



Producer Price Indexes



Price Adjustment Guide for Contracting Parties

Business firms in search of effective methods for coping with changes in prices often employ price adjustment (escalation) clauses in long-term sales and purchase contracts. BLS estimates that agreements with a lifetime worth in the trillions of dollars are currently adjusted using the Producer Price Index (PPI) family of indexes, either alone or in conjunction with other sources of economic data.¹

Because they measure price changes objectively, both at the aggregated level and for particular products, free from possible manipulation by either of the contracting parties, PPIs calculated by the Bureau of Labor Statistics (BLS) are widely recognized among business people, economists, statisticians, and accountants as useful in price adjustment clauses.

This document provides guidance on the development of price adjustment clauses in contracts that are to be tied to PPI data. Such clauses should be written with great care to avoid serious problems when contract adjustments are implemented. The information in this Guide is based on BLS staff experience in handling issues that have been brought to their attention in connection with price adjustment clauses.

The role of the BLS is to provide requested data and to explain their underlying methodology and limitations. The BLS does not encourage or discourage the use of price adjustment measures in purchase agreements, sales agreements, and contracts. The BLS does not directly assist in writing contracts, nor does it provide advice regarding disputes arising from contract interpretation. Because index methodology and publication conventions could be crucial in developing price adjustment clauses, this Guide is intended to alert users to potential problems arising in these areas.²

This Guide is divided into three sections. First, an [overview of the PPI system](#) describes the major categories and groupings of the several thousand indexes that are published each month. Then, [guidelines for assisting in the development of price adjustment clauses](#) are outlined. Finally, a [practical example of provisions that might be incorporated into a contract](#) is presented, based on the guidelines discussed, along with an example of the price adjustment calculations that would be needed to implement these provisions.

This Guide provides summary information on a number of issues relating to PPI. For a more detailed review of PPI concepts and methods, see the [BLS Handbook of Methods, Chapter 14: Producer Prices](#).

The Structure of Producer Price Indexes

Producer price indexes measure the average change in prices received by domestic producers for their output. A PPI is an output price index. That is, it measures price changes received by mining, manufacturing, services, and construction providers. It does not directly measure the cost of producing a good, providing a service, or building a structure, though costs do factor into the selling price. PPI data are based on selling prices reported by establishments of all sizes selected by probability sampling, with the probability of selection proportionate to size. Individual items and transaction terms from these firms are also chosen by probability proportionate to size sampling methods. PPIs are based on a monthly sample of over 100,000 prices.

PPIs are organized in three major structures:

(a) Final Demand-Intermediate Demand (FD-ID) System: The final demand portion of the FD-ID structure measures price changes for goods, services, and construction sold as personal consumption, capital investment, to government, and as exports. The intermediate demand portion of the FD-ID system tracks price change for goods, services, and construction products sold to businesses as inputs to production, excluding capital investment. The FD-ID system replaced the Stage-of-Processing system in January 2014.

(b) Commodity type: The commodity classification structure of the PPI organizes products by similarity of end use or material composition, irrespective of industry origin. Prior to January 2009, the commodity-type classification system included only goods-based price indexes. With the release of data for January 2009, PPI expanded the commodity classification structure to include services and construction products.

(c) Industries and their products: The industry-based classification structure measures changes in prices received for industry outputs. At the industry and industry-group level, indexes track price changes for products and services sold outside the industry of origin. These indexes reflect the price trends of a constant set of goods and services that together represent the total net output of industries, as defined in the [North American Industry Classification System \(NAICS\)](#).

For a more detailed description of these three index structures, see the [Appendix](#) to this document.

Within each of the three major structures, indexes are available at different levels of aggregation and detail. There are broad FD-ID indexes (for example, Materials and components for construction, Transportation and warehousing services for Intermediate Demand), broad industry indexes (for example, Total manufacturing industries, Selected health care industries), as well as indexes for specific products (for example, diesel fuel, steel mill products, motor vehicle parts, truck transportation of freight, and business wired telephone services).

In addition, since 1986 the PPI has published indexes measuring changes in selling prices for material and supply inputs to selected industries. (These inputs-to-industries indexes exclude capital investment, labor, and imports.) From June 1986 through December 2014, coverage was limited to measuring changes in prices for goods inputs for construction industries. However, with the release of data for January 2015, the PPI substantially improved the inputs-to-industries index structure through two changes. First, the PPI expanded the scope of coverage for the inputs-to-industries structure by introducing indexes that measure changes in prices for inputs to selected goods and services producing industries. A second improvement was that the program began including changes in prices for services and construction inputs in the calculation of the inputs-to-industries indexes. (Capital investment, labor, and imported inputs to industries are still excluded.)

The indexes for inputs to construction industries, available since 1986, have long been employed by contracting parties for price adjustment. The PPI anticipates that as more input indexes for goods and services industries enter publication, contracting parties will use indexes from this structure for price adjustment with increased frequency. A [brief introduction](#) to the inputs-to-industries methodology is available, as is [information regarding areas of coverage](#). The table titled Producer price indexes for net inputs to industries, excluding capital investment, labor, and imports, not seasonally adjusted, located in the [PPI Detailed Report](#),

provides an up-to-date list of indexes included in this structure. For a detailed explanation of the methodology used to calculate inputs-to-industries indexes, go to the BLS Monthly Labor Review article titled [New PPI net inputs to industry indexes](#).

Guidelines for Developing Price Adjustment Clauses

(1) Establish the base selling price subject to adjustment.

The item price subject to adjustment should be specified as precisely as possible. State whether the base price refers to a per-unit quantity or a certain volume of units. Give the effective month and year of the base selling price; this time period is often called the base period. Indicate the length of time the base price will remain in effect. (Note that BLS no longer publishes unit prices for any item within the PPI system. From the Program's inception until 1985, unit prices were published for selected index categories.)

(2) Select an appropriate index or indexes.

A high-level FD-ID index, such as Final demand, Finished goods, Processed goods for intermediate demand, or Services for intermediate demand indicate the general trend of inflation at a broad level that may be appropriate for the price adjustment agreement. There are detailed FD-ID indexes that exclude food, energy, and trade, for users wishing to avoid the effects of volatile price movements in these goods and services. Detailed Intermediate Demand indexes under the category for Processed goods for intermediate demand (formerly called the index for Intermediate materials, supplies, and components) may best indicate price trends for semi-finished goods, components, and supplies for business demand. Indexes for specific 4-, 6-, or 8-digit commodity indexes, or for industry-based indexes that reflect product or service lines or groupings of products or services, may better indicate price trends at a more detailed level. (See [Appendix](#) for more information about indexes and index structures.)

Contracting parties may want to adjust the base price by a single PPI series. Often, however, users prefer to adjust prices on the basis of several data series, including data from other Government statistical programs, to reflect changes in costs of a variety of inputs. In some contracts, for example, costs of major materials and supplies are adjusted with one or more PPIs, while costs of labor are adjusted with other BLS series such as the Employment Cost Index.³ In such cases, the price adjustment clause should specify the percentage weight given to each index in calculating the total adjustment amount. (See detailed discussion under guideline (9)(d).)

Contracting parties should choose an index or group of indexes representing the costs for providing a particular product or service, rather than an index for the product itself. For example, if an apparel manufacturer were contracting for long-term purchases with a producer of finished fabrics, it would be more advisable to tie the price adjustment clause to a PPI for synthetic fibers, processed yarns and threads, or greige fabrics (raw fabric), rather than to a PPI for a type of finished fabric. Otherwise, the parties could find themselves in a serious contracting problem that would be difficult from which to escape.⁴

Regarding the level of index aggregation or detail that might be chosen, it should be understood that while detailed indexes may target costs more specifically, they are also more likely to be permanently discontinued by BLS, or to have occasional gaps in data availability. Contracts should provide for these contingencies. This hazard can be minimized if contracting parties cite a commodity index that does not fall below the 4- or 6-digit level of detail, or an industry-based product code that does not fall below the 7-digit level.⁵

Even with the PPI program's nearly complete coverage of the mining and manufacturing sectors, not all products are included directly in the PPI sample or published in the PPI system. Sometimes related indexes or higher level indexes must be chosen as proxies to estimate price movements.

(3) Clearly identify the selected index and cite an appropriate source.

The price adjustment clause of a contract should identify the index or group of indexes selected by providing complete titles and identifying codes.

Please note that there is no single index titled "The Producer Price Index." The term "Producer Price Index" refers to a family of indexes compiled by the Bureau of Labor Statistics. Each index to be used should be cited specifically in the contract by referring to "the Producer Price Index for..." followed by the exact title and any identifying code number.

The clause should also cite an appropriate source for the index selected. The primary official source of PPI data is the BLS Website. From the PPI homepage, data may be obtained using various methods:

- (a) Link to the [PPI database](#) to access various methods for downloading data. For an explanation of these database tools, link to the [PPI Data Retrieval Guide](#).
- (b) The monthly periodical, [PPI Detailed Report](#) includes all PPIs currently in publication, and is available online each month the day PPI data are released. This publication provides current month index values (first issued), previous month index values (first issued), 4 month prior index values (revised), as well as 1-month and 12-month rates of change.
- (c) The PPI news release, published monthly, provides index data, 1-month, and 12-month percent changes for a subset of more widely used PPIs. Link to [PPI News Release](#) and [Archived PPI News Releases](#) for current and archived PPI news releases.

Contracting parties should not cite table numbers or table titles in their contracts, since they are subject to change. BLS sources are preferable to secondary sources, such as other government publications or private firms. If contracting parties agree to obtain index values for price adjustment over the telephone from BLS staff members, the price adjustment clause should specify appropriate procedures and whether subsequent verification from a published source is necessary.

(4) Specify whether seasonally adjusted indexes or unadjusted indexes are to be used.

In general, seasonally adjusted indexes are not appropriate in price adjustment agreements. Because price adjustment clauses usually are intended to capture actual price changes, contracting parties normally would not want to remove seasonal price movements from their calculations.

(5) State the frequency of price adjustment.

The price adjustment clause should specify when adjustments are to be made, such as quarterly, semi-annually, or annually, or some other period. To conform to the procedure described in guideline (9) below, price adjustments should be calculated over an interval whose beginning point is the contract's base period. This is the time period associated with the chosen base price. For a discussion of base price, see guideline (1).

Difficulties can be encountered with those contracts that do not designate a specific frequency for price adjustment. The paragraph that follows, and guideline (7) expand upon this issue.

Note that PPI data are published as monthly indexes and as annual averages for calendar years. Monthly PPIs are representative of the entire month and do not refer to a specific day of the month. Avoid wording such as "the index for aluminum mill shapes, PPI commodity code 102501, as of September 30," since several different and equally plausible interpretations are possible for such language. For example, "as of September 30" could refer to the index that was available on September 30, which would be the August figure. That phrase also could refer to the September index. It could even mean the October index, since the September index would be based on information supplied to BLS well before September 30.

(6) Provide for missing or discontinued data.

Occasionally, a PPI may be unavailable for a particular time period, usually because price information was not supplied by a sufficient number of survey respondents to meet BLS publication standards. Highly detailed indexes are more susceptible to this problem than indexes for broader groupings. For example, the PPI for Metal tanks and vessels, custom fabricated and field erected, code 1072-0152, was temporarily unavailable from July 2011 to September 2012. During that period, contracting parties might have used code 1072-01, Metal tanks, or some other series of their choosing. Price adjustment clauses should provide procedures for times when PPI data do not publish.

Sometimes an index is permanently discontinued if a product declines in market importance. This most commonly occurs at the time of periodic resampling of industries and their output. As is the case when an index fails to meet minimum publication standards, price adjustment clauses should provide guidance for successor indexes in cases when original indexes are discontinued. A default provision that calls for using the next higher-level series might be included in the contract.

Note that if BLS merely changes the title or recodes an index, it is considered to be the same series, and therefore, this situation should not necessitate any contract renegotiation. The online monthly periodical PPI Detailed Report routinely provides lists of recoded indexes each time there are sample changes. Prior to June 2015, these lists appeared in the January and July issues. Since June 2015, sample updates typically have been posted in February, June, and October issues of the report.

(7) Specify that calculations of price adjustments shall always use the latest version of the PPI data published as of the date specified for such calculations. This requires contracting parties to explicitly agree on the base and comparison months employed by the price adjustment, as well as the precise month and the approximate date that the price adjustment calculations are to be made.

Adherence to this principle and its implications will prevent many potential problems. Contracts that fail to incorporate this guideline will instead need to specify which version of PPI data should be used, because:

- (a) BLS routinely revises PPI data 4 months after initial publication;
- (b) PPI data are rebased at infrequent intervals; and
- (c) on rare occasions, PPI data may be corrected.

Among other advantages, following guideline (7) should resolve any ambiguities arising due to the fact that all PPI not seasonally adjusted data are routinely subject to revision once, 4 months after original publication, to reflect late reports and corrections by respondents in the PPI survey. Revisions are usually small at the higher levels of index aggregation, but may be relatively large for detailed indexes. The version of any PPI published 4 months after its initial publication is considered final and will not change again, barring corrections or rebasing, a separate matter addressed in guideline (8).⁶

To follow guideline (7) effectively, it is essential to specify not only frequency/interval for price adjustment, but also the approximate date on which the price adjustment is to be made. Currently, PPI data are usually published between the 10th and the 18th of the month following the reference month in question. (However, the January data release in February might occur a few days later.) Therefore, a contract might state that parties to an agreement should contact the PPI prior to the 10th of the month following the designated month for price adjustment in order to verify the date that data will be available to enact the price adjustment. All first-published indexes for a given month, as well as final indexes for four months earlier, are considered officially published and are available on the day of release.

The contracting parties' selection of the date for price adjustment should be made only after they have agreed on, (a) the base period reference month, (b) interval for price adjustment, and (c) whether the calculation is to be based on the first-published or the final index values for the price adjustment month for comparison. It is vital to address these matters **before** a contract is signed. Otherwise, disagreements may arise when the first-published and final versions of the selected index are different.

If contracting parties do not specify an exact date for making price adjustments, the contract should at least specify whether first-published or final data should be used for calculations. The final version of the data for the price adjustment should be specified whenever feasible, because only final data will be rebased retroactively whenever BLS updates the PPI reference base. Contracting parties might choose to use first-issued indexes for the current period for price adjustment if capturing more recent price movements is valued by the parties to the agreement.

Any procedure that departs from guideline (7) by failing to specify the version of the data or the date when the price adjustment is to be made, needs to be constructed so that it will be in harmony with the frequency of price adjustment, as specified elsewhere in the contract. This is discussed in guideline (5).

A contract should not refer to an index value associated with a base price, but instead to its month and year alone. For example, the following reference could prove problematic:

Divide the current index value by 103.9 (which is the value of the index for the base period January 2010) and then....

Rather, it should be written:

Divide the index value which corresponds with the month associated with the price adjustment by the index value for January 2010, which represents the base period index value, and then....

(8) Avoid locking indexes used for price adjustment to a particular index reference base period.

Contracting parties should follow the principle of guideline (7) by calculating percent changes using indexes expressed on the index reference base period in use when the contract adjustment is applied. For example, if a contract called for a price adjustment to be made using data for December 1987 published in January 1988 (which was just prior to the rebasing that became effective on February 12, 1988), indexes expressed on the old reference base of 1967=100 would have been used.

Comprehensive index base period changes to the PPI system have been routine, although infrequent. The most recent large-scale conversion occurred when the index reference base period was set to 1982=100 in early 1988. This was the first such rebasing since BLS adopted 1967 as the standard in 1971, and that in turn was the first rebasing since the 1957-59 base was adopted in 1962. Previously, the standard reference base period was updated roughly every 10 years. ²

Relying upon a current index reference base period as set by BLS will not affect calculations, except for differences related to rounding. However, rounding could make a meaningful difference when the dollar amount of a contract is very large, or if the index prior to rebasing stood at a relatively high level.

Official PPI data based on the current reference base are not available on previous index reference base periods. Further, as a general rule, estimating a conversion of PPI data to an old base for the purpose of contractual price adjustment is inadvisable because such a method could well be challenged for referencing something other than official government data.

However, for parties wanting to look back to the prior index reference base, rebasing factors are only made available by BLS to convert data on the current standard reference base period to the immediately preceding one. For example, there are no official rebasing factors to convert data on the 1982=100 base back to the 1957-59 =100 index base.

Rebasing is not considered "revising," because the relative movements of any series over time are not affected, outside of rounding. The absolute level of any index has no intrinsic meaning other than relating a measurement to the base year, which is itself arbitrary to a degree.

Older contracts may specify use of originally published indexes, particularly since this was recommended by BLS in the September 1979 version of this Guide (BLS Report 570). BLS is now strongly discouraging such language in contracts, in accordance with guidelines (7) and (8), recommending that the latest available version of index data be used. In addition, BLS does not maintain database records for originally published indexes. As a result, no official versions of such originally published indexes are readily available.

(9) Define the mechanics of price adjustment.

(a) Simple percentage method.

One method of price adjustment is to have the base price changed by the same percentage as the percent change in a selected PPI. To illustrate, suppose that a price adjustment clause called for using the intermediate demand PPI titled Materials and components for manufacturing, not seasonally adjusted. Also suppose that the value of this index was 178.4 for December 2010, the month that corresponds with the base price for adjustment, \$1,000 per unit. Twelve months later, when December 2011 data were released and the first stipulated price adjustment was to be made, the index value for December 2011, published mid-January 2012, was 187.7. The percent change represents an increase of 5.2 percent in the index for Materials and components for manufacturing and a \$52 per unit increase in the price for the product. (See below.)

Index at time of calculation, December 2011:	187.7
Divided by index at time base price was set, December 2010:	178.4
Equals	1.052
Base price	\$1,000
Multiplied by	1.052
Equals adjusted price	\$1,052

In later years, this procedure could be applied again by taking the next year's December index value, dividing by the index value at the time the base price was set, and proceeding as described above. For example, let us assume that this contract continued through the year 2013. In mid-January 2013, the December 2012 index would be released by PPI. The ratio of price change would be derived by taking the December 2012 index and dividing by the December 2010 value, and multiplying this result by the base price of \$1,000 to provide an updated price for 2013.

Index at time of second calculation, December 2012:	187.2
Divided by index at time base price was set, December 2010:	178.4
Equals	1.049
Base price	\$1,000
Multiplied by	1.049
Equals adjusted price	\$1,049

Note that in this example, because prices for materials and components for manufacturing declined in 2012, the adjusted price in 2013 would be slightly lower than it was in 2012. In addition, if the parties to the contract had agreed to perform these calculations each year in mid-May, after the release of revised data for December, the calculations would have been based on final index values.

(b) Adjusting a portion of the base price.

Another procedure sometimes employed identifies a portion of the base price to be adjusted by a selected PPI, while the balance remains fixed. To illustrate, suppose that an item has a base price of \$1,000, of which \$700 is to be adjusted by the index, while the other \$300 remains unchanged. To determine the "certain dollar amount" that is needed for citation in the contract, divide the designated variable portion of the base price (\$700) by 100, in this case yielding \$7 for each 1.0 percent movement in the index. Based on the prior example using the PPI for Materials and Components for Manufacturing, the base price would be adjusted to \$1,036.40 after one year. (See below.)

Base price	\$1,000
Index at time of calculation, December 2011:	187.7
Index at time base price was set, December 2010:	178.4

Equals percent change for 2011: 5.2

Price adjustment: $5.2 \times \$7 = \36.40

Equals adjusted price: \$1,000.00 (base price) + \$36.40 (adjustment) = \$1,036.40 (adjusted price)

(c) Index points.

Relatively few price adjustment clauses adjust contract prices on the basis of changes in index points. The BLS strongly discourages this practice, because changes in index levels do not reflect percent changes in prices when the values move away from their base level of 100. For instance, in the earlier example, an index point change of 9.3 reflected the 5.2-percent increase in prices for material and components for manufacturing from December 2010 to December 2011. Adjusted by index point changes has the effect of overestimating the percentage change in prices when the index is above 100 and underestimating the percentage change in prices when the index level is below 100. In addition, contracts employing the index point method are subject to complications relating to index base date changes.

(d) Composite indexes.

Some contracts provide for the construction of a composite index based on several series. The advantage of a composite index is that it may more accurately identify the appropriate change for a base price (see guideline (2)), since it would refer to several of the costs involved in producing the product or service in question. However, a composite index entails more calculations at the time of adjustment than the simpler procedures described earlier. Though these composite calculations often employ official BLS data, these composite indexes constructed by the contracting parties are not official BLS data.

The procedures for specifying a composite index to be used in a price adjustment agreement are illustrated by the following steps:

- (i) Choose the indexes that will represent the different costs involved in producing the good or service. For example, indexes for energy, machinery and equipment, services, and labor might provide an appropriate mix.
- (ii) Choose the appropriate weights for these indexes, in accordance with the proportion of the production budget which may be devoted to these various categories. The weights should be assigned as proportions and sum to 1.0, the equivalent of 100 percent coverage. For example, a producer might decide that for a specific price adjustment calculation, the appropriate weightings for energy, machinery and equipment, services, and labor might be 0.15, 0.25, 0.25, and 0.35, respectively.
- (iii) The weights should be representative of the time period associated with the base price, which would be the base period for any calculations.
- (iv) Once indexes have been chosen and relative proportions assigned, it is necessary to rebase all of the original index data to the contract's base period. This is done for each series by dividing the indexes that correspond to the price adjustment month and year by their index values in the base period, and then multiplying the result by 100. For this and following steps, note the detailed example in Table 1 that follows in the Example of Price Adjustment Procedures section.
- (v) Derive the value for the composite index by multiplying the relative weights for each cost category by the rebased index values for each index series. Then, sum the results.
- (vi) Using the composite index values created in step (v), calculate the current adjustment in standard fashion; that is, using the procedure described in guideline (9)(a).

(e) Limits for price adjustment.

Price adjustment clauses sometimes reference a floor, a ceiling, or both, to limit the total price adjustment during the life of the contract. Contracts typically provide that a price adjustment is to apply in both an upward and downward direction. On occasion, however, contracts stipulate that the base price is a price floor and that prices can only rise. In addition, some contracts specify that no price adjustments are to be made until a minimum price change has occurred.

Example of Price Adjustment Procedures

Suppose a manufacturer of widgets enters into a long-term sales contract with a customer. The buyer and the seller agree to include a clause that adjusts the selling price yearly, up or down, to account for changes in energy, machinery and equipment, business service, and labor costs. The following is an example of the terms that might be incorporated into such a price adjustment clause. The example assumes the use of the composite index method, discussed in section (d) of guideline (9).

- (a) The base selling price for type A widget is set at \$1,000 per unit as of December 2010, to remain in effect for 1 year. December 2010 is hereafter called the base period.
- (b) The base selling price shall be adjusted in accordance with the percent changes of the composite index described in (D) below. The index shall be derived from the following component indexes:
 - (i) Energy: PPI code ID69113, Processed energy goods, database code WPUID69113,
 - (ii) Machinery and equipment: PPI code 114, General purpose machinery and equipment, database code WPU114,
 - (iii) Services: PPI code ID63, Services for intermediate demand, database code WPUID63,
 - (iv) Labor: Employment Cost Index (ECI) for Total Compensation (wages and benefits), private industry, goods producing industries, database code CIU201G000000000I. Note that this BLS index is published on a quarterly basis, and as such, 4th quarter values will be used for the price adjustment calculation.

PPI data can be obtained from the [BLS Website](#), by emailing the PPI at ppi-info@bls.gov, or by calling (202) 691-7705. To access data from the ECI, visit the [ECI website](#), submit a question via the [online form](#), or call (202) 691-6199.

- (c) The selling price shall be adjusted on or after February 1 of each year, beginning 12 months after the contract is initiated, for all years that the contract remains active, based on the percent change (up or down) in the composite index described below. The calculation will compare the base period (December 2010) with

December of the most recent year. PPI data for December are typically released mid-January, and Employment Cost Index data for the fourth quarter are typically released by the end of January. Contact the PPI and the ECI each January to identify when December PPIs and the fourth quarter ECI data are scheduled for publication. All calculations shall be based on the latest versions of the PPI and the ECI available on or after February 1 when the December PPIs and the fourth quarter ECI are published. All indexes for this calculation are not seasonally adjusted.

(d) The composite index shall be derived in the following manner:

(i) The values for the current period for each of the 4 BLS index series specified in (b) above shall be rebased to the reference base period December 2010. This shall be done by dividing the current December value of each index by its value for the base period, and then multiplying the result by 100.

(ii) The rebased energy index shall be assigned a proportion of 0.15, representing 15%. The rebased machinery and equipment index shall be assigned a proportion of 0.25 (25%). The rebased services index shall be assigned a proportion of 0.25 (25%). The rebased labor index shall be assigned a proportion of 0.35 (35%). These proportions sum to 1.00 (100%), and correspond with the base period of December 2010.

(iii) Multiply the rebased current index for each component by its relative proportion.

(iv) The sum of these 4 values shall result in the composite index for the current time period.

(v) Divide the component index by 100 and multiply that result by the original base price. This final figure shall be the adjusted price for the current time period.

(e) If December ECI data are not available for any year, the ECI for the immediately preceding September shall be used as the basis for adjustment of the labor index. If December PPI data are not available for any year, the PPI data for the most recent immediately preceding month shall be used as the basis for adjustment. If no ECI or PPI data have been published for those months, then the contracting parties shall agree upon substitute series.

With these terms in effect, table 1 below is an example of the data and calculations which would have been made on February 1, 2012 to determine the new per unit selling price for type A widgets based on changes in specified BLS indexes from December 2010 to December 2011.

Table 1. Sample Calculation Procedures for a Composite Index Calculation

	Energy	Machinery and equipment	Services	Labor	Composite index
Base price = \$1,000 per unit sold					
Adjustment period index (Dec. 2011 / 4th qtr. 2011)	217.0	210.5	103.4	113.8	-
Divide by base period index (Dec. 2010 / 4th qtr. 2010)	195.7	202.1	101.4	111.1	-
Equals:	1.109	1.042	1.020	1.024	-
Multiply by 100 to yield the rebased index	110.9	104.2	102.0	102.4	-
Assigned proportion	0.15	0.25	0.25	0.35	-
Multiply rebased index by assigned proportion	16.6	26.1	25.5	35.8	-
Add components to obtain the composite index	-	-	-	-	104.0
Divide composite index by 100	-	-	-	-	1.040
Multiply the result by the base price to yield adjusted price	-	-	-	-	\$1,040

On or after February 1, 2013, if this price adjustment agreement remained in effect, another adjustment would result. With the release of PPI data for December 2012 in mid-January 2013 and the release of ECI data for the fourth quarter of 2012 in late January 2013, replacing the December 2011 / fourth quarter 2011 values in the table with December 2012 / fourth quarter 2012 values would yield the updated amount.

Pitfalls to avoid

- Vague citation of "the Producer Price Index" rather than a reference to a specific index by its title and identifying code. See *guideline (3)*.
- Citation of the All Commodities index or the Industrial Commodities index rather than an index that mitigates or does not include multiple counting. See *the discussion of commodity indexes in the Appendix*.
- Use of unofficial estimates derived using rebasing factors rather than relying on official BLS data. See *guideline (8)*.
- Ambiguous references to dates. See *guideline (5)*.
- Lack of a provision for a successor index should the designated index be dropped from the PPI program, or become temporarily unavailable. See *guideline (6)*.
- Locking indexes to a specific base period. See *guideline (8)*.
- Using ambiguous terms. For example, referring to "actual" indexes. See *guideline (7)*.

Appendix: An Overview of PPI Classification

Final Demand-Intermediate Demand (FD-ID) Indexes

The PPI FD-ID structure measures price change for goods, services, and construction sold to final demand and to intermediate demand. The FD-ID system replaced the PPI stage-of-processing (SOP) system as PPI's primary aggregation model with the release of data for January 2014. The FD-ID system expands coverage in its aggregate measures beyond that of the SOP system through the addition of services, construction, exports, and government purchases.

FD-ID indexes are constructed from commodity-based producer output price indexes. These commodity-based output price indexes are allocated to aggregate categories based on proportions of use by type of buyer. The main source of data used to determine buyer type is the table titled Use of commodities by industries, before redefinition from the Benchmark Input Output Data Tables of the United States, produced by the U.S. Bureau of Economic Analysis (BEA). The two primary classes of buyers included in the FD ID system are final demand (personal consumption, capital investment, government, export) and intermediate demand (business purchases, excluding capital investment). In many cases, the same commodity is purchased by different buyer types, so commodities are often included in several FD ID indexes. For example, regular gasoline is purchased for personal consumption, export, government use, and business use. The PPI program publishes only one commodity index for regular gasoline, reflecting sales to all types of buyers. It is this index that is used in all FD

ID aggregations, regardless of whether the gasoline is sold for personal consumption, as an export, to government, or to businesses, with differences accounted for in the applicable weights to each aggregate FD or ID index. In some cases, buyer type is an important price determining characteristic, and results in commodity indexes being created on that basis. For example, within the PPI category for loan services, separate indexes for consumer loans and business loans were constructed. In this case, the commodity index for consumer loans would be included in the final demand index and the commodity index for business loans would fall under intermediate demand.

For more information relating to the construction of the FD-ID system, see "[A new, experimental system of indexes from the PPI program](#)" in the February 2011 Monthly Labor Review, or visit the web page documenting the [FD-ID Aggregation System](#). More information about overall PPI methodology is available from the PPI chapter of the [BLS Handbook of Methods](#).

Final demand

The final demand portion of the FD-ID system measures price change for commodities sold as personal consumption, capital investment, government purchases, and exports. The system is composed of six main price indexes: final demand goods; final demand trade services; final demand transportation and warehousing services; final demand services excluding trade, transportation, and warehousing; final demand construction; and overall final demand.

The final demand goods index measures price change for both unprocessed and processed goods sold to final demand. Fresh fruit sold to consumers and computers sold as capital investment are examples of transactions included in the final demand goods price index. The final demand trade services index measures changes in margins received for the retailing and wholesaling of merchandise sold to final demand, generally without transformation. The final demand transportation and warehousing services index tracks price change for transportation of passengers, as well as, transportation of cargo sold to final demand, and also includes prices for warehousing and storage of goods sold to final demand. The final demand services less trade, transportation, and warehousing index measures price change for all services other than trade and transportation sold to final demand. Publishing, banking, lodging, and health care are examples of these services. The final demand construction index tracks price change for new construction and maintenance and repair construction sold to final demand. Construction of office buildings is an example of a commodity that would be included in the final demand construction index. Lastly, the overall final demand index tracks price change for all types of commodities sold to final demand by combining the five final demand component indexes described above.

Intermediate demand

The intermediate demand portion of the FD-ID system tracks price change for goods, services, and construction products sold to businesses as inputs to production, excluding capital investment. The system includes two parallel treatments of intermediate demand. The first treatment organizes intermediate demand commodities by type. The second organizes intermediate demand commodities into production stages, with the explicit goal of developing a forward-flow model of production and price change.

INTERMEDIATE DEMAND BY COMMODITY TYPE

The intermediate demand by commodity type treatment within the FD-ID system organizes commodities by similarity of product. The system is composed of six main price indexes: unprocessed goods for intermediate demand; processed goods for intermediate demand; intermediate demand trade services; intermediate demand transportation and warehousing services; intermediate demand services less trade, transportation, and warehousing; and intermediate demand construction. The grouping for processed goods for intermediate demand is equivalent to the SOP grouping for intermediate materials, supplies, and components, and the grouping for unprocessed goods for intermediate demand corresponds with the SOP grouping for crude materials for further processing.

The unprocessed goods for intermediate demand index measures price change for goods that have undergone no fabrication and are sold to businesses as inputs to production. Crude petroleum sold to refineries is an example of an unprocessed good sold to intermediate demand. The processed goods for intermediate demand index tracks price change for fabricated goods sold as business inputs. Examples include car parts sold to car manufacturers and gasoline sold to trucking companies. The index for trade services for intermediate demand measures changes in margins received for the services of retailing and wholesaling goods purchased by businesses as inputs to production. The intermediate demand transportation and warehousing index measures price change for business travel, as well as, transportation and warehousing of cargo sold to intermediate demand. The intermediate demand services less trade, transportation, and warehousing index tracks price change for non-trade and non-transportation services purchased by firms as inputs to production. Legal and accounting services purchased by businesses are examples of intermediate demand services excluding trade, transportation, and warehousing. Finally, the construction for intermediate demand index measures price change for construction purchased by firms as inputs to production. Since new construction is categorized in the final demand portion of the economy as capital investment, the construction for intermediate demand index tracks price change for maintenance and repair construction purchased by firms.

INTERMEDIATE DEMAND BY PRODUCTION FLOW

The production flow treatment of intermediate demand is a stage-based system of price indexes. These indexes can be used to study price transmission across stages of production and final demand. This system is constructed in a manner that maximizes forward flow of production between stages, while minimizing back flow of production. The production flow treatment contains four main indexes: intermediate demand stage 1, intermediate demand stage 2, intermediate demand stage 3, and intermediate demand stage 4.

Indexes for the four stages were developed by first assigning each industry in the economy to one of four stages of production, where industries assigned to the fourth stage primarily produce output consumed as final demand, industries in the third stage primarily produce output consumed by stage 4 industries, industries assigned to the second stage primarily produce output consumed by stage 3 industries, and industries assigned to the first stage produce output primarily consumed by stage 2 industries. Indexes for the stages track prices for the net inputs consumed by industries in each of the four stages of production. For example, the stage 4 intermediate demand index tracks price change for inputs consumed, but not produced, by industries included in the fourth stage of production. Hence, the index measures price change in the inputs to production of industries that primarily produce final demand commodities. The main sources of data used to develop these indexes were the BEA tables titled Use of commodities by industries, before redefinition and Make of commodities by industries, before redefinition.

Examples of heavily weighted goods-producing industries in stage 4 include the manufacture of light trucks and utility vehicles, automobiles, and pharmaceuticals. Retail trade, food service and drinking places, and hospitals are examples of heavily weighted service industries included in stage 4. Stage 4 also includes all new construction industries. Examples of goods consumed by stage 4 industries include motor vehicle parts, commercial electric power, plastic construction products, biological products, and beef and veal. Engineering services, machinery and equipment wholesaling, long distance motor carrying, and legal services constitute examples of services consumed by stage 4 industries.

Examples of highly weighted goods-producing industries included in stage 3 are motor vehicle parts manufacturing, animal (except poultry) slaughtering and processing, and semiconductor manufacturing. Services industries classified in stage 3 include wholesale trade; insurance carriers; architecture, engineering, and related services; and hotels and motels. Examples of goods consumed by stage 3 industries include slaughter steers and heifers, industrial electric power, and hot

rolled steel bars, plates, and structural shapes. Services commonly consumed by stage 3 industries include commissions from sales of property and casualty insurance, business loans, temporary help services, and administrative and general management consulting services.

Petroleum refineries; electricity generation, transmission, and distribution; natural gas distribution; cattle ranching and farming; and plastic materials and resin manufacturing are among the goods-based industries assigned to stage 2. Services industries that are heavily weighted in stage 2 include management of companies and enterprises; non-depository credit intermediation and related activities; insurance agencies, brokerages, and related activities; and services to buildings and dwellings. Goods commonly purchased by stage 2 industries include crude petroleum, natural gas, formula feeds, and primary basic organic chemicals. Services that are heavily weighted in the intermediate demand stage 2 index are legal services, business loans, and cellular phone and other wireless telecommunication.

Goods producing industries in stage 1 include oil and gas extraction, paper mills, and grain farming. Real estate, legal services, and advertising services are examples of highly weighted services industries included in stage 1. Examples of goods consumed by stage 1 industries are commercial and industrial electric power and gasoline. Services commonly consumed by stage 1 industries include solid waste collection, chemicals and allied products wholesaling, and guestroom or unit rental. All inputs purchased by stage 1 industries are by definition produced either within stage 1 or by latter stages of processing, leaving stage 1 less useful for price transmission analysis.

See [industry stage assignments](#) for more information.

Special groupings

In addition to the FD-ID structures described in the prior sections, a number of supplemental indexes have been developed in order to provide data users with index groupings not available through the primary FD-ID structures. Some examples of these special grouping indexes include:

Final demand

Final demand less foods, energy, and trade services

Final demand goods plus final demand distributive services

Final demand distributive services

Total finished (the personal consumption and private capital investment portion of final demand)

Finished goods

Total exports

Government purchased goods

Government purchased services

Personal consumption

Personal consumption goods plus personal consumption distributive services

Intermediate demand

Processed energy goods

Processed foods and feeds

Processed materials less foods and energy

Processed goods plus intermediate distributive services

Unprocessed foodstuffs and feedstuffs

Unprocessed energy materials

Unprocessed nonfood materials less energy

Total goods inputs to stage 4 intermediate demand

Total services inputs to stage 4 intermediate demand

Total goods inputs to stage 3 intermediate demand

Total services inputs to stage 3 intermediate demand

Total goods inputs to stage 2 intermediate demand

Total services inputs to stage 2 intermediate demand

To view the complete set of indexes included in the FD-ID system, see tables 1, 2, and 3 of the [PPI News Release](#).

Commodity Indexes

The commodity classification structure of the PPI organizes products by similarity of end use or material composition, regardless of their industry of origin. This system is unique to the PPI and does not match any other standard coding structure, such as the NAICS or the U.N. Standard International Trade Classification (SITC). The historical continuity of index series, the needs of index users, and a variety of ad-hoc factors were important in developing the PPI commodity classification. Prior to January 2009, the commodity classification system included only goods-based price indexes. With the release of data for January 2009, PPI expanded the commodity classification structure to include services and construction products. Table 9 of the [PPI Detailed Report](#) includes data for commodity indexes, organized in a hierarchical structure, including major groupings, subgroups, product classes, sub-product classes, and individual items.

The commodity classification system is organized as a hierarchical structure that starts with major commodity groupings (2-digit level of aggregation). Major groupings 01 through 15 encompass commodity-based goods indexes. Major groupings 30 through 61 include services-based commodity indexes, and major group 80 encompasses construction-based commodity indexes. Each major commodity grouping includes (in descending order of aggregation) subgroups (3-digit level), product classes (4-digit level), sub-product classes (5- and 6-digit level), item groupings (7-digit level), and individual items (8-, 9-, and 10-digit levels).

Unlike many FD-ID indexes, some of the traditional commodity grouping indexes, such as the All Commodities index, the Industrial Commodities index, and 2- and 3-digit commodity grouping indexes, exhibit a multiple counting bias in reflecting price changes. In brief, multiple-counting bias means that price changes for components that go through many stages of processing have an excessive influence on aggregate index series. This problem is common among highly aggregated PPI commodity groupings because they are calculated from price changes of commodities at several stages of the production process, where each individual price change is weighted by its total gross value of shipments in the weight-base year. This problem occurs because many products go through successive stages of fabrication or processing and have their price changes counted separately at each stage. The indexes for final demand, intermediate demand by production flow, and the net output of industries and industry groups eliminate the defect of multiple counting of price changes, while the intermediate demand by commodity type indexes mitigate, but do not eliminate, this defect.

To illustrate the multiple-counting problem, suppose that the price of cotton rises sharply. If the price increase is passed through by spinners of cotton yarn and thread, then by weavers of gray cotton fabric, then by producers of finished cotton fabric, and, finally, by shirt manufacturers, the single price increase for the raw material cotton would have been included five times in the All Commodities index and four times in both the Industrial Commodities index and the major commodity grouping index for textile products and apparel. Inasmuch as prices throughout the economy are always changing at different rates, multiple counting can result in rates of change for aggregated price indexes that are highly misleading, because prices of raw materials tend to be more volatile than prices of final demand goods and because gross output values are used as weights for major commodity groups. Specific, detailed commodity indexes, such as 6- and 8-digit commodity-based PPIs, and many 4-digit commodity codes, are effectively free of this multiple-counting defect.

Industry Indexes

A Producer Price Index for an industry is a measure of changes in prices received for the industry's output sold outside the industry (that is, its net output). Measures of price change classified by industry form the basis of sampling and data collection within the PPI. These indexes reflect the price trends of a constant set of goods and services that together represent the total output of an industry. Standardized industry-based index codes provide comparability with a wide assortment of industry-based data for other economic phenomena, including productivity, production, employment, wages, and earnings.

For about 25 years (from the late 1970s through 2003), the PPI program made use of the Standard Industrial Classification (SIC) system as the structure for the collection and presentation of industry-based price data. However, the SIC system received increasing criticism about its inability to handle rapid changes in the U.S. economy. Developments in information services, new forms of health care, expansion in services, and high-tech manufacturing are examples of industrial changes that could not be studied adequately under the SIC system.

The PPI program began publishing industry-based price data organized in accordance with the North American Industry Classification System (NAICS) with the release of data for January 2004. Developed in cooperation with Canada and Mexico, NAICS represents one of the most profound changes in statistical programs focusing on emerging economic activities. NAICS uses a production-oriented conceptual framework to group establishments into industries on the basis of the primary activity in which they are engaged. Establishments using similar raw-material inputs, similar capital equipment, and similar labor are classified under the same industry. The industry within which an establishment is classified is determined by those products which account for the largest share of the establishment's total value of shipments.

In addition to aggregate indexes tracking price changes for groups of industries and industries as a whole, in general, there may be as many as three kinds of product level indexes for categories within a given industry. Every industry has primary product indexes that show changes in prices received by establishments in the industry for the various products made primarily, but not necessarily exclusively, by that industry. For contracting parties looking to use industry based PPIs for price adjustment purposes, these indexes, which directly relate to the various types of primary production of an industry, are more appropriate for use in contracts. Two examples of primary production are cranes produced by construction machinery manufacturers (NAICS 333120), and financial auditing done by offices of certified public accountants (NAICS 521211). In addition to indexes for primary products of industries, most industries have secondary product indexes that show changes in prices received by establishments within an industry for products made chiefly by other industries. Some examples include mining machinery production and the selling of scrap done by construction machinery manufacturers, as well as management consulting services performed by accounting firms. Finally, some industries have miscellaneous receipts indexes that show price changes for other sources of revenue, such as resales of purchased products or collection of rents. Indexes for secondary products and miscellaneous receipts generally are not considered appropriate for price adjustment, since they reflect an undefined basket of goods or services. It is suggested that contracting parties looking for a high-level index for a specific industry consider using the industry's primary products aggregate index, which brings together the various products that constitute the primary production of that industry into a single aggregate index.

Footnotes

1 See, [Highlights of the 2013 PPI User Survey](#), Bureau of Labor Statistics, Beyond the Numbers, August 2013, Volume 2, No. 20, Joseph Kelley and Antonio Lombardozi.

2 Data requests and technical questions concerning the PPI may be addressed to the PPI Section of Index Analysis and Public Information. They can be reached at telephone number 202-691-7705, or by e-mail at (ppi-info@bls.gov). Please refer to the desired series by title and code, exactly as cited in the contract.

3 The Employment Cost Index (ECI) is based on a quarterly survey typically published in the month that follows the completion of the calendar quarter. Because the ECI has relatively little industry detail, data users may have to use a higher level of aggregation than they do with PPI data. However, the Employment Cost Index is a highly useful measure of labor costs because it covers all workers (not just production and nonsupervisory workers) and because it includes not only wages and salaries but also employer costs for employee benefits. Like the PPI, the ECI is a fixed-weight index and is not influenced by employment shifts among industries and occupations with different wage and benefit levels. But unlike the PPI, ECI data are final when they are first published and are not subject to revision (except on a seasonally adjusted basis). The ECI Website is located at <http://www.bls.gov/ncs/ect/>, and they can be reached over the phone at 202-691-6199.

4 From the seller's point of view, a contract which adjusts the price of a product based on the change in the PPI for that same product might not provide an appropriate basis for changing the base price. If most companies reporting a product's price to BLS employed price adjustment clauses using the PPI for that same product, these firms would be unable to raise their prices until the PPI advanced; however, there could be no advance in the PPI until the companies were able to raise their prices. From the buyer's point of view, a reverse circularity is evident when the price of a product purchased is adjusted by the PPI for the same product. A rise in the contract price may be reflected in a rise in the PPI, which would trigger yet another rise. In summary, contract escalators generally are put in place to cope with input cost volatility from the sellers' side of the transaction. Under certain conditions, sellers may not be able to provide the agreed to product or service if large increases in input costs are not mitigated. Similarly, buyers may feel little incentive to lock in a price over time if they perceive that a drop in input costs accrues only to the seller as a windfall.

5 Sometimes, however, government agencies, laws, or regulations stipulate which index or level of detail must be cited.

6 As an example of PPI practices, first-published PPI data for December 2012, as well as final data for August 2012, were released on January 15, 2013. Final data for December 2012 were released on May 15, 2013 with the first release of data for April 2013. Final data for all indexes appear in the recalculated index column of each table in each issue of the PPI Detailed Report, and are available online through LABSTAT. Contracting parties who want to use other BLS series for price adjustment in addition to PPIs should be aware that each BLS program has its own revision and correction policies.

7 Most of the new FD-ID indexes have an index base of November 2009=100 or April 2010=100. However, the goods-based indexes of the FD-ID system that correspond with the previous SOP model have an index base of 1982=100. Some commodity-type indexes also have an index base of 1982=100, but other commodity-type indexes, as well as all of the industry-based indexes, have their base period set equal to the month and year of their introduction.

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