B. Collection of Information Employing Statistical Methods

1. Universe and Sample Size

   The Producer Price Index is an on-going survey of net transaction prices received by producers. The current universe for the PPI survey consists of roughly 5.0 million establishments comprising the covered portions of the mining, manufacturing, forestry, utility, and non-goods producing sectors. About 5,836 respondents are initiated in any given year, while 20,600 respondents provide monthly data pertaining to 93,500 price quotations. The replenishment and rotation of respondents within the PPI occurs at a rate of approximately 13.3 percent each year. Effective with the release of PPI data for June 2015, PPI started updating samples on a tri-annual basis, coinciding with the release of data for February, June, and October (in March, July, and November, respectively). This accelerated approach to replacing industry samples will result in indexes that better represent current industry production and will improve data quality. The list containing the universe of all producing establishments comes mostly from Unemployment Insurance (UI) files provided by state agencies. Supporting information and alternative frames may be obtained from other sources, if they are deemed to be more accurate.

   Note: the PPI does not distinguish between private and public establishments selected for the survey.

   - Initiation Reponses Rates

   Initiation response rates for the PPI are computed based on unit (establishment) response at sample initiation.

   Un-Weighted Initiation Annual (Fiscal Year) Response Rate =

   $¿of establishments agreeing ¿ particpate ∈ the PPI survey \dfrac{¿}{¿of establishments agreeing ¿} particpate + ¿ of es$

   Note: establishments identified as out of business or out of scope during the initiation process are not counted in this response rate.

Fiscal Year	Initiation Response Rate
2016	75%
2015	77%
2014	81%

   - Repricing Response Rates

The PPI repricing response rate for estimation is an unweighted item based rate. The estimation response rate provides the percentage of items eligible for use in estimation and represents the actual response based on current potential for response. The numerator of this rate is the count of all items used in estimation and the denominator is the count of all items for which information was requested.

Un-Weighted Estimation Annual (Fiscal Year) Response Rate $\dot{\iota}$

$$\frac{\dot{\iota}\,of\,items\,used \in estimation}{\dot{\iota}\,of\,items\,for\,which\,information\,was\,requested}$$

Note: items that are out of season or have been discounted are no counted in this response rate.

Fiscal Year	Repricing Response Rate
2016	77%
2015	76%
2014	70%

2. Collection Procedures

    The PPI survey is based on probability-proportional-to-size sampling. Every establishment listed as belonging to the universe of entities producing in the to-be-sampled NAICS industry, regardless of size, has a chance of being selected. The chance of any single establishment being chosen for participation in the survey is commensurate with its importance to the industry as a whole. Comprehensive coverage is necessary to insure that the price data collected is a representative sample of the universe of pricing activity within an industry. It is the PPI's opinion that the burden imposed on business establishments is very near the practical minimum consistent with production of a statistically meaningful index.

    The steps involved in probability-proportional-to-size sampling include: constructing a frame (a list of businesses from which a sample is to be selected), identifying any specific variables that represent unique price-forming groups (explicit stratification), calculating the number of sample units and price quotations required within each unique group, sorting each group by a measure of size (usually employment), and using a calculated sample interval to select a representative subset of entities from the list. Probability-proportional-to-size sampling, in addition to improving efficiency and reducing bias, provides the capability to calculate statistical estimates of reliability, precision, and error.

The number of establishments and price quotations selected for repricing varies, depending on the homogeneity within the sampled industry. The sample must be large enough to represent the full range of producers and products. Since participation in the survey is voluntary, not every entity selected cooperates. Furthermore, sample frames typically contain a certain degree of error. Frame error includes entities defined as out of business and those incorrectly classified. Anticipated respondent attrition over the life of the sample also influences sample allocation.

Once a respondent has been approached by a BLS data collector and agrees to cooperate, initiation into the PPI survey requires, on average, 2 hours of respondent time. The first step in initiating an establishment into the PPI involves verification of address and employment information. The next step involves identifying product lines produced or service lines provided, along with revenue data for each activity. The third step is item selection, which BLS refers to as disaggregation.

For each line of activity, respondents identify unique price-determining characteristics that come into play, along with the revenue that each line generates. A random number table is used to choose the unique transactions that will be tracked by PPI. This process is repeated for detailed categories until completely unique transaction types are identified. Disaggregation identifies unique price-determining variables, both product and transaction specific, and assigns a weighted importance to each. Identifying unique activities and their importance relative to the respondent's full revenue-generating activity allows the PPI to efficiently sample a representative subset of transactions, and permits efficient recording of these classification parameters for future tracking. The BLS National Office provides forms to data collectors to assist in the process of assigning probabilities, selecting transactions, and documenting sampled transactions. (See forms: BLS-1810A, BLS-18A1, BLS-1810-B, BLS-1810C, BLS-1810-C1, and BLS-1810E.)

Effective with the release of data for January 2004, the PPI converted its sampling, data collection, and industry-based publication structures to the NAICS. Previously, PPI's industry-based procedures were linked to the SIC organizational system.

During monthly repricing, the main communication between the PPI and respondents are the price-collection form BLS 473P and the BLS Internet Data Collection Facility (IDCF). The Program currently sends out approximately 93,500 pricing requests per month to roughly 20,600 responding establishments. One request exists for each price quotation that is being monitored. The request contains the specific information required by the PPI to track changes in net transaction prices for predetermined outputs. Survey requests are designed to take industry-specific factors into account, allowing adaptation to individual company accounting and data structures. The program modified the format, in March 2014, in order to streamline and simplify the layout and content. The changes were made to gather more accurate data and decrease burden significantly. As mentioned in section A.3, Use of Electronic Collection Methods, the Program has introduced a new capability for survey participants to provide monthly repricing updates over the Internet. The online screens are structured similarly to the price-collection form BLS 473P. (See

IDCF screen shots.) As usage of the Internet facility grows, the number of forms sent out via the mail or fax will continue to decline, though the number of requests for updated information will remain the same overall.

When price-quotation questionnaires are returned by fax or mail, they are entered into a database using an optical scanner. Respondents often submit forms that include changes to product descriptors, transaction descriptors, or net transaction prices. These changes may require a telephone call from a PPI industry analyst for clarification and verification. With monthly repricing via the internet, data reported by respondents are automatically transferred from the BLS Internet Data Collection Facility to the PPI database on a daily basis. Items requiring follow-up by BLS staff are flagged by our computing system.

Detailed-level price indexes are constructed by combining price quotations from respondents that describe similar product or service categories. Aggregate indexes -- whether they are product line, industry, industry group, commodity group, or final demand-intermediate demand -- are weighted averages of detailed-level price indexes.

The modified Laspeyres formula provided below approximates the actual computation procedure for the Producer Price Index:

$$I_t = \left[\left(\sum Q_a P_o (P_t/P_o) \right) \Big/ \left(\sum Q_a P_o (P_{t-1}/P_o) \right) \right] \times I_{t-1}$$

where I_t is the price index in the current period, I_{t-1} is the price index in the previous period, P_o is the price of a product in the comparison period, P_t is the current price, and Q_a represents the quantity shipped during the base period. In this form, an index is the weighted average of price ratios for each item (P_t/P_o) in a detailed cell.

Within each PPI detailed cell, individual price quotation reports from establishments are given different weights, according to shipment values which respondents provided to BLS during initiation interviews. The weights are adjusted by BLS using probability selection techniques.

If a price quotation report has not been received in a particular month, then the change for that price can be estimated by averaging the price changes for the other items within the same detailed cell (that is, for the same kind of products) for which price reports have been received.

3. Methods to Maximize Response Rates

Four months after first publishing monthly indexes, PPI recalculates and finalizes indexes, taking into account late reports and back-corrections received from respondents.

At this four-month mark, approximately 70% of price-quotation questionnaires are returned.

In order to maintain and improve cooperation, the PPI maintains a procedure that includes contacting, by telephone, any selected respondents that have not returned forms for a specified period of time. Assistance is provided with regard to any aspects of the form that at first glance appear unclear or burdensome; a common reason for non-response. Price sharing between PPI and the International Price Program (IPP) may be used to help prevent a respondent from refusing participation in the surveys. Price sharing may be used in response to a request by a respondent or if indicated by the respondent that this is the only condition under which he/she will participate. Price sharing only applies to PPI schedules and IPP export schedules since import items would be out of scope for PPI

The PPI conducted a study[1] in 2012 to determine if non-response bias existed in its published data. Analysis showed that very few PPI indexes exhibited signs of nonresponse bias and the ones that did were affected by unusually high nonresponse in very specific size classes. These findings did not identify strong evidence of nonresponse bias in PPI indexes for the industries and years that were analyzed. There is no need to adjust for nonresponse on a systematic basis. Even so, PPI will continue to stress its ongoing efforts to improve response rate such as monitoring response more closely and emphasizing repricing delinquency follow-up. With continued care in the selection of industries to be resampled, improvements to PPI sampling methodology, and concerted nonresponse follow-up efforts, nonresponse bias can be kept at an acceptable minimum.

4. Testing Procedures or Plans

   The PPI is not currently planning any procedural or methods tests requiring OMB approval.

5. Statistical Contacts

   Oversight of statistical methods in the PPI survey are maintained by the Bureau of Labor Statistics, Office of Prices and Living Conditions, Division of Price Statistical Methods, Steven P. Paben, Supervisory Mathematical Statistician, (202) 691-6147.

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[1] See Boriana Chopova, Greg Kelly, Soon Paik, Andy Sadler, Dave Slack "Analyzing Nonresponse Bias in the Producer Price Index", BLS website at https://www.bls.gov/osmr/pdf/st120080.pdf, October 2012, modified April 2013.

PPI Methodology References

The methodology of the PPI has been documented in numerous papers and articles written since 1977 when the PPI underwent the most comprehensive redesign in its history. These papers cover a broad spectrum of topics ranging from price theory and program concepts to actual data collection methodology. A list of references includes:

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U.S. Department of Labor, Bureau of Labor Statistics, *Escalation and Producer Price Indexes: A Guide for Contracting Parties,* Report 807. Original produced September 1991; last updated July 2006: http://www.bls.gov/ppi/ppiescalation.htm.

The Bureau of Labor Statistics in the Monthly Labor Review has published additional articles on specific PPI topics. All the articles can be accessed from this web page: http://www.bls.gov/ppi/ppimlr.htm .

Additional articles related to PPI can be found at: http://www.bls.gov/opub/btn/archive/home.htm