

## **Producer Price Indexes: What they Are & How They're Used**

### **Producer Price Indexes (PPIs) defined**

Producer Price Indexes are a family of indexes that measures the average change over time in the selling prices received by domestic producers of goods and services. PPIs measure price change from the perspective of the seller. This contrasts with other measures, such as the Consumer Price Index (CPI), that measure price change from the purchaser's perspective. Sellers' and purchasers' prices may differ due to government subsidies, sales and excise taxes, and distribution costs.

Over 10,000 PPIs for individual products and groups of products are released each month. PPIs are available for the products of virtually every industry in the mining and manufacturing sectors of the U.S. economy.

New PPIs have been introduced for the products of industries in the transportation, utilities, trade, finance, and services sectors of the economy.

### **When are PPI data is available**

Producer Price indexes are published monthly. First-published data for a particular month as well as the revisions from the previous 4 months (final figures) are available the following month, usually during the second full week. Price indexes apply to the entire month. For example, in August 1999, the latest available, first-published PPIs would be for July 1999 and the latest final figures would have been for March 1999. In September, first-published indexes for August and final figures for April will be released.

### **How PPIs are used**

Producer Price Index data are widely used by the business community as well as government. Three major uses are:

*As an economic indicator.* The PPIs capture price movements prior to the retail level. Therefore, they may foreshadow subsequent price changes for businesses and consumers. The President, Congress, and the Federal Reserve employ these data in formulating fiscal and monetary policies.

*As a deflator of other economic series.* PPIs are used to adjust other economic time series for price changes and to translate those series into inflation-free dollars. For example, constant-dollar gross domestic product data are estimated using deflators based on PPI data.

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*As the basis for contract escalation.* PPI data are used in escalating purchase and sales contracts. These contracts typically specify dollar amounts to be paid at some point in the future. It is often desirable to include an escalation clause that accounts for increases in input prices. For example, a long-term contract for bread may be escalated for changes in wheat prices by applying the percent change in the PPI for wheat to the contracted price for bread.

### **The Producer Price Index differs from the Consumer Price Index**

While both the PPI and CPI measure price change over time for a fixed set of goods and services; they differ in two critical areas:

- (1) The composition of the set of goods and services.
- (2) The types of prices collected for the included goods and services.

The target set of goods and services included in PPIs is the entire marketed output of U.S. producers. The set includes both goods and services purchased by other producers as inputs to their operations or as capital investment, as well as goods and services purchased by consumers either directly from the service producer or indirectly from a retailer. Because the PPI target is the output of U.S. producers, imports are excluded. The target set of items included in the CPI is the set of goods and services purchased for consumption purposes by urban U.S. households. This set includes imports.

The price collected for an item included in the PPIs is the revenue received by its producer. Sales and excise taxes are not included in the price because they do not represent revenue to the producer. The price collected for an item included in the CPI is the out-of-pocket expenditure by a consumer for the item. Sales and excise taxes are included in the price because they are necessary expenditures by the consumer for the item.

The differences between the PPI and CPI are consistent with the different uses of the two measures. A primary use of the PPI is to deflate revenue streams in order to measure real growth in output. A primary use of the CPI is to adjust income and expenditure streams for changes in the cost of living.

The composition of items in the Finished Goods Price Index differs from that of the All Items Consumer Price Index in two major respects. First, the Finished Goods Price Index includes price changes for producers' durable equipment, which are not purchased by typical consumers and, therefore, are not included in the CPI. Second, the All Items CPI includes services which are not reflected in the Finished Goods Price Index. An additional difference is that the Finished

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Goods Price Index is only available at the U.S. level, while the All Items CPI is available at the regional, metropolitan area, and U.S. levels.

### How an index is interpreted

An index is a tool that simplifies the measurement of movements in a numerical series. Movements are measured with respect to the base period, when the index is set to 100. Currently, most PPIs have an index base set at 1982 = 100. (Some PPIs have a base corresponding to the month prior to the month that the index was introduced). BLS measures price change in relation to that figure. An index of 110, for example, means there has been a 10-percent increase in prices since the base period; similarly, an index of 90 indicates a 10-percent decrease. Movements of price indexes from one month to another are usually expressed as percent changes rather than as changes in index points because index point changes are affected by the level of the index in relation to its base period, while percent changes are not. An advantage of calculating percent changes is that the result will be the same no matter what base period is specified. The example below demonstrates the computation of index point and percent changes.

#### Index point change

Finished Goods Price Index	107.5
Less previous index	104.0
Equals index point change	3.5

#### Index percent change

Index point change	3.5
Divided by the previous index	104.0
Equals	0.034
Result multiplied by 100	0.034 x 100
Equals percent change	3.4%

### How are PPIs are Weighted

To improve the precision of PPI estimates of price change, sampled items are weighted by a measure of their size and importance.

*In the first stage of PPI computation, price indexes are constructed for narrowly-defined goods or services. The individual items included in these indexes are weighted by the establishment's revenue for the product line.*

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*In the second stage of PPI computation*, indexes for individual goods and services are combined into aggregate indexes. Data for weighting together the product-line indexes comes primarily from the economic censuses of the Bureau of Census. These weights are changed every 5 years.

The weights for combining product-line indexes into aggregate indexes are somewhat different for each of the three types of aggregate indexes. For industry net output indexes, product-line weights are the value of shipments from establishments in the industry primarily engaged in the production of the product to establishments outside of the industry. For the traditional commodity grouping indexes, product line weights are the gross value of shipments across all industries engaged in the production of the product. For the commodity stage-of-processing indexes, the product-line weights from the traditional commodity grouping indexes are simply allocated, based on relationships seen in the U.S. input-output accounts, to either the crude, intermediate, or finished goods stages.

### **How are producers and products are selected for PPIs**

PPIs are published for the output of virtually all U.S. mining and manufacturing industries and are gradually being introduced for the output of industries in other sectors of the economy. For any given industry, producers are selected for the survey via a systematic sampling from a listing of all firms that file with the Unemployment Insurance System. Typically, a firm's probability of selection is based on its employment size. After a firm is selected and agrees to participate in the survey, a probability sampling technique called disaggregation is used to determine which specific products or services will be in the PPI.

Disaggregation is a process in which iterative steps are taken to select items based on their proportionate value to the manufacturer's overall revenue. First a reporter breaks down the type of items shipped into categories. Next, these categories are broken down further by price determining characteristics, for example, options, color, size. Further break downs may be necessary to differentiate between types of buyers or discounts. Disaggregation continues until a specific product sold to a specific buyer is selected.

### **How PPI data is collected**

When an establishment is selected to participate in the PPI survey, it is visited by a field economist who solicits the firm's voluntary cooperation and informs the firm of the strict confidentiality rules that will safeguard the information being requested. Once cooperation is obtained, the field economist uses the

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disaggregation technique to select the specific goods or services for which prices will be reported.

From this point forward, the establishment reports prices for the selected products, usually on a monthly basis, on a form provided by BLS. Establishments are asked to report their prices as of Tuesday of the week containing the 13th of the month. Each month approximately 100,000 prices are collected from 30,000 reporters. If the establishment fails to report or reports incomplete information, it is called by a BLS economist who requests the needed information. Nearly all establishments report prices through the mail. However, the use of electronic reporting methods such as fax is gradually being expanded. Establishments continue to report until a new sample is selected—after 7 years, on average, for an industry.

### **PPI data are published seasonally adjusted and unadjusted**

Because PPI data are used for different purposes, BLS publishes seasonally adjusted as well as unadjusted changes each month. Certain 4-digit and 6-digit commodity series are selected for seasonal adjustment if statistical tests indicate seasonality and if there is an economic rationale for the observed seasonality.

Indexes for most 2-digit commodity groupings and 8-digit individual commodities, as well as industry and Census product indexes, are published only as unadjusted data.

### **When to use seasonally adjusted PPIs**

Seasonally adjusted indexes are preferred for analyzing general price trends in the economy because such indexes eliminate the effect of changes that normally occur at about the same time and in about the same magnitude every year. Such recurring movements may result from normal weather patterns, regular production and marketing cycles, model changeovers, seasonal discounts, and holidays. These are removed from seasonally adjusted data, thereby clearly revealing underlying cyclical trends.

Unadjusted data are of primary interest to users who need information that can be related to actual dollar-value transactions. Individuals requiring this information include marketing specialists, purchasing agents, budget and cost analysts, contract specialists, and commodity traders. Unadjusted data are virtually always used for escalating long-term contracts such as purchasing agreements or real estate leases.

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### **What PPIs report**

BLS publishes only price indexes, not actual or average prices. Of course, actual transaction prices are used in the calculation of the indexes.

The actual prices are not published because they are provided on a voluntary and confidential basis by PPI reporters. Should a PPI user have a need for a time series of actual prices for an item, BLS suggests that the user obtain the actual price from a published source, such as a trade journal, and move it forward or backward by the change in the applicable PPI.

### **PPI indexes are published by industry classification**

PPIs are available for two different product classification systems. Both sets of PPIs draw from the same pool of price information provided to BLS by cooperating reporters. Both sets of PPIs feature both individual product and product line indexes and comprehensive "stage-of-processing" indexes for aggregations of products. The latter indexes are useful for studying the transmission of price change across successive stages of economic activity in the U.S. economy.

*Commodity classification.* The commodity classification structure organizes products by similarity of end use or material composition. Products are classified in this structure without regard to their industry of origin. The commodity classification system used is unique to the PPI and does not match any other widely used coding structure such as the North American Industry Classification System (NAICS).

The commodity stage-of-processing indexes group commodities by class of buyer and amount of physical processing or assembling. The finished goods grouping includes commodities that are ready for sale to the final-demand user, either an individual consumer or a business firm. In national income accounting terminology, the Finished Goods Price Index roughly measures changes in prices received by producers for two portions of the gross domestic product: (1) Personal consumption expenditures on goods, and (2) capital investment expenditures on equipment.

The intermediate materials, supplies, and components grouping consists partly of commodities that have been processed that still require further processing. Examples of such semi-finished goods include flour, cotton yarn, steel mill products, and lumber. The intermediate goods category also encompasses nondurable, physically complete goods purchased by business firms as inputs for

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their operations. Examples include diesel fuel, belts and belting, paper boxes, and fertilizers.

The crude materials for further processing grouping contains unprocessed commodities not sold directly to consumers. Crude foodstuffs and feedstuffs include items such as grains and livestock. The crude energy goods category consists of crude petroleum, natural gas to pipelines, and coal. Examples of crude nonfood materials other than energy include raw cotton, construction sand and gravel, and iron and steel scrap.

*Industry classification.* The industry classification structure organizes products by their industry of origin. A PPI for an industry is a measure of price change for the industry's products sold outside the industry (that is, its net output). The industry classification system used is NAICS. This is the same system used for published BLS employment, compensation, and productivity data.

### **PPIs are subject to revision after being first published**

After an index is first published, it is subject to recalculation to take into account late survey reports and corrections by respondents. Every index is recalculated on a systematic basis—4 index months after being first published. In addition, previously published seasonally adjusted indexes are subject to change in January when new seasonal factors are calculated and applied to the most recent 5 years of data.

### **Why some PPIs go in and out of publication**

PPIs go out of publication if they fail to meet either of the following conditions.

- The index must have cooperation from a minimum number of reporting units (establishments). If an index fails this requirement, it usually means that the index will remain unpublished and unreleased until a new sample of establishments is selected for the industry. Of course, if U.S. production of the commodity in question has ceased, the index will never reappear.
- In any given month, the index must have actual prices from a minimum number of reporting units. If an index fails this requirement it may only be out of publication temporarily. If a sufficient number of price quotes are received in subsequent months, the index will again be published. In addition, when that index is recalculated 4 months after publication, it may be published if late reports have been received.

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### **The base period subject to change**

The official reference period is subject to change every 10 years or so. This makes it easier to compare PPIs with other economic series compiled by the Federal Government. The switch to the 1982 reference period occurred in January 1988 to comply with the mandate of the Office of Management and Budget to implement common reference periods for all government statistics.

### **Historical data**

The Producer Price Index program is the oldest continuous statistical series of the Federal Government. When first published in 1902, it covered the years from 1890 through 1901. Many major commodity-based indexes are available from the early 1900s. Indexes for the major stage-of-processing categories are available from 1947 to present. Most manufacturing and mining industry indexes, however, are available only since the early 1980s; most service indexes are available only for the last 1-5 years.

### **Using a price index for escalation**

Generally, an index should be chosen that represents the costs for providing a particular product or service, rather than indexes for the products or services themselves. For example, if an apparel manufacturer is contracting for long-term purchases with a producer of finished fabrics, it would be more advisable to tie the escalation clause to a PPI for synthetic fibers rather than to a PPI for a type of finished fabric. Otherwise, the parties may find themselves in a complicated situation that could be difficult to escape.

As to the level of index aggregation or detail that might be chosen, it should be understood that while detailed indexes may target costs more effectively, such indexes are more likely to be discontinued by BLS, or to have occasional gaps in availability. Contracts should provide for these contingencies, and may minimize them if they cite only the higher level categories. In addition, because of the unavailability of certain indexes, proxies must sometimes be chosen to estimate price movements for some series.

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