A

CBO

REPORT

CBO's Economic Forecasting Record: 2007 Update

November 2007

The Congress of the United States ■ Congressional Budget Office

Note

All years are calendar years.

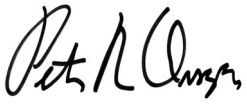
Numbers in the text and tables may not add to totals because of rounding.

Pub. No. 3042

Preface

The Congressional Budget Office (CBO) regularly publishes evaluations of the accuracy of its economic and budget forecasts. Those evaluations help guide CBO's efforts to improve its forecasts and also assist Members of Congress in their use of CBO's estimates.

This report was prepared by Christopher Williams and Kim Kowalewski of CBO's Macroeconomic Analysis Division, with assistance from Adam Weber and Eric Miller and under the direction of John Peterson and Robert Dennis. Kate Kelly edited the report, and Christian Howlett proofread it. Maureen Costantino and Allan Keaton prepared the report for publication, Lenny Skutnik produced the printed copies, Linda Schimmel coordinated print distribution, and Simone Thomas created the electronic version for CBO's Web site (www.cbo.gov).



Peter R. Orszag
Director

November 2007

Contents

Tables

Tables (Continued)

Figures

Box

CBO's Economic Forecasting Record: 2007 Update

Since publishing its first macroeconomic forecast in 1976, the Congressional Budget Office (CBO) has compiled a forecasting track record comparable to those of the Administration and the *Blue Chip* consensus (an average of private-sector forecasts published periodically as the *Blue Chip Economic Indicators*). In particular, CBO's accuracy for two-year forecasts made between 1982 and 2005 did not differ markedly either from that of the *Blue Chip* consensus or from that of the Administration over those years (see Table 1 on page 11). The accuracy of CBO's five-year projections also was similar (see Table 2 on page 12), although the Administration has had slightly smaller errors in projecting types of income as a share of national output. Comparing CBO's forecasts with those of the *Blue Chip* consensus suggests that when the agency's economic predictions missed by the largest margin, those inaccuracies probably reflected problems that all forecasters had in predicting turning points in the business cycle.

Choice of Forecasts for the Evaluation

The data used for this evaluation were compiled from forecasts published in the early months of the years from 1976 through 2005. (Two-year average forecasts published in 2006 and in early 2007 could not be included in this evaluation because the latest full-year historical data are for 2006.) For all years except 1981, CBO's forecasts were based on the calendar year forecasts published early each year (or from related files of unpublished forecasts for some variables in some years). The Administration's forecasts were taken from the budget documents for all years except 1981.[1] Where possible, *Blue Chip* consensus forecasts were those published in the same month as CBO's forecasts. Although the *Blue Chip* publishes forecasts every month, in only two months of the year—March and October—do forecasts extend out more than two years, and those longer-term forecasts are published, on average, three months after CBO's forecast is completed. Also limiting the analysis are the shorter history of the *Blue Chip*'s two-year forecasts, which began in 1982, and their narrower scope. (The *Blue Chip*'s forecasts exclude several important series, most notably wages and salaries, that are vital for budget projections.) The appendix to this report gives further details on the choice of historical time–series data and on the sources of forecast data for the comparisons.

1. The Administration's forecast made in early 1981 came from the Reagan Administration's revisions to President Carter's last budget.

Measuring the Quality of Forecasts

Like earlier studies of economic forecasts, this evaluation focused on two aspects of the quality of CBO's forecasts: statistical bias and accuracy. Other desirable characteristics—such as efficiency, which is discussed later—are harder to assess definitively and would require a larger sample than is available for CBO's forecasts.

Bias

The statistical bias of a forecast is its tendency to be pessimistic or optimistic. To measure statistical bias, CBO's evaluation used the mean error (the arithmetic average of the forecast errors), which is the simplest and most widely used measure. Because it is a simple average, however, underestimates and overestimates offset each other in calculating it. As a result, the mean error imperfectly measures the quality of a forecast—a small mean error would result either if all of the errors were small or if all of the errors were large but the overestimates and underestimates happened to balance each other out.

Accuracy

The accuracy of a forecast is the degree to which its values are narrowly dispersed around actual outcomes. Measures of accuracy more clearly reflect the usual meaning of forecast quality than does the mean error because overestimates and underestimates do not offset each other in these measures. CBO's evaluation used two measures of accuracy. The mean absolute error (the average of the forecasts' errors without regard to arithmetic sign) indicates the average difference between forecasts and actual values without regard to whether individual forecasts are overestimates or underestimates. The root mean square error (calculated by first squaring the errors, then taking the square root of the arithmetic average of the squared errors) also shows the size of the error without regard to sign, but it gives greater weight to larger errors. Because small errors typically are inconsequential, the root mean square error usually gives the best indication of accuracy.

Alternative Measures of Forecast Quality

Studies by analysts outside CBO have used measures that are somewhat more elaborate than the mean error to test for statistical bias in CBO's forecasts. Those studies have generally concluded, as does this evaluation, that CBO's short-term economic forecasts do not contain a statistically significant bias.[2]

Other methods have been developed to evaluate a forecast's "efficiency," or the extent to which a particular forecast could have been improved by using additional information that was available when the forecast was made.[3] One simple method compares a forecast with the *Blue Chip* consensus forecast, which represents a variety of economic forecasts and thus reflects a broader blend of sources and methods than can be expected from any single forecaster. As such, the consensus forecast may produce better forecasts than any single forecaster.[4] In this evaluation, the *Blue Chip* predictions serve as a proxy for an efficient forecast. The fact that CBO's forecasts are about as accurate as the *Blue Chip*'s is a rough indication of their efficiency.

Some researchers contend that economic forecasters, in general, do not use all of the information available to them to forecast downturns in the business cycle and, as a result, make avoidable systematic errors in forecasting those business cycles.[5] Such critics point to the ability of certain leading indicators to predict recessions. Nevertheless, the information in such indicators cannot be readily translated into economic forecasts.

Limitations of Forecast Evaluations

Elaborate measures and methods do not necessarily produce reliable indicators of a forecast's quality when the sample of observations is small, as with CBO's sample of only 30 two-year observations. Small samples present three main problems in evaluating forecasts. First, they reduce the reliability of statistical tests that are based on the assumption that the errors in the forecast follow a normal (bell-shaped) distribution. The more elaborate measures of forecast quality all make such an assumption about the hypothetical ideal forecast with which the

2. Another approach to testing a forecast for bias is based on linear regression analysis of actual values against forecast values. For details of that method, see J. Mincer and V. Zarnowitz, "The Evaluation of Economic Forecasts," in J. Mincer, ed., *Economic Forecasts and Expectations* (New York: National Bureau of Economic Research, 1969). That approach is not used here because of the small size of the sample. However, previous studies that have used it to evaluate the short-term forecasts by CBO and the Administration have not been able to reject the hypothesis that those forecasts are unbiased. See, for example, M.T. Belongia, "Are Economic Forecasts by Government Agencies Biased? Accurate?" *Review,* Federal Reserve Bank of St. Louis, vol. 70, no. 6 (November/December 1988), pp. 15–23. For a more recent and more elaborate study of forecast bias that included CBO's forecasts among a sizable sample, see David Laster, Paul Bennett, and In Sun Geoum, *Rational Bias in Macroeconomic Forecasts,* Staff Report No. 21 (New York: Federal Reserve Bank of New York, March 1997).

3. For studies that have examined the relative efficiency of CBO's economic forecasts, see Belongia, "Are Economic Forecasts by Government Agencies Biased?"; and S.M. Miller, "Forecasting Federal Budget Deficits: How Reliable Are U.S. Congressional Budget Office Projections?" *Applied Economics,* vol. 23 (December 1991), pp. 1789–1799. Although both studies identify series that might have been used to make CBO's forecasts more accurate, they rely on statistics that assume a larger sample than is available. Moreover, although statistical tests can identify sources of inefficiency in a forecast after the fact, they generally do not indicate how such information could be used to improve forecasts when the forecasts are being made.

4. See, for example, Andy Bauer and others, "Forecast Evaluation with Cross-Sectional Data: The *Blue Chip* Surveys," *Economic Review,* Federal Reserve Bank of Atlanta (Spring 2003), pp. 17–31; and Henry Townsend, "A Comparison of Several Consensus Forecasts," *Business Economics* (January 1996).

5. See R. Fildes and H. Stekler, "The State of Macroeconomic Forecasting," pp. 435–468, and K.D. West, "Comments on 'The State of Macroeconomic Forecasting,'" pp. 495–497, both in *Journal of Macroeconomics,* vol. 24 (December 2002).

actual forecasts are being compared. Second, in small samples, individual errors in a forecast can have an unduly large influence on the measures. Third, the small sample means that CBO's track record indicates only weakly the possible direction or size of forecasting inaccuracies in the future.

Apart from the general caveat that should attend any conclusions based on statistical analysis, there are several reasons for viewing any evaluation of CBO's forecasts with particular caution:

- The procedures and purposes of the economic forecasts produced by CBO, the *Blue Chip,* and the Administration differ and have changed over the past two decades, and they may change again. In the late 1970s, CBO characterized its medium-term projections as a goal for the economy; it now considers them to be projections of what will prevail, on average, if the economy continues to reflect historical trends and fiscal policies do not change. In contrast, the underlying policy assumptions in the *Blue Chip* forecasts, either for the short run or for the medium term, are not clear. The *Blue Chip* is a survey, and the various forecasters often do not state their assumptions about fiscal policy. Last, the various Administration forecasts normally include the projected economic effects of their respective policy proposals, whereas CBO's forecasts assume the continuation of current policies.[6]

- An institution's track record in forecasting may not indicate its future abilities because of changes in personnel or methods.

- Inaccuracies in a forecast increase when the economy is more volatile and when economic trends change. All three groups of forecasters—CBO, the *Blue Chip,* and the Administration—made relatively large errors when forecasting for periods that included turning points in the business cycle and for the late 1990s, when the sustainable growth rate of the economy increased because of faster growth in productivity.

- The common practice of revising statistical data may mean that forecasters make predictions about one concept and the statistical agencies that compile those data ultimately report a materially different concept. A quantitatively important case in point was the addition of software expenditures to business fixed investment—and hence to gross domestic product (GDP)—in the comprehensive revision of the national income and product accounts (NIPAs) that occurred in October 1999.

The Effects of Business Cycles, Changes in the Trend Rate of Productivity Growth, and Oil Price Shocks

Forecasters collectively have tended to err during periods that included either turning points in the business cycle or significant shifts in the trend rate of growth of labor productivity. The difficulty of forecasting business-cycle turning points explains why most forecasters overestimated the economy's growth rate just before the two back-to-back recessions of the early 1980s. That pattern was repeated in the forecasts made just before the more moderate recession of the early 1990s. In addition, during the mid- to late 1970s, forecasters continued to assume that the productivity trend of the previous two decades would prevail. The productivity trend of the 1970s and 1980s, however, turned out to be significantly lower than that of the 1950s and 1960s. Because forecasters in the 1970s expected the previous trend to return, their forecasts of real (inflation adjusted) output in the mid- to late 1970s turned out to be too optimistic. Partly for the same reason, forecasters repeatedly underestimated inflation in the late 1970s.

The late 1990s were a mirror image of the forecasting experience of the late 1970s. Partly because forecasters underestimated the trend rate of productivity growth beginning in 1996, they underpredicted the economy's growth rate and overpredicted inflation for several consecutive years. As the economy continued to outperform expectations, analysts put more effort into investigating the possible causes of the increase in productivity growth. Those investigations focused on the possible contribution of the so-called new economy—especially the improved flow of information among producers and between producers and consumers, which improved productivity and reduced inventories. Given revised data on production and inputs to production, CBO now estimates that an increase in the amount of capital (buildings, equipment, and software) per worker—sometimes called "capital

6. The role of current-policy or current-law assumptions in CBO's economic forecasts is explored in Congressional Budget Office, *What Is a Current-Law Economic Baseline?* (June 2, 2005).

deepening"—was the primary source of the faster growth in productivity in the late 1990s.

To be sure, large forecast errors of economic growth can occur in the absence of recessions and changes in productivity trends. The two-year forecasts made in 2004 and 2005 by CBO, the *Blue Chip* consensus, and the Administration all show notably larger forecast errors for real GDP (the causes of which are discussed in a subsequent section) than do the two-year forecasts made in 2002 and 2003. The larger errors in the later forecasts did not result from a recession or from an unforeseen downshift in trend productivity.

The proximate cause of many sizable errors in forecasting price inflation has been large, unexpected movements in oil prices. From 1979 to 1980, oil prices roughly doubled; they doubled again between late 2003 and mid-2006. Both CBO and the Administration substantially underpredicted consumer price index (CPI) inflation in the 1979–1980, 1980–1981, 2004–2005, and 2005–2006 forecasts. By contrast, sharp and unexpected declines in oil prices in 1986, and again in 1997 and 1998, led forecasters to overestimate the two-year rate of price inflation.

CBO's Forecasting Record

This analysis evaluates CBO's macroeconomic forecasts, which cover two-year and five-year periods. Because the budget reports that CBO and the Administration publish every winter focus on projections for the fiscal year that begins in the following October, an economic forecast that is accurate not only for the months leading up to that year but also for the budget year itself will provide the basis for a more accurate projection of the budget's bottom line (the annual deficit or surplus) on a current-law basis—hence the interest in the two-year period. The five-year period is used to examine the accuracy of longer-term projections of several variables that are important for CBO's budget projections. Because there have been more turning points than shifts in the trend in productivity growth, the average errors in forecasting real gross national product and real GDP are greater over the two-year forecasting horizon than over the five-year horizon.

In another publication, CBO analyzed the overall uncertainty of its budget projections, which depend in part on the accuracy of its economic projections.[7] In addition, "rules of thumb" for estimating the effects that alternative assumptions about various macroeconomic variables have on budget projections appear in Appendix B of CBO's *The Budget and Economic Outlook: Fiscal Years 2008 to 2017* (January 2007).

Two-Year Forecasts

Historically, the accuracy of CBO's two-year forecasts, as measured by the root mean square error, has been very similar to the accuracy of the forecasts of the *Blue Chip* consensus and the Administration.

Growth in Real Output. The accuracy of CBO's forecasts closely matched that of the *Blue Chip* consensus for the two-year forecasts made between 1982 and 2005. CBO's root mean square error was 1.2 percentage points, as was that for the *Blue Chip* consensus (see Table 3 on page 14). The two sets of errors were highly positively correlated; when CBO's error was relatively large, the *Blue Chip*'s error also was large and in the same direction. In addition, the two sets of forecast errors differed by more than 0.1 percentage point in 11 of the 24 forecasts made during those years. CBO was closer to the actual value in six of those forecasts. (CBO's forecasts, which were published in the same month as the *Blue Chip* forecasts with which they were compared, were normally completed nearly two months earlier to provide time for the budget projections to be prepared.) Overall, the Administration's forecasts were about as accurate as those of CBO.

As noted earlier, forecast errors tend to be larger at turning points in the business cycle and when shifts occur in major economic trends. That tendency can be clearly seen in the forecasts of real output growth by comparing the large errors for 1979 through 1983—when the economy went through its most turbulent recessionary period of the postwar era—with the smaller errors recorded for the mid-expansion years from 1985 to 1987. More recently, the recession of 2001 and slow recovery in 2002 accounted for the overpredictions made by all three forecasters in 2000 and 2001.

All three forecasters underpredicted two-year real GDP growth in every year between 1992 and 1999, with very large errors for the two-year forecasts made between 1996 and 1999. About one-fourth of that apparent pessimism resulted from subsequent revisions to the NIPAs, which included important definitional changes (see Box 1). Yet

7. See also Congressional Budget Office, *The Uncertainty of Budget Projections: A Discussion of Data and Methods* (March 2006).

Box 1.

How Data Revisions May Affect the Interpretation of Forecast Errors

Data revisions account for some of the forecast error for several series examined in this analysis. If revisions change trends that are incorporated into history, forecasts based on prerevision trends can be inaccurate. The comprehensive revisions to the national income and product accounts (NIPAs) produced by the Bureau of Economic Analysis (BEA) in October 1999 increased two-year growth rates for real gross domestic product (GDP) over most of the historical period and raised rates by about 0.4 percentage points, on average, for 1992 to 1998. That increase came largely from redefining software spending as investment and from adopting new price series for various categories of consumption.

The upward revision to the growth of real output was accompanied by a downward revision to the growth of the GDP price index over the same period. In addition to making the mean forecast error less informative, those revisions distort the reliability of the statistical measures of accuracy. (Some of the series examined here—the consumer price index and nominal interest rates—are unaffected.) Not every GDP revision has consequences, however. BEA's comprehensive NIPA revisions in December 2003 and December 2006 did not significantly affect the historical pattern of any of the variables used in this analysis.

The three-year NIPA revisions released in July 2007 changed the patterns of errors for forecasts of NIPA variables for 2004 through 2006. Growth of real GDP was revised downward, but because the price index for gross domestic purchases was revised upward, the downward revisions to nominal GDP were small.

The two-year forecast for growth in real GDP for 2004–2005 illustrates how data revisions change measures of forecast performance. Before the latest revision, CBO's forecast error for real GDP growth was an overprediction of 0.9 percentage points; the *Blue Chip* consensus and the Administration overpredicted real GDP growth by 0.6 and 0.4 percentage points, respectively. After the July 2007 revision, all of those errors rose. The errors in the *Blue Chip* and Administration forecasts rose to 0.8 and 0.6 percentage points, respectively, and as currently measured, CBO's overprediction increased to 1.1 percentage points. The same revision to the real GDP data essentially eliminated CBO's forecast error for 2003 to 2004, but the other forecasts, which had been on the mark, now show slight overpredictions.

Analysts' understanding of trends in types of income as a share of output can change sharply with data revisions, thus changing the accuracy of forecasts. Consider the forecast for the change in the share of wages and profits for 2003 to 2004. In early 2003, CBO forecast a gain of 1.1 percentage points; the Administration forecast a gain of 1.6 percentage points. Before the July 2006 three-year revision of the NIPAs, the actual income share was reported as unchanged over 2003 to 2004, implying a CBO forecast error of 1.2 percentage points. But the July 2006 revision implied that the income share of wages, salaries, and book profits increased by 0.9 percentage points over those years, so CBO's error was reduced to 0.2 percentage points.

The Administration's error, previously 1.6 percentage points, fell to 0.7 percentage points. The July 2007 revision to the NIPAs changed the story again. Now the combined income share is reported to have risen by 1.6 percentage points over that period. So the Administration's forecast of the increase in that share is now seen to have been on target. The same revised data now imply that CBO's forecast error is an underprediction, not an overprediction. Not only did CBO's error change sign, but at 0.4 percentage points, it is twice the absolute magnitude implied before the latest NIPA revision.

leaving those data revisions aside, the underpredictions made between 1996 and 1999 still reflect the failure to foresee important economic developments.

What CBO and other forecasters missed was the investment boom of the late 1990s, which deepened the capital stock and thereby boosted labor productivity and real economic growth.

All three forecasters overpredicted the growth of real GDP in the two-year forecast made in early 2004. They foresaw strong expansion in domestic demand, which was subsequently reported by the Bureau of Economic Analysis (BEA), but wrongly expected that U.S. output would grow as fast as demand. Forecasters, including CBO, failed to see that labor force participation would stay low, that hours worked would not rebound quickly, and that, with the growth of domestic output lower than predicted, an increasing share of domestic demand would be met by foreign production. Instead of the narrowing of the trade deficit that was anticipated for 2005, the trade deficit widened further. Later revisions to the data indicated that domestic demand was somewhat weaker than initially reported, thereby increasing the measured forecast errors. CBO forecast somewhat stronger economic growth for the two-year period than the Administration and the *Blue Chip* consensus did, so its forecast error for real output was—and remains after revision—larger.

Early in 2005, all three forecasters lowered their two-year forecasts for the growth of real GDP, compared with those made a year before. Despite the change, they all overpredicted growth for 2005 and 2006. Because CBO's forecast for real GDP growth had been slightly stronger than the other two forecasters', its forecast errors were slightly larger. About half of CBO's forecast error for 2005–2006 resulted from overpredicting domestic final demand, and about half came from overpredicting the contribution from trade and inventories.

Growth in Nominal Output. The records of CBO and the *Blue Chip* in forecasting two-year growth in nominal output are also quite similar overall (see Table 4 on page 16). The accuracies for the entire period, as measured by the root mean square error, were almost identical at 1.3 percentage points for CBO and 1.2 percentage points for the *Blue Chip.* The two forecasts are positively correlated, and of the 24 forecasts made between 1982 and 2005, the *Blue Chip*'s error was smaller (by more than 0.1 percentage point) than CBO's 8 times, CBO had the smaller error 3 times, and the two forecasters recorded virtually identical errors 13 times.

The Administration's projections of nominal output were about as accurate as those of CBO, both since 1982 and over the longer interval between 1976 and 2005.

In 2004 and again in 2005, all three forecasters overpredicted the two-year growth rate of real output but underpredicted inflation in the GDP price index by more. Hence, all three forecasters underpredicted the growth rate of nominal output. The forecast errors for the two-year projection of nominal GDP beginning in 2004 made by CBO and the *Blue Chip* were almost identical. The Administration's underprediction of nominal GDP was somewhat larger than that of CBO and the *Blue Chip* for the forecast made in 2004 but identical to them for the forecast made in 2005.

CPI Inflation. CBO's success matched that of the *Blue Chip* in forecasting two-year average growth in the consumer price index (see Table 5 on page 18). CBO was more than 0.1 percentage point closer to the actual value in 8 of the 24 periods, the *Blue Chip* was closer in 5 periods, and the errors of the two forecasters were essentially the same in 11 periods.

The variability of oil prices caused CBO and the *Blue Chip* to err in forecasting inflation. Each forecaster overestimated future inflation for 1982–1986 and for 1997–1998, partly because of the rapid drop in oil prices early in 1986 and in 1997–1998. Conversely, sharply increased in oil prices in 2000 and again in 2003 caused both to underestimate inflation in their two-year forecasts published in early 1999 and 2000 as well as those published in 2003. Further large unanticipated hikes in oil prices occurred in 2004, 2005, and 2006, and as a result, both forecasters recorded above-average errors for their two-year forecasts for CPI inflation made in early 2004 and 2005. (Two-year forecasts for inflation made in early 2005 underestimated energy prices in both 2005 and 2006, but forecast errors were larger still because housing rents rose significantly faster than anticipated in 2006.) In its 2005 forecast, CBO predicted a greater decline in two-year inflation than did the *Blue Chip;* when actual inflation was higher than the consensus, CBO's forecast error was larger.

The accuracy of CBO's forecasts of inflation was virtually the same as the Administration's in the period since 1982 and over the longer period since 1976.

Nominal Short- and Long-Term Interest Rates. For the 1982–2005 forecasts of nominal short-term interest rates, CBO's record was almost the same as the *Blue Chip*'s as measured by the root mean square error (see Table 6 on page 20). Both CBO and the *Blue Chip* tended to slightly overestimate rates on three-month Treasury bills (their mean errors over that period were 0.5 percentage points). CBO was more than 0.1 percentage point closer to the actual value in 8 of the 24 periods, and the *Blue Chip* was closer 6 times.

For long-term interest rates, the overall accuracy of CBO's forecasts for 1984–2005 was very close to that of the *Blue Chip* (see Table 7 on page 22). CBO was more than 0.1 percentage point closer to the actual value in 6 of the 22 periods, the *Blue Chip* was closer in 5 periods, and the two forecasters had essentially identical errors in 11 periods. Since 1991, CBO has been closer for five forecasts and the *Blue Chip* for one.

CBO's forecasts of long-term interest rates were slightly more accurate than those of the Administration, but there was no significant difference between the accuracy of the two government forecasters for nominal short-term rates.

Real Short-Term Interest Rates. CBO and the *Blue Chip* had similar accuracy, according to their root mean square errors, in estimating short-term interest rates adjusted for inflation in the 1982–2005 period (see Table 8 on page 24). CBO's forecasts were closer to the actual value in 3 of the 24 periods, the *Blue Chip*'s were closer in 12, and the two registered similar errors in 9 periods.

CBO's forecast accuracy has been similar to that of the Administration since 1982; however, CBO was slightly more accurate than the Administration over the full 1976–2005 period.

The Difference Between the Growth of the CPI and the GDP Price Index. The difference in the forecast growth rates of the two major price indexes, the CPI and the GDP price index, is important for budget projections. The growth of the GDP price index is a critical determinant in forecasting the growth of nominal GDP and, therefore, the growth of income subject to federal taxes. All else being equal, the faster the projected growth of the GDP price index, the faster the projected growth of revenues. For its part, the growth of the consumer price index affects forecasts of outlays because a number of federal programs are indexed to the CPI. The projection of the CPI, however, also affects projections of revenues because elements of the personal tax code, such as tax brackets, are indexed to the CPI. In general, the faster the growth of the CPI, the faster the growth of outlays and the slower the growth of revenues. Therefore, if the GDP price index is forecast to grow more rapidly than the CPI, all else equal, the projection of the deficit will be smaller than if the GDP price index is assumed to grow more slowly than the CPI.

The accuracy of CBO's forecast of the difference between the two growth rates two years ahead was the same as that of the *Blue Chip* consensus (see Table 9 on page 26). CBO was more accurate than the *Blue Chip* (by more than 0.1 percentage point) in 4 of the 24 periods, the *Blue Chip* was more accurate in 4 periods, and the two forecasters had essentially identical errors in 16 periods. The Administration was about as accurate as CBO was in each period, 1976–2005 and 1982–2005.

The persistent apparent overprediction of the difference through 1999 for forecasters largely reflects a conceptual and methodological change to the NIPAs in 1999, when business spending on software was added to investment and therefore to GDP (previously, spending for business software was considered purchasing an intermediate good). Because the price index for software purchases has been growing much less rapidly than all other prices, on average, the change in classifying software spending caused a downward revision of the historical data for the growth of the GDP price index. Hence, the forecasts made before 2000 were based on a pattern of historical growth in the GDP price index that was higher than is currently reported.

Since 2001, the actual difference between the growth of the CPI and the GDP price index has fallen relative to its history. That change in the relationship between the two price indexes reflects acceleration of the prices of some investment goods (mostly involved in business and residential structures) that are not included in the CPI. The acceleration in those investment prices was not generally foreseen, causing forecasters to overpredict the difference between the CPI and the GDP price index.

Taxable Income. One important source of error in budget projections involves the forecasting of taxable income. The errors in the first step—predicting nominal GDP growth—were discussed above. The errors in the second step—forecasting the relationship of major components of taxable income to nominal GDP (particularly the "high-tax" income share of GDP)—are discussed in this section. The most important component of taxable income for revenue projections is wages and salaries, followed by the book profits of corporations.[8] Because the *Blue Chip* does not report wages and salaries, CBO's forecast record cannot be compared with that of the private-sector survey in that respect.

The record of accuracy in CBO's and the Administration's forecasts of the two-year change in wages, salaries, and book profits as a combined share of GDP has been almost identical for the period since 1980 (see Table 10 on page 28). The pattern of errors also has been similar: Both forecasters had a string of underpredictions of the change in income share in forecasts made between 1994 and 1999, and both had large overpredictions in their 2001 and 2002 forecasts. Recently revised data from BEA show that the combined income share actually rose for the two-year periods beginning in 2003 and 2004, and the forecasts made in 2003 and 2004 by CBO and the Administration are fairly close to those actual data. For the two-year forecasts beginning in 2005, CBO and the Administration made similar large errors: They both forecast smaller increases in the combined income share, but BEA's data now show that the income share rose about twice as much as forecast. CBO had predicted a slightly smaller increase than the Administration had, so CBO's forecast error was slightly larger.

Three factors contributed to that series of under- and overpredictions: First was the unusual behavior of the statistical discrepancy in the NIPAs—the difference between measures of total income and total product. In principle, the discrepancy should be zero, but in practice it is not, because BEA must use different primary sources to estimate income on the one hand and product on the other. The discrepancy is essentially impossible to forecast because it reflects errors in estimating. If those errors were predictable, BEA would try to correct them.

Between 1994 and 2000, total income grew faster than total product—that is, the statistical discrepancy fell and became negative, leading to underpredictions (see Figure 1). With the onset of recession, the statistical discrepancy then swung sharply back and, according to the latest BEA data, was positive again before the end of 2002. That swing slowed income growth relative to output, leading to overpredictions. The latest revisions to BEA data show that the statistical discrepancy was quite different than had been estimated in 2004 and 2005: It is now estimated to have fallen sharply over the two-year periods beginning in both 2004 and 2005.

A second source of difficulty in forecasting taxable income is the recent variability in the part of labor income that is not subject to taxation. Throughout most of the post-World War II period, the nontaxable part of labor income rose as a share of total labor compensation because employers and employees preferred to substitute untaxed noncash, or fringe, benefits (such as employer-paid insurance premiums and pension contributions) for taxable wages and salaries. But between 1994 and 1999, that trend reversed (see Figure 2). The share of total labor compensation that is not taxed declined, while the share of compensation that is taxed increased. That turnaround stemmed from changes in the way health care is provided and from the rise in the stock market (which reduced the necessity for employers to contribute to defined-benefit pension plans). During 2001 and 2002, however, the nontaxable share of labor income rose sharply again. Since then, according to the latest data, the nontaxable share has been roughly constant, but during some of that time, legislative changes have temporarily reduced the payments that firms would otherwise have been required to make to fund defined-benefit pensions, further complicating forecasting.[9]

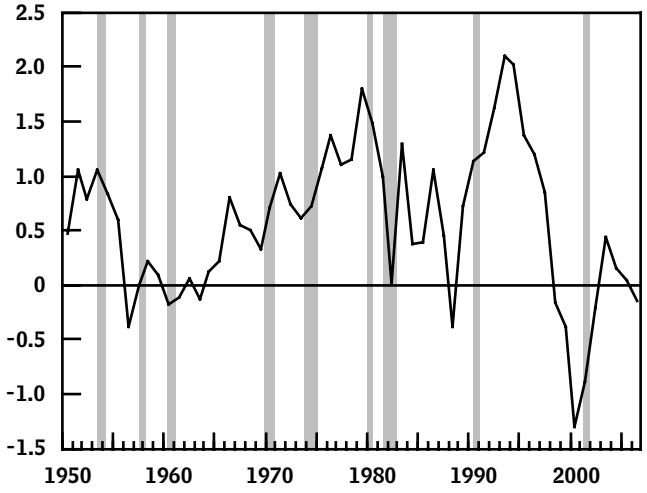
8. See Congressional Budget Office, *How CBO Forecasts Income* (August 2006).

9. The implications for CBO's baseline forecasts of subsequent legislative changes are discussed in Congressional Budget Office, *What Is a Current-Law Economic Baseline?* Further details about the treatment of contributions to defined-benefit pension plans are outlined in Box 2-2 of Congressional Budget Office, *The Budget and Economic Outlook: An Update* (August 2005).

Figure 1.

Statistical Discrepancy in the NIPAs

(Percentage of gross domestic product)



Sources: Congressional Budget Office; Department of Commerce, Bureau of Economic Analysis.

Notes: NIPAs = national income and product accounts.

The shaded vertical bars indicate periods of recession. (A recession extends from the peak of a business cycle to its trough.)

The statistical discrepancy is the measure of national product minus the measure of national income. When the discrepancy is positive, total income (as measured in the NIPAs) is less than the corresponding measure of the economy's total product.

A third factor complicating the task of forecasting the growth of taxable income is changes in the law. Forecasts made in January 2001 and 2002 were affected by the change to tax rules for the depreciation of capital goods made in legislation enacted in 2002 and 2003. By allowing more depreciation than before, the changes caused corporate book profits to be lower relative to economic profits (because more depreciation could be written off as a business expense) than usual. Forecasters in 2001 did not incorporate that effect for 2002, so forecasts of book profits were too high for that year.

Even when they are anticipated, changes to tax law complicate forecasts of income shares because estimates of tax effects are themselves subject to error. The increase in book depreciation for tax years 2002 to 2004 was less than models of the legislative impact had suggested. Forecasters also anticipated that the built-in expiration of the provisions enacted in 2002 and 2003 carried the implication that book depreciation would fall sharply in 2005 and hence that corporate tax liabilities would rise. Yet forecasts made in 2004 and 2005 still underestimated the rise in taxable corporate income.

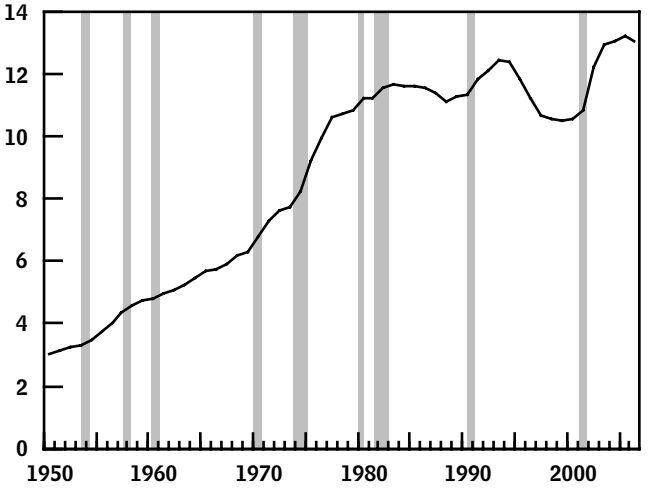
Five-Year Projections

CBO's five-year economic projections were about as accurate as those of the *Blue Chip* and the Administration for all the series examined except taxable income, for which the Administration displayed a slight edge. The *Blue Chip*'s five-year economic projections (published twice a year) are generally published about three months after the CBO forecasts with which they are compared. Although CBO's projections are constrained to assume no change in fiscal policy and the Administration's forecasts generally assume that the Administration's proposals are enacted, the *Blue Chip* forecasters are free to make their best projections for future fiscal policy. That freedom and the additional months of data do not seem to translate into a forecasting edge, however.

Figure 2.

Fringe Benefits

(Percentage of total labor compensation)



Sources: Congressional Budget Office; Department of Commerce, Bureau of Economic Analysis.

Notes: The shaded vertical bars indicate periods of recession. (A recession extends from the peak of a business cycle to its trough.)

Fringe benefits are employers' contributions for employees' pension and insurance funds.

Real Output. CBO's projections of medium-term growth in real output have been about as accurate as the *Blue Chip*'s in the period since 1979 (see Table 11 on page 30). As with the errors in the two-year forecasts, the errors in the five-year projections were highly positively correlated, with both forecasters posting similarly large errors for the same years (1979 as well as 1994 through 1997). The mean errors for the 1979–2002 period indicate that both forecasters had an identical downward bias (they predicted slower growth, on average, than actually occurred) of 0.3 percentage points. In the five-year projections made between 1992 and 1999, both CBO and the *Blue Chip* mostly underpredicted medium-term growth because of the surprisingly strong economy of the late 1990s and, to a lesser extent, the upward revisions to BEA's growth rate estimates previously discussed.

The accuracy of CBO's five-year projections of real output also has been similar to that of the Administration. In the three years from 2000 to 2002, all three forecasters' five-year projections of real economic growth were higher than they had been during the 1990s. The projections made in 2000 and 2001 now appear to have been overpredictions mainly because they did not anticipate the recession of 2001 and the weakness of the subsequent recovery in 2002; those forecasts actually underpredicted growth in 2004. The five-year projections made in 2002, which did not span a recession, also have proved to be overpredictions. Compared with projections made the previous year, they incorporated an upward revision to the forecasts of growth from 2003 onward. It turns out that the projection of real GDP growth in 2003 that was made in 2002 was too optimistic by more than a percentage point; recent downward revisions now leave real growth over the 2004–2006 period somewhat slower than in that projection.

Nominal Output. The accuracy of CBO's and the *Blue Chip*'s forecasts of the growth of nominal output has been similar for the period since 1982 (see Table 12 on page 32). The accuracy has been better than that for the forecasts made since 1992 for the growth of real output; the forecasters' errors in projecting inflation in the GDP price index offset their errors in forecasting real output.

Inflation Measures. The difference between the two major inflation measures is even more important for five-year budget projections than for two-year forecasts. The mean error statistics indicate a slightly larger downward bias than for the two-year forecasts. All three forecasters' projections of the difference in the growth of the CPI and the GDP price index were too low in virtually every period before 2000 (see Table 13 on page 34). At least 0.2 percentage points of the apparent forecast bias between 1985 and 1998 resulted from the downward revision in the growth of the GDP price index that occurred when the NIPAs were revised in 1999.

Even when the errors are adjusted for the effect of the revisions, a slight downward bias remains for all three forecasters. That bias indicates that projections of the relationship between those two inflation measures tend to contribute to optimistic budget projections. Although all of the projections showed a similar bias, CBO's accuracy was about the same as that of the *Blue Chip* and slightly better than that of the Administration.

As noted above, the actual difference between the growth rates of the CPI and the GDP price index has been smaller since 2001 than it was previously. Five-year projections for this period were influenced by the longer historical record and so overestimated the difference between the price indexes.

Taxable Income. The final five-year projection record examined here is that of the change in the sum of wages and salaries and corporate book profits expressed as a share of output. (As with the two-year forecast, those are the most important income components for revenue projections.) CBO's five-year projections of that share are less accurate than are the Administration's (see Table 14 on page 36). Compared with the Administration's projections, CBO's were insufficiently pessimistic in the early 1980s and too pessimistic in 1996 and 1997. As with some other variables, the errors of both forecasters show alternating periods of optimism and pessimism and are positively correlated. CBO's five-year projections made between 1991 and 1997 indicated less growth in the tax base relative to GDP than actually occurred. The Administration made similar errors. Difficulties in forecasting the statistical discrepancy and the nontaxable component of labor income are major sources of errors in the five-year projections as well as in the two-year forecasts. (Three factors that contribute to errors in CBO's forecasts of taxable income were discussed above in the context of the two-year horizon.) Moreover, as the errors for the five-year periods encompassing the 2001 recession indicate, the difficulty in forecasting business-cycle turning points also complicates forecasts of income shares.

Table 1.

Summary Measures of Performance for Two-Year Average Forecasts

(Percentage points)

	CBO	*Blue Chip*[a]	Administration
Growth Rate for Real Output (1982–2005)			
Mean error	-0.4	-0.4	-0.3
Mean absolute error	1.0	1.0	1.0
Root mean square error	1.2	1.2	1.3
Growth Rate for Nominal Output (1982–2005)			
Mean error	0.0	0.1	0.2
Mean absolute error	1.0	0.9	1.1
Root mean square error	1.3	1.2	1.4
Inflation in the Consumer Price Index (1982–2005)			
Mean error	0.3	0.3	0.2
Mean absolute error	0.7	0.7	0.7
Root mean square error	0.9	0.9	0.9
Nominal Interest Rate on Three-Month Treasury Bills (1982–2005)			
Mean error	0.5	0.5	0.1
Mean absolute error	1.0	1.0	1.0
Root mean square error	1.3	1.2	1.3
Nominal Long-Term Interest Rate (1984–2005)			
Mean error	0.3	0.4	-0.1
Mean absolute error	0.7	0.6	0.8
Root mean square error	0.7	0.7	0.9
Real Interest Rate on Three-Month Treasury Bills (1982–2005)			
Mean error	0.2	0.1	-0.1
Mean absolute error	0.9	0.9	0.9
Root mean square error	1.2	1.1	1.2
Difference Between Inflation in the CPI and in the GDP Price Index (1982–2005)			
Mean error	-0.1	-0.2	-0.2
Mean absolute error	0.4	0.4	0.4
Root mean square error	0.4	0.4	0.5
Change in Wage and Salary Disbursements Plus Corporate Book Profits as a Share of Output (1980–2005)			
Mean error	0.1	*	0.2
Mean absolute error	1.0	*	0.9
Root mean square error	1.2	*	1.1

Sources: Congressional Budget Office; Office of Management and Budget; Aspen Publishers, Inc., *Blue Chip Economic Indicators;* Department of Commerce, Bureau of Economic Analysis.

Notes: The values reported here are derived from Tables 3 through 10. Errors are projected values minus actual values; thus, a positive error is an overestimate.

CPI = consumer price index; GDP = gross domestic product; * = not applicable.

a. The *Blue Chip* consensus is the average of approximately 50 private-sector forecasts.

Table 2.

Summary Measures of Performance for Five-Year Average Projections

(Percentage points)

	CBO	*Blue Chip* [a]	Administration
Growth Rate for Real Output (1979–2002)			
Mean error	-0.3	-0.3	0.0
Mean absolute error	0.6	0.6	0.8
Root mean square error	0.9	0.8	0.9
Growth Rate for Nominal Output (1982–2002)			
Mean error	0.4	0.5	0.5
Mean absolute error	0.8	0.8	0.8
Root mean square error	0.9	1.0	1.0
Difference Between Inflation in the CPI and in the GDP Price Index (1983–2002)			
Mean error	-0.2	-0.3	-0.4
Mean absolute error	0.4	0.4	0.5
Root mean square error	0.4	0.5	0.5
Change in Wage and Salary Disbursements Plus Corporate Book Profits as a Share of Output (1980–2002)			
Mean error	-0.3	*	-0.1
Mean absolute error	1.8	*	1.5
Root mean square error	2.2	*	1.9

Sources: Congressional Budget Office; Office of Management and Budget; Aspen Publishers, Inc., *Blue Chip Economic Indicators;* Department of Commerce, Bureau of Economic Analysis.

Notes: The values reported here are derived from Tables 11 through 14. Errors are projected values minus actual values; thus, a positive error is an overestimate.

CPI = consumer price index; GDP = gross domestic product; * = not applicable.

a. The *Blue Chip* consensus is the average of approximately 50 private-sector forecasts.

Table 3.

CBO, *Blue Chip*, and Administration Forecasts of Two-Year Average Growth Rates for Real Output

(By calendar year, in percent)

	Actual									
	1972 Dollars[a]	1982 Dollars[b]	1987 Dollars[c]	Chain-Type Annual-Weighted Index	CBO		*Blue Chip*[e]		Administration	
					Forecast	Error[d]	Forecast	Error[d]	Forecast	Error[d]
Real GNP										
1976–1977	6.7	4.8	4.8	5.1	6.2	1.1	*	*	5.9	0.9
1977–1978	5.2	5.0	4.7	5.1	5.5	0.4	*	*	5.1	0.1
1978–1979	3.9	3.9	3.8	4.5	4.7	0.3	*	*	4.7	0.3
1979–1980	1.3	1.1	1.1	1.6	2.7	1.2	*	*	2.9	1.3
1980–1981	1.1	0.9	0.5	1.0	0.5	-0.5	*	*	0.5	-0.5
1981–1982	0.2	-0.3	-0.4	0.2	2.1	1.9	*	*	2.6	2.4
1982–1983	0.7	0.5	0.7	1.2	2.1	0.9	2.0	0.8	2.7	1.4
1983–1984	5.2	5.2	4.9	5.7	3.4	-2.3	3.5	-2.2	2.6	-3.1
1984–1985	*	5.1	4.4	5.4	4.7	-0.7	4.3	-1.1	4.7	-0.7
1985–1986	*	3.0	2.8	3.5	3.3	-0.2	3.2	-0.3	3.9	0.4
1986–1987	*	3.1	2.9	3.3	3.1	-0.1	3.0	-0.3	3.7	0.4
1987–1988	*	3.9	3.5	3.8	2.9	-0.9	2.8	-0.9	3.3	-0.5
1988–1989	*	3.5	3.3	3.9	2.4	-1.4	2.1	-1.7	3.0	-0.9
1989–1990	*	1.7	2.0	2.8	2.5	-0.3	2.2	-0.6	3.2	0.4
1990–1991	*	*	0.3	0.9	2.0	1.2	1.9	1.1	2.8	1.9
1991–1992	*	*	0.7	1.5	1.6	0.1	1.2	-0.3	1.4	-0.1
Real GDP[f]										
1992–1993	*	*	2.7	3.0	2.6	-0.4	2.3	-0.7	2.2	-0.8
1993–1994	*	*	3.6	3.3	2.9	-0.4	3.0	-0.3	2.9	-0.4
1994–1995	*	*	*	3.3	2.8	-0.5	2.8	-0.4	2.9	-0.3
1995–1996	*	*	*	3.1	2.4	-0.7	2.6	-0.5	2.6	-0.5
1996–1997	*	*	*	4.1	1.9	-2.1	2.1	-2.0	2.2	-1.8
1997–1998	*	*	*	4.3	2.1	-2.2	2.2	-2.1	2.1	-2.2
1998–1999	*	*	*	4.3	2.3	-2.0	2.4	-1.9	2.2	-2.1
1999–2000	*	*	*	4.1	2.0	-2.1	2.3	-1.7	2.2	-1.9
2000–2001	*	*	*	2.2	3.2	1.0	3.3	1.1	3.0	0.8
2001–2002	*	*	*	1.2	2.9	1.7	3.0	1.8	3.2	2.1
2002–2003	*	*	*	2.1	2.4	0.4	2.2	0.1	2.2	0.2
2003–2004	*	*	*	3.1	3.0	0.0	3.2	0.1	3.2	0.2
2004–2005	*	*	*	3.4	4.5	1.1	4.1	0.8	4.0	0.6
2005–2006	*	*	*	3.0	3.7	0.8	3.5	0.5	3.5	0.6

Continued

Table 3.

Continued

(By calendar year, in percent)

	Actual				CBO		*Blue Chip*[e]		Administration	
	1972 Dollars[a]	1982 Dollars[b]	1987 Dollars[c]	Chain-Type Annual-Weighted Index	Forecast	Error[d]	Forecast	Error[d]	Forecast	Error[d]
Statistics for 1976–2005										
Mean error	*	*	*	*	*	-0.2	*	*	*	-0.1
Mean absolute error	*	*	*	*	*	1.0	*	*	*	1.0
Root mean square error	*	*	*	*	*	1.2	*	*	*	1.3
Statistics for 1982–2005										
Mean error	*	*	*	*	*	-0.4	*	-0.4	*	-0.3
Mean absolute error	*	*	*	*	*	1.0	*	1.0	*	1.0
Root mean square error	*	*	*	*	*	1.2	*	1.2	*	1.3

Sources: Congressional Budget Office; Office of Management and Budget; Aspen Publishers, Inc., *Blue Chip Economic Indicators;* Department of Commerce, Bureau of Economic Analysis.

Notes: Actual values are for the two-year growth rates for real gross national product (GNP) and real gross domestic product (GDP) last reported by the Bureau of Economic Analysis, not the first reported values. Forecast values are for the average annual growth of real GNP or GDP over the two-year period. The forecasts were issued in the first half of the initial year of the period or in December of the preceding year.

* = not applicable.

a. Data for 1972-dollar GNP and GDP are available only through the third quarter of 1985.

b. Data for 1982-dollar GNP and GDP are available only through the third quarter of 1991.

c. Data for 1987-dollar GNP and GDP are available only through the second and third quarters, respectively, of 1995.

d. Errors (which are in percentage points) are forecast values minus actual values; thus, a positive error is an overestimate. The chain-type annual-weighted index of actual GNP or GDP was used to calculate the errors.

e. Two-year forecasts for the *Blue Chip* consensus were not available until 1982.

f. With the 1992 benchmark revision by the Bureau of Economic Analysis, GDP replaced GNP as the central measure of national output.

Table 4.

CBO, *Blue Chip*, and Administration Forecasts of Two-Year Average Growth Rates for Nominal Output

(By calendar year, in percent)

		CBO		*Blue Chip*[b]		Administration	
	Actual	Forecast	Error[a]	Forecast	Error[a]	Forecast	Error[a]
GNP							
1976–1977	11.5	13.1	1.7	*	*	12.3	0.8
1977–1978	12.1	10.8	-1.3	*	*	11.2	-1.0
1978–1979	12.5	10.9	-1.6	*	*	11.2	-1.3
1979–1980	10.4	11.0	0.5	*	*	10.4	-0.1
1980–1981	10.4	9.7	-0.7	*	*	9.5	-0.8
1981–1982	8.0	12.1	4.1	*	*	11.9	4.0
1982–1983	6.3	9.7	3.4	9.5	3.2	9.8	3.5
1983–1984	9.8	8.2	-1.6	9.0	-0.9	8.0	-1.8
1984–1985	9.0	9.9	0.9	9.6	0.6	9.6	0.6
1985–1986	6.2	7.6	1.3	7.4	1.2	8.2	1.9
1986–1987	5.8	7.1	1.3	6.7	0.9	7.7	1.8
1987–1988	7.0	6.5	-0.5	6.4	-0.5	6.9	-0.1
1988–1989	7.6	6.3	-1.3	6.1	-1.5	6.8	-0.9
1989–1990	6.7	6.8	0.1	6.6	-0.1	7.1	0.4
1990–1991	4.6	6.1	1.5	6.0	1.4	7.1	2.5
1991–1992	4.4	5.7	1.3	5.2	0.8	5.6	1.2
GDP[c]							
1992–1993	5.4	5.7	0.3	5.5	0.2	5.4	0.0
1993–1994	5.6	5.3	-0.3	6.0	0.4	5.3	-0.3
1994–1995	5.4	5.6	0.2	5.6	0.2	5.7	0.3
1995–1996	5.1	5.2	0.1	5.7	0.6	5.6	0.4
1996–1997	6.0	4.7	-1.3	4.5	-1.4	5.1	-0.9
1997–1998	5.8	4.6	-1.2	4.6	-1.2	4.7	-1.0
1998–1999	5.6	4.5	-1.2	4.5	-1.1	4.2	-1.5
1999–2000	5.9	3.9	-2.0	4.1	-1.8	4.0	-1.9
2000–2001	4.5	4.9	0.3	5.1	0.6	4.9	0.4
2001–2002	3.3	5.2	1.9	5.1	1.8	5.4	2.1
2002–2003	4.0	4.2	0.2	4.0	0.0	4.2	0.2
2003–2004	5.6	4.8	-0.9	5.0	-0.7	4.7	-0.9
2004–2005	6.5	5.6	-0.9	5.7	-0.8	5.3	-1.2
2005–2006	6.3	5.5	-0.7	5.5	-0.7	5.6	-0.7

Continued

Table 4.
Continued

(By calendar year, in percent)

		CBO		*Blue Chip*[b]		Administration	
	Actual	Forecast	Error[a]	Forecast	Error[a]	Forecast	Error[a]
Statistics for 1976–2005							
Mean error	*	*	0.1	*	*	*	0.2
Mean absolute error	*	*	1.2	*	*	*	1.1
Root mean square error	*	*	1.5	*	*	*	1.5
Statistics for 1982–2005							
Mean error	*	*	0.0	*	0.1	*	0.2
Mean absolute error	*	*	1.0	*	0.9	*	1.1
Root mean square error	*	*	1.3	*	1.2	*	1.4

Sources: Congressional Budget Office; Office of Management and Budget; Aspen Publishers, Inc., *Blue Chip Economic Indicators;* Department of Commerce, Bureau of Economic Analysis.

Notes: Actual values are for the two-year growth rates for gross national product (GNP) and gross domestic product (GDP) last reported by the Bureau of Economic Analysis, not the first reported values. Forecast values are for the average annual growth of nominal GNP or GDP over the two-year period. The forecasts were issued in the first half of the initial year of the period or in December of the preceding year.

* = not applicable.

a. Errors (which are in percentage points) are forecast values minus actual values; thus, a positive error is an overestimate.

b. Two-year forecasts for the *Blue Chip* consensus were not available until 1982.

c. With the 1992 benchmark revision by the Bureau of Economic Analysis, GDP replaced GNP as the central measure of national output.

Table 5.

CBO, *Blue Chip*, and Administration Forecasts of Two-Year Average Inflation in the Consumer Price Index

(By calendar year, in percent)

	Actual		CBO		*Blue Chip*[b]		Administration	
	CPI-U	CPI-W	Forecast	Error[a]	Forecast	Error[a]	Forecast	Error[a]
1976–1977	6.1	6.1	7.1	1.0	*	*	6.1	0.0
1977–1978	7.0	7.0	4.9	-2.1	*	*	5.2	-1.8
1978–1979	9.4	9.5	5.8	-3.7	*	*	6.0	-3.5
1979–1980	12.4	12.5	8.1	-4.3	*	*	7.4	-5.0
1980–1981	11.9	11.9	10.1	-1.8	*	*	10.5	-1.4
1981–1982	8.2	8.1	10.4	2.1	*	*	9.7	1.6
1982–1983	4.6	4.5	7.2	2.6	7.2	2.6	6.6	2.1
1983–1984	3.8	3.3	4.7	1.0	4.9	1.1	4.7	1.5
1984–1985	3.9	3.5	4.9	1.0	5.2	1.3	4.5	1.0
1985–1986	2.7	2.5	4.1	1.4	4.3	1.6	4.2	1.7
1986–1987	2.8	2.6	3.8	1.2	3.8	1.0	3.8	1.2
1987–1988	3.8	3.8	3.9	0.1	3.6	-0.2	3.3	-0.5
1988–1989	4.4	4.4	4.7	0.3	4.3	-0.1	4.2	-0.2
1989–1990	5.1	5.0	4.9	-0.1	4.7	-0.4	3.7	-1.3
1990–1991	4.8	4.6	4.1	-0.7	4.1	-0.7	3.9	-0.7
1991–1992	3.6	3.5	4.2	0.6	4.4	0.8	4.6	1.1
1992–1993	3.0	2.9	3.4	0.4	3.5	0.5	3.1	0.1
1993–1994	2.8	2.7	2.8	0.1	3.3	0.6	2.8	0.1
1994–1995	2.7	2.7	2.8	0.1	3.0	0.3	3.0	0.3
1995–1996	2.9	2.9	3.2	0.4	3.4	0.6	3.1	0.3
1996–1997	2.6	2.6	2.9	0.3	2.8	0.2	2.9	0.3
1997–1998	1.9	1.8	2.9	1.0	2.9	1.0	2.7	0.8
1998–1999	1.9	1.8	2.3	0.5	2.4	0.5	2.1	0.3
1999–2000	2.8	2.8	2.5	-0.2	2.2	-0.6	2.2	-0.5
2000–2001	3.1	3.1	2.4	-0.6	2.5	-0.6	2.5	-0.6
2001–2002	2.2	2.1	2.8	0.6	2.5	0.3	2.6	0.4
2002–2003	1.9	1.8	2.1	0.2	2.0	0.1	2.0	0.1
2003–2004	2.5	2.4	2.2	-0.2	2.2	-0.2	2.1	-0.3
2004–2005	3.0	3.1	1.6	-1.4	1.9	-1.1	1.4	-1.6
2005–2006	3.3	3.4	2.1	-1.2	2.4	-0.9	2.3	-1.0

Continued

Table 5.
Continued

(By calendar year, in percent)

	Actual		CBO		*Blue Chip*[b]		Administration	
	CPI-U	CPI-W	Forecast	Error[a]	Forecast	Error[a]	Forecast	Error[a]
Statistics for 1976–2005								
Mean error	*	*	*	0.0	*	*	*	-0.2
Mean absolute error	*	*	*	1.0	*	*	*	1.0
Root mean square error	*	*	*	1.5	*	*	*	1.5
Statistics for 1982–2005								
Mean error	*	*	*	0.3	*	0.3	*	0.2
Mean absolute error	*	*	*	0.7	*	0.7	*	0.7
Root mean square error	*	*	*	0.9	*	0.9	*	0.9

Sources: Congressional Budget Office; Office of Management and Budget; Aspen Publishers, Inc., *Blue Chip Economic Indicators;* Department of Labor, Bureau of Labor Statistics.

Notes: Values are for the average annual growth of the consumer price index (CPI) over the two-year period. Before 1978, the Bureau of Labor Statistics published only one consumer price index series, now known as the CPI-W (the price index for urban wage earners and clerical workers). In January 1978, the bureau began to publish a second, broader consumer price index series, the CPI-U (the price index for all urban consumers). For most years since 1979, CBO forecast the CPI-U; for 1986 through 1989, however, CBO forecast the CPI-W. The Administration forecast the CPI-W until 1992, when it switched to the CPI-U. The *Blue Chip* forecast the CPI-U for the entire period. The forecasts were issued in the first half of the initial year of the period or in December of the preceding year.

* = not applicable.

a. Errors (which are in percentage points) are forecast values minus actual values; thus, a positive error is an overestimate.

b. Two-year forecasts for the *Blue Chip* consensus were not available until 1982.

Table 6.

CBO, *Blue Chip*, and Administration Forecasts of Two-Year Average Nominal Interest Rates on Three-Month Treasury Bills

(By calendar year, in percent)

	Actual		CBO		*Blue Chip*[b]		Administration	
	New Issue	Secondary Market	Forecast	Error[a]	Forecast	Error[a]	Forecast	Error[a]
1976–1977	5.1	5.1	6.2	1.1	*	*	5.5	0.4
1977–1978	6.2	6.2	6.4	0.2	*	*	4.4	-1.8
1978–1979	8.6	8.6	6.0	-2.6	*	*	6.1	-2.5
1979–1980	10.8	10.7	8.3	-2.4	*	*	8.2	-2.6
1980–1981	12.8	12.7	9.5	-3.2	*	*	9.7	-3.1
1981–1982	12.4	12.3	13.2	0.9	*	*	10.0	-2.4
1982–1983	9.7	9.6	12.6	3.0	11.3	1.6	11.1	1.4
1983–1984	9.1	9.1	7.1	-2.0	7.9	-1.2	7.9	-1.1
1984–1985	8.5	8.5	8.7	0.3	9.1	0.5	8.1	-0.4
1985–1986	6.7	6.7	8.5	1.8	8.5	1.8	8.0	1.3
1986–1987	5.9	5.9	6.7	0.9	7.1	1.2	6.9	1.0
1987–1988	6.2	6.2	5.6	-0.6	5.7	-0.5	5.5	-0.7
1988–1989	7.4	7.4	6.4	-0.9	6.1	-1.2	5.2	-2.1
1989–1990	7.8	7.8	7.5	-0.3	7.5	-0.3	5.9	-1.9
1990–1991	6.5	6.4	7.0	0.6	7.1	0.7	6.0	-0.4
1991–1992	4.4	4.4	6.8	2.4	6.4	2.0	6.2	1.8
1992–1993	3.2	3.2	4.7	1.5	4.6	1.4	4.5	1.3
1993–1994	3.6	3.6	3.4	-0.2	3.8	0.2	3.4	-0.2
1994–1995	4.9	4.9	3.9	-1.0	3.6	-1.3	3.6	-1.3
1995–1996	5.3	5.2	5.9	0.7	6.1	0.9	5.7	0.4
1996–1997	5.0	5.0	4.8	-0.2	5.0	0.0	4.7	-0.3
1997–1998	4.9	4.9	5.0	0.1	5.1	0.2	4.8	-0.1
1998–1999	4.7	4.7	5.2	0.5	5.1	0.4	4.9	0.2
1999–2000	5.2	5.2	4.5	-0.7	4.3	-0.9	4.2	-1.0
2000–2001	4.6	4.6	5.5	0.9	5.6	1.0	5.2	0.6
2001–2002	2.5	2.5	4.8	2.4	5.4	2.9	5.8	3.4
2002–2003	1.3	1.3	3.3	2.0	2.7	1.4	2.8	1.5
2003–2004	1.2	1.2	2.4	1.3	2.2	1.1	2.4	1.3
2004–2005	2.3	2.3	2.1	-0.1	1.9	-0.3	1.8	-0.4
2005–2006	3.9	3.9	3.4	-0.5	3.4	-0.5	3.1	-0.8

Continued

Table 6.

Continued

(By calendar year, in percent)

	Actual							
	New Issue	Secondary Market	CBO Forecast	CBO Error[a]	*Blue Chip*[b] Forecast	*Blue Chip*[b] Error[a]	Administration Forecast	Administration Error[a]
Statistics for 1976–2005								
Mean error	*	*	*	0.2	*	*	*	-0.3
Mean absolute error	*	*	*	1.2	*	*	*	1.3
Root mean square error	*	*	*	1.5	*	*	*	1.5
Statistics for 1982–2005								
Mean error	*	*	*	0.5	*	0.5	*	0.1
Mean absolute error	*	*	*	1.0	*	1.0	*	1.0
Root mean square error	*	*	*	1.3	*	1.2	*	1.3

Sources: Congressional Budget Office; Office of Management and Budget; Aspen Publishers, Inc., *Blue Chip Economic Indicators;* Federal Reserve Board.

Notes: Values are for the geometric averages of the three-month Treasury bill rates for the two-year period. The actual values are published by the Federal Reserve Board as the rate on new issues (reported on a bank-discount basis) and the secondary-market rate. CBO forecast the secondary-market rate; the Administration forecast the new-issue rate prior to 2001 but the secondary-market rate since then. The *Blue Chip* alternated between the two rates, forecasting the new-issue rate from 1982 to 1985, the secondary-market rate from 1986 to 1991, the new-issue rate again from 1992 to 1997, and the secondary-market rate since then. The forecasts were issued in the first half of the initial year of the period or in December of the preceding year.

* = not applicable.

a. Errors (which are in percentage points) are forecast values minus actual values; thus, a positive error is an overestimate.

b. Two-year forecasts for the *Blue Chip* consensus were not available until 1982.

Table 7.

CBO, *Blue Chip*, and Administration Forecasts of Two-Year Averages for Nominal Long-Term Interest Rates

(By calendar year, in percent)

	Actual		CBO		*Blue Chip*		Administration	
	10-Year Note	Corporate Aaa Bond	Forecast	Error[a]	Forecast	Error[a]	Forecast	Error[a]
1984–1985	11.5	12.0	11.9	-0.1	12.2	0.2	9.7	-1.8
1985–1986	9.1	10.2	11.5	1.3	11.8	1.7	10.6	1.5
1986–1987	8.0	9.2	8.9	0.9	9.9	0.8	8.7	0.7
1987–1988	8.6	9.5	7.2	-1.4	8.7	-0.8	6.6	-2.0
1988–1989	8.7	9.5	9.4	0.7	9.8	0.3	7.7	-1.0
1989–1990	8.5	9.3	9.1	0.6	9.5	0.3	7.7	-0.8
1990–1991	8.2	9.0	7.7	-0.5	8.7	-0.3	7.2	-1.0
1991–1992	7.4	8.5	7.8	0.4	8.7	0.3	7.3	-0.1
1992–1993	6.4	7.7	7.1	0.7	8.4	0.7	6.9	0.5
1993–1994	6.5	7.6	6.6	0.2	8.2	0.6	6.6	0.2
1994–1995	6.8	7.8	5.9	-0.9	7.1	-0.7	5.8	-1.0
1995–1996	6.5	7.5	7.3	0.8	8.6	1.1	7.5	1.0
1996–1997	6.4	7.3	6.2	-0.2	6.2	-0.1	5.4	-0.9
1997–1998	5.8	6.9	6.2	0.4	6.4	0.6	6.0	0.2
1998–1999	5.5	6.8	6.0	0.6	5.9	0.5	5.8	0.4
1999–2000	5.8	7.3	5.2	-0.6	5.0	-0.8	4.9	-0.9
2000–2001	5.5	7.4	6.3	0.8	6.3	0.8	6.1	0.6
2001–2002	4.8	6.8	5.1	0.3	5.4	0.6	5.8	1.0
2002–2003	4.3	6.1	5.2	0.9	5.3	1.0	5.1	0.8
2003–2004	4.1	5.6	4.8	0.7	4.8	0.7	4.6	0.5
2004–2005	4.3	5.4	5.0	0.7	5.0	0.8	4.8	0.5
2005–2006	4.5	5.4	5.1	0.6	5.0	0.5	4.9	0.4
Statistics for 1984–2005								
Mean error	*	*	*	0.3	*	0.4	*	-0.1
Mean absolute error	*	*	*	0.7	*	0.6	*	0.8
Root mean square error	*	*	*	0.7	*	0.7	*	0.9

Sources: Congressional Budget Office; Office of Management and Budget; Aspen Publishers, Inc., *Blue Chip Economic Indicators;* Federal Reserve Board.

Notes: Actual values are for the geometric averages of the 10-year Treasury note rates or Moody's corporate Aaa bond rates for the two-year period as reported by the Federal Reserve Board. CBO forecast the 10-year Treasury note rate in all years except 1984 and 1985, when it forecast the corporate Aaa bond rate. The Administration forecast the 10-year note rate, but the *Blue Chip* forecast the corporate Aaa bond rate through 1995 and then switched to the 10-year Treasury note rate. Data are only available beginning in 1984 because not all of the forecasters published long-term rate projections before then. The forecasts were issued in the first half of the initial year of the period or in December of the preceding year.

* = not applicable.

a. Errors (which are in percentage points) are forecast values minus actual values; thus, a positive error is an overestimate.

Table 8.

CBO, *Blue Chip*, and Administration Forecasts of Two-Year Average Real Interest Rates on Three-Month Treasury Bills

(By calendar year, in percent)

	Actual									
	New Issue		Secondary Market		CBO		*Blue Chip*[b]		Administration	
	CPI-U	CPI-W	CPI-U	CPI-W	Forecast	Error[a]	Forecast	Error[a]	Forecast	Error[a]
1976–1977	-0.9	-0.9	-0.9	-0.9	-0.8	0.1	*	*	-0.6	0.3
1977–1978	-0.8	-0.7	-0.8	-0.7	1.5	2.2	*	*	-0.8	-0.1
1978–1979	-0.7	-0.8	-0.7	-0.8	0.2	1.0	*	*	0.1	0.9
1979–1980	-1.4	-1.5	-1.4	-1.5	0.2	1.7	*	*	0.7	2.2
1980–1981	0.8	0.9	0.7	0.8	-0.5	-1.2	*	*	-0.7	-1.6
1981–1982	3.8	4.0	3.7	3.9	2.6	-1.2	*	*	0.3	-3.7
1982–1983	4.8	4.9	4.7	4.9	5.0	0.3	3.8	-1.0	4.2	-0.8
1983–1984	5.1	5.7	5.1	5.6	2.2	-2.9	2.9	-2.3	3.1	-2.6
1984–1985	4.4	4.9	4.4	4.8	3.6	-0.8	3.6	-0.8	3.4	-1.4
1985–1986	3.9	4.1	3.9	4.1	4.2	0.3	4.0	0.1	3.6	-0.4
1986–1987	3.1	3.2	3.0	3.2	2.8	-0.4	3.2	0.1	3.0	-0.3
1987–1988	2.3	2.4	2.3	2.3	1.7	-0.7	2.0	-0.3	2.1	-0.2
1988–1989	2.8	2.9	2.8	2.9	1.7	-1.2	1.8	-1.0	1.0	-1.9
1989–1990	2.6	2.6	2.6	2.6	2.5	-0.1	2.7	0.2	2.1	-0.6
1990–1991	1.6	1.7	1.5	1.7	2.8	1.2	2.9	1.3	2.0	0.3
1991–1992	0.8	0.9	0.7	0.9	2.5	1.8	1.9	1.2	1.5	0.6
1992–1993	0.2	0.4	0.2	0.3	1.3	1.1	1.1	0.8	1.3	1.1
1993–1994	0.8	0.9	0.8	0.9	0.5	-0.3	0.5	-0.4	0.6	-0.3
1994–1995	2.1	2.2	2.1	2.1	1.0	-1.1	0.5	-1.6	0.6	-1.5
1995–1996	2.3	2.3	2.3	2.3	2.6	0.3	2.6	0.3	2.5	0.1
1996–1997	2.3	2.4	2.3	2.4	1.8	-0.5	2.1	-0.3	1.7	-0.6
1997–1998	2.9	3.1	2.9	3.1	2.0	-0.9	2.1	-0.8	2.1	-0.9
1998–1999	2.8	2.9	2.8	2.9	2.8	0.0	2.6	-0.1	2.7	-0.1
1999–2000	2.4	2.3	2.4	2.3	1.9	-0.5	2.1	-0.3	2.0	-0.4
2000–2001	1.5	1.5	1.5	1.5	3.0	1.5	3.0	1.6	2.6	1.1
2001–2002	0.3	0.5	0.3	0.4	2.0	1.7	2.8	2.5	3.1	2.8
2002–2003	-0.6	-0.5	-0.6	-0.5	1.2	1.8	0.7	1.3	0.8	1.4
2003–2004	-1.3	-1.2	-1.3	-1.2	0.2	1.4	0.0	1.3	0.3	1.5
2004–2005	-0.7	-0.8	-0.7	-0.8	0.5	1.2	0.0	0.8	0.4	1.1
2005–2006	0.6	0.5	0.6	0.5	1.2	0.6	1.0	0.4	0.7	0.1

Continued

Table 8.

Continued

(By calendar year, in percent)

	Actual									
	New Issue		Secondary Market		CBO		*Blue Chip*[b]		Administration	
	CPI-U	CPI-W	CPI-U	CPI-W	Forecast	Error[a]	Forecast	Error[a]	Forecast	Error[a]
Statistics for 1976–2005										
Mean error	*	*	*	*	*	0.2	*	*	*	-0.1
Mean absolute error	*	*	*	*	*	1.0	*	*	*	1.0
Root mean square error	*	*	*	*	*	1.2	*	*	*	1.4
Statistics for 1982–2005										
Mean error	*	*	*	*	*	0.2	*	0.1	*	-0.1
Mean absolute error	*	*	*	*	*	0.9	*	0.9	*	0.9
Root mean square error	*	*	*	*	*	1.2	*	1.1	*	1.2

Sources: Congressional Budget Office; Office of Management and Budget; Aspen Publishers, Inc., *Blue Chip Economic Indicators;* Department of Labor, Bureau of Labor Statistics; Federal Reserve Board.

Notes: Values are fore the appropriate three-month Treasury bill rate discounted by the respective forecast for inflation as measured by the change in the consumer price index. CBO forecast the secondary-market rate; the Administration forecast the new-issue rate before 2001, but since then, the secondary-market rate. The *Blue Chip* alternated between the two rates, forecasting the new-issue rate from 1982 to 1985, the secondary-market rate from 1986 to 1991, the new-issue rate again from 1992 to 1997, and the secondary-market rate since then. For most years since 1979, CBO has forecast the CPI-U (the consumer price index for all urban consumers); from 1986 to 1989, however, it forecast the CPI-W (for urban wage earners and clerical workers). The Administration forecast the CPI-W until 1992, when it switched to the CPI-U. The *Blue Chip* forecast the CPI-U for the entire period. All forecasts were issued in the first half of the initial year of the period or in December of the preceding year.

* = not applicable.

a. Errors (which are in percentage points) are forecast values minus actual values; thus, a positive error is an overestimate.

b. Two-year forecasts for the *Blue Chip* consensus were not available until 1982.

Table 9.

CBO, *Blue Chip*, and Administration Forecasts of the Difference Between Two-Year Average Inflation in the CPI and in the GNP or GDP Price Index

(By calendar year, in percentage points)

	Actual		CBO		*Blue Chip*[b]		Administration	
	CPI-U	CPI-W	Forecast	Error[a]	Forecast	Error[a]	Forecast	Error[a]
1976–1977	0.0	0.0	0.6	0.5	*	*	0.2	0.1
1977–1978	0.4	0.3	-0.1	-0.5	*	*	-0.5	-0.8
1978–1979	1.8	1.8	-0.1	-1.9	*	*	-0.1	-1.9
1979–1980	3.7	3.8	0.1	-3.6	*	*	0.2	-3.6
1980–1981	2.7	2.6	1.0	-1.7	*	*	1.6	-1.1
1981–1982	0.5	0.4	0.7	0.1	*	*	0.6	0.3
1982–1983	-0.4	-0.5	-0.2	0.2	-0.1	0.3	-0.3	0.2
1983–1984	-0.1	-0.6	0.1	0.2	-0.4	-0.3	-0.5	0.2
1984–1985	0.5	0.1	0.1	-0.5	0.1	-0.4	-0.2	-0.3
1985–1986	0.1	-0.1	0.0	-0.1	0.2	0.1	0.1	0.2
1986–1987	0.3	0.1	-0.1	-0.2	0.2	-0.1	0.0	-0.1
1987–1988	0.8	0.7	0.4	-0.3	0.2	-0.6	-0.1	-0.8
1988–1989	0.8	0.8	1.0	0.2	0.4	-0.4	0.5	-0.2
1989–1990	1.3	1.2	0.7	-0.5	0.4	-0.9	0.0	-1.2
1990–1991	1.1	1.0	0.2	-1.0	0.2	-1.0	-0.2	-1.2
1991–1992	0.7	0.6	0.2	-0.5	0.4	-0.3	0.4	-0.1
1992–1993	0.7	0.6	0.4	-0.3	0.4	-0.3	0.0	-0.7
1993–1994	0.6	0.5	0.5	-0.1	0.4	-0.1	0.5	-0.1
1994–1995	0.6	0.6	0.2	-0.5	0.3	-0.3	0.3	-0.3
1995–1996	0.9	0.9	0.5	-0.4	0.4	-0.5	0.3	-0.6
1996–1997	0.9	0.8	0.3	-0.6	0.5	-0.4	0.1	-0.7
1997–1998	0.6	0.4	0.5	0.0	0.6	0.0	0.1	-0.4
1998–1999	0.6	0.5	0.3	-0.3	0.3	-0.3	0.2	-0.4
1999–2000	1.0	1.0	0.6	-0.3	0.5	-0.5	0.4	-0.5
2000–2001	0.8	0.8	0.8	0.0	0.8	0.0	0.7	-0.1
2001–2002	0.1	0.0	0.6	0.5	0.5	0.4	0.6	0.4
2002–2003	0.0	-0.1	0.4	0.4	0.3	0.3	0.1	0.1
2003–2004	0.0	-0.1	0.6	0.6	0.5	0.5	0.7	0.8
2004–2005	0.0	0.0	0.6	0.6	0.4	0.4	0.2	0.2
2005–2006	0.1	0.2	0.5	0.3	0.4	0.3	0.4	0.3

Continued

Table 9.

Continued

(By calendar year, in percentage points)

	Actual		CBO		*Blue Chip*[b]		Administration	
	CPI-U	CPI-W	Forecast	Error[a]	Forecast	Error[a]	Forecast	Error[a]
Statistics for 1976–2005								
Mean error	*	*	*	-0.3	*	*	*	-0.4
Mean absolute error	*	*	*	0.6	*	*	*	0.6
Root mean square error	*	*	*	0.9	*	*	*	0.9
Statistics for 1982–2005								
Mean error	*	*	*	-0.1	*	-0.2	*	-0.2
Mean absolute error	*	*	*	0.4	*	0.4	*	0.4
Root mean square error	*	*	*	0.4	*	0.4	*	0.5

Sources: Congressional Budget Office; Office of Management and Budget; Aspen Publishers, Inc., *Blue Chip Economic Indicators;* Department of Labor, Bureau of Labor Statistics.

Notes: Values are for the difference between the average annual growth of the consumer price index (CPI) and average annual growth of the gross national product (GNP) or gross domestic product (GDP) price index over the two-year period. The GNP price index is used for data before 1992, and the GDP price index is used thereafter. Before 1978, the Bureau of Labor Statistics published only one consumer price index series, now known as the CPI-W (the price index for urban wage earners and clerical workers). In January 1978, the bureau began to publish a second, broader consumer price index series, the CPI-U (the price index for all urban consumers). For most years since 1979, CBO forecast the CPI-U; for 1986 through 1989, however, CBO forecast the CPI-W. The Administration forecast the CPI-W until 1992, when it switched to the CPI-U. The *Blue Chip* forecast the CPI-U for the entire period. The forecasts were issued in the first half of the initial year of the period or in December of the preceding year.

* = not applicable.

a. Errors are forecast values minus actual values; thus, a positive error is an overestimate.

b. Two-year forecasts for the *Blue Chip* consensus were not available until 1982.

Table 10.

CBO and Administration Forecasts of the Two-Year Change in Wage and Salary Disbursements Plus Corporate Book Profits as a Share of Output

(By calendar year, as a percentage of GNP or GDP)

		CBO		Administration	
	Actual	Forecast	Error[a]	Forecast	Error[a]
1980–1981	-3.2	-0.6	2.5	-1.3	1.8
1981–1982	-3.3	-2.6	0.7	-1.2	2.1
1982–1983	-2.0	-1.8	0.3	-1.7	0.3
1983–1984	-1.0	0.0	0.9	-1.0	-0.1
1984–1985	-0.6	-0.2	0.4	-0.2	0.5
1985–1986	-0.8	-0.6	0.2	-0.8	0.0
1986–1987	1.4	1.0	-0.3	0.8	-0.5
1987–1988	2.7	0.9	-1.8	1.4	-1.3
1988–1989	-0.3	0.6	0.9	0.4	0.7
1989–1990	-1.2	0.4	1.6	0.7	1.9
1990–1991	-0.2	0.7	0.9	1.4	1.6
1991–1992	-0.1	0.1	0.2	-0.1	0.1
1992–1993	-0.1	1.0	1.1	1.4	1.4
1993–1994	-0.4	0.5	1.0	0.5	1.0
1994–1995	1.3	0.2	-1.1	0.4	-0.9
1995–1996	1.8	-0.3	-2.1	-0.6	-2.5
1996–1997	1.0	-0.4	-1.4	0.8	-0.2
1997–1998	0.4	-0.5	-0.9	0.0	-0.4
1998–1999	0.3	-0.2	-0.4	0.2	-0.1
1999–2000	1.0	-0.1	-1.2	0.0	-1.1
2000–2001	-0.8	-0.5	0.2	-0.8	0.0
2001–2002	-2.2	-0.4	1.7	-0.8	1.4
2002–2003	-0.9	0.1	1.0	0.6	1.4
2003–2004	1.6	1.1	-0.4	1.6	0.0
2004–2005	3.4	2.8	-0.5	3.0	-0.3
2005–2006	2.8	1.2	-1.6	1.5	-1.4
Statistics for 1980–2005					
Mean error	*	*	0.1	*	0.2
Mean absolute error	*	*	1.0	*	0.9
Root mean square error	*	*	1.2	*	1.1

Sources: Congressional Budget Office; Office of Management and Budget; Department of Commerce, Bureau of Economic Analysis.

Notes: The forecasts were issued in the first half of the initial year of the period or in December of the preceding year. For the forecasts made between 1980 and 1991, gross national product (GNP) was used to calculate the shares; for the forecasts made in 1992 and later, gross domestic product (GDP) was used. The *Blue Chip* does not include forecasts for wages or salaries.

* = not applicable.

a. Errors (which are in percentage points) are forecast values minus actual values; thus, a positive error is an overestimate.

Table 11.

CBO, *Blue Chip*, and Administration Projections of Five-Year Average Growth Rates for Real Output

(By calendar year, in percent)

	Actual									
	1972 Dollars[a]	1982 Dollars[b]	1987 Dollars[c]	Chain-Type Annual-Weighted Index	CBO		*Blue Chip*[e]		Administration	
					Forecast	Error[d]	Forecast	Error[d]	Forecast	Error[d]
Real GNP										
1976–1980	4.2	3.4	3.3	3.8	5.7	1.9	*	*	6.2	2.4
1977–1981	3.1	2.8	2.6	3.1	5.3	2.2	*	*	5.1	2.0
1978–1982	1.6	1.4	1.2	1.8	4.8	3.0	*	*	4.8	3.0
1979–1983	1.3	1.0	1.1	1.6	3.8	2.2	3.1	1.5	3.8	2.2
1980–1984	2.1	1.9	1.7	2.3	2.4	0.1	2.5	0.2	3.0	0.7
1981–1985	*	2.6	2.4	3.1	2.8	-0.3	3.0	-0.1	3.8	0.7
1982–1986	*	2.7	2.6	3.3	3.0	-0.3	2.7	-0.5	3.9	0.6
1983–1987	*	4.0	3.7	4.4	3.6	-0.8	3.5	-0.9	3.5	-0.9
1984–1988	*	4.1	3.7	4.3	4.0	-0.3	3.5	-0.8	4.3	0.0
1985–1989	*	3.3	3.1	3.6	3.4	-0.3	3.4	-0.3	4.0	0.3
1986–1990	*	2.8	2.7	3.3	3.3	0.1	3.1	-0.1	3.8	0.5
1987–1991	*	*	2.0	2.6	2.9	0.4	2.7	0.1	3.5	0.9
1988–1992	*	*	1.9	2.5	2.6	0.0	2.5	0.0	3.2	0.7
1989–1993	*	*	1.7	2.2	2.3	0.1	2.6	0.3	3.2	1.0
1990–1994	*	*	1.9	2.3	2.3	0.0	2.4	0.1	3.0	0.7
1991–1995	*	*	*	2.4	2.3	-0.1	2.0	-0.4	2.5	0.1
Real GDP[f]										
1992–1996	*	*	*	3.2	2.6	-0.6	2.5	-0.8	2.7	-0.6
1993–1997	*	*	*	3.5	2.8	-0.7	2.8	-0.7	2.8	-0.7
1994–1998	*	*	*	3.8	2.7	-1.1	2.8	-1.0	2.8	-1.0
1995–1999	*	*	*	3.9	2.4	-1.5	2.5	-1.3	2.6	-1.3
1996–2000	*	*	*	4.1	2.0	-2.1	2.1	-2.0	2.3	-1.8
1997–2001	*	*	*	3.5	2.1	-1.4	2.3	-1.2	2.2	-1.3
1998–2002	*	*	*	2.9	2.1	-0.8	2.3	-0.6	2.2	-0.7
1999–2003	*	*	*	2.6	2.2	-0.4	2.6	0.0	2.2	-0.4
2000–2004	*	*	*	2.4	2.9	0.5	3.2	0.8	2.8	0.3
2001–2005	*	*	*	2.3	3.0	0.7	3.1	0.8	3.2	0.9
2002–2006				2.7	3.0	0.3	3.1	0.4	3.0	0.3

Continued

Table 11.

Continued

(By calendar year, in percent)

	Actual									
	1972 Dollars[a]	1982 Dollars[b]	1987 Dollars[c]	Chain-Type Annual-Weighted Index	CBO Forecast	CBO Error[d]	*Blue Chip*[e] Forecast	*Blue Chip*[e] Error[d]	Administration Forecast	Administration Error[d]
Statistics for 1976–2002										
Mean error	*	*	*	*	*	0.0	*	*	*	0.3
Mean absolute error	*	*	*	*	*	0.8	*	*	*	1.0
Root mean square error	*	*	*	*	*	1.1	*	*	*	1.2
Statistics for 1979–2002										
Mean error	*	*	*	*	*	-0.3	*	-0.3	*	0.0
Mean absolute error	*	*	*	*	*	0.6	*	0.6	*	0.8
Root mean square error	*	*	*	*	*	0.9	*	0.8	*	0.9

Sources: Congressional Budget Office; Office of Management and Budget; Aspen Publishers, Inc., *Blue Chip Economic Indicators;* Department of Commerce, Bureau of Economic Analysis.

Notes: Actual values are for the five-year growth rates for real gross national product (GNP) and real gross domestic product (GDP) last reported by the Bureau of Economic Analysis, not the first reported values. Projected values are for the average growth of real GNP or GDP over the five-year period. The majority of the projections were issued in the first quarter of the initial year of the period or in December of the preceding year.

* = not applicable.

a. Data for 1972-dollar GNP and GDP are available only through the third quarter of 1985.

b. Data for 1982-dollar GNP and GDP are available only through the third quarter of 1991.

c. Data for 1987-dollar GNP and GDP are available only through the second and third quarters, respectively, of 1995.

d. Errors (which are in percentage points) are projected values minus actual values; thus, a positive error is an overestimate. The chain-type annual-weighted index of actual GNP or GDP was used to calculate the errors.

e. Five-year projections for the *Blue Chip* consensus were not available until 1979.

f. With the 1992 benchmark revision by the Bureau of Economic Analysis, GDP replaced GNP as the central measure of national output.

Table 12.

CBO, *Blue Chip*, and Administration Projections of Five-Year Average Growth Rates for Nominal Output

(By calendar year, in percent)

		CBO		*Blue Chip*[b]		Administration	
	Actual	Forecast	Error[a]	Forecast	Error[a]	Forecast	Error[a]
GNP							
1976–1980	11.3	12.3	1.0	*	*	12.0	0.6
1977–1981	11.4	10.6	-0.8	*	*	10.5	-0.9
1978–1982	9.9	10.7	0.8	*	*	10.6	0.7
1979–1983	9.1	11.3	2.2	*	*	9.6	0.6
1980–1984	8.9	11.3	2.5	*	*	11.3	2.5
1981–1985	8.5	11.8	3.3	*	*	11.3	2.8
1982–1986	7.2	9.8	2.6	9.7	2.4	9.7	2.5
1983–1987	7.6	8.2	0.6	9.0	1.4	8.5	0.9
1984–1988	7.5	9.0	1.5	9.1	1.6	8.9	1.4
1985–1989	6.8	7.7	0.9	7.8	1.0	8.1	1.3
1986–1990	6.6	7.5	0.9	7.0	0.4	7.4	0.8
1987–1991	6.1	6.9	0.8	6.6	0.5	6.9	0.8
1988–1992	6.0	6.6	0.6	6.6	0.6	6.7	0.7
1989–1993	5.5	6.6	1.1	6.9	1.5	6.5	1.0
1990–1994	5.2	6.3	1.2	6.4	1.2	6.9	1.7
1991–1995	5.0	6.1	1.2	5.9	1.0	6.4	1.4
GDP[c]							
1992–1996	5.4	5.8	0.4	5.9	0.4	6.0	0.5
1993–1997	5.6	5.1	-0.4	6.0	0.5	5.1	-0.4
1994–1998	5.6	5.4	-0.2	5.8	0.1	5.7	0.1
1995–1999	5.6	5.2	-0.4	5.6	0.0	5.5	0.0
1996–2000	5.8	4.8	-1.0	4.5	-1.3	5.1	-0.7
1997–2001	5.3	4.7	-0.6	4.9	-0.4	4.9	-0.4
1998–2002	4.7	4.4	-0.3	4.7	0.0	4.3	-0.4
1999–2003	4.6	4.3	-0.3	4.5	-0.2	4.2	-0.4
2000–2004	4.7	4.6	-0.2	5.2	0.5	4.8	0.0
2001–2005	4.8	5.1	0.3	5.3	0.4	5.4	0.5
2002–2006	5.4	4.9	-0.5	5.1	-0.4	4.9	-0.5

Continued

Table 12.

Continued

(By calendar year, in percent)

		CBO		*Blue Chip*[b]		Administration	
	Actual	Forecast	Error[a]	Forecast	Error[a]	Forecast	Error[a]
Statistics for 1976–2002							
Mean error	*	*	0.6	*	*	*	0.6
Mean absolute error	*	*	1.0	*	*	*	0.9
Root mean square error	*	*	1.2	*	*	*	1.2
Statistics for 1982–2002							
Mean error	*	*	0.4	*	0.5	*	0.5
Mean absolute error	*	*	0.8	*	0.8	*	0.8
Root mean square error	*	*	0.9	*	1.0	*	1.0

Sources: Congressional Budget Office; Office of Management and Budget; Aspen Publishers, Inc., *Blue Chip Economic Indicators;* Department of Commerce, Bureau of Economic Analysis.

Notes: Actual values are for the five-year growth rates for gross national product (GNP) and gross domestic product (GDP) last reported by the Bureau of Economic Analysis, not the first reported values. Projected values are for the average annual growth of nominal GNP or GDP over the five-year period. The projections were issued in the first half of the initial year of the period or in December of the preceding year.

* = not applicable.

a. Errors (which are in percentage points) are projected values minus actual values; thus, a positive error is an overestimate.

b. Five-year projections for the *Blue Chip* consensus were not available until 1982.

c. With the 1992 benchmark revision by the Bureau of Economic Analysis, GDP replaced GNP as the central measure of national output.

Table 13.

CBO, *Blue Chip*, and Administration Projections of the Difference Between Five-Year Average Inflation in the CPI and in the GNP or GDP Price Index

(By calendar year, in percentage points)

	Actual		CBO		*Blue Chip*[b]		Administration	
	CPI-U	CPI-W	Forecast	Error[a]	Forecast	Error[a]	Forecast	Error[a]
1976–1980	1.6	1.6	0.2	-1.4	*	*	0.0	-1.6
1977–1981	1.8	1.8	0.0	-1.8	*	*	-0.3	-2.1
1978–1982	1.8	1.7	0.0	-1.7	*	*	-0.1	-1.8
1979–1983	1.5	1.4	0.0	-1.5	*	*	0.1	-1.4
1980–1984	1.0	0.7	0.4	-0.6	*	*	0.6	-0.1
1981–1985	0.3	0.0	0.4	0.2	*	*	-0.1	-0.1
1982–1986	0.0	-0.3	0.1	0.1	*	*	-0.2	0.1
1983–1987	0.2	-0.1	0.0	-0.2	-0.1	-0.3	-0.2	-0.1
1984–1988	0.5	0.2	0.0	-0.5	0.1	-0.4	-0.1	-0.3
1985–1989	0.5	0.5	0.0	-0.6	0.1	-0.5	0.1	-0.4
1986–1990	0.8	0.6	0.1	-0.5	-0.1	-0.8	0.0	-0.7
1987–1991	1.0	0.9	0.3	-0.6	0.2	-0.8	-0.1	-0.9
1988–1992	0.9	0.8	0.6	-0.2	0.3	-0.6	0.2	-0.6
1989–1993	0.9	0.8	0.5	-0.3	0.2	-0.7	0.0	-0.8
1990–1994	0.8	0.7	0.3	-0.5	0.2	-0.6	-0.1	-0.8
1991–1995	0.7	0.6	0.1	-0.5	0.4	-0.2	0.2	-0.4
1992–1996	0.7	0.7	0.4	-0.3	0.4	-0.4	0.0	-0.8
1993–1997	0.7	0.7	0.5	-0.3	0.4	-0.3	0.5	-0.3
1994–1998	0.7	0.6	0.4	-0.3	0.3	-0.3	0.4	-0.3
1995–1999	0.7	0.7	0.6	-0.2	0.4	-0.3	0.2	-0.5
1996–2000	0.8	0.8	0.2	-0.6	0.4	-0.4	0.1	-0.7
1997–2001	0.7	0.6	0.4	-0.3	0.5	-0.2	0.1	-0.6
1998–2002	0.5	0.4	0.3	-0.2	0.2	-0.3	0.1	-0.4
1999–2003	0.5	0.4	0.6	0.1	0.4	0.0	0.3	-0.2
2000–2004	0.3	0.2	0.8	0.6	0.6	0.3	0.6	0.3
2001–2005	0.1	0.0	0.6	0.5	0.5	0.4	0.6	0.5
2002–2006	0.0	0.0	0.5	0.5	0.5	0.5	0.4	0.3

Continued

Table 13.
Continued

(By calendar year, in percentage points)

	Actual		CBO		*Blue Chip*[b]		Administration	
	CPI-U	CPI-W	Forecast	Error[a]	Forecast	Error[a]	Forecast	Error[a]
Statistics for 1976–2002								
Mean error	*	*	*	-0.4	*	*	*	-0.5
Mean absolute error	*	*	*	0.6	*	*	*	0.6
Root mean square error	*	*	*	0.7	*	*	*	0.8
Statistics for 1983–2002								
Mean error	*	*	*	-0.2	*	-0.3	*	-0.4
Mean absolute error	*	*	*	0.4	*	0.4	*	0.5
Root mean square error	*	*	*	0.4	*	0.5	*	0.5

Sources: Congressional Budget Office; Office of Management and Budget; Aspen Publishers, Inc., *Blue Chip Economic Indicators;* Department of Labor, Bureau of Labor Statistics.

Notes: Values are for the difference between the average annual growth of the consumer price index (CPI) and average annual growth of the gross national product (GNP) or gross domestic product (GDP) price index over the five-year period. The GNP price index is used for data before 1992, and the GDP price index is used thereafter. Before 1978, the Bureau of Labor Statistics published only one consumer price index series, now known as the CPI-W (the price index for urban wage earners and clerical workers). In January 1978, the bureau began to publish a second, broader consumer price index series, the CPI-U (the price index for all urban consumers). For most years since 1979, CBO forecast the CPI-U; for 1986 through 1989, however, CBO forecast the CPI-W. The Administration forecast the CPI-W until 1992, when it switched to the CPI-U. The *Blue Chip* forecast the CPI-U for the entire period. The forecasts were issued in the first half of the initial year of the period or in December of the preceding year.

* = not applicable.

a. Errors are projected values minus actual values; thus, a positive error is an overestimate.

b. Five-year projections for the *Blue Chip* consensus were not available until 1983.

Table 14.

CBO and Administration Forecasts of the Five-Year Change in Wage and Salary Disbursements Plus Corporate Book Profits as a Share of Output

(By calendar year, as a percentage of GNP or GDP)

		CBO		Administration	
	Actual	Forecast	Error[a]	Forecast	Error[a]
1980–1984	-5.4	1.0	6.4	-1.1	4.3
1981–1985	-4.7	-2.6	2.2	-1.9	2.8
1982–1986	-3.0	-0.4	2.6	-3.3	-0.3
1983–1987	0.0	-0.6	-0.5	-0.3	-0.2
1984–1988	1.7	0.0	-1.7	0.3	-1.4
1985–1989	0.6	-1.1	-1.6	-0.1	-0.7
1986–1990	1.1	0.8	-0.3	0.6	-0.5
1987–1991	1.2	2.3	1.1	1.7	0.6
1988–1992	-0.4	0.7	1.1	1.1	1.5
1989–1993	-1.6	0.2	1.7	1.5	3.1
1990–1994	-0.4	0.5	0.9	1.9	2.3
1991–1995	0.9	-0.3	-1.2	0.8	-0.1
1992–1996	1.5	1.2	-0.4	1.6	0.0
1993–1997	2.0	0.7	-1.3	0.7	-1.3
1994–1998	2.0	-0.4	-2.3	0.1	-1.8
1995–1999	2.7	-0.9	-3.6	-1.0	-3.7
1996–2000	1.7	-1.6	-3.3	1.0	-0.7
1997–2001	0.1	-1.6	-1.7	-0.2	-0.3
1998–2002	-1.4	-0.9	0.5	-0.2	1.2
1999–2003	-1.1	-0.3	0.8	-0.5	0.6
2000–2004	-0.1	-1.2	-1.2	-1.9	-1.8
2001–2005	1.2	-0.8	-2.1	-1.1	-2.3
2002–2006	3.5	0.3	-3.2	1.0	-2.5
Statistics for 1980–2002					
Mean error	*	*	-0.3	*	-0.1
Mean absolute error	*	*	1.8	*	1.5
Root mean square error	*	*	2.2	*	1.9

Sources: Congressional Budget Office; Office of Management and Budget; Aspen Publishers, Inc., *Blue Chip Economic Indicators;* Department of Commerce, Bureau of Economic Analysis.

Notes: The forecasts were issued in the first half of the initial year of the period or in December of the preceding year. For the forecasts made between 1980 and 1991, gross national product (GNP) was used to calculate the shares; for the forecasts made in 1992 and later, gross domestic product (GDP) was used. The *Blue Chip* consensus does not include forecasts for wages or salaries.

* = not applicable.

a. Errors are projected values minus actual values; thus, a positive error is an overestimate.

Appendix: Historical and Forecast Data

Evaluating the Congressional Budget Office's (CBO's) forecasting record entails compiling the basic historical and forecast data for growth in real (inflation adjusted) and nominal output, inflation in the consumer price index (CPI), interest rates, and taxable income.

Selection of Historical Data

The choice of historical data for the evaluation was determined by the availability of actual data and by the nature of the forecast variables examined. Although CBO, the Administration, and the *Blue Chip* consensus all published the same measure for real output growth, selecting a historical series was difficult because of periodic benchmark revisions to the actual data.[1] By comparison, not all of the forecasters published the same measures for CPI inflation and interest rates, but the selection of historical data for those series was clear-cut.

Growth in Real and Nominal Output

Historical two-year averages of growth in real output were developed from calendar year averages of the quarterly chain-type annual weighted indexes of real gross national product (GNP) and real gross domestic product (GDP) published by the Bureau of Economic Analysis (BEA). The fact that several real GNP and GDP series were discontinued because of periodic benchmark revisions meant that they were unsuitable historical series. For example, during the 1976–1985 period, the three forecasters published estimates for a measure of growth in real GNP that was based on 1972 prices, which was the measure published by BEA at that time. In late 1985, however, BEA discontinued the 1972-dollar series and began to publish GNP on a 1982-dollar basis. As a result, an official series of values for GNP growth in 1972 dollars is not available for the years after 1984, and actual two-year average growth rates are not available to compare with the forecasts made in early 1984 and 1985.

From 1986 to 1991, forecasters published estimates of growth in real GNP based on 1982 prices. BEA revised the benchmark again in the second half of 1991: It discontinued the 1982-dollar GNP series and began to publish GNP on a 1987-dollar basis. Today, the historical annual series for 1982-dollar GNP is available only through 1990, and actual two-year average growth rates are not available to compare with the forecasts made in early 1990 and 1991. The forecasters then published estimates of growth in real GDP on a 1987-dollar basis until 1995, when BEA made another switch, late in the year, to a chain-weighted measure of GDP. Therefore, the historical annual series for 1987-dollar GDP ends with the 1994 annual value, and actual two-year average growth rates are not available to compare with the forecasts made in early 1994 and 1995.

By periodically updating the series to reflect more recent prices, BEA's benchmark revisions yield a measure of real output that is more relevant for analyzing contemporary movements in real growth. But the process of revision makes it difficult to evaluate forecasts of real growth produced over a period of years in series that are later discontinued. The comparison avoids the difficulties presented by periodic revisions of the data by using BEA's chain-type annual-weighted index of real GNP or GDP throughout the data series.[2]

1. Before 1992, CBO, the Administration, and the *Blue Chip* consensus survey used gross national product to measure output. Beginning in early 1992, however, all three forecasters began to publish forecasts and projections of gross domestic product instead.

2. For a discussion of that index, see Congressional Budget Office, *The Economic and Budget Outlook: An Update* (August 1995), Appendix B, pp. 71–73.

In the case of nominal GNP and GDP, historical two-year averages for growth were developed from calendar year averages of the quarterly values published by BEA.

CPI Inflation

CBO calculated two-year averages of inflation in the consumer price index from calendar year averages of monthly data published by the Bureau of Labor Statistics. Before 1978, the bureau published only one consumer price index series, now known as the CPI-W (the price index for urban wage earners and clerical workers). In January 1978, however, the bureau began to publish a second, broader consumer price index series, the CPI-U (the price index for all urban consumers), including its history. CBO's comparison of forecasts uses both series.

Until 1992, the Administration published its forecasts for the CPI-W, the measure used to index most of the federal government's spending for entitlement programs. For all but four of its forecasts since 1979 (1986 through 1989), in contrast, CBO based its inflation forecast on the CPI-U, a more widely cited measure of inflation and the one now used to index federal income tax brackets. The *Blue Chip* consensus has always included forecasts for the CPI-U. Although annual fluctuations in the CPI-U and CPI-W are virtually indistinguishable, the indexes differ in some years. For that reason, CBO used historical data for both series to evaluate the alternative forecasting records.

Interest Rates

CBO used monthly data published by the Board of Governors of the Federal Reserve System to calculate two-year averages of nominal short- and long-term interest rates.

The forecasts of short-term interest rates were compared with historical values for two measures of the interest rate on three-month Treasury bills: the new-issue rate and the secondary-market rate. Before 2001, the Administration forecast the new-issue rate, which corresponds to the price of three-month bills auctioned by the Department of the Treasury—that is, it reflects the interest actually paid on that debt. Since mid-2001, the Administration has forecast the secondary-market rate, which corresponds to the price of three-month bills traded outside Treasury auctions. Such transactions occur continually in markets that involve many more traders than do Treasury auctions. Thus, the secondary-market rate provides an updated evaluation of short-term federal debt by the wider financial community.

CBO forecasts the secondary-market rate and, unlike the Administration, has never forecast the new-issue rate. The *Blue Chip* has alternated between those two rates: It published the new-issue rate from 1982 to 1985, switched to the secondary-market rate from 1986 to 1991, and then returned to the new-issue rate from 1992 to 1997. Since March 1997, the *Blue Chip* has forecast the secondary-market rate. Clearly, there is no reason to expect the rates to differ persistently; indeed, the differences between their calendar-year averages are minuscule.

CBO likewise compared the various forecasts of long-term interest rates with historical values for two measures of long-term rates: the 10-year Treasury note rate and Moody's Aaa corporate bond rate. A comparison of forecasts is not possible before 1984 because not all of the forecasters published projections of long-term interest rates before then. For forecasts made in early 1984 and 1985, CBO projected the Aaa corporate bond rate. Beginning with its early 1986 forecast, however, CBO switched to the 10-year Treasury note rate. The Administration has always published projections for the 10-year Treasury note rate, but the *Blue Chip* forecast the Aaa corporate bond rate until January 1996, when it switched to the 10-year Treasury rate.

CBO calculated separate historical values for real short-term interest rates using the nominal short-term interest rate and the inflation rate appropriate for each forecaster. In each case, the two-year average nominal short-term interest rate was discounted by the two-year average rate of inflation. The resulting real short-term interest rates were similar among forecasts.

Taxable Income

Through its direct influence on projections of federal revenues, the forecast for taxable income plays a critical role in determining the accuracy of budget projections under current law. The income measure examined here—wage and salary disbursements—focuses on the source of income to which tax receipts are most sensitive. In addition, because some other types of income are not taxed (income derived from assets held in nontaxable accounts), the effective tax rate on wages and salaries exceeds the corresponding rate on other income.

Historical estimates of taxable income are subject to substantial statistical revisions. However, those revisions do not have much implication for projections of revenues as long as the revisions are carried forward into the forecast.

The result is that the accuracy of projections of taxable income is measured by using the forecast change of taxable income as a share of GDP.

Sources of Forecast Data

For every measure except taxable income, this evaluation used the calendar year forecasts and projections that CBO has published early each year since 1976, roughly coinciding with the publication of the Administration's annual budget proposals. The Administration's forecasts were taken from its budget in all but one case: The forecast made in early 1981 came from the Reagan Administration's revisions of President Carter's last budget.

The corresponding CBO forecast was taken from CBO's published analysis of President Reagan's budget proposals. That CBO baseline forecast did not include the economic effects of the new Administration's fiscal policy proposals, but it did assume the continuation of the tax and spending policies of the Second Concurrent Resolution on the Budget for Fiscal Year 1981, including accelerated depreciation and a 10 percent cut in personal income taxes.[3]

The average two-year forecasts in the *Blue Chip* consensus survey, which are published monthly, were taken from those published in the same month as CBO's forecasts. Because the *Blue Chip* did not begin publishing its two-year forecasts until the middle of 1981, the first such forecast available for this comparison was published in early 1982. Average five-year projections, however, are included in the *Blue Chip* only twice a year, on a schedule that does not correspond to the times at which forecasts are necessary for federal budgeting. All but one of its five-year projections used in this evaluation were published in March; the 1980–1984 projection of real output was published in May. The *Blue Chip*'s medium-term forecasts were prepared about three months after CBO made its medium-term projections.

Because CBO has regularly published forecasts for wages and salaries only since 1985, some of the CBO forecasts for wages and salaries that are used here were taken from CBO's files of unpublished forecasts.

3. Another exceptional case occurred in early 1993, when the Clinton Administration adopted CBO's economic assumptions as the basis for its budget. As a result, the errors for the early 1993 forecast are the same for CBO and the Administration.

CONGRESS OF THE UNITED STATES
CONGRESSIONAL BUDGET OFFICE
WASHINGTON, DC 20515

INSIDE MAIL