



# Focus on Prices and Spending



## Producer Price Index: Third Quarter 2011

U.S. Bureau of Labor Statistics November 2011 Volume 2, Number 10



### Current Price Topics Technology in Commodity Markets

The Producer Price Index tracks price changes for a variety of agricultural commodities that have price movements which are influenced by the commodity markets. The commodity markets are composed of a number of international commodity exchanges, including the Chicago Mercantile Exchange Group (CME)<sup>1</sup> and the New York Mercantile Exchange (NYMEX). Common types of contracts, such as spot, futures, and options, are frequently traded on these exchanges at a high volume. Traditionally, commodity trading had been performed using the open outcry system, a communication method that consists of floor traders shouting or using hand signals to buy or sell orders while standing in a trading pit.

There are many factors that affect commodity prices, including inclement weather conditions, such as droughts or floods; overall consumption; or the supply and demand for the commodity in the market. Historically, conditions such as these have led to commodity prices experiencing periods of high volatility when the commodities were traded using the traditional open outcry system. The emergence of electronic trading has only served to exacerbate the level of volatility in commodity prices, as seen in some Producer Price Indexes.

### Electronic Trading

In the last decade the open outcry system has been eclipsed by electronic trading. In electronic trading, a broker-dealer uses a computer to execute point-and-click trades on the electronic trading platforms and networks that make up a virtual marketplace. On August 1, 2006, the CME introduced electronic trading of agricultural futures contracts, and electronic trading took place alongside the open outcry system. Trading volume quickly migrated from the floor to the computer, and within 6 months electronic trading of futures contracts accounted for 50 percent of the total trading volume.<sup>2</sup> The Commodity Futures Trading Commission (CFTC) estimates that electronic trading now accounts for a majority of the more than one billion futures and option contracts that are traded annually, and its share is expected to continue to increase dramatically.<sup>3</sup>

### Algorithmic Trading

In recent years, the use of mathematical formulas called algorithms has gained prominence in electronic financial markets. Algorithmic trading (AT) uses a mathematical set of instructions and parameters, scripted by computer programmers for their clients, to make decisions about buying and selling. The dominant use of algorithms in the commodity space is for risk assessment or straightforward limit-order and stop-loss trades in click-and-point trading.<sup>4</sup> However, algorithmic trading of commodities futures, also known as black-box trading, has quickly evolved to the point that

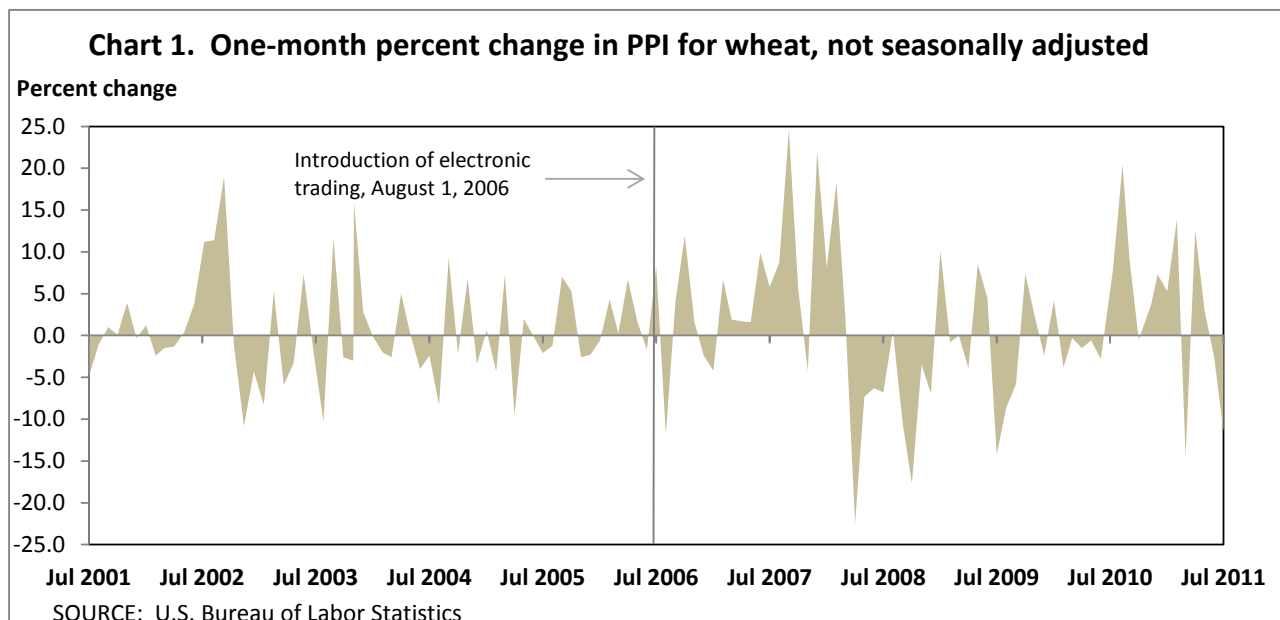
the computers are now enabled to make trading decisions. This type of trading uses sophisticated algorithms to read the market data, analyze trading opportunities, and transmit order messages with little or no human intervention.<sup>5</sup>

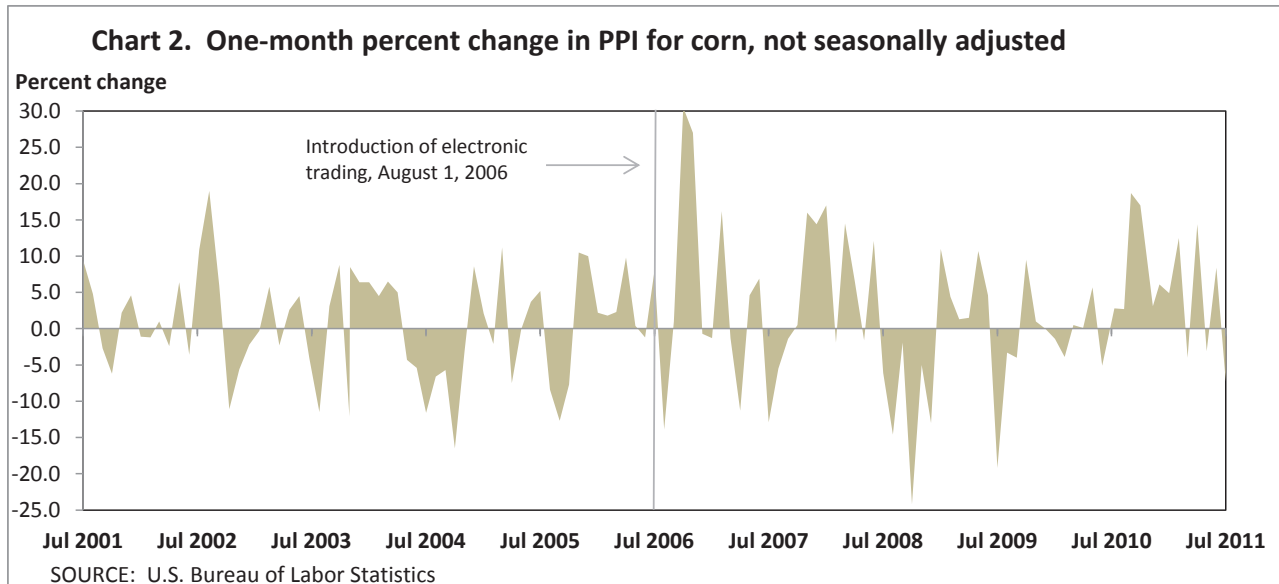
### High Frequency Trading

High frequency trading (HFT), a subset of algorithmic trading, analyzes market data to capture trading opportunities that may open for only a fraction of a second. The success of HFT depends upon how fast and effectively the trades are made. For HFT to be considered successful, trades must be made at lightning speeds. High frequency traders compete with other high frequency traders for very small, consistent profits by making large purchases which may be held for only minutes. Whether HFT has a positive effect on price behavior is a matter of debate among traders. Some traders believe that HFT increases market liquidity because buyers and sellers are always


available at every price level, and that HFT promotes good trading opportunities.<sup>6</sup>

Other traders believe that HFT contributes to the volatility in commodity markets, as seen recently with agricultural commodities, specifically the PPIs for corn and wheat.<sup>7</sup> A comparison of the 5-year period before the introduction of electronic trading in the commodity markets (July 2001–July 2006) with the 5-year period after electronic trading was introduced (August 2006–July 2011) shows a statistically significant increase in the volatility of monthly price movements.<sup>8</sup> (See charts 1 and 2.) Some traders and regulators feel this volatility can be attributed to electronic trading and the presence of index traders in the corn and wheat commodity markets. During periods when many traders purchased and held futures contracts, it created excess demand compared with the cash market for these commodities.<sup>9</sup> In turn, this excess demand led to higher prices,





independent of typical supply and demand factors. According to a U.S. Senate report, the activities of these index traders constitute the type of excessive speculation that has impaired the ability of farmers to price their crops and manage price risks over time.<sup>10</sup>

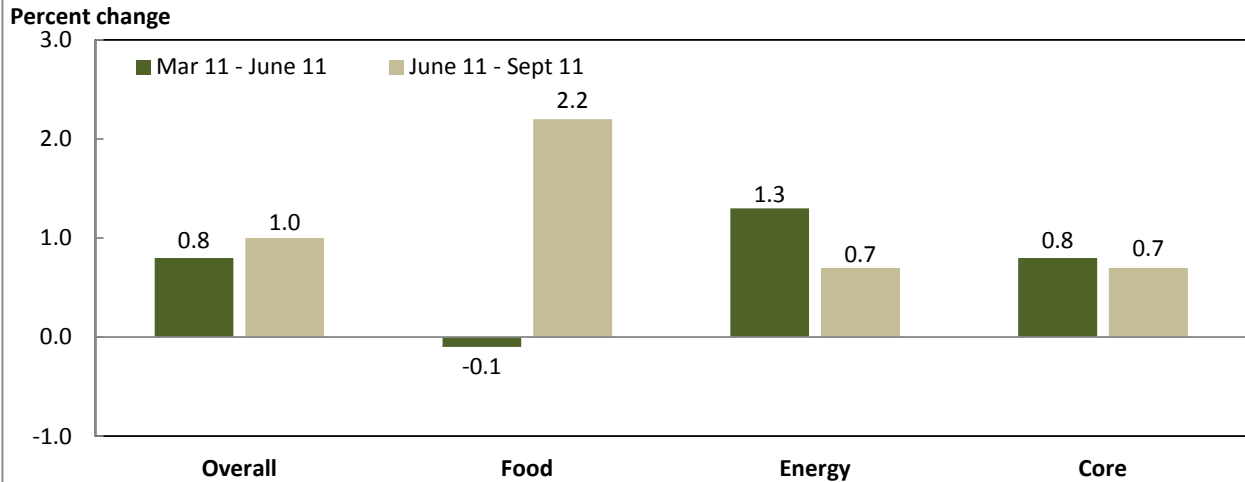
The effect of electronic trading on the commodity markets and Producer Price Indexes will continue to be studied and debated in the coming years as the use of technology increases and evolves. 



The PPI for finished goods increased 1.0 percent in the third quarter of 2011, compared with a 0.8-percent rise in the

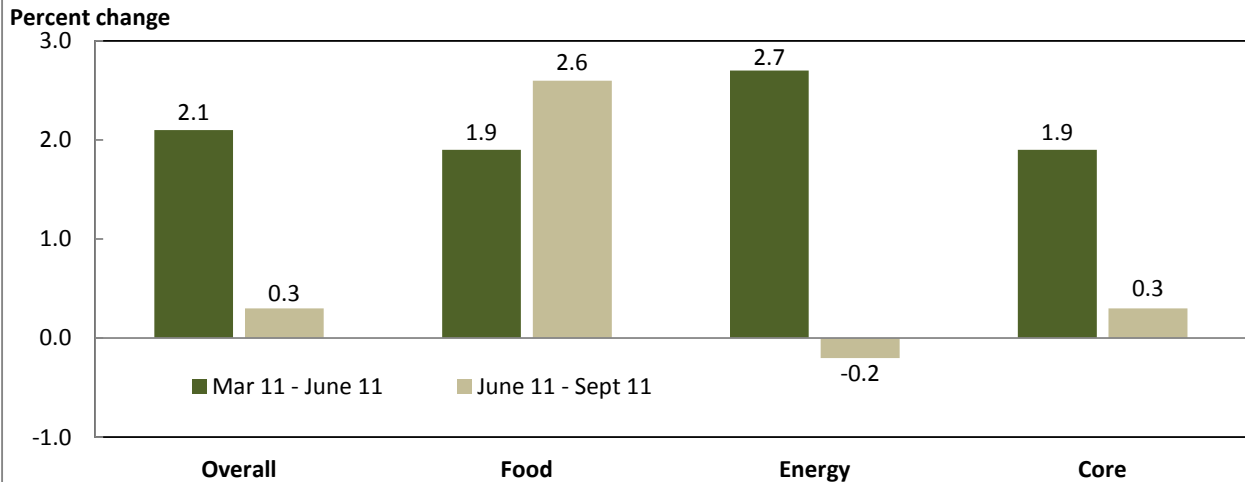
second quarter.<sup>11</sup> This slightly faster rate of advance can be traced to prices for finished consumer foods, which climbed 2.2 percent for the 3 months ended in September, after inching down 0.1 percent in the preceding quarter. In contrast, the index for finished energy goods moved up 0.7 percent following a 1.3-percent increase for the 3 months ended in June. Prices for finished goods less food and energy also rose 0.7 percent in the third quarter, nearly the same rate as in the prior quarter, 0.8 percent.<sup>12</sup> (See chart 3.) At the earlier stages of processing, prices received by manufacturers of intermediate goods edged up 0.3 percent for the 3 months ended in September, after climbing 2.1 percent in the previous quarter. A slower rate of advance in the intermediate core index, combined with a downturn in prices for intermediate energy goods, outweighed acceleration in the rate of inflation for intermediate foods and feeds. (See chart 4.) The crude goods index turned up

**Chart 3. Three-month percent change in PPI for overall, food, energy, and core finished goods, seasonally adjusted**



SOURCE: U.S. Bureau of Labor Statistics

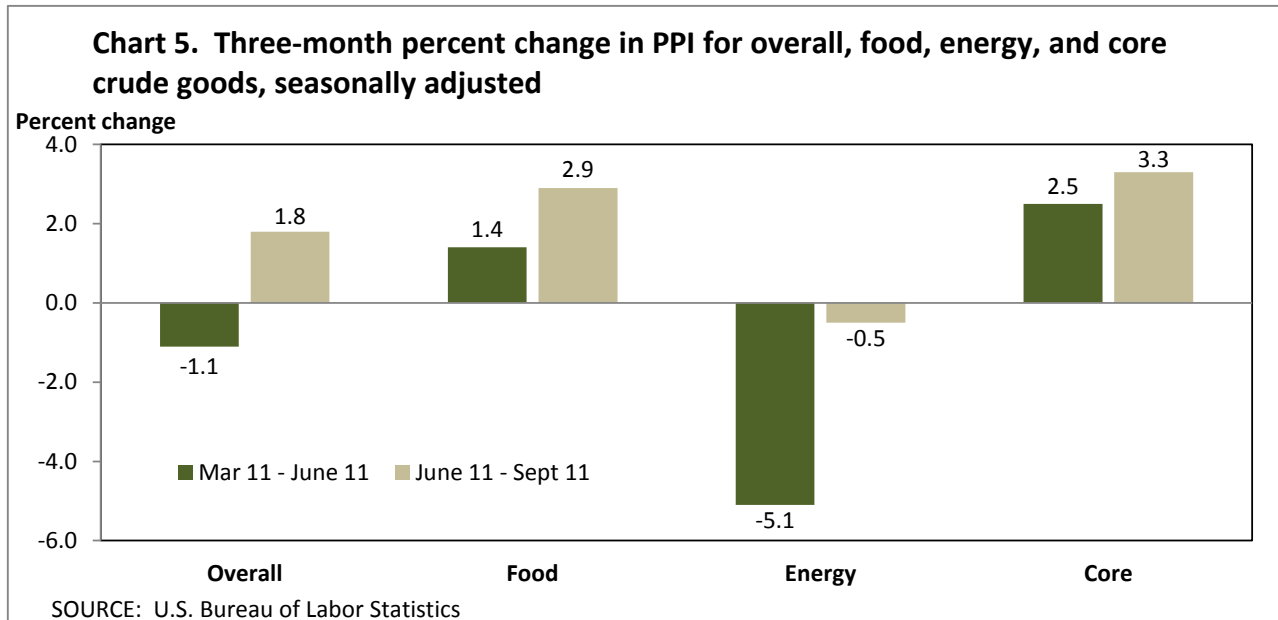
**Chart 4. Three-month percent change in PPI for overall, food, energy, and core intermediate goods, seasonally adjusted**



SOURCE: U.S. Bureau of Labor Statistics

1.8 percent in the third quarter of 2011 after a 1.1-percent decrease in the preceding quarter. Price increases accelerated for both crude foodstuffs and feedstuffs and for crude core commodities, while the index for crude energy materials inched down following a steep drop in the second quarter. (See chart 5.)

In the food sector, prices for corn, oilseeds, and alfalfa hay advanced in the third quarter of 2011. The 2011 yield per acre for corn is forecast to be down 3.1 percent to 148.1 bushels per acre, and projected usage is expected to remain strong, significantly depleting inventory.<sup>13</sup> In the oilseeds market,



soybean yield per acre is projected to fall 3.9 percent in 2011 to 41.8 bushels, and with harvested acreage down 3.7 percent in 2011, supply and inventory projections are pessimistic.<sup>14</sup> Higher grain and feedstuff prices contributed to rising prices in the third quarter for prepared animal feeds and slaughter livestock, as well as more highly processed goods such as meats and dairy products.

In the energy sector, moderating inflation for refined petroleum products and processed gas fuels (utility natural gas and liquefied petroleum gas) led to more modest price changes in the indexes for both finished and intermediate energy goods. Wellhead natural gas prices exhibited a steep drop in the third quarter, in response to ample injections to underground storage of natural gas and Energy Information Administration

(EIA) projections for moderate winter heating demand.<sup>15</sup> According to EIA, the National Oceanic and Atmospheric Administration forecasted that the upcoming winter will likely be about 2 percent warmer than last winter. The PPI for crude petroleum, which dropped over 31.1 percent from May to August, surged 23.0 percent in September.

### Finished goods

The PPI for finished goods moved up 1.0 percent for the 3-month period ended September 2011, subsequent to a 0.8-percent advance for the 3 months ended in June. Spurring this acceleration, prices for finished consumer foods turned up from June to September, after inching down in the prior quarter. By contrast, the indexes for both finished energy goods and finished goods less foods and energy advanced less than they had in the 3 months ended in June.

From June to September, prices for finished consumer foods advanced 2.2 percent, compared with a 0.1-percent decline in the preceding quarter. Leading this upturn, prices for meats climbed 6.6 percent in the third quarter after falling 2.2 percent for the 3 months ended in June. The index for fresh and dry vegetables fell less in the third quarter, and prices for processed fruits and vegetables increased more than they had in the second quarter. By contrast, the index for eggs for fresh use moved down 2.3 percent in the third quarter, following a 38.2-percent jump from March to June. Prices for sugar and confectionary products and for soft drinks also turned down after rising in the second quarter.

Finished energy goods prices moved up 0.7 percent from June to September, compared with a 1.3-percent gain in the previous quarter. The increase in the index for liquefied petroleum gas slowed to 1.7 percent in the third quarter, following a 12.0-percent jump for the 3-month period ended in June. Prices for gasoline and finished lubricants also rose less than they had in the second quarter. The index for residential natural gas turned down after increasing for the 3 months ended in June. Conversely, prices for residential electric power turned up in the third quarter, advancing 1.5 percent after declining 1.2 percent in the previous 3-month period. The index for home heating oil fell less from June to September than it had from April to June.

The index for finished goods less foods and energy advanced 0.7 percent for the 3-month period ended in September, following a 0.8-percent gain in the second quarter. From June to September, higher prices for light motor trucks, cigarettes, pharmaceutical preparations, apparel and other fabricated textile products, printing ink, and rubber and rubber products outweighed lower prices for passenger cars.

### Intermediate goods

The PPI for intermediate materials, supplies, and components inched up 0.3 percent for the 3 months ended in September, following a 2.1-percent rise for the 3 months ended in June. Leading this deceleration, the index for intermediate goods less food and energy advanced less than it had in the second quarter. Also contributing to the smaller rise in prices for intermediate goods, the index for intermediate energy goods fell for the 3 months ended in September, after moving up in the previous quarter. In contrast, prices for intermediate foods and feeds rose more than they had in the preceding 3 months.

Prices for intermediate materials other than foods and energy edged up 0.3 percent in the third quarter after increasing 1.9 percent in the preceding quarter. The rise in the index for thermoplastics resins and materials slowed to 3.0 percent from 7.2 percent in the second quarter. Prices for industrial chemicals, plastic products, steel mill products, and aluminum mill shapes turned down in the third quarter. Conversely, the lumber index moved up 0.8

percent for the 3 months ended in September, after dropping 3.9 percent for the 3 months ended in June.

Prices for intermediate energy goods inched down 0.2 percent for the 3 months ended in September, following a 2.7-percent increase in the previous quarter. The asphalt index dropped 4.2 percent after surging 25.6 percent in the second quarter. Prices for jet fuel, utility natural gas, and residual fuel also turned down in the third quarter. The index for liquefied petroleum gas rose at a slower rate than it had in the preceding 3 months. In contrast, electric power prices advanced 2.5 percent for the 3 months ended in September, following a 1.7-percent decrease for the 3 months ended in June.

The index for intermediate foods and feeds increased 2.6 percent for the 3 months ended in September, after moving up 1.9 percent in the previous quarter. Leading this acceleration, meat prices jumped 6.6 percent in the third quarter, following a 2.2-percent decline for the 3-month period ended in June. The indexes for processed cheese and related products and for soybean cake and meal advanced after falling in the second quarter. Conversely, the index for meat and bone meal dropped 18.5 percent for the 3 months ended in September, following a 17.3-percent surge in the preceding 3 months. Prices for flour and flour-base mixes and doughs and for refined sugar and byproducts also turned down in the third quarter.

### Crude goods

The PPI for crude materials for further processing turned up 1.8 percent for the 3 months ended in September, after falling 1.1 percent during the preceding quarter. The indexes for crude foodstuffs and feedstuffs and for crude nonfood materials less energy rose more in the third quarter than they had from March to June. Prices for crude energy materials decreased less than they had in the second quarter.

The increase in the index for crude foodstuffs and feedstuffs accelerated to 2.9 percent in the third quarter from 1.4 percent in the prior quarter. Slaughter livestock prices turned up 2.3 percent from June to September, after decreasing 1.9 percent during the previous quarter. The index for fresh vegetables (except potatoes) decreased less in the third quarter, and prices for corn rose more than they had in the second quarter. By contrast, the index for Irish potatoes for processing turned down 19.6 percent for the 3 months ended in September, following a 105.3 percent jump from March to June. Prices for slaughter poultry and wheat also declined after moving up in the second quarter.

The decline in the index for crude energy materials slowed to 0.5 percent in June to September, a decrease from 5.1 percent in the previous quarter. In the third quarter, a 7.8-percent drop in natural gas prices outweighed advances of 3.4 percent for crude petroleum and 2.7 percent for coal.

The rise in the index for crude nonfood materials less energy accelerated to 3.3 percent for the 3 months ended in September, from 2.5 percent in the previous quarter. The index for gold ores advanced 21.8 percent in the third quarter, following an 8.7-percent fall in the 3 months ended in June. Prices for raw cotton and copper ores also turned up after decreasing in the second quarter. Conversely, the index for nonferrous scrap fell 1.2 percent after rising 2.4 percent in the preceding quarter. Prices for wheat also turned down in the third quarter, and the index for corrugated wastepaper rose less than it had in the second quarter.

### Trade industries


The PPI for the net output of total trade industries moved up 0.8 percent in the third quarter, compared with a 1.1-percent increase for the 3 months ended in June. (Trade industry PPIs measure changes in margins received by wholesalers and retailers.) From June to September, higher margins received by merchant wholesalers of nondurable goods, family clothing stores, pharmacies and drug stores, and supermarkets outweighed lower margins received by department stores and merchant wholesalers of durable goods.

### Transportation and warehousing industries

The PPI for the net output of transportation and warehousing industries declined 0.4 percent from June to September after advancing 1.4 percent in the previous 3-month period. About a third of this downturn is attributable to prices

received by long-distance general freight truckers, which fell 0.4 percent in the third quarter, after a 2.6-percent rise in the previous quarter. The indexes for couriers, line-haul railroads, and specialized freight trucking also turned down in the third quarter after increasing from March to June. Conversely, prices received by the industry for freight transportation arrangement moved up 2.9 percent for the 3 months ended in September, after decreasing 1.0 percent in the prior quarter. The index for the U.S. Postal Service was unchanged after rising from March to June.

### Traditional service industries

The PPI for the net output of total traditional service industries rose 0.4 percent for the 3 months ended in September, following a 0.7-percent increase from March to June. Most of this slower rate of advance can be traced to prices received by the industry for commercial banking, which moved up 0.5 percent compared with a 7.7-percent jump a quarter earlier. From June to September, the indexes for portfolio management, engineering services, and newspaper publishers declined after rising in the previous 3-month period. By contrast, prices received by general medical and surgical hospitals advanced 0.6 percent after edging down 0.1 percent. Prices received by offices of physicians increased in the third quarter, following no change for the 3 months ended in June. The industry indexes for savings institutions and passenger car rental turned up after decreasing in the second quarter. 



## Notes

<sup>1</sup>In July 2007 the Chicago Mercantile Exchange (CME) and the Chicago Board of Trade (CBOT) merged to form the CME Group. For actions taken by either the CBOT or CME prior to merger, we will refer to them as the CME group.

<sup>2</sup>Pia Bandyopadhyay, Valeria Martinez, Yiuman Tse, “Market Quality Conditions in Agricultural Commodities Futures Markets,” September 2008, <http://69.175.2.130/~finman/Reno/Papers/commodities.pdf>.

<sup>3</sup>“Advanced Research Technology Initiatives for the Commodity Futures Trading Commission” (Commodity Futures Trading Commission), March 3, 2011, [https://www.fbo.gov/index?s=opportunity&mode=form&tab=core&id=55f92b9147102939756aac47524d2ac6&\\_cview=0](https://www.fbo.gov/index?s=opportunity&mode=form&tab=core&id=55f92b9147102939756aac47524d2ac6&_cview=0).

<sup>4</sup>Ivy Schmerken, “Commodities Traders Increasingly Adopt Algorithms,” *Wall Street & Technology*, March 29, 2010, <http://www.wallstreetandtech.com/trading-technology/224200634>.

<sup>5</sup>Will Acworth, “Algorithmic Trading: Seeking an Edge,” *Futures Industry Magazine*, July/August 2007, <http://www.futuresindustry.org/fi-magazine-home.asp?a=1192>.

<sup>6</sup>Daryl Guppy, “Fast work important in trading,” *China Daily*, July 25, 2011, [http://www.chinadaily.com.cn/usa/business/2011-07/25/content\\_12975777.htm](http://www.chinadaily.com.cn/usa/business/2011-07/25/content_12975777.htm).

<sup>7</sup>“High frequency trading in agricultural commodities, a practice under close surveillance,” *Momagri*, March 21, 2011, [http://www.momagri.org/UK/a-look-at-the-news/High-frequency-trading-in-agricultural-commodities-a-practice-under-close-surveillance\\_869.html](http://www.momagri.org/UK/a-look-at-the-news/High-frequency-trading-in-agricultural-commodities-a-practice-under-close-surveillance_869.html).

<sup>8</sup>For corn and wheat indexes, an F-test for equality of variance was used to determine there was a statistically significant increase in variability of monthly price movements in the time period following the introduction of electronic trading (August 2006–July 2011) compared to an earlier time period where the traditional outcry system was used (July 2001–July 2006).

<sup>9</sup>Paul-Florent Montifort, “Increasing Commodity Index Speculation,” *Momagri*, [http://www.momagri.org/UK/focus-on-issues/The-U-S-Senate-denounces-excessive-speculation-on-agricultural-futures-markets\\_538.html](http://www.momagri.org/UK/focus-on-issues/The-U-S-Senate-denounces-excessive-speculation-on-agricultural-futures-markets_538.html).

<sup>10</sup>“Excessive Speculation in the Wheat Market” (Senate Committee on Homeland Security and Governmental Affairs), June 24, 2009, [http://hsgac.senate.gov/public/index.cfm?FuseAction=Files.View&FileStore\\_id=fb439667-dcd3-4025-b95b-1b91f8ea29d1](http://hsgac.senate.gov/public/index.cfm?FuseAction=Files.View&FileStore_id=fb439667-dcd3-4025-b95b-1b91f8ea29d1).

<sup>11</sup>Price movements for PPIs described in this article include preliminary data for the months of June 2011 through September 2011. All PPI data are recalculated 4 months after original publication, to reflect late data received from survey respondents. In addition, seasonally adjusted PPIs are recalculated on an annual basis for 5 years, to reflect more recent seasonal patterns.

<sup>12</sup>Within the PPI stage-of-processing structure, indexes for goods other than foods and energy commonly are referred to as the core indexes.

<sup>13</sup>“Feed Outlook,” *FDS-11i*, Sept. 14, 2011, United States Department of Agriculture, pp. 3 and 15, <http://usda01.library.cornell.edu/usda/ers/FDS//2010s/2011/FDS-09-14-2011.pdf>.

<sup>14</sup>“Oil Crops Outlook,” *OCS-11i*, Sept. 13, 2011, United States Department of Agriculture, pp. 1 and 8, <http://usda01.library.cornell.edu/usda/ers/OCS//2010s/2011/OCS-09-13-2011.pdf>.

<sup>15</sup>“Natural Gas Weekly Update,” Energy Information Administration, [http://www.eia.gov/oog/info/ngw/historical/2011/10\\_13/ngupdate.asp](http://www.eia.gov/oog/info/ngw/historical/2011/10_13/ngupdate.asp).