

Survey of  
**PROFESSIONAL**  
FORECASTERS

Federal Reserve Bank  
of Philadelphia

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## 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 variables have been in the survey since 1968:Q4; others were added in 1981:Q3. In recent years, we added the following variables.

- Beginning with the survey of 1992:Q1, we added long-term forecasts (10-year annual average) for real GDP growth, productivity growth, and rates on financial assets. The forecasts for these variables appear in first-quarter surveys only.
- In the survey of 2003:Q4, we added forecasts for nonfarm payroll employment.
- In the survey of 2007:Q1, we added forecasts for core CPI inflation, headline PCE inflation, and core PCE inflation.
- In the survey of 2009:Q2, we added density projections for the civilian unemployment rate. We also extended the annual forecast horizon two years for density projections for real GDP growth.
- In the survey of 2010:Q1, we added projections for the rate on Moody's BAA corporate bond yields.

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. Except as noted in the pages below, the format of the survey is the same as it was when we took it over. However, In recent years, we made the following changes to the forecast horizons.

- Beginning with the 2009:Q2 survey, we asked the forecasters to provide two more years of annual projections for the civilian unemployment rate and real GDP.
- Beginning with the 2009:Q3 survey, we asked the forecasters to provide two more years of annual projections for the rates on three-month Treasury bills rate and 10-year Treasury bonds.

This documentation provides information on the variables forecast and the format of the files. We begin with a listing and description of the files and the survey's timing. We then discuss the following topics.

- Section 2 discusses the organization of the files for median and mean forecasts for the levels of variables. We also document the names of the variables. Importantly, this section describes any caveats on particular survey variables.
- Section 3 discusses forecasts for growth rates. For most survey variables, we construct growth rates as the rate of growth in the mean or median forecast for the level. The exceptions are the headline and core CPI and PCE inflation rates, which enter the survey in growth-rate form. We express all growth rates in annualized percentage points.
- Section 4 discusses the files for individual forecasts. The organization of the files is the similar to that for the mean and median forecasts. Important caveats exist in using the individual responses.
- 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 density projections.
- Section 7 discusses an alternative way of presenting the data by the variable forecast.
- Section 8 discusses the files containing the projections for the natural rate of unemployment (NAIRU). This variable enters the survey only in the third quarter.
- Section 9 discusses the data files and our computations for cross-sectional forecast dispersion.
- Section 10 discusses implied forecasts for 21 variables that do not directly enter the survey. This includes projections for interest-rate term spreads, real interest rates, and forward inflation rates.
- Section 11 lists the changes made to this document.

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

**Table 1. Overview - Files and Contents**

Name of File	Brief Description of Contents
<b>MedianLevel.xls</b>	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.
<b>MeanLevel.xls</b>	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.
<b>MedianGrowth.xls</b>	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.
<b>MeanGrowth.xls</b>	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.
<b>Prob.xls</b>	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.
<b>Dispersion_1.xls</b>	An Excel workbook with multiple worksheets. Each worksheet holds the time series of forecast <i>dispersion</i> for the level of a different variable. The <i>dispersion</i> measure is defined as the difference between the 75th percentile and the 25th percentile of the projections in levels. The first column lists the year and quarter in which the survey was conducted. The remaining columns give the forecast <i>dispersion</i> for all quarterly horizons. We provide this measure of dispersion only for the variables for which it makes the most sense.
<b>Dispersion_2.xls</b>	An Excel workbook with multiple worksheets. Each worksheet holds the time series of forecast <i>dispersion</i> for the Q/Q growth (annualized percentage points) of a different variable. The <i>dispersion</i> measure is defined as the difference between the 75th percentile and the 25th percentile of the projections for Q/Q growth, expressed in annualized percentage points. The first column lists the year and quarter in which the survey was conducted. The remaining columns give the forecast <i>dispersion</i> for all quarterly horizons. We provide this measure of dispersion only for the variables for which it makes the most sense.
<b>Dispersion_3.xls</b>	An Excel workbook with multiple worksheets. Each worksheet holds the time series of forecast <i>dispersion</i> for the log difference of the levels of a different variable. The dispersion measure is defined as the percent difference (in percentage

Name of File	Brief Description of Contents
	points) between the 75th percentile and the 25th percentile of the projections in levels. The first column lists the year and quarter in which the survey was conducted. The remaining columns give the forecast <i>dispersion</i> for all quarterly horizons. We provide this measure of dispersion only for the variables for which it makes the most sense.
<b>Micro1.xls to Micro5.xls</b>	Four Excel workbooks, each with multiple worksheets. These are the files of individual forecasts: <b>Micro1.xls</b> covers surveys conducted over the period 1968:Q4 to 1979:Q4; <b>Micro2.xls</b> covers 1980:Q1 to 1989:Q4; <b>Micro3.xls</b> covers 1990:Q1 to 1999:Q4; <b>Micro4.xls</b> covers 2000:Q1 to 2009:Q4; and <b>Micro5.xls</b> 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).
<b>Inflation.xls</b>	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. We now discuss several topics related to the survey's timing. The topics are:

- Information sets and deadlines;
- Survey release dates;
- Timing of surveys prior to the 1990:Q2 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. The survey's 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.

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 production 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.)

***Survey 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 accounts<sup>1</sup>.

***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.

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<sup>1</sup> 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.

However, because we are uncertain about the ASA/NBER's timing, 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***

<b><i>Survey Name</i></b>	<b><i>Questionnaires Sent to Panelists</i></b>	<b><i>Last Quarter of History in the Panelists' Information Sets</i></b>	<b><i>Date of Deadline for Submissions<sup>2</sup></i></b>	<b><i>Results Released to the Public</i></b>
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)

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<sup>2</sup> 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](http://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.<sup>3</sup> 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.

In July 2012, we added forecasts for some variables that do not appear directly in the survey. We construct these "implied forecasts" as linear combinations of the forecasts for variables in the survey. Examples are forecasts for real interest rates, the spread between various interest rates, and five-year forward, five-year annual-average inflation rates. **Table 2A** lists the variables for which we compute "implied forecasts."

**Table 2. Variables Forecast in the Survey**

Variable Name & Worksheet Tab	Description
<b>NGDP</b>	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.
<b>PGDP</b>	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.
<b>CPROF</b>	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.
<b>UNEMP</b>	Forecasts for the quarterly average and annual average unemployment rate. Seasonally adjusted, percentage points.
<b>EMP</b>	Forecasts for the quarterly average and annual average level of nonfarm payroll employment. Seasonally adjusted, thousands of jobs.

<sup>3</sup> 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
<b>INDPROD</b>	Forecasts for the quarterly average and annual average level of the index of industrial production. Seasonally adjusted, index, base year varies.
<b>HOUSING</b>	Forecasts for the quarterly average and annual average level of housing starts. Seasonally adjusted, annual rate, millions.
<b>TBILL</b>	Forecasts for the quarterly average and annual average three-month Treasury bill rate. Percentage points.
<b>BOND</b>	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).
<b>BAABOND</b>	Forecasts for the quarterly average and annual average level of Moody's BAA corporate bond yield. Percentage points.
<b>TBOND</b>	Forecasts for the quarterly average and annual average 10-year Treasury bond rate. Percentage points.
<b>RGDP</b>	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 $NGDP / PGDP * 100$ .
<b>RCONSUM</b>	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.
<b>RNRESIN</b>	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.
<b>RRESINV</b>	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.
<b>RFEDGOV</b>	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.
<b>RSLGOV</b>	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.
<b>RCBI</b>	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.
<b>REXPORT</b>	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.
<b>CPI5YR</b>	Forecasts for the annual average rate of CPI inflation over the next 5 years. Percentage points.

Variable Name & Worksheet Tab	Description
<b>PCE5YR</b>	Forecasts for the annual average rate of PCE inflation over the next 5 years. Percentage points.
<b>CPI10</b>	Forecasts for the annual average rate of CPI inflation over the next 10 years. Percentage points.
<b>PCE10</b>	Forecasts for the annual average rate of PCE inflation over the next 10 years. Percentage points.
<b>RGDP10</b>	Forecasts for the annual average rate of growth in real GNP/GDP over the next 10 years. Percentage points. First-quarter surveys only.
<b>PROD10</b>	Forecasts for the annual average rate of growth in productivity over the next 10 years. Percentage points. First-quarter surveys only.
<b>STOCK10</b>	Forecasts for the annual average rate of return to equities (S&P 500) over the next 10 years. Percentage points. First-quarter surveys only.
<b>BOND10</b>	Forecasts for 10-year annual-average yield on 10-year constant maturity Treasury bonds. Percentage points. First-quarter surveys only.  The phrasing of the question for this variable changed in the survey of 2014:Q1. This change may or may not cause a structural break in the time series of responses. For additional details, see the section below on caveats.
<b>BILL10</b>	Forecasts for the annual average rate of return to three-month Treasury bills over the next 10 years. Percentage points. First-quarter surveys only.
<b>CPI</b>	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.
<b>CORECPI</b>	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.
<b>PCE</b>	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.
<b>COREPCE</b>	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.

**Table 2A. Variables For Which We Compute Implied Forecasts**

*These variables do not appear directly in the survey. Rather, we compute the implied forecasts using linear combinations of the projections for variables in the survey. The section entitled "Implied Forecasts" provides extensive documentation on our methods.*

<b>Variable Name &amp; Worksheet Tab</b>	<b>Description</b>
<b>SPR_TBOND_TBILL</b>	(Implied) Forecasts for the spread between the nominal rate on 10-year Treasury bonds and the nominal rate on three-month Treasury bills. Annualized percentage points.
<b>SPR_BAA_AAA</b>	(Implied) Forecasts for the spread between the nominal rate on Moody's BAA bonds and the nominal rate on Moody's AAA bonds. Annualized percentage points.
<b>SPR_BAA_TBOND</b>	(Implied) Forecasts for the spread between the nominal rate on Moody's BAA bonds and the nominal rate on 10-year Treasury bonds. Annualized percentage points.
<b>SPR_AAA_TBOND</b>	(Implied) Forecasts for the spread between the nominal rate on Moody's AAA bonds and the nominal rate on 10-year Treasury bonds. Annualized percentage points.
<b>RR1_TBILL_PGDP RR2_TBILL_PGDP RR3_TBILL_PGDP</b>	(Implied) Forecasts for the real rate on three-month Treasury bills using forecasts for GNP/GDP inflation. Annualized percentage points.  See the section on "Implied Forecasts" for additional information.
<b>RR1_TBILL_CPI RR2_TBILL_CPI RR3_TBILL_CPI</b>	(Implied) Forecasts for the real rate on three-month Treasury bills using forecasts for headline CPI inflation. Annualized percentage points.  See the section on "Implied Forecasts" for additional information.
<b>RR1_TBILL_CCPI RR2_TBILL_CCPI RR3_TBILL_CCPI</b>	(Implied) Forecasts for the real rate on three-month Treasury bills using forecasts for core CPI inflation. Annualized percentage points.  See the section on "Implied Forecasts" for additional information.
<b>RR1_TBILL_PCE RR2_TBILL_PCE RR3_TBILL_PCE</b>	(Implied) Forecasts for the real rate on three-month Treasury bills using forecasts for headline PCE inflation. Annualized percentage points.  See the section on "Implied Forecasts" for additional information.
<b>RR1_TBILL_CPCE RR2_TBILL_CPCE RR3_TBILL_CPCE</b>	(Implied) Forecasts for the real rate on three-month Treasury bills using forecasts for core PCE inflation. Annualized percentage points.  See the section on "Implied Forecasts" for additional information.
<b>CPIF5</b>	Five-year forward, five-year annual-average CPI inflation.

Variable Name & Worksheet Tab	Description
	Annualized percentage points.
<b>PCEF5</b>	Five-year forward, five-year annual-average PCE inflation. Annualized percentage points.

**File Structure: Column Header Nomenclature and Forecast Horizons.** We organize the files by the date of the survey. Each row gives the projections from a different survey. 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 2009:Q2 survey, we extended the annual forecast horizon by two years for the civilian unemployment rate and real GDP. Beginning with the 2009:Q3 survey, we extended the annual forecast horizon by two years for the three-month Treasury bill rate and 10-year Treasury bond rate. 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 quarterly 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 or the nowcast.) The forecasters' annual-average projections were those for 2005 and 2006.

Note two features about the format of our files. First, as you move down a particular column, you get the sequence of a given step-ahead forecast. For example, the column labeled NGDP2 gives the sequence of current-quarter (or nowcast) forecasts. The column labeled 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 that was in effect at the time of the survey. Over time, as benchmark revisions to the data occur, the scale changes. (Below, we provide additional information on base years.)

Second, the years included in the annual forecast horizon ("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**

Survey Date (Year, Quarter)		Quarterly Historical Value	Quarterly Projections: Quarter Forecast					Annual-Average Projections: Year Forecast	
(1) Year	(2) Quarter	(3) NGDP1	(4) NGDP2	(5) NGDP3	(6) NGDP4	(7) NGDP5	(8) NGDP6	(9) NGDPA	(10) NGDPB
2005	3	2005:Q2	2005:Q3	2005:Q4	2006:Q1	2006:Q2	2006:Q3	2005	2006
2005	4	2005:Q3	2005:Q4	2006:Q1	2006:Q2	2006:Q3	2006:Q4	2005	2006
2006	1	2005:Q4	2006:Q1	2006:Q2	2006:Q3	2006:Q4	2007:Q1	2006	2007

**Table notes.** The table shows how we organize the survey's median (or mean) responses for three survey dates: 2005:Q3, 2005:Q4, and 2006:Q1. The entries in columns (1) - (2) show the year and quarter when we conducted the survey. The entry in column (3) shows the observation date for the last known historical quarter at the time we sent the questionnaire to the panelists. The entries in columns (4) - (8) show the quarterly observation dates forecast. The entries in columns (9) - (10) show the annual observation dates forecast.

At each survey date, we record the projections for various horizons in the same row. **NGDP1** is the real-time quarterly historical value for the previous quarter—that is, the quarter before the quarter when we conducted the survey. **NGDP2** is the forecast (nowcast) for the current quarter—that is, the quarter when we conducted the survey. **NGDP3 to NGDP6** are the forecasts for the following four quarters. **NGDPA and NGDPB** are the annual-average projections for the current year (the year when we conducted the survey) and the following year.

**Changes in Base Year.** There have been a number of changes of base year in the national income and product accounts (NIPA) 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. The base year for the survey's forecasts for industrial production has also changed over time. These base years appear 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 <sup>4</sup>	1987
1996:Q1 to 1999:Q3 <sup>5</sup>	1992
1999:Q4 to 2003:Q4	1996
2004:Q1 to 2009:Q2	2000
2009:Q3 to 2013:Q2	2005
2013:Q3 to present	2009

**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 2010:Q2	2002
2010:Q3 to present	2007

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

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

**Caveats: Breaks in the Historical Series of Projections 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.
- **Long-Term Forecasts for the Yield on 10-Year Constant-Maturity Treasury Bonds (BOND10).** Beginning with the survey of 2014:Q1, we changed the way in which we ask the forecasters for their long-term (10-year annual average) forecast for the yield on 10-year constant-maturity Treasury bonds. We made the change because the question had always been ambiguously phrased. Such ambiguity might produce difficulties in interpreting the survey's responses. This change may or may not affect the way in which the panelists answer the question. Note that this variable (BOND10) enters the survey only in the first quarter of the year. However, each quarter the survey asks for short-term projections for the 10-year Treasury rate.
  - In first-quarter surveys prior to that of 2014:Q1: We asked the forecasters for their expectation of the "annual average over the next 10 years of the return to 10-year Treasury bonds." This could mean: (1) The return to buying a 10-year Treasury bond on the survey date and holding it until maturity; or (2) The 10-year average return to buying a 10-year Treasury bond every day (or month or quarter) over the next 10 years and holding each bond until maturity. [The second interpretation is somewhat more consistent with the survey's overall design because the SPF has always asked for quarterly projections for the 10-year Treasury rate (nowcast and next four quarters) and annual-average projections (current year and future years).]
  - In first-quarter surveys beginning with that of 2014:Q1: We ask the forecasters for their expectation of the "annual average yield on 10-year constant-maturity Treasury bonds over the next 10 years." We also make it clear that we mean the average of a panelist's projections for the current year and the following nine years and that the long-term survey projection should be consistent with the short-term survey projection for the current year and the following three years.

### 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.<sup>6</sup>

**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

$$\begin{aligned} \hat{g}_{t|t-1} &= 100 \left[ \left( \frac{NGDP2_t}{NGDP1_t} \right)^4 - 1 \right] \\ \hat{g}_{t+1|t-1} &= 100 \left[ \left( \frac{NGDP3_t}{NGDP2_t} \right)^4 - 1 \right] \end{aligned}$$

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

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<sup>6</sup> 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 noteworthy 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.

- **First Exception.** 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.
- **Second Exception.** 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.
- **Third Exception.** 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.

- **Fourth Exception.** The fourth exception is that we include two additional worksheet tabs in *Micro4.xls* and *Micro5.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, we code the data set of individual responses 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.

## **INDUSTRY Classification**

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-Ahead 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 when we conducted the survey. 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:

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

- **PRUNEMP.** The worksheet PRUNEMP gives the mean probability that the *annual average* in the civilian unemployment rate falls in a particular range.
- **RECESS.** 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:

- The ranges change over time.
- The number of annual forecast horizons changes over time.
- In early surveys, the output variable was nominal output, not real output.

Some details follow. 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. In 2009:Q2, the number of categories was changed to 11 and two additional years of annual forecast were added.

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 to the survey 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 to the survey in 2009:Q2. 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:

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

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

$$\vdots$$

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

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)**

	Survey Dates					
Variable Number ↓	1992:Q1 to 2013:Q4	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

Variable Number ↓	Survey Dates	
	2014:Q1 to Present	
	Ranges (Year-over-Year Percent Changes, Percentage Points)	
1	4.0 or more	
2	3.5 to 3.9	
3	3.0 to 3.4	
4	2.5 to 2.9	
5	2.0 to 2.4	
6	1.5 to 1.9	
7	1.0 to 1.4	
8	0.5 to 0.9	
9	0.0 to 0.4	
10	Will decline	
11	Same as 1 – 10 for next year	
12		
13		
14		
15		
16		
17		
18		
19		
20		

**Table 8. Probability Ranges for PRGDP (Output)**

	Survey Dates		
Variable Number ↓	1992:Q1 to 2009:Q1 (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	
	2009:Q2 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**

	<b>Survey Dates</b>	
Variable Number ↓	<b>2007:Q1 to Present</b>	
	<b>Ranges (Fourth-Quarter over Fourth-Quarter Percent Changes)</b>	
	<b>PRCCPI</b>	<b>PRCPCE</b>
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**

	<b>Survey Dates</b>	
Variable Number ↓	<b>2014:Q1 to Present</b>	<b>2009:Q2 to 2013:Q4</b>
	<b>Ranges (Annual Average, Percent)</b>	
1	> 9.0	> 11.0
2	8.0 to 8.9	10.0 to 10.9
3	7.5 to 7.9	9.5 to 9.9
4	7.0 to 7.4	9.0 to 9.4
5	6.5 to 6.9	8.5 to 8.9
6	6.0 to 6.4	8.0 to 8.4
7	5.5 to 5.9	7.5 to 7.9
8	5.0 to 5.4	7.0 to 7.4
9	4.0 to 4.9	6.0 to 6.9
10	< 4.0	< 6.0
11 to 20	Same as 1 – 10 for next year	Same as 1 – 10 for next year
21 to 30	Same as 1 – 10 for year 3	Same as 1 – 10 for year 3
31 to 40	Same as 1 – 10 for year 4	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. Cross-Sectional Forecast Dispersion

We organize the files for cross-sectional measures of forecast dispersion in two ways: By dispersion measure and by individual variable.

### Files Organized By Measure of Dispersion

The files *Dispersion\_1.xls*, *Dispersion\_2.xls*, and *Dispersion\_3.xls* contain the cross-sectional forecast dispersion for selected survey variables. Each file corresponds to a different measure of dispersion. The three files are organized in the same manner. Each is an Excel workbook containing multiple worksheets, with each worksheet containing the forecast dispersion 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 first column in each worksheet gives the year and quarter in which the survey was conducted. The remaining columns give the forecast dispersion. As you move across a given row, the columns give the forecast dispersion for current quarter (T) and the following four quarters (T+1, ... , T+4).

Please note that not all dispersion measures are available for each survey variable. In particular, we avoid measures that are influenced by arbitrary changes in the scale of the data, such as those that arise when the base year changes in a benchmark revision.

For most survey variables, we use “level” to refer to the level of the variable — for example, the level of real GDP in chain-weighted dollars. However, for CPI and PCE inflation, we define the level as a quarter-over-quarter (Q/Q) growth rate, in annualized percentage points, because the forecasters provide their projections for these variables in growth rates.

We construct *Dispersion\_1.xls* by first computing the 75th percentile and the 25th percentile of the forecasts for the level of the variable (X). We then compute dispersion measure *D1* as the difference between the 75th percentile and the 25th percentile, using the formula

$$X\_D1_{t+k|t-1} = \hat{X}(75th)_{t+k|t-1} - \hat{X}(25th)_{t+k|t-1}, \quad k = 0, 1, \dots, 4$$

where  $X\_D1_{t+k|t-1}$  represents the inter-quartile forecast dispersion for the level of the variable X in period  $t+k$  made on the basis of observations known through period  $t-1$ , and  $\hat{X}(75th)_{t+k|t-1}$  and  $\hat{X}(25th)_{t+k|t-1}$  represent the corresponding 75<sup>th</sup> and 25<sup>th</sup> percentiles for the level forecasts. 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.

We construct *Dispersion\_2.xls* by first computing the 75th percentile and the 25th percentile of the projections for Q/Q growth (in annualized percentage points) of the variable (X). We then compute dispersion measure *D2* as the difference between the 75th percentile and the 25th percentile of the Q/Q growth forecasts, using the formula

$$X\_D2_{t+k|t-1} = \hat{g}_X(75th)_{t+k|t-1} - \hat{g}_X(25th)_{t+k|t-1}, \quad k = 0, 1, \dots, 4$$

where  $X\_D2_{t+k|t-1}$  represents the inter-quartile forecast dispersion for the Q/Q growth ( $g_X$ ) of the variable  $X$  in period  $t+k$  made on the basis of observations known through period  $t-1$ , and  $\hat{g}_X(75th)_{t+k|t-1}$  and  $\hat{g}_X(25th)_{t+k|t-1}$  represent the corresponding 75<sup>th</sup> and 25<sup>th</sup> percentiles for the Q/Q growth forecasts.

We construct *Dispersion\_3.xls* by first computing the 75th percentile and the 25th percentile for the level of the variable ( $X$ ). We then compute dispersion measure  $D3$  as the percent difference between the 75th percentile and the 25th percentile of the projections in levels, using the formula

$$X\_D3_{t+k|t-1} = 100 * (\log \hat{X}(75th)_{t+k|t-1} - \log \hat{X}(25th)_{t+k|t-1}), \quad k = 0, 1, \dots, 4$$

where  $X\_D3_{t+k|t-1}$  represents the inter-quartile forecast dispersion for the percent difference between the 75th percentile and the 25th percentile of the projections in level of the variable  $X$  in period  $t+k$  made on the basis of observations known through period  $t-1$ , and  $\log \hat{X}(75th)_{t+k|t-1}$  and  $\log \hat{X}(25th)_{t+k|t-1}$  represent the corresponding natural logarithms of the 75<sup>th</sup> and 25<sup>th</sup> percentiles for the level.

### Files Organized By Individual Variable

We also construct an alternative way of presenting the forecast dispersion data. In this arrangement, each SPF variable has its own file (Excel workbook) to let users select different measures of cross-sectional forecast dispersion ( $D1$ ,  $D2$ , and  $D3$ ) for that particular variable. Each Excel workbook contains up to three worksheets, with each worksheet containing a different dispersion measure for a particular variable. You move among the worksheets by choosing the appropriate tab at the bottom. These tabs refer to the  $D1$ ,  $D2$ , and  $D3$  measures of dispersion (described above). The first column in each worksheet gives the year and quarter in which the survey was conducted. The remaining columns give the forecast dispersion. As you move across a given row, the columns give the forecast dispersion for the current quarter ( $T$ ) and the following four quarters ( $T+1$ , ... ,  $T+4$ ).

Please note that not all dispersion measures are available for each survey variable. In particular, we avoid measures that are influenced by arbitrary changes in the scale of the data, such as those that arise when the base year changes in a benchmark revision.

For most survey variables, we use the “level” to refer to the level of the variable — for example, the level of real GDP in chain-weighted dollars. However, for CPI and PCE inflation, we define the level as a quarter-over-quarter (Q/Q) growth rate, in annualized percentage points, because the forecasters provide their projections for these variables in growth rates.

## 10. Implied Forecasts

**Overview.** In August 2012, we released the projections for 21 new variables. These new variables do not appear directly in the survey. Rather, we compute the projections as linear combinations of the forecasts for variables already in the survey. For this reason, we refer to the new projections as "implied forecasts." We compute the implied forecasts for:

- Yield spreads
- Forward inflation rates, and
- Real interest rates.

For the new variables listed below, we compute each panelist's implied forecast at each survey date and forecast horizon. Then, for each survey, we compute the cross-sectional mean forecasts, the cross-sectional median forecasts, and measures of dispersion. (A previous section provides more information on measures of dispersion.)

The table below describes the variables for which we compute implied forecasts.<sup>7</sup>

### *The Implied Forecasts Cover These Variables*

<i>Yield Spreads (Annualized Percentage Points)</i>	
1. SPR_TBOND_TBILL	Nominal Rate on 10-Year Treasury Bonds Minus Nominal Rate on 3-Month Treasury Bills
2. SPR_BAA_AAA	Nominal Rate on Moody's BAA Corporate Bonds Minus Nominal Rate on Moody's AAA Corporate Bonds
3. SPR_BAA_TBOND	Nominal Rate on Moody's BAA Corporate Bonds Minus Nominal Rate on 10-Year Treasury Bonds
4. SPR_AAA_TBOND	Nominal Rate on Moody's AAA Corporate Bonds Minus Nominal Rate on 10-Year Treasury Bonds
<i>Forward Inflation Rates (Annualized Percentage Points)</i>	
5. CPIF5	5-Year Forward 5-Year Annual-Average Headline CPI Inflation Rate
6. PCEF5	5-Year Forward 5-Year Annual-Average Headline PCE Inflation Rate
<i>Real Interest Rates: Nominal Rate on 3-Month Treasury Bills Minus GDP Price Inflation (Annualized Percentage Points)</i>	
7. RR1_TBILL_PGDP	3-Month Treasury Bill Minus By Same-Quarter GDP Price Inflation
8. RR2_TBILL_PGDP	3-Month Treasury Bill Minus Next-Quarter GDP Price Inflation
9. RR3_TBILL_PGDP	3-Month Treasury Bill Minus Average of Same-Quarter GDP Price Inflation and Next-Quarter GDP Price Inflation

<sup>7</sup> The discussion of this section covers the survey's forecasts at quarterly horizons. The quarterly horizons cover the current quarter (that is, the quarter when we conduct the survey) and the four quarters following the current quarter. The survey also produces forecasts at annual horizons. (See "Median and Mean Forecasts for Levels" for more information on the annual forecast horizons.) The implied forecasts for yield spreads are available at these annual horizons.

(Continued) *The Implied Forecasts Cover These Variables*

<i>Real Interest Rates: Nominal Rate on 3-Month Treasury Bills Minus Headline CPI Inflation (Annualized Percentage Points)</i>	
10. RR1_TBILL_CPI	3-Month Treasury Bill Minus Same-Quarter CPI Inflation
11. RR2_TBILL_CPI	3-Month Treasury Bill Minus Next-Quarter CPI Inflation
12. RR3_TBILL_CPI	3-Month Treasury Bill Minus Average of Same-Quarter CPI Inflation and Next-Quarter CPI Inflation
<i>Real Interest Rates: Nominal Rate on 3-Month Treasury Bills Minus Core CPI Inflation (Annualized Percentage Points)</i>	
13. RR1_TBILL_CCPI	3-Month Treasury Bill Minus Same-Quarter Core CPI Inflation
14. RR2_TBILL_CCPI	3-Month Treasury Bill Minus Next-Quarter Core CPI Inflation
15. RR3_TBILL_CCPI	3-Month Treasury Bill Minus Average of Same-Quarter Core CPI Inflation and Next-Quarter Core CPI Inflation
<i>Real Interest Rates: Nominal Rate on 3-Month Treasury Bills Minus Headline PCE Inflation (Annualized Percentage Points)</i>	
16. RR1_TBILL_PCE	3-Month Treasury Bill Minus Same-Quarter PCE Inflation
17. RR2_TBILL_PCE	3-Month Treasury Bill Minus Next-Quarter PCE Inflation
18. RR3_TBILL_PCE	3-Month Treasury Bill Minus Average of Same-Quarter PCE Inflation and Next-Quarter PCE Inflation
<i>Real Interest Rates: Nominal Rate on 3-Month Treasury Bills Minus Core PCE Inflation (Annualized Percentage Points)</i>	
19. RR1_TBILL_CPCE	3-Month Treasury Bill Minus Same-Quarter Core PCE Inflation
20. RR2_TBILL_CPCE	3-Month Treasury Bill Minus Next-Quarter Core PCE Inflation
21. RR3_TBILL_CPCE	3-Month Treasury Bill Minus Same-Quarter Core PCE Inflation and Next-Quarter Core PCE Inflation

**Computations for Implied Forecasts.** We begin by defining the existing survey variables that we use to construct the implied forecasts. These variables enter the survey directly. The table below provides the definitions.

Now, let  $t$  index a quarterly survey date.

Also, let  $x_{t+\tau|t-1}$ ,  $\tau = -1, 0, 1, \dots, 4$ , denote a panelist's forecast for the quarterly value that variable  $x$  will take in period  $t + \tau$ , as reported in the survey of period  $t$ , with quarterly historical values known through period  $t - 1$ . (For simplicity, we suppress the use of subscripts to distinguish one panelist's projection from another's.)

For example,  $x_{t|t-1}$  denotes the current-quarter forecast (or nowcast) for quarter  $t$  in the survey of quarter  $t$ , and  $x_{t+1|t-1}$  denotes the corresponding forecast for the quarter after the nowcast quarter. Note that  $x_{t-1|t-1}$  represents the last quarter of history in the forecasters' information set when they form their projections for the survey of period  $t$ . (As noted above, the forecasters are permitted to forecast a revision to the last quarterly historical value, but most do not.)

*Component Variables Used in Computing the Implied Forecasts  
(Various Quarterly Forecast Horizons Indicated)*

<i>Long Name</i>	<i>Survey Name (Forecast Horizon Indicated as 1,...,6)</i>	<i>Mathematical Notation (Forecast Horizon: <math>\tau = -1, 0, \dots, 4</math>)</i>
Nominal Rate on 3-Month Treasury Bills (annualized percentage points)	TBILL1 ,..., TBILL6	$TBILL_{t+\tau t-1}$
Nominal Rate on 10-Year Treasury Bonds (annualized percentage points)	TBOND1,...,TBOND6	$TBOND_{t+\tau t-1}$
Nominal Rate on Moody's AAA Bonds (annualized percentage points)	BOND1,...,BOND6	$BOND_{t+\tau t-1}$
Nominal Rate on Moody's BAA Bonds (annualized percentage points)	BAABOND1,...,BAABOND6	$BAABOND_{t+\tau t-1}$
GNP/GDP Price Level	PGDP1,...,PGDP6	$PGDP_{t+\tau t-1}$
Q/Q Rate of Change in the Quarterly-Average Headline CPI Level (annualized percentage points)	CPI1,...,CPI6	$CPI_{t+\tau t-1}$
Q/Q Rate of Change in the Quarterly-Average Core CPI Level (annualized percentage points)	CoreCPI1,...,CoreCPI6	$CORECPI_{t+\tau t-1}$

*(Continued) Component Variables Used in Computing the Implied Forecasts  
(Various Quarterly Forecast Horizons Indicated)*

<i>Long Name</i>	<i>Survey Name (Forecast Horizon Indicated as 1,...,6)</i>	<i>Mathematical Notation (Forecast Horizon: <math>\tau = -1, 0, \dots, 4</math>)</i>
Q/Q Rate of Change in the Quarterly-Average Headline PCE Price Index Level (annualized percentage points)	PCE1,...,PCE6	$PCE_{t+\tau t-1}$
Q/Q Rate of Change in the Quarterly-Average Core PCE Price Index Level (annualized percentage points)	CorePCE1,...,CorePCE6	$COREPCE_{t+\tau t-1}$
<i>Five- and Ten-Year Inflation Projections (Annualized Percentage Points)</i>		
<i>Long Name</i>	<i>Survey Name</i>	
Five-Year Annual-Average Headline CPI Inflation (Horizon: Year of Survey and Following Four Years)	CPI5YR	
Five-Year Annual-Average Headline PCE Inflation (Horizon: Year of Survey and Following Four Years)	PCE5YR	
Ten-Year Annual-Average Headline CPI Inflation (Horizon: Year of Survey and Following Nine Years)	CPI10	
Ten-Year Annual-Average Headline PCE Inflation (Horizon: Year of Survey and Following Nine Years)	PCE10	

**Computations For Yield Spreads.** We compute each panelist's implied forecasts using the formulas shown below. Then, for each survey and across all panelists, we compute the mean projections, the median projections, and measures of cross-section dispersion.

$$SPR\_TBOND\_TBILL_{t+\tau|t-1} = TBOND_{t+\tau|t-1} - TBILL_{t+\tau|t-1}, \quad \tau = -1, 0, \dots, 4$$

$$SPR\_BAA\_AAA_{t+\tau|t-1} = BAABOND_{t+\tau|t-1} - BOND_{t+\tau|t-1}, \quad \tau = -1, 0, \dots, 4$$

$$SPR\_BAA\_TBOND_{t+\tau|t-1} = BAABOND_{t+\tau|t-1} - TBOND_{t+\tau|t-1}, \quad \tau = -1, 0, \dots, 4$$

$$SPR\_AAA\_TBOND_{t+\tau|t-1} = BOND_{t+\tau|t-1} - TBOND_{t+\tau|t-1}, \quad \tau = -1, 0, \dots, 4$$

The table below maps the mathematical names on the left-hand-side of the preceding equation for  $SPR\_TBOND\_TBILL$  to the variables names in the survey's Excel files. Note that the Excel file dates the observations at the survey date ( $t$ ) and indicates the forecast horizon with a suffix. The mapping is similar for the remaining variables whose equations are shown immediately above.

*Example: Variable Names for  $SPR\_TBOND\_TBILL$   
(Quarterly Forecast Horizons)*

<i>Mathematical Name (<math>\tau = -1, 0, \dots, 4</math>)</i>	<i>Variable Name in Excel File (Dated at the Survey Quarter, <math>t</math>)</i>
$SPR\_TBOND\_TBILL_{t-1 t-1}$	$SPR\_TBOND\_TBILL1_t$ (Historical value for $t-1$ )
$SPR\_TBOND\_TBILL_{t t-1}$	$SPR\_TBOND\_TBILL2_t$ (Nowcast for quarter $t$ from survey $t$ )
$SPR\_TBOND\_TBILL_{t+1 t-1}$	$SPR\_TBOND\_TBILL3_t$ (Forecast for quarter $t+1$ from survey $t$ )
$SPR\_TBOND\_TBILL_{t+2 t-1}$	$SPR\_TBOND\_TBILL4_t$ (Forecast for quarter $t+2$ from survey $t$ )
$SPR\_TBOND\_TBILL_{t+3 t-1}$	$SPR\_TBOND\_TBILL5_t$ (Forecast for quarter $t+3$ from survey $t$ )
$SPR\_TBOND\_TBILL_{t+4 t-1}$	$SPR\_TBOND\_TBILL6_t$ (Forecast for quarter $t+4$ from survey $t$ )

**Computations for Real Interest Rates.** We compute the projection for the nominal interest rate on three-month Treasury bills minus the projection for inflation. We do this first for each panelist, using the formulas shown below. Then, for each survey and across all panelists, we compute the mean projections, the median projections, and measures of cross-section dispersion.

Because there is not a perfect correspondence between the period covered by the interest rate and the period for inflation, we compute three measures of the real interest rate (RR1, RR2, and RR3). The measures differ according to the horizon for the inflation projection. The first measure subtracts the same-quarter inflation projection from the interest-rate projection. The second measure subtracts the one-quarter ahead inflation projection. The third measure subtracts the average inflation projection (same quarter and one-quarter ahead) from the interest-rate projection.

*Nominal Rate on Three-Month Treasury Bills Minus GNP/GDP Price Inflation*

$$RR1\_TBILL\_PGDP_{t+\tau|t-1} = TBILL_{t+\tau|t-1} - 100 \left[ \left( \frac{PGDP_{t+\tau|t-1}}{PGDP_{t+\tau-1|t-1}} \right)^4 - 1 \right], \quad \tau = 0, \dots, 4$$

$$RR2\_TBILL\_PGDP_{t+\tau|t-1} = TBILL_{t+\tau|t-1} - 100 \left[ \left( \frac{PGDP_{t+\tau+1|t-1}}{PGDP_{t+\tau|t-1}} \right)^4 - 1 \right], \quad \tau = 0, \dots, 3$$

$$RR3\_TBILL\_PGDP_{t+\tau|t-1} = TBILL_{t+\tau|t-1} - 100 \left[ \left( \frac{PGDP_{t+\tau+1|t-1}}{PGDP_{t+\tau-1|t-1}} \right)^{\frac{4}{2}} - 1 \right], \quad \tau = 0, \dots, 3$$



The table below maps the mathematical names on the left-hand-side of the preceding equation for  $RR1\_TBILL\_PGDP$  to the variables names in the survey's Excel files. Note that the Excel file dates the observations at the survey date ( $t$ ) and indicates the forecast horizon with a suffix. The mapping is similar for the remaining variables whose equations are shown directly above and for the additional measures of real interest rates given below.

*Example: Variable Names for  $RR1\_TBILL\_PGDP$   
(Quarterly Forecast Horizons)*

<i>Mathematical Name (<math>\tau = 0, \dots, 4</math>)</i>	<i>Variable Name in Excel File (Dated at the Survey Quarter, <math>t</math>)</i>
$RR1\_TBILL\_PGDP_{t t-1}$	$RR1\_TBILL\_PGDP\_2_t$ (Nowcast for quarter $t$ from survey $t$ )
$RR1\_TBILL\_PGDP_{t+1 t-1}$	$RR1\_TBILL\_PGDP\_3_t$ (Forecast for quarter $t+1$ from survey $t$ )
$RR1\_TBILL\_PGDP_{t+2 t-1}$	$RR1\_TBILL\_PGDP\_4_t$ (Forecast for quarter $t+2$ from survey $t$ )
$RR1\_TBILL\_PGDP_{t+3 t-1}$	$RR1\_TBILL\_PGDP\_5_t$ (Forecast for quarter $t+3$ from survey $t$ )
$RR1\_TBILL\_PGDP_{t+4 t-1}$	$RR1\_TBILL\_PGDP\_6_t$ (Forecast for quarter $t+4$ from survey $t$ )

*Nominal Rate on Three-Month Treasury Bills Minus Headline CPI Inflation*

$$RR1\_TBILL\_CPI_{t+\tau|t-1} = TBILL_{t+\tau|t-1} - CPI_{t+\tau|t-1}, \quad \tau = 0, \dots, 4$$

$$RR2\_TBILL\_CPI_{t+\tau|t-1} = TBILL_{t+\tau|t-1} - CPI_{t+\tau+1|t-1}, \quad \tau = 0, \dots, 3$$

$$RR3\_TBILL\_CPI_{t+\tau|t-1} = TBILL_{t+\tau|t-1} - 100 \left\{ \left[ \left( 1 + \frac{CPI_{t+\tau|t-1}}{100} \right) \left( 1 + \frac{CPI_{t+\tau+1|t-1}}{100} \right) \right]^{\frac{1}{2}} - 1 \right\}, \quad \tau = 0, \dots, 3$$

*Nominal Rate on Three-Month Treasury Bills Minus Core CPI Inflation*

$$RR1\_TBILL\_CCPI_{t+\tau|t-1} = TBILL_{t+\tau|t-1} - CORECPI_{t+\tau|t-1}, \quad \tau = 0, \dots, 4$$

$$RR2\_TBILL\_CCPI_{t+\tau|t-1} = TBILL_{t+\tau|t-1} - CORECPI_{t+\tau+1|t-1}, \quad \tau = 0, \dots, 3$$

$$RR3\_TBILL\_CCPI_{t+\tau|t-1} = TBILL_{t+\tau|t-1} - 100 \left\{ \left[ \left( 1 + \frac{CORECPI_{t+\tau|t-1}}{100} \right) \left( 1 + \frac{CORECPI_{t+\tau+1|t-1}}{100} \right) \right]^{\frac{1}{2}} - 1 \right\}, \quad \tau = 0, \dots, 3$$

*Nominal Rate on Three-Month Treasury Bills Minus Headline PCE Inflation*

$$RR1\_TBILL\_PCE_{t+\tau|t-1} = TBILL_{t+\tau|t-1} - PCE_{t+\tau|t-1}, \quad \tau = 0, \dots, 4$$

$$RR2\_TBILL\_PCE_{t+\tau|t-1} = TBILL_{t+\tau|t-1} - PCE_{t+\tau+1|t-1}, \quad \tau = 0, \dots, 3$$

$$RR3\_TBILL\_PCE_{t+\tau|t-1} = TBILL_{t+\tau|t-1} - 100 \left\{ \left[ \left( 1 + \frac{PCE_{t+\tau|t-1}}{100} \right) \left( 1 + \frac{PCE_{t+\tau+1|t-1}}{100} \right) \right]^{\frac{1}{2}} - 1 \right\}, \quad \tau = 0, \dots, 3$$

*Nominal Rate on Three-Month Treasury Bills Minus Core PCE Inflation*

$$RR1\_TBILL\_CPCE_{t+\tau|t-1} = TBILL_{t+\tau|t-1} - COREPCE_{t+\tau|t-1}, \quad \tau = 0, \dots, 4$$

$$RR2\_TBILL\_CPCE_{t+\tau|t-1} = TBILL_{t+\tau|t-1} - COREPCE_{t+\tau+1|t-1}, \quad \tau = 0, \dots, 3$$

$$RR3\_TBILL\_CPCE_{t+\tau|t-1} = TBILL_{t+\tau|t-1} - 100 \left\{ \left[ \left( 1 + \frac{COREPCE_{t+\tau|t-1}}{100} \right) \left( 1 + \frac{COREPCE_{t+\tau+1|t-1}}{100} \right) \right]^{\frac{1}{2}} - 1 \right\}, \quad \tau = 0, \dots, 3$$

**Computations for Forward Inflation Rates.** We use the survey's projections for five-year annual-average inflation and 10-year annual-average inflation. (Note that the survey's projections for five-year annual-average inflation cover the first five years of the 10-year horizon.)

We compute each panelist's implied forecast for inflation over the second five years of the 10-year horizon, using the formulas shown below. Then, for each survey and across all panelists, we compute the mean projections, the median projections, and measures of cross-section dispersion.

$$CPIF5_t = 100 \left[ \frac{\left( 1 + \frac{CPI10_t}{100} \right)^2}{\left( 1 + \frac{CPI5YR_t}{100} \right)} - 1 \right] \quad (= \text{Five-year forward five-year annual-average CPI inflation})$$

$$PCEF5_t = 100 \left[ \frac{\left( 1 + \frac{PCE10_t}{100} \right)^2}{\left( 1 + \frac{PCE5YR_t}{100} \right)} - 1 \right] \quad (= \text{Five-year forward five-year annual-average PCE inflation})$$

## 11. 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.
June 2010	The base year for the IP indexes changed from 2002 to 2007.
September 2010	Added a new section entitled "Cross-Sectional Forecast Dispersion."
August 2011	Extended RGDP1, RGDP2, UNEMP1, UNEMP2, PRGDP1-PRGDP44, and PRUNEMP1-PRUNEMP40 series back to 2009:Q2. Previously, these series started in 2010:Q1. Extended TBILL1, TBILL2, TBOND1, and TBOND2 series back to 2009:Q3. Previously, these series started in 2010:Q1.

Date of Change	Description of Change
August 2012	Added a new section entitled “Implied Forecasts.”
February 2014	Modified the bin definitions for PRPGDP and PRUNEMP.  Also added a new definition for the long-term projection for the 10-year constant-maturity Treasury yield (BOND10).

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