

A

CBO

REPORT

**CBO's Economic Forecasting Record:
2009 Update**

July 2009



CONGRESSIONAL BUDGET OFFICE
SECOND AND D STREETS, S.W.
WASHINGTON, D.C. 20515



CBO's Economic Forecasting Record: 2009 Update

July 2009

Notes

Unless otherwise noted, all years referred to in this report are calendar years.

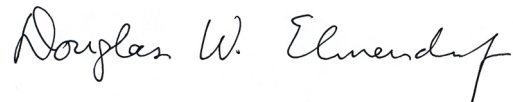
Numbers in the text and tables may not add to totals because of rounding.



Preface

The Congressional Budget Office (CBO) regularly evaluates the accuracy of its economic forecasts by comparing those forecasts with the economy's actual performance and with the projections of other forecasters. Such evaluations help guide CBO's efforts to improve the quality of its forecasts and also assist Members of Congress in their use of CBO's estimates.

This report was prepared by CBO's Macroeconomic Analysis Division, under the direction of Robert Dennis and John Peterson. Loretta Lettner edited the report, and Sherry Snyder proofread it. Maureen Costantino prepared the report for publication, with assistance from Allan Keaton. Lenny Skutnik produced the printed copies, Linda Schimmel coordinated the print distribution, and Simone Thomas created the electronic version for CBO's Web site (www.cbo.gov).



Douglas W. Elmendorf
Director

July 2009



Contents

Choice of Forecasts for the Evaluation	1
Measuring the Quality of Forecasts	1
Statistical Bias	2
Accuracy	2
Alternative Measures of Forecast Quality	2
Limitations of Forecast Evaluations	2
The Effects of Business Cycles, Changes in the Trend Rate of Productivity Growth, and Oil Price Shocks	3
CBO's Forecasting Record	4
Two-Year Forecasts	5
Five-Year Projections	9
Appendix: Historical and Forecast Data	35
Tables	
1. Summary Measures of Performance for Two-Year Average Forecasts	11
2. Summary Measures of Performance for Five-Year Average Projections	12
3. CBO's, <i>Blue Chip's</i> , and the Administration's Forecasts of Two-Year Average Growth Rates for Real Output	13
4. Comparison of CBO's, <i>Blue Chip's</i> , and the Administration's Forecasts of Two-Year Average Growth Rates for Nominal Output	15
5. CBO's, <i>Blue Chip's</i> , and the Administration's Forecasts of Two-Year Average Inflation in the Consumer Price Index	17
6. CBO's, <i>Blue Chip's</i> , and the Administration's Forecasts of Two-Year Average Nominal Interest Rates on Three-Month Treasury Bills	19
7. CBO's, <i>Blue Chip's</i> , and the Administration's Forecasts of Two-Year Averages for Nominal Long-Term Interest Rates	21
8. CBO's, <i>Blue Chip's</i> , and the Administration's Forecasts of Two-Year Average Real Interest Rates on Three-Month Treasury Bills	22
9. CBO's, <i>Blue Chip's</i> , and the Administration's Forecasts of the Difference Between Two-Year Average Inflation in the CPI and in the GNP or GDP Price Index	24

Tables (Continued)

10. CBO's and the Administration's Forecasts of the Two-Year Change in Wage and Salary Disbursements Plus Corporate Book Profits as a Share of Output	26
11. CBO's, <i>Blue Chip's</i> , and the Administration's Projections of Five-Year Average Growth Rates for Real Output	28
12. CBO's, <i>Blue Chip's</i> , and the Administration's Projections of Five-Year Average Growth Rates for Nominal Output	30
13. Comparison of CBO's, <i>Blue Chip's</i> , and the Administration's Projections of the Difference Between Five-Year Average Inflation in the CPI and in the GNP or GDP Price Index	32
14. CBO's and the Administration's Projections of the Five-Year Change in Wage and Salary Disbursements Plus Corporate Profits as a Share of Output	34

Figure

1. Oil Price Fluctuations, 1967 to 2008	4
---	---

Box

1. How Data Revisions Can Affect the Interpretation of Forecasting Errors	6
---	---



CBO's Economic Forecasting Record: 2009 Update

Since publishing its first macroeconomic forecast in 1976, the Congressional Budget Office (CBO) has compiled a forecasting track record that is comparable in quality with that of the Administration and that of the *Blue Chip* consensus.¹ In particular, the accuracy of CBO's two-year forecasts between 1982 and 2007 paralleled that of the forecasts published by the *Blue Chip* consensus and the Administration over the same period (see Table 1 on page 11). The accuracy of CBO's five-year projections also generally corresponded to that of other forecasters (see Table 2 on page 12), although the Administration's projections of types of income (such as wages and salaries and profits) as a share of national output had slightly smaller errors. Comparing CBO's forecasts with those of the *Blue Chip* consensus suggests that when the agency's predictions of the economy's performance missed by the largest margin, those errors probably reflected problems shared by other forecasters in predicting turning points in the business cycle.

CBO's forecasting record provides a measure of the uncertainty underlying forecasts under normal circumstances.² However, the current degree of economic dislocation exceeds that of any previous period in the past half-century, so the uncertainty inherent in current forecasts exceeds the historical average.

1. The *Blue Chip* consensus is an average of private-sector forecasts that is published periodically as the *Blue Chip Economic Indicators*.

2. For a discussion of forecasting errors and qualitative assessments of the range of possible outcomes, see David Reifschneider and Peter Tulip, *Gauging the Uncertainty of the Economic Outlook from Historical Forecasting Errors*, Finance and Economic Discussion Series Working Paper No. 2007-60 (Washington, D.C.: Board of Governors of the Federal Reserve, November 2007).

Choice of Forecasts for the Evaluation

The data used for this evaluation were compiled from forecasts published in the early months of the years 1976 through 2007. (Two-year average forecasts published in early 2008 could not be included because the latest full-year historical data do not extend beyond 2008.) For all years except 1981, CBO's evaluation was based on calendar year forecasts that the agency published early in the year (or, for some variables in some years, on unpublished forecasts), and on forecasts shown in the Administration's annual budget documents.³ The *Blue Chip* consensus forecasts that CBO relied on for this evaluation were those published as close as possible to the publication date of CBO's forecasts. Although the *Blue Chip* publishes forecasts monthly, in only two months of the year—March and October—do forecasts extend beyond two years. Those longer-term forecasts are published, on average, three months after CBO completes its forecast. Also limiting the analysis are the shorter history of the *Blue Chip*'s two-year forecasts, which were first published in 1982, and their narrower scope. (The *Blue Chip*'s forecasts do not include several 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.

Measuring the Quality of Forecasts

As with CBO's earlier studies of economic forecasts, this evaluation focuses on two indicators of the quality of CBO's forecasts: statistical bias and accuracy. Other

3. For 1981, the Administration's forecast came from the Reagan Administration's revisions to President Carter's last budget, and the corresponding CBO forecast came from its published analysis of President Reagan's budget proposals.

desirable characteristics—such as efficiency—are harder to assess definitively and would require a larger sample than is available for CBO's forecasts.

Statistical Bias

Statistical bias indicates the tendency of a forecast to be pessimistic or optimistic. To measure statistical bias, CBO used the mean error—the arithmetic average of the forecast errors, which is the simplest and most widely used measure—in its evaluation. Because it is a simple average, however, underestimates and overestimates offset one another. Therefore, the mean error imperfectly measures the quality of a forecast: a small mean error would result if all of the errors were small or if all of the errors were large but the overestimates and underestimates balanced out one another.

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 one another in those measures. CBO used two measures of accuracy in its evaluation: 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 conducted by analysts outside of 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.⁴

Other methods have been developed to evaluate a forecast's "efficiency," or the extent to which a particular forecast could have been improved by information that was available but not used when the forecast was made.⁵ The *Blue Chip* consensus forecast represents a variety of eco-

nomics forecasts and thus reflects a broader blend of sources and methods than can be expected from any single forecaster. As such, that consensus forecast may produce better forecasts than any single forecaster. In this evaluation, the *Blue Chip's* predictions can serve as a proxy for an efficient forecast.⁶ The fact that CBO's forecasts are about as accurate as the *Blue Chip's* is a rough indication of their efficiency.

Limitations of Forecast Evaluations

Statistical measures do not necessarily produce reliable indicators of a forecast's quality when the sample of observations is small, as with CBO's relatively limited set—32 in all—of two-year forecasts. Small samples present three main problems in evaluating forecasts. First, they reduce the reliability of statistical tests. Second, a few particular errors can have an unduly large influence on the measures. Third, historical track records only weakly indicate the possible direction or size of forecasting inaccuracies in the future.

Apart from these general caveats, there are several reasons for viewing this evaluation of CBO's forecasts with particular caution:

4. 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 Jacob A. Mincer and Victor Zarnowitz, "The Evaluation of Economic Forecasts," in Jacob A. Mincer, ed., *Economic Forecasts and Expectations: Analysis of Forecasting Behavior and Performance* (Cambridge, Mass.: National Bureau of Economic Research, 1969). That approach is not used here because of the small size of the sample. However, studies that have used it to evaluate forecasts published by CBO and the Administration have not been able to reject the hypothesis that short-term forecasts are unbiased. See, for example, George A. Krause and James W. Douglas, "Institutional Design Versus Reputational Effects on Bureaucratic Performance: Evidence from U.S. Government Macroeconomic and Fiscal Projections," *Journal of Public Administration Research and Theory*, vol. 15, no. 2 (April 2005), pp. 281–306; J. Kevin Corder, "Managing Uncertainty: The Bias and Efficiency of Federal Macroeconomic Forecasts," *Journal of Public Administration Research and Theory*, vol. 15, no. 1 (January 2005), pp. 55–70; and Michael T. Belongia, "Are Economic Forecasts by Government Agencies Biased? Accurate?" *Review*, vol. 70, no. 6 (Federal Reserve Bank of St. Louis, November/December 1988), pp. 15–23. For a more elaborate study of forecast bias that included CBO's forecasts among a sizable sample, see Corder, "Managing Uncertainty," and David Laster, Paul Bennett, and In Sun Geoum, *Rational Bias in Macroeconomic Forecasts*, Staff Report No. 21 (Federal Reserve Bank of New York, March 1997).

- The purposes of the economic forecasts produced by CBO, the *Blue Chip* consensus, and the Administration—and the procedures used to develop those forecasts—differ and have changed over the past three 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 those projections to be indicators of what will prevail, on average, if the economy continues to reflect historical trends and if fiscal policies do not change.
- When preparing forecasts, CBO, unlike private forecasters and the Administration, does not assume any future changes in fiscal policy.⁷ The various Administration forecasts normally include the projected economic effects of their respective policy proposals. By contrast, the underlying policy assumptions in the *Blue Chip* forecasts, either for the short run or for the medium term, are not clear. The various private forecasters included in the *Blue Chip* survey often do not state their assumptions about fiscal policy, but they most likely incorporate their own assumptions about policy changes. That freedom, however, does not seem to translate into a better forecasting record for the *Blue Chip* forecasters.
- CBO's track record in forecasting may not indicate its future abilities because of changes in personnel and methods.
- Inaccuracies in a forecast increase when the economy is more volatile and when economic trends change. All three forecasters—CBO, the *Blue Chip* consensus, and the Administration—made relatively large forecast errors 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 labor productivity.
- The common practice of revising statistical data could mean that forecasters make predictions about one concept and that 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 October 1999 when the Bureau of Economic Analysis (BEA) made comprehensive revisions to the national income and product accounts (NIPAs). Such revisions will contribute to the economic forecasting errors reported here, but they are unlikely to imply corresponding errors in budget projections because budget projections based on the unrevised data will have been calibrated to those data.

-
5. 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.
 6. See, for example, Andy Bauer and others, "Forecast Evaluation with Cross-Sectional Data: The *Blue Chip* Surveys," *Economic Review*, vol. 88, no. 2 (Federal Reserve Bank of Atlanta, 2003), pp. 17–31; and Henry Townsend, "A Comparison of Several Consensus Forecasts," *Business Economics* (January 1996).
 7. 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?*, Issue Brief (June 2, 2005).

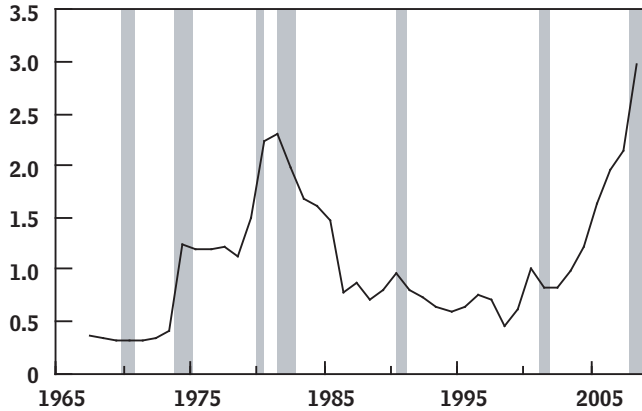
The Effects of Business Cycles, Changes in the Trend Rate of Productivity Growth, and Oil Price Shocks

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. Large changes in oil prices—apart from their role in precipitating business cycles—also cause errors in forecasts of inflation.

The difficulty of forecasting business-cycle turning points explains why most forecasters overestimated the economy's future growth rate in the forecasts they made just before the two back-to-back recessions of the early 1980s. That pattern was repeated in the forecasts made just before the recessions that began in 1990 and 2001.

Figure 1. Oil Price Fluctuations, 1967 to 2008

(Index, 2000 = 1)



Source: Congressional Budget Office.

Notes: The figure shows the ratio of the price index for petroleum imports divided by the core price index for personal consumption (the price index excluding energy and food prices).

The data, which are annual, are plotted through 2008.

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

The productivity trend of the 1970s and 1980s turned out to be significantly lower than that of the 1950s and 1960s. Because forecasters in the 1970s assumed that the productivity trend of the previous decades would prevail, 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.⁸ As the economy continued to outperform expectations, analysts put more effort into investigating the possible causes of the increase in productivity growth.

8. See Spencer Krane, "An Evaluation of Real GDP Forecasts: 1996–2001," *Economic Perspectives*, vol. 27, no. 1 (Federal Reserve Bank of Chicago, 2003), pp. 2–21; and Scott Schuh, "An Evaluation of Recent Macroeconomic Forecast Errors," *New England Economic Review* (Federal Reserve Bank of Boston, January/February 2001), pp. 35–56.

Those investigations initially focused on the possible contribution of the so-called new economy, especially the improved flow of information among producers and between producers and consumers. Using revised data on production and inputs to production, however, CBO now estimates that an increase in the amount of capital (buildings, equipment, and software) per worker—sometimes called capital deepening—was the primary source of the faster growth in productivity in the late 1990s.⁹

Turning to forecasts of inflation, large, unexpected movements in oil prices have been a proximate cause of many sizable forecast errors (see Figure 1). Unexpected jumps in oil prices caused both CBO and the Administration to underpredict the growth of the consumer price index (CPI) in the forecasts they made early in 1979, 1980, 1990, 2000, 2004, 2005, and 2007. 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 over two-year and five-year periods.¹⁰ The two-year period is important because the budget reports that CBO and the Administration publish every winter focus on projections for the fiscal year that begins 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. 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 output are greater over the two-year forecasting horizon than over the five-year horizon.

9. See Congressional Budget Office, *Labor Productivity: Developments Since 1995* (March 2007).

10. In another publication—Congressional Budget Office, *The Uncertainty of Budget Projections: A Discussion of Data and Methods* (March 2006)—CBO analyzed the overall uncertainty of its budget projections, which depend in part on the accuracy of its economic projections. That analysis was updated in *The Budget and Economic Outlook*, Chapter 1 (January 2008).

Two-Year Forecasts

Historically, CBO's two-year forecasts, as measured by the root-mean-square error, have been about as accurate as the forecasts published by the *Blue Chip* consensus and the Administration. Those forecasts typically focus on various measures of the economy's performance, including growth in real and nominal output, inflation in the CPI, fluctuations in nominal short- and long-term interest rates and in real short-term interest rates, the difference between the growth of the CPI and the GDP price index, and rates of taxable income.

Growth in Real Output. The accuracy of CBO's forecasts closely matched that of the *Blue Chip* consensus for the 26 two-year forecasts made between 1982 and 2007. CBO's root-mean-square error was 1.2 percentage points, as was that for the *Blue Chip* consensus. 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 (see Table 3 on page 13). In addition, CBO was closer to the actual value in six of the forecasts in which the forecast errors differed by more than 0.1 percentage point, and the *Blue Chip* was closer in six other 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, although the Administration's forecasts were prepared even earlier.)

Forecasting 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 forecasts of growth in real output by comparing the large errors made from 1979 to 1983—when the economy went through an extremely turbulent recessionary period—with the smaller errors recorded during the midexpansion years from 1985 to 1987. More recently, the recession of 2001 and the slow recovery in 2002 accounted for the overpredictions made by all three forecasters in 2000 and 2001, while a sharp slowing of growth in real GDP in 2007 and 2008 explained much of the overpredictions in forecasts published in 2006 and 2007.

All three forecasters underpredicted two-year growth in real GDP 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). Those data revisions aside, the significant underpredictions made between 1996 and 1999 reflect the failure of analysts to foresee important economic developments—in particular, the investment boom of the late 1990s, which increased the capital stock and thereby boosted labor productivity and real output.

All three forecasters erred in the opposite direction in the two-year forecasts they produced in early 2004, overpredicting the growth of real GDP. They correctly foresaw strong expansion in domestic demand but wrongly expected that U.S. output would grow as fast as demand. Forecasters, including CBO, failed to see that the trade deficit would further expand as demand for goods outstripped domestic production.

The three forecasters trimmed their two-year forecasts for growth in real GDP in early 2007, but their two-year-ahead forecasts were undercut by the onset of the recession in December 2007. The poor performance of the economy in 2008 caused most of the error in forecasting for the two-year period. In addition, given the sharp decline in economic activity in the fourth quarter of 2008 and in the first quarter of this year, the errors in the forecasts made in January 2008 are likely to be at least as large as those that occurred in previous recessions.

Growth in Nominal Output. The records of CBO and the *Blue Chip* consensus in forecasting two-year growth in nominal output are also quite similar overall, although the *Blue Chip* had a slight edge. The two forecasters' accuracy for the entire period, as measured by the root-mean-square error, was almost identical at 1.2 percentage points for CBO and 1.1 percentage points for the *Blue Chip*. The two forecasts are positively correlated: Of the 26 forecasts made between 1982 and 2007, the *Blue Chip's* error was smaller than CBO's (by more than 0.1 percentage point) nine times; CBO had the smaller error four times; and the two forecasters recorded virtually identical errors 13 times. (See Table 4 on page 15.)

The Administration's projections of nominal output were about as accurate as those of CBO over the longer interval between 1976 and 2006. However, the accuracy of CBO's projections over the period after 1982 was slightly better.

Box 1.**How Data Revisions Can Affect the Interpretation of Forecasting Errors**

Sometimes, what appear to be inaccuracies in forecasts result not because of forecasting errors but because of postforecast revisions to historical data. Such revision-related “misses” should be interpreted with care because they do not necessarily translate into corresponding errors in budget projections. For example, the Bureau of Economic Analysis (BEA) made comprehensive revisions to the national income and product accounts (NIPAs) in October 1999, which increased the reported growth of real (inflation-adjusted) gross domestic product (GDP) over most of the period since World War II. That increase stemmed largely from BEA’s redefinition of spending on software as investment and from its adoption of new price series for various categories of consumption. However, the treatment of software spending in the NIPAs and improved inflation measures are essentially irrelevant to federal budget projections because they do not affect estimates of spending or revenues.

Nevertheless, such revisions do affect the data used to assess the accuracy of economic forecasts, distorting the reliability of the statistical measures of accuracy for many of the concepts described here. In particular, the 1999 revisions to the NIPAs added about 0.4 percent to reported real growth for the period from 1992 to 1998 and, to a similar degree, lessened the growth of the GDP price index. Forecasts made before 1999 did not, of course, anticipate those revisions. Revisions released in July 2008 had the opposite effect, reducing the reported growth of real GDP for the period from 2005 through 2007 but increasing the reported growth of the GDP price index by a smaller amount.

Projections of income are particularly important to budget projections because they help determine how much the government can expect to collect in revenues. There, too, apparent inaccuracies in income forecasts must be interpreted carefully because they do not necessarily translate directly into errors in

budget projections if they result from data revisions. CBO, like other producers of forecasts, bases its revenue models on income data available at the time projections are made. After-the-fact revisions typically require recalibration of the revenue models; but whether such changes will cause a revenue projection to move in the same direction as the revision of incomes, or in the opposite direction, is generally unpredictable.

Revisions of historical income data—which often reflect the availability of improved underlying data rather than conceptual revisions—have sometimes been large enough to affect the statistics of accuracy significantly. Moreover, income data are often revised many times, leading to different apparent misestimates. For example, in early 2003, CBO forecast a gain of 1.1 percentage points in the share of GDP that comprised wages and profits; the Administration forecast a gain of 1.6 percentage points. Before the July 2006 three-year revision of the NIPAs, the actual income share for the 2003–2004 period was reported as unchanged, implying that CBO’s forecasting misestimate was 1.1 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 apparent misestimate, previously 1.6 percentage points, fell to 0.7 percentage points. Further revisions in July 2007 and July 2008 changed the reported data for that period twice more, altering each time the apparent misestimates of both CBO and the Administration.

Some of the series examined here—the consumer price index and nominal interest rates—are not revised. Moreover, not every GDP revision has consequences. For example, BEA’s comprehensive revisions to the NIPAs in December 2003 and December 2006 did not significantly affect the historical pattern of any of the variables used in this analysis.

In both 2004 and 2005, all three forecasters overpredicted the two-year growth rate of real output but underpredicted inflation in the GDP price index to an even greater degree. Hence, all three forecasters underpredicted the growth rate of nominal output. In 2006 and 2007, all three forecasters still overpredicted the two-year growth rate of real output and underpredicted inflation in the GDP price index, but the errors on output were larger than those on prices, so that all three forecasters overpredicted the growth rate of nominal output. (The unanticipated sharp increases in oil prices in those years had a much larger impact on the CPI than on the GDP price index.)

Inflation in the CPI. CBO's success matched that of the *Blue Chip* in forecasting two-year average growth in the consumer price index. CBO was more than 0.1 percentage point closer to the actual value in eight of the 26 periods, the *Blue Chip* was closer in five periods, and the errors of the two forecasters were essentially the same in 13 periods. (See Table 5 on page 17.)

The variability of oil prices caused CBO and the *Blue Chip* to err in forecasting inflation. Each forecaster overestimated future inflation for the 1982–1986 period and for the 1997–1998 period, partly because of the rapid drop in oil prices early in 1986 and between 1997 and 1998. Conversely, sharp increases in oil prices in 2000 and persistently rapid growth in oil prices between 2003 and 2008 caused both to underestimate inflation in the two-year forecasts they published in early 1999 and 2000 as well as those published from 2004 to 2007.

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

Nominal Short- and Long-Term Interest Rates. For the forecasts of nominal short-term interest rates produced between 1982 and 2007, CBO's record was almost the same as the *Blue Chip*'s as measured by the root-mean-square error. Both CBO and the *Blue Chip* consensus tended to slightly overestimate rates on three-month Treasury bills (the mean error for both over that period was 0.5 percentage points). CBO was more than 0.1 percentage point closer to the actual value in nine of the 26 periods, and the *Blue Chip* was closer six times. (See Table 6 on page 19.)

For long-term interest rates, the overall accuracy of CBO's forecasts for the years between 1984 and 2007 was very close to that of the *Blue Chip* consensus. CBO was more than 0.1 percentage point closer to the actual value in six of the 24 periods, the *Blue Chip* was closer in six periods, and the two forecasters had essentially identical errors in 12 periods. (See Table 7 on page 21.)

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

Real Short-Term Interest Rates. The *Blue Chip* had an edge over CBO, according to their root-mean-square errors, in estimating inflation-adjusted short-term interest rates for the 1982–2007 period. CBO's forecasts were closer to the actual value in three of the 26 periods, the *Blue Chip*'s were closer in 14, and the two registered similar errors in nine periods. (See Table 8 on page 22.)

CBO's accuracy in forecasting real short-term interest rates has been similar to that of the Administration both since 1982 and over the full 1976–2007 period.

The Difference Between Growth Rates of the CPI and the GDP Price Index. The difference in the growth rates that were forecast for 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 will be the projected growth of revenues. For its part, the growth in 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 will be and the slower the growth of revenues will be. Therefore, if the GDP price index is forecast to grow more slowly than the CPI, all else being equal, the projection of the deficit will be larger than if the GDP price index is assumed to grow at about the same rate as the CPI.

CBO's forecast of the difference between the two growth rates two years ahead was about as accurate as that of the *Blue Chip* consensus. CBO was more accurate than the *Blue Chip* (by more than 0.1 percentage point) in five of the 26 periods, the *Blue Chip* was more accurate in four periods, and the two forecasters had essentially identical errors in 17 periods. The Administration was about as accurate as CBO for the 1976–2007 period and slightly worse for the 1982–2007 period. (See Table 9 on page 24.)

The persistent apparent underprediction of the difference in the two growth rates in the years before 1999 (averaging 0.3 percentage points from 1985 to 1998 for CBO, 0.4 percentage points for the *Blue Chip*, and 0.5 percentage points for the Administration) is somewhat misleading. In part, it 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 other prices, on average, the change in the classification of 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. That difference probably accounted for about 0.2 percentage points of the apparent forecast bias in that period.

Between 2001 and 2006, the actual difference between the growth of the CPI and the GDP price index fell relative to the historical difference in the two rates. That change in the relationship between the two price indexes reflects an acceleration in the prices of some investment goods (particularly those involved in business, residential, and government structures) that are not included in the CPI, as well as an acceleration in the price index for military compensation. The acceleration in those prices was not generally anticipated, causing forecasters to overpredict the difference between the CPI and the GDP price index. Inflation in the price of private structures fell sharply in 2007, but the two-year average difference between the growth rate of the CPI and the GDP price index nevertheless remained low for 2007 compared with the historical difference through 2001.

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 those components that tend to produce relatively high tax revenue per dollar)—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.¹¹ Because the *Blue Chip* does not report wages and salaries, CBO's forecasting record cannot be compared with that of the private-sector survey in that respect.

The accuracy of 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. 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; both had large overpredictions in their 2001 and 2002 forecasts; and both underpredicted again for their 2004–2006 forecasts. (See Table 10 on page 26.)

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 difficult to forecast because it reflects errors in estimating.

Between 1994 and 2000, total income grew faster than total product—that is, the statistical discrepancy fell and became negative, leading to underpredictions of income. With the onset of the recession, the statistical discrepancy then reversed sharply and, according to the latest data from BEA, was positive again before the end of 2002. That swing slowed income growth relative to output, which led to overpredictions. From that time through the end of 2006, the discrepancy swung from a positive value to negative \$195 billion as income once again grew faster than product, and forecasts of income shares tended to be underpredicted. Since 2007, the discrepancy has swung

11. See Congressional Budget Office, *How CBO Forecasts Income*, Background Paper (August 2006).

once again toward the positive, dampening income growth relative to total product growth.

A second source of difficulty in forecasting taxable income is the recent variability in the portion of labor income not subject to taxation. Throughout most of the post–World War II period, the nontaxable portion of labor income as a share of total labor compensation rose 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. 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 again rose sharply. According to the latest data, the nontaxable share of labor income has remained roughly constant since 2002, even though during some of that period it would have been expected to fall as legislative changes temporarily reduced the payments that firms would otherwise have been required to make to fund defined-benefit pensions.¹²

A third factor that complicates the task of forecasting growth in taxable income is changes in the law. Forecasts made in January 2001 and 2002 were affected by changes to tax rules—contained in legislation enacted in 2002 and 2003—that relate to the depreciation of capital goods for tax purposes. By allowing more depreciation than before, the changes caused corporate book profits to be lower than usual relative to economic profits (because more depreciation could be written off as a business expense). Forecasters in 2001 had no way of predicting that effect for 2002, so projections of book profits were too high for that year. Moreover, even if private forecasters had had an inkling that those legislative changes were forthcoming, CBO could not have incorporated them

into its projections because of its mandate to assume no changes in current law.

Even when changes to tax law are anticipated, they can complicate forecasts of income shares because estimates of tax effects are themselves subject to error. The increase in book depreciation for the 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 implied 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 also about as accurate as those of the *Blue Chip* consensus and the Administration for all the series examined except taxable income shares of GDP, for which the Administration displayed a slight edge (see Table 2 on page 12). The *Blue Chip's* five-year economic projections (which are issued twice a year) are generally published about three months after CBO's forecasts. Although CBO's projections are constrained by the mandate that no change in fiscal policy be assumed, and the Administration's forecasts generally assume that the Administration's proposals will be 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.

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 28). 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 projections made in the same years (1979 and 1994 through 1997). The mean errors for the 1979–2004 period indicate that both forecasters had an identical downward bias (they predicted slower growth, on average, than actually occurred) of 0.2 percentage points. In the five-year projections made between 1992 and 1999, both CBO and the *Blue Chip* underpredicted medium-term growth because of the surprisingly strong economy of the late 1990s and, to a lesser extent, because of the upward revisions to BEA's growth rate estimates. The accuracy of CBO's five-year projections of real output also has been similar to that of the Administration.

12. 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 Congressional Budget Office, *The Budget and Economic Outlook: An Update*, Box 2-2 (August 2005), pp. 32–33.

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 30). The accuracy of forecasts made since 1992 for the growth of nominal output is generally better than that for real output, in part because errors in forecasting inflation partially offset errors in forecasting real growth.

Differences in Inflation Measures. All three forecasters' five-year projections of the difference in the growth of the CPI and the GDP price index were too low in virtually every period before 2000—the discrepancy averaging 0.4 percentage points for CBO, 0.5 percentage points for the *Blue Chip* consensus, and 0.6 percentage points for the Administration between 1985 and 1998 (see Table 13 on page 32). However, about 0.2 percentage points of the apparent forecast bias that occurred between 1985 and 1998 resulted from the downward revision in the growth of the GDP price index that happened when the NIPAs were revised in 1999.

After adjusting for the effect of those revisions, a small downward bias remained for that period for all three forecasters. That bias indicates that projections of the relationship between those two inflation measures tended to contribute to optimistic budget projections. All of the projections showed a similar bias.

The actual differences between the growth rates of the CPI and the GDP price index were smaller over the 2001–2006 period than in previous years. Five-year projections for that period were influenced by the longer historical record and ultimately 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. CBO's five-year projections of that share are less accurate than are the Administration's. Compared with the Administration's projections, CBO's were insufficiently pessimistic in the early 1980s and overly pessimistic in 1996 and 1997. As with some other variables, the errors made by both forecasters show alternating periods of optimism and pessimism and are positively correlated (see Table 14 on page 34). The five-year projections that CBO made between 1991 and 1997 indicated less growth in the tax base relative to GDP than actually occurred. The Administration made errors that were in the same direction but smaller in magnitude. 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.

The five-year periods beginning in 2002 and 2003 and ending in 2006 and 2007 saw the largest gains in the combined income shares recorded in the NIPAs since those shares began to be recorded in 1947. Both CBO and the Administration forecast rising income shares for those periods, but their forecasts still fell short. Indeed, in 2003, both agencies made their largest forecasts of gains in the combined share to date, but because of the record gains in the published data, they still underpredicted the rise in the combined share. An important caveat to interpreting the most recent forecasts is that data for the latest years are still subject to revision; hence, the final accounting of the latest forecast errors for the change in combined income shares is not yet complete.

Table 1.**Summary Measures of Performance for Two-Year Average Forecasts**

(Percentage points)

	CBO	<i>Blue Chip</i> ^a	Administration
Growth Rate for Real Output (1982-2007)			
Mean error	-0.3	-0.3	-0.1
Mean absolute error	1.0	1.0	1.0
Root-mean-square error	1.2	1.2	1.3
Growth Rate for Nominal Output (1982-2007)			
Mean error	0.1	0.1	0.2
Mean absolute error	1.0	0.9	1.1
Root-mean-square error	1.2	1.1	1.4
Inflation in the Consumer Price Index (1982-2007)			
Mean error	0.2	0.2	0.1
Mean absolute error	0.7	0.7	0.8
Root-mean-square error	0.9	0.9	0.9
Nominal Interest Rate on Three-Month Treasury Bills (1982-2007)			
Mean error	0.5	0.5	0.2
Mean absolute error	1.0	1.0	1.0
Root-mean-square error	1.3	1.2	1.3
Nominal Long-Term Interest Rate (1984-2007)			
Mean error	0.3	0.4	0
Mean absolute error	0.6	0.6	0.8
Root-mean-square error	0.7	0.7	0.9
Real Interest Rate on Three-Month Treasury Bills (1982-2007)			
Mean error	0.3	0.2	0.1
Mean absolute error	1.0	0.9	1.0
Root-mean-square error	1.3	1.2	1.3
Difference Between Inflation in the CPI and the GDP Price Index (1982-2007)			
Mean error	-0.1	-0.2	-0.2
Mean absolute error	0.4	0.4	0.5
Root-mean-square error	0.4	0.5	0.6
Change in Wage and Salary Disbursements Plus Corporate Book Profits as a Share of Output (1980-2007)			
Mean error	0	*	0.2
Mean absolute error	1.1	*	1.0
Root-mean-square error	1.3	*	1.2

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

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

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

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

Table 2.**Summary Measures of Performance for Five-Year Average Projections**

(Percentage points)

	CBO	<i>Blue Chip</i> ^a	Administration
Growth Rate for Real Output (1979-2004)			
Mean error	-0.2	-0.2	0.1
Mean absolute error	0.6	0.6	0.8
Root-mean-square error	0.9	0.8	0.9
Growth Rate for Nominal Output (1982-2004)			
Mean error	0.3	0.5	0.4
Mean absolute error	0.7	0.7	0.8
Root-mean-square error	0.9	0.9	1.0
Difference Between Inflation in the CPI and the GDP Price Index (1983-2004)			
Mean error	-0.2	-0.3	-0.3
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 (1980-2004)			
Mean error	-0.4	*	-0.2
Mean absolute error	1.8	*	1.5
Root-mean-square error	2.3	*	1.9

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

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

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.

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

Table 3.**CBO's, *Blue Chip's*, and the Administration's Forecasts of Two-Year Average Growth Rates for Real Output**

(Percent, by calendar year)

	Actual			Chain-Type Annual- Weighted Index	CBO		<i>Blue Chip</i> ^e		Administration	
	1972	1982	1987		Forecast	Error ^d	Forecast	Error ^d	Forecast	Error ^d
	Dollars ^a	Dollars ^b	Dollars ^c							
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	3.2	0.1	3.2	0.2
2004–2005	*	*	*	3.3	4.5	1.2	4.1	0.9	4.0	0.7
2005–2006	*	*	*	2.9	3.7	0.9	3.5	0.6	3.5	0.7
2006–2007	*	*	*	2.4	3.5	1.1	3.2	0.8	3.3	0.9
2007–2008	*	*	*	1.6	2.6	1.1	2.7	1.1	2.9	1.3

Continued

Table 3.

Continued

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

(Percent, by calendar year)

	Actual			Chain-Type Annual- Weighted Index	CBO		<i>Blue Chip</i> ^e		Administration	
	1972 Dollars ^a	1982 Dollars ^b	1987 Dollars ^c		Forecast	Error ^d	Forecast	Error ^d	Forecast	Error ^d
Statistics for 1976–2007										
Mean error	*	*	*	*	*	-0.1	*	*	*	0
Mean absolute error	*	*	*	*	*	1.0	*	*	*	1.0
Root-mean-square error	*	*	*	*	*	1.2	*	*	*	1.3
Statistics for 1982–2007										
Mean error	*	*	*	*	*	-0.3	*	-0.3	*	-0.1
Mean absolute error	*	*	*	*	*	1.0	*	1.0	*	1.0
Root-mean-square error	*	*	*	*	*	1.2	*	1.2	*	1.3

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

Notes: GNP = gross national product; GDP = gross domestic product; * = not applicable.

Actual values are for the two-year growth rates for real (inflation-adjusted) GNP and real GDP that were last reported by BEA, not the first reported values. Forecast values are for the average annual growth of real GNP or GDP over the two-year period. All of the forecasts were issued in the first half of the initial year of the period or in December of the preceding year.

- a. Data for GNP and GDP that are based on 1972 dollars are available only through the third quarter of 1985.
- b. Data for GNP and GDP that are based on 1982 dollars are available only through the third quarter of 1991.
- c. Data for GNP and GDP that are based on 1987 dollars 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 BEA's 1992 benchmark revision, GDP replaced GNP as the central measure of national output.

Table 4.**Comparison of CBO's, *Blue Chip's*, and the Administration's Forecasts of Two-Year Average Growth Rates for Nominal Output**

(Percent, by calendar year)

	Actual	CBO		<i>Blue Chip</i> ^b		Administration	
		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
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	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	-0.7	5.3	-1.1
2005–2006	6.2	5.5	-0.7	5.5	-0.6	5.6	-0.6
2006–2007	5.4	5.7	0.3	5.6	0.2	5.7	0.3
2007–2008	4.0	4.6	0.5	4.9	0.9	5.4	1.3

Continued

Table 4.

Continued

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

(Percent, by calendar year)

	Actual	CBO		<i>Blue Chip</i> ^b		Administration	
		Forecast	Error ^a	Forecast	Error ^a	Forecast	Error ^a
Statistics for 1976–2007							
Mean error	*	*	0.1	*	*	*	0.2
Mean absolute error	*	*	1.1	*	*	*	1.1
Root-mean-square error	*	*	1.4	*	*	*	1.5
Statistics for 1982–2007							
Mean error	*	*	0.1	*	0.1	*	0.2
Mean absolute error	*	*	1.0	*	0.9	*	1.1
Root-mean-square error	*	*	1.2	*	1.1	*	1.4

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

Notes: GNP = gross national product; GDP = gross domestic product; * = not applicable.

Actual values are for the two-year growth rates for GNP and GDP that were last reported by BEA, not the first reported values. Forecast values are for the average annual growth of nominal GNP or GDP over the two-year period. All of the forecasts were issued in the first half of the initial year of the period or in December of the preceding year.

- Errors (which are in percentage points) are forecast values minus actual values; thus, a positive error is an overestimate.
- Two-year forecasts for the *Blue Chip* consensus were not available until 1982.
- With BEA's 1992 benchmark revision, GDP replaced GNP as the central measure of national output.

Table 5.**CBO's, *Blue Chip's*, and the Administration's Forecasts of Two-Year Average Inflation in the Consumer Price Index**

(Percent, by calendar year)

	Actual		CBO		<i>Blue Chip</i> ^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
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
2006–2007	3.0	3.0	2.5	-0.5	2.6	-0.4	2.7	-0.3
2007–2008	3.3	3.5	2.1	-1.2	2.1	-1.2	2.0	-1.3

Continued

Table 5.

Continued

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

(Percent, by calendar year)

	Actual		CBO		<i>Blue Chip</i> ^b		Administration	
	CPI-U	CPI-W	Forecast	Error ^a	Forecast	Error ^a	Forecast	Error ^a
Statistics for 1976–2007								
Mean error	*	*	*	-0.1	*	*	*	-0.2
Mean absolute error	*	*	*	1.0	*	*	*	1.0
Root-mean-square error	*	*	*	1.4	*	*	*	1.5
Statistics for 1982–2007								
Mean error	*	*	*	0.2	*	0.2	*	0.1
Mean absolute error	*	*	*	0.7	*	0.7	*	0.8
Root-mean-square error	*	*	*	0.9	*	0.9	*	0.9

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

Notes: CPI-U = consumer price index for all urban consumers; CPI-W = consumer price index for urban wage earners and clerical workers; * = not applicable.

Values are for the average annual growth of the CPI over the two-year period. Before 1978, BLS published only one CPI series, now known as the CPI-W. In January 1978, the bureau began publishing a second, broader consumer price index series, the CPI-U. For most years since 1979, CBO forecast the CPI-U; from 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* consensus forecast the CPI-U for the entire period. All of the forecasts were issued in the first half of the initial year of the period or in December of the preceding year.

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

(Percent, by calendar year)

	Actual		CBO		<i>Blue Chip</i> ^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	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
2006-2007	4.6	4.5	4.5	0.0	4.5	0	4.2	-0.3
2007-2008	2.9	2.8	4.6	1.8	4.8	2.0	4.6	1.8

Continued

Table 6.

Continued

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

(Percent, by calendar year)

	Actual		CBO		<i>Blue Chip</i> ^b		Administration	
	New Issue	Secondary Market	Forecast	Error ^a	Forecast	Error ^a	Forecast	Error ^a
Statistics for 1976–2007								
Mean error	*	*	*	0.2	*	*	*	-0.3
Mean absolute error	*	*	*	1.1	*	*	*	1.2
Root-mean-square error	*	*	*	1.5	*	*	*	1.5
Statistics for 1982–2007								
Mean error	*	*	*	0.5	*	0.5	*	0.2
Mean absolute error	*	*	*	1.0	*	1.0	*	1.0
Root-mean-square error	*	*	*	1.3	*	1.2	*	1.3

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

Notes: * = not applicable.

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, since that time, the secondary-market rate. The *Blue Chip* consensus 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 that time. All of the forecasts were issued in the first half of the initial year of the period or in December of the preceding year.

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

(Percent, by calendar year)

	Actual		CBO		<i>Blue Chip</i>		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
2006–2007	4.7	5.6	5.1	0.4	4.9	0.2	5.2	0.5
2007–2008	4.1	5.6	4.9	0.8	4.9	0.8	5.0	0.9
Statistics for 1984–2007								
Mean error	*	*	*	0.3	*	0.4	*	0
Mean absolute error	*	*	*	0.6	*	0.6	*	0.8
Root mean square error	*	*	*	0.7	*	0.7	*	0.9

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

Notes: * = not applicable.

Actual values are for the geometric averages of the 10-year Treasury-note rates or Moody's Aaa corporate-bond rates for the two-year period as reported by the Board of the Federal Reserve. CBO forecast the 10-year Treasury-note rate in all years except 1984 and 1985, when it forecast the Aaa corporate-bond rate. The Administration forecast the 10-year-note rate, but the *Blue Chip* consensus forecast the Aaa corporate-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. All of the forecasts were issued in the first half of the initial year of the period or in December of the preceding year.

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

Table 8.**CBO's, *Blue Chip's*, and the Administration's Forecasts of Two-Year Average Real Interest Rates on Three-Month Treasury Bills**

(Percent, by calendar year)

	Actual				CBO		<i>Blue Chip</i> ^b		Administration	
	New Issue		Secondary Market		Forecast	Error ^a	Forecast	Error ^a	Forecast	Error ^a
	CPI-U	CPI-W	CPI-U	CPI-W						
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	1.5
2003–2004	-1.3	-1.2	-1.3	-1.2	0.2	1.5	0	1.3	0.3	1.6
2004–2005	-0.7	-0.8	-0.7	-0.8	0.5	1.2	0	0.8	0.4	1.1
2005–2006	0.6	0.6	0.6	0.6	1.2	0.6	1.0	0.4	0.7	0.1
2006–2007	1.5	1.5	1.5	1.5	2.0	0.5	1.8	0.3	1.5	0
2007–2008	-0.4	-0.5	-0.5	-0.6	2.5	3.0	2.6	3.1	2.5	3.0

Continued

Table 8.

Continued

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

(Percent, by calendar year)

	Actual				CBO		<i>Blue Chip</i> ^b		Administration	
	New Issue		Secondary Market		Forecast	Error ^a	Forecast	Error ^a	Forecast	Error ^a
	CPI-U	CPI-W	CPI-U	CPI-W						
Statistics for 1976–2007										
Mean error	*	*	*	*	*	0.3	*	*	*	0
Mean absolute error	*	*	*	*	*	1.0	*	*	*	1.0
Root-mean-square error	*	*	*	*	*	1.2	*	*	*	1.3
Statistics for 1982–2007										
Mean error	*	*	*	*	*	0.3	*	0.2	*	0.1
Mean absolute error	*	*	*	*	*	1.0	*	0.9	*	1.0
Root-mean-square error	*	*	*	*	*	1.3	*	1.2	*	1.3

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

Notes: CPI-U = the consumer price index for all urban consumers; CPI-W = the consumer price index for urban wage earners and clerical workers; * = not applicable.

Values are for the appropriate three-month Treasury-bill rate discounted by the respective forecast for inflation as measured by the change in the CPI. CBO forecast the secondary-market rate, whereas the Administration forecast the new-issue rate. The *Blue Chip* consensus alternated between the two rates, forecasting the new-issue rate from 1982 to 1985, the secondary-market rate from 1986 to 1991, and the new-issue rate again beginning in 1992. Moreover, for most years since 1979, CBO forecast the CPI-U; from 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* consensus forecast the CPI-U for the entire period. All of the forecasts were issued in the first half of the initial year of the period or in December of the preceding year.

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

(Percentage points, by calendar year)

	Actual		CBO		<i>Blue Chip</i> ^b		Administration	
	CPI-U	CPI-W	Forecast	Error ^a	Forecast	Error ^a	Forecast	Error ^a
1976–1977	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	-0.1	0.2	0.1	0.1	0.2
1986–1987	0.3	0.1	-0.1	-0.2	0.2	-0.1	0	-0.1
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	-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	-0.7
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	0.6	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	0.7	-0.1
2001–2002	0.1	0	0.6	0.5	0.5	0.4	0.6	0.4
2002–2003	0	-0.1	0.4	0.4	0.3	0.3	0.1	0.1
2003–2004	0	-0.1	0.6	0.6	0.5	0.5	0.7	0.8
2004–2005	0	0	0.6	0.6	0.4	0.4	0.2	0.2
2005–2006	0.1	0.1	0.5	0.4	0.4	0.4	0.4	0.3
2006–2007	0.1	0.1	0.4	0.3	0.4	0.3	0.4	0.3
2007–2008	0.9	1.0	0.3	-0.6	0	-0.9	-0.4	-1.3

Continued

Table 9.

Continued

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

(Percentage points, by calendar year)

	Actual		CBO		<i>Blue Chip</i> ^b		Administration	
	CPI-U	CPI-W	Forecast	Error ^a	Forecast	Error ^a	Forecast	Error ^a
Statistics for 1976–2007								
Mean error	*	*	*	-0.3	*	*	*	-0.4
Mean absolute error	*	*	*	0.6	*	*	*	0.6
Root-mean-square error	*	*	*	0.9	*	*	*	0.9
Statistics for 1982–2007								
Mean error	*	*	*	-0.1	*	-0.2	*	-0.2
Mean absolute error	*	*	*	0.4	*	0.4	*	0.5
Root-mean-square error	*	*	*	0.4	*	0.5	*	0.6

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

Notes: CPI = consumer price index; CPI-U = the price index for all urban consumers; CPI-W = the price index for urban wage earners and clerical workers; GNP = gross national product; GDP = gross domestic product; * = not applicable.

Values are for the difference between the average annual growth of the CPI and average annual growth of the GNP or GDP price index over the two-year period. The GNP price index is used for data before 1993, and the GDP price index is used thereafter. Before 1978, BLS published only one CPI series, now known as the CPI-W. In January 1978, the bureau began to publish a second, broader CPI series, the CPI-U. For most years since 1979, CBO forecast the CPI-U; from 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* consensus forecast the CPI-U for the entire period. All of the forecasts were issued in the first half of the initial year of the period or in December of the preceding year.

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

(Percentage of GNP or GDP, by calendar year)

	Actual	CBO		Administration	
		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	0.9	-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
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	-0.4
1998–1999	0.3	-0.2	-0.4	0.2	-0.1
1999–2000	1.0	-0.1	-1.2	0	-1.1
2000–2001	-0.8	-0.5	0.2	-0.8	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
2004–2005	3.8	2.8	-1.0	3.0	-0.7
2005–2006	3.5	1.2	-2.3	1.5	-2.0
2006–2007	1.0	-1.3	-2.3	-0.4	-1.4
2007–2008	-2.8	-0.9	2.0	-0.6	2.2

Continued

Table 10.**Continued**

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

(Percentage of GNP or GDP, by calendar year)

	Actual	CBO		Administration	
		Forecast	Error ^a	Forecast	Error ^a
Statistics for 1980–2007					
Mean error	*	*	0	*	0.2
Mean absolute error	*	*	1.1	*	1.0
Root-mean-square error	*	*	1.3	*	1.2

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

Notes: GNP = gross national product; GDP = gross domestic product; * = not applicable.

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, GNP was used to calculate the shares; for the forecasts made in 1992 and later, GDP was used. The *Blue Chip* consensus does not forecast wages and salaries.

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

Table 11.**CBO's, *Blue Chip's*, and the Administration's Projections of Five-Year Average Growth Rates for Real Output**

(Percent, by calendar year)

	Actual			Chain-Type Annual- Weighted Index	CBO		<i>Blue Chip</i> ^e		Administration	
	1972 Dollars ^a	1982 Dollars ^b	1987 Dollars ^c		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	b	2.6	2.4	3.1	2.8	-0.3	3.0	-0.1	3.8	0.7
1982–1986	b	2.7	2.6	3.3	3.0	-0.3	2.7	-0.5	3.9	0.6
1983–1987	b	4.0	3.7	4.4	3.6	-0.8	3.5	-0.9	3.5	-0.9
1984–1988	b	4.1	3.7	4.3	4.0	-0.3	3.5	-0.8	4.3	0
1985–1989	b	3.3	3.1	3.6	3.4	-0.3	3.4	-0.3	4.0	0.3
1986–1990	b	2.8	2.7	3.3	3.3	0.1	3.1	-0.1	3.8	0.5
1987–1991	b	c	2.0	2.6	2.9	0.4	2.7	0.1	3.5	0.9
1988–1992	b	c	1.9	2.5	2.6	0	2.5	0	3.2	0.7
1989–1993	b	c	1.7	2.2	2.3	0.1	2.6	0.3	3.2	1.0
1990–1994	b	c	1.9	2.3	2.3	0	2.4	0.1	3.0	0.7
1991–1995	b	c	d	2.4	2.3	-0.1	2.0	-0.4	2.5	0.1
Real GDP ^f										
1992–1996	b	c	d	3.2	2.6	-0.6	2.5	-0.8	2.7	-0.6
1993–1997	b	c	d	3.5	2.8	-0.7	2.8	-0.7	2.8	-0.7
1994–1998	b	c	d	3.8	2.7	-1.1	2.8	-1.0	2.8	-1.0
1995–1999	b	c	d	3.9	2.4	-1.5	2.5	-1.3	2.6	-1.3
1996–2000	b	c	d	4.1	2.0	-2.1	2.1	-2.0	2.3	-1.8
1997–2001	b	c	d	3.5	2.1	-1.4	2.3	-1.2	2.2	-1.3
1998–2002	b	c	d	2.9	2.1	-0.8	2.3	-0.6	2.2	-0.7
1999–2003	b	c	d	2.6	2.2	-0.4	2.6	0	2.2	-0.4
2000–2004	b	c	d	2.4	2.9	0.5	3.2	0.8	2.8	0.3
2001–2005	b	c	d	2.3	3.0	0.7	3.1	0.8	3.2	0.9
2002–2006	b	c	d	2.7	3.0	0.3	3.1	0.4	3.0	0.3
2003–2007	b	c	d	2.8	3.2	0.4	3.2	0.4	3.3	0.5
2004–2008	b	c	d	2.5	3.5	1.0	3.6	1.1	3.6	1.1

Continued

Table 11.

Continued

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

(Percent, by calendar year)

	Actual			Chain-Type Annual- Weighted Index	CBO		<i>Blue Chip</i> ^e		Administration	
	1972 Dollars ^a	1982 Dollars ^b	1987 Dollars ^c		Forecast	Error ^d	Forecast	Error ^d	Forecast	Error ^d
Statistics for 1976–2004										
Mean error	*	*	*	*	*	0.1	*	*	*	0.4
Mean absolute error	*	*	*	*	*	0.8	*	*	*	1.0
Root-mean-square error	*	*	*	*	*	1.1	*	*	*	1.2
Statistics for 1979–2004										
Mean error	*	*	*	*	*	-0.2	*	-0.2	*	0.1
Mean absolute error	*	*	*	*	*	0.6	*	0.6	*	0.8
Root-mean-square error	*	*	*	*	*	0.9	*	0.8	*	0.9

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

Notes: GNP = gross national product; GDP = gross domestic product; * = not applicable.

Actual values are for the five-year growth rates for real (inflation-adjusted) GNP and GDP that were last reported by BEA, not the first reported values. Projected values are for the average growth of real GNP or GDP over the five-year period. All of the projections were issued in the first quarter of the initial year of the period or in December of the preceding year.

- Data for GNP and GDP based on 1972 dollars are available only through the third quarter of 1985.
- Data for GNP and GDP based on 1982 dollars are available only through the third quarter of 1991.
- Data for GNP and GDP based on 1987 dollars are available only through the second and third quarters, respectively, of 1995.
- 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.
- Five-year projections for the *Blue Chip* consensus were not available until 1979.
- With BEA's 1992 benchmark revision, GDP replaced GNP as the central measure of national output.

Table 12.**CBO's, *Blue Chip's*, and the Administration's Projections of Five-Year Average Growth Rates for Nominal Output**

(Percent, by calendar year)

	Actual	CBO		<i>Blue Chip</i> ^b		Administration	
		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	5.5	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	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
2001–2005	4.8	5.1	0.3	5.3	0.4	5.4	0.6
2002–2006	5.4	4.9	-0.5	5.1	-0.3	4.9	-0.5
2003–2007	5.7	5.2	-0.5	5.2	-0.5	4.9	-0.8
2004–2008	5.4	5.0	-0.4	5.4	0	5.2	-0.2

Continued

Table 12.

Continued

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

(Percent, by calendar year)

	Actual	CBO		<i>Blue Chip</i> ^b		Administration	
		Forecast	Error ^a	Forecast	Error ^a	Forecast	Error ^a
Statistics for 1976–2004							
Mean error	*	*	0.6	*	*	*	0.6
Mean absolute error	*	*	0.9	*	*	*	0.9
Root-mean-square error	*	*	1.2	*	*	*	1.1
Statistics for 1982–2004							
Mean error	*	*	0.3	*	0.5	*	0.4
Mean absolute error	*	*	0.7	*	0.7	*	0.8
Root-mean-square error	*	*	0.9	*	0.9	*	1.0

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

Notes: GNP = gross national product; GDP = gross domestic product; * = not applicable.

Actual values are for the five-year growth rates for GNP and GDP that were last reported by BEA, not the first reported values.

Projected values are for the average annual growth of nominal GNP or GDP over the five-year period. All of the projections were issued in the first half of the initial year of the period or in December of the preceding year.

- Errors (which are in percentage points) are projected values minus actual values; thus, a positive error is an overestimate.
- Five-year projections for the *Blue Chip* consensus were not available until 1982.
- With BEA's 1992 benchmark revision, GDP replaced GNP as the central measure of national output.

Table 13.

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

(Percentage points, by calendar year)

	Actual		CBO		<i>Blue Chip</i> ^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	-1.6
1977–1981	1.8	1.8	0	-1.8	*	*	-0.3	-2.1
1978–1982	1.8	1.7	0	-1.7	*	*	-0.1	-1.8
1979–1983	1.5	1.4	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	0.4	0.2	*	*	-0.1	-0.1
1982–1986	0	-0.3	0.1	0.1	*	*	-0.2	0.1
1983–1987	0.2	-0.1	0	-0.2	-0.1	-0.3	-0.2	-0.1
1984–1988	0.5	0.2	0	-0.5	0.1	-0.4	-0.1	-0.3
1985–1989	0.5	0.5	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	-0.7
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	-0.8
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	-0.8
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	-0.1	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	0.6	0.5	0.5	0.4	0.6	0.5
2002–2006	0	-0.1	0.5	0.5	0.5	0.5	0.4	0.4
2003–2007	0	0.1	0.5	0.4	0.5	0.5	0.6	0.6
2004–2008	0.3	0.4	0.5	0.2	0.3	0	0.3	-0.1

Continued

Table 13.

Continued

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

(Percentage points, by calendar year)

	Actual		CBO		<i>Blue Chip</i> ^b		Administration	
	CPI-U	CPI-W	Forecast	Error ^a	Forecast	Error ^a	Forecast	Error ^a
Statistics for 1976–2004								
Mean error	*	*	*	-0.4	*	*	*	-0.5
Mean absolute error	*	*	*	0.5	*	*	*	0.6
Root-mean-square error	*	*	*	0.7	*	*	*	0.8
Statistics for 1983–2004								
Mean error	*	*	*	-0.2	*	-0.3	*	-0.3
Mean absolute error	*	*	*	0.4	*	0.4	*	0.5
Root-mean-square error	*	*	*	0.4	*	0.5	*	0.5

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

Notes: CPI = consumer price index; CPI-U = the price index for all urban consumers; CPI-W = the price index for urban wage earners and clerical workers; GNP = gross national product; GDP = gross domestic product; * = not applicable.

Values are for the difference between the average annual growth of the CPI and average annual growth of the GNP or GDP price index over the five-year period. The GNP price index is used for data before 1993, and the GDP price index is used thereafter. Before 1978, BLS published only one CPI series, now known as the CPI-W. In January 1978, the bureau began to publish a second, broader CPI series, the CPI-U. For most years since 1979, CBO forecast the CPI-U; from 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* consensus forecast the CPI-U for the entire period. All of the forecasts were issued in the first half of the initial year of the period or in December of the preceding year.

- 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's and the Administration's Projections of the Five-Year Change in Wage and Salary Disbursements Plus Corporate Profits as a Share of Output

(Percentage of GNP or GDP, by calendar year)

	Actual	CBO		Administration	
		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	-0.6	-0.5	-0.3	-0.2
1984–1988	1.7	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
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	1.6	-0.8	-2.5	-1.1	-2.7
2002–2006	4.2	0.3	-3.9	1.0	-3.2
2003–2007	4.8	2.8	-2.0	2.4	-2.4
2004–2008	2.2	2.1	-0.1	2.2	0
Statistics for 1980–2004					
Mean error	*	*	-0.4	*	-0.2
Mean absolute error	*	*	1.8	*	1.5
Root-mean-square error	*	*	2.3	*	1.9

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

Notes: GNP = gross national product; GDP = gross domestic product; * = not applicable.

For the forecasts made between 1980 and 1991, GNP was used to calculate the shares; for the forecasts made in 1992 and later, GDP was used. The *Blue Chip* consensus does not forecast wages and salaries. All of the forecasts were issued in the first half of the initial year of the period or in December of the preceding year.

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



Appendix: Historical and Forecast Data

This appendix offers an overview of the basic historical and forecast data used to evaluate the Congressional Budget Office's (CBO's) forecasting record. Those measures include growth in real (inflation-adjusted) and nominal output, inflation in the consumer price index (CPI), fluctuations in interest rates, and changes in 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

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.

chain-type annual-weighted index of real GNP or GDP throughout the data series.² 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. By contrast, for all but four of its forecasts since 1979—specifically, those published from 1986 to 1989—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 using 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 corre-

sponds 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 the 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 (for instance, income derived from assets held in

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

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 was based on the Reagan Administration's revisions of President Carter's last budget.

CBO's corresponding forecast was taken from the agency'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 of investment 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 that comparison dates to early 1982. Average five-year projections, however, are included in the *Blue Chip* only twice a year and on a schedule that does not correspond to that necessary for compiling forecasts for federal budgeting. All but one of the five-year projections from the *Blue Chip* consensus that was 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 published forecasts for wages and salaries on a regular basis only since 1985, some of the forecasts for wages and salaries that CBO produced and used for this evaluation were taken from the agency'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 from 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