CBO

An Evaluation of CBO's Past Outlay Projections

Percent

Since 1984, CBO's projections of total outlays for the upcoming fiscal year have exceeded actual amounts by an average of 1.7 percent, excluding the effects of legislative changes.

NOVEMBER 2017

Notes

Unless otherwise indicated, all years referred to in this report 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 and tables may not add up to totals because of rounding.

Supplemental data are posted along with this report on CBO's website.

Contents

An Evaluation of CBO's Past Outlay Projections

Summary

Since its inception, the Congressional Budget Office has regularly published baseline projections of federal revenues and outlays. Those projections, which reflect the assumption that current laws will generally remain unchanged, typically underlie the budget resolutions prepared by the House and Senate Budget Committees as well as CBO's cost estimates for proposed legislation. The baseline projections can also be useful to policymakers seeking to identify and address budgetary trends that are likely to play out over the coming years if current laws remain in place.

As part of the process of preparing its projections, the agency regularly assesses the quality of its past estimates of federal spending and revenues to refine its methods and improve the accuracy of its projections in the future. For this analysis, CBO reviewed the baseline projections of total outlays as well as those of broad categories of spending that it has issued each spring, focusing on two fiscal years in the period spanned by each projection: the second year (often called the budget year), which usually begins about six months after a spring baseline is released, and the sixth year. To assess the relative quality of its estimates, CBO compared its budget-year projections with those of the Administration.

The quality of CBO's projections can be measured in various ways, but in this assessment, CBO focuses primarily on two characteristics: statistical bias (the tendency of a set of projections to err in the same direction) and accuracy (how close projected values are to actual amounts).

Any comparison of actual outcomes with projections is complicated by changes in law made after the projections are prepared. Although CBO does not attempt to predict future legislative changes or their effects on outlays when preparing its baseline budget projections, actual outlays are affected by those changes. CBO therefore adjusted its projections to incorporate the estimated effects of legislation that was enacted after the projections were produced. Thus, the analysis presented in this report concentrates on the remaining differences between projected and actual outlays, which are related to CBO's economic forecast or other factors (referred to as technical factors). For the purposes of this analysis, the agency also removed outlays for the housing entities Fannie Mae and Freddie Mac from its projections and the actual amounts reported by the Treasury Department because CBO and the Administration account for those entities' transactions differently.

All told, CBO's projections of outlays for both the budget year and the sixth year have generally been close to actual amounts, although they have been too high, on average. The Administration has also tended to overestimate baseline outlays for the budget year. (The Administration has not published detailed information on differences between its projections and actual outlays over the six-year horizon, so CBO could not compare those longer-term projections.) In general, both CBO's and the Administration's projection errors followed similar patterns and were larger for years in which unanticipated events that had large budgetary effects occurred. The Administration's projections for budget years 1993 through 2005 were about as accurate as CBO's projections. Since 2005, however, the Administration has overestimated spending in the budget year by more than CBO has in all but one year.

How Close Were CBO's Budget-Year Projections to Actual Outlays?

Since 1984, CBO has tended to overestimate total outlays (after adjustments for legislative changes) for the budget year; the average error for total outlays is 1.7 percent. Of the 32 budget-year projections produced from 1984 to 2015, 25 exceeded actual outlays.

Although often too high, CBO's projections of total outlays for the budget year have generally been close to actual amounts. Half of the agency's projections made since 1984 have differed from actual outlays by less than 2 percent of the actual amounts. A few projections, however, had significantly larger errors. For example, in 1992, CBO's estimate of total outlays for 1993 was too high by about 8 percent.

The mean absolute error of the budget-year projections—that is, the average of all errors without regard for whether they were positive or negative—equals 2.3 percent. If CBO's current budget-year projection of $4.1 trillion in total outlays had an error the size of that mean absolute error, actual outlays for 2018 would be higher or lower than the agency projected by $0.1 trillion—or about 0.5 percent of gross domestic product (GDP).[1]

How Close Were CBO's Sixth-Year Projections to Actual Outlays?

CBO's sixth-year projections also tended to be too high, exceeding actual outlays in 20 of 28 years. Both the average error (3.0 percent) and the mean absolute error (5.9 percent) of the sixth-year projections made between 1984 and 2011 were larger than those of the budget-year projections covered by this analysis. Of the 28 sixth-year projections, 9 were within 4 percent of actual outlays, and 4 were off by 10 percent or more. If CBO's June 2017 projection of $5.2 trillion in total outlays for 2022 had an error equal to that mean absolute error, actual outlays would be higher or lower than the agency projected by $0.3 trillion (or 1.3 percent of GDP).

What Factors Have Contributed to Differences Between CBO's Projections and Actual Outlays?

Many factors account for the differences between CBO's projections and actual outlays. Some of those factors relate to the agency's economic forecast. Forecasting interest rates has been particularly challenging, even during relatively stable periods, and errors in interest rate forecasts have significantly affected CBO's projections of interest payments. In addition, turning points in the economy can have significant effects on the budget. During recessions, outlays for countercyclical income security programs—to pay unemployment benefits, for example—can increase rapidly. Such turning points, and the cumulative budgetary effects that result from them, are very difficult to anticipate.

Other factors unrelated to the economic forecast have also contributed to misestimates in CBO's projections. For example, quickly identifying new trends—particularly in federal spending on health care—and incorporating them into the agency's baseline projections has

proved difficult. Anticipating large and sudden increases or decreases in spending for government programs related to the financial sector has also been challenging. Although such developments related to the financial sector have been rare, when they have occurred, they have resulted in CBO's misestimating outlays in its budget-year projections.

After observing how those and other factors affected the accuracy of its past outlay projections, CBO noted the following:

- Projections of net interest outlays were not as accurate as those of most other categories of spending, primarily because CBO significantly overestimated interest rates during the most recent recession and subsequent recovery (as did other economic forecasters). The sixth-year projections of such outlays were substantially less accurate than the budget-year projections. When net interest outlays are excluded from the evaluation of the projections for 1997 to 2016, the mean error of CBO's sixth-year projections of overall outlays over that period is reduced by more than half.

- Sixth-year projections of Medicare and Medicaid spending were significantly less accurate than those of all other categories of spending except for net interest outlays, in part because it took CBO several years to fully incorporate into its projections the slowing growth in spending for those programs that occurred between 1996 and 2002 and between 2008 and 2014. (Budget-year projections for those programs were considerably more accurate.)

- Occasionally, large errors in projections of spending for other programs—mostly related to financial activities—significantly influenced overall measures of bias and accuracy. For example, unanticipated changes in spending for deposit insurance that stemmed from the savings and loan crisis accounted for roughly 90 percent of the large difference between CBO's budget-year projection of total outlays for 1993 and the actual total. In 2010, the discrepancies between the projections of outlays for deposit insurance and for the Troubled Asset Relief Program (TARP) prepared the previous year and the actual amounts together exceeded the difference between the projected and actual amounts of total outlays. Excluding those two programs would lower the

---

1.   Congressional Budget Office, *An Update to the Budget and Economic Outlook: 2017 to 2027* (June 2017), www.cbo.gov/publication/52801.

average error of CBO's budget-year projections of total outlays for 1993 to 2016 by about two-thirds of a percentage point.

- Differences between CBO's estimates of total outlays in the budget year and actual outlays increased notably for the years immediately following the 2007–2009 recession and have narrowed somewhat since then. The differences between CBO's sixth-year projections and actual outlays also increased during those years, but those larger differences—stemming from projections made before 2012—have persisted in recent years.

CBO's Method for Projecting Outlays

In accordance with the rules governing baseline projections, CBO constructs its 10-year projections of federal spending and revenues under the assumption that current laws will generally remain unchanged.[2] The agency projects outlays for the three main categories of spending—mandatory, discretionary, and net interest— although the procedures used to make projections for those three categories typically differ:

- Projections of mandatory spending reflect changes that CBO anticipates will occur in the economy, demographics, and other factors that affect spending for various programs.

- Projections for discretionary spending incorporate the caps on such funding when they are in place; for years for which no caps have been legislated, the baseline reflects the assumption (as required by section 257 of the Deficit Control Act) that discretionary funding will keep pace with inflation. Those categories of discretionary funding that are not constrained by the

caps—appropriations designated for overseas military operations, for example—are assumed to keep pace with inflation throughout the baseline projection period.[3]

- Projections of net interest outlays depend on the current amount of debt held by the public, CBO's forecast of interest rates, and the agency's baseline estimates of future borrowing needs.

CBO's baseline projections of outlays are not intended to be a prediction of budgetary outcomes. Rather, they reflect CBO's best judgment about what the economy and the budget would look like in future years under existing laws. That approach allows the baseline to serve as a neutral benchmark against which the effects of proposed legislation or alternative policies can be measured.

CBO's Method for Updating Its Projections

CBO generally releases baseline budget projections three times a year: near the beginning of the calendar year, in early spring (to coincide with CBO's estimate of the President's annual budgetary proposals), and in late summer. Whenever CBO updates its baseline, the agency divides the changes in estimated outlays for each of the three types of spending into three categories: legislative, economic, and technical. Legislative changes are the estimated effects of new laws enacted since the last set of baseline projections was completed. Economic changes are those that result from an update to CBO's economic forecast. The agency typically updates its economic forecast—which includes projections of GDP, interest rates, the unemployment rate, and other factors that affect the budget—twice a year. Any updates to projections that are neither legislative nor economic are considered technical changes. Examples of such changes include those stemming from modeling improvements, the incorporation of new demographic information, recent agency actions or judicial decisions, and updated data from federal agencies or other sources.

The legislative effects that are incorporated into CBO's baseline updates normally reflect the cost estimate that was prepared when the legislation was enacted. CBO

---

2. CBO constructs its baseline in accordance with provisions set forth in the Congressional Budget and Impoundment Control Act of 1974 and the Balanced Budget and Emergency Deficit Control Act of 1985, as amended by the Balanced Budget Act of 1997. Section 257 of the Deficit Control Act specifies some exceptions to the requirement that baseline projections reflect the assumption that current laws remain unchanged. In particular, the law requires CBO to assume full funding of entitlement authority. Another exception relates to mandatory programs whose authorization expires during the baseline period. All such programs that predate the Balanced Budget Act and have current-year outlays greater than $50 million are assumed to continue in CBO's baseline projections. For mandatory programs established after 1997, continuation is assessed on a program-by-program basis, in consultation with the House and Senate Budget Committees.

---

3. In 2000, CBO estimated discretionary spending for its baseline projections using three different methods. This analysis incorporates the baseline from that year in which discretionary funding adhered to the caps through 2002. In 2001, CBO departed from convention by publishing projections of discretionary spending for 2002 that did not incorporate the caps that had been legislated for that year.

does not typically revisit its initial estimates of the budgetary effects of legislation. Rather, if it makes any subsequent revisions to its baseline to account for changes in programs affected by that legislation, CBO considers all aspects of each program and classifies the revisions as economic or technical. (For more information about how CBO categorizes changes to its original estimates of legislation, see Box 1.)

After each fiscal year ends, CBO undertakes a detailed review of the actual outlays reported by the Treasury for the year to assess the quality of its projections for that year. Those evaluations are important for two main reasons. First, they can help CBO improve its projections by identifying the factors that might have caused CBO to misestimate the trajectory of particular categories of spending. Second, such evaluations provide historical data that CBO can use to quantify the likely errors or uncertainty in future projections. (In addition to conducting those annual internal reviews, CBO has previously published evaluations of the quality of its past outlay projections. For more information about those previous evaluations of CBO's projections, see Box 2.)

CBO's Method for Assessing Its Projections

To assess its past projections of outlays, CBO compared them with actual amounts recorded in the budget and attempted to determine the sources of any differences between the two. Because the agency intentionally does not incorporate the effects of possible legislative changes into its baseline projections, this report focuses on those differences between projected and actual outlays that result from economic and technical factors. However, categorizing the changes is an imperfect process, in part because all three categories interact with one another.

This evaluation focuses on two characteristics of CBO's outlay projections: statistical bias (the tendency of a set of projections to be too low or too high over a period of time) and accuracy (how close projected values are to actual values). To measure statistical bias, CBO uses the average, or mean, error. To assess accuracy, the agency uses two other measures: the mean absolute error (which is the average of the magnitude of all errors, without regard for whether they are positive or negative) and the root mean square error (or RMSE, which is calculated by squaring the errors, averaging those squares, and taking the square root of that average). Both of those measures indicate the degree to which projections are dispersed around the actual values.

Sources of Data

Although CBO has regularly published baseline budget projections since it was established, the number of years covered by those projections has changed over time. Between 1984 (the earliest year included in this evaluation) and April 1995, CBO's projections typically covered the current year and the next 5 fiscal years. Since that time, the agency's baseline projections have covered the fiscal year in progress and the next 10 fiscal years. For example, in March 2016, CBO released projections of outlays for fiscal year 2016 (the current year), for fiscal year 2017 (the budget year), and for each of the next nine years. The Treasury Department reports the actual amounts of outlays for each year in October, shortly after the end of the fiscal year (see Figure 1). (Those actual amounts are subject to later revisions, which, if made, are typically small.)

This analysis uses estimates from the outlay projections that CBO released each spring (generally around March), primarily because the budgetary effects of legislation being considered by the Congress are typically measured in relation to those estimates.[4] The span of years examined for this evaluation differs by category of spending on the basis of data availability. The oldest projections of total outlays included here were made in 1984; the earliest projections of mandatory spending (including details for Social Security, Medicare, Medicaid, and other mandatory programs), total discretionary spending, and net interest outlays were made in 1992; and the oldest projections of defense and nondefense discretionary outlays were made in 1998.

The data necessary to categorize differences as legislative, economic, or technical for most types of spending are not available for projections made before 1992, so this analysis focuses on projections made since then. As a result, the sample size of the projection errors is relatively small by statistical standards: 24 budget-year projections and only 20 sixth-year projections. Because CBO did not extend its baseline beyond six years until late 1995 and because this analysis includes actual data only through 2016, the sample size of projection errors drops off precipitously for longer projection periods. (For example,

---

4. CBO's evaluation of its revenue projections used projections released near the beginning of the calendar year instead of those published in the spring. Using the spring updates for that analysis would have had very minimal effects on the results. See Congressional Budget Office, *CBO's Revenue Forecasting Record* (November 2015), www.cbo.gov/publication/50831.

Box 1.

How CBO Classifies Changes to Its Estimates of the Budgetary Effects of Legislation

Each time the Congressional Budget Office updates its baseline projections, the agency divides the changes in estimated outlays into three categories: legislative, economic, and technical. Because CBO constructs its baseline projections under the assumption that current laws will generally remain unchanged, the agency adjusted its projections for this report to account for the effects on outlays of legislation enacted after the projections were produced, thereby allowing it to focus on economic and technical errors.

The legislative effects that are incorporated into CBO's updated baseline projections normally reflect the cost estimate that the agency prepared when the legislation was enacted. However, the costs and savings that result from legislation depend on how the changes are implemented, prevailing economic conditions, and other factors. If any of those factors differ from the conditions that CBO initially anticipated, the agency may subsequently adjust its estimate of outlays for the affected programs to account for those variations.

CBO does not normally revisit its initial estimates of legislation, however. In fact, in most cases it would be impossible to disentangle the effect of the legislation from other factors that affect spending for a program. Rather, any subsequent changes to the baseline for programs affected by that legislation, including the estimated effects of implementing the new law through the administrative or regulatory process, are classified as economic or technical rather than legislative. Two examples of such treatment are CBO's projection of the cost of extending unemployment benefits and its projection of

additional spending for Medicaid created by the expansion of the program under the Affordable Care Act (ACA).

Emergency Unemployment Compensation. During and after the most recent recession, lawmakers enacted several laws that temporarily extended unemployment benefits under the Emergency Unemployment Compensation (EUC) program. CBO's original cost estimates for EUC extensions were based on its current economic forecasts and technical factors (such as the number of people currently receiving regular unemployment benefits and historical information on average benefit amounts and duration of unemployment spells) that were known when each estimate was prepared. In many cases, however, the actual unemployment rate ended up differing from the rate that CBO projected when it prepared its cost estimate for a particular piece of legislation. As a result, updates to CBO's baseline projections that included EUC often included changes to estimates of spending for that program that were classified as economic or technical rather than legislative.

Medicaid Expansion Under the ACA. The ACA required all states to expand Medicaid coverage, so when the law was enacted on March 23, 2010, CBO updated its baseline projections to account for the additional Medicaid outlays, a change it classified as legislative. But in 2012 the Supreme Court ruled that the Medicaid expansion was optional for states, and it became clear that some states would not expand coverage. Because of that decision, CBO reduced its projections of spending for Medicaid and recorded that revision as a technical change.

---

only 15 seventh-year projections could be evaluated.) CBO therefore chose to focus on evaluating its budget-year and sixth-year projections in this report.

Calculation of Differences Between Projected and Actual Outlays

Before comparing its baseline projections with the actual outlays reported by the Treasury Department, CBO adjusted the projections to account for the effects of legislation enacted after they were made. Because CBO's baseline is constructed under the assumption that current laws will generally remain in place, it was necessary to adjust the baseline projections to include the estimated

effects of subsequently enacted legislation.[5] Such adjustments isolate discrepancies between projected and actual amounts that stem from economic and technical factors that CBO attempts to account for in its projections.

---

5. On average, CBO estimates that legislative changes have increased total outlays in the budget year by 2 percent and in the sixth year by 4 percent. However, those averages result from wide ranges of effects. For budget-year projections made between 1984 and 2015, the effect of legislation enacted after they were prepared ranged from reducing budget-year outlays by 2 percent to increasing them by 14 percent. For the sixth-year estimates published between 1984 and 2011, the variation in legislative effects was even greater, ranging from a reduction in spending of 16 percent to an increase of 21 percent.

Box 2.

Previously Published Evaluations of CBO's Outlay Projections

Although this report is the Congressional Budget Office's most comprehensive evaluation of the quality of its past outlay projections to date, the agency has previously included evaluations of the accuracy of its outlay projections in various publications. Those evaluations, which have taken different approaches over the years, have detailed the reasons why CBO's outlay projections differed from actual amounts.

One approach that CBO has used in the past to evaluate the accuracy of its projections has been to analyze the sources of differences between targets set in the budget resolution in a given year and actual budgetary outcomes for that year.[1] The annual budget resolutions, adopted by both Houses of Congress, specify target levels for revenues, spending, and the deficit or surplus for the upcoming fiscal year (the budget year). Typically those targets are based on CBO's economic assumptions and baseline projections for the budget year and incorporate estimates of the budgetary effects of proposed policy changes to be enacted in the coming year. Thus, by evaluating the accuracy of the budget resolutions, CBO was essentially evaluating its own budget-year projections. Using that method, CBO has analyzed the accuracy of its budget projections for the years between 1977 and 1999.

In its evaluations, CBO classified the differences between the targets specified in budget resolutions and actual amounts as stemming from policy, economic, or technical factors. (In some evaluations, a fourth category was included to account for differences that resulted from administrative actions; in other evaluations, such differences were attributed to technical factors.) Differences attributed to policy changes included the budgetary effects of proposals that were anticipated at the time a resolution was prepared but not enacted during the year, proposals that were enacted in a different form than originally envisioned, and proposals that were not envisioned by lawmakers when they adopted a resolution but were enacted. Differences between the targets and actual amounts that resulted from economic and technical factors were accounted for in ways that were largely consistent with the approach used in this analysis except for years when the budget resolution incorporated the Administration's economic assumptions rather than CBO's.

In past editions of *The Budget and Economic Outlook*, which CBO publishes each winter (typically in January), the agency evaluated its track record of projecting baseline revenues, outlays, and the surplus or deficit (after adjusting the projections to account for legislative changes) in the current year, the budget year, and each of the following four years.[2] Those evaluations, which covered projections made between 1981 and 2003, included discussions of reasons for the projection errors.[3]

More recently, in 2012, CBO published a short report that compared its January 2001 baseline projections for 2001 to 2011 with the actual outlays recorded in those years and examined the reasons for differences between the projected and actual amounts.[4] The agency has also looked at the accuracy of its projections of outlays for specific programs (Medicare's Part D prescription drug program, for example) and examined why its projections for broad categories of spending (such as spending for the major health care programs) have changed over time.[5] In addition to those evaluations of its outlay projections, CBO has published assessments of the quality of its economic forecasts and revenue projections.[6]

---

1. See, for example, Congressional Budget Office, *The Economic and Budget Outlook: An Update* (August 1987), Chapter III, www.cbo.gov/publication/16362.

2. See, for example, Congressional Budget Office, *The Budget and Economic Outlook: Fiscal Years 2005 to 2014* (January 2004), Appendix A, www.cbo.gov/publication/15179.

3. Unlike the evaluations for projections made between 1981 and 2003, this analysis begins with the projections made in 1984 for 1985. The primary reason for the different starting point is that the current study evaluates outlay projections in CBO's March baselines, whereas earlier evaluations analyzed the agency's January baseline projections. The detailed data necessary to evaluate outlay projections in the agency's March baseline are available only for 1984 and later years.
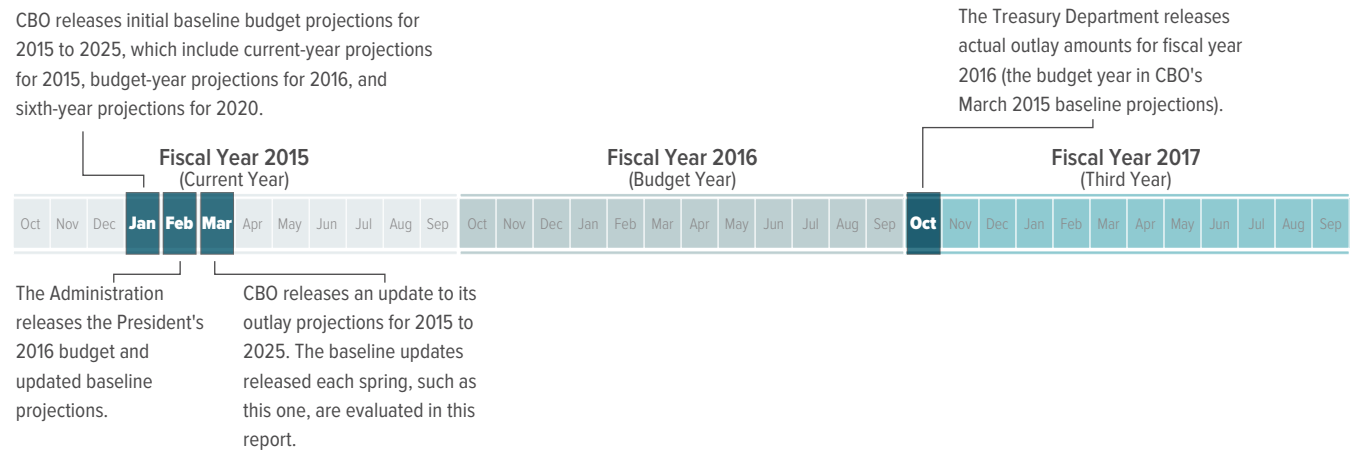
4. See Congressional Budget Office, *Changes in CBO's Baseline Projections Since January 2001* (June 2012), www.cbo.gov/publication/41463.

5. See, for example, Congressional Budget Office, "The Accuracy of CBO's Budget Projections," *CBO Blog* (March 25, 2013), www.cbo.gov/publication/44017, and "How Have CBO's Projections of Spending for Medicare and Medicaid Changed Since the August 2012 Baseline?" *CBO Blog* (February 21, 2013), www.cbo.gov/publication/43947.

6. See, for example, Congressional Budget Office, *CBO's Economic Forecasting Record: 2017 Update* (October 2017), www.cbo.gov/publication/53090, and *CBO's Revenue Forecasting Record* (November 2015), www.cbo.gov/publication/50831.

Figure 1.

Sample Timeline for Measuring Errors in CBO's Projections of Outlays for the Budget Year

CBO releases initial baseline budget projections for 2015 to 2025, which include current-year projections for 2015, budget-year projections for 2016, and sixth-year projections for 2020.

The Treasury Department releases actual outlay amounts for fiscal year 2016 (the budget year in CBO's March 2015 baseline projections).

Fiscal Year 2015
(Current Year)

Fiscal Year 2016
(Budget Year)

Fiscal Year 2017
(Third Year)

| Oct | Nov | Dec | **Jan** | **Feb** | **Mar** | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | **Oct** | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep |

The Administration releases the President's 2016 budget and updated baseline projections.

CBO releases an update to its outlay projections for 2015 to 2025. The baseline updates released each spring, such as this one, are evaluated in this report.

Source: Congressional Budget Office.

Dates for the budget-year projection of outlays for 2016 (the most recent examined in this study) are used in this timeline for illustrative purposes. The timelines for measuring errors in all budget-year projections of outlays are similar, although the President's budget is not always released in February.

The agency also adjusted its baseline projections and the actual amounts reported to remove outlays related to Fannie Mae and Freddie Mac, two entities that help finance the majority of mortgages in the United States. CBO did so because it accounts for the activities of those entities differently than the Administration does in the budget or the Treasury does in its reports. Since 2008, when the federal government placed Fannie Mae and Freddie Mac into conservatorship, CBO and the budget committees have considered the activities of those two institutions to be governmental. In CBO's view, transactions between Fannie Mae and Freddie Mac and the Treasury should be considered intragovernmental. In contrast, the Administration considers Fannie Mae and Freddie Mac to be outside the federal government for budgetary purposes and thus records cash transactions between them and the Treasury as increases or decreases in federal outlays.[6] Because the accounting for those two concepts is entirely different, comparing CBO's estimates with the amounts recorded by the Treasury would not contribute to a meaningful assessment of CBO's statistical bias or accuracy in estimating outlays.

After making those two adjustments, CBO calculated the errors in its projections by subtracting actual outlays

from the adjusted projections and dividing that difference by actual outlays. Thus, the errors are expressed as percentages of actual outlays, with negative values representing underestimates and positive values, overestimates. For example, in March 2015, CBO released baseline projections for 2015 through 2025 and projected that outlays in the budget year, 2016, would total a little more than $3.9 trillion under current law. That projection was $55 billion more than actual outlays in 2016 (excluding spending for Fannie Mae and Freddie Mac). Adjusting CBO's projection for the estimated $49 billion in outlays that resulted from legislation enacted into law after the baseline was completed increases the total difference between projected and actual outlays to $104 billion. Dividing that amount by actual outlays recorded in 2016 ($3.9 trillion) yields a projection error of 2.7 percent. (See the appendix for a detailed explanation of how CBO calculates and characterizes the differences from one baseline update to the next.)

Measuring the Quality of Projections
Like CBO's previous studies of its economic forecasts and revenue projections, this evaluation of the agency's outlay projections focuses on two indicators of quality: statistical bias and accuracy.

Statistical Bias. The statistical bias of a set of projections indicates the tendency of the projections to err in

---

6. To make its estimate of current-year outlays reflect what the Treasury will ultimately report, CBO adopts the Administration's treatment for outlays in the current year.

a particular direction. CBO aims to provide a baseline projection of outlays that is free of such bias—that is, one that is equally likely to be higher than actual outlays as it is to be lower. To measure statistical bias, CBO uses the mean error—the arithmetic average of the projection errors—which is the simplest measure of bias. However, because the positive values of overestimates offset the negative values of underestimates in the calculation of the mean error, the measure provides an imperfect view of the accuracy of a projection. A number of projections with small errors in both directions that largely offset one another would produce a small mean error. But so, too, would relatively large overestimates and underestimates, as long as they were approximately the same magnitude and counterbalanced one another.

Accuracy. The accuracy of a set of projections is the degree to which projected values are dispersed around actual outcomes. In this evaluation, CBO used two standard measures of accuracy: the mean absolute error and the RMSE. The mean absolute error is the arithmetic average of the errors without regard to the sign of the error (that is, the negative signs are removed from underestimates before averaging), so errors in different directions do not offset one another. The RMSE also measures the size of errors without regard to direction, but by squaring the errors, it places a greater weight on larger deviations.[7]

Assessment of the Projections

CBO's projections of total outlays and of most broad categories of spending for both the budget year and the sixth year have generally been too high. Projections for the budget year have been more accurate than those for the sixth year for most categories of spending, primarily because changes in the economy, demographics, and a variety of other factors are more difficult to anticipate over longer time horizons.
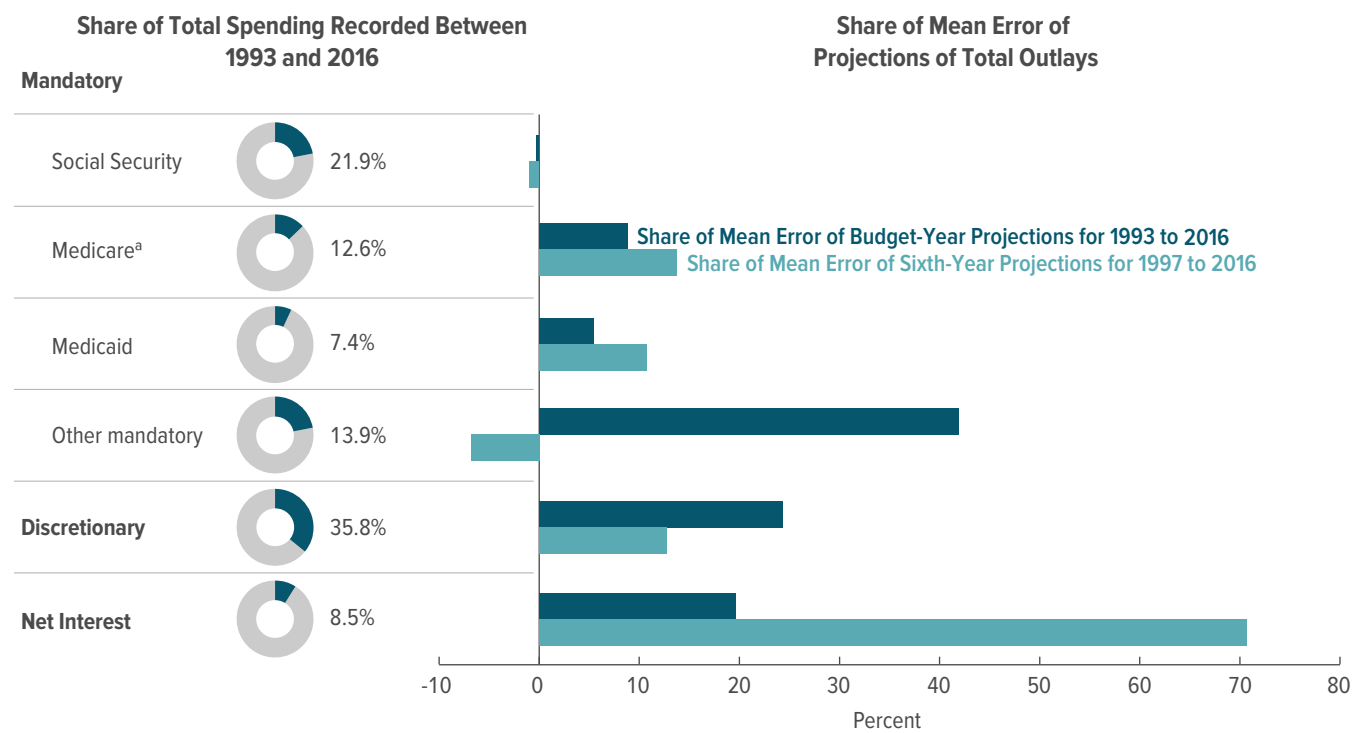
The sum of the budget-year projections of spending that CBO prepared between 1992 and 2015 for the years 1993 to 2016 and the estimated outlays in those years resulting from legislation enacted after those projections were prepared is $61.9 trillion (excluding outlays related to Fannie Mae and Freddie Mac). However, actual outlays for those years were $1.3 trillion, or 2.2 percent, less than that amount. Errors in projections of outlays for mandatory programs other than Social Security, Medicare, and Medicaid accounted for about 40 percent of the total difference between projected and actual amounts, even though such spending represented only about 14 percent of all outlays over that time. Similarly, the projections of outlays for net interest, which made up about 9 percent of total outlays, were responsible for 20 percent of the overall difference (see Figure 2). By contrast, projections of discretionary spending accounted for about a quarter of the total difference even though such spending has constituted about 36 percent of total outlays since 1993. Social Security made up 22 percent of total outlays but had almost no effect on the mean error of projections of total outlays.

For the sixth-year projections of total outlays that CBO made for the years 1997 to 2016, overestimates of net interest outlays were responsible for most of the gap between projected outlays and actual amounts. Although such spending made up only about 8 percent of all outlays over that period, it accounted for roughly 70 percent of the total difference between estimated outlays and the actual amounts reported.[8] Projections of Medicare spending—the next largest contributor to the overall error—accounted for about 14 percent of the difference between projected and actual outlays, an amount roughly equal to such spending's share of total outlays since 1997. As was the case for the budget-year projections, discrepancies between projections of discretionary spending and actual amounts accounted for a portion of the overall mean error (13 percent) that was much smaller than such spending's share of total outlays between 1997 and 2016 (36 percent). In its sixth-year projections, CBO underestimated spending for mandatory programs other than Social Security, Medicare, and Medicaid, offsetting a small part of the agency's overestimates in other categories of spending and reducing the mean error of its projections of total outlays by 7 percent. Those other

---

7.   The RMSE is calculated by squaring the projection errors, averaging those squares, and taking the square root of that average. The mean square projection error is equal to the square of the bias in the errors plus the variance (that is, the square of the standard deviation) of the errors. Because the projection errors in this assessment are measured as a percentage of the actual amount, the RMSE measurement reported here is often referred to as the root mean square percentage error. Likewise, the mean absolute error reported in this assessment is often referred to as the mean absolute percentage error.

---

8.   If net interest is excluded, the average error of CBO's sixth-year projections made for 1997 to 2016 drops from 5.9 percent to 2.3 percent.

Figure 2.

Share of Total Spending and of Projection Errors for Total Outlays, by Category of Spending

Share of Total Spending Recorded Between 1993 and 2016

Share of Mean Error of Projections of Total Outlays

Mandatory

Social Security — 21.9%

Medicare[a] — 12.6%

Medicaid — 7.4%

Other mandatory — 13.9%

Discretionary — 35.8%

Net Interest — 8.5%

Share of Mean Error of Budget-Year Projections for 1993 to 2016
Share of Mean Error of Sixth-Year Projections for 1997 to 2016

Percent

Source: Congressional Budget Office.

Errors are projected amounts minus actual amounts, expressed as percentages of actual amounts; thus, a negative error indicates an underestimate, and a positive error, an overestimate. The mean error is the arithmetic average of the projection errors.

Outlays related to the activities of Fannie Mae and Freddie Mac are excluded from the data above. The projection errors also exclude the estimated budgetary effects of legislation enacted after the projections were produced.

a. Includes offsetting receipts.

programs accounted for about 14 percent of total outlays over the period.

About three-quarters of the mean error in the budget-year projections of total outlays (after the adjustments to remove the discrepancies attributable to legislative changes) stems from technical factors and the remainder of the error, from economic factors. Errors in projections of specific categories of spending were overwhelmingly technical in nature, with the exception of errors in projections of net interest, which stemmed primarily from errors in CBO's forecast of interest rates, and in projections of outlays for Social Security. About 60 percent of the mean error of the sixth-year projections of total outlays is attributable to economic factors, namely the difficulty CBO and others experienced in forecasting interest rates. As with the budget-year projections, errors in the agency's sixth-year projections of specific

categories of spending other than net interest and Social Security were largely technical.

The 2007–2009 recession provides one example of the significant effect that economic developments can have on the budget. Both budget-year projections and sixth-year projections for fiscal year 2010 were less accurate than those for most previous years because of the 2007–2009 recession and the difficulty of projecting interest rates during the subsequent economic recovery and expansion. Although the mean error and the mean absolute error of the budget-year projections have returned to levels similar to those recorded before the recession, the errors for the sixth-year projections have not.

Total Outlays

In the budget-year projections that CBO made between 1984 and 2015, the agency was more likely to

Table 1.

Summary Measures of the Quality of CBO's Projections of Outlays

Percent

	Budget-Year Projections			Sixth-Year Projections		
	Mean Error	**Mean Absolute Error**	**Root Mean Square Error**	**Mean Error**	**Mean Absolute Error**	**Root Mean Square Error**
	By Category of Error					
	(For baseline projections published since 1984)[a]					
Total Outlays	1.7	2.3	3.1	3.0	5.9	6.7
Economic errors	0.4	0.7	0.9	3.1	3.5	3.9
Technical errors	1.3	2.0	2.6	-0.1	4.0	4.9
	By Category of Spending					
	(For baseline projections published since 1992)[b]					
Total Outlays	2.2	2.3	2.9	5.9	6.0	6.9
Mandatory	2.4	2.9	4.1	2.5	3.4	5.0
Social Security	*	0.8	0.9	0.3	2.9	3.6
Medicare[c]	1.9	3.3	4.1	7.3	8.0	10.5
Medicaid	2.5	4.0	5.1	10.3	13.5	17.5
Other mandatory	7.0	8.5	13.8	-1.9	5.2	6.3
Discretionary	1.3	1.4	1.7	1.9	2.0	2.5
Net Interest	5.2	7.7	9.4	54.0	56.0	67.0

Source: Congressional Budget Office.

Errors are projected amounts minus actual amounts, expressed as percentages of actual amounts; thus, a negative error indicates an underestimate, and a positive error, an overestimate. The mean error is the arithmetic average of the projection errors. The mean absolute error is the average of the errors with the negative signs removed from the underestimates. The root mean square error is calculated by squaring the projection errors, averaging those squares, and taking the square root of that average.

The estimated budgetary effects of legislation enacted after the projections were produced, as well as outlays related to the activities of Fannie Mae and Freddie Mac, are excluded from the errors.

* = between zero and 0.05 percent.

a. Measures are based on budget-year projections for 1985 to 2016 and sixth-year projections for 1989 to 2016. The data necessary to calculate the projection errors for total outlays are not available for projections made before 1984.

b. Measures are based on budget-year projections for 1993 to 2016 and sixth-year projections for 1997 to 2016. The data necessary to calculate the projection errors for most types of spending are not available for projections made before 1992.

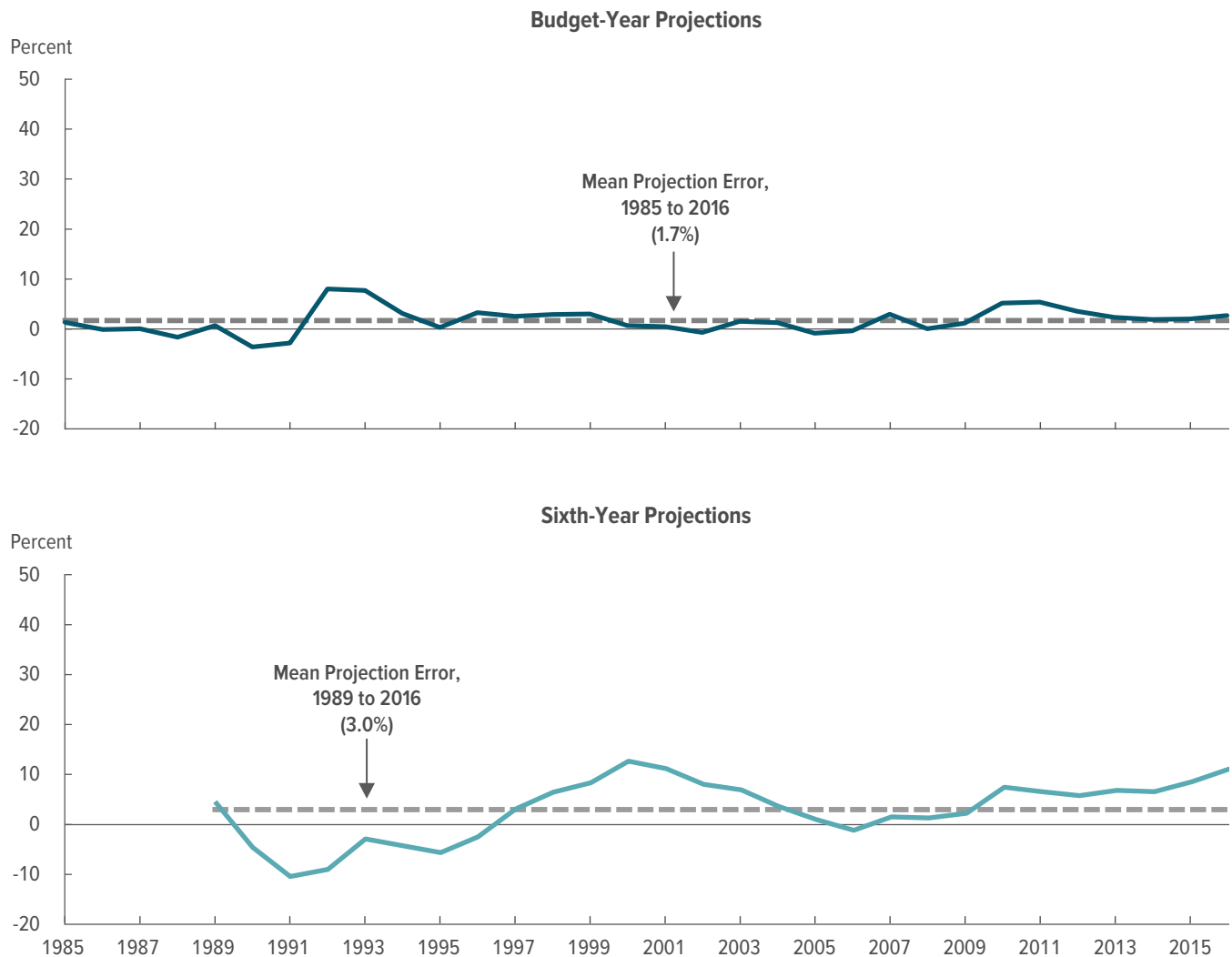c. Includes offsetting receipts.

overestimate total outlays (excluding the effects of legislative changes) than to underestimate them. The mean error of projections made in those years is 1.7 percent, the mean absolute error is 2.3 percent, and the RMSE is 3.1 percent (see Table 1). If the projection of $4.1 trillion in total outlays for 2018 that CBO published in June 2017 had an error equal to that mean absolute error, actual outlays would be $0.1 trillion higher or lower than the agency projected.

CBO's projections of total outlays for the budget year have generally been close to actual amounts. Half of the projections made between 1984 and 2015 were within

2 percent of the actual outlays. A few errors, however, were much larger than that. In 1992, for example, CBO overestimated total outlays for 1993 by about 8 percent for economic and technical reasons (see Figure 3). The unusually large error in the projection for that year was primarily the result of an unanticipated delay in providing the funding necessary to allow the government to resolve failed savings and loan associations. (The projection for 1992 was off by a similar amount.) When such spending is excluded, CBO's projection for 1993 is only about 1 percent higher than actual outlays recorded for that year.

Figure 3.

Errors in CBO's Projections of Total Outlays

Budget-Year Projections

Percent

Mean Projection Error,
1985 to 2016
(1.7%)

Sixth-Year Projections

Percent

Mean Projection Error,
1989 to 2016
(3.0%)

Source: Congressional Budget Office.

The years shown are those for which each projection was made. For example, the values shown for 2016 are for the budget-year projection published in March 2015 and the sixth-year projection published in March 2011.

Errors are projected amounts minus actual amounts, expressed as percentages of actual amounts; thus, a negative error indicates an underestimate, and a positive error, an overestimate. The mean error is the arithmetic average of the projection errors.

The estimated budgetary effects of legislation enacted after the projections were produced, as well as outlays related to the activities of Fannie Mae and Freddie Mac, are excluded from the errors.

CBO's sixth-year projections have also tended to be too high. Of the 28 sixth-year projections of total outlays evaluated, 20 exceeded the actual amounts recorded. The mean error (3.0 percent), the mean absolute error (5.9 percent), and the RMSE (6.7 percent) of the projections made between 1984 and 2011 for 1989 to 2016 were larger than those of the budget-year projections analyzed in this report. The larger values of the three summary measures of the quality of the sixth-year projections indicate that they had larger errors than the budget-year projections had and that those errors were more widely dispersed. Of the 28 sixth-year projections, 9 were within 4 percent of actual outlays, and 4 were off by 10 percent or more. If CBO's June 2017 projection of $5.2 trillion in total outlays for 2022 (the current sixth-year projection) had an error equal to that mean absolute error of 5.9 percent, actual outlays would differ from the projected amount by $0.3 trillion.

Mandatory Outlays

Mandatory, or direct, spending consists of outlays for some federal benefit programs and for certain other payments to people, businesses, nonprofit institutions, and state and local governments. It includes outlays for Social Security, Medicare, and Medicaid as well as other spending that is generally governed by statute rather than by specific annual appropriations. (Some mandatory programs receive annual funding in appropriation acts.) In 2016, mandatory spending amounted to $2.4 trillion, or 63 percent of total federal outlays for the year (net of offsetting receipts, which reduce outlays). The share of all federal outlays that goes to mandatory spending has grown significantly over time; such spending accounted for about 47 percent of federal spending in 1992.

The Deficit Control Act requires CBO to construct baseline projections of spending for most mandatory programs under the assumption that current laws will continue unchanged.[9] CBO's projections of mandatory spending also reflect changes in the economy, demographics, and other factors that it anticipates will occur under current law.

Excluding legislative changes, CBO has tended to overestimate mandatory outlays since 1992 (the first year for which the data necessary for evaluation are available). Indeed, 19 of 24 budget-year projections made for the years 1993 to 2016 exceeded actual amounts (see Figure 4). The mean error of those projections was 2.4 percent, and the mean absolute error, 2.9 percent (see Table 2). Most of the projections—17 of 24 (including 16 of the 18 most recent projections)—had errors of 2.9 percent or less. Only 5 projections differed from the actual amounts by a percentage greater than the RMSE of the projections (4.1 percent). If CBO's June 2017 projection of $2.6 trillion in mandatory outlays for 2018 (the current budget-year projection) had an error equal to that mean absolute error of 2.9 percent, actual outlays for those programs would be $74 billion higher or lower than projected.

The statistical bias and accuracy of the sixth-year projections of mandatory spending followed a pattern similar

to that of the budget-year projections. Of the 20 sixth-year projections made between 1992 and 2011 (for 1997 to 2016), 14 were overestimates. The mean error of CBO's sixth-year projections was 2.5 percent—only 0.1 percentage point higher than the mean error of the budget-year estimates. The size of overestimates in the two sets of projections is also similar. For the budget-year projections, the largest overestimate was 12.7 percent, and the average overestimate was 3.4 percent; for the sixth-year projections, the largest overestimate was 11.8 percent, and the average overestimate, 4.2 percent. In addition, when CBO underestimated mandatory outlays in its sixth-year projections, it did so by slightly larger amounts than it did in its budget-year projections. The average underestimate in the sixth-year projections was 1.4 percent, whereas the average underestimate in the budget-year projections was 1.1 percent. The mean absolute error of the sixth-year projections (3.4 percent) was about half a percentage point greater than the mean absolute error of the budget-year projections.

In general, both CBO's budget-year and sixth-year projections of Social Security outlays have been close to actual outlays and have exhibited little statistical bias. Projections of Medicare and Medicaid have been further off, especially those for the sixth year. CBO's budget-year projections of other mandatory spending have differed significantly from actual outlays, mostly because of large errors in projections of outlays for a few programs. The sixth-year projections of other mandatory spending, however, have been much closer to actual spending. That is the only major category for which the sixth-year projections were more accurate than the budget-year projections.
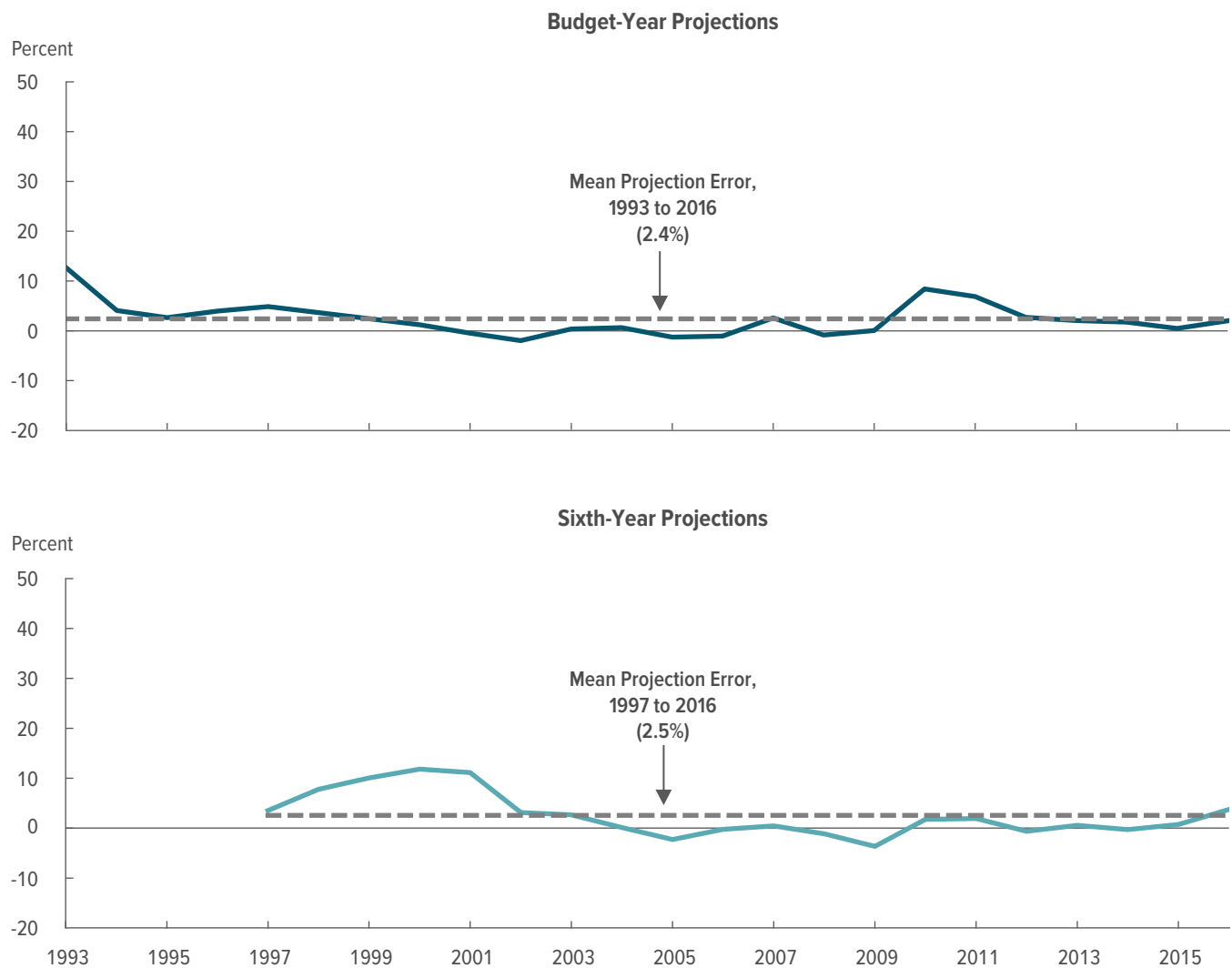
Social Security. Social Security comprises two parts: Old-Age and Survivors Insurance (OASI) and Disability Insurance (DI). To receive either type of benefit, an individual must have a substantial work history and meet other criteria. (For old-age benefits, the claimant must have reached a minimum retirement age; for disability benefits, a claimant must be unable to work because of a disability.) Certain dependents of deceased, retired, or disabled workers also qualify for benefits. CBO's projections of outlays for those benefits are based on the number of beneficiaries and their average benefits. In 2016, mandatory outlays for Social Security totaled $910 billion, almost 85 percent of which was for OASI.[10]

---

9. In keeping with rules established by the Deficit Control Act, CBO's baseline projections reflect the assumption that certain mandatory programs whose authorization expires within the current projection period will continue. In addition, the Deficit Control Act directs CBO to assume that entitlement authority will be fully funded and that a cost-of-living adjustment for veterans' compensation will be granted each year.

---

10. Administrative expenses for Social Security are classified as discretionary spending.

Figure 4.

Errors in CBO's Projections of Mandatory Outlays

Budget-Year Projections

Percent

Mean Projection Error,
1993 to 2016
(2.4%)

Sixth-Year Projections

Percent

Mean Projection Error,
1997 to 2016
(2.5%)

1993   1995   1997   1999   2001   2003   2005   2007   2009   2011   2013   2015

Source: Congressional Budget Office.

The years shown are those for which each projection was made. For example, the values shown for 2016 are for the budget-year projection published in March 2015 and the sixth-year projection published in March 2011.

Errors are projected amounts minus actual amounts, expressed as percentages of actual amounts; thus, a negative error indicates an underestimate, and a positive error, an overestimate. The mean error is the arithmetic average of the projection errors.

The estimated budgetary effects of legislation enacted after the projections were produced, as well as outlays related to the activities of Fannie Mae and Freddie Mac, are excluded from the errors.

Statistical Bias and Accuracy. CBO's budget-year projections of Social Security spending were lower than the actual outlays almost as often as they were too high—and by roughly similar amounts—resulting in a mean error close to zero (see Figure 5). Those projections also have consistently been accurate, with a mean absolute error of 0.8 percent. Of the 24 budget-year projections evaluated, 17 had an error of 1 percent or less; the largest difference between projected and actual outlays was 2.6 percent. In general, relatively small errors in CBO's forecasts of inflation, which determine annual cost-of-living adjustments (COLAs), have been offset by relatively small errors related to other determinants of benefit amounts and projections of caseloads. (Caseloads for Social Security are fairly stable from year to year, which contributes significantly to the accuracy of CBO's estimates.)

Table 2.

Summary Measures of the Quality of CBO's Projections of Mandatory Outlays

Percent

	Budget-Year Projections			Sixth-Year Projections		
	Mean Error	Mean Absolute Error	Root Mean Square Error	Mean Error	Mean Absolute Error	Root Mean Square Error
Total Mandatory	2.4	2.9	4.1	2.5	3.4	5.0
Economic errors	0.1	0.6	0.8	0.2	2.0	2.6
Technical errors	2.3	2.7	3.9	2.3	3.0	4.0
Social Security	*	0.8	0.9	0.3	2.9	3.6
Economic errors	-0.2	0.5	0.7	-0.4	1.7	2.4
Technical errors	0.3	0.5	0.6	0.7	1.8	2.4
Medicare[a]	1.9	3.3	4.1	7.3	8.0	10.5
Economic errors	0.1	0.3	0.4	1.0	1.6	2.0
Technical errors	1.8	3.1	3.9	6.2	7.1	9.2
Medicaid	2.5	4.0	5.1	10.3	13.5	17.5
Economic errors	*	0.4	0.5	*	1.4	1.7
Technical errors	2.5	4.0	5.0	10.3	13.1	17.0
Other Mandatory	7.0	8.5	13.8	-1.9	5.2	6.3
Economic errors	0.7	1.9	2.3	0.8	4.4	5.7
Technical errors	6.2	8.1	13.5	-2.6	6.2	8.2

Source: Congressional Budget Office.

Measures are based on budget-year projections for 1993 to 2016 and sixth-year projections for 1997 to 2016 from the baseline projections that CBO published between 1992 and 2015.

Errors are projected amounts minus actual amounts, expressed as percentages of actual amounts; thus, a negative error indicates an underestimate, and a positive error, an overestimate. The mean error is the arithmetic average of the projection errors. The mean absolute error is the average of the errors with the negative signs removed from the underestimates. The root mean square error is calculated by squaring the projection errors, averaging those squares, and taking the square root of that average.

The estimated budgetary effects of legislation enacted after the projections were produced, as well as outlays related to the activities of Fannie Mae and Freddie Mac, are excluded from the errors.

* = between −0.05 and 0.05 percent.

a. Includes offsetting receipts.

As with the budget-year projections, the sixth-year projections of Social Security outlays were too low almost as often as they were too high, resulting in small mean error (0.3 percent). The mean absolute error (2.9 percent) and RMSE (3.6 percent) were larger than those for the budget-year projections but still relatively small, indicating that the sixth-year projections were fairly accurate. Of the 20 projections evaluated, 15 differed from actual outlays by less than the RMSE of 3.6 percent, and only 2 were off by more than 6 percent.

Factors Underlying the Errors. The large size and stability of OASI caseloads enable CBO to project outlays for Social Security fairly accurately. For OASI, the number

of beneficiaries collecting benefits at the beginning of a projection period is large, and the entries to and exits from the program are relatively small. Thus, projections of future caseloads are not particularly volatile.

Projecting the average benefits per beneficiary depends on accurate forecasts of the growth in wages and of the rate of inflation. Initial Social Security benefit amounts are based on workers' individual earnings histories (indexed to changes in average annual earnings for the U.S. workforce). Because the number of new entrants to the program is relatively small, the main determinant of the change in average benefits each year is the COLA, which is based on the annual increase, if any,

Figure 5.

Errors in CBO's Projections of Social Security Outlays
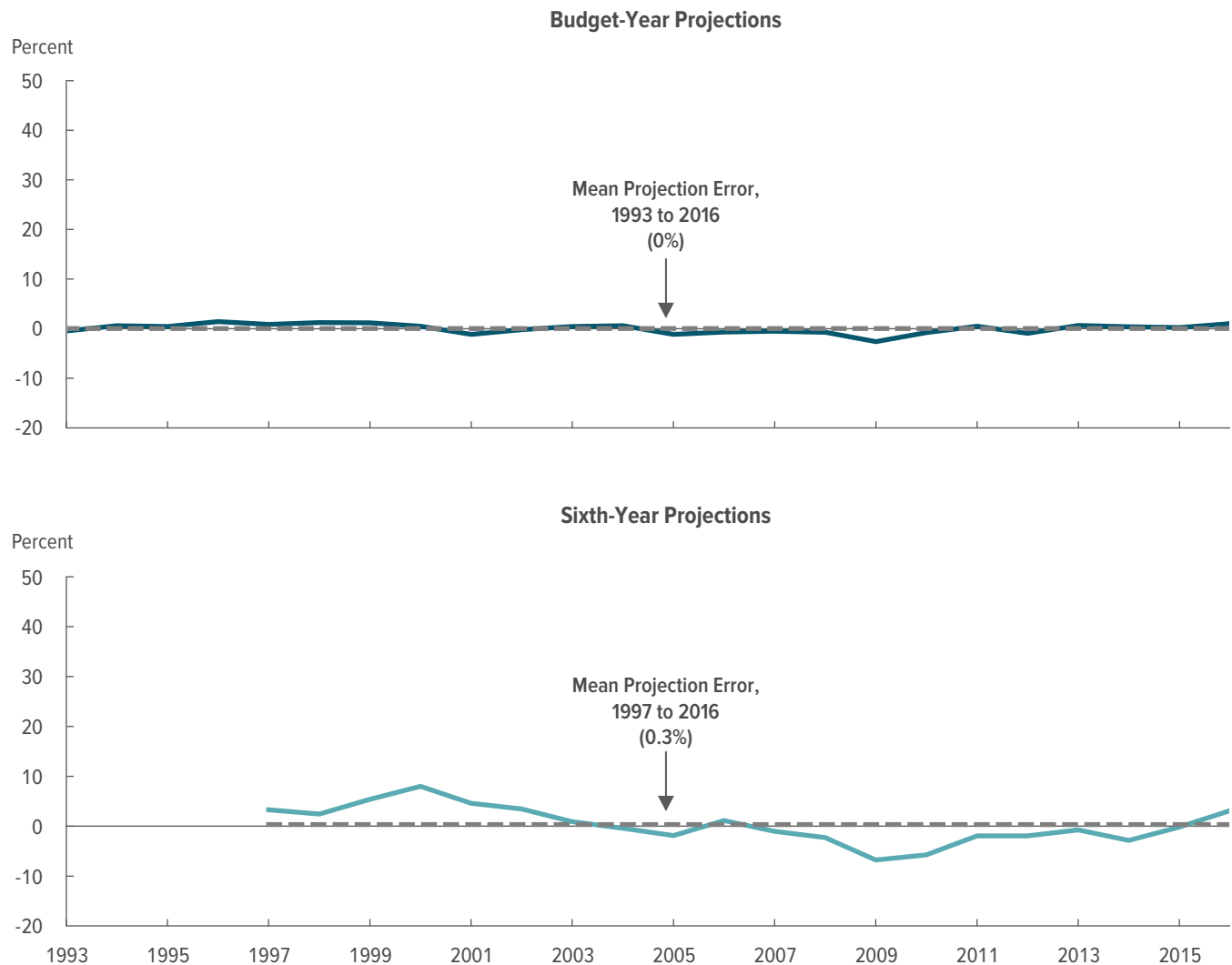
Budget-Year Projections

Percent

Mean Projection Error,
1993 to 2016
(0%)

Sixth-Year Projections

Percent

Mean Projection Error,
1997 to 2016
(0.3%)

Source: Congressional Budget Office.

The years shown are those for which each projection was made. For example, the values shown for 2016 are for the budget-year projection published in March 2015 and the sixth-year projection published in March 2011.

Errors are projected amounts minus actual amounts, expressed as percentages of actual amounts; thus, a negative error indicates an underestimate, and a positive error, an overestimate. The mean error is the arithmetic average of the projection errors.

The estimated budgetary effects of legislation enacted after the projections were produced are excluded from the errors.

in the consumer price index for urban wage earners and clerical workers.

Most of the overestimates in CBO's sixth-year projections for Social Security occurred in the projections made between 1992 and 1997 (for 1997 to 2002) and were the result of both technical and economic factors. In the underlying economic forecasts that the agency

prepared for those years, CBO overestimated inflation in the consumer price index, on average (as did the Administration and the *Blue Chip* consensus, an average of about 50 private-sector forecasts).[11]

---

11. Congressional Budget Office, *CBO's Economic Forecasting Record: 2017 Update* (October 2017), www.cbo.gov/publication/53090.

Most of the underestimates in CBO's sixth-year projections of Social Security outlays occurred in the projections made between 1999 and 2010 (for 2004 to 2015), and like the underestimates in the budget-year projections, they are largely related to CBO's forecasts of inflation. One notable example is CBO's March 2004 baseline projection, in which the agency projected that outlays for Social Security would total $618 billion in 2009. Actual outlays amounted to $678 billion that year—$60 billion more than CBO projected. According to CBO's calculations, about three-quarters of that difference was the result of economic factors. Much of that error arose because COLAs for 2005 through 2009 ended up being larger than CBO anticipated. For example, in 2004, CBO projected that the COLA for 2009 would be 2.2 percent, but the COLA that year was unusually high—5.8 percent.[12]

Medicare. Medicare provides subsidized medical insurance to the elderly and to some people with disabilities. The program has three principal components: Part A (Hospital Insurance), Part B (Medical Insurance, which covers doctors' services, outpatient care, home health services, and other medical services), and Part D (which covers outpatient prescription drugs). Part D coverage began in 2006, more than halfway through the period covered in this report. People generally become eligible for Medicare when they reach age 65 or two years after they qualify to receive disability insurance. Nearly all Medicare beneficiaries begin participating in the program soon after they become eligible. In 2016, net outlays for Medicare (including the offsetting effects of premium payments and other receipts to the program) totaled $588 billion.

Statistical Bias and Accuracy. CBO overestimated Medicare outlays for the budget year about 60 percent of the time, less often than it overestimated either total outlays or mandatory outlays as a whole. The mean error of the budget-year projections of Medicare outlays (1.9 percent) is slightly smaller than the corresponding error for total outlays. Of the 24 budget-year projections, 10 were within 2 percent of the actual outlays for Medicare, but 1 projection (that was made in 1998 for 1999) was 11 percent higher than the actual amount (see Figure 6). The mean absolute error of CBO's budget-year

projections of Medicare outlays was 3.3 percent, and the RMSE was 4.1 percent.

The differences between CBO's sixth-year projections of Medicare outlays and actual outlays were much larger; their mean error was 7.3 percent. CBO overestimated Medicare outlays in about three-quarters of its sixth-year projections, and on average, those overestimates were significantly larger (10.2 percent) than the underestimates (1.5 percent), resulting in a mean absolute error (8.0 percent) that is only modestly higher than the mean error. The RMSE of the sixth-year projections was 10.5 percent, about twice as large as the RMSE of the projections of all mandatory outlays, indicating that differences between projected and actual Medicare outlays were particularly large in some years. In fact, the errors of 5 of the 20 sixth-year projections exceeded the RMSE— those produced for 1999 to 2003. The errors in CBO's projections of Medicare outlays for the sixth year of its baseline projection period have ranged from an underestimate of 3.3 percent in its 2004 forecast (for 2009) to an overestimate of 23.4 percent in its 1997 forecast (for 2001).[13] The large errors highlight the growing difficulty of projecting spending for Medicare as the projection period extends further into the future.

Factors Underlying the Errors. Most of the differences between projected and actual outlays stem from technical factors. For example, growth in Medicare spending slowed significantly from 1996 to 2002, and it took CBO several years to recognize that the change was more than a short-term deviation from past trends and to fully incorporate the slowdown into its projections of spending. That slowdown appears to have been caused by factors affecting beneficiaries' demand for care and changes in providers' behavior. A similar lag between a sustained slowdown and CBO's recognizing it and incorporating it into the agency's projections of Medicare spending occurred after the 2007–2009 recession.[14]
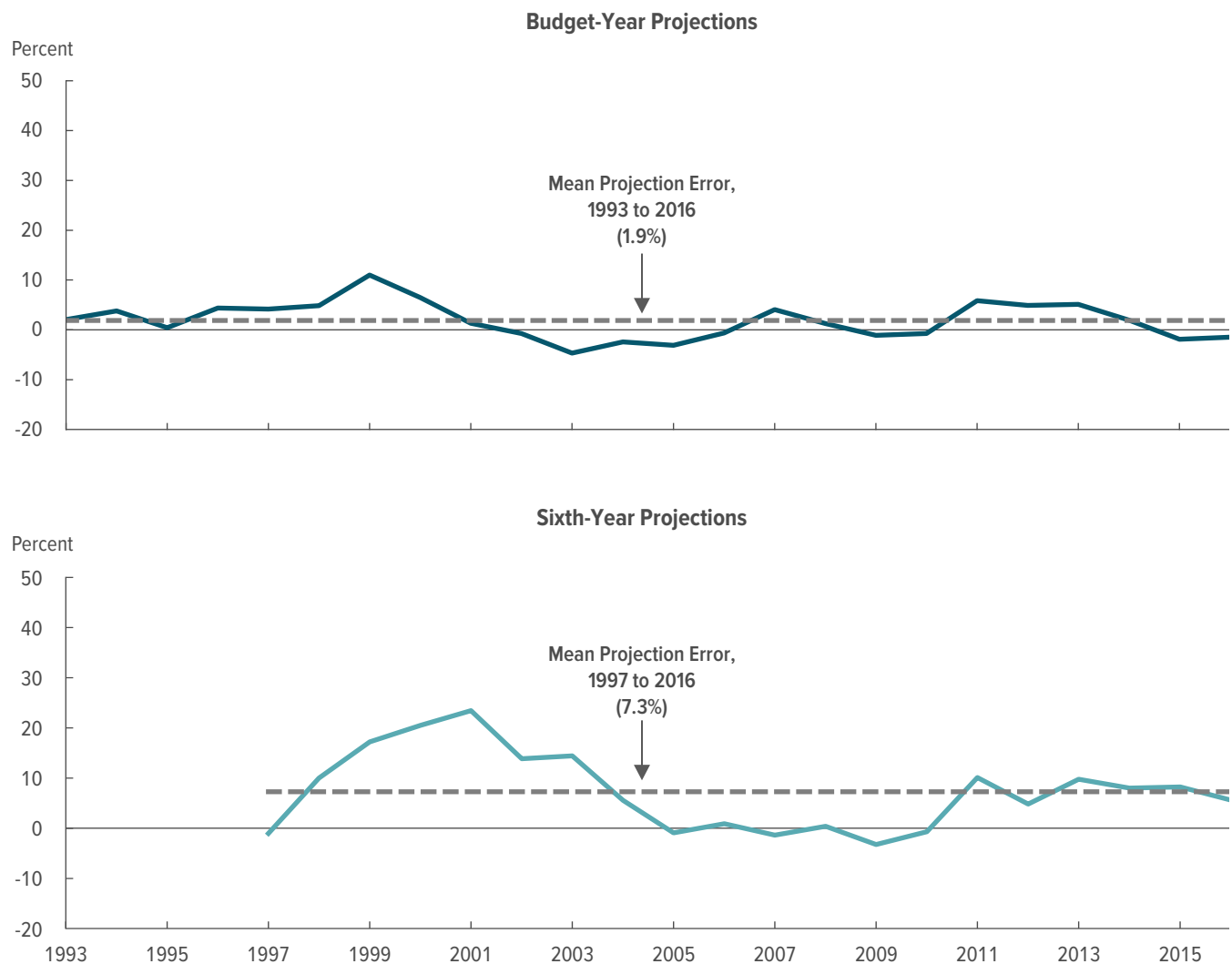
---

12. Congressional Budget Office, *The Budget and Economic Outlook: Fiscal Years 2005 to 2014* (January 2004), p. 61, www.cbo.gov/publication/15179.

13. For most years of the analysis, sixth-year projections of Medicare outlays made by the Centers for Medicare & Medicaid Services were similar to those made by CBO. See Centers for Medicare & Medicaid Services, "Trustees Report & Trust Funds" (last updated July 13, 2017), https://go.usa.gov/xnCkg.

14. See Michael Levine and Melinda Buntin, *Why Has Growth in Spending for Fee-for-Service Medicare Slowed?* Working Paper 2013-06 (Congressional Budget Office, August 2013), www.cbo.gov/publication/44513.

Figure 6.

Errors in CBO's Projections of Medicare Outlays

Budget-Year Projections

Percent

Mean Projection Error,
1993 to 2016
(1.9%)

Sixth-Year Projections

Percent

Mean Projection Error,
1997 to 2016
(7.3%)

Source: Congressional Budget Office.

Medicare outlays include offsetting receipts.

The years shown are those for which each projection was made. For example, the values shown for 2016 are for the budget-year projection published in March 2015 and the sixth-year projection published in March 2011.

Errors are projected amounts minus actual amounts, expressed as percentages of actual amounts; thus, a negative error indicates an underestimate, and a positive error, an overestimate. The mean error is the arithmetic average of the projection errors.

The estimated budgetary effects of legislation enacted after the projections were produced are excluded from the errors.

The largest overestimate in CBO's sixth-year projections of Medicare outlays (23.4 percent in its 1997 projection for 2001) was so large because CBO made the projection immediately after a period of rapid growth in the program and before the agency recognized that a marked and lasting slowdown had begun. In other years, estimates of the effects of legislation, such as the new prescription drug benefit, proved to be too high, and adjustments to those original estimates were classified as technical changes. When technical errors are excluded and only differences attributable to economic factors are considered, the mean error of the budget-year projections falls to 0.1 percent, and that of the sixth-year projections drops to 1.0 percent. Those economic errors

stem from misestimates of various measures of inflation, which are the basis for adjusting payment rates for most services in the fee-for-service component of Medicare.

Medicaid. Medicaid is a joint federal-state program that pays for health care services for people with low income. State governments operate the program under federal oversight, and the federal government reimburses each state a portion of its costs for medical care and program administration. The states administer the program's daily operations, reimburse health care providers and health plans, and determine which eligibility and service options to adopt. Federal outlays for Medicaid are affected by whether states choose to cover optional groups of enrollees and optional services, states' reimbursement rates for providers, and economic growth. (Medicaid is generally countercyclical—that is, spending for Medicaid tends to rise when the economy falters.) In 2016, federal spending for Medicaid totaled $368 billion.

Statistical Bias and Accuracy. Even though CBO has tended to overestimate federal spending for Medicaid about as often as it has spending for Medicare, the differences between projected and actual outlays are larger for Medicaid. CBO overestimated outlays for Medicaid in about 60 percent of the budget-year projections evaluated. The errors in the projections ranged from an underestimate of 5.6 percent (in the projection for 2015) to an overestimate of 12.0 percent (in the projection for 1994) and averaged 2.5 percent overall (see Figure 7). The mean absolute error of those projections was 4.0 percent, and the RMSE, 5.1 percent. About three-quarters of CBO's budget-year projections were within 5 percent of the actual outlays for Medicaid.

CBO overestimated outlays for Medicaid more frequently—80 percent of the time—in its sixth-year projections. Those projections were, on average, too high by 10.3 percent. The mean absolute error of the projections was 13.5 percent, significantly higher than the 4.0 percent mean absolute error of the budget-year projections, indicating that the challenge of projecting outlays for Medicaid increases as the projection period extends further into the future. Of the 20 sixth-year projections evaluated, 6 were off by a percentage greater than the mean absolute error, some by substantially larger amounts. The differences exceeded 30 percent on three occasions, contributing to an RMSE of 17.5 percent. CBO's sixth-year projections of Medicaid outlays have

improved over time. The mean absolute error of projections made between 1992 and 2000 (for 1997 to 2005) averaged 20.3 percent, but that of projections made for 2006 to 2016 was much smaller: 8.0 percent. Most of the differences between projected and actual spending for Medicaid are classified as technical errors.

Factors Underlying the Errors. CBO's projections of spending for Medicaid have been heavily influenced by volatile patterns of past growth. Growth in Medicaid outlays has fluctuated significantly since 1980: Annual changes in such spending have ranged from an increase of 29 percent to a decrease of 9 percent. From 1980 to 1993, Medicaid spending increased at an average annual rate of 14 percent (including three years, 1990 to 1992, in which there was extremely high growth). CBO expected that strong growth to persist, and that expectation is reflected in the March 1992 baseline projections it made for 1993 to 1997, which showed average annual growth of about 13 percent in spending for Medicaid. But the growth in spending slowed abruptly beginning in 1994, in part because of legislation designed to limit the ability of states to make payments to institutions that care for large numbers of indigent patients. Medicaid spending continued to grow at a slower pace, largely because rapid economic growth held down enrollment in the program. Another factor during that period was legislation that changed the relationship between Medicaid and people who qualified for income support programs. For a time, the new laws created confusion about Medicaid eligibility rules among the state agencies that administer the program, which led to some enrollees losing their eligibility. Because a significant portion of the budgetary effects of those developments were not recognized at the time legislation was enacted or when economic updates were made to CBO's baselines, the differences between CBO's projections and actual outlays were recorded as technical.

By 1997, CBO had lowered its projection of annual growth in Medicaid outlays significantly; the agency estimated that federal outlays for Medicaid would increase at an average annual rate of nearly 8 percent over the 1998–2007 period.[15] On average, actual growth over that period was even lower, at about 7 percent annually. (However, annual growth in Medicaid spending spiked

---

15. Congressional Budget Office, *The Economic and Budget Outlook: Fiscal Years 1998–2007* (January 1997), www.cbo.gov/publication/10330.

Figure 7.

Errors in CBO's Projections of Medicaid Outlays
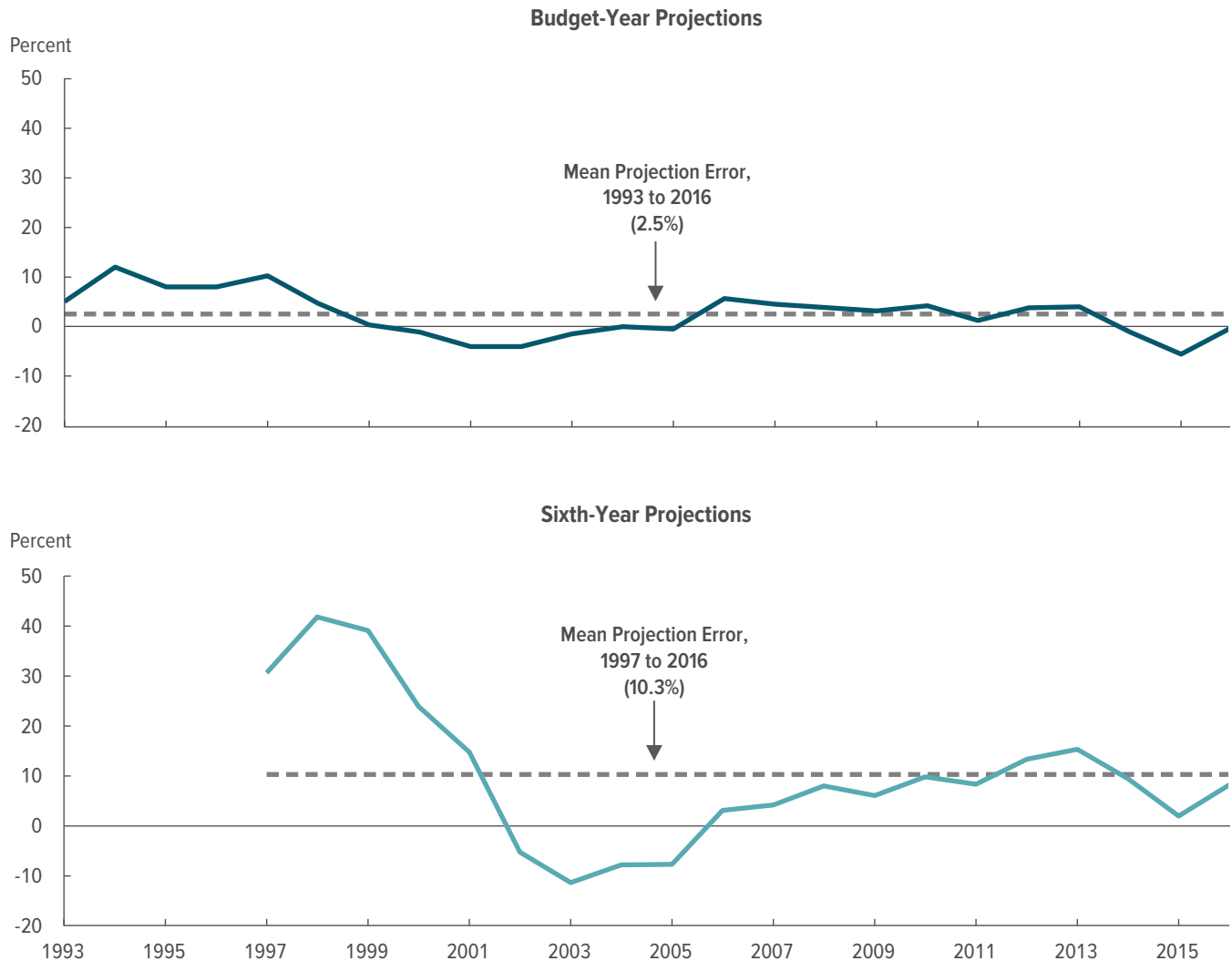
Budget-Year Projections

Percent

Mean Projection Error,
1993 to 2016
(2.5%)

Sixth-Year Projections

Percent

Mean Projection Error,
1997 to 2016
(10.3%)

Source: Congressional Budget Office.

The years shown are those for which each projection was made. For example, the values shown for 2016 are for the budget-year projection published in March 2015 and the sixth-year projection published in March 2011.

Errors are projected amounts minus actual amounts, expressed as percentages of actual amounts; thus, a negative error indicates an underestimate, and a positive error, an overestimate. The mean error is the arithmetic average of the projection errors.

The estimated budgetary effects of legislation enacted after the projections were produced are excluded from the errors.

to 14 percent in 2002—the result of a combination of higher prices and rising enrollment and utilization—and was 9 percent in 2003 and 10 percent in 2004, causing CBO's budget-year and sixth-year projections for those years to be too low.)

In its sixth-year projections for later years, 2007 through 2016, CBO continued to overestimate outlays for the

program, by an average of about 8 percent. Growth in spending for Medicaid slowed significantly from 2011 to 2013. Indeed, in 2012, when the additional federal matching funds that were provided to states by the American Recovery and Reinvestment Act (ARRA) from 2009 to 2011 were no longer available, federal spending *fell* by nearly 9 percent. As a result, the sixth-year

projections that CBO made between 2006 and 2008 for those years overestimated outlays by an average of 13 percent.

In its most recent baseline projections, published in June 2017, the agency projected that outlays for Medicaid would grow at an average annual rate of 5 percent over the 2018–2027 period.[16] The primary reason that CBO expects Medicaid outlays to grow at a slower rate in the future is that it projects lower growth in spending for long-term care.

Other Mandatory Spending. Other mandatory spending includes some federal expenditures for health care (other than those for Medicare and Medicaid); outlays for income security programs, such as unemployment compensation and nutrition assistance; and spending for civilian and military retirement, certain veterans' benefits, agricultural support, and higher education (including the net cost of student loans). It also includes outlays related to programs designed to stabilize the financial sector, such as deposit insurance and, during the most recent recession, TARP. Outlays for such programs can swing positive or negative and are significantly affected by financial crises. In 2016, other mandatory spending amounted to $575 billion.

Statistical Bias and Accuracy. Budget-year projections of other mandatory spending have tended to be significantly too high. The mean error of the budget-year projections of such spending (after the adjustments to account for the effects of legislative changes) is 7.0 percent—significantly greater than the mean errors of the budget-year projections of outlays for Social Security, Medicare, and Medicaid. CBO overestimated outlays for other mandatory spending in about three-quarters of the projections, and the average overestimate was 10.3 percent. Moreover, CBO overestimated other mandatory spending in every budget-year projection made for the years 2009 to 2016. Underestimates were fewer and smaller. In the six projections in which CBO underestimated other mandatory spending for the budget year, the average underestimate was 3.0 percent. The mean absolute error of the budget-year projections of other mandatory spending was 8.5 percent, and the RMSE, 13.8 percent.

---

16. Congressional Budget Office. *An Update to the Budget and Economic Outlook: 2017 to 2027* (June 2017), www.cbo.gov/ publication/52801.

Most of the errors in the budget-year projections stemmed from overestimates of outlays for programs aimed at mitigating financial crises—the 2007– 2009 recession and the savings and loan crisis of the late 1980s (which continued to affect outlays into the 1990s). When spending for those programs is removed from the analysis, the measures of bias and accuracy for the budget-year projections of other mandatory spending improve dramatically: The mean error falls to 1.7 percent; the mean absolute error, to 4.4 percent; and the RMSE, to 5.3 percent.

Together, the economic and technical errors in CBO's sixth-year projections of other mandatory spending are smaller than those for the budget-year projections. The mean error of the sixth-year projections is –1.9 percent, meaning that, on average, the projections were less than actual outlays. The overestimates in the sixth-year projections of other mandatory spending were fewer and smaller than those in the budget-year projections. Of the 20 sixth-year projections, 14 (or 70 percent) were lower than actual spending. The mean absolute error of the sixth-year projections of other mandatory spending was 5.2 percent, and the RMSE was 6.3 percent.

Factors Underlying the Errors. The errors in the budget-year projections were heavily influenced by spending for programs that help resolve financial crises. About 70 percent of the cumulative difference between the budget-year projections of other mandatory spending made for 1993 through 2016 and the actual outlays recorded in those years stems from misestimates of outlays for deposit insurance and for the Troubled Asset Relief Program, which was established in 2008. Nearly 90 percent of the errors in the budget-year projections of outlays for those two programs is concentrated in the projections made for 1993, 2010, and 2011 (see Figure 8). For the sixth-year projections of other mandatory spending, the errors are mostly from projections of spending on programs other than TARP and deposit insurance.

The largest percentage error in a single budget-year projection of other mandatory spending was 48 percent in CBO's 1992 projection for 1993. (Actual outlays were $80 billion less than CBO projected, before any adjustments to account for legislative differences.) Most of that error arose from a delay in the funding of the Resolution Trust Corporation (RTC).

Figure 8.

Errors in CBO's Projections of Other Mandatory Spending

Budget-Year Projections

Percent

Deposit Insurance and TARP

All Other Mandatory

Other Mandatory, Excluding Deposit Insurance and TARP

Sixth-Year Projections

Percent

Source: Congressional Budget Office.

The years shown are those for which each projection was made. For example, the values shown for 2016 are for the budget-year projection published in March 2015 and the sixth-year projection published in March 2011.

Errors are projected amounts minus actual amounts, expressed as percentages of actual amounts; thus, a negative error indicates an underestimate, and a positive error, an overestimate. The mean error is the arithmetic average of the projection errors.

The estimated budgetary effects of legislation enacted after the projections were produced, as well as outlays related to the activities of Fannie Mae and Freddie Mac, are excluded from the errors.

TARP = Troubled Asset Relief Program.

The RTC, which was established in 1989, was charged with purchasing and liquidating assets (such as mortgage loans) of savings and loan associations that were declared insolvent by the Office of Thrift Supervision in the late 1980s. (In 1995, the duties of the RTC were transferred to the Federal Deposit Insurance Corporation.) Both CBO and the Administration considered outlays for the

activities of the RTC to be a mandatory obligation and estimated its operations on an unconstrained basis, anticipating that the program would need additional resources beyond those that had been provided under current law at the time. Organizations such as the RTC that aim to resolve failed financial institutions have both positive and negative outlays: Amounts that the government spends

to purchase assets are recorded as positive outlays, and amounts it receives for selling those assets are recorded as negative outlays—or offsetting receipts. (Premiums for certain programs, such as deposit insurance, are also reflected on the federal budget as offsetting receipts.) Over the 1993–2016 period, net outlays for the RTC and deposit insurance totaled –$127 billion, about 1½ percent of all other mandatory spending; however, that total reflects several years of substantial outlays offset by other years of sizable receipts.

In 1992, CBO projected that insurance losses and disbursements of the RTC would exceed the proceeds from asset sales in 1993 and result in net outlays of $50 billion. However, funding for the program was interrupted from April 1992 to December 1993, and as a result, the RTC had limited authority to incur losses. It could, however, continue to sell off its portfolio of assets, and consequently, the RTC recorded negative outlays of $28 billion in 1993.

For the next 15 years or so, the discrepancies between CBO's projections of other mandatory spending and the actual amounts were relatively small. But the errors spiked again in the wake of the 2007–2009 recession, primarily because of overestimates in projections of outlays for deposit insurance and TARP. Over successive baselines, CBO revised downward its budget-year projections of outlays for deposit insurance for 2010 and 2011—by $68 billion and by $22 billion, respectively—to account for changes in the timing of expenditures and receipts stemming from the failure of federally insured banks, thrift institutions, and credit unions during the financial crisis. During those years, the Federal Deposit Insurance Corporation also accelerated premium payments (which are recorded as negative outlays) from covered institutions to replenish the balances of the Deposit Insurance Fund, which had been depleted as a result of the financial crisis.

CBO's estimates of outlays for TARP in those projections were also too high. TARP was created by the Emergency Economic Stabilization Act of 2008, which granted the Treasury broad authority to invest up to $700 billion in troubled financial assets. The law specified that costs of TARP should be recorded in the budget by calculating the present value of the program's anticipated costs, adjusted for market risk.[17] Under the rules that govern

budget estimates for such programs, the riskiness of credit-related activity is reevaluated each year, and any changes to the assessment of whether a program would result in costs or savings to the government are recorded that year as "credit reestimates." Those changes are considered technical, and they may be either positive or negative. Net outlays for TARP have amounted to roughly $24 billion since the program was created, but both large positive and large negative outlays were recorded from 2009 to 2012.

Initially, CBO estimated that the entire $700 billion made available to TARP would be disbursed and that, as a result of significantly weakened financial markets, much of the value of the assets purchased under TARP would not be recovered. As the Treasury's approach to implementing the program became clear and financial markets stabilized to the point that several large banks were able to repurchase preferred stock that they had sold to the government, the program's net cost to the government and its effect on the deficit declined. Most of the discrepancies between the 2009 and 2010 budget-year projections for 2010 and 2011 and the actual outlays for those years arose because TARP actually disbursed far less than originally anticipated and because the disbursements that were made were not as costly as initially envisioned by CBO and the Administration's Office of Management and Budget (OMB). Because of those changes, OMB revised its estimate of the cost of the credit-related activities under TARP, decreasing the estimated cost of the program by $117 billion in 2010 and by $58 billion in 2011 by recording negative outlays of those amounts in those years.[18]

Aside from errors related to outlays for the RTC, deposit insurance, and TARP, some of the largest errors in CBO's budget-year and sixth-year projections of other mandatory spending include those associated with the following categories of outlays:

■ Outlays for countercyclical income security programs (such as unemployment compensation), projections

---

17. A present value is a single number that expresses a flow of current or future income or payments in terms of an equivalent lump sum received or paid at a specific point in time.

18. Comparing estimates that account for market risk with actual budgetary outlays can be considered conceptually inconsistent, because the estimates include premiums to account for market risk, whereas the actual amounts do not incorporate that additional cost. Even if losses were exactly as forecast, there would still be downward reestimates after the transactions were completed and the actual cash flows were discounted using risk-free rates. For more information, see Congressional Budget Office, *Fair-Value Accounting for Federal Credit Programs* (March 2012), www.cbo.gov/publication/43027.

of which are sensitive to CBO's forecasts of economic factors, such as the unemployment rate, and tend to be too low at the start of recessions and too high in periods of recovery;

- The subsidy costs of student loans, revisions to which can be positive or negative and are recorded in the federal budget each year using the Administration's estimates; and

- Receipts from the Federal Communications Commission's periodic auctions of licenses for use of the electromagnetic spectrum.

Some other components of other mandatory spending are more easily estimated, and errors in CBO's projections of outlays for those programs are smaller. In particular, federal civil service and military retirement programs exhibit characteristics similar to Social Security, including fairly stable caseloads, detailed data on benefit payments, and annual cost-of-living adjustments. Errors in projections of outlays for those retirement programs thus follow a pattern similar to those in projections for Social Security—economic errors stemming from errors in forecasts of inflation are generally offset by technical errors, so the mean error is near zero.

Discretionary Outlays

Funding for most discretionary programs is provided through annual appropriation acts in the form of budget authority—that is, the authority to incur financial obligations that result in federal outlays. Discretionary spending is divided into two main categories: defense and nondefense. Lawmakers appropriate funding each year for the majority of defense and nondefense activities; the latter include activities and programs such as law enforcement, transportation, national parks, disaster relief, and foreign aid. (A few programs receive multiyear appropriations.) Depending on the activity or program, federal spending that arises from that budget authority can occur quickly (to pay salaries, for example) or slowly (to pay for long-term research and construction). Thus, discretionary outlays recorded each year come not only from new budget authority but also from prior appropriations. To estimate the amount of outlays that would result from projected discretionary funding levels, CBO typically evaluates factors such as the historical rate at which budget authority has been obligated and spent as well as the amount of outstanding budget authority available from previous years' appropriations. Over the

past 25 years, discretionary spending has decreased as a share of total federal outlays, falling from 39 percent in 1992 to 31 percent in 2016.

Because funding for most discretionary programs is provided in annual appropriation acts, the largest differences between CBO's projections of discretionary spending and the actual amounts recorded tend to be legislative in nature. They result from differences between the appropriated amounts and the baseline projections and reflect any adjustments made to caps on discretionary funding, such as those currently in place through 2021. CBO's baseline projections generally reflect the assumption, specified in section 257 of the Deficit Control Act, that funding keeps pace with inflation. For years in which caps on discretionary funding were in place, the projected funding levels reflect those caps.

Almost all of the small economic errors in projections of discretionary outlays arise because of errors in the agency's forecast of inflation. The remaining differences between projections of discretionary spending and actual amounts are classified as technical and largely stem from the agency's misestimating the rate at which budget authority would be spent.

CBO's budget-year projections of discretionary outlays have generally been too high, but by only a relatively small amount; the mean error of those projections is 1.3 percent (see Table 3). Nevertheless, of the 24 such estimates produced for 1993 to 2016, 20 exceeded the actual outlays in those years. As for accuracy, the mean absolute error of those projections was 1.4 percent, less than that of budget-year projections of any other category of spending except for Social Security. An error of that size in CBO's June 2017 budget-year projection of $1.2 trillion in discretionary outlays would mean that the agency misestimated actual discretionary outlays for 2018 by $17 billion.

An RMSE of 1.7 percent—only slightly higher than the mean absolute error—indicates that the errors of CBO's budget-year projections of discretionary spending were narrowly dispersed. Only 8 of the 24 projections evaluated differed from actual outlays by more than 1.7 percent. (But 7 of those 8 projections were made in the past 10 years.) The largest difference was between the projection published in 2009 and the actual outlays recorded in 2010; CBO overestimated discretionary outlays by 3.5 percent, or $47 billion, mostly because the funds

Table 3.

Summary Measures of the Quality of CBO's Projections of Discretionary Outlays

Percent

	Budget-Year Projections			Sixth-Year Projections		
	Mean Error	Mean Absolute Error	Root Mean Square Error	Mean Error	Mean Absolute Error	Root Mean Square Error
By Category of Error						
(For baseline projections published since 1992)[a]						
Total Discretionary	1.3	1.4	1.7	1.9	2.0	2.5
Economic errors	-0.1	0.1	0.2	-0.1	0.8	1.1
Technical errors	1.4	1.4	1.7	2.0	2.2	2.6
By Category of Spending						
(For baseline projections published since 1998)[b]						
Defense	0.9	1.4	1.7	1.4	1.9	2.4
Nondefense	2.1	2.4	2.7	2.9	3.0	3.4

Source: Congressional Budget Office.

Errors are projected amounts minus actual amounts, expressed as percentages of actual amounts; thus, a negative error indicates an underestimate, and a positive error, an overestimate. The mean error is the arithmetic average of the projection errors. The mean absolute error is the average of the errors with the negative signs removed from the underestimates. The root mean square error is calculated by squaring the projection errors, averaging those squares, and taking the square root of that average.

The estimated budgetary effects of legislation enacted after the projections were produced are excluded from the errors.

a. Measures are based on budget-year projections for 1993 to 2016 and sixth-year projections for 1997 to 2016. The data necessary to calculate the projection errors for total discretionary outlays are not available for projections made before 1992.

b. Measures are based on budget-year projections for 1999 to 2016 and sixth-year projections for 2003 to 2016. The data necessary to calculate the projection errors for defense and nondefense discretionary spending are not available for projections made before 1998.

provided by the American Recovery and Reinvestment Act of 2009 were spent more slowly than CBO anticipated (see Figure 9).

The sixth-year projections of discretionary spending follow a pattern similar to that of the budget-year projections in terms of both statistical bias and accuracy. Of the 20 sixth-year projections of discretionary spending evaluated, 18 exceeded actual amounts. Nevertheless, the measures of bias and accuracy have generally been much smaller than those for projections of other major categories of spending. On average, CBO overestimated discretionary spending by 1.9 percent in its sixth-year projections; the mean absolute error of the projections was 2.0 percent. The variation in the errors was relatively narrow. In its sixth-year projections, CBO underestimated discretionary outlays by as much as 0.8 percent (in its 2004 projection for 2009) and overestimated them by as much as 5.2 percent (in its 2008 projection for 2013), resulting in an RMSE of 2.5 percent. The largest misestimates tended to be in projections in which

both defense spending and nondefense spending were overestimated.

Currently, funding for the two categories of discretionary spending are subject to separate caps (with adjustments for spending related to overseas contingency operations, disaster relief, designated emergencies, and initiatives designed to enhance program integrity). From 1992 to 1998, however, total funding for discretionary programs, regardless of whether it was for defense or nondefense purposes, was subject to a single cap for some years. CBO did not consistently make separate budget-year and sixth-year projections for the two categories; it projected only total discretionary spending. As a result, CBO does not have the historical data needed to distinguish between defense and nondefense spending in projections made before 1998.[19] In general, CBO has tended to

---

19. For information on the accuracy of the estimates of discretionary spending that CBO prepared for appropriation bills before 1998, see Congressional Budget Office, *An Analysis of CBO's Outlay Estimates for Appropriation Bills, Fiscal Years 1993–1997* (October 1998), www.cbo.gov/publication/11255.

Figure 9.

Errors in CBO's Projections of Total Discretionary Outlays
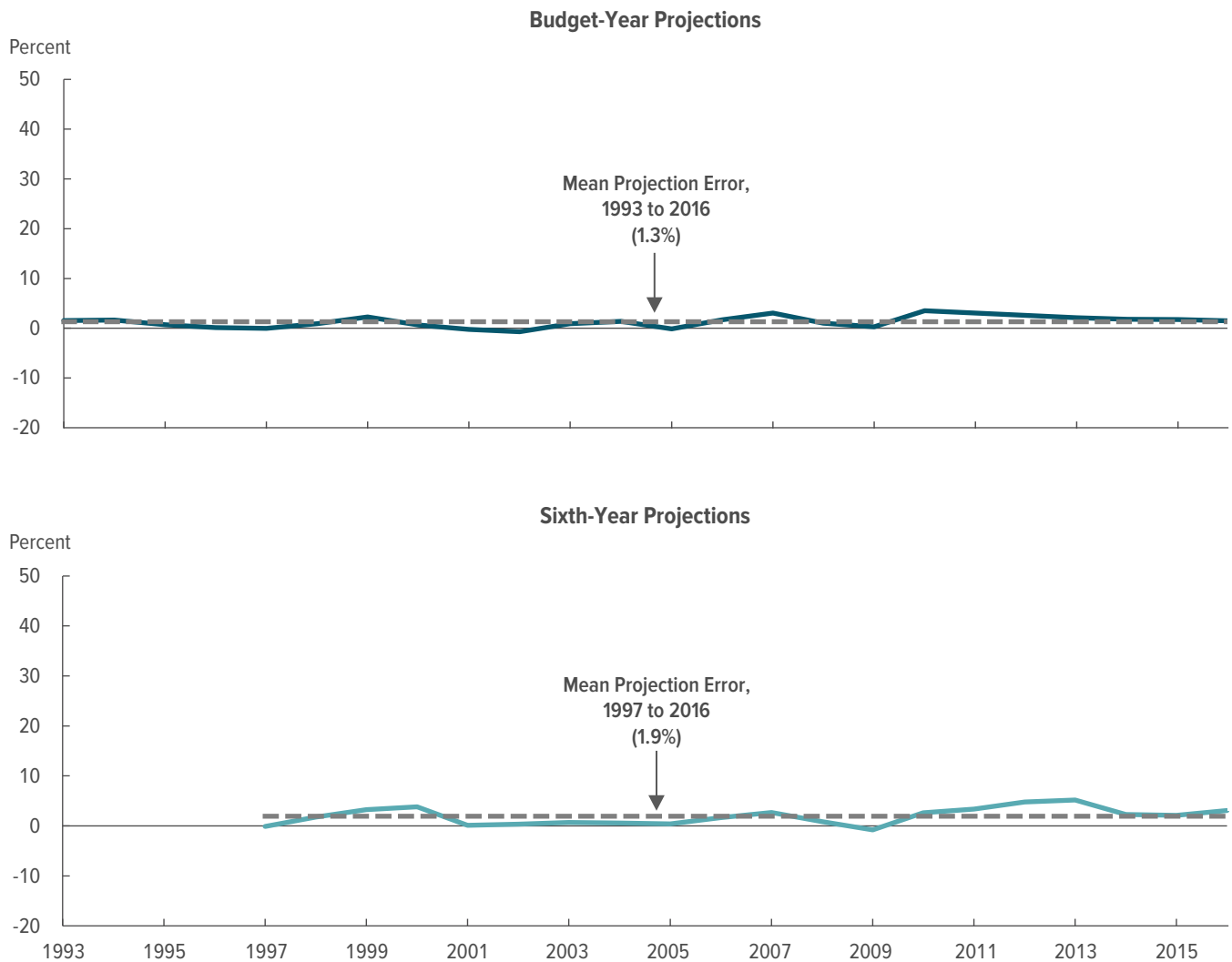
Budget-Year Projections

Percent

Mean Projection Error,
1993 to 2016
(1.3%)

Sixth-Year Projections

Percent

Mean Projection Error,
1997 to 2016
(1.9%)

Source: Congressional Budget Office.

The years shown are those for which each projection was made. For example, the values shown for 2016 are for the budget-year projection published in March 2015 and the sixth-year projection published in March 2011.

Errors are projected amounts minus actual amounts, expressed as percentages of actual amounts; thus, a negative error indicates an underestimate, and a positive error, an overestimate. The mean error is the arithmetic average of the projection errors.

The estimated budgetary effects of legislation enacted after the projections were produced are excluded from the errors.

overestimate both defense and nondefense outlays since 1998, but it has overestimated nondefense spending by larger amounts.

Defense Spending. Defense spending consists of the outlays associated with the military activities of the Department of Defense (DoD)—including those for operation and maintenance, procurement of weapon

systems and other equipment, and pay and benefits for military personnel—as well as with the atomic energy activities of the Department of Energy. A small portion of defense spending is for various defense-related activities in other agencies. In 2016, outlays for defense totaled $585 billion and accounted for almost half of all discretionary outlays and 15 percent of total outlays.

Statistical Bias and Accuracy. Overall, CBO has tended to slightly overestimate defense spending for the budget year. Of the 18 budget-year projections made for 1999 through 2016, 16 were overestimates, leading to a mean error of 0.9 percent. All but one of the overestimates were made in consecutive years between 2001 and 2015 (in projections for 2002 to 2016), and the mean error of those projections was 1.3 percent. Despite CBO's tendency to overestimate such spending, its budget-year projections of defense outlays have been fairly accurate: A third of the projections fell within 1 percent of the actual outlays, and none differed from the actual amounts by more than 3.3 percent. The mean absolute error of those projections was 1.4 percent.

Much like CBO's sixth-year projections for discretionary spending as a whole, CBO's sixth-year projections of defense spending tended to be slightly high (about two-thirds of the projections were overestimates) but were among the most accurate of the projections of all the various categories of spending evaluated. On average, CBO overestimated defense spending by 1.4 percent in the sixth-year projections it made between 1998 and 2011 (for 2003 to 2016). The mean absolute error of those projections was 1.9 percent. The projection errors ranged from an underestimate of 1.7 percent (in the projection made in 1999 for 2004) to an overestimate of 4.4 percent (in the projection published in 2008 for 2013).

Factors Underlying the Errors. Although CBO underestimated the rate at which defense budget authority would be spent in the budget-year projections it made between 1999 and 2000 (for 2000 and 2001), it overestimated the rate in the projections it made between 2001 and 2015 (for 2002 to 2016). One reason for those overestimates was that significant changes in funding levels and uncertainty about future funding amounts resulted in patterns of spending that differed from those CBO had anticipated. The differences between projected and actual outlays for 2002 to 2016 largely stemmed from sharp increases in funding in the early and mid-2000s for overseas contingency operations (war-related activities, primarily in Iraq and Afghanistan) and changes in the tempo of total spending. In its projections for 2003 to 2010, CBO overestimated defense outlays, partly because the number and timing of appropriation bills varied during that period, making it difficult to estimate the rates at which the regularly increasing budget authority would be spent. After defense funding began to decline in 2010, CBO continued to overestimate budget-year

spending for defense for the next few years. In part, that is because uncertainty over future funding created by the Budget Control Act of 2011 led DoD to spend its budget authority more slowly than CBO had expected. In its projections for 2015 and 2016, CBO still overestimated defense discretionary spending, but it did so by considerably smaller amounts—less than 1 percent of actual outlays.

Although projections of all categories of defense spending contributed to the overestimates of total defense spending for the years 2002 to 2016, some categories affected the accuracy of CBO's projections more than others. For example, projections of spending for military personnel have been both relatively unbiased and accurate. The mean error and mean absolute error of the projections of such spending made between 2001 and 2015 (for 2002 to 2016) were both less than 1.0 percent. By contrast, projections of spending for operation and maintenance, including DoD's working capital funds, and for procurement have differed more significantly from actual spending. The majority of those projections have been too high for the past 14 years.

Nondefense Spending. Nondefense programs cover a wide array of government activities, including those related to primary and secondary education, transportation, federal law enforcement, and pay and benefits for federal employees. In 2016, discretionary outlays for nondefense purposes totaled $600 billion and accounted for just over half of all discretionary outlays and 16 percent of total outlays.

Statistical Bias and Accuracy. CBO overestimated nondefense spending for the budget year as frequently as it did defense spending in the projections made for 1999 to 2016, but the magnitude of the differences was larger, on average, for nondefense spending. Of the 18 budget-year projections evaluated, CBO overestimated nondefense discretionary spending in 15 of them (including the 6 most recent projections, those for 2010 to 2016). The mean error of the budget-year projections of nondefense discretionary spending was 2.1 percent, 1.2 percentage points higher than the mean error of the budget-year projections of defense discretionary outlays. Furthermore, the standard measures of accuracy indicate that CBO's nondefense discretionary projections have been somewhat less accurate than its defense projections. The mean absolute error (2.4 percent) and the RMSE (2.7 percent) of CBO's budget-year projections

of nondefense outlays were 1 percentage point higher than the corresponding measures for the agency's defense projections.

The differences between CBO's sixth-year projections of nondefense discretionary spending and actual outlays follow a pattern similar to those of its budget-year projections (that is, large errors tend to occur in budget-year projections and sixth-year projections for the same years). Although the sixth-year projections of nondefense spending were a bit worse than the agency's sixth-year defense projections in terms of both statistical bias and accuracy, they were nevertheless slightly more accurate and less statistically biased than the agencies' projections of most other categories of spending. The sixth-year projections of nondefense discretionary outlays exceeded the actual amounts recorded in every year except 2009, but they did so by relatively small amounts: 9 of the 14 projections were within 3.0 percent of the actual amounts. The overestimates in the projections made between 2005 and 2011 (for 2010 to 2016) were a little larger, averaging 4.0 percent.

Factors Underlying the Errors. Although most of the overestimates for nondefense outlays were relatively small, projections of spending for certain programs have tended to have larger errors. For instance, projected budget-year collections for the Federal Housing Administration's (FHA's) single-family mortgage insurance program have differed by more than 10 percent from actual collections on multiple occasions. The budgetary effect recorded for that program each year is the estimated present value of the government's receipts from fees and its expenses from defaults (net of recoveries) over many years from the guarantees issued in that year.[20] Those amounts are recorded as offsetting collections—that is, funds collected from other government accounts or from the public that are treated as negative budget authority and outlays. Most of the difference between CBO's projection and the actual amount is considered technical, and that difference tends to be larger when there are significant fluctuations in the housing market.

CBO's projections of discretionary outlays for Pell grants also vary in terms of accuracy more than other discretionary programs. The program was created to improve the access of low-income students to postsecondary education. CBO bases its projections of spending for the program on estimates of the number of Pell grant recipients in each year. The agency underestimated costs in projections it made just before economic downturns (because as unemployment rises during recessions, enrollment in higher education increases) and overestimated costs for periods when the economy was stabilizing following a recession.[21]

Some of the errors in CBO's projections of nondefense spending for 2010 to 2016 can be attributed to the agency's overestimating the rate at which ARRA funding would be spent. (Enacted in 2009 in response to significant weakness in the economy, that legislation provided discretionary budget authority of $268 billion for a number of governmental activities that year and smaller amounts of funding in the following years.) A smaller portion of the funding appropriated for ARRA was spent in the first few years after enactment than CBO had originally estimated (even though CBO's original estimates took account of lags in disbursing funding that are typical for the programs like those funded by that legislation).

Additionally, uncertainty around sequestration in 2013 may have led some agencies to temporarily slow obligations and spending.[22] CBO's projections of nondefense discretionary outlays were thus higher than actual spending for 2012 and 2013 because, when preparing its budget-year and sixth-year projections, CBO had anticipated that budget authority would be spent at historical rates.

Net Interest Outlays
Net interest outlays include interest paid on Treasury securities and other interest that the government pays (interest paid for late refunds issued by the Internal

---

20. The program provides guarantees for first-time homebuyers and other borrowers who might otherwise find it difficult to obtain a mortgage, and the FHA is required to set fees for its insurance so that projected receipts exceed the projected losses from defaults on mortgages insured under the program. See Congressional Budget Office, "FHA's Single-Family Mortgage Guarantee Program: Budgetary Cost or Savings?" *CBO Blog* (October 21, 2013), www.cbo.gov/publication/44628.

21. For a detailed explanation of why the Federal Pell Grant Program's costs increase during recessions, see Congressional Budget Office, *The Federal Pell Grant Program: Recent Growth and Policy Options* (September 2013), www.cbo.gov/publication/44448.

22. Sequestration is an enforcement mechanism by which the President orders the cancellation of budgetary resources to enforce the discretionary spending caps specified in the Budget Control Act of 2011.

Revenue Service, for example) minus the interest that it collects from various sources (such as from states that pay the federal unemployment trust fund interest on advances they received when the balances of their state unemployment accounts were insufficient to pay benefits in a timely fashion). Net interest costs are determined primarily by the size and composition of the government's debt and by market interest rates. As a share of total outlays, net interest spending has decreased by more than half since 1992, falling from 14 percent in that year (when the benchmark 10-year interest rate averaged 7.2 percent) to 6 percent in 2016 (when the 10-year rate averaged only 1.9 percent).

Statistical Bias and Accuracy. CBO has tended to overestimate net interest outlays for the budget year—the projections (after the adjustment to account for the effects of new legislation) exceeded actual outlays in 19 of the past 24 years (see Figure 10). The mean error of the budget-year projections of net interest was 5.2 percent, which is higher than the mean error of the projections of all other spending categories except for other mandatory spending.

CBO's budget-year projections of net interest outlays have been less accurate than those of most other categories of spending. The errors were widely dispersed, ranging from an underestimate of 13.9 percent (in the agency's 2009 projection for 2010) to an overestimate of 19.2 percent (in the 2014 projection for 2015). The mean absolute error of the projections was 7.7 percent, and the RMSE, 9.4 percent. If CBO's June 2017 projection of $307 billion of net interest had an error of the same magnitude as that mean absolute error, actual net interest outlays in 2018 would be $24 billion higher or lower than CBO projected.

Of all the projections of specific categories of spending evaluated in this report, CBO's projections of net interest for the sixth year produced the largest percentage differences between projected and actual outlays. The mean error of the sixth-year projections was 54.0 percent, and the mean absolute error, 56.0 percent. The corresponding errors for Medicaid, the category with the next largest errors, were 10.3 percent and 13.5 percent.

Factors Underlying the Errors. The discrepancies between the projected and actual amounts are primarily attributable to economic factors, namely to overestimations in

CBO's forecast of interest rates (see Table 4).[23] Since the early 2000s, CBO—like most forecasters—has consistently overestimated interest rates. The most significant errors were in forecasts for years following recessions, when the Federal Reserve lowered interest rates more than expected and kept them low for longer than anticipated. All told, economic factors accounted for a mean error of 5.6 percent and a mean absolute error of 7.5 percent in budget-year projections of interest costs.

When those economic errors are excluded and only differences attributable to technical factors are considered, the mean error of the budget-year projections falls to –0.4 percent, and the mean absolute error, to 3.0 percent. Those technical factors include the amount of each type of security issued by the Treasury, intergovernmental interest payments, and amounts received by nonbudgetary credit financing accounts. Also included in CBO's accounting of technical errors are the differences in debt-service costs that arise from the federal government's borrowing more or less than CBO projected because of technical errors in estimates of other types of outlays.[24]

Economic factors also explain most of the net interest overestimates in sixth-year projections, contributing 50 percentage points to each measure of error. The effect of errors in the economic forecast was most pronounced after the 2007–2009 recession, resulting in an average error of about 88 percent in the projections made between 2004 and 2011 for 2009 to 2016.

CBO's tendency to overestimate interest rates for the years after the recessions in 2001 and from 2007 to 2009 stems partly from the fact that CBO did not anticipate the recessions when it was preparing its projections for those years and partly from the unusually slow recoveries that followed the recessions. Interest rates were historically low after those recessions, and CBO did not anticipate that the rates would remain below their historical averages for such an extended period of time (see Figure 11).

For example, by 2009, the rate on 3-month Treasury bills, which averaged 4.3 percent over the previous

---

23. For more information on how CBO forecasts interest rates, see Congressional Budget Office, *CBO's Economic Forecasting Record: 2017 Update* (October 2017), www.cbo.gov/publication/53090.

24. Debt service refers to a change in interest payments resulting from a change in estimates of the deficit.

Figure 10.

Errors in CBO's Projections of Net Interest Outlays
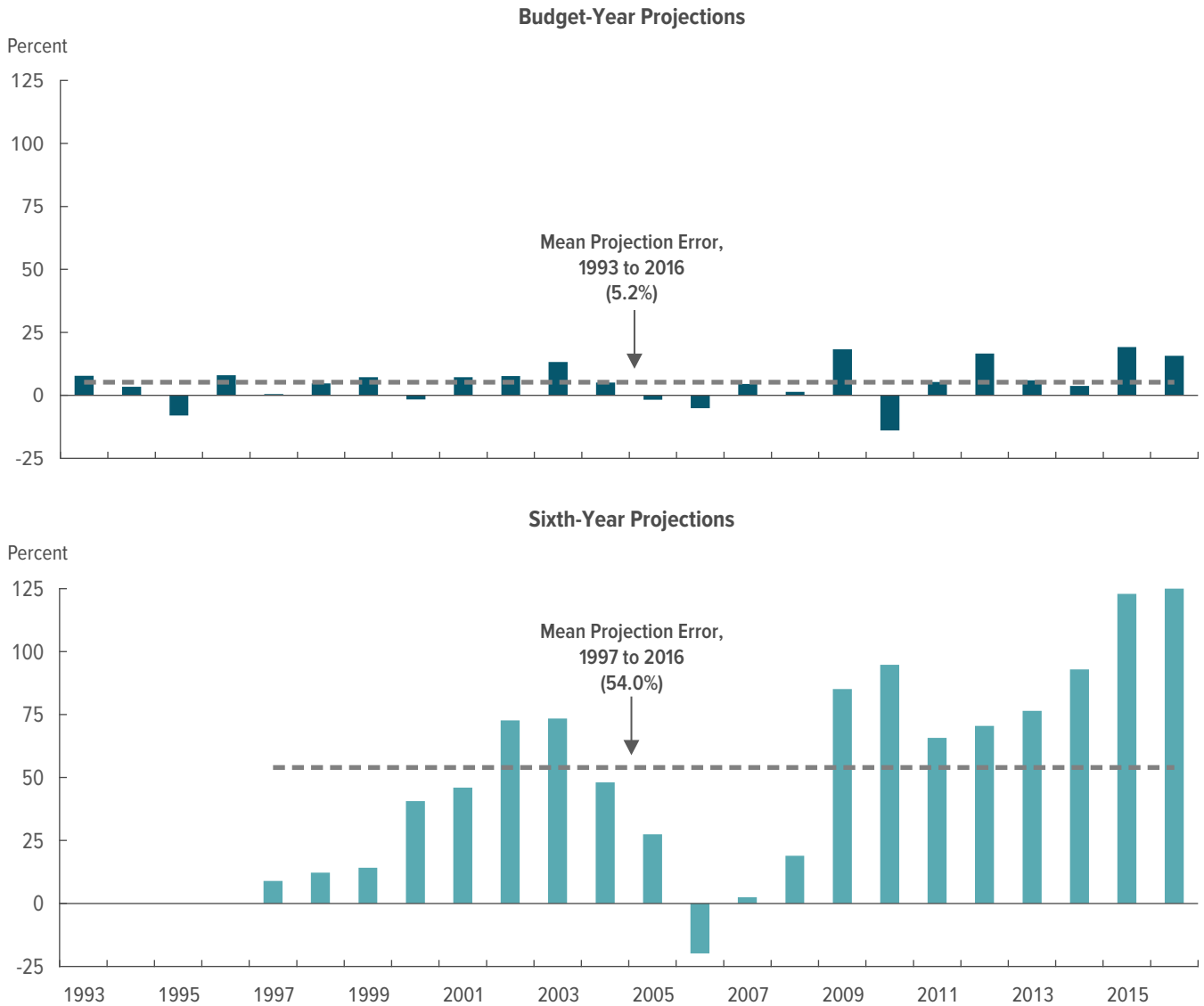
Budget-Year Projections

Percent

Mean Projection Error,
1993 to 2016
(5.2%)

Sixth-Year Projections

Percent

Mean Projection Error,
1997 to 2016
(54.0%)

Source: Congressional Budget Office.

The years shown are those for which each projection was made. For example, the values shown for 2016 are for the budget-year projection published in March 2015 and the sixth-year projection published in March 2011.

Errors are projected amounts minus actual amounts, expressed as percentages of actual amounts; thus, a negative error indicates an underestimate, and a positive error, an overestimate. The mean error is the arithmetic average of the projection errors.

The estimated budgetary effects of legislation enacted after the projections were produced are excluded from the errors.

20 years, had plummeted to an annual average of 0.2 percent. However, the rates that CBO used to construct its budget-year projection of outlays for 2009 were those from the economic forecast it made in March 2008, before the National Bureau of Economic Research recognized that a recession had begun in December 2007, so they remained elevated at

2.1 percent.[25] CBO's overestimates of short-term rates have been exacerbated in the years since then by the

25. CBO typically updates its economic forecast only twice per year, once in January and once during the summer; however, because economic conditions were rapidly deteriorating in early 2008, the agency also updated its forecast before preparing its March baseline budget projections that year.

Table 4.

Summary Measures of the Quality of CBO's Projections of Outlays for Debt Service and Other Net Interest

Percent

	Budget-Year Projections			Sixth-Year Projections		
	Mean Error	Mean Absolute Error	Root Mean Square Error	Mean Error	Mean Absolute Error	Root Mean Square Error
Total Net Interest	5.2	7.7	9.4	54.0	56.0	67.0
Economic errors	5.6	7.5	9.5	50.0	50.0	61.9
Rate effects[a]	5.4	7.5	9.5	47.2	47.2	61.0
Debt service[b]	0.1	0.6	0.9	2.8	8.2	10.7
Technical errors	-0.4	3.0	4.7	4.0	13.5	15.6
Mix of securities and other[c]	-1.0	2.2	4.1	1.1	4.2	6.2
Debt service[b]	0.6	1.6	2.2	2.8	14.1	16.8

Source: Congressional Budget Office.

Measures are based on budget-year projections for 1993 to 2016 and sixth-year projections for 1997 to 2016 from the baseline projections that CBO published between 1992 and 2015.

Errors are projected amounts minus actual amounts, expressed as percentages of actual amounts; thus, a negative error indicates an underestimate, and a positive error, an overestimate. The mean error is the arithmetic average of the projection errors. The mean absolute error is the average of the errors with the negative signs removed from the underestimates. The root mean square error is calculated by squaring the projection errors, averaging those squares, and taking the square root of that average.

The estimated budgetary effects of legislation enacted after the projections were produced are excluded from the errors.

a. Errors in projections of net interest outlays caused by misestimates of interest rates.

b. Errors stemming from changes in interest payments that result from differences between projections of deficits and of outstanding debt and the actual amounts.

c. Errors resulting from misestimates of the relative amounts of the types of securities the Treasury will issue to finance deficits. For example, the time to maturity of those securities or the schedule of interest payments on them might have differed from CBO's estimates.

unusually slow recovery and by the Federal Reserve's decision to maintain the federal funds rate at nearly zero for an unprecedented length of time.[26] Short-term borrowing rates, which are closely tied to the rates set by the Federal Reserve, have averaged just 0.1 percent since 2008. Similarly, rates on 10-year notes have averaged 2.5 percent since 2008, well below their previous historical average of 5.9 percent.

Like its forecasts of interest rates two years out, CBO's forecasts of interest rates for six years in the future have tended to be too high. Over the past 20 years, actual rates for 3-month Treasury bills have averaged 2.2 percent, and those for the 10-year Treasury note have averaged 4.0 percent. By comparison, the rates that CBO
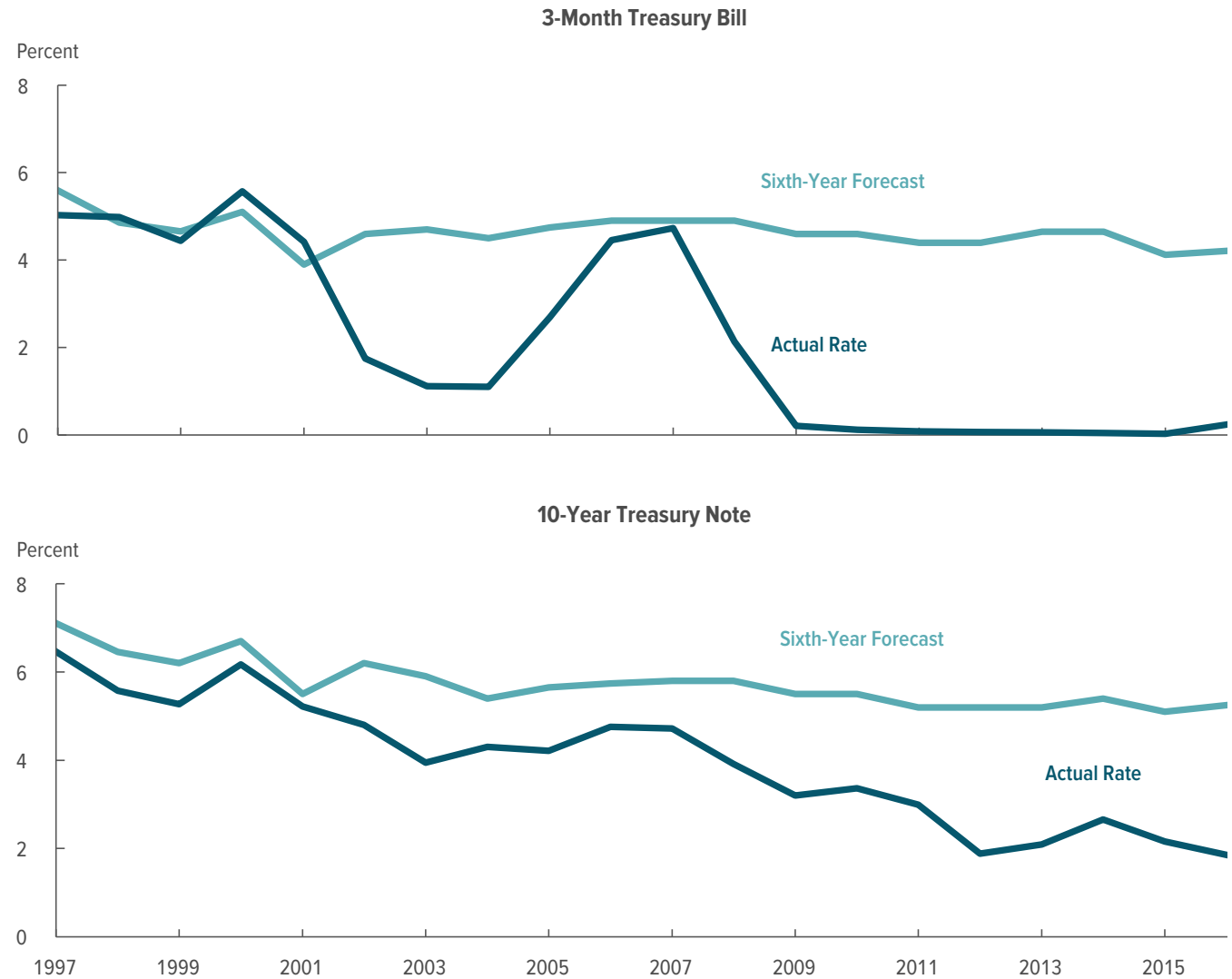
used in its sixth-year baseline projections for those years averaged 4.7 percent and 5.7 percent, respectively.

In addition to those recessions and unusually slow recoveries, several other factors account for CBO's having persistently overestimated interest rates since the early 2000s. Over the past 15 years or so, inflation, growth in hours worked, and growth in labor productivity—all of which are important determinants of interest rates—have been below expectations. Low foreign interest rates, heightened concern about global growth, and increased demand for Treasury securities as a hedge against possible adverse economic outcomes have further contributed to low interest rates, especially since the most recent recession ended in 2009. The Federal Reserve's policy of quantitative easing—that is, its practice of directly purchasing long-term Treasury securities, mortgage-backed securities, and agency debt—has also contributed to the unusually low long-term interest rates since that recession.

26. The federal funds rate is the interest rate that financial institutions charge each other for overnight loans of their monetary reserves. The Federal Reserve uses the federal funds rate to conduct monetary policy.

Figure 11.

Comparison of CBO's Sixth-Year Forecasts of Interest Rates on 3-Month Treasury Bills and 10-Year Treasury Notes With Actual Rates

3-Month Treasury Bill

Percent

Sixth-Year Forecast

Actual Rate

10-Year Treasury Note

Percent

Sixth-Year Forecast

Actual Rate

Source: Congressional Budget Office.

The years shown are those for which each projection was made. For example, the rates shown for 2016 are for the sixth-year projection published in January 2011.

Overly optimistic forecasts of real (inflation-adjusted) output growth account for the bulk of the overestimates in the interest rate forecasts during the expansionary period of the mid-2000s. Given the positive outlook for growth in the economy, CBO (and other forecasters) expected the Federal Reserve to try to temper that growth and the inflationary pressures that could result from it by raising interest rates.

Even when projections for the most recent period of extremely low rates are excluded, the remaining projections still indicate that CBO had a tendency to overestimate interest rates. The average actual rates for short-term and long-term debt from 1996 to 2008 were both roughly 1 percentage point lower than the forecast rates. As a result of those misestimates as well as differences in the amount of federal debt, that period accounted for large errors in projections of interest outlays. The mean

error of the sixth-year projections of net interest outlays made between 1992 and 2003 (for 1997 to 2008) was 28.8 percent, and the mean absolute error of those projections was 32.1 percent.

Comparison of CBO's and the Administration's Outlay Projections

In addition to evaluating its own record, CBO compared its budget-year projections with those released by the Administration. The Administration's budget-year projections of total outlays, as well as its projections of mandatory, discretionary, and net interest outlays, have been close to CBO's projections in most years since 1992. But CBO's projections for the major spending categories—particularly those made between 2005 and 2015 (for 2006 to 2016)—were slightly more accurate and less statistically biased than the Administration's corresponding projections.

Adjusting the Administration's Data for Comparison

Like CBO, the Administration publishes baseline projections when it submits the budget to the Congress. In many years, the Administration published an adjusted baseline that incorporated the estimated effects on outlays and revenues of certain proposals that had not yet been enacted, along with other adjustments. To make those projections comparable to its own baseline projections, CBO removed those adjustments from the Administration's estimates. Additionally, CBO removed outlays related to Fannie Mae and Freddie Mac from both its and the Administration's baseline projections.

CBO was able to compare only its budget-year baseline projections with those of the Administration, not its sixth-year projections. In the *Analytical Perspectives* volume that it publishes annually along with the budget, the Administration provides information on differences between its budget-year baseline projections and actual outlays for broad categories in the budget; however, it does not generally provide details for specific programs. As a result, CBO was able to compare only the projections of total outlays and the projections of the three main subcategories of spending—mandatory, discretionary, and net interest. The Administration has not published detailed information on the accuracy of its projections beyond the budget year, so CBO could not compare the Administration's sixth-year projections with its own.

Comparing the Quality of CBO's and the Administration's Projections

The Administration has tended to overestimate total outlays for the budget year by a slightly greater amount than CBO has. The Administration overestimated total outlays for 1993 to 2016, on average, by 2.9 percent, about 0.7 percentage points greater than the mean error of CBO's budget-year projections. The mean absolute error of the Administration's budget-year projections was 3.0 percent, and the RMSE was 3.6 percent—both were larger than CBO's corresponding errors of 2.3 percent and 2.9 percent.

Through the projection for 2005, the Administration's projections were similar to CBO's in terms of statistical bias and accuracy. Since 2005, both CBO and the Administration have continued to overestimate budget-year outlays, but the Administration's overestimates have tended to be greater than CBO's. The budget-year projections that CBO and the Administration published between 1992 and 2004 (for 1993 to 2005) had similar mean errors: 1.9 percent for CBO's projections and 2.1 percent for the Administration's (see Figure 12). But the errors in the projections for 2006 to 2016 diverged by a much greater amount. Whereas the Administration overestimated outlays for those years by an average of 3.8 percent of the actual amounts, CBO overestimated by an average of 2.4 percent.

The mean absolute errors for the two sets of projections followed a similar pattern. For budget-year projections for 1993 to 2005, the Administration's mean absolute error was 2.3 percent, nearly the same as CBO's mean absolute error of 2.2 percent. But for projections for 2006 to 2016, the Administration's mean absolute error was 3.8 percent, more than 1 percentage point greater than CBO's mean absolute error.

Mandatory Spending. As with projections of total outlays, the Administration's projections of total mandatory spending were slightly more statistically biased than CBO's, and they have tended to be less accurate. By CBO's calculations, the mean error of the Administration's budget-year projections of total mandatory outlays for 1993 to 2016 was 3.1 percent, 0.7 percentage points larger than the mean error of CBO's corresponding projections. The pattern of errors in the Administration's and CBO's projections of mandatory spending was similar, but the Administration's projections tended to have larger errors. As a result, the

Figure 12.

Comparison of Mean Errors in CBO's and the Administration's Budget-Year Projections of Outlays

Percent
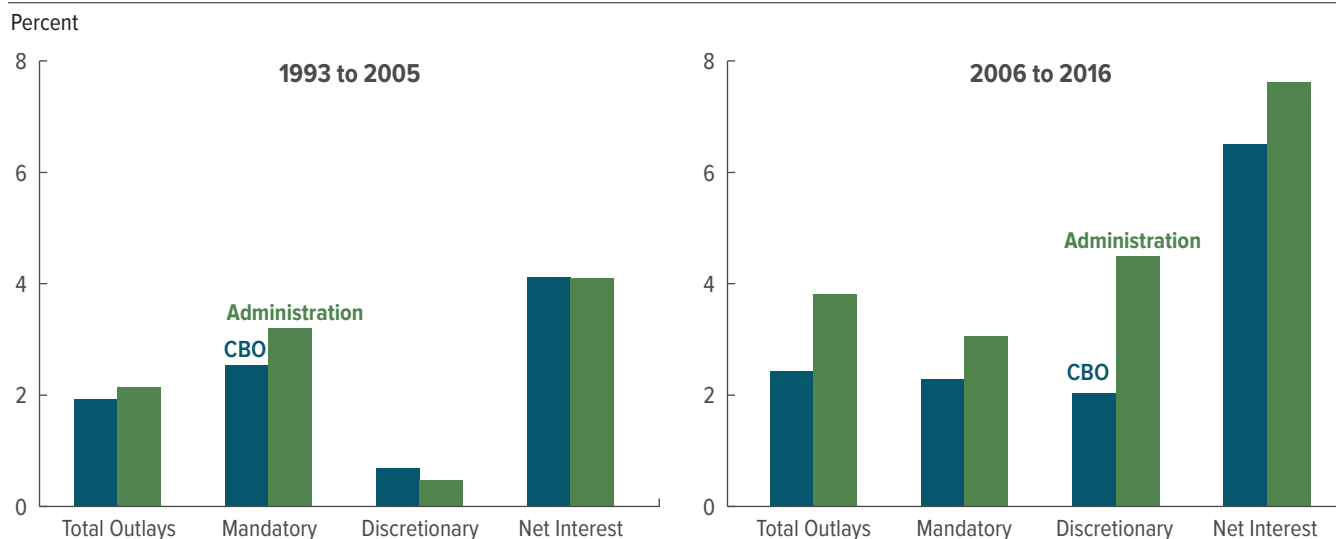
Sources: Congressional Budget Office; Office of Management and Budget.

The years shown are those for which each projection was made. For example, the right panel shows the mean errors for the budget-year projections for 2006 to 2016 that were made between 2005 and 2015.

Errors are projected amounts minus actual amounts, expressed as percentages of actual amounts; thus, a negative error indicates an underestimate, and a positive error, an overestimate. The mean error is the arithmetic average of the projection errors.

The estimated budgetary effects of legislation enacted after the projections were produced, as well as outlays related to the activities of Fannie Mae and Freddie Mac, are excluded from the errors.

mean absolute error of the Administration's mandatory spending projections (3.7 percent) was larger than that of CBO's projections (2.9 percent).

Discretionary Spending. The Administration's budget-year projections that differed most from CBO's were those of discretionary outlays. The Administration's budget-year projections of total discretionary spending were more statistically biased than CBO's, and they have tended to be less accurate. The Administration overestimated discretionary outlays in the projections it made for 1993 to 2016 by 2.3 percent, on average; the mean error of CBO's projections of such outlays was 1.3 percent. By CBO's calculation, the mean absolute error of the Administration's budget-year projections of discretionary spending was 2.6 percent, and the RMSE was 3.5 percent—both were more than 1 percentage point larger than the corresponding errors of CBO's projections.

The Administration's errors have been larger in recent years. In the projections they published between 1992 and 2004 (for 1993 to 2005), both CBO and the

Administration overestimated discretionary spending by less than 1 percent. In the projections it published between 2005 and 2015 (for 2006 to 2016), the Administration overestimated total discretionary spending by an average of 4.5 percent because both defense and nondefense programs spent appropriated funds more slowly than it had expected. CBO also overestimated discretionary spending in the budget-year projections it published during that period, but it did so by only 2.0 percent, on average.

Net Interest Outlays. The Administration's budget-year projections of net interest have followed a pattern similar to CBO's. The Administration and CBO generally made large overestimates in the same years, although CBO's projections have been somewhat more accurate. The mean error of the Administration's budget-year projections of net interest for 1993 to 2016 was 5.7 percent, and the mean absolute error, 8.7 percent. The mean error of CBO's projections for the same years was 5.2 percent, and the mean absolute error, 7.7 percent. Most of the difference between the measures of bias and accuracy of the two sets of projections is attributable to errors in

projections of net interest for years after the most recent recession. In the projections they made between 1992 and 2004 (for 1993 to 2005), both the Administration and CBO overestimated net interest outlays by 4.1 percent, on average. In the projections it made for 2006 to 2016, the Administration overestimated net interest outlays by 7.6 percent, on average—more than 1 percentage point higher than the mean error of CBO's corresponding projections.

Appendix:
Calculation of Economic and Technical Errors in CBO's Projections of Outlays

Each time that it publishes a new baseline, the Congressional Budget Office includes an explanation of the changes it made to its previous projections.[1] Those changes are divided into three categories—legislative, economic, and technical. Legislative changes are the estimates of the budgetary effects of laws enacted since the agency published its previous baseline. CBO classifies changes as economic if they result from an update to its economic forecast, such as revisions to the agency's projections of gross domestic product, interest rates, or the unemployment rate. Technical changes are those that arise from factors other than new laws or updated assessments of the economy. They stem from such developments as the incorporation of new information or data from federal agencies, changes made to the way programs are administered, updates to regulations, or improvements in modeling techniques.

The data that CBO generates as part of the process of preparing its baselines form the basis of the calculations in this report. To illustrate CBO's method of adjusting its projections to compare them with actual outlays, this appendix looks at the legislative, economic, and technical changes CBO made to its projections for 2016 between March 2015, when the projections were first published, and when the Treasury Department released the actual outlay amounts recorded in the fiscal year.

Adjustments to CBO's Published Projections
As mandated by law, CBO constructs its 10-year projections of federal spending and revenues under the assumption that current laws will generally remain unchanged. The agency's projections are thus not intended to be a prediction of budgetary outcomes;

rather, they reflect CBO's best judgment about what the economy and the budget would look like in future years under existing laws. That approach allows the baseline to serve as a neutral benchmark against which the effects of proposed legislation or alternative policies can be measured. However, the practice makes it difficult to evaluate the accuracy of the agency's projections because actual outlays are affected by legislation enacted since the projections were made.

For this analysis, CBO was concerned primarily with those differences between its projections of outlays and the actual amounts recorded that stem from economic and technical factors. To isolate those differences, the agency adjusted its published baseline projections to include the estimated effects of legislation enacted after the original baselines were released.[2]

For example, CBO's March 2015 projection of total outlays for 2016 was $3,925 billion (see Table A-1). However, legislation enacted after March 2015 increased outlays for 2016 by $49 billion, according to CBO's estimates. Adding those outlays to CBO's projection for 2016 brought the estimated total to $3,974 billion.

The largest legislative changes affecting the projection for 2016 occurred between the publication of CBO's August 2015 and January 2016 baselines.[3] During that period, CBO revised its estimates of discretionary outlays for 2016 upward by $25 billion, mostly because

---

1. Updates to the agency's baseline projections can be found in the "Budget and Economic Outlook and Updates" section of CBO's website (www.cbo.gov/about/products/major-recurring-reports#1).

2. In addition, for this analysis, CBO reclassified the incorporation of the automatic enforcement procedures in the Budget Enforcement Act of 2011 as legislative changes. The budgetary effects of triggering those procedures were originally incorporated as technical changes in CBO's January 2012 baseline projections.

3. Congressional Budget Office, *The Budget and Economic Outlook: 2016 to 2026* (January 2016), www.cbo.gov/publication/51129, and *An Update to the Budget and Economic Outlook: 2015 to 2025* (August 2015), www.cbo.gov/publication/50724.

Table A-1.

How CBO Adjusts Its Budget-Year Projections of Total Outlays to Compare Them With Actual Spending: An Example Using the March 2015 Projections for 2016

Billions of Dollars

	2016
March 2015 Baseline Projection of Total Outlays	3,925
Adjustments to Include Estimated Effects of Legislation	
March 2015 to August 2015	19
August 2015 to January 2016	30
January 2016 to March 2016	*
March 2016 to August 2016	a
Difference between August 2016 baseline and actual amount	a
Subtotal	49
Adjustment to Exclude Outlays Associated With Fannie Mae and Freddie Mac	-3
Total Adjustments	46
Adjusted March 2015 Baseline Projection of Total Outlays	**3,971**
Economic Changes	
March 2015 to August 2015	-26
August 2015 to January 2016	-16
January 2016 to March 2016[b]	*
March 2016 to August 2016	-4
Difference between August 2016 baseline and actual amount	-4
Subtotal	-51
Technical Changes	
March 2015 to August 2015	10
August 2015 to January 2016	*
January 2016 to March 2016	-23
March 2016 to August 2016	-31
Difference between August 2016 baseline and actual amount	-10
Subtotal	-54
Actual Total Outlays, Excluding Those Associated With Fannie Mae and Freddie Mac	**3,867**

Source: Congressional Budget Office; Office of Management and Budget.

The periods identified above correspond to the intervals between successive baseline projections, which CBO typically publishes each winter, early spring, and summer.

The economic and technical changes shown in the reports on the budget and economic outlook that CBO published between August 2015 and August 2016 do not add up to the total amount for such changes shown here because this analysis adds the difference between CBO's August 2016 baseline projection (the final projection for fiscal year 2016) and actual outlays to those previously published amounts. In addition, this analysis excludes from the technical changes the budgetary transactions of Fannie Mae and Freddie Mac, whereas the earlier reports included them.

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

a. CBO did not estimate any legislative effects for fiscal year 2016 between March 2016 and the end of the fiscal year.

b. CBO typically updates its economic forecast only twice a year, once before preparing its January baseline and again before the August baseline. However, CBO modified the economic forecast that it had prepared in early December 2015 later that same month to account for new legislation— too late in the process to fully incorporate the modifications in the budget projections it published in January 2016.

the Bipartisan Budget Act of 2015 (Public Law 114-74) had increased the caps on budget authority for defense and nondefense programs, and the resulting appropriations were equal to those limits in 2016. Most of the other revisions to CBO's projection of outlays for 2016 that were attributable to legislative changes stemmed from the enactment of the Medicare Access and CHIP Reauthorization Act of 2015 (P.L. 114-10), which increased outlays for Medicare, Medicaid, and the Children's Health Insurance Program in 2016. Other legislation enacted between March 2015 and the end of the 2016 fiscal year had relatively small effects on projections of outlays for 2016.

CBO also adjusted its projections and the actual totals to remove outlays for Fannie Mae and Freddie Mac (two institutions that help finance the majority of mortgages in the United States). Those outlays were removed because CBO and the Administration treat transactions between those two institutions and the Treasury differently. The Administration—in the President's budget and in data compiled by the Department of the Treasury—treats Fannie Mae and Freddie Mac as nongovernmental organizations and records payments between the two entities and the Treasury on a cash basis. By contrast, CBO projects the budgetary impact of the two entities' operations as if they were conducted by a federal agency because of the degree of management and financial control that the government exercises over them. CBO therefore estimates the net lifetime costs—that is, the subsidy costs—of the new loans and guarantees that the entities are expected to issue and counts those costs as federal outlays in the year of issuance for all years after the current one in its projections. (In the current year, CBO projects payments between Fannie Mae and Freddie Mac and the Treasury on a cash basis.) In its March 2015 baseline, CBO estimated that the net lifetime costs of new loans and guarantees issued by the two entities in fiscal year 2016 would total $3 billion; that amount was removed from CBO's baseline projection of total outlays for the year.

After the effects of new legislation were accounted for and the outlays associated with Fannie Mae and Freddie Mac were removed, CBO's March 2015 projection of total outlays for 2016 amounted to $3,971 billion. Actual total outlays, excluding $14 billion in offsetting receipts from Fannie Mae and Freddie Mac, were $3,867 billion.

Calculation of Economic and Technical Errors

After adjusting for new legislation and transactions with Fannie Mae and Freddie Mac, CBO calculated the remaining differences between its projections and actual outlays (that is, the economic and technical errors) by adding up all revisions of each type that were recorded in the baseline updates as well as the difference between the final revised projections and the actual amounts recorded at the end of the fiscal year.

In March 2015, CBO overestimated outlays for 2016 by $104 billion, or 2.7 percent (after the baseline projections were adjusted to account for new legislation and the outlays associated with Fannie Mae and Freddie Mac). That percentage difference is the error in the budget-year projection for 2016. That error was attributable to economic and technical factors in almost equal proportions.

Economic Errors

Economic factors were responsible for $51 billion, or 1.3 percent, of the difference between the March 2015 budget-year projection of total outlays for 2016 and actual spending. Most of that difference was accounted for by downward revisions that CBO made between March 2015 and January 2016.

An overestimate of net interest costs contributed $37 billion to the overestimate attributable to economic factors, and an overestimate of mandatory spending added $14 billion. Much of the overestimate of net interest occurred because CBO's forecast of interest rates was too high. The agency lowered that forecast before preparing both its August 2015 and January 2016 baselines and revised its projection of net interest for 2016 accordingly, lowering it by about $14 billion in each of those baselines. CBO's March 2015 projection of interest costs also reflected an overestimate in the agency's forecast of inflation, which boosted the projected costs of Treasury inflation-protected securities.

As for the agency's projections of mandatory spending, almost half of the total economic error was in its projections of outlays for Social Security. The largest discrepancy occurred because CBO overestimated the cost-of-living adjustment for 2016 in its March 2015 baseline, projecting that the adjustment would be 0.9 percent. However, there was no cost-of-living adjustment in 2016 because the rate of inflation was lower than

originally forecast. CBO had anticipated that outcome and reduced its estimate of the adjustment to zero in its August 2015 baseline.

Technical Errors

Technical factors explain $54 billion of the overestimate of total outlays for 2016 in CBO's adjusted March 2015 baseline projection. CBO classified as technical a $35 billion overestimate of mandatory spending, an $18 billion overestimate of discretionary outlays, and an overestimate of net interest payments of less than half a billion dollars.

The $35 billion overestimate in CBO's projections of mandatory spending stemmed from a $41 billion overestimate for programs other than Medicaid, Medicare, and Social Security that was offset by an underestimate of Medicare spending. For example, for technical reasons, the agency overestimated outlays for health insurance purchased through the marketplaces established under the Affordable Care Act and related spending by $17 billion and outlays for income security programs by $8 billion in its March 2015 baseline. In the baselines CBO produced after March 2015, the agency made technical adjustments to spending projections for those programs and others, which brought the estimates closer to actual spending and reduced its overall projection of mandatory outlays.

An additional $6 billion overestimate classified as technical stemmed from agencies' updating their estimates of the net costs of several credit programs. Each year various agencies revise their estimates of the subsidy costs for outstanding credit programs. Such revisions—known as credit reestimates—reflect changing economic conditions and actual loan performance and are recorded in the budget as an increase or decrease in mandatory outlays. In 2016, agencies determined that previous subsidy estimates were too high and therefore reported downward credit reestimates of $6 billion. CBO does not estimate future credit reestimates because it does not attempt to predict when the various agencies will revise their credit estimates. The $6 billion in downward reestimates reported in 2016 is therefore considered a technical error in CBO's March 2015 projection of other mandatory spending.

Because of technical factors, CBO overestimated both defense and nondefense discretionary outlays for 2016 in its March 2015 baseline—defense spending by about $4 billion and nondefense spending by $14 billion. The overestimates were not concentrated in any particular program.

List of Tables and Figures

About This Document

Keith Hall
Director
November 2017