

Survey of
PROFESSIONAL
FORECASTERS

Federal Reserve Bank
of Philadelphia

Documentation

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1. Overview

The forecasts for the Survey of Professional Forecasters are provided by the Federal Reserve Bank of Philadelphia. The quarterly survey, formerly conducted by the American Statistical Association (ASA) and the National Bureau of Economic Research (NBER), began in 1968:Q4 and was taken over by the Philadelphia Fed in 1990:Q2.

The data set contains the 32 economic variables currently included in the survey. Some have been in the survey since 1968:Q4; others were added in 1981:Q3. Beginning in 1992, additional long-term forecasts were added to the survey in the first quarter of each year. Forecasts for nonfarm payroll employment were added in 2003:Q4. Forecasts for core CPI inflation, PCE inflation, and core PCE inflation were added in 2007:Q1. Forecasts for Moody's BAA corporate bond yield were added in 2010:Q1. Also, in 2010:Q1, we added probability of civilian unemployment rates and two additional years for probability of changes in real GDP to the questionnaire. In the surveys conducted since the Philadelphia Fed took over, the forecasters provide quarterly projections for five quarters and annual projections for the current year and the following year. Beginning with the 2010:Q1 survey, we asked the forecasters to provide two more years of annual forecasts for the civilian unemployment rate, three-month Treasury bill rate, 10-year Treasury bond rate, and real GDP. With a few exceptions, noted below, the same format characterizes the surveys conducted before we took over.

This documentation provides information on the variables forecast and the format of the files. We begin with a listing of the files and a description of their content. Section 2 discusses the files containing the median and mean forecasts for the levels of variables. Section 3 discusses forecasts for growth rates. Section 4 discusses the individual forecasts. Section 5 discusses a special file that we have constructed for one-year-ahead and 10-year-ahead forecasts for CPI inflation. Section 6 discusses the survey's probability variables.

Table 1 provides a list of the files and a description of their contents.

Table 1. Overview - Files and Contents

Name of New File	Brief Description of Contents
MedianLevel.xls	An Excel workbook with multiple worksheets. Each worksheet holds the time series of <i>median</i> forecasts for the level of a different variable. The first two columns list the year and quarter in which the survey was conducted. The remaining columns give the <i>median</i> forecasts for all quarterly and annual horizons, as described below.
MeanLevel.xls	An Excel workbook with multiple worksheets. Each worksheet holds the time series of <i>mean</i> forecasts for the level of a different variable. The first two columns list the year and quarter in which the survey was conducted. The remaining columns give the <i>mean</i> forecasts for all quarterly and annual horizons, as described below.
MedianGrowth.xls	An Excel workbook with multiple worksheets. Each worksheet holds the time series of <i>median</i> forecasts for growth of a different variable (annualized percentage points). These are the growth rates of the levels provided in MedianLevel.xls. The first two columns list the year and quarter in which the survey was conducted. The remaining columns give the forecasts for all quarterly horizons.
MeanGrowth.xls	An Excel workbook with multiple worksheets. Each worksheet holds the time series of <i>mean</i> forecasts for growth of a different variable (annualized percentage points). These are the growth rates of the levels provided in MeanLevel.xls. The first two columns list the year and quarter in which the survey was conducted. The remaining columns give the forecasts for all quarterly horizons.
Prob.xls	An Excel workbook with five worksheets. Each worksheet gives the time series of <i>mean</i> probability forecasts for a different probability variable in the survey, as described below. The first two columns give the year and quarter in which the survey was conducted.
Micro1.xls to Micro5.xls	Four Excel workbooks, each with multiple worksheets. These are the files of individual forecasts: Micro1.xls covers surveys conducted over the period 1968:Q4 to 1979:Q4; Micro2.xls covers 1980:Q1 to 1989:Q4; Micro3.xls covers 1990:Q1 to 1999:Q4; Micro4.xls covers 2000:Q1 to 2009:Q4; and Micro5.xls covers 2010:Q1 to present. The first three columns give the year and quarter of the survey and the forecaster's identification number (ID). The remaining columns give the forecasts for all horizons in the survey, organized in the same manner as the mean and median forecast files for levels (MedianLevel.xls and MeanLevel.xls).
Inflation.xls	An Excel workbook with one worksheet containing three series for expectations of inflation. The first two are one-year-ahead expectations of inflation (measured by the GNP/GDP price index and, alternatively, the CPI). The third series is the expectation for annual average inflation over the next 10 years. The one-year-ahead expectations are annual averages, in annualized percentage points, over the four quarters, beginning with the quarter after the quarter in which the survey was conducted. (The year and quarter in which the survey was conducted are listed in the first two columns.) All forecasts are based on the median response.

Timing of the Survey. The Philadelphia Fed's first survey was the one for 1990:Q2. However, this survey was not conducted in real time because we had not yet taken over full responsibility from the ASA/NBER. For this survey, the forecasters were asked to provide dated forecasts from May 1990. The first survey we conducted in real time was the one for 1990:Q3. With a few minor exceptions noted below, we have maintained a consistent timing in conducting the surveys since the 1990:Q3 survey.

Information Sets and Deadlines. The survey's timing is geared to the release of the Bureau of Economic Analysis' *advance report* of the national income and product accounts. This report is released at the end of the first month of each quarter. It contains the first estimate of GDP (and components) for the previous quarter. We send our survey questionnaires after this report is released to the public. Indeed, our survey questionnaires report recent historical values of the data from the BEA's advance report and the most recent reports of other government statistical agencies. Thus, in submitting their projections, our panelists' information sets include the data reported in the advance report. Our survey questionnaires are sent to the panelists on the day of the advance report.

For the surveys we conducted after the 1990:Q2 survey, we have set the deadlines for responses at late in the second to third week of the middle month of each quarter. A complete list of the dates of deadlines for surveys from 1990:Q2 to the present is available on the Philadelphia Fed's website at:

<http://www.philadelphiafed.org/research-and-data/real-time-center/survey-of-professional-forecasters/spf-release-dates.txt>

For some variables, notably those contained in the Bureau of Labor Statistics monthly Employment Situation Report, there could be a revision to the data (and an additional monthly observation) compared with the data we reported on the survey questionnaire. This happens when there is a new release of the data after we send the survey questionnaire but before the deadline for returning it. The Employment Situation Report is a prime example because the BLS has almost always released this report on the first Friday of each month, after we send the questionnaire and before the deadline. Thus, the information sets of the panelists include the data reported in the Employment Situation Report that the BLS releases to the public in the middle month of each quarter.

A minor change in the timing of the dates of deadlines occurred beginning with the survey of 2005:Q1. Beginning with this survey, we tightened our schedule. The dates of the deadlines for responses were moved up a few days (in most surveys), to the second week of the middle month. (The dates for release to the public were also moved up a few days.)

News Release Dates. From 1990:Q3 to 2004:Q4, we released the results of the survey to the public in the fourth week of the middle month of the quarter. Exceptions are noted in the aforementioned file available on the Philadelphia Fed's website. Beginning with the survey of 2005:Q1, we advanced the dates of release a few days, to late in the second week of the

middle month of the quarter. We always release the results before the BEA's second report for the national income and product accounts¹.

Timing of Surveys Prior to the 1990:Q2 Survey. We do not know with certainty the timing of the surveys conducted by the ASA/NBER. We think that, in broad terms, the timing was similar to that adopted by the Philadelphia Fed. In other words, we think the questionnaires were sent to panelists after the first (advance) report of the national income and product accounts and the results were released to the public before the second report. For this reason, the aforementioned file of the dates of deadlines and news releases does not include the specific dates for surveys conducted prior to the 1990:Q2 survey.

The following table summarizes the timing of the Survey of Professional Forecasters in the surveys beginning with 1990:Q3.

***Timing of the Survey of Professional Forecasters
1990:Q3 to present***

<i>Survey Name</i>	<i>Questionnaires Sent to Panelists</i>	<i>Last Quarter of History in the Panelists' Information Sets</i>	<i>Date of Deadline for Submissions²</i>	<i>Results Released to the Public</i>
First Quarter	End of January (after NIPA advance report)	Q4	Middle of February (second to third week)	Middle to Late February (before NIPA second report)
Second Quarter	End of April (after NIPA advance report)	Q1	Middle of May (second to third week)	Middle to Late May (before NIPA second report)
Third Quarter	End of July (after NIPA advance report)	Q2	Middle of August (second to third week)	Middle to Late August (before NIPA second report)
Fourth Quarter	End of October (after NIPA advance report)	Q3	Middle of November (second to third week)	Middle to Late November (before NIPA second report)

¹ Beginning with the benchmark revision of July 2009, the BEA will change its vintage terminology: Instead of the terminology "Advance", "Preliminary", and "Final", the BEA will use "Advance", "Second", and "Third". The timing of these releases will remain the same.

² A minor break in the timing of the dates of deadlines and news releases begins with the survey of 2005:Q1. For details, see the text above and the file located on the Philadelphia Fed's website at: www.philadelphiafed.org/files/spf/reesdat.txt.

2. Median and Mean Forecasts for Levels

In each survey, the forecasters provide their projections for the next five quarters and for the current and following years.³ The files *MedianLevel.xls* and *MeanLevel.xls* contain the median and mean survey responses. Both files are organized in the same manner. Each is an Excel workbook containing multiple worksheets, with each worksheet containing the forecasts for a particular variable. You move among the worksheets by choosing the appropriate tab at the bottom. These tabs refer to the variable being forecast. The number “-999” denotes a missing value. **Table 2** defines the variables forecast (worksheet tabs) and provides a brief description of each.

Table 2. Variables Forecast in the Survey

Variable Name & Worksheet Tab	Description
NGDP	Forecasts for the quarterly and annual level of nominal GDP. Seasonally adjusted, annual rate, billions \$. Prior to 1992, these are forecasts for nominal GNP. Annual forecasts are for the annual average.
PGDP	Forecasts for the quarterly and annual level of the GDP price index. Seasonally adjusted, index, base year varies. Prior to 1996, GDP implicit deflator. Prior to 1992, GNP deflator. Annual forecasts are for the annual average.
CPROF	Forecasts for the quarterly and annual level of nominal corporate profits after tax <i>excluding</i> IVA and CCAdj. Seasonally adjusted, annual rate, billions \$. Beginning with the survey of 2006:Q1, this variable <i>includes</i> IVA and CCAdj. Annual forecasts are for the annual average.
UNEMP	Forecasts for the quarterly average and annual average unemployment rate. Seasonally adjusted, percentage points.
EMP	Forecasts for the quarterly average and annual average level of nonfarm payroll employment. Seasonally adjusted, thousands of jobs.
INDPROD	Forecasts for the quarterly average and annual average level of the index of industrial production. Seasonally adjusted, index, base year varies.
HOUSING	Forecasts for the quarterly average and annual average level of housing starts. Seasonally adjusted, annual rate, millions.
TBILL	Forecasts for the quarterly average and annual average three-month Treasury bill rate. Percentage points.

³ See the discussion below for exceptions for the annual forecasts in the surveys of 1985:Q1, 1986:Q1, and 1990:Q1. Beginning with the 2007:Q1 survey, we asked the forecasters to provide the annual forecasts for the current and the next two years for CPI inflation rate, core CPI inflation rate, PCE inflation rate, and core PCE inflation rate. Beginning with the 2010:Q1 survey, we asked the forecasters to provide two more years of annual forecasts for the civilian unemployment rate, three-month Treasury bill rate, 10-year Treasury bond rate, and real GDP.

Variable Name & Worksheet Tab	Description
BOND	Forecasts for the quarterly average and annual average level of Moody's AAA corporate bond yield. Percentage points. Prior to 1990:Q4, this is the new, high-grade corporate bond yield (<i>Business Conditions Digest</i> variable 116).
BAABOND	Forecasts for the quarterly average and annual average level of Moody's BAA corporate bond yield. Percentage points.
TBOND	Forecasts for the quarterly average and annual average 10-year Treasury bond rate. Percentage points.
RGDP	Forecasts for the quarterly and annual level of real GDP. Seasonally adjusted, annual rate, base year varies. Prior to 1992, real GNP. Annual forecasts are for the annual average. Prior to 1981:Q3, RGDP is computed by using the formula $NGDP / PGDP * 100$.
RCONSUM	Forecasts for the quarterly and annual level of real personal consumption expenditures. Seasonally adjusted, annual rate, base year varies. Annual forecasts are for the annual average.
RNRESIN	Forecasts for the quarterly and annual level of real nonresidential fixed investment. Seasonally adjusted, annual rate, base year varies. Annual forecasts are for the annual average.
RRESINV	Forecasts for the quarterly and annual level of real residential fixed investment. Seasonally adjusted, annual rate, base year varies. Annual forecasts are for the annual average.
RFEDGOV	Forecasts for the quarterly and annual level of real federal government consumption and gross investment. Seasonally adjusted, annual rate, base year varies. Annual forecasts are for the annual average.
RSLGOV	Forecasts for the quarterly and annual level of real state and local government consumption and gross investment. Seasonally adjusted, annual rate, base year varies. Annual forecasts are for the annual average.
RCBI	Forecasts for the quarterly and annual level of real change in private inventories. Seasonally adjusted, annual rate, base year varies. Annual forecasts are for the annual average.
REXPORT	Forecasts for the quarterly and annual level of real net exports. Seasonally adjusted, annual rate, base year varies. Annual forecasts are for the annual average.
CPI5YR	Forecasts for the annual average rate of CPI inflation over the next 5 years. Percentage points.
PCE5YR	Forecasts for the annual average rate of PCE inflation over the next 5 years. Percentage points.
CPI10	Forecasts for the annual average rate of CPI inflation over the next 10 years. Percentage points.
PCE10	Forecasts for the annual average rate of PCE inflation over the next 10 years. Percentage points.

Variable Name & Worksheet Tab	Description
RGDP10	Forecasts for the annual average rate of growth in real GNP/GDP over the next 10 years. Percentage points.
PROD10	Forecasts for the annual average rate of growth in productivity over the next 10 years. Percentage points.
STOCK10	Forecasts for the annual average rate of return to equities (S&P 500) over the next 10 years. Percentage points.
BOND10	Forecasts for the annual average rate of return to 10-year Treasury bonds over the next 10 years. Percentage points.
BILL10	Forecasts for the annual average rate of return to three-month Treasury bills over the next 10 years. Percentage points.
CPI	Forecasts for the CPI <i>inflation rate</i> . Seasonally adjusted, annual rate, percentage points. Quarterly forecasts are annualized quarter-over-quarter percent changes. Annual forecasts are fourth-quarter over fourth-quarter percent changes.
CORECPI	Forecasts for the core CPI <i>inflation rate</i> . Seasonally adjusted, annual rate, percentage points. Quarterly forecasts are annualized quarter-over-quarter percent changes. Annual forecasts are fourth-quarter over fourth-quarter percent changes.
PCE	Forecasts for the PCE <i>inflation rate</i> . Seasonally adjusted, annual rate, percentage points. Quarterly forecasts are annualized quarter-over-quarter percent changes. Annual forecasts are fourth-quarter over fourth-quarter percent changes.
COREPCE	Forecasts for the core PCE <i>inflation rate</i> . Seasonally adjusted, annual rate, percentage points. Quarterly forecasts are annualized quarter-over-quarter percent changes. Annual forecasts are fourth-quarter over fourth-quarter percent changes.

Column Header Nomenclature and Forecast Horizons. The first two columns give the year and quarter in which the survey was conducted. The remaining columns give the forecasts. As you move across a given row, the columns give the forecast for a different quarterly or annual horizon. We distinguish among the horizons by appending “1” to “6” (quarterly forecasts) or “A” and “B” (annual-average forecasts) to a root name identifying the variable forecast. The number “1” represents the “forecast” for the quarter prior to the quarter in which the survey is conducted. The forecasters know the values of the variables for this quarter at the time they submit their projections. For example, for NIPA variables, these values are the Bureau of Economic Analysis’s (BEA) advance estimate for the quarter. The forecasters are permitted to forecast a revision to the BEA’s advance estimate but most do not. Thus, the data in this column correspond closely to the BEA’s advance estimate. The number “2” represents the forecast for the current quarter, defined as the quarter in which the

survey is conducted. The numbers “3” through “6” represent the forecasts for the four quarters after the current quarter. The letters “A” and “B” represent annual average forecasts for the current year (the year in which the survey is conducted) and the following year.

Beginning with the 2007:Q1 survey, we added three new inflation variables to the questionnaire: core CPI inflation, PCE inflation, and core PCE inflation. We also extended the annual forecast horizon by one year. For these three inflation variables and for CPI inflation, the letters “A”, “B”, and “C” represent fourth-quarter over fourth-quarter percent change (Q4/Q4) for the current year and the next two years.

Beginning with the 2010:Q1 survey, we extended the annual forecast horizon by two years for the civilian unemployment rate, three-month Treasury bill rate, 10-year Treasury bond rate, and real GDP. For these four variables, the letters “A”, “B”, “C”, and “D” represent annual average forecasts for the current year and the next three years.

Example. Table 3 gives an example of the forecast horizons included at three successive survey dates, 2005:Q3, 2005:Q4, and 2006:Q1. In the survey conducted in the third quarter of 2005, the forecasters knew the BEA’s advance estimate for 2005:Q2, and they provided quarterly forecasts for 2005:Q3 through 2006:Q3. Their projection for 2005:Q3 is a forecast for the current quarter because that is the quarter in which the forecasters are standing when they make their projections. (Some call this the one-step-ahead forecast while others call it the 0-step-ahead forecast.) The forecasters’ annual-average projections were for 2005 and 2006. Note two features about the format of our files. First, as you go down a particular column, you get the sequence of a given step-ahead forecast. For example, the column “NGDP2” gives the sequence of current-quarter forecasts. The column “NGDP6” gives the sequence of 5-step-ahead forecasts—if you count “NGDP2” as the one-step-ahead forecast. *Be careful about these sequences!* The forecasts for levels are always scaled to the base year in effect at the time the survey questionnaire was sent to the forecasters. Over time, as benchmark revisions to the data occur, the scale changes. (Additional information on base year changes is provided below.) Second, the years included in the annual forecasts (“A” and “B”) change in each first-quarter survey. In the surveys conducted from 2005:Q1 through 2005:Q4, for example, the forecasters provided annual average projections for the current year (2005) and the next year (2006). In the survey of 2006:Q1, the current year is 2006 and the next year is 2007, so the forecasters provided projections for those years.

Table 3. Example—Forecast Horizons for Nominal GDP at Three Survey Dates

	History	Quarterly Forecasts					Annual-Average Forecasts	
Survey Date ↓	NGDP1	NGDP2	NGDP3	NGDP4	NGDP5	NGDP6	NGDPA	NGDPB
2005:Q3	2005:Q2	2005:Q3	2005:Q4	2006:Q1	2006:Q2	2006:Q3	2005	2006
2005:Q4	2005:Q3	2005:Q4	2006:Q1	2006:Q2	2006:Q3	2006:Q4	2005	2006
2006:Q1	2005:Q4	2006:Q1	2006:Q2	2006:Q3	2006:Q4	2007:Q1	2006	2007

Changes in Base Year. There have been a number of changes of base year in the NIPA accounts since the survey began. As noted above, the forecasts for levels in our data set use the base year that was in effect when we sent the forecasters the survey questionnaire. In particular, we do not rescale the forecasts of previous surveys when there is a change in base year. **Table 4** provides the base year in effect for NIPA variables for each range of survey dates. There have also been a number of changes in the base year for the survey's forecasts for industrial production. These are documented in **Table 5**.

Table 4. Base Years for NIPA Variables in the Survey of Professional Forecasters

Range of Surveys	Base Year
1968:Q4 to 1975:Q4	1958
1976:Q1 to 1985:Q4	1972
1986:Q1 to 1991:Q4	1982
1992:Q1 to 1995:Q4 ⁴	1987
1996:Q1 to 1999:Q3 ⁵	1992
1999:Q4 to 2003:Q4	1996
2004:Q1 to 2009:Q2	2000
2009:Q3 to present	2005

⁴ In the survey of 1992:Q1, the survey's measure of output switches from GNP to GDP.

⁵ In the survey of 1996:Q1, the survey's measures of NIPA prices and quantities switches to chain-weighted measures.

Table 5. Base Years for Industrial Production in the Survey of Professional Forecasters

Range of Surveys	Base Year
1968:Q4 to 1971:Q3	1957-1959
1971:Q4 to 1985:Q2	1967
1985:Q3 to 1990:Q1	1977
1990:Q2 to 1996:Q4	1987
1997:Q1 to 2002:Q4	1992
2003:Q1 to 2005:Q4	1997
2006:Q1 to present	2002

Caveats on Breaks in the Historical Series and Additional Information for Selected Variables. The historical time series in this survey are quite lengthy. A limited number of series are subject to some discontinuities. This section documents these breaks and provides additional information for selected variables.

- **Moody's Corporate AAA Bond Yield (BOND).** This variable is inconsistent before 1990:Q4. Prior to the survey of 1990:Q4, the variable used was the new, high-grade corporate bond yield (*Business Conditions Digest* variable number 116.) This rate was generated at the U.S. Treasury primarily for internal use. The advantage of using it beginning in 1981:Q3 was that it was readily available. But many forecasters did not track this variable and, instead, sent in forecasts of closely related variables, such as Moody's AAA bond rate. The levels of these other variables may have differed by as much as 50 basis points. To eliminate this problem, we switched to using Moody's AAA bond rate in 1990:Q4, and now the forecasts are consistent.
- **Corporate Profits (CPROF).** This variable is inconsistent before 2006:Q1. Prior to the survey of 2006:Q1, it is corporate profits after tax, *excluding* IVA and CCAdj. The historical values of this particular measure are subject to large discrete jumps when there is a change in tax law affecting depreciation provisions. The time series of projections for this series in the Survey of Professional Forecasters may or may not capture the jumps in historical values, depending on whether the forecasters anticipated the corresponding changes in tax law. Beginning with the survey of 2006:Q1, we switched to the after tax measure that *includes* IVA and CCAdj.
- **Small Sample in the Survey of 1990:Q2.** The Philadelphia Fed took over the survey in the summer of 1990. We were too late to send out a survey in 1990:Q2. However, to avoid having a missing data point, we mailed a 1990:Q2 survey form along with the 1990:Q3 survey form. We asked that only those who had a written record of their forecasts of three months earlier fill out the 1990:Q2 survey. As a result, the number of respondents was only nine. We felt that even a small, after-the-fact sample was better than no sample at all.

- **Problem with Annual Forecasts and Probability Forecasts—Surveys 1985:Q1, 1986:Q1, and 1990:Q1.** Generally, annual forecasts pertain to the current year and the following year. However, an error was made in the first-quarter surveys of 1985 and 1986. In those quarters, for the first 19 variables listed above (excluding EMP), the first annual forecast is for the previous year and the second annual forecast is for the current year. However, we cannot be sure from the NBER's records whether the same is true for the probability variables PRGDP and PRPGDP. In addition, in the first quarter of 1990, for the same variables listed above, the same error was made, so that the first annual forecast is for the previous year and the second annual forecast is for the current year. The probability variables were done correctly in that survey, so they pertain to the current year and the following year.
- **Real GNP prior to the Survey of 1981:Q3.** The survey did not ask the panelists to forecast this variable prior to the survey of 1981:Q3. In order to provide a longer time series for this variable, we compute real GNP from 1968:Q4 to 1981:Q2 by using the formula $NGDP / PGDP * 100$. We compute the implied forecast for each panelist, then the means and medians.

3. Median and Mean Forecasts for Growth Rates

Two files contain median and mean forecasts for *growth* of selected survey variables: *MedianGrowth.xls* and *MeanGrowth.xls*. We construct these forecast growth rates by first computing the median or mean forecast for the level of the variable (X), as given in *MedianLevel.xls* and *MeanLevel.xls*. We then compute the rate of growth (g), using the formula

$$\hat{g}_{t+k|t-1} = 100 \left[\left(\frac{\hat{X}_{t+k|t-1}}{\hat{X}_{t+k-1|t-1}} \right)^4 - 1 \right], \quad k = 0, 1, \dots, 4$$

where $\hat{g}_{t+k|t-1}$ represents the forecast for quarter-over-quarter growth in period $t+k$ made on the basis of observations known through period $t-1$, and $\hat{X}_{t+k|t-1}$ represents the corresponding mean or median forecast for the level. Our notation makes use of the fact that a survey is conducted in quarter t , and the forecasters make their projections on the basis of historical observations dated $t-1$ and earlier. The (quarterly) projections are for periods $t, t+1, \dots, t+4$. Thus, when $k=0$, we have the forecast for growth in the current quarter, the quarter in which the survey was conducted. As explained above, $\hat{X}_{t-1|t-1} = X_{t-1}$, where X_{t-1} represents the historical value for the quarter before the survey quarter, as reported by government statistical agencies at the time the survey questionnaire is sent to the forecasters.⁶

An Example. Forecast growth rates are computed from the forecasts for levels in the files, *MedianLevel.xls* and *MeanLevel.xls*. Using the nomenclature for these files developed above, we can write the forecast for growth for nominal GDP in the current quarter and the next quarter as

$$\hat{g}_{t|t-1} = 100 \left[\left(\frac{NGDP2_t}{NGDP1_t} \right)^4 - 1 \right]$$

$$\hat{g}_{t+1|t-1} = 100 \left[\left(\frac{NGDP3_t}{NGDP2_t} \right)^4 - 1 \right]$$

while the forecast growth rate for the last quarter in the quarterly horizon of each survey is that given by

⁶ The forecasters are permitted to forecast a revision to the last quarter of history (X_{t-1}). Most do not. Thus, in almost all cases, $\hat{X}_{t-1|t-1} = X_{t-1}$.

$$\hat{g}_{t+4|t-1} = 100 \left[\left(\frac{NGDP6_t}{NGDP5_t} \right)^4 - 1 \right].$$

The format of our files of forecast growth rates parallels that described above for the forecasts of levels. Here are some important features.

- We provide forecast growth rates for the following variables: NGDP, PGDP, CPROF, EMP, INDPROD, HOUSING, RGDP, RCONSUM, RNRESIN, RRESINV, RFEDGOV, RSLGOV.
- Growth rates are those for quarter-over-quarter growth, expressed in annualized percentage points, beginning with the forecast for the current quarter.
- Each worksheet lists the year and quarter in which the survey was conducted.
- The column headers in each worksheet follow the same nomenclature described above. (We use “d” in the column header to denote a growth rate.) In particular, the number “2” appended to a column header represents a forecast for the quarter in which the survey is conducted. The numbers “3” to “6” represents the quarter-over-quarter growth rate forecasts for the following four quarters.
- Two worksheets are associated with the forecasts for the level of nonfarm payroll employment (EMP): EMP_AVG and EMP_PCG. The first (EMP_AVG) gives the implied forecast for the per month flow of new jobs, defined as the first difference of the forecast for the quarterly average level, divided by three. The second (EMP_PCG) gives the forecast growth rate, in annualized percentage points.

4. Forecasts of Individual Participants

Five files contain the individual responses of the forecasters: *Micro1.xls*, *Micro2.xls*, *Micro3.xls*, *Micro4.xls*, and *Micro5.xls*. Each file covers the surveys from a different period. **Table 6** shows the surveys covered in each file.

Table 6. Surveys Included in Each File of Individual Responses

File Name	Surveys Covered
Micro1.xls	1968:Q4 to 1979:Q4
Micro2.xls	1980:Q1 to 1989:Q4
Micro3.xls	1990:Q1 to 1999:Q4
Micro4.xls	2000:Q1 to 2009:Q4
Micro5.xls	2010:Q1 to present

With four exceptions, these files are organized in the same manner described above for the files of median and mean responses.

The first exception is that we include an additional column giving the forecaster's confidential identification number (ID). This column appears after the columns giving the year and quarter in which the survey was conducted. The identification numbers are consistent over time, allowing you to trace a given forecaster's responses from one survey to the next. See the section below for some caveats on using individual identification numbers.

The second exception is that we include another column giving the forecaster's industry classification (INDUSTRY). This column appears after the columns giving the year, quarter, and individual identification number. Each forecaster in each survey (1990Q2 to present) is assigned a "1," "2," or "3" for the industry classification depending on whether he works in a firm that we characterize as a financial service provider ("1") or a nonfinancial service provider ("2"). A value of "3" is used when we don't know the industry. A forecaster's classification can change when he changes his affiliation. In other words, we track the forecaster's classification in real time. See the section below for more information on the INDUSTRY column.

The third exception is that we include three new worksheet tabs in each workbook: PRGDP, PRPGDP, and RECESS. The worksheet (variable) PRGDP gives the probability that the annual-average over annual-average percent change in GDP falls in a particular range. The worksheet PRPGDP does the same for the GDP price index. The

percent changes are computed from the forecasts for annual-average levels. Please note that these two worksheets contain data that are very tricky to work with because: (1) the ranges change over time, (2) the number of annual forecast horizons changes over time, and (3) in early surveys, the output variable was nominal output, not real output. A section below discusses these points in detail. The worksheet RECESS gives the probability of a decline in the *level* of real GDP in the current quarter and the following four quarters. These are declines in the level of real GDP from one quarter to the next, beginning with a decline in the current quarter (the quarter in which the survey was conducted) compared with the quarter prior.

The fourth exception is that we include two additional worksheet tabs in *Micro4.xls*: PRCCPI and PRCPCE. The worksheet PRCCPI gives the probability that the *fourth-quarter over fourth-quarter* percent change in core CPI falls in a particular range. The worksheet PRCPCE gives the probability that the *fourth-quarter over fourth-quarter* percent change in core PCE falls in a particular range. Please note that these probability ranges are for growth in the current year (the year in which the survey was conducted) and the following year, as shown in Table 9.

Caveats on Using the Individual Identification Numbers

As noted above, the data set of individual responses is coded with an identification number for each forecaster. In principle, this identifier allows you to track an individual's responses over time. However, for two reasons, users of these data should exercise some caution in interpreting the identifiers. First, in the surveys conducted by the NBER/ASA, the same identification number could represent different forecasters. In these surveys, we have noticed some occurrences in which an individual participates, suddenly drops out of the panel for a large number of periods, and suddenly re-enters, suggesting that the same identifier might have been assigned to different forecasters. Unfortunately, we cannot investigate the historical record of these individuals because we do not have hard-copy historical records from the early surveys. Second, in the surveys conducted by the Philadelphia Fed, it can be difficult to assign an identification number to an individual who changes his place of employment but remains in the survey. The question is: Should the identification number follow the individual or should it remain with the original firm? Over the years, we have tried to use the following guideline in deciding: If a forecast seems associated more with the firm than the individual, the identification number stays with the firm, and we assign a new identification number to the individual. If the forecast seems more clearly associated with the panelist, the identification number follows the panelist to his new place of employment.

Classification of INDUSTRY Column

In the second half of 2007, we searched our computer files and hard copy records to retroactively classify the industry with which each panelist is affiliated, beginning with the survey in 1990:Q2 (the first SPF conducted by the Federal Reserve Bank of Philadelphia). Loosely speaking, we code the industry as a “1” for a financial service provider, “2” for a nonfinancial service provider, and “3” if we are uncertain. We took a very conservative approach in assigning 1’s and 2’s: we use “1” or “2” only when we are very certain. If we do not know the firm at which the panelist is employed, we code the INDUSTRY variables as “3.” Even when we know the firm, we sometimes code INDUSTRY as “3” if we have no information about the firm.

Below, we list examples of the types of firms that we code as “1” or “2.”

We assign a “1” to the following list of financial service providers:

1. Insurance
2. Investment Banking
3. Commercial Banking
4. Payment Services
5. Hedge Funds
6. Mutual Funds
7. Association of Financial Service Providers
8. Asset Management

We assign a “2” to the following list of nonfinancial service providers:

1. Manufacturers
2. Universities
3. Forecasting Firms
4. Investment Advisors
5. Pure Research Firms
6. Consulting Firms

5. One-Year-Ahead and 10-Year Average Inflation Forecasts

The file *Inflation.xls* contains expectations for one-year-ahead annual average inflation, measured either by the GDP price index (INFPGDP1YR) or the CPI (INFCPI1YR), and expectations for the annual average rate of CPI inflation over the next 10 years (INFCPI10YR).

The two one-year-ahead series are expectations for average inflation over the four quarters following the quarter in which the survey was conducted. We compute these series from the underlying median forecasts in the following manner. For INFPGDP1YR, we use the forecasts for the level of the price index in the columns PGDP2 and PGDP6 of the worksheet PGDP in the workbook MedianLevel.xls. For INFCPI1YR, we use the geometric average of the quarter-over-quarter median forecasts for CPI inflation, corresponding to the columns CPI3 to CPI6 of the worksheet CPI in the same workbook. The formulas are given by:

$$INFPGDP1YR_t = 100 \left[\left(\frac{PGDP6_t}{PGDP2_t} \right) - 1 \right]$$

and

$$INFCPI1YR_t = 100 \left\{ \left[\left(1 + \frac{CPI3_t}{100} \right) \left(1 + \frac{CPI4_t}{100} \right) \left(1 + \frac{CPI5_t}{100} \right) \left(1 + \frac{CPI6_t}{100} \right) \right]^{1/4} - 1 \right\}$$

The formulas differ—even though they measure a rate of change in the same way—because the forecasters provide their projections for the GDP price index in levels, but they report their forecasts for the CPI as quarter-over-quarter growth rates.

6. Mean Probability Forecasts

The file *Prob.xls* contains the mean responses for the survey's six probability variables in the following worksheets:

- The worksheet PRGDP gives the mean responses for the probability that the *annual-average over annual-average* percent change in GDP falls in a particular range.
- The worksheet PRPGDP does the same for the GDP price index.
- The worksheet PRCCPI gives the mean probability that the *fourth-quarter over fourth-quarter* percent change in core CPI falls in a particular range.
- The worksheet PRCPCE gives the mean probability that the *fourth-quarter over fourth-quarter* percent change in core PCE falls in a particular range.

(Note an important difference in the way that the probability ranges are defined for PRGDP and PRPGDP on the one hand and for PRCCPI and PRCPCE on the other. For PRGDP and PRPGDP, the probability ranges are for growth in the annual average level of GDP and the GDP price index. For PRCCPI and PRCPCE, the ranges are for fourth-quarter over fourth-quarter growth.)

- The worksheet PRUNEMP gives the mean probability that the *annual average* in the civilian unemployment rate falls in a particular range.
- The worksheet RECESS gives the mean responses for the probability of a decline in the *level* of real GDP in the current quarter and the following four quarters. These are declines in the level of real GDP from one quarter to the next, beginning with a decline in the current quarter (the quarter in which the survey was conducted) compared with the quarter prior.

PRGDP and PRPGDP

Note that, conceptually, the percent changes for these two variables are those for the annual-average levels. These two worksheets contain data that are very tricky to work with because: (1) the ranges change over time, (2) the number of annual forecast horizons changes over time, and (3) in early surveys, the output variable was nominal output, not real output. We provide additional details below. The variable PRGDP is the mean probability that the percent change in GDP falls in a particular range. From 1968:Q4 to 1981:Q2, this was the probability of nominal GNP falling in a particular range, while from 1981:Q3 to 1991:Q4, this variable refers to real GNP. From 1992:Q1 on, this variable refers to real GDP. Thus, over the entire history of the survey, this variable has switched from nominal to real and GNP to GDP. The variable PRPGDP is the mean probability that the percent change in the price index for GDP (for GNP prior to 1992:Q1) falls in a particular range. The ranges for both these variables have changed over time.

Major changes in these probability distribution questions occurred in the 1981:Q3 and 1992:Q1 surveys. The old version (prior to 1981:Q3) asked for the probability attached

to each of 15 possible percent changes in nominal GNP and the implicit deflator, usually from the previous year to the current year. The new version (1981:Q3 on) asks for percent changes in real GNP and the implicit deflator, usually for the current and following year. However, there are only six categories for each of the two years, instead of the 15 categories in the old version. Then, in 1992:Q1, the number of categories was changed to 10 for each of the two years, and output was changed from GNP to GDP.

As noted above, the probability variables prior to 1981:Q3 usually referred to percent changes for the current year. From 1981:Q3 and after, the two probability variables usually refer to the current year and the following year. However, there are some exceptions. In certain surveys prior to 1981:Q3, most often in the fourth quarter, the probability variables referred to the percent change in nominal GNP and the deflator in the following year, rather than the current year. The surveys for which this is true are 1968:Q4, 1969:Q4, 1970:Q4, 1971:Q4, 1972:Q3-Q4, 1973:Q4, 1975:Q4, 1976:Q4, 1977:Q4, 1978:Q4, and 1979:Q2-Q4. (For example, the probability ranges in the 1968:Q4 survey should pertain to growth in 1968, but in fact the survey asked about probabilities for growth in 1969.) In addition, we are uncertain about the years referred to in the surveys of the first quarters of 1985 and 1986 and have not found documentation that can confirm our suspicion that the years do not follow the standard of the current year and the following year. For surveys since 1990:Q2 (when the Philadelphia Fed took over the survey), the probability ranges always pertain to the current year and the following year.

Tables 7 – 8 show how the ranges have changed over the years.

PRCCPI and PRCPCE

These two variables were added in 2007:Q1. Note that the percent changes for these two variables are measured in fourth-quarter over fourth-quarter growth rates of the price indices.

Table 9 shows the probability ranges for PRCCPI and PRCPCE.

PRUNEMP

This variable was added in 2010:Q1. It is the probability that unemployment will fall into each of 10 ranges.

Table 10 shows the probability ranges for PRUNEMP.

RECESS. The variable RECESS is the probability of a decline in real GDP (real GNP prior to 1992:Q1) in the current quarter and the following four quarters. We label these RECESS1 to RECESS5. Please note that this is the probability of a decline in the *level* of real GDP from *one quarter to the next*. RECESS1, for example, refers to a decline in the current quarter from the previous quarter, and RECESS2 refers to a quarter-over-quarter decline in the next quarter. This is sometimes hard to explain to users of the data, but we

can provide precise content with the following probability statements, using the nomenclature established above for the quarterly forecasts for the level of real GDP:

$$\text{Recess1}_t = \text{Prob}(RGDP2_t < RGDP1_t)$$

$$\text{Recess2}_t = \text{Prob}(RGDP3_t < RGDP2_t)$$

⋮

$$\text{Recess5}_t = \text{Prob}(RGDP6_t < RGDP5_t)$$

where $\text{Prob}(x)$ is the probability of event x , and $RGDP2$ to $RGDP6$ are the quarterly forecasts for the level of real GDP in the current quarter ($RGDP2$) and the next four quarters. $RGDP1$ refers, of course, to the historical value for the quarter before the quarter in which the survey is conducted.

Table 7. Probability Ranges for PRPGDP (Prices)

Variable Number ↓	Survey Dates					
	1992:Q1 to Present	1985:Q2 to 1991:Q4	1981:Q3 to 1985:Q1	1974:Q4 to 1981:Q2	1973:Q2 to 1974:Q3	1968:Q4 to 1973:Q1
Ranges (Year-over-Year Percent Changes, Percentage Points)						
1	8+	10+	12+	16+	12+	10+
2	7 to 7.9	8 to 9.9	10 to 11.9	15 to 15.9	11 to 11.9	9 to 9.9
3	6 to 6.9	6 to 7.9	8 to 9.9	14 to 14.9	10 to 10.9	8 to 8.9
4	5 to 5.9	4 to 5.9	6 to 7.9	13 to 13.9	9 to 9.9	7 to 7.9
5	4 to 4.9	2 to 3.9	4 to 5.9	12 to 12.9	8 to 8.9	6 to 6.9
6	3 to 3.9	< 2	< 4	11 to 11.9	7 to 7.9	5 to 5.9
7	2 to 2.9	Same as 1 – 6 for next year	Same as 1 – 6 for next year	10 to 10.9	6 to 6.9	4 to 4.9
8	1 to 1.9			9 to 9.9	5 to 5.9	3 to 3.9
9	0 to 0.9			8 to 8.9	4 to 4.9	2 to 2.9
10	< 0			7 to 7.9	3 to 3.9	1 to 1.9
11	Same as 1 – 10 for next year			6 to 6.9	2 to 2.9	0 to 0.9
12				5 to 5.9	1 to 1.9	-1 to -0.1
13				4 to 4.9	0 to 0.9	-2 to -1.1
14				3 to 3.9	-1 to -0.1	-3 to -2.1
15				< 3	< -1	< -3
16				Not included	Not included	Not included
17	Not included	Not included	Not included			
18	Not included	Not included	Not included			
19	Not included	Not included	Not included			
20	Not included	Not included	Not included			

Table 8. Probability Ranges for PRGDP (Output)

Variable Number ↓	Survey Dates		
	1992:Q1 to 2009:Q4 (Real GDP)	1981:Q3 to 1991:Q4 (Real GNP)	1968:Q4 to 1981:Q2 (Nominal GNP)
	Ranges (Year-over-Year Percent Changes, Percentage Points)		
1	6+	6+	Same as PRPGDP
2	5 to 5.9	4 to 5.9	
3	4 to 4.9	2 to 3.9	
4	3 to 3.9	0 to 1.9	
5	2 to 2.9	-2 to -0.1	
6	1 to 1.9	< -2	
7	0 to 0.9	Same as 1 – 6 for next year	
8	-1 to -0.1		
9	-2 to -1.1		
10	< -2		
11	Same as 1 – 10 for next year		
12			
13			
14			
15			
16			
17			
18			
19			
20			

Variable Number ↓	Survey Dates
	2010:Q1 to Present (Real GDP)
	Ranges (Year-over-Year Percent Changes, Percentage Points)
1	6+
2	5 to 5.9
3	4 to 4.9
4	3 to 3.9
5	2 to 2.9
6	1 to 1.9
7	0 to 0.9
8	-1 to -0.1
9	-2 to -1.1
10	-3 to -2.1
11	<-3
12 to 22	Same as 1 – 11 for next year
23 to 33	Same as 1 – 11 for year 3
34 to 44	Same as 1 – 11 for year 4

Table 9. Probability Ranges for PRCCPI and PRCPCE

	Survey Dates	
Variable Number ↓	2007:Q1 to Present	
	Ranges (Fourth-Quarter over Fourth-Quarter Percent Changes)	
	PRCCPI	PRCPCE
1	4.0 or more	4.0 or more
2	3.5 to 3.9	3.5 to 3.9
3	3.0 to 3.4	3.0 to 3.4
4	2.5 to 2.9	2.5 to 2.9
5	2.0 to 2.4	2.0 to 2.4
6	1.5 to 1.9	1.5 to 1.9
7	1.0 to 1.4	1.0 to 1.4
8	0.5 to 0.9	0.5 to 0.9
9	0.0 to 0.4	0.0 to 0.4
10	Will decline	Will decline
11	Same as 1 – 10 for next year	Same as 1 – 10 for next year
12		
13		
14		
15		
16		
17		
18		
19		
20		

Table 10. Probability Ranges for PRUNEMP

	Survey Dates
Variable Number ↓	2010:Q1 to Present
	Ranges (Annual Average, Percent)
1	> 11.0
2	10.0 to 10.9
3	9.5 to 9.9
4	9.0 to 9.4
5	8.5 to 8.9
6	8.0 to 8.4
7	7.5 to 7.9
8	7.0 to 7.4
9	6.0 to 6.9
10	< 6.0
11 to 20	Same as 1 – 10 for next year
21 to 30	Same as 1 – 10 for year 3
31 to 40	Same as 1 – 10 for year 4

7. Presentation of Data by Individual Variable

In September 2008, we published an alternative way of presenting the SPF data on our website. The new arrangement presents the SPF data by individual variable. On the main index page (<http://www.philadelphiafed.org/research-and-data/real-time-center/survey-of-professional-forecasters/data-files/>), we group the data files into seven sub-groups:

- U.S. Business Indicators
- Real GDP and Its Components
- CPI and PCE Inflation
- Long-Term Inflation Forecasts
- Additional Long-Term Forecasts
- Probability on Ranges
- Anxious Index

This arrangement lets researchers find a particular variable quickly. Each SPF variable has its own web page to let users select the individual, mean, median, mean growth, or median growth responses for that particular variable. For example, by choosing the link Nominal Gross National Product/Gross Domestic Product (NGDP) from the main index page, a user can browse the page for NGDP (<http://www.philadelphiafed.org/research-and-data/real-time-center/survey-of-professional-forecasters/data-files/NGDP/>) and select the desired data. For some variables, we also provide links to the real-time data and the forecast error statistics.

8. Natural Rate of Unemployment (NAIRU)

In third-quarter surveys, we ask the forecasters to provide their estimates of the natural rate of unemployment (NAIRU). An important part of the analysis is the breakdown of the responses into two groups: (1) those who use the natural rate concept in preparing their forecasts, and (2) those who do not. The variable “DUMMY_UBAR” is coded as “1” for those who use the concept and “0” for those who do not. The variable “UBAR” is used to record the NAIRU forecasts. Our newsletter reports the median response for those who use the concept.

In October 2008, we added a new UBAR worksheet tab to each of the following Excel files:

1. *Micro1.xls*, *Micro2.xls*, *Micro3.xls*, and *Micro4.xls* for individual responses.
2. *MedianLevel.xls* and *MeanLevel.xls* for means and medians responses.

We have also produced three new Excel files for the UBAR variable:

1. *Individual_UBAR.xls*.
2. *Mean_UBAR_Level.xls*.
3. *Median_UBAR_Level.xls*

9. List of Changes to This Document

The table below lists the changes made to this document.

Date of Change	Description of Change
May 2008	INDUSTRY classification added in Section 4.
September 2008	Timing of the survey added in Section 1.
September 2008	Presentation of data by individual variable added in Section 7.
October 2008	Natural rate of unemployment (NAIRU) added in Section 8.
July 2009	Made minor changes to some narrative to reflect the BEA's July 2009 benchmark revision to the national income and product accounts.
November 2009	Extended RGDP series back to 1968:Q4. Previously, RGDP started in 1981:Q3.
January 2010	Added Moody's BAA corporate bond yield. Added two more years of annual forecasts for the civilian unemployment rate, three-month Treasury bill rate, 10-year Treasury bond rate, and real GDP. Added two additional years for probability of changes in real GDP. Added probability of civilian unemployment rates.

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