errors for total revenues—because they were the largest source of federal revenues over the 1982–2025 period. Payroll taxes were the second-largest source of federal revenues. But with the smallest RMSE of the seven categories when measured as a percentage of revenues from that source, projections of payroll tax receipts contributed less to CBO's projection errors for total revenues than did projections of receipts from corporate income taxes, which were the third-largest revenue source and had the largest RMSE when measured as a percentage of revenues from that source.

Differences in the accuracy of projections by revenue source are largely explained by characteristics of the tax bases for the different sources—in particular, how stable or volatile those tax bases are and how much they move with the ups and downs of the overall economy (that is, how cyclical they are). The primary tax base for individual income and payroll taxes is wages and salaries, which tend to change at stable rates over time and generally move with the overall economy. Those characteristics make projections of revenues from individual income and payroll taxes more accurate than projections of other types of revenues.

Revenues from corporate income taxes are more difficult to project accurately because their primary tax base is corporate profits, which are volatile and fluctuate over the business cycle. In addition, the relationship between corporate profits and the corporate income tax base has been changing over time: Profits have grown in relation to the size of the economy, whereas the amount that corporations pay in federal taxes has remained stable.[19] That change has contributed to overestimates in CBO's projections of corporate tax receipts, which, combined with the volatility of corporate profits, reduces the accuracy of the projections.

Grouping projections for specific revenue sources into cumulative measures for years 1 to 6 and years 1 to 11 of a baseline period further emphasizes the importance of the characteristics of the underlying tax bases (see Table 7). For projections of individual income tax receipts, centeredness and accuracy are worse for the 11-year period than for the 6-year period, but the dispersion of errors is wide for both periods. That pattern is consistent with a tax base that consists mainly of wages and salaries but includes other sources (such as capital gains realizations) that contribute to volatility in errors. For projections of payroll tax receipts, centeredness and accuracy are also worse for the 11-year period, but the dispersion of errors is narrow for both periods because the underlying tax base consists almost entirely of wages and salaries.

For projections of corporate income tax receipts, centeredness, dispersion, and accuracy are all better over the longer period, reflecting volatile year-to-year forecasts with errors that tend to offset each other. Corporate income tax receipts are highly cyclical, which makes projecting such receipts for a given year difficult but also makes the projections less prone to persistent bias over a longer horizon.

19. Congressional Budget Office, *Trends in Corporate Economic Profits and Tax Payments, 1998 to 2017* (May 2023), www.cbo.gov/publication/58267.

Table 7.

Cumulative Measures of the Quality of CBO's Projections of Revenues by Source

	Projection years	
	Current year to 6th year	Current year to 11th year
Number of projections	39	20
Measure (percentage of actual revenues from a given source)		
Centeredness (average error)		
Individual income taxes	0.5	4.0
Payroll taxes	2.5	5.8
Corporate income taxes	6.7	3.7
Dispersion (two-thirds spread of errors)		
Individual income taxes	20.3	22.9
Payroll taxes	9.5	13.6
Corporate income taxes	45.8	31.4
Accuracy		
Average absolute error		
Individual income taxes	7.7	10.7
Payroll taxes	4.3	7.6
Corporate income taxes	18.5	13.4
Root mean square error		
Individual income taxes	10.0	12.9
Payroll taxes	5.3	8.9
Corporate income taxes	21.9	15.0

Data source: Congressional Budget Office. See www.cbo.gov/publication/62552#data.

The revenue projections included in this analysis are baseline projections published in calendar years 1982 to 2025 (typically in January or February). The first baseline used in the assessment of 7th-year to 11th-year projections was published in 1996; it was the first baseline to contain 11 years of projections and 11 years of data about the effects of legislative changes that had occurred since the previous baseline was released.

A projection year is the fiscal year for which a projection is made; in this analysis, it is identified by its position within the baseline projection period. The current year is the fiscal year during which the projection is made.

Centeredness is the tendency of projections to be overestimates or underestimates. Dispersion is how widely spread errors are. (The two-thirds spread is the span of the middle two-thirds of errors, after the lowest one-sixth and highest one-sixth of errors are removed.) Accuracy is the amount by which actual values differ from projected values. (The average absolute error is the average of errors without regard to whether they are overestimates or underestimates, so positive and negative errors do not offset each other. The root mean square error is similar, but it places greater weight on larger errors because the errors are squared before they are averaged.)

Errors in Projections of Revenues by Source Relative to Projections of Income

CBO's projections of growth rates for components of income as measured in BEA's national income and product accounts largely determine how fast the income reported on tax returns is projected to grow. Accounting for errors in CBO's projections of income can provide a measure of the extent to which errors in revenue projections result from differences between economic forecasts and economic outcomes rather than from other sources. In a 2025 analysis, CBO examined the accuracy of its forecasts of the growth of wages and salaries and found small overestimates.[20]

Analyzing CBO's projections of individual income tax revenues and payroll tax revenues in relation to its projection of wages and salaries—the main tax base for both types of revenues—yields an alternative measure of projection error that controls for errors in the economic forecast that can significantly affect those revenue sources. (For more details about CBO's alternative measure of projection errors, see the appendix.)

For budget year projections, the errors in CBO's projections of individual income tax revenues and payroll tax revenues are similar in size whether measured as a percentage of actual revenues of that type or as a percentage of actual revenues of that type relative to income (wages and salaries). For 6th-year projections—in which errors in projecting those revenues often reflect unanticipated changes to wages and salaries because of turning points in the business cycle—the measure of error as a percentage of actual revenues relative to wages and salaries is smaller than the measure of error as a percentage of actual revenues (see Figure 3).

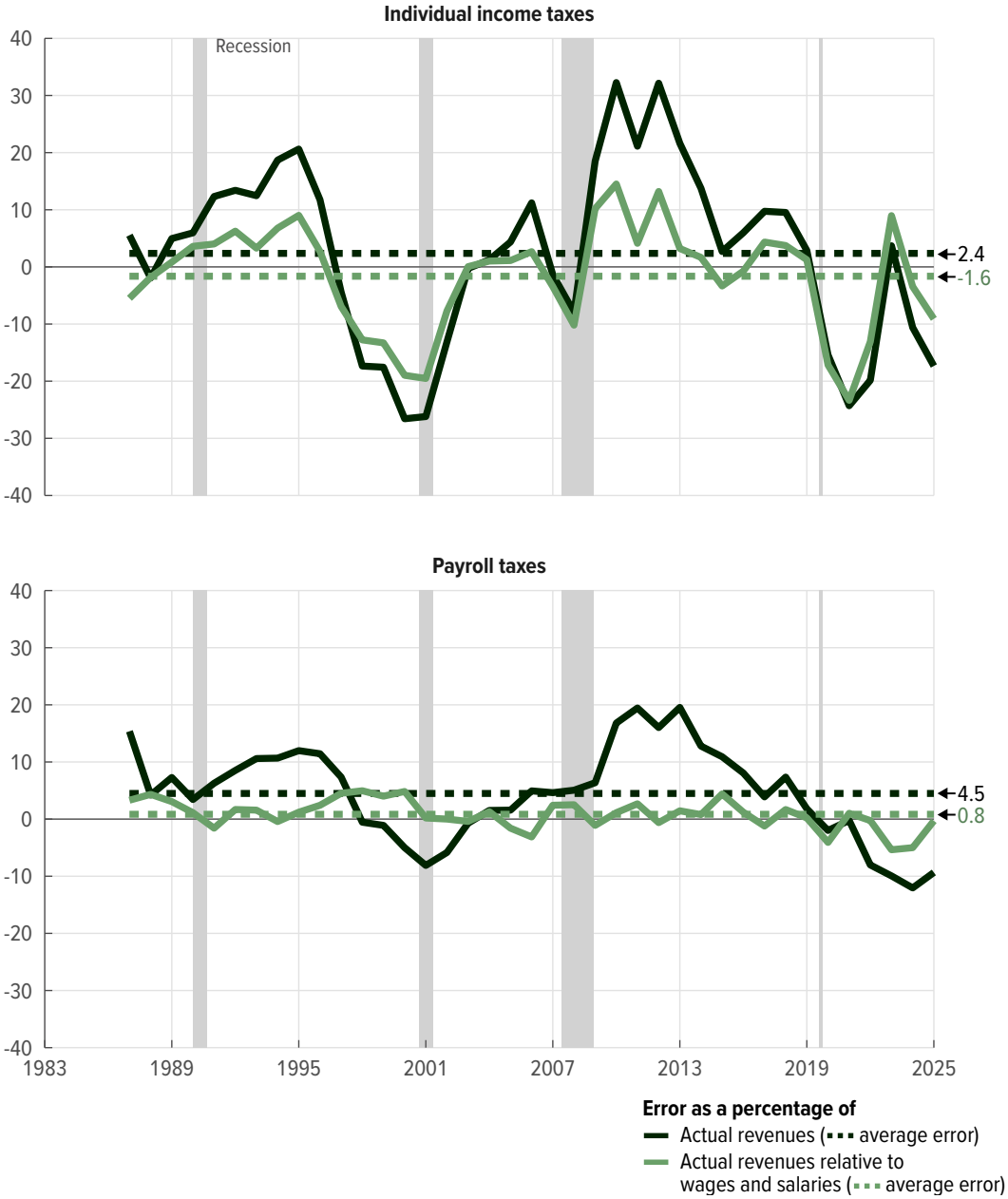
For example, relative to actual revenues, the average error in 6th-year projections for individual income taxes was 2.4 percent. An overestimate of that size in CBO's February 2024 baseline would amount to $60 billion of the $2.5 trillion in individual income tax revenues CBO projected for 2025 (adjusted to include the effects of later legislation). Relative to actual revenues as a percentage of wages and salaries, the average error in 6th-year projections for individual income taxes was an

20. Congressional Budget Office, *CBO's Economic Forecasting Record: 2025 Update* (July 2025), www.cbo.gov/publication/61334.

Figure 3.

Errors in CBO's 6th-Year Projections of Individual Income and Payroll Tax Revenues, as a Percentage of Actual Revenues and of Revenues Relative to Wages and Salaries

Percent



In projections of individual income tax revenues and payroll tax revenues made for the 6th year of a projection period, errors often reflect unexpected changes in wages and salaries because of turning points in the cycle of economic expansions and contractions. The average errors in those projections are smaller when measured as a percentage of wages and salaries than when measured as a percentage of actual revenues from those sources.

Data source: Congressional Budget Office. See www.cbo.gov/publication/62552#data.

A projection year is the fiscal year for which a projection is made; in this analysis, it is identified by its position within the baseline projection period. Data are plotted by the fiscal year being projected rather than the year in which the projection was made.

The average error for 6th-year projections is the average of the annual projection errors for that year. An annual projection error represents the difference between projected revenues (adjusted to include the effects of later legislation) and actual revenues, expressed as a percentage of actual revenues from that source or of actual revenues relative to wages and salaries.

underestimate: –1.6 percent. An error that size in the February 2024 baseline would correspond to a difference of –0.3 percentage points in revenues as a percentage of wages and salaries in 2025 (18.9 percent, versus CBO's projection of 19.2 percent), or –$40 billion of the $12.8 trillion in wages and salaries that CBO projected for 2025.

Projection Errors in Recent Years

This report updates CBO's 2020 assessment of its revenue projections by including six more years of baseline projections and actual revenues: 2020 to 2025.[21] Beginning in 2020, unanticipated events—including the COVID-19 pandemic and legislative responses, higher-than-expected inflation, and administrative actions—caused budgetary and economic outcomes to differ significantly from what CBO had projected before those events occurred. The impact of those unanticipated events on the accuracy of CBO's projections is clear from the agency's April 2018 baseline revenue projections. Those projections, which incorporated CBO's and JCT's estimates of the effects of the 2017 tax act (Public Law 115-97), were remarkably accurate for the current year (2018) and the budget year (2019). But the advent of the pandemic in 2020 meant that economic conditions and revenues from that year onward were very different from what CBO had projected.[22]

Adding the 2020–2025 period to the assessment caused the average error in CBO's revenue projections to decline, compared with the findings of the previous report, but caused the average absolute error and the RMSE to increase. Those changes reflect large underestimates of revenues in 2020, 2021, and 2022 (see Figure 4) that partly offset overestimates in earlier years—making the projections appear more centered but also, because of the size of the recent underestimates, reducing the overall accuracy of the projections. For budget year projections, the projection error as a percentage of total revenues largely reflects technical errors in CBO's recent projections. For 6th-year projections, the projection error reflects those technical errors as well as the effects of unanticipated economic changes.

Effects of Errors in Legislative Estimates

In 2020 and 2021, lawmakers enacted various tax provisions and programs, including many designed to help individuals and businesses affected by the COVID-19 pandemic. When the policies were enacted, CBO and JCT estimated how soon they would take full effect and how people would respond to them. Differences between those estimates and how the policies were actually implemented and used by taxpayers contributed significantly to recent errors in CBO's revenue projections.

When CBO adjusted its past revenue projections to include the effects of later legislation (to compare the projections with actual revenues for this analysis), it used the estimated revenue effects reported in cost estimates that CBO and JCT prepared around the time legislation was enacted. If the actual effects differed from the estimated effects, those differences are classified as errors in the baseline projections.

In its projections for the budget year, CBO underestimated revenues from individual income taxes by a total of $1.4 trillion in the baselines it produced from 2020 to 2022 and then overestimated individual income tax revenues by about $400 billion in its 2023 baseline. Those errors stemmed partly from differences in the timing or size of the effects of tax deferrals and tax credits enacted in response to the pandemic. CBO does not routinely reestimate the effects of legislation after enactment, but it did so for several temporary policies to better understand the errors in its revenue projections (see Table 8).

Employer Payroll Tax Deferral. Employers submit payments for their share of federal payroll taxes shortly after paying wages to their employees. Laws enacted in 2020 allowed employers to delay making payroll tax payments—for wages paid from March to December 2020, they could make half of their payroll tax payments in December 2021 and half in December 2022.[23] The share of businesses that opted to defer those payments was smaller than originally anticipated. Because fewer employers chose to defer payments, payroll tax revenues were larger in 2020 and 2021 than expected. In 2022

21. For details of the previous assessment, see Congressional Budget Office, *An Evaluation of CBO's Past Revenue Projections* (August 2020), www.cbo.gov/publication/56499.

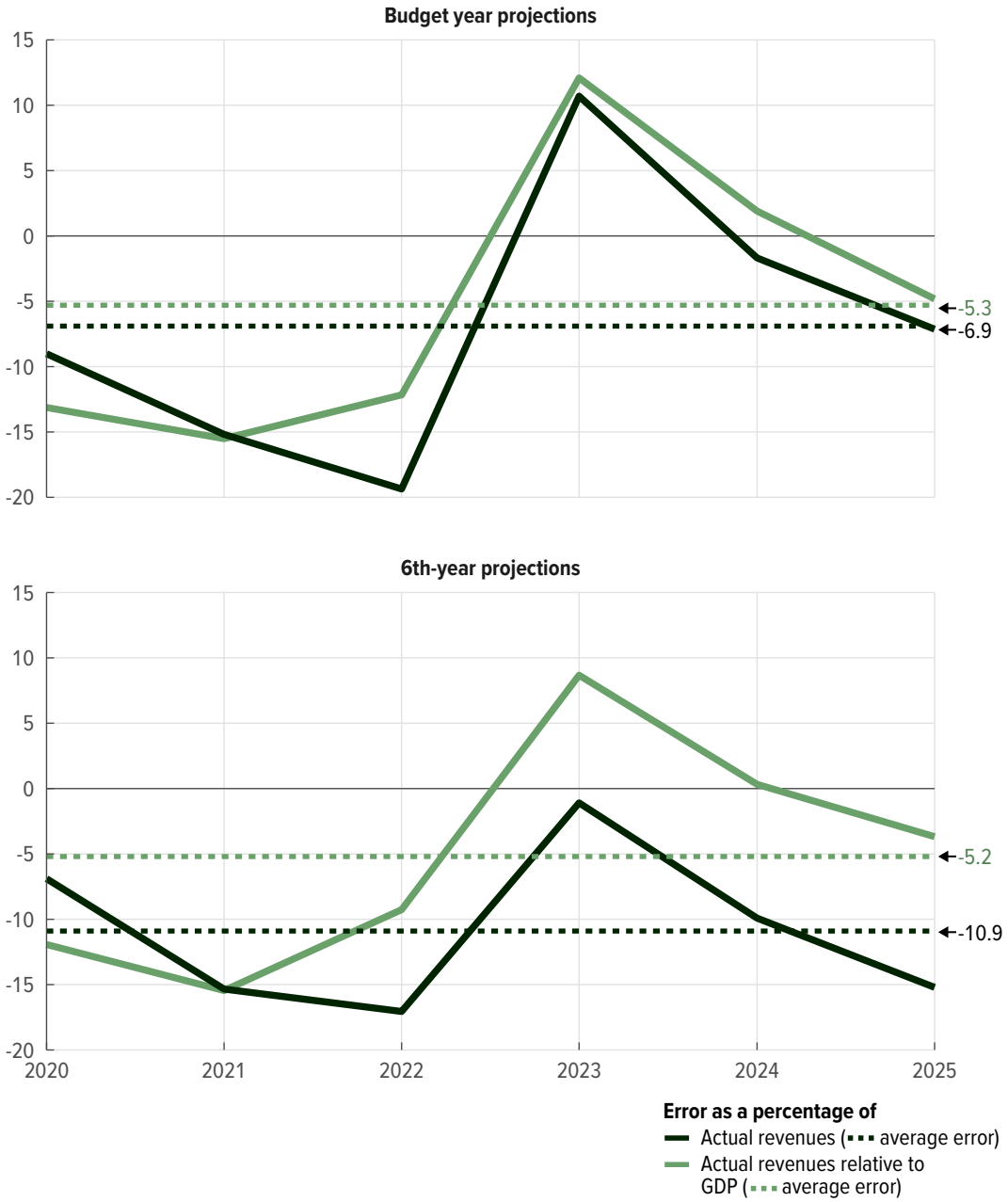
22. Phillip L. Swagel, Director, Congressional Budget Office, "CBO's Estimates of the 2017 Tax Act: Growth and Revenues" (presentation at the 40th Annual National Bureau of Economic Research Tax Policy and the Economy Conference, Washington, D.C., September 18, 2025), www.cbo.gov/publication/61644.

23. The employer payroll tax deferral was created by the Coronavirus Aid, Relief, and Economic Security (CARES) Act and expanded by the Paycheck Protection Program (PPP) Flexibility Act to include businesses that took PPP loans.

Figure 4.

Recent Errors in CBO's Projections of Total Revenues and of Total Revenues Relative to GDP, as a Percentage of Actual Values

Percent



The 2020–2025 period saw unexpected economic, legislative, and technical changes that significantly affected revenues. Analyzing CBO's revenue projections in relation to its projections of economic output factors out some of the unanticipated economic change, producing a measure of average error that is closer to zero than the measure of average error as a percentage of actual revenues.

Data source: Congressional Budget Office. See www.cbo.gov/publication/62552#data.

A projection year is the fiscal year for which a projection is made; in this analysis, it is identified by its position within the baseline projection period. The budget year is the year for which the next federal budget is being considered (usually the upcoming fiscal year). Data are plotted by the fiscal year being projected rather than the year in which the projection was made.

The average error for a given projection year is the average of the annual projection errors for that year. An annual projection error represents the difference between projected revenues (adjusted to include the effects of later legislation) and actual revenues, expressed as a percentage of actual revenues or of actual revenues relative to gross domestic product.

Table 8.

Reestimates of the Effects on Revenues of Legislative Provisions Enacted in Response to the COVID-19 Pandemic

Billions of dollars

	2020	2021	2022	2023	2024	2025	Total, 2020–2025
Employer payroll tax deferral							
Original estimate	-221	-149	180	177	0	0	-13
CBO's updated estimate	-86	-43	69	53	0	0	-6
Difference between updated estimate and original estimate[a]	135	106	-110	-124	0	0	6
Employee retention tax credit							
Original estimate	-49	-27	-1	0	0	0	-77
CBO's updated estimate	-9	-35	-29	-64	-1	-21	-159
Difference between updated estimate and original estimate[a]	40	-8	-28	-64	-1	-21	-82
Tax credit for employer-paid sick leave and family leave							
Original estimate	-89	-21	-2	0	0	0	-113
CBO's updated estimate	-3	-7	0	0	0	0	-10
Difference between updated estimate and original estimate[a]	86	15	2	0	0	0	103
Total							
Original estimates	-359	-197	176	177	0	0	-203
Updated estimates	-98	-84	40	-11	-1	-21	-175
Difference between updated estimates and original estimates[a]	261	113	-136	-188	-1	-21	27
Addendum:							
Total error in CBO's budget year projection of individual income tax revenues (adjusted to include the effects of later legislation using original estimates)[b]	-250	-507	-639	398	40	-194	-1,153

Data sources: Congressional Budget Office; staff of the Joint Committee on Taxation. See www.cbo.gov/publication/62552#data.

a. Positive numbers are reductions to overestimates of revenue effects; negative numbers are additions to underestimates of revenue effects.

b. Positive numbers are overestimates of revenues; negative numbers are underestimates of revenues. The budget year is the year for which the next federal budget is being considered (usually the upcoming fiscal year). The budget year projections were adjusted to include the effects of legislation enacted after the projections were made using estimates of those effects that CBO or the staff of the Joint Committee on Taxation prepared near the time of the legislation's enactment. The updated estimates shown in this table reflect CBO's current view of the effects of the legislation, which are not necessarily reflected in the budget year projections presented here.

and 2023, when the deferred payments were required to be made, payroll tax revenues were smaller than anticipated.

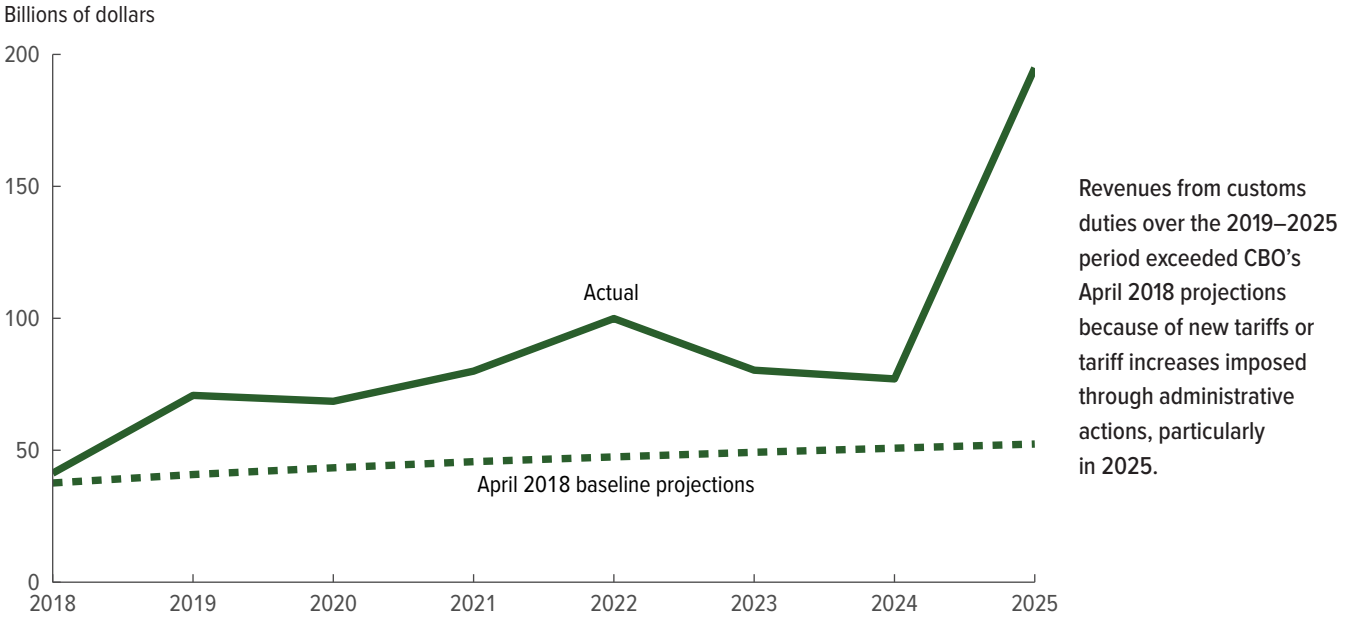
Employee Retention Tax Credit. Another pandemic-era policy was the creation of a refundable payroll tax credit for wages and health insurance costs, called the employee retention tax credit (ERTC). It was available to certain employers who continued to pay wages to their employees during 2020 and 2021 despite suspending their operations or experiencing a decline in their gross receipts.

When the laws that created and then extended the ERTC were enacted, JCT estimated that the credit would have budgetary effects from 2020 to 2022 but would have no effect in 2023.[24] Initially, employers did not use the ERTC as much as anticipated, which contributed to underestimates of income tax revenues in 2020 and 2021. However, employers can amend their

24. The Coronavirus Aid, Relief, and Economic Security (CARES) Act established the employee retention tax credit for wages paid from March 13 to December 31, 2020. Subsequent legislation—the Consolidated Appropriations Act, 2021, and the American Rescue Plan Act of 2021—expanded the ERTC and extended it through December 30, 2021. Those changes were estimated to reduce revenues. Later, the Infrastructure Investment and Jobs Act ended most employers' eligibility for the ERTC after September 30, 2021, and limited the types of wages and employers that were still eligible for the credit through December 30, 2021. Those changes were estimated to increase revenues.

Figure 5.

Comparison of CBO's April 2018 Projections of Revenues From Customs Duties and Actual Revenues



Data source: Congressional Budget Office. See www.cbo.gov/publication/62552#data.

tax returns for up to three years after the filing deadline; an unexpectedly large number did so in 2022 and 2023 and claimed the credit. The ERTC reduced individual and corporate income tax revenues by $64 billion in 2023, contributing to the large overestimate of revenues in that year.[25]

Tax Credit for Employer-Paid Sick Leave and Family Leave. Employers who were required to provide employees with paid leave for absences related to the pandemic were eligible for refundable tax credits to cover the costs of that leave. Employers used those tax credits far less than initially anticipated.[26]

25. Because of the way in which the Treasury records income and payroll taxes, credits claimed on amended returns reduce income tax revenues from individual business owners and corporations. When the ERTC, which was refundable, exceeded the amount of tax an employer owed, the government paid the excess to the employer, and the Treasury classified the payment as an outlay for "U.S. Coronavirus Refundable Tax Credits." CBO estimates that the ERTC increased outlays by $22 billion in 2022 and $49 billion in 2023.

26. Congressional Budget Office, letter to the Honorable Mark Warner about the budgetary effects of the tax credit for employer-paid sick and family leave during the coronavirus pandemic (July 16, 2021), www.cbo.gov/publication/57362.

Effects of Administrative Actions

Although most administrative actions have negligible effects on the federal budget, some have a significant impact and thus can greatly affect measures of the quality of CBO's projections. CBO does not track the estimated effects of every administrative action, so the agency generally cannot quantify the overall budgetary effects of such actions as it can the effects of legislation. However, some major administrative actions and their estimated effects are identifiable. In particular, several administrative actions have significantly affected the quality of CBO's revenue projections in recent years.

Customs Duties. In its April 2018 baseline, CBO projected that revenues from customs duties would grow steadily from $41 billion in 2019 to $52 billion in 2025 (see Figure 5).[27] Because of new U.S. tariffs implemented through executive actions, actual revenues from customs duties were an average of about $30 billion higher each year from 2019 to 2024 than CBO had projected. In 2025, tariffs on most imported goods (including consumer products and intermediate inputs used in manufacturing) were increased through executive actions. As

27. Congressional Budget Office, *The Budget and Economic Outlook: 2018 to 2028* (April 2018), www.cbo.gov/publication/53651.

a result, revenues from customs duties were $118 billion greater in 2025 than in 2024.[28]

Regulations on Vehicle Emissions. After the 2022 reconciliation act (P.L. 117-169) created and expanded tax credits for clean vehicles, the Environmental Protection Agency (EPA) finalized a rule specifying more stringent standards for vehicle emissions. Starting in February 2024, CBO incorporated that rule into its baseline projections. That change increased CBO's projections of claims for clean vehicle tax credits above the amount that JCT had estimated when the 2022 reconciliation act was enacted.[29] The new rule also led CBO to reduce its projections of revenues from excise taxes on gasoline.[30]

CBO later estimated that repealing EPA's vehicle emissions rule and a rule related to fuel economy standards for vehicles would reduce the deficit by a total of $111 billion from 2025 to 2034.[31] Because the vehicle emissions rule reduced revenues, projections made before February 2024 were overestimates. The clean vehicle tax credit provisions were repealed in the 2025 reconciliation act (P.L. 119-21), and EPA's vehicle emissions rule was eliminated in 2026. Because the tax credits and rule were repealed, they will not contribute to errors in future baseline projections.

Delays in Deadlines for Tax Payments. When tax policies are implemented, the Treasury and the IRS can take actions that cause payments to be deferred beyond their normal or originally scheduled deadlines. Under some circumstances, the IRS is required to postpone certain deadlines, as it did in 2023 when it delayed tax payment deadlines for most taxpayers in California because much of the state was declared a federal disaster area.[32] That delay shifted about $70 billion in individual and corporate income tax payments from 2023 to 2024, which contributed to projection errors in those years.

Effects of Economic Changes

High rates of inflation that began in March 2021 caused total nominal income to be larger than CBO had projected. By increasing nominal income, inflation leads to higher tax revenues, even if the same percentage of income is collected in taxes. Inflation also increases the percentage of income collected in taxes, because the tax system is only partly indexed for inflation and that indexing occurs with a lag. Tax liabilities (the amount taxpayers owe) are temporarily pushed up until the inflation adjustments catch up with the rise in inflation. Such temporary increases in tax liabilities were reflected in revenue collections in 2021 and 2022.

High inflation contributed significantly to underestimates in CBO's budget year projections of revenues for 2021 and 2022.[33] It will continue to contribute to errors in 6th-year projections until 2028 and in 11th-year projections until 2033, because the baselines CBO produced from 2011 to 2022 cover years in which CBO failed to anticipate the shift in the amount of revenues resulting from inflation.

Effects of Capital Gains Realizations

A capital gain is an increase in the value of a capital asset above what it cost the owner to acquire or improve the asset. When an individual or a business sells an asset, the capital gain is realized and becomes subject to individual or corporate income taxes. The total amount of realized capital gains in a year depends on the path of the economy, trends in asset values, and taxpayers' behavior in selling assets. As a result, capital gains realizations are volatile (see Figure 6), fluctuating more than other economic variables or revenue sources and not always moving proportionately with changes in overall economic activity. That volatility, plus a long lag in the availability

28. Congressional Budget Office, *Monthly Budget Review: Summary for Fiscal Year 2025* (November 10, 2025), www.cbo.gov/publication/61307.

29. Because the tax incentives for clean energy in the 2022 reconciliation act resulted from changes to the Internal Revenue Code, the budgetary effects of the legislation were estimated by JCT.

30. Congressional Budget Office, *The Budget and Economic Outlook: 2024 to 2034* (February 2024), Box 3-1, www.cbo.gov/publication/59710.

31. Congressional Budget Office, *Part 2 of Answers to Questions for the Record Following a Hearing on* An Update to the Budget and Economic Outlook: 2024 to 2034 (August 2024), www.cbo.gov/publication/60593.

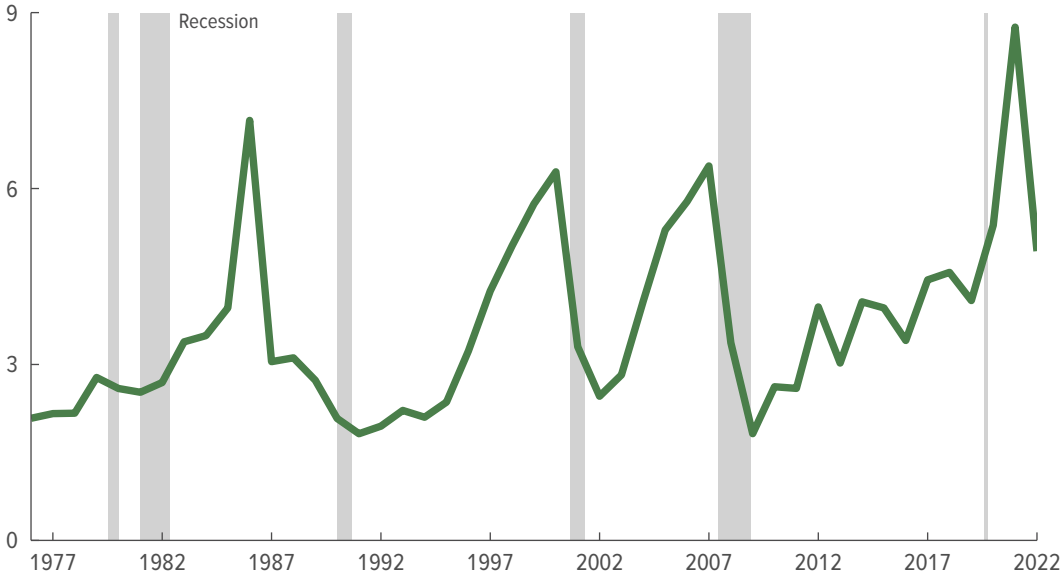
32. Internal Revenue Service, "For California Storm Victims, IRS Postpones Tax-Filing and Tax-Payment Deadline to Nov. 16" (press release, October 16, 2023), https://tinyurl.com/m675zzhp.

33. Phillip L. Swagel, Director, Congressional Budget Office, "CBO's Estimates of the 2017 Tax Act: Growth and Revenues" (presentation at the 40th Annual National Bureau of Economic Research Tax Policy and the Economy Conference, Washington, D.C., September 18, 2025), www.cbo.gov/publication/61644.

Figure 6.

Capital Gains Realizations

Percentage of GDP



Capital gains realizations from asset sales fluctuate more from year to year than other economic variables and do not always mirror changes in the overall economy. That volatility makes it harder to project revenues from income taxes on capital gains realizations than to project revenues from other sources.

Data source: Congressional Budget Office. See www.cbo.gov/publication/62552#data.

of data on actual capital gains realizations, makes them challenging to project.

A large swing in capital gains realizations, such as the spike that occurred in calendar year 2021, can lead to significant errors in revenue projections. In its January 2020 baseline, CBO projected that capital gains realizations would total $1 trillion in 2021.[34] Actual realizations in 2021 were more than double that amount—their largest annual total since CBO began producing baseline projections. The true level of capital gains income in 2021 was not known until detailed underlying tax data for that year became available in 2023. For that reason, and because capital gains taxes are typically paid through a mix of estimated tax payments (mostly received in the current fiscal year) and final payments (mostly received in the next fiscal year), CBO's error in projecting capital gains income contributed to large underestimates in its budget year projections of individual income tax receipts for fiscal years 2021 and 2022.

34. Congressional Budget Office, *CBO's Projections of Realized Capital Gains Subject to the Individual Income Tax* (February 2023), www.cbo.gov/publication/58914.

Comparing CBO's and the Administration's Revenue Projections

Besides assessing the quality of its own revenue projections, CBO compared its projections with those released by the Office of Management and Budget as part of the Administration's annual budget request (see Table 9). For that comparison, CBO adjusted OMB's projections to exclude the effects of the Administration's proposed policy changes and to incorporate the estimated revenue effects of legislation enacted after the projections were published. (To make the legislative adjustments, CBO used estimates that it or JCT prepared near the time the legislation was enacted.)

The errors in OMB's budget year projections of total revenues were similar, in both size and direction, to the errors in CBO's projections (see Figure 7). In the budget year projections it has published since 1982, the Administration overestimated revenues, on average, by 0.3 percent—slightly more than CBO's average overestimate of 0.1 percent. OMB's budget year projections had a two-thirds spread of errors that was narrower than that of CBO's projections (11.5 percent, versus 12.2 percent for CBO). The RMSE was 8.0 percent for the Administration's projections and 7.9 percent for CBO's projections.

Table 9.

Measures of the Quality of the Administration's Projections of Total Revenues

	Projection year					
	Current year	Budget year	3rd year	4th year	5th year	6th year
Number of projections	43	43	42	41	40	39
Years covered by the projections	1982–2024[a]	1983–2025	1984–2025	1985–2025	1986–2025	1987–2025
Measure (percentage of actual revenues)						
Centeredness (average error)	-0.7	0.3	1.4	2.8	3.9	5.1
Dispersion (two-thirds spread of errors)	7.9	11.5	17.8	22.9	22.8	23.2
Accuracy						
Average absolute error	2.9	5.8	7.8	9.4	10.2	10.5
Root mean square error	4.0	8.0	10.0	11.3	12.1	12.3

Data sources: Office of Management and Budget; Congressional Budget Office. See www.cbo.gov/publication/62552#data.

A projection year is the fiscal year for which a projection is made; in this analysis, it is identified by its position within the projection period. The current year is the fiscal year during which the projection is made. The budget year is the year for which the next federal budget is being considered (usually the upcoming fiscal year).

Centeredness is the tendency of projections to be overestimates or underestimates. Dispersion is how widely spread errors are. (The two-thirds spread is the span of the middle two-thirds of errors, after the lowest one-sixth and highest one-sixth of errors are removed.) Accuracy is the amount by which actual values differ from projected values. (The average absolute error is the average of errors without regard to whether they are overestimates or underestimates, so positive and negative errors do not offset each other. The root mean square error is similar, but it places greater weight on larger errors because the errors are squared before they are averaged.)

a. The budget projections the Administration released in 2025 mainly covered discretionary spending. The most recent year in which the Administration released current-year revenue projections was 2024.

The Administration's 6th-year projections were less centered than CBO's projections. Whereas CBO overestimated revenues in the 6th year of the projection period by 3.1 percent of actual revenues, on average, the Administration overestimated them by an average of 5.1 percent. The dispersion of the Administration's 6th-year projections was narrower than that of CBO's projections. (The two-thirds spread of errors was 23.2 percent for OMB and 25.3 percent for CBO.) But the Administration's 6th-year projections had a larger RMSE (12.3 percent, versus 11.7 percent for CBO), meaning its projections were slightly less accurate. That difference may reflect differences in the underlying economic forecasts; CBO's forecasts tend to be more accurate than the Administration's.[35] (The Administration did not provide enough details to make its 11th-year projections comparable with CBO's.)

For projections of revenues from specific sources, the accuracy of the Administration's budget year projections was similar to that of CBO's projections. CBO's budget year projections of receipts from individual income taxes and payroll taxes had slightly larger RMSEs than OMB's projections (see Figure 8). But CBO's projections for other revenue sources had smaller RMSEs than the Administration's did.

CBO's Efforts to Improve Its Revenue Projections

CBO seeks to improve the accuracy of its work by regularly assessing the quality of its past projections and identifying the factors that might have led it to underestimate or overestimate revenues. When CBO prepares new baseline projections, it updates its models for each revenue source using a variety of data. Those updates typically incorporate policy changes, the most recent detailed information available from tax returns, and new economic data from agencies such as the Bureau of Economic Analysis.

Updates to CBO's models also account for any differences between projected revenues and actual collections reported by the Treasury. When such differences occur, CBO seeks to understand the reasons and refine its modeling to reduce future errors. In recent years, the agency has formalized its review of budget year errors for the most recent fiscal year by publishing an annual report

35. Congressional Budget Office, *CBO's Economic Forecasting Record: 2025 Update* (July 2025), www.cbo.gov/publication/61334.

Figure 7.

Comparison of Errors in CBO's and the Administration's Projections of Total Revenues, as a Percentage of Actual Revenues

Percent

Errors in CBO's budget year projections of total revenues were similar in size and direction to those in the Administration's projections.

For 6th-year projections, CBO's projections were more centered, with a smaller average error.

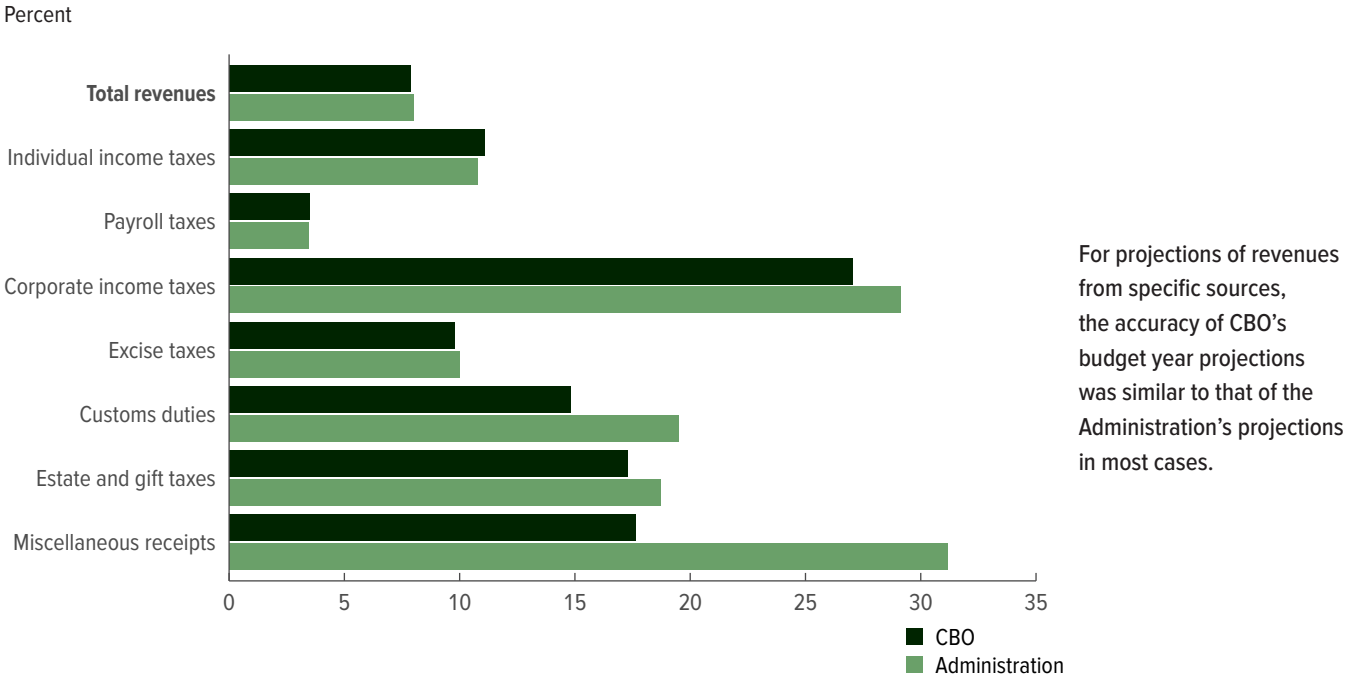
Data sources: Office of Management and Budget; Congressional Budget Office. See www.cbo.gov/publication/62552#data.

A projection year is the fiscal year for which a projection is made; in this analysis, it is identified by its position within the baseline projection period. The budget year is the year for which the next federal budget is being considered (usually the upcoming fiscal year). Data are plotted by the fiscal year being projected rather than the year in which the projection was made.

The average error for a given projection year is the average of the annual projection errors for that year. An annual projection error represents the difference between projected revenues (adjusted to include the effects of later legislation) and actual revenues, expressed as a percentage of actual revenues.

Figure 8.

Root Mean Square Errors of CBO's and the Administration's Budget Year Projections of Revenues by Source, as a Percentage of Actual Revenues From That Source



Data sources: Office of Management and Budget; Congressional Budget Office. See www.cbo.gov/publication/62552#data.

The revenue projections included in this analysis are those published in calendar years 1982 to 2024 (typically in January or February). A projection year is the fiscal year for which a projection is made; in this analysis, it is identified by its position within the baseline projection period. The budget year is the year for which the next federal budget is being considered (usually the upcoming fiscal year).

The root mean square error is a measure of the average of errors without regard to whether they are overestimates or underestimates, so positive and negative errors do not offset each other. It places greater weight on larger errors because the errors are squared before they are averaged.

about the accuracy of its baseline projections.[36] This section discusses several ways in which CBO has updated its models and estimation methods to improve the accuracy of its revenue projections.

Adjustments to Address Serial Correlation

CBO's projection errors since 1982 show some degree of serial correlation—that is, projections tend to err in the same direction in consecutive years.[37] For example, one overestimate of revenues in the budget year is likely to be followed the next year by another overestimate of revenues in the next budget year. That tendency suggests that as new information becomes available, CBO may not be incorporating all of the information into its projections.

CBO regularly assesses the factors that produce serial correlation. One reason for delays in incorporating new information is that doing so immediately can create large differences between successive forecasts that are difficult to explain. Incorporating new information gradually (for example, by phasing in a change to a historical

36. See, for example, Congressional Budget Office, *The Accuracy of CBO's Budget Projections for Fiscal Year 2025* (January 2026), www.cbo.gov/publication/61916.

37. To test for serial correlation in its projection errors, CBO calculated the Durbin-Watson statistic for the budget year projections it made for 1983 to 2025 and the 6th-year projections it made for 1987 to 2025. Durbin-Watson values range from zero to 4: Zero indicates positive serial correlation, 2 indicates no serial correlation, and 4 indicates negative serial correlation. For CBO's budget year revenue projections, the Durbin-Watson value was 1.45, indicating that the errors had a positive serial correlation—meaning that an overestimate of revenues in one budget year projection was likely to be followed by an overestimate in the next year's budget year projection. The Durbin-Watson value for CBO's 6th-year revenue projections was 0.46, indicating that those projections had a greater positive serial correlation of errors than the agency's budget year projections did.

pattern over several years) creates some serial correlation in CBO's projections and reduces their accuracy, but it also causes projections to be more stable and easier to interpret.

A challenge in reducing serial correlation is that it is difficult to determine whether a deviation from a historical trend marks a persistent change in the trend or is only temporary. When as-yet-unknown factors cause actual revenues to differ from the estimates produced by CBO's models, the agency generally expects—on the basis of experience—that the effects of those factors will gradually dissipate over the course of a projection period. In recent years, delays in the dissemination of the detailed tax file that provides the main data for CBO's individual income microsimulation model has created uncertainty about whether trends are temporary or persistent.[38]

When CBO determines that the differences between its projections and actual tax collections are systemic rather than temporary, it refines its modeling to bring model-based estimates closer to actual revenues. For example, as noted above, the relationship between corporate profits and the tax base for corporate income taxes has been changing over time.[39] CBO continually makes modeling refinements so its projections of corporate income taxes better reflect the current relationship.

Refinements of Legislative Estimates

As the effects of past legislative changes appear in various economic data, CBO revisits and refines the estimates of legislative effects that are incorporated in its baseline. For example, when employers were given the option in 2020 to temporarily defer their share of payroll tax payments, CBO and JCT expected that a large majority of employers would take that option. However, when the amount of taxes withheld from paychecks did not decline as sharply as anticipated, CBO lowered its estimates for the use of that tax provision. Its adjustments were initially based on surveys of small businesses by the Census Bureau and analyses of public financial filings by public corporations. Eventually, when detailed tax return data became available, CBO was able to further refine its estimates to more precisely reflect the share of payroll taxes that were deferred.

Adjustments to Estimates of Behavioral Responses

CBO regularly assesses whether its modeling tools accurately account for the ways in which individuals and businesses change their behavior in response to changes in the federal government's tax and spending policies. One important recent example involves the government's tariff policies.

For decades, tariff policies remained fairly stable. During that time, CBO's baseline projections of customs duties were based on a relatively simple model that began with recent trade data and extrapolated later collections of customs duties by using projections of total imports and adjusting for scheduled statutory changes in tariff rates. Beginning in 2018, the Administration imposed higher tariff rates on certain goods, particularly those imported from China. Rates rose again in 2025 after the Administration levied broad-based tariffs on most imports into the United States. Since then, tariff policies have changed frequently. In response, CBO invested significant resources to review its methods for modeling tariffs and to develop an improved model that better accounts for shifting incentives for individuals and businesses to substitute imports among countries and products that are subject to differing tariff rates.[40] CBO continues to evaluate customs duties collections and adjusts each new baseline to account for observed changes in patterns of imports.

Refinements Made in Response to Differences Between Projected and Actual Revenues

Sometimes, changes in the overall economy reveal that CBO's modeling tools need to be updated. For example,

38. The IRS's Statistics of Income (SOI) individual income tax file consists of a sample of more than 400,000 tax returns. In the past, details of the SOI sample file were typically published in August or September, more than a year and a half after the end of the calendar year the file covered, in a report called Publication 1304. More recent versions of the report have been delayed: The report covering tax year 2020 was published in November 2022, the report for 2021 was published in April 2024, and the report for 2022 was published in January 2025. For more information about the SOI sample file, see Internal Revenue Service, "SOI Tax Stats—Individual Income Tax Returns Complete Report (Publication 1304)" (July 22, 2026), https://tinyurl.com/3z6p8z3x.

39. Congressional Budget Office, *Trends in Corporate Economic Profits and Tax Payments, 1998 to 2017* (May 2023), www.cbo.gov/publication/58267.

40. Congressional Budget Office, *CBO's Conventional Tariff Analysis Model* (May 2026), www.cbo.gov/publication/61388. For examples of changes that CBO made in response to new information about tariffs, see Phillip L. Swagel, "CBO's Updated Projections of the Budgetary Effects of Tariffs as of November 15, 2025," *CBO Blog* (November 20, 2025), www.cbo.gov/publication/61877.

CBO recently updated the way it models the Federal Reserve System's remittances to the Treasury in response to changes seen in remittances when interest rates rose. (Those remittances reflect the difference between the income the Federal Reserve earns on its portfolio of assets and the interest it pays on deposits plus the administrative costs of operating the system.)

Before its February 2023 baseline, CBO estimated remittances using a method that generally modeled the Federal Reserve as a single, unified system. When the Federal Reserve raised interest rates sharply beginning in 2022, CBO anticipated that the system's interest expenses would exceed its income—which, under a unified framework, would suggest that remittances would be suspended. When remittances nonetheless continued at a significant level, CBO refined its model of the system. The improved model recognizes that each of the 12 Federal Reserve banks differs in its asset and liability allocations and operating costs, which in turn affect its profitability and remittances.

Currently, most Federal Reserve banks have suspended remittances because their past expenses have exceeded their income. But a few have continued to realize net profits and make remittances. Since its 2023 baseline, CBO has projected that remittances will increase more gradually over the projection period than previously projected as additional Federal Reserve banks resume making remittances.

Appendix: Additional Details About CBO's Methods for Assessing Revenue Projections

To evaluate its past projections of revenues, the Congressional Budget Office compares those projections with actual revenues recorded in the federal budget and tries to determine the sources of any differences. Because CBO intentionally does not incorporate the effects of possible future legislative changes in its baseline projections, the assessments in this report focus on differences between projected and actual revenues that result from factors other than legislation. This appendix provides additional details about the data CBO used for this analysis and about how the agency calculates differences between actual and projected revenues.

Since its inception, CBO has regularly published baseline budget projections. The number of years covered by those projections has expanded over time. From 1982 (the earliest year included in this evaluation) to 1991, CBO's baseline typically covered the current year and the next 5 fiscal years. Since 1992, the agency's baseline has covered the current year and the following 10 fiscal years.[1] For example, in February 2024, CBO published projections of revenues for fiscal year 2024 (the current year), 2025 (the budget year, which began in October 2024), and each of the next 9 years. The Department of the Treasury reports actual revenues each October, shortly after the end of the fiscal year (see Table A-1). In the case of CBO's February 2024 baseline, actual revenues for the budget year were reported in October 2025. Those actual amounts are sometimes revised later, but the revisions are usually small.

1. Although CBO extended its baseline by 5 years starting in 1992, baseline projections produced before 1996 did not include detailed data about the effects of legislation enacted after the previous baseline for the full 11 years. The first winter baseline with data about the effects of legislation for all 11 years of the projection period was released in 1996; it is the first baseline used in the assessment of 11th-year projections in this report.

Adjusting CBO's and the Administration's Projections to Account for Later Legislation

Laws enacted after projections are made can affect revenues and cause actual amounts to differ significantly from the projected values. To remove such effects from its measures of projection errors, CBO adjusts the projections to incorporate the estimated revenue effects of legislation enacted after the projections were published. CBO uses estimates of the effects of legislation that it or the staff of the Joint Committee on Taxation (JCT) prepared near the time of the legislation's enactment to make those adjustments. Such legislative changes are described in *The Budget and Economic Outlook* reports that CBO publishes each year.[2] The actual budgetary effects of legislation may have differed from those estimated effects.

By longstanding convention, CBO's and JCT's estimates of the budgetary effects of legislation do not include "macroeconomic feedback"—effects on the budget that result from broad changes to the economy caused by the legislation. Those feedback effects can contribute to differences between the economic forecast and actual outcomes, which appear in this analysis as errors in the baseline projections.

In this analysis, CBO also used its and JCT's estimates of the effects of legislation to adjust the Administration's revenue projections for legislation enacted after those projections were made. That adjustment was one of the steps needed to compare errors in the Administration's projections with errors in CBO's projections.

2. See, for example, Congressional Budget Office, *The Budget and Economic Outlook: 2026 to 2036* (February 2026), Chapter 5, www.cbo.gov/publication/61882.

Table A-1.

Sample Timeline for Measuring Errors in CBO's Budget Year Revenue Projections

	Date
Start of fiscal year 2024 (current year)	Oct. 2023
CBO releases initial baseline budget projections, which include current-year projections for 2024, budget year projections for 2025, and so on	Feb. 2024
The Administration releases the President's budget request for fiscal year 2025	Mar. 2024
Start of fiscal year 2025 (budget year)	Oct. 2024
Start of fiscal year 2026 (3rd year)	Oct. 2025
The Treasury Department releases data about actual revenues in fiscal year 2025 (the budget year in CBO's Feb. 2024 baseline projections)	Oct. 2025

Data source: Congressional Budget Office. See www.cbo.gov/publication/62552#data.

The actual dates for revenue projections provided here are examples. The timelines for measuring projection errors are similar for all budget year projections.

Adjusting the Administration's Projections for Proposed Policies

Unlike CBO's baseline, the Administration's main revenue projections include the estimated effects of policies proposed in the President's annual budget request that are not yet law. To make those projections comparable with CBO's projections for the same period, CBO uses a baseline the Administration publishes separately, in which the estimated effects of the proposed policies are subtracted from the Administration's revenue projections.[3] (The resulting projections may still include some budgetary feedback effects from those proposals, because those effects are also included in the Administration's economic projections. For that reason, the adjusted projections are not completely comparable with CBO's baseline projections.)

3. The Administration calls its revenue projections without the effects of proposed policies its "current-services baseline"; it has also called those projections the "Balanced Budget and Emergency Deficit Control Act (BBEDCA) baseline."

Calculating Differences Between Projected and Actual Revenues

After accounting for the estimated effects of enacted legislation, CBO calculates the errors in its revenue projections by subtracting actual revenues from the adjusted projections and dividing that difference by actual revenues for each year. Thus, the projection errors are expressed as percentages of revenues, with negative values representing underestimates and positive values representing overestimates. Calculating the projection errors as percentages of revenues rather than as dollar amounts makes the errors for different years easier to compare.

As an illustration of that process, CBO's January 2019 baseline included a projection that revenues in the budget year, 2020, would total $3.7 trillion (see Table A-2). CBO adjusted that projection to account for an estimated $573 billion decrease in revenues resulting from laws enacted after the baseline was completed. The resulting revenue projection for 2020 declined to $3.1 trillion. That projection was $308 billion less than actual revenues in 2020. Dividing that difference (–$308 billion) by actual revenues in 2020 ($3.4 trillion) yields a projection error of –9 percent of revenues, an underestimate.

CBO's Alternative Measure of Errors in Its Revenue Projections

Many of the errors in CBO's revenue projections can be attributed to differences between the agency's economic forecast and actual economic outcomes. One way to separate out the contributions of economic factors and other sources of error (referred to as technical factors) is by controlling for the economic factors, leaving a residual amount that approximates the technical error.

To get a sense of the relative contributions of economic and technical errors, CBO assesses errors in its projections of total revenues not only as a percentage of actual revenues but also in relation to economic output. In that alternative measure, projected revenues as a percentage of projected output minus actual revenues as a percentage of actual output are divided by actual revenues as a percentage of actual output. In those calculations, output is measured as gross domestic product (GDP) starting

Table A-2.

An Example of How CBO Adjusts Its Projections to Calculate Projection Errors

Billions of dollars

	Projection year					
	Current year (2019)	Budget year (2020)	3rd year (2021)	4th year (2022)	5th year (2023)	6th year (2024)
CBO's January 2019 baseline projections of total revenues	3,515	3,686	3,841	4,012	4,208	4,448
Estimated effects of later legislation, by enactment period						
January 2019–August 2019	*	*	*	*	*	*
August 2019–January 2020		-34	-27	-28	-34	-36
January 2020–September 2020		-539	-264	186	182	9
September 2020–February 2021			-39	-23	-12	-13
February 2021–July 2021			-80	-54	1	4
July 2021–July 2022				9	1	3
July 2022–February 2023					26	18
February 2023–February 2024						*
February 2024–June 2024						-1
Total adjustment to account for the estimated effects of later legislation	*	**-573**	**-410**	**89**	**165**	**-16**
CBO's adjusted baseline projections of total revenues	3,515	3,113	3,431	4,102	4,373	4,432
Actual revenues	3,463	3,421	4,047	4,897	4,441	4,918
Difference between adjusted projections and actual revenues	51	-308	-617	-796	-68	-486

Data source: Congressional Budget Office. See www.cbo.gov/publication/62552#data.

A projection year is the fiscal year for which a projection is made; in this analysis, it is identified by its position within the baseline projection period. The current year is the fiscal year during which the projection is made. The budget year is the year for which the next federal budget is being considered (usually the upcoming fiscal year).

* = between -$500 million and $500 million.

in 1992 and as gross national product (GNP) in earlier years, when CBO did not forecast GDP.[4]

That alternative measure partially removes the component of projection error that stems from economic misestimates, because changes in revenues are highly correlated with changes in output. Assessing errors using that measure is slightly more complicated than simply looking at errors in CBO's projections of revenues as a percentage of GDP, because the Bureau of Economic Analysis (BEA) revises its estimates of past GDP. CBO's alternative measure adjusts for those revisions. In CBO's adjustment, a 1 percent increase in GDP leads to a 1 percent increase in revenues. That adjustment is approximate and does not account for the progressive structure of the tax system or changes in income equality.

The way in which CBO calculates that alternative measure can be illustrated using the agency's February 2021 baseline projections for the budget year. The first step is to calculate the projected growth in revenues as a percentage of GDP from the year before the baseline was published (the last year with historical data, in this case 2020) to the budget year (in this case, 2022). Translating CBO's projection of revenues to that measure of projected growth in revenues adjusts for any changes in revenues as a percentage of GDP in 2020 that became known after CBO published its February 2021 baseline. For example, in early 2021, CBO estimated that total revenues in 2020 equaled 16.3 percent of GDP (see Table A-3). Subsequent revisions to GDP data by BEA meant that revenues actually equaled 16.0 percent of GDP in 2020.

To account for that revision, CBO adjusted its projection of revenues as a percentage of GDP in 2022 to account for the lower percentage in 2020. To do that, CBO applied its projection of growth in revenues as

4. CBO follows the same approach to calculate the alternative measure of errors in its projections of individual income tax revenues and payroll tax revenues, except that it uses projected and actual wage and salary distributions instead of GNP or GDP.

Table A-3.

Total Projected and Actual Revenues From 2020 to 2022

Percentage of GDP

Projection year	Revenues in CBO's February 2021 baseline projections	Actual revenues	Revenues in CBO's adjusted February 2021 baseline projections[a]
2020 (prior year)	16.3	16.0	n.a.
2021 (current year)	15.6	17.6	15.4
2022 (budget year)	17.1	19.2	16.9

Data source: Congressional Budget Office. See www.cbo.gov/publication/62552#data.

A projection year is the fiscal year for which a projection is made; in this analysis, it is identified by its position within the baseline projection period. The current year is the fiscal year during which the projection is made. The budget year is the year for which the next federal budget is being considered (usually the upcoming fiscal year).

n.a. = not applicable.

a. Adjusted to account for revisions to GDP data made by the Bureau of Economic Analysis after CBO's baseline was published.

a percentage of GDP from 2020 to 2022 (5 percent) to the actual value of revenues as a percentage of GDP in 2020 to arrive at an adjusted projection for 2022. That adjusted budget year projection was 16.9 percent of GDP, smaller than the budget year projection of 17.1 percent of GDP in CBO's February 2021 baseline.

The difference between that adjusted projection and actual revenues in 2022 (19.2 percent of GDP) was –2.3 percentage points. That means CBO underestimated budget year revenues measured in relation to economic output by 12 percent. The comparable measure of projection error as a percentage of actual revenues (the main measure in this report) for budget year 2022 was an underestimate of 19 percent of actual revenues.

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About This Document

This report is one of the Congressional Budget Office's periodic evaluations of the quality of its revenue projections. Such evaluations help guide CBO's efforts to improve the quality of its projections and can assist Members of Congress in their use and understanding of the agency's projections. In keeping with CBO's mandate to provide objective, impartial analysis, the report makes no recommendations.

Kathleen Burke wrote the report with guidance from John McClelland, Molly Saunders-Scott, Joshua Shakin, and Edward Harris. Aaron Feinstein contributed to the analysis. David Austin, Daniel Fried, and Noah Meyerson offered comments. Jack Lynch fact-checked the report, and Tyler Van Patten fact-checked the supplemental data.

Jeffrey Kling reviewed the report. Christian Howlett edited it, and Casey Labrack created the graphics and prepared the text for publication. The report is available at www.cbo.gov/publication/62552.

CBO seeks feedback to make its work as useful as possible. Please send comments to communications@cbo.gov.

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