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Producer prices mixed in 2018, energy prices retreat from 2017 highs

Using data from the Producer Price Index (PPI) program, this article describes changes in producer prices in 2018. The PPI for final demand increased 2.5 percent in 2018, the same as in 2017. Within final demand, a downturn in prices for energy goods offset faster rates of increase for foods, core goods, services, and construction, comparing 2018 with 2017. Within intermediate demand, producer inflation was mixed for goods and services inputs destined for the business sector.

The Producer Price Index measures the average change over time in the selling prices received by domestic producers for their output. The Final Demand–Intermediate Demand (FD–ID) aggregation system, the main structure used to analyze the behavior of producer prices, measures final demand inflation (price changes for goods, services, and construction sold for personal consumption, as capital investment, to government, and for export) and intermediate demand inflation (price changes for goods, services, and construction sold to businesses as inputs to production). This article describes PPI price movements in 2018.[1]

Joseph Kowal
kowal.joseph@bls.gov

Joseph Kowal is an economist in the Office of Prices and Living Conditions, U.S. Bureau of Labor Statistics.

Lana Conforti
conforti.lana@bls.gov

Lana Conforti is an economist in the Office of Prices and Living Conditions, U.S. Bureau of Labor Statistics.

Brian Hergt
hergt.brian@bls.gov

Brian Hergt is an economist in the Office of Prices and Living Conditions, U.S. Bureau of Labor Statistics.

Scott Sager
sager.scott@bls.gov

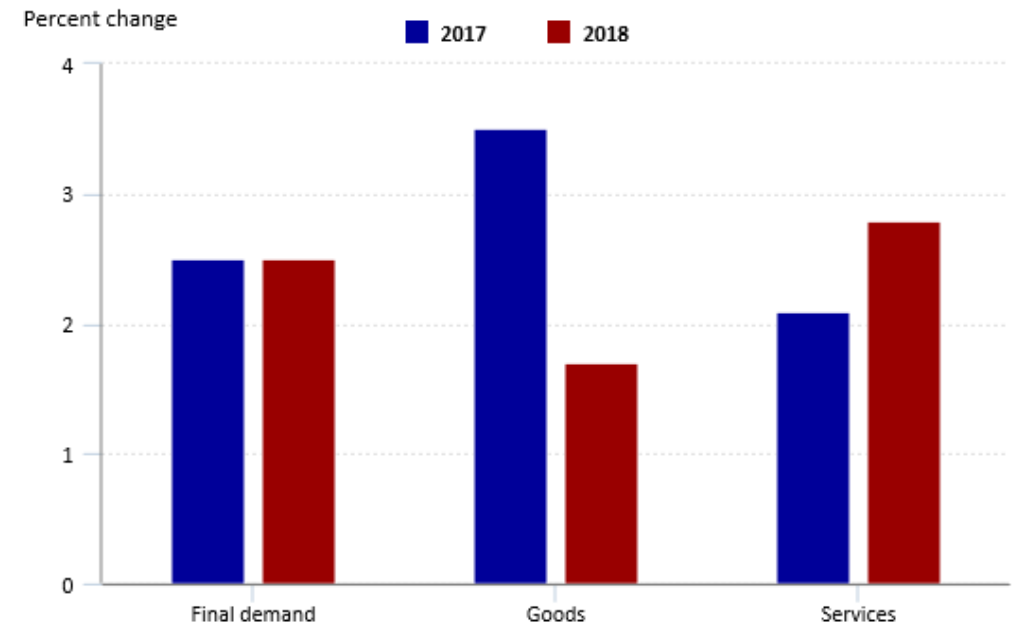
Overview

Producer price changes were uneven in 2018. The PPI for final demand climbed 2.5 percent, the same as in 2017. During this period, price increases for final demand services and final demand construction accelerated, while the index for final demand goods increased at a substantially slower rate than in 2017, primarily because of a downturn in energy prices.

Scott Sager is a supervisory economist in the Office of Prices and Living Conditions, U.S. Bureau of Labor Statistics.

In calendar-year 2018, the index for final demand services increased 2.8 percent following a 2.1-percent advance for the 12 months ended December 2017. Leading the broad-based acceleration, the index for final demand transportation and warehousing services jumped 6.5 percent, compared with a 2.3-percent rise the previous year. Margins for final demand trade services moved up 2.5 percent in 2018 after increasing 1.8 percent a year earlier. (Trade indexes measure changes in margins received by wholesalers and retailers.[2]) The index for final demand services less trade, transportation, and warehousing rose 2.6 percent after climbing 2.3 percent in 2017. (See figure 1 and table 1.)

Figure 1. Producer price indexes for total final demand, goods, and services, 12-month percent change, 2017 and 2018



Source: U.S. Bureau of Labor Statistics.

Table 1. Selected producer price indexes for final demand and intermediate demand, 12-month percent changes, 2017 and 2018

Index	2017	2018
Final demand		
Total final demand	2.5	2.5
Goods for final demand	3.5	1.7
Foods	2.0	3.3
Energy goods	10.1	-2.7
Goods less foods and energy	2.2	2.5
Services for final demand	2.1	2.8

See footnotes at end of table.

Table 1. Selected producer price indexes for final demand and intermediate demand, 12-month percent changes, 2017 and 2018

Index	2017	2018
Trade services	1.8	2.5
Transportation and warehousing services	2.3	6.5
Services less trade, transportation, and warehousing	2.3	2.6
Construction for final demand	3.1	5.1
Intermediate demand, by type of commodity		
Processed goods for intermediate demand	5.0	3.0
Processed foods and feeds	1.0	.1
Processed energy goods	13.5	2.9
Processed materials less foods and energy	3.6	3.4
Unprocessed goods for intermediate demand	5.0	9.1
Unprocessed foodstuffs and feedstuffs	3.0	-1.2
Unprocessed energy materials	4.1	22.3
Unprocessed nonfood materials less energy	8.5	3.1
Services for intermediate demand	2.9	3.1
Trade services for intermediate demand	4.0	4.1
Transportation and warehousing services for intermediate demand	2.9	4.1
Services less trade, transportation, and warehousing for intermediate demand	2.8	2.7
Construction for intermediate demand	1.3	2.2
Intermediate demand, by production flow		
Stage 4 intermediate demand	3.4	3.1
Total goods inputs to stage 4 intermediate demand	3.4	3.0
Total services inputs to stage 4 intermediate demand	3.2	3.3
Stage 3 intermediate demand	4.8	1.8
Total goods inputs to stage 3 intermediate demand	6.3	.5
Total services inputs to stage 3 intermediate demand	3.3	3.1
Stage 2 intermediate demand	3.7	5.7
Total goods inputs to stage 2 intermediate demand	5.1	10.4
Total services inputs to stage 2 intermediate demand	2.7	2.3
Stage 1 intermediate demand	5.7	3.5
Total goods inputs to stage 1 intermediate demand	8.1	3.1
Total services inputs to stage 1 intermediate demand	2.6	3.9

Source: U.S. Bureau of Labor Statistics.

In the goods-producing sector, the index for final demand goods moved up 1.7 percent in calendar-year 2018 after rising 3.5 percent in 2017. A 2.7-percent decline in final demand energy prices in 2018, after a 10.1-percent rise in 2017, explains this slowdown. Conversely, the index for final demand foods increased 3.3 percent in 2018 after advancing 2.0 percent in the preceding year, and prices for final demand goods other than foods and energy climbed 2.5 percent following a 2.2-percent rise in 2017.[3]

The index for final demand less foods, energy, and trade services rose 2.8 percent in 2018 after advancing 2.3 percent in 2017. Historically, the indexes for food, energy, and trade services have exhibited greater short-term volatility than other components of the FD–ID system. As a result, the PPI calculates a number of indexes that exclude these potentially volatile components.[4] The index for final demand less foods, energy, and trade services

is an aggregation of PPI final demand core goods; final demand transportation and warehousing services; final demand services less trade, transportation, and warehousing; and final demand construction.

Within the PPIs for intermediate demand—a gauge of business-to-business price movements—inflation for goods generally slowed in 2018 while price increases for services continued much as they did in 2017. The index for processed goods for intermediate demand rose 3.0 percent, compared with a 5.0-percent rise in 2017. Leading the broad-based deceleration in the rate of advance, the index for processed energy goods moved up 2.9 percent in 2018 after surging 13.5 percent in the prior year. Prices for processed core goods and for processed foods and feeds also rose at slower rates than a year earlier.

In contrast, the index for unprocessed goods for intermediate demand climbed 9.1 percent in 2018, following a 5.0-percent rise in 2017. An end-of-year spike in natural gas prices caused this 2018 advance. Excluding prices for natural gas, the PPI for unprocessed goods for intermediate demand would have fallen more than 2.0 percent in 2018.[5] Prices for crude petroleum and for unprocessed foodstuffs and feedstuffs turned down in 2018, after rising a year earlier, while the index for unprocessed core goods moved up at a slower rate than in 2017.

Within the category for intermediate demand services, the inflation rate rose to 3.1 percent in 2018, which was a slightly higher rate than the 2.9-percent advance in the preceding year. The transportation and warehousing services index, which moved up more in 2018 than a year earlier, caused the faster rate of advance in prices for business-to-business services. Margins for trade services and prices for services other than trade, transportation, and warehousing changed little in 2018, compared with the prior year.[6]

Economic background

This section describes the economic events that influenced producer price movements for the energy, food, core goods, and services indexes in 2018.

Energy

Following a runup that began in mid-2017 and persisted through the third quarter of 2018, prices for crude petroleum declined substantially during the final 2 months of the year. The 12-month rate of increase in the PPI for crude petroleum peaked at 63.6 percent in July 2018, but closed the year with an 11.1-percent rate of decrease. Spot prices for West Texas Intermediate crude oil rose from $45.18 per barrel in June 2017 to $70.98 in July 2018, only to drop to $49.52 by the end of the year. Internationally, the corresponding spot-price dollar figures for Brent (North Sea) crude were $46.37, $74.25, and $57.36, respectively.[7] The PPI for refined petroleum products—an index that includes gasoline, diesel fuel, heating oil, and jet fuel—declined 3.4 percent in 2018 after climbing 22.8 percent in 2017. As recently as June 2018, the index for refined petroleum products was surging at a 39.7-percent 12-month rate.

From the supply side, the United States Energy Information Administration reported that U.S. field production of crude petroleum surged 19.8 percent in 2018, rising from 9,731 thousand barrels per day in December 2017 to 11,656 thousand barrels per day in December 2018.[8] In contrast, U.S. net inputs of crude oil to refineries grew just 2.1 percent (353 thousand barrels), to 17,428 thousand barrels per day over the same period.[9] Total U.S. finished petroleum products supplied edged up 1.4 percent (comparing average monthly production for January through

October 2018 with the average for 2017), while total gasoline ending stocks were 2.4 percent higher in December 2018 than 12 months earlier.[10]

Outside the United States, the production of crude oil by the Organization of Petroleum Exporting Countries (OPEC) and Russia was little changed during the first 11 months of 2018, compared with 2017. OPEC production averaged 35,468 thousand barrels per day in 2017 and 35,433 thousand barrels per day through the first 11 months of 2018. For Russia, the corresponding figures were 10,580 thousand barrels per day and 10,732 thousand barrels per day. Overall, the small rise in worldwide production in 2018—from an average of 81,092 thousand barrels per day in 2017 to an average of 82,672 thousand barrels per day through the first 11 months of 2018—is attributable to increases in U.S. production.[11]

Relating to overall demand for refined petroleum products, after posting a GDP growth rate of 2.2 percent for 2017 and the first quarter of 2018, U.S. GDP climbed 4.2 percent and 3.4 percent in the second and third quarters, respectively.[12] Looking ahead, the Organisation for Economic Co-operation and Development (OECD) reported in November 2018 that worldwide growth appeared to have peaked at a 3.8-percent rate of expansion in 2018, compared with a 3.4-percent average from 2011 to 2017. The OECD forecasts worldwide growth for 2019 and 2020 at 3.6 percent and 3.5 percent, respectively, with member-nation growth slowing more than nonmember growth.[13]

In the natural gas sector, prices for wellhead natural gas were stable to slightly lower through most of 2018; however, in December, the natural gas index surged 64.3 percent. As a result, prices for wellhead natural gas ended the year 71.0 percent higher than in December 2017. Contributing to this volatility, the level of working gas in underground storage fell well below its 5-year historical average in mid-to-late 2018, which was attributable to increased weather-related demand domestically as well as higher exports.[14, 15] Starting in mid-October and running through mid-December, when heating demand for natural gas typically rises, natural gas prices surged.[16] However, by late December, natural gas prices retreated to their level of 3 months earlier. As a result of the volatile market for wellhead natural gas, the index for utility natural gas also moved higher at the close of 2018.

U.S. natural gas marketed production increased by 3.522 trillion cubic feet in 2018, a 12.1-percent increase from 2017. Natural gas was the leading source of electric power generation in 2018, accounting for more than 35.0 percent of the electric power generated during this period.[17] Total consumption also grew in 2018, by 10.8 percent, while the inventory of working gas in underground storage declined 4.3 percent.

Food

In 2018, changes in producer prices for foods varied. Although overall price changes for unprocessed foodstuffs and feedstuffs and for final demand foods were moderate, individual sectors were volatile. The PPIs for both slaughter cattle and slaughter hogs turned downward in 2018 after rising in 2017. In both cases, increased domestic slaughter production outweighed higher export demand. The U.S. Department of Agriculture reported that total domestic beef production rose 2.9 percent in 2018, to 26.9 billion pounds, and pork production grew 2.8 percent, to 26.3 billion pounds. Net exports of beef were 186 million pounds in 2018, compared with net imports of 133 million pounds in 2017. For pork, net exports grew to 4,925 million pounds in 2018 from 4,516 million pounds.[18] Despite increased production for both beef and pork, price increases for beef and veal accelerated in

2018, while the pork index fell in 2018, after rising in 2017. Sustained domestic demand for beef and veal products, and record pork production, led to these differences.

The index for chicken eggs dropped measurably in 2018 after surging in 2017. Prices for eggs have been extremely volatile in the aftermath of the outbreak of highly pathogenic avian influenza (HPAI). The HPAI outbreak originally caused a drop in egg production of about 20 percent and resulted in an increase in prices of more than 75 percent in 2017. Production levels have subsequently recovered, increasing 1.9 percent in 2018.[19]

In the crops sector in 2018, prices for corn and wheat climbed 13.0 percent and 18.5 percent, respectively, while the oilseeds index fell 8.2 percent. In terms of production, corn yield per acre edged up 1.3 percent, to 178.9 bushels per acre, while total production was steady at 14.626 billion bushels. Strong demand from livestock and poultry producers for prepared animal feeds helped strengthen corn prices. Wheat yield per acre climbed 2.8 percent, to 47.6 bushels per acre, and total production rose 8.3 percent to 1.884 billion bushels.[20] However, ending stocks for wheat fell for the second consecutive year, to 974 million bushels in 2018, down from 1.099 billion bushels in 2017 and 1.181 billion bushels in 2016.[21] Soybean yield rose 5.7 percent, to 52.1 bushels per acre, and total production increased 4.3 percent, to 4.6 billion bushels.[22] But a steep drop of more than 40 percent in soybean exports, from 25.7 million metric tons for the 2017 marketing year (September 1 through August 31) to 15.4 million metric tons for the 2018 marketing year, contributed to the decline in oilseed prices.[23] Exports to China fell from 17.98 million metric tons to 341 thousand metric tons over this period—a 98-percent drop.

The markets for both fresh fruits and melons and fresh and dry vegetables experienced substantial spikes in prices in late 2018, driving the faster rate of advance in the index for final demand foods. Less-than-ideal growing conditions in California, from both excessive rain and colder-than-normal temperatures, as well as E. coli contamination fears, contributed to surging prices for strawberries, lettuce, broccoli, and spinach during the final quarter of 2018.

Core goods

In the metals market, U.S. tariffs on steel imports appear to have contributed to an acceleration in the rate of inflation for steel mill products, fabricated metal products, and fabricated ferrous wire products.[24, 25] Resulting global market disruptions appear to have contributed to weaker export demand and softer pricing for various nonferrous metal products: nonferrous ore, nonferrous scrap, primary and secondary nonferrous metals, and nonferrous mill shapes.[26] For more highly processed goods, the PPIs for general purpose machinery and equipment, motor vehicle parts, and aircraft and related equipment rose at slightly faster rates in 2018, compared with 2017. However, in the chemicals sector, trade tensions and volatility in crude oil markets weakened selling prices for basic organic chemicals and for plastic resins and materials in 2018.

Services

In the passenger transportation sector, the PPI for airline passenger services increased 7.7 percent, after falling 3.3 percent in 2017. This upturn was a major contributor to the accelerating rates of inflation for both intermediate demand transportation and warehousing services and final demand transportation and warehousing services. In 2018, global airline industry revenue grew an estimated 8.7 percent, to $821 billion. According to industry projections, global passenger and cargo traffic volume expanded 6.5 percent and 4.1 percent, respectively. In North America, passenger air traffic rose an estimated 5.0 percent in 2018. In terms of expenses, fuel outlays climbed more than 20 percent in 2018 to $180 billion, partly because of a 4.4-percent rise in total fuel

consumption.[27] From mid-2017 to mid-2018, the PPI for jet fuel increased more than 50 percent, but this index closed the year only 3.4 percent above its December 2017 level.

Affecting the freight transportation sector, prices for refined petroleum products rose, U.S. economic growth was robust, truckdriver and rail-worker shortages were common, and ground- and rail-based transportation were near capacity limits.[28] As a result, prices for rail transportation of freight, truck transportation of freight, water transportation of freight, and ground-based package delivery services advanced at a faster rate in 2018.[29] Worker shortages have been particularly evident in both the trucking and rail industries, resulting in higher wage rates, shipping bottlenecks, and rising prices for transportation services.[30]

In the financial sector, the U.S. Federal Reserve increased the target federal funds interest rate four times in 2018—in March, June, September, and December. The federal funds rate, which began 2018 at a level of 1.25–1.50 percent, closed the year at 2.25–2.50 percent. The Federal Reserve also increased the discount rate four times in 2018, from 2.00 percent to 3.00 percent.[31] In light of these increases, the PPI for consumer loans climbed 5.8 percent in 2018 after edging up 0.4 percent a year earlier, prices for business loans jumped 17.4 percent following a 3.8-percent rise in 2017, and the index for services related to securities brokerage and dealing rose 27.8 percent after surging 53.7 percent in 2017. The latter index includes many business-to-business financial activities, such as loan repurchase agreements, and interest rate changes greatly affect these transaction prices.

Final demand

In 2018, the index for final demand rose 2.5 percent, the same as in 2017. The 2018 advance is attributable to higher prices for both final demand services and final demand goods.

Final demand services

Prices for final demand services rose 2.8 percent in 2018 after advancing 2.1 percent in 2017. A 2018 increase of 6.5 percent in the index for final demand transportation and warehousing services is responsible for more than 40 percent of the broad-based acceleration in the final demand services index. Margins for final demand trade services increased 2.5 percent in 2018 after a 1.8-percent advance in the prior year. Prices for final demand services less trade, transportation, and warehousing moved up 2.6 percent following a 2.3-percent rise in 2017.

More than 30 percent of the acceleration in prices for final demand services in 2018—a rise of 2.8 percent followed a 2.1-percent advance a year earlier—is attributable to the airline passenger services index. Prices for airline passenger services climbed 7.7 percent following a 3.3-percent decrease in 2017. Margins for food retailing also rose in 2018 after falling in 2017. The indexes for machinery and equipment wholesaling, loan services (partial), food wholesaling, and hospital inpatient care increased at faster rates than in the previous year. Conversely, the increase in prices for portfolio management slowed to 1.5 percent in 2018, from 9.2 percent in the preceding year. The indexes for chemicals and allied products wholesaling and services related to securities brokerage and dealing (partial) also advanced less than in 2017.

Final demand goods

In 2018, the increase in prices for final demand goods slowed to 1.7 percent from 3.5 percent in 2017. The deceleration is due to the index for final demand energy, which turned down 2.7 percent after jumping 10.1 percent a year earlier. In contrast, prices for final demand foods rose more in 2018, advancing 3.3 percent, after increasing

2.0 percent in the previous year. The index for final demand goods less foods and energy moved up 2.5 percent following a 2.2-percent rise in 2017.

Over 70 percent of the deceleration in prices for final demand goods is attributable to the index for gasoline, which fell 12.2 percent in 2018 after climbing 15.6 percent in 2017. Prices for chicken eggs and liquefied petroleum gas also decreased after increasing the preceding year. The indexes for diesel fuel and pharmaceutical preparations rose less in 2018 than a year earlier. Prices for electric power were unchanged in 2018 after advancing in 2017. Conversely, the index for fresh and dry vegetables surged 52.8 percent in 2018, after jumping 28.2 percent in the year prior. Prices for fresh fruits and melons and for steel mill products also increased at faster rates than in 2017.

Intermediate demand by commodity type

This section describes producer inflation for intermediate demand goods and services—producer price movements for business-to-business sales of processed goods, unprocessed goods, and services. The intermediate demand portion of the FD-ID aggregation system excludes sales of capital equipment, sales to government, and exports.

Processed goods for intermediate demand

The rise in the index for processed goods for intermediate demand slowed to 3.0 percent in 2018, from 5.0 percent in 2017. Leading the broad-based deceleration, prices for processed energy goods advanced 2.9 percent after jumping 13.5 percent a year earlier. The index for processed materials less foods and energy increased 3.4 percent, following a 3.6-percent rise in 2017. The advance in the index for processed foods and feeds slowed to 0.1 percent in 2018, after moving up 1.0 percent in the prior year.

Price increases for diesel fuel, which slowed from 40.9 percent in 2017 to 5.0 percent in 2018, caused roughly two-thirds of the deceleration in the index for processed goods for intermediate demand. The indexes for basic organic chemicals, gasoline, residual fuels, and processed eggs went down after rising in 2017. Prices for electric power were unchanged after advancing in the previous year. In contrast, the increase in the index for utility natural gas accelerated to 17.6 percent in 2018 from 3.6 percent in the preceding year. Prices for steel mill products also rose more than in 2017, while the index for prepared animal feeds went up after falling in the prior year.

Unprocessed goods for intermediate demand

In 2018, the index for unprocessed goods for intermediate demand rose 9.1 percent, compared with 5.0 percent a year earlier. The unprocessed energy materials index surged 22.3 percent in 2018, after a 4.1-percent advance in 2017, leading the way in the price increase for unprocessed goods for intermediate demand. Conversely, the rise in the index for unprocessed nonfood materials less energy slowed to 3.1 percent in 2018, following an 8.5-percent increase in the preceding year. Prices for unprocessed foodstuffs and feedstuffs declined 1.2 percent after a 3.0-percent rise in 2017.

The acceleration in prices for unprocessed goods for intermediate demand was primarily the result of the index for natural gas, which jumped 71.0 percent in 2018 after declining 11.9 percent in the preceding year. Prices for corn, strawberries, slaughter turkeys, tree nuts, and high grade wastepaper also rose after falling in 2017. The index for fresh vegetables, except potatoes advanced more than in the previous year. In contrast, prices for ungraded

chicken eggs went down 30.3 percent in 2018, following a 212.4-percent jump in the prior year. The indexes for crude petroleum and nonferrous scrap also declined following increases in 2017.

Services for intermediate demand

In 2018, the index for services for intermediate demand moved up 3.1 percent, which was slightly more than the 2.9-percent increase in 2017. A 2.7-percent rise in prices for services less trade, transportation, and warehousing for intermediate demand in 2018 was responsible for 60 percent of the broad-based advance. The indexes for trade services for intermediate demand and transportation and warehousing services for intermediate demand both moved up 4.1 percent.

A major factor in the 2018 advance in the services for intermediate demand index was prices for securities brokerage, dealing, investment advice, and related services, which rose 9.1 percent. The indexes for transportation of freight and mail, loan services (partial), machinery and equipment parts and supplies wholesaling, gross rents of retail properties, and food wholesaling also increased. Conversely, prices for internet advertising by nonprint publishers dropped 10.5 percent. The indexes for co-employment staffing services and furniture wholesaling also declined.

Intermediate demand by production flow

The production-flow treatment of intermediate demand is a stage-based system of price indexes. The stage-based indexes help explain price-transmission relationships between the sequential intermediate demand stages, and between the stage 4 intermediate demand and final demand. The production-flow system contains four main indexes, each corresponding to one of four stages of intermediate demand (stages 1 through 4). Indexes for the four stages were developed by assigning each industry to a stage. Industries assigned to the fourth stage primarily produce output consumed for 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. The four stage-based intermediate demand indexes track price change for the *net inputs consumed by industries assigned to each of the four stages*. The stage 4 intermediate demand index, for example, tracks price change for inputs consumed, not produced, by industries included in the fourth stage. Hence, the index for stage 4 intermediate demand measures price change in the inputs to production for industries that primarily produce final demand goods, services, and construction.

Stage 4 Intermediate demand

The index for stage 4 intermediate demand advanced 3.1 percent in 2018, after rising 3.4 percent in 2017. In 2018, prices for total services inputs to stage 4 intermediate demand increased 3.3 percent, and the index for total goods inputs moved up 3.0 percent. A major factor in the 2018 advance in the index for stage 4 intermediate demand was margins for machinery and equipment parts and supplies wholesaling, which rose 3.4 percent. The indexes for fabricated structural metal products, loan services (partial), gross rents of retail properties, iron and steel, and transportation of freight and mail also moved higher. In contrast, prices for gasoline declined 12.2 percent. The indexes for primary basic organic chemicals and internet advertising by non-print publishers also fell.

Stage 3 Intermediate demand

The increase in the index for stage 3 intermediate demand slowed to 1.8 percent in 2018 from 4.8 percent in 2017. Prices for total goods inputs to stage 3 intermediate demand moved up 0.5 percent following a 6.3-percent advance a year earlier. The rise in the index for total services inputs slowed to 3.1 percent from 3.3 percent a year earlier. Prices for gasoline turned down 12.2 percent in 2018 after increasing 15.6 percent in the previous year. The indexes for ungraded chicken eggs and slaughter hogs also declined following rises in 2017. Prices for diesel fuel and jet fuel increased less than in the preceding year. Conversely, the advance in the index for steel mill products accelerated to 18.5 percent in 2018 from 7.5 percent in 2017. Margins for food wholesaling also rose more than in 2017, while the index for securities brokerage, dealing, and investment advice went up after decreasing a year earlier.

Stage 2 Intermediate demand

The advance in the index for stage 2 intermediate demand accelerated to 5.7 percent in 2018 from 3.7 percent in 2017. Prices for total goods inputs to stage 2 intermediate demand jumped 10.4 percent after rising 5.1 percent a year earlier. In contrast, price increases for total services inputs slowed to 2.3 percent from 2.7 percent in the preceding year. The index for natural gas turned up 71.0 percent in 2018 following an 11.9-percent decline in 2017. Prices for securities brokerage, dealing, and investment advice; airline passenger services; and corn also rose after decreasing in 2017. The indexes for steel mill products and accounting services (partial) moved up more than they did a year earlier. Conversely, price increases for portfolio management slowed to 1.5 percent in 2018 from 9.2 percent in the previous year. The index for thermoplastic resins and materials also advanced less in 2018, while crude petroleum prices went down after rising in 2017.

Stage 1 Intermediate demand

The increase in the index for stage 1 intermediate demand slowed to 3.5 percent in 2018 from 5.7 percent in 2017. Prices for total goods inputs to stage 1 intermediate demand moved up 3.1 percent after advancing 8.1 percent in 2017. In contrast, the rise in the index for total services inputs accelerated to 3.9 percent from 2.6 percent in the prior year. The increase in diesel fuel prices slowed to 5.0 percent in 2018 from 40.9 percent a year earlier. The chemicals and allied products wholesaling index also moved up less than in 2017. Prices for basic organic chemicals, nonferrous scrap, gasoline, and crude petroleum turned down after advancing in the previous year. Conversely, the rise in the index for loan services (partial) accelerated to 11.0 percent in 2018 from 2.3 percent in the preceding year. Prices for natural gas and airline passenger services turned up after decreasing in 2017.

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NOTES

[1] PPI data included in this article that reference indexes for September through December 2018 are first issued. Revised indexes for December 2018 will be posted with the release of first-issued data for April 2019 on May 9, 2019. All PPIs are recalculated 4 months after original publication to reflect late reporting by survey respondents.

[2] PPIs for trade services measure changes in margins received by wholesalers and retailers. For more information on these PPIs, see “Wholesale and retail producer price indexes: margin prices,” *Beyond the Numbers: Prices and Spending*, vol. 1, no. 8 (U.S. Bureau

of Labor Statistics, August 2012), https://www.bls.gov/opub/btn/volume-1/pdf/wholesale-and-retail-producer-price-indexes-margin-prices.pdf.

[3] The Final Demand–Intermediate Demand (FD–ID) system was first introduced in January 2011 as a set of experimental indexes. With the release of data for January 2014, the FD–ID system replaced the Stage of Processing (SOP) system. Nearly all FD–ID goods, services, and construction indexes provide historical data back at least to either November 2009 or April 2010. The indexes for goods that correspond to the historical SOP indexes go back to the 1970s or earlier. For more information about the FD–ID system, see "A new, experimental system of indexes from the PPI program," *Monthly Labor Review*, February 2011, https://www.bls.gov/opub/mlr/2011/02/art1full.pdf, or visit the PPI FD–ID system webpage at https://www.bls.gov/ppi/fdidaggregation.htm.

[4] Historically, the PPIs for food and energy goods have exhibited greater short-term volatility than the PPIs for goods other than food and energy. As a result, the PPI program long ago introduced a number of goods indexes that exclude one or both of these potentially volatile components. With the transition from the SOP to the FD–ID system, the PPI program continues to produce these indexes. In addition, with the FD–ID expansion to include prices for many services, it has been observed that the indexes for wholesale and retail trade, which measure changes in margins, also are subject to potentially large short-term volatility. Consequently, the PPI program calculates a number of indexes that exclude prices for trade services. These indexes include final-demand services less trade services and final demand less trade services. In addition, the PPI program calculates an index for final demand less foods, energy, and trade services, removing all three potentially volatile components.

[5] The component indexes within unprocessed goods for intermediate demand that exclude natural gas prices—unprocessed foodstuffs and feedstuffs and unprocessed nonfood materials except fuel--fell 1.2 and 3.7 percent respectively, in 2018. Their respective weights within unprocessed goods for intermediate demand were 36.697 percent and 42.776 percent in December 2017.

[6] For a detailed discussion of price transmission across stages of processing, see Jonathan Weinhagen, "An empirical analysis of price transmission by stage of processing," *Monthly Labor Review*, November 2002, https://www.bls.gov/opub/mlr/2002/11/art1full.pdf; and Weinhagen, "Price transmission within the PPI for intermediate goods," *Monthly Labor Review*, May 2005, https://www.bls.gov/opub/mlr/2005/05/art4full.pdf. More highly processed semifinished and completely manufactured goods commonly exhibit price movements that are somewhat different from those of less processed goods, because basic material costs tend to be a smaller portion of total costs for producers of more highly processed goods than for manufacturers of less processed goods. Contracts and escalation agreements also can delay or mitigate the pass-through effect of early stage price volatility on successive stages of processing.

[7] "Petroleum & Other Liquids, Spot Prices" (U.S. Energy Information Administration, visited January 16, 2019), https://www.eia.gov/dnav/pet/pet_pri_spt_s1_m.htm.

[8] "Petroleum & Other Liquids, 4-Week Average U.S. Field Production of Crude oil" (U.S. Energy Information Administration, visited January 16, 2019), https://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=WCRFPUS2&f=4. The figures cited here are averages for all of December 2018 compared to all of December 2017.

[9] "Petroleum & Other Liquids, 4-Week Average U.S. Refiner Net Input of Crude Oil" (U.S. Energy Information Administration, visited January 18, 2019), https://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=pet&s=wcrrius2&f=4. The figures cited here are averages for all of December 2018 compared with all of December 2017.

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