

PPI Program Spotlight



U.S. Department of Labor
Bureau of Labor Statistics

Stage-of-Processing Indexes

The Producer Price Index (PPI) measures change over time in selling prices received by domestic producers of goods and services.¹ The PPI collectively refers to over 10,000 different price indexes for individual products and services and for groupings of products and services. The most watched PPIs—those that are analyzed in the monthly BLS press release—are the three stage-of-processing (SOP) price indexes: Crude materials for further processing; intermediate materials, supplies, and components; and finished goods.

Overview

SOP indexes are useful for analyzing inflation in the U.S. economy or, more specifically, for studying how price change for input goods—used to produce final goods—is passed through to the price of final goods. Final goods are those that are ready to be sold to consumers for personal consumption or to businesses as capital investment.

The crude materials for further processing SOP index includes commodities that are entering the market for the first time and have not been processed. The intermediate SOP index includes partially processed materials that require further processing and components that require only assembly or installation. In addition, this category includes fuels and lubricants, containers, and supplies consumed by businesses as inputs into the production of outputs. In accordance with national accounting conventions, the intermediate category excludes capital equipment, even though the equipment are inputs into production. (Capital equipment is included in finished goods.) The finished goods SOP index includes commodities that undergo no further processing and are for sale—either to a final demand user or to the chain of distribution.

It is important to note that a particular good may be included, with appropriate weights, in more than one SOP index. This occurs because some goods are used by businesses as inputs and are also purchased by consumers for personal consumption. For example, gasoline is included in the consumer nondurable goods component of finished goods to reflect purchases as fuel for automobiles

used by individual consumers. However, gasoline is also included in the processed fuels and lubricants for manufacturing and nonmanufacturing industries components of intermediate goods to reflect purchases by businesses as fuel for delivery vehicles. Though a weight for gasoline is included in both the intermediate and finished SOP indexes, its price movement is identical in the two indexes. The PPI for Gasoline—like all PPIs for individual commodities—measures the average change in the prices received by producers from all types of buyers.

Uses

PPIs track prices prior to the retail level. Since finished goods are ready for sale to final demand, many policymakers and forecasters use the PPI, along with other statistical tools, as a leading indicator to the goods portion of the Consumer Price Index (CPI). Due to compositional differences, the overall PPI for Finished Goods is generally not considered comparable to the overall CPI-U for All Urban Consumers.² Major differences between these indexes include: (1) Services prices, included in the CPI, are excluded from the finished goods SOP, (2) Capital equipment prices, included in the PPI, are excluded from the CPI, and (3) Import prices, included in the CPI, are excluded from the PPI. The individual PPI and CPI indexes that are considered most closely comparable in coverage are the PPI Finished Consumer Goods Index and the commodities component index of the CPI.

The crude and intermediate goods indexes are barometers of price movement for businesses' cost of materials and costs of products purchased from other firms. Economic reasoning would suggest that rising production costs will eventually lead to rising final goods prices. Accordingly, many analysts study the crude and intermediate goods SOP indexes in an effort to anticipate future movements in the finished goods SOP index. The expectation that there may be linkage in the movements of the 3 PPI SOP indexes is supported by examination of the figure below, which plots 12-month percent changes in the so called core -- exclusive of volatile food and energy components --

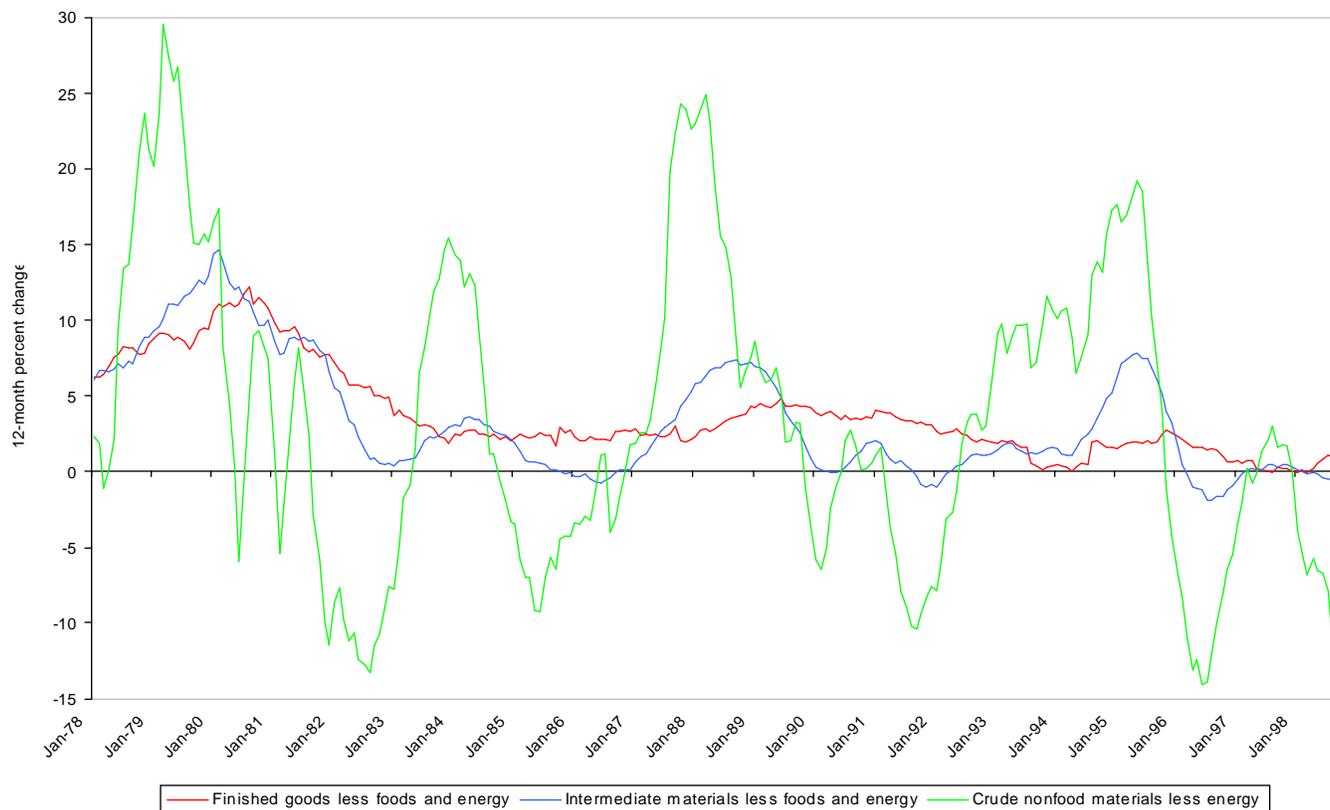
NO. 98-5
BUREAU OF LABOR
STATISTICS

2 MASS. AVE. NE,
WASHINGTON, D.C.
20212
ROOM 3840

(202) 606-7705
<http://stats.bls.gov>

Spotlight

Percent changes for selected stage-of-processing price indexes (excluding foods and energy),
January 1978 through September 1998



crude, intermediate, and finished goods SOP indexes from 1978-1998. Twelve-month percent changes are plotted because this tends to smooth out the time series. As seen in this figure, there has been a fairly strong tendency over the period for crude goods price movements to lead intermediate goods price movements, and a much weaker tendency for the latter to lead finished goods price movements.

There are three major qualifications to the expectation of linkage in the movements of the three PPI SOP indexes. The first is that material-input costs are but a portion of producers' total production costs. Other costs include purchased services, insurance, wages, interest, and rent. Increases in any of these excluded costs may impact finished goods prices but will not show up in the crude or intermediate goods SOP indexes. Second, depending on competitive conditions, firms experiencing rising material input costs may be unable to pass these on to purchasers of their final goods. Also, firms experiencing productivity gains may be able to accommodate rising material input costs, without raising final goods prices.

Third, inter-industry transactions in the U.S. economy do not always follow the pattern implied by SOP indexes. The SOP model implies a forward flow of transactions towards final demand, with outputs moving between industries aligned in a series of input-output relationships. With transactions so aligned, changes in crude goods prices could be expected to influence the intermediate goods index; and changes in intermediate goods prices would eventually impact the

finished goods index. In practice, however, economic transactions do not always follow this model. Finished goods, e.g., paper, flow in reverse as supplies for businesses. Crude goods, e.g., agricultural commodities, skip the intermediate stage of production to be exported as part of final demand. A related point is that the division of U.S. goods outputs into three stages is a somewhat arbitrary determination. While it is generally feasible to identify those goods first entering the production chain (i.e., crude goods), as well as those goods leaving the manufacturing sector as finished consumer goods and capital equipment (i.e., finished goods), within the intermediate processing stage, some goods are inputs into other goods. One example is the inclusion of both corrugated paper and cardboard boxes in the intermediate SOP index. This internal, rather than forward flow of goods, results in multiple counting of price change within intermediate goods. In 1978, BLS switched its analytical focus on PPI data from the All commodities to the Stage of processing indexes because of the excessive multiple counting of price change in the former.

In the following sections, the content and component indexes of each of the major SOP categories are described in more detail.

Finished goods

In national income accounting terminology, the finished goods price index roughly measures changes in prices received by producers for two portions of the gross domes-

tic product: (1) personal consumption expenditures on goods, and (2) capital investment on equipment. By contrast, total gross domestic product is comprised of the sum of personal consumption expenditures for goods and services, private investment for both equipment and residential and nonresidential structures, government consumption expenditures and investment, and exports less imports. Ten of the more heavily weighted items in the finished goods SOP index include: Residential electric power, passenger cars, light trucks, civilian aircraft, miscellaneous processed foods, residential natural gas, cigarettes, unleaded regular gasoline, women's apparel, and radio and television communication equipment.

The two major component indexes of finished goods are finished consumer goods and capital equipment. (See table A.) Capital equipment are goods used in industry or commerce to manufacture or transport other commodities. Consumer goods are goods used by individual consumers. The index for passenger cars serves as an example of a good included in both of these indexes since these ultimately get purchased both by individual consumers and by businesses for their fleets.

Table A. Producer Price Indexes for finished goods

Finished goods
Finished consumer goods
Finished consumer foods
Crude
Processed
Finished consumer goods, excluding foods
Nondurable goods less foods
Durable goods
Capital equipment
Manufacturing industries
Nonmanufacturing industries
Special groupings
Finished goods excluding foods
Finished energy goods
Finished goods less energy
Finished consumer goods less energy
Finished goods less foods and energy
Finished consumer goods less foods and energy
Consumer nondurable goods less foods and energy

Finished consumer goods. This category consists of consumer foods, as well as other consumer nondurable goods, and consumer durable goods. The consumer foods category is made up largely of processed consumer foods, but also includes raw agricultural products that are ultimately consumed (after sorting, packaging, or grading) by the individual consumer. Examples of consumer foods includes processed items such as pasta products, processed meats, and bakery products, as well as crude products, such as fresh fruits and vegetables, tree nuts, and eggs for fresh use.

Finished consumer goods excluding foods are comprised of two categories: consumer nondurable goods less foods and consumer durable goods. Consumer nondurable goods less foods consist of nonfood items with a shelf life of less than three years and that are ready for final demand. Some examples of these goods are children's apparel; prescription drugs; cosmetics; sanitary papers; and energy goods, such as gasoline, home heating oil, and residential electric power. Consumer durable goods include products that have a much longer shelf life than nondurables. Items in this category include passenger cars, light trucks, household appliances, and home electronic equipment.

Capital equipment. This grouping consists of products that are used to manufacture or transport other goods in the manufacturing sector and includes machine tools for cutting and stamping metals, other specialized machinery, such as farm machinery and textile machinery, heavy trucks, ships, and boats. In addition, this grouping includes those nonmanufacturing industry products, such as computers, office furniture, and heating equipment, that are used in the operation of businesses.

Special groupings. These indexes are special combinations of components. Often data users want to look at SOP components without the effects of highly volatile categories, such as foods and energy. One such widely-used series is the index for finished goods less foods and energy.

Intermediate goods

The PPI Intermediate Goods Price Index reflects change in the prices received by firms for their sales of materials, supplies, and components to other firms. Ten of the more heavily weighted items in the Intermediate goods SOP index include: Commercial electric power, industrial chemicals, motor vehicle parts, commercial printing, steel mill products, industrial electric power, converted paper and paperboard products, miscellaneous metal products, paper, and plastic packaging. Table B lists all the separate intermediate goods indexes. Roughly speaking, these indexes can be divided into two categories: those for input that are *incorporated* into final goods being produced by firms and those that are *consumed* during the production of final goods. More information on each of these sets of indexes follows.

Materials and components for manufacturing and construction. Indexes for materials and components for manufacturing and construction are major contributors to the intermediate goods SOP. Materials for food manufacturing encompasses commodities like flour, crude vegetable oils, and confectionery materials. Examples of materials for nondurable manufacturing include industrial chemicals, as well as paperboard. Steel mill products, a commodity used in motor vehicle manufacturing, contributes primarily to materials for durable manufacturing. Other examples of materials for durable manufacturing include aluminum mill shapes and glass. Components for manufacturing, while similar to

materials because they become tangible parts of an end-use product, are unlike materials, in that they are already completed and require only installation or assembly. Returning to our motor vehicles example, plastic parts and foundry and forge shop products are examples of components for motor vehicle manufacturing classified within the intermediate SOP. The materials and components for construction index captures price movement for a wide range of commodities, including lumber, plywood, millwork, glass, plumbing fixtures, water heaters, and furnaces.

Fuels and Lubricants, Containers, and Supplies. The intermediate indexes for fuels and lubricants, containers, and supplies all include commodities consumed during production. Examples of intermediate fuels and lubricants include commercial and industrial electric power, commercial and industrial natural gas, liquefied petroleum gas, jet fuel, gasoline, diesel, and lubricating grease and similar oils. The containers index represents enclosures used for shipping. An example is paperboard boxes. The supplies index incorporates commodities such as animal feeds, hand tools, and office supplies.

Table B. Producer Price Indexes for intermediate goods

- Intermediate materials, supplies, and components
 - Materials and components for manufacturing
 - Materials for food manufacturing
 - Materials for nondurable manufacturing
 - Materials for durable manufacturing
 - Components for manufacturing
- Materials and components for construction
- Processed fuels and lubricants
 - Manufacturing industries
 - Nonmanufacturing industries
- Containers
- Supplies
 - Manufacturing industries
 - Nonmanufacturing industries
 - Feeds
 - Other supplies
- Special groupings
 - Intermediate materials less foods and feeds
 - Intermediate foods and feeds
 - Intermediate energy goods
 - Intermediate materials less energy
 - Intermediate materials less foods and energy

Crude goods

The crude goods index is a barometer of price movement for commodities that are entering the market for the first time. Many of these commodities are the outputs of the agriculture or mining sector. Ten of the more heavily weighted items in the crude goods SOP include: Natural gas, crude petroleum, slaughter cattle, bituminous coal, milk eligible for fluid use, corn, slaughter hogs, oilseeds, and slaughter chickens.

The components of crude materials for further processing are foodstuffs and feedstuffs, crude fuel, and nonfood materials except fuel. Foodstuffs and feedstuffs includes commodities such as wheat, corn, animals for slaughter, and oilseeds (e.g., peanuts, cottonseed, and soybeans). Crude fuel includes coal and natural gas. Crude fuel excludes crude petroleum. Nonfood materials less fuel includes commodities such as raw cotton, leaf tobacco, crude petroleum, and metal ores. (See table C.)

Table C. Producer Price Indexes for crude goods

- Crude materials for further processing
 - Foodstuffs and feedstuffs
 - Nonfood materials
 - Nonfood materials except fuel
 - Manufacturing
 - Construction
 - Crude fuel
 - Manufacturing industries
 - Nonmanufacturing industries
- Special groupings
 - Crude materials less agricultural products
 - Crude energy materials
 - Crude materials less energy
 - Crude nonfood materials less energy

Additional information

Telephone. For questions regarding PPI data, contact the Section of Index Analysis and Public Information of BLS at (202) 606-7705.

Internet (<http://stats.bls.gov/ppihome.htm>). This World Wide Web (WWW) site offers current index data available, as well as historical series and news releases. For more information about accessing the PPI home page, see Program Spotlight No. 98-4, "Producer Price Index Data via Internet."

¹ For a detailed description of the PPI program, see "Producer Prices," *BLS Handbook of Methods*. Bulletin 2490, Chapter 14. April 1997.

² For additional information relating to PPI-CPI comparisons, see "How Does the Producer Price Index Differ from the Consumer Price Index?" *PPI Program Spotlight* No. 98-3.