

Commodity Market Monthly

Research Department, Commodities Unit

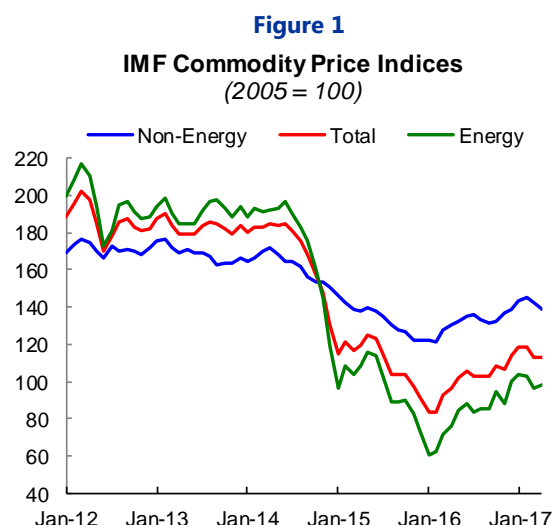


May 15, 2017¹

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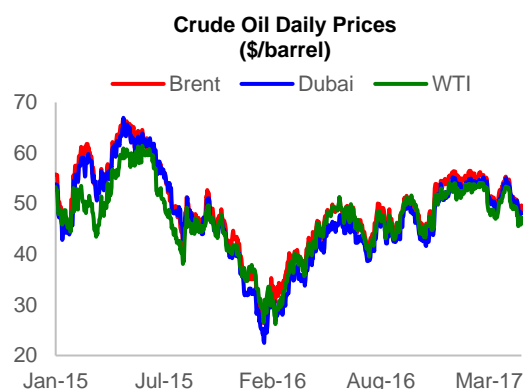
Overall, commodity prices were unchanged in April, falling less than 0.1 percent. (Figure 1.) The 6.4 percent fall in the metal price index was offset by 2.7 percent rise in the energy price index. The Food Index fell more modestly, by 1.6 percent.



Energy

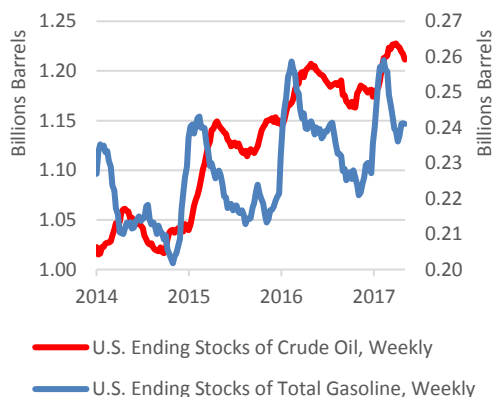
Monthly average crude oil prices increased 2.6 percent in April to \$52.23/barrel (bbl). During the month of April (from the end of March to the end of April), Average Petroleum Spot Price (simple average of U.K. Brent, Dubai Fateh, and West Texas Intermediate; APSP) decreased 2.5 percent. It has declined further in early May and is trading around 49 dollars as of May 12 (Figure 2).

Figure 2



Oil prices rebounded in the middle of April as the market priced in the extension of Organization of the Petroleum Exporting Countries' production cut. However, it has since decreased amid continued US supply growth (production and inventories) and signs of weaker demand (Figure 3).

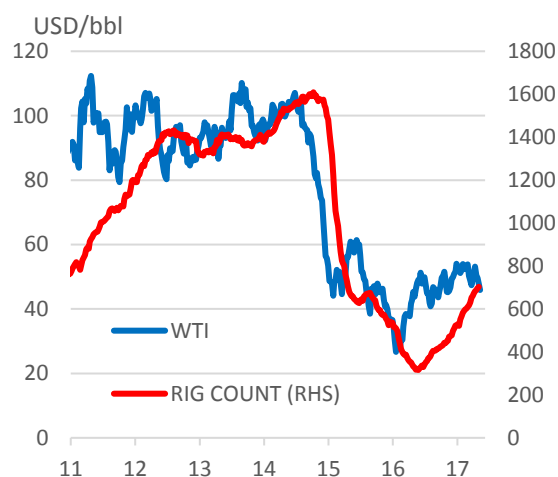
Figure 3
U.S. Oil Inventory



¹ Fan charts are based on the closing price of May 10, 2017.

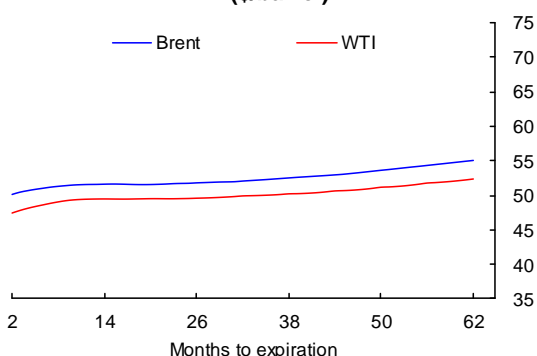
The U.S. rig count more than doubled compared to last year (Figure 4). The U.S. Energy Information Administration revised its forecast for U.S. crude oil production in 2017 upward by 0.1 million barrels per day (mbd) while the International Energy Agency revised its global demand growth forecast for 2017 downwards by 0.1 mbd, as reported last month.

Figure 4
Oil prices and rig counts in the U.S.



Futures contracts point to oil prices (APSP) stay almost flat at \$50.60 in 2017 (compared to the current IMF baseline of \$55.23) and \$50.31 in 2018 (compared to current IMF baseline of \$55.06). Future curves are gradually increasing for the next 5 years. (Figure 5.)

Figure 5
Day's Oil Future Curves (\$/barrel)



Average monthly natural gas prices at Henry Hub in the U.S. increased by 7.2 percent to an average of \$3.08 per million British thermal units (MMBtu) in April from an average of \$2.87/MMBtu in March. Daily prices increased 23.3 percent to \$3.17 at the end of March from \$3.10 at the end of April. In Europe, Average monthly natural gas prices (converted to U.S. dollars) at the NetConnect Germany (NCG) Virtual Trading Point, our new benchmark natural gas prices in Europe, have increase to by 1.3 percent to \$5.18/MMBtu in April. Average monthly natural gas prices in Asia, which are derived from LNG benchmark prices (Source: Argus Media Group) in North East Asia, have decreased by 1.5 percent in April as demand eases.

Coal prices in Australia have increased by 5.1 percent in April. It has decreased in May as Chinese economic data shows weakness.

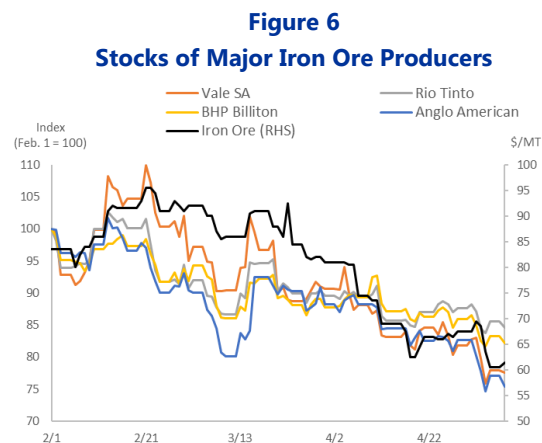
Metals

The IMF base metal index, comprised of 8 base metals (Table 1), fell 6.4 percent in April month-on-month (m-o-m). This fall is largely explained by iron ore which plummeted 19.3 percent m-o-m and 29 percent from the end of March to the end of April. Most base metals fell in April: copper (-2.4%), nickel (-5.8%), zinc (-5.8%), and lead (-2.6%). Aluminum was the exception, increasing 1.0% while tin remained constant (+0.2%).

Iron ore prices have been trending downwards since late February 2017. This fall is in line with expectations of a weakening demand due to credit tightening in China that is expected to diminish their steel consumption. China's GDP growth accelerated faster than expected in the first quarter (6.9% annual pace). More recently, its economy shows signs of slowing in April, with the Manufacturing Purchasing Managers' Index dropping from 51.8 in March to 51.2 in April. On

the supply side, exports from major iron ore producers (Australia and Brazil) rose to record levels and China has restarted higher-cost iron ore mines. Vale's new S11D mine in Brazil will bring low-cost capacity to the market, thus putting further downward pressure on prices. Meanwhile, inventories in Chinese ports are at record levels. The free fall in iron ore prices, driven by speculators, had overtaken fundamentals, leading prices to rebound in late April before resuming their fall. The continued decline in iron ore prices have begun hurting the share prices of major mining companies. Since iron ore price peaked in February, shares of Anglo American, BHP Billiton, Rio Tinto, and Vale SA have fallen (see Figure 6). Iron ore prices are projected to continue falling through 2018.

Aluminum prices rose modestly m-o-m in April (1%) but fell 2.5 percent from the end of March to the end of April. In late April, the Trump Administration ordered an investigation into the effect of aluminum imports on US national security. This investigation could lead to tariffs or other barriers to imports, which would have a direct effect on China, one of the largest exporters of aluminum. In 2016, China produced 55 percent of global primary aluminum.



Copper prices fell 2.4 percent m-o-m and 3.0 percent from the end of March to the end of April.

March had been characterized by disruptions at several major copper mines: Escondida (Chile), Grasberg (Indonesia), and Cerro Verde (Peru). April saw a strike at Southern Copper's Cuajone and Toquepala mines in Peru, which lasted two weeks. Unlike the previous disruptions in March, Southern Copper's strikes did not significantly impact production as the mines continued to operate at 92 percent capacity using sub-contracted workers. Indonesia granted Freeport McMoRan a temporary (8-month) mining license in early April to resume exports of copper and nickel ores from its Grasberg mine. Copper prices are projected to remain flat.

Nickel prices reached a 10-month low the last week in April. China's nickel imports have been declining. Prices have been on an overall downward trend since Indonesia relaxed its export ban on ores. Prices may tick up again should Philippines' president Rodrigo Duterte follow through on his threat to stop all mining operations in the country. Investors are skeptical of such strict regulations. Prices are predicted to remain robust in 2017, on strong demand from China.

Table 1
Current Base Metal Prices and % changes
(as of March 31, 2017)

Metal	Price (\$)	% change	
		Month-on-Month	Year-to-Date
Copper	5,711/MT	-2.4	3.4
Aluminum	1,903/MT	1.0	11.7
Tin	19,990/MT	-0.2	-5.7
Nickel	9,404/MT	-5.8	-5.6
Zinc	2,619/MT	-5.8	2.4
Lead	2,284/MT	-2.6	14.2
Iron Ore	67.5/MT	-19.3	-15.6
Uranium	22.8/lb	-5.7	11.5

Sources: London Metal Exchange (Copper, aluminum, tin, nickel, zinc, and lead); DataStream CIF China United States (FE63.5%, iron ore); and New York Mercantile Exchange (uranium).

Agriculture

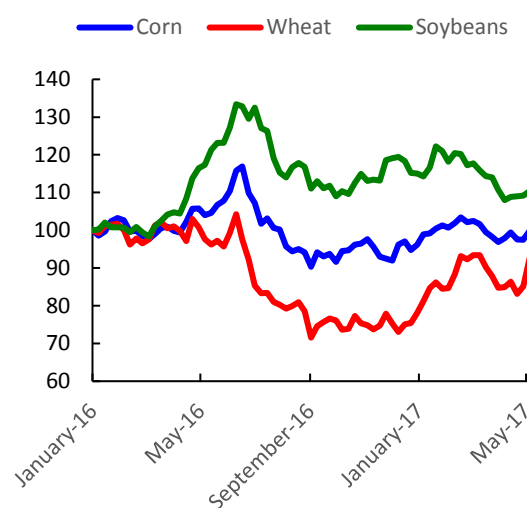
The IMF's price index of food, beverages and agricultural raw materials decreased by 1.7 percent in April 2017. The index of food and beverages and that of agricultural raw materials both declined by 1.7 and 1.8 percent, respectively. After a price rally in January this year, April now marks the third consecutive month of losses, with the index now essentially back at its December 2016 level. Like last month, the decline in the food and beverages index comes on account of losses for the indices of sugar, vegetable oils, beverages and cereals, which decreased by 7.5, 3.9, 2.7 and 2.3 percent respectively, while indices for seafood and meats increased respectively by 2.9 and 0.5 percent. Furthermore, free market sugar, palm oil, cocoa, pork and soybeans continued their decline, decreasing respectively by 9.2, 6.0, 4.9, 12.8 and 5.0 percent, while wheat also experienced a substantial decline of 5.4 percent.

Similar to last month, hedge funds continued to increase their net short position in futures and options in the 13 top U.S.-traded agricultural commodities, wheat in particular. While there has been weather-induced bearish news regarding upcoming harvest for several cereals, implying ample supplies in 2017, several observers have noted that the current net short may be unsustainable. As a result, agricultural markets may experience significant price volatility in the weeks to come.

The price of wheat decreased by 5.4 percent in April 2017, thereby interrupting the rally that started at the end of last year. Cumulative gains of 19 percent between January-March 2017, raise the possibility that market rebalancing may once again need more time. The first half of the month was characterized by mostly bearish news. First, on April 11, 2017, the United States Department

of Agriculture (USDA) upgrades its forecast of the 2016-2017 global ending stock to 252.3 million metric tons (mmt), up from 250 mmt. Second, weather conditions in the US and Europe initially improved in April, raising global wheat production expectations for the 2017-2018 season. At the end of April, the cumulative net short in wheat held by hedge funds was the highest on record, but many observers note that this may have become unsustainable.

Figure 7. Corn, wheat and soybean prices.
(January 1, 2016=100)



Sources: United States Department of Agriculture (corn, wheat), Chicago Board of Trade (soybeans)

As of May 12, 2017, however, the wheat market once again looks markedly different. In the week ending Friday, May 5, 2017, the price of wheat jumped by a spectacular 8.8 percent, as hedge funds reduced their net short position in wheat for the first time in 10 weeks. This occurred amid concerns that weather damage to winter wheat crops in the U.S., after a late snow storm rolled over the US midwestern plain states in the weekend of April 29, 2017. Following these events, the USDA released its monthly world agricultural demand and supply estimates

(WASDE) report on May 10, 2017, in which it projects US supply of wheat output to fall by 9 percent year-on-year in 2017/2018.

After declining 3.9 percent last month, soybean prices fell back further in April 2017, this time by 5.0 percent. Similar to wheat, news has been bearish. Consider news from the USDA for example. On April 11, 2017, the USDA upgraded its forecast of Brazilian output to 111 mmt, up from 108 mmt, and slightly increased it again on May 10, to 111.6 mmt. Forecasts of global 2016/2017 ending stocks increased too, first to 87.41 mmt in April and then to 90.14 in May, up from 82.82 in March 2017. While crop yields are expected to return to more average levels next year and acreage increasing at a slower pace, thereby diminishing supply, the first 2017/2018 ending stock forecast of 88.81 mmt indicates a prolonged easing of demand-and-supply conditions.

Free market sugar lost more ground again this month, its price declining by 9.2 percent, which comes after a sharp decline of 11.2 percent in March 2017. Falling sugar prices come at a time when the harvest season is now underway in Brazil and, as indicated last month, the current dry weather implies good harvesting conditions. In addition to good supplies, falling ethanol prices likely constitute another culprit behind falling prices. Sugar prices are now close to ethanol parity, potentially providing for a price floor in the weeks and months ahead. If sugar cane supplies from the ongoing Brazilian harvest were to become even more abundant, sugar cane mills may prefer conversion to ethanol, reducing sugar production.

Lean hog prices decreased for the second month in a row, declining by 12.8 percent month-on-month in April 2017. Supply to U.S. slaughterhouses has continued to be strong,

outpacing domestic demand and export growth to Mexico, South Korea and Japan. A seasonal increase in U.S. demand should provide support to prices in the first half of the summer. Looking at global markets, it will be some time before global production levels for pork, which peaked in 2014, will recover, as environmental regulations are forcing the modernisation and geographical relocation of pork production. Local prices in the U.S., the European Union and Latin America will continue to be influenced by countries' access to the large Chinese market.

The price of cocoa beans decreased by 4.9 percent in the month of April 2017, thereby resuming its downward trend that was initiated last year after the beginning of a historically large bumper crop in West-Africa. However, as with several other commodities, there has been fairly little movement in fundamentals, suggesting that hedge fund selling has played a role in the decline of cocoa prices. With the current price level hovering around a 10-year low, Rabobank maintains a bullish outlook, as a potential El Niño poses a threat to the harvest from West Africa next season and a stronger Euro induces European market players to hold on to larger stocks.

Figure 8

**April Commodity Prices Changes
(percent from previous month)**

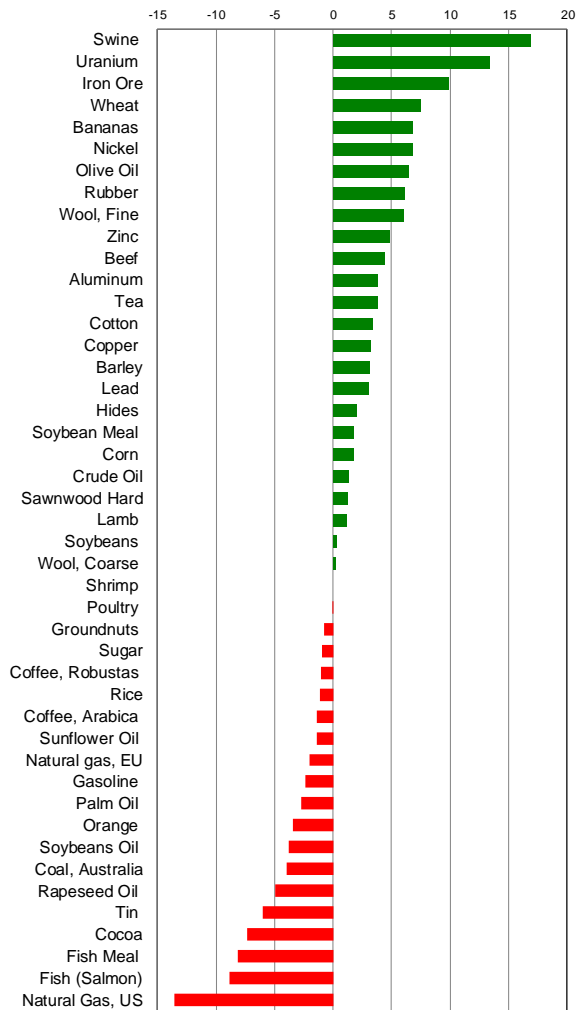


Table 1. Market Prices for Non-Fuel and Fuel Commodities

	Units	2014	2015	2016	2016Q2	2016Q3	2016Q4	2017Q1	Mar-17	Apr-17
Food										
Cereals										
Wheat	\$/MT	242.5	185.6	143.2	159.2	128.2	122.6	143.6	146.4	138.4
Maize	\$/MT	192.9	169.8	159.2	171.1	153.4	152.2	160.6	159.0	156.4
Rice	\$/MT	426.5	380.0	388.3	401.8	418.2	365.3	369.6	367.8	374.5
Barley	\$/MT	146.1	127.9	129.4	137.4	131.1	129.3	135.2	137.3	138.8
Vegetable oils and protein meals										
Soybeans	\$/MT	457.8	347.4	362.7	387.8	372.2	367.3	375.5	366.1	347.9
Soybean meal	\$/MT	467.0	352.7	350.2	392.9	370.0	342.9	364.3	356.9	342.6
Soybean oil	\$/MT	812.7	672.2	721.2	719.7	701.4	776.6	746.1	723.4	695.3
Palm oil	\$/MT	739.4	565.1	639.8	647.8	647.0	677.7	698.9	663.3	623.2
Fish meal	\$/MT	1921.5	1759.2	1418.5	1511.5	1409.7	1286.2	1139.7	1069.0	1094.7
Sunflower Oil	\$/MT	1080.3	1022.2	1009.7	1028.6	982.0	1003.7	961.5	936.8	940.0
Olive oil	\$/MT	3780.6	4292.8	3978.5	3897.5	3982.3	3948.3	4336.9	4434.1	4389.0
Groundnuts	\$/MT	2148.3	1946.2	1798.3	1855.4	1804.7	1711.8	1836.6	1882.5	1848.0
Rapeseed oil	\$/MT	904.4	774.6	822.0	797.7	810.6	904.7	876.5	839.9	823.0
Meat										
Beef	cts/lb	224.1	200.5	178.2	179.3	185.4	179.3	183.8	190.2	192.9
Lamb	cts/lb	130.6	107.9	106.9	100.6	110.8	120.8	124.7	128.3	134.5
Swine Meat	cts/lb	102.8	67.9	62.4	72.6	66.6	50.1	67.2	68.4	59.6
Poultry	cts/lb	110.1	114.7	111.5	111.8	110.9	111.1	117.6	124.0	130.7
Seafood										
Fish	\$/kg	6.6	5.3	7.1	7.3	7.2	7.5	7.9	7.2	7.4
Shrimp	\$/kg	16.6	14.1	11.0	10.6	10.7	11.8	12.1	12.1	12.1
Sugar										
Free market	cts/lb	17.1	13.2	18.5	17.6	20.8	20.9	19.6	18.1	16.4
United States	cts/lb	24.9	24.8	27.0	26.4	27.2	28.9	29.7	29.8	28.7
EU	cts/lb	27.4	25.4	22.5	23.9	21.8	20.7	20.6	20.5	21.0
Bananas	\$/MT	931.9	958.7	1002.4	993.0	1023.2	965.4	1029.8	1075.2	1063.5
Oranges	\$/MT	782.5	675.0	889.1	784.7	992.5	1093.1	919.6	921.3	849.4
Beverages										
Coffee										
Other milds	cts/lb	202.8	160.5	164.5	158.5	173.6	175.3	164.3	159.4	155.9
Robusta	cts/lb	105.6	94.2	94.3	90.4	98.5	106.1	110.5	110.0	106.2
Cocoa Beans	\$/MT	3062.8	3135.2	2892.0	3099.9	2987.9	2499.6	2097.4	2063.1	1961.2
Tea	cts/kg	237.9	340.4	287.4	251.4	284.7	323.4	369.2	356.1	362.1
Agricultural raw materials										
Timber										
Hardwood										
Logs 1/	\$/M3	282.0	246.0	274.4	275.7	290.7	272.8	261.8	263.5	270.3
Sawnwood 1/	\$/M3	897.9	833.3	738.9	782.3	716.2	676.8	674.9	672.5	688.4
Softwood										
Logs 1/	\$/M3	174.3	162.0	156.8	143.5	151.7	163.7	162.6	160.1	160.1
Sawnwood 1/	\$/M3	307.3	308.7	297.1	309.2	307.6	304.7	299.8	300.4	300.4
Cotton	cts/lb	83.1	70.4	74.2	71.2	79.7	79.0	84.8	86.8	87.0
Wool										
Fine	cts/kg	1074.4	1005.8	1112.0	1092.8	1140.3	1191.4	1371.0	1454.8	1405.0
Coarse	cts/kg	1034.6	927.8	1016.4	1009.0	1082.2	1015.1	1039.0	1059.6	991.1
Rubber	cts/lb	88.8	70.7	74.5	75.2	76.1	87.3	115.4	107.4	101.2
Hides	cts/lb	110.2	87.7	74.1	73.5	74.2	75.9	76.5	77.9	75.4

1/ Provisional.

2/ Average Petroleum Spot Price (APSP). Average of U.K. Brent, Dubai, and West Texas Intermediate, equally weighted.

Table 1. Market Prices for Non-Fuel and Fuel Commodities (Continued)

	Units	2014	2015	2016	2016Q2	2016Q3	2016Q4	2017Q1	Mar-17	Apr-17
Metals										
Copper	\$/MT	6863.4	5510.5	4867.9	4736.4	4779.6	5280.8	5840.0	5824.6	5683.9
Aluminum	\$/MT	1867.4	1664.7	1604.2	1571.8	1620.2	1710.3	1851.2	1901.5	1921.2
Iron Ore	\$/MT	97.4	56.1	58.6	56.4	58.6	70.8	85.6	87.2	70.4
Tin	\$/MT	21898.9	16066.6	17933.8	16902.1	18584.3	20810.1	20004.5	19875.2	19910.3
Nickel	\$/MT	16893.4	11862.6	9595.2	8822.5	10263.5	10787.0	10273.1	10204.7	9609.3
Zinc	\$/MT	2161.0	1931.7	2090.0	1916.9	2251.6	2514.2	2779.1	2776.9	2614.9
Lead	\$/MT	2095.5	1787.8	1866.7	1717.6	1872.7	2138.3	2278.3	2280.9	2220.6
Uranium	\$/lb	33.5	36.8	26.3	27.5	25.5	19.6	23.9	24.6	23.2
Energy										
Spot Crude 2/	\$/bbl	96.2	50.8	42.8	44.8	44.7	49.1	53.0	50.9	52.2
U.K. Brent	\$/bbl	98.9	52.4	44.0	46.0	45.8	50.1	54.1	52.0	53.1
Dubai	\$/bbl	96.7	51.2	41.2	42.9	43.4	47.9	52.9	51.2	52.4
West Texas Intermediate	\$/bbl	93.1	48.7	43.2	45.5	44.9	49.2	51.8	49.6	51.2
Natural Gas										
Russian in Germany	\$/mmbtu	10.5	7.3	4.4	4.0	4.2	4.6	5.9	5.1	5.2
Indonesian in Japan (LNG)	\$/mmbtu	17.0	11.0	7.4	6.9	7.4	7.4	7.4	5.8	5.7
US, domestic market	\$/mmbtu	4.4	2.6	2.5	2.1	2.8	3.0	3.0	2.9	3.1
Coal										
Australian, export markets	\$/MT	75.1	61.6	70.6	55.6	72.3	99.8	87.4	86.3	90.7

1/ Provisional.

2/ Average Petroleum Spot Price (APSP). Average of U.K. Brent, Dubai, and West Texas Intermediate, equally weighted.

Table 2. Indices of Market Prices for Non-Fuel and Fuel Commodities, 2014-2016

(2005=100, in terms of U.S. dollars) 1/

	(weights) 1/	2014	2015	2016	2016Q2	2016Q3	2016Q4	2017Q1	Mar-17	Apr-17
All Primary Commodities 2/	100.0	171.9	111.2	100.1	101.4	102.7	109.7	116.7	113.3	113.3
Non-Fuel Commodities	36.9	162.3	134.0	131.5	132.8	133.4	135.9	143.8	142.9	138.4
Agriculture	26.2	161.5	136.9	136.3	139.8	138.6	137.1	142.2	140.3	137.9
Food	16.7	170.1	140.8	143.8	149.2	145.9	143.9	150.6	147.6	145.2
Cereals	3.6	180.2	149.0	131.4	142.0	126.4	120.6	131.3	131.8	128.8
Vegetable oils and protein meals	4.4	190.5	152.8	155.9	163.8	158.6	158.0	161.3	157.0	150.8
Meat	3.7	160.5	137.4	126.6	131.4	130.9	121.9	133.3	138.1	137.5
Seafood	3.2	162.0	131.7	161.6	164.8	163.0	169.5	178.8	165.0	169.7
Beverages	1.8	178.0	172.6	163.9	163.5	169.8	163.8	156.0	152.8	148.7
Agricultural raw materials 3/	7.7	138.8	120.1	113.3	113.7	115.5	116.3	120.8	121.4	119.3
Timber	3.4	109.3	104.5	100.2	103.0	101.6	99.4	97.9	97.8	98.8
Metals	10.7	164.4	126.6	119.7	115.6	120.6	132.9	147.8	149.4	139.9
Edibles 4/	18.5	170.9	143.9	145.8	150.6	148.2	145.8	151.1	148.1	145.6
Industrial Inputs 5/	18.4	153.7	123.9	117.0	114.8	118.5	125.9	136.5	137.7	131.2
Energy 6/	63.1	177.4	97.9	81.7	83.0	84.8	94.3	100.8	96.0	98.6
Petroleum 7/	53.6	181.1	95.6	80.4	84.1	84.0	92.2	99.6	95.8	98.2
Natural Gas	6.9	159.9	106.8	70.0	64.1	69.3	73.1	83.4	70.8	71.6
Coal	2.6	149.1	121.3	138.4	110.8	141.7	193.3	171.8	167.6	175.9

1/ Weights based on 2002-2004 average world export earnings.

2/ Non-Fuel Primary Commodities and Energy Index.

3/ Includes Forestry Products.

4/ Edibles comprised of Food and Beverages

5/ Industrial (Non-Fuel) Inputs comprised of Agriculture and Metals

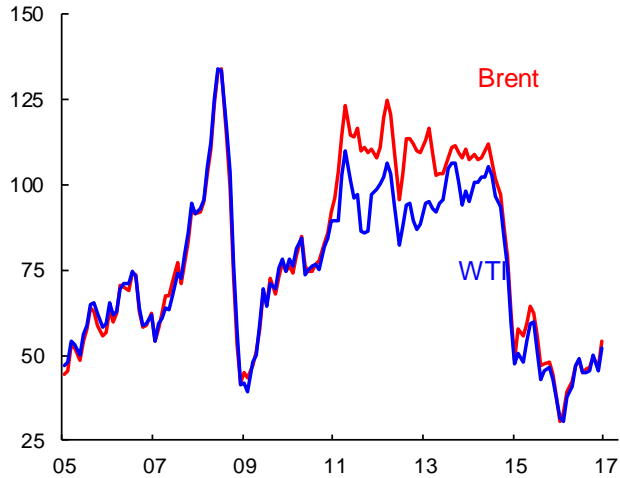
6/ Includes Petroleum, Natural Gas and Coal

7/ Average Petroleum Spot Price (APSP). Average of U.K. Brent, Dubai, and West Texas Intermediate, equally weighted.

Commodity Prices Movements

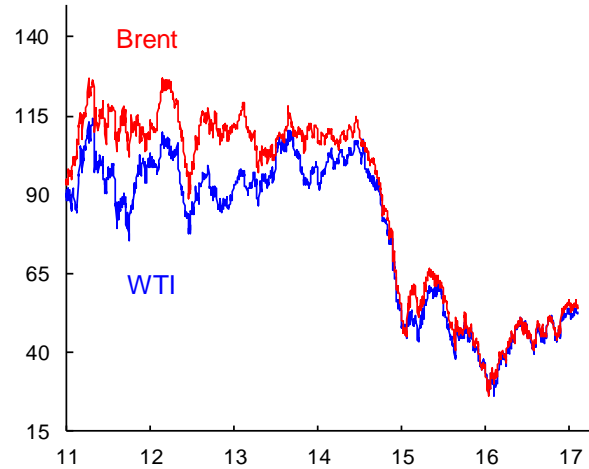
Monthly (from 2005)

Crude oil (\$/bbl)

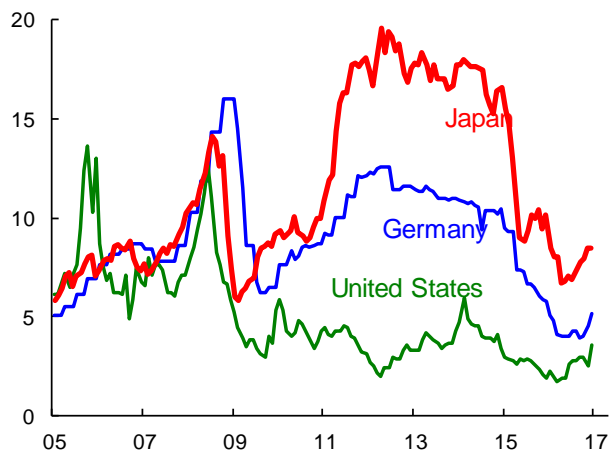


Daily (from 2011)

Crude oil (\$/bbl)

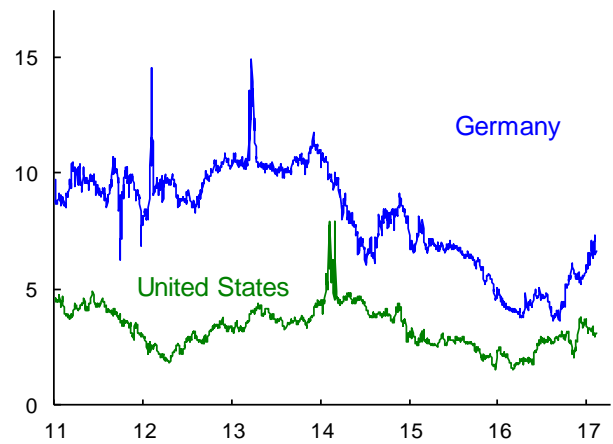


Natural Gas (\$/mmbtu)



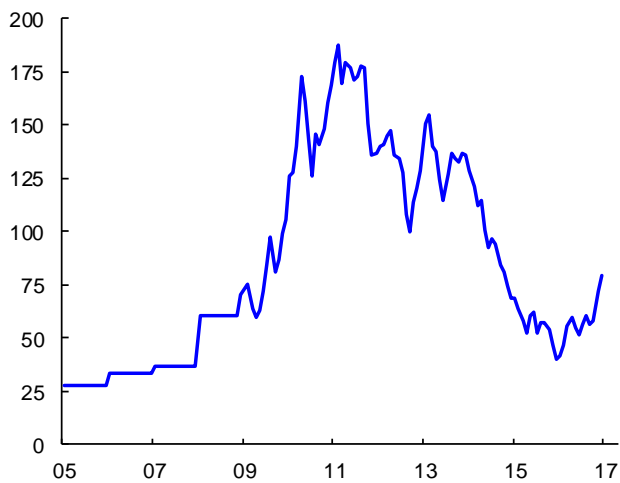
Sources: Energy Intelligence; Bloomberg, L.P.

Natural Gas (\$/mmbtu)



Source: Bloomberg, L.P.

Iron Ore (\$/ton)



Iron Ore (\$/ton)



Commodity Prices Movements (Continued)

Monthly (from 2005)

Copper (\$/ton)



Aluminium (\$/ton)



Nickel (\$/ton)



Daily (from 2011)

Copper (\$/ton)



Aluminium (\$/ton)



Nickel (\$/ton)



Commodity Prices Movements (Continued)

Monthly (from 2005)

Tin (\$/ton)



Wheat (\$/ton)

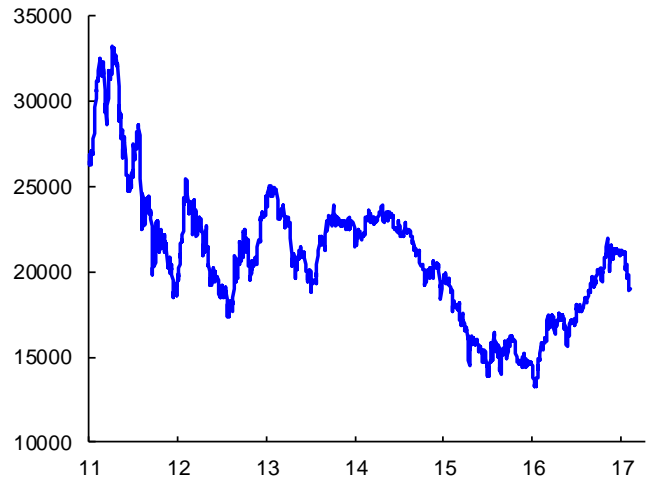


Corn (\$/ton)

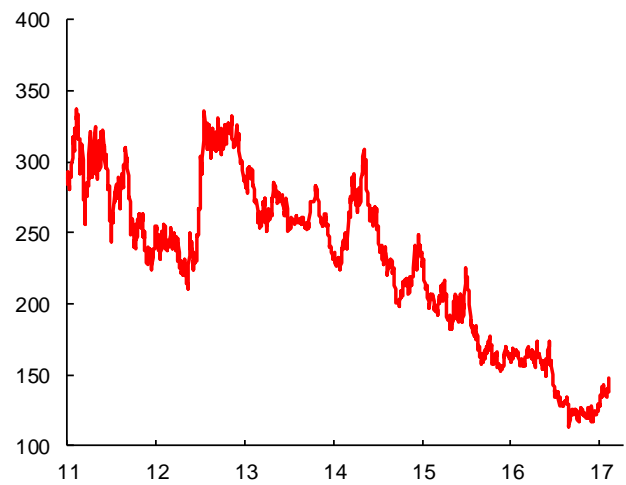


Daily (from 2011)

Tin (\$/ton)



Wheat (\$/ton)



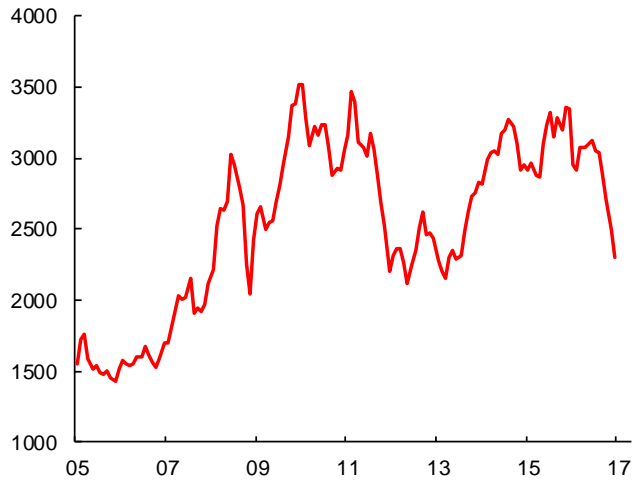
Corn (\$/ton)



Commodity Prices Movements (Continued)

Monthly (from 2005)

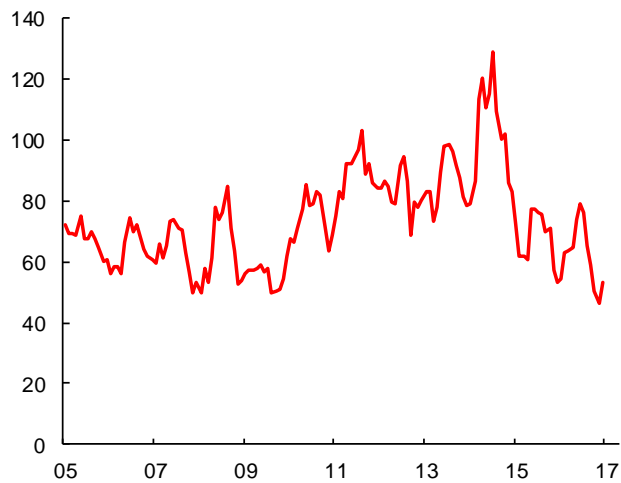
Cocoa (\$/ton)



Coffee (cents/lb)

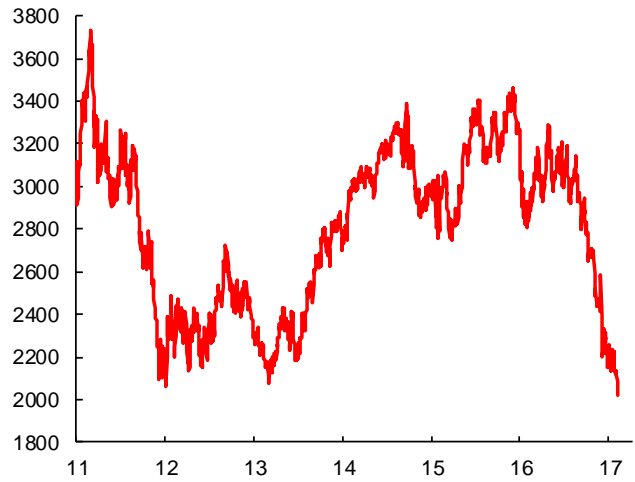


Swine (cents/lb)

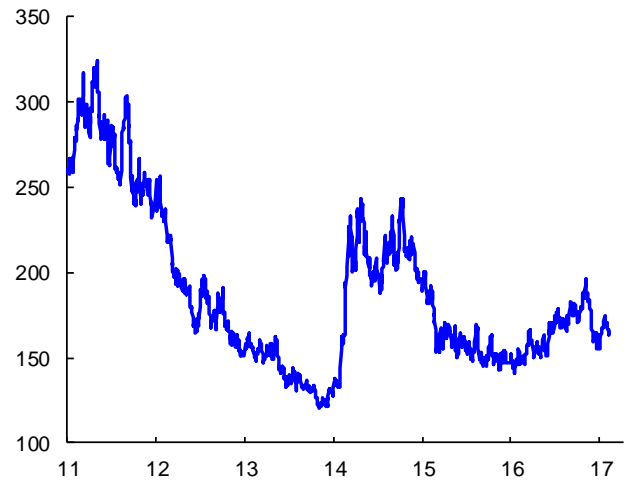


Daily (from 2011)

Cocoa (\$/ton)



Coffee (cents/lb)



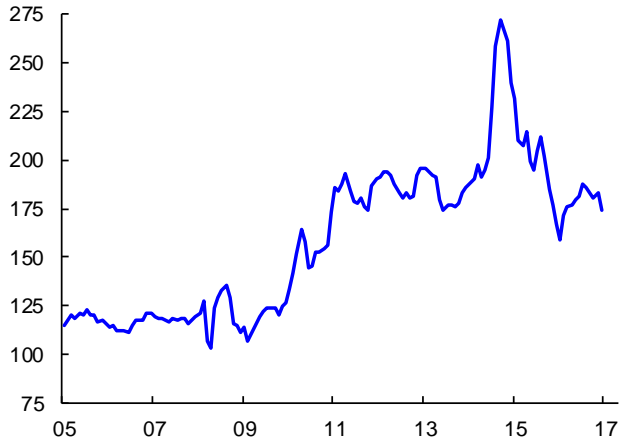
Swine (cents/lb)



Commodity Prices Movements (Continued)

Monthly (from 2005)

Beef (cents/pound)



Source: Meat & Livestock Australia.

Daily (from 2011)

Beef (cents/lb)



Source: Bloomberg, L.P.

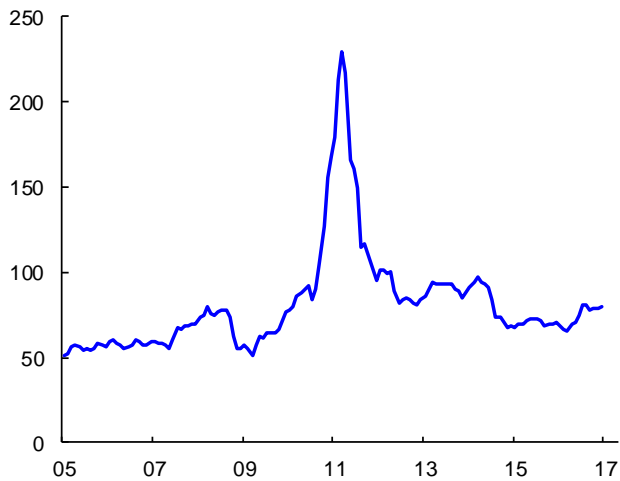
Soybeans (\$/ton)



Soybeans (\$/ton)



Cotton (cents/pound)



Cotton (cents/lb)



Commodity Prices Movements (Continued)

Monthly (from 2005)

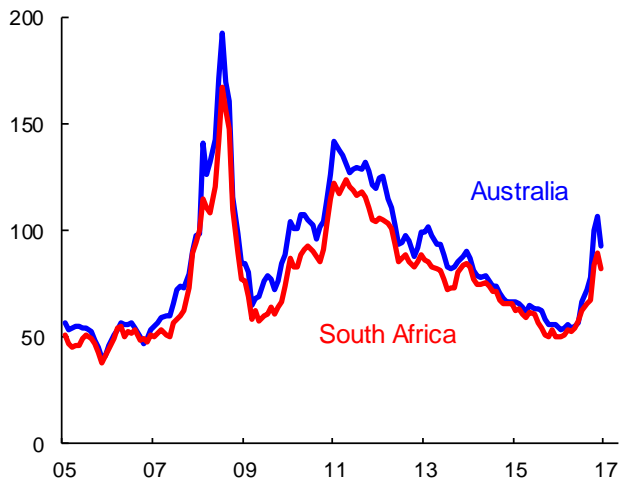
Uranium(\$/lb)



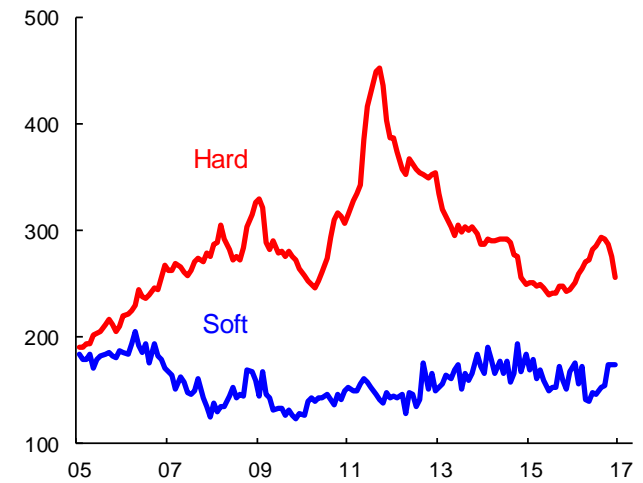
Zinc (\$/ton)



Coal (\$/ton)



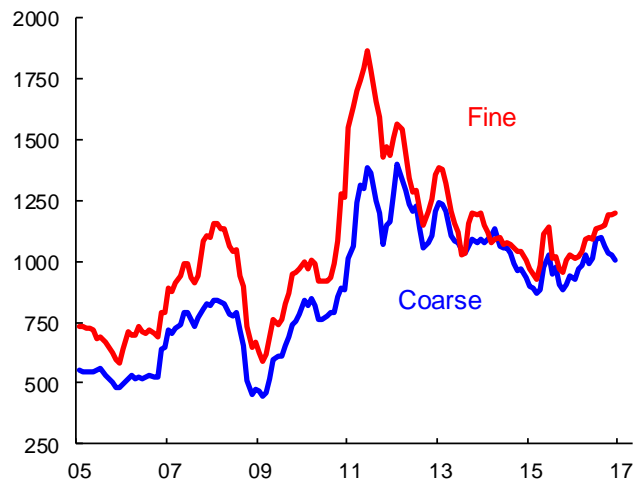
Logs (\$/cubic meter)



Rubber (\$/lb)



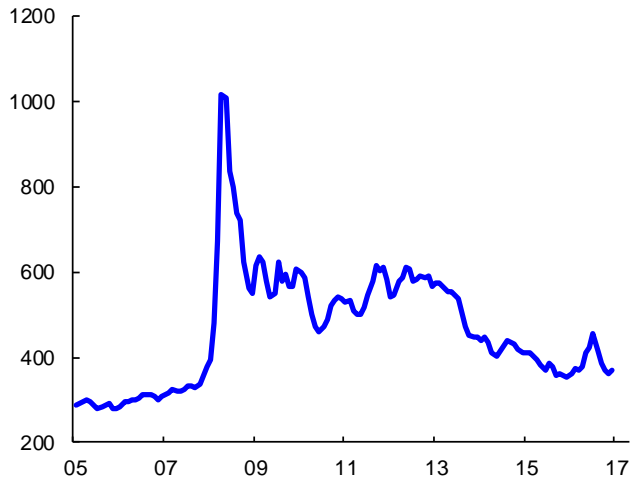
Wool (cents/kg)



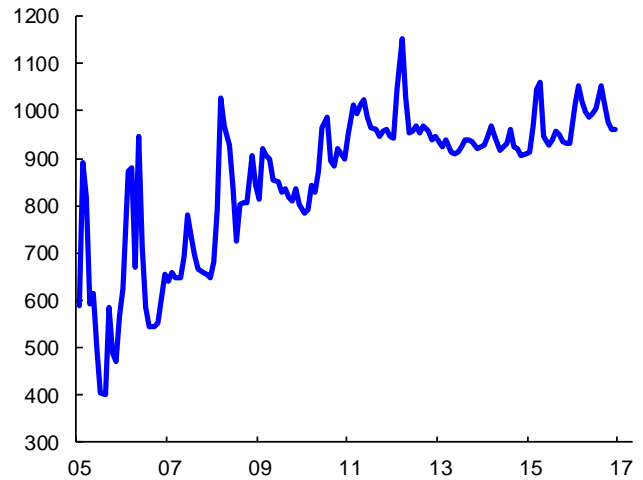
Commodity Prices Movements (Continued)

Monthly (from 2005)

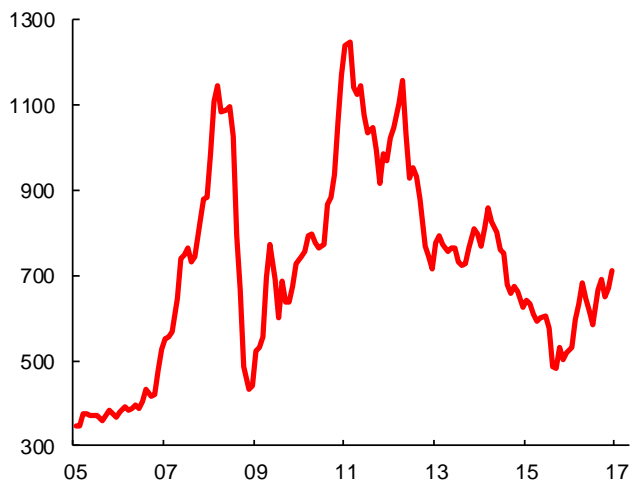
Rice (\$/ton)



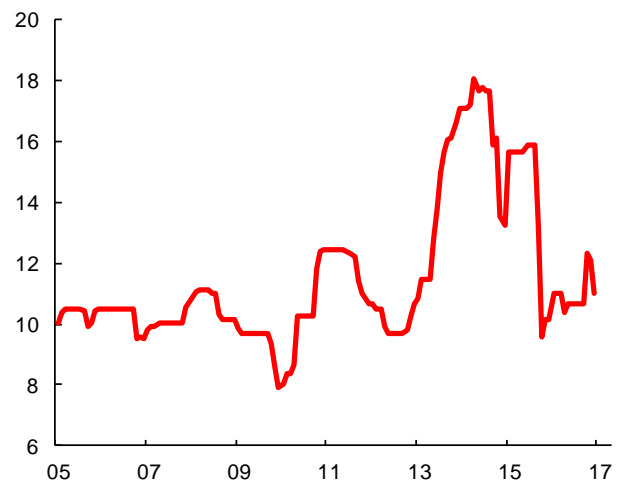
Bananas (\$/ton)



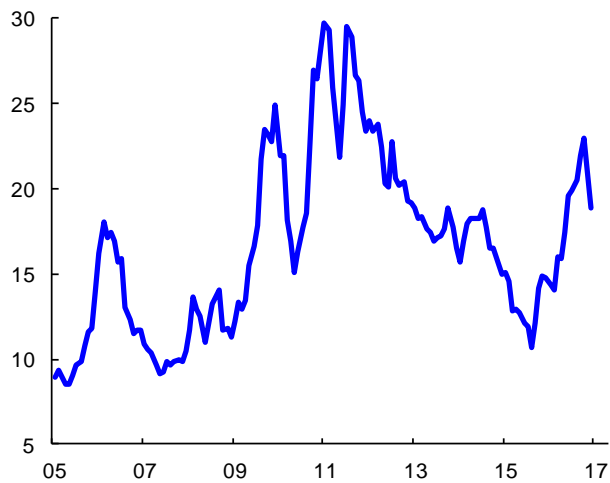
Palm Oil (\$/ton)



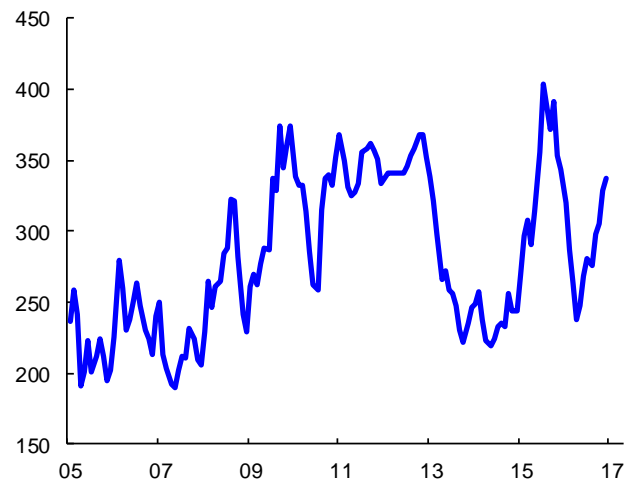
Shrimp (\$/kg)



Sugar (cents/pound)



Tea (cents/kg)



Commodity Prices Movements (Continued)

Daily (from 2011)

Gold (\$/troy ounce)



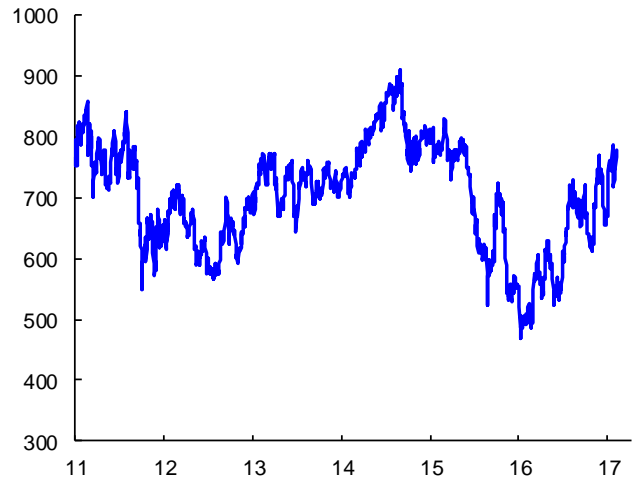
Silver (\$/troy ounce)



Platinum (\$/ounce)

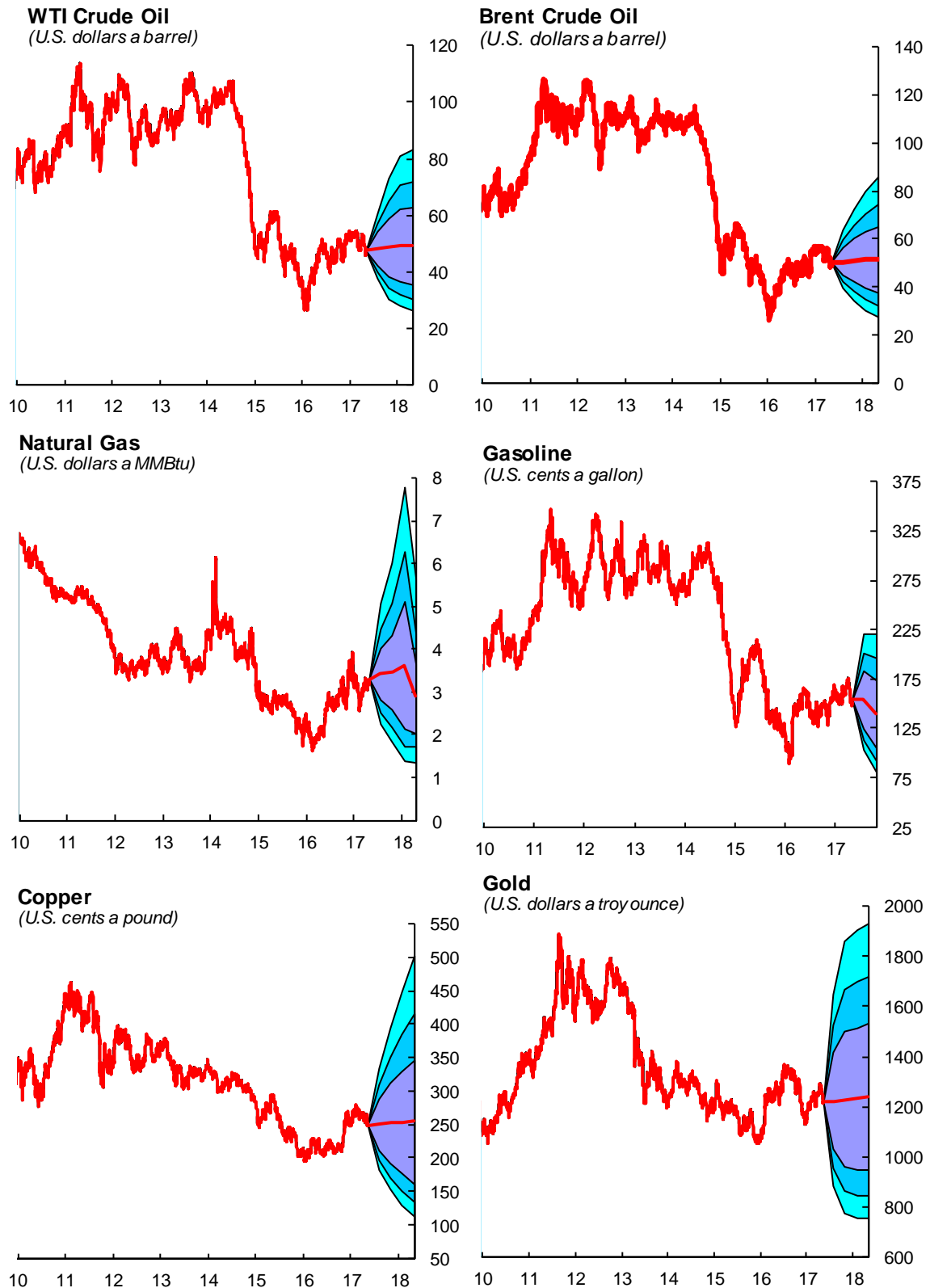


Palladium (\$/ounce)



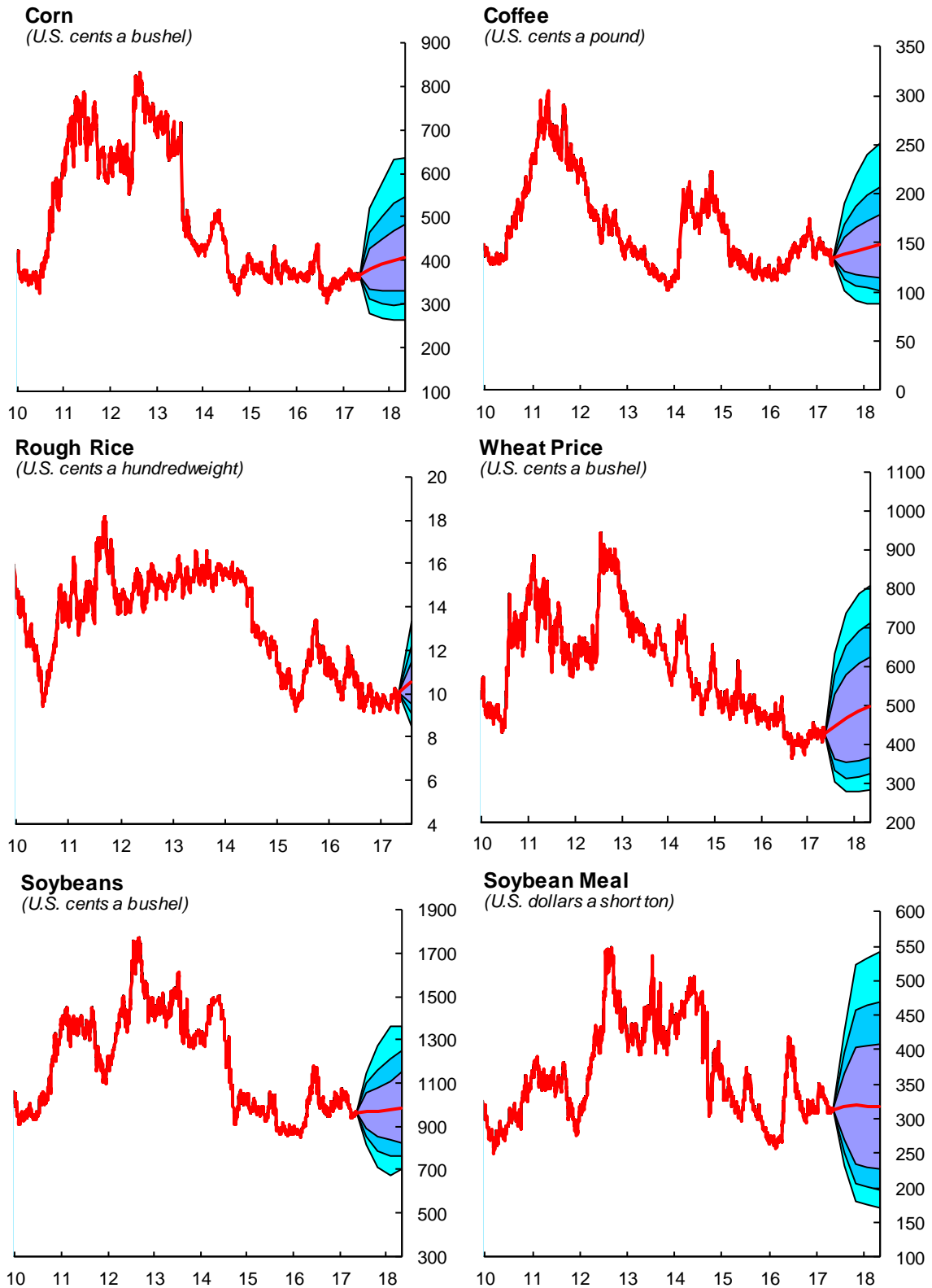
Selected Commodities—Market Price Outlook and Risks

95% confidence interval 86% confidence interval 68% confidence interval Futures



Selected Commodities—Market Price Outlook and Risks (concluded)

■ 95% confidence interval
 ■ 86% confidence interval
 ■ 68% confidence interval
— Futures



Options-based Price Thresholds

WTI Crude Oil

(probabilities in percent; prices in U.S. dollars a barrel)

Threshold Prices	Months Forward			
	3	6	9	12
< 20	0.0	0.0	0.0	0.1
< 25	0.0	0.2	0.7	1.4
< 30	0.0	2.3	4.5	6.5
< 35	0.7	9.8	14.8	17.0
< 40	8.9	24.5	31.5	32.4
< 45	35.7	45.0	50.6	49.9
> 50	30.2	33.9	32.5	33.6
> 55	9.1	17.7	19.6	20.4
> 60	1.9	8.2	11.0	11.6
> 65	0.3	3.6	5.9	6.3
> 70	0.0	1.5	3.1	3.3

Brent Crude Oil

(probabilities in percent; prices in U.S. dollars a barrel)

Threshold Prices	Months Forward			
	3	6	9	12
< 20	0.0	0.0	0.0	0.1
< 25	0.0	0.0	0.3	0.8
< 30	0.0	0.5	2.1	4.0
< 35	0.3	3.6	7.8	11.5
< 40	3.7	12.9	19.2	24.1
< 45	19.1	30.8	36.4	40.9
> 50	47.5	45.4	43.6	41.5
> 55	17.3	24.3	26.1	26.4
> 60	4.5	11.0	14.0	15.5
> 65	1.0	4.6	7.0	8.6
> 70	0.2	1.8	3.4	4.7

U.S. Natural Gas

(probabilities in percent; prices in U.S. dollars an MMBtu)

Threshold Prices	Months Forward			
	3	6	9	12
< 1.00	0.0	0.0	0.1	0.1
< 1.50	0.0	0.3	2.0	1.6
< 2.00	0.7	3.9	12.0	11.4
< 2.50	7.5	15.9	30.9	38.5
< 3.00	30.6	40.4	52.2	68.6
> 3.50	31.1	31.1	30.1	13.2
> 4.00	10.2	13.4	17.7	5.2
> 4.50	3.4	5.8	10.0	2.2
> 5.00	1.1	2.6	5.5	1.0
> 5.50	0.3	1.1	2.9	0.5
> 6.00	0.1	0.5	1.6	0.3

Gasoline

(probabilities in percent; prices in U.S. dollars a gallon)

Threshold Prices	Months Forward			
	3	6	9	12
< 0.25	0.0	0.0		
< 0.50	0.0	0.0		
< 0.75	0.0	0.8		
< 1.00	1.8	11.6		
< 1.25	19.4	41.0		
> 1.50	44.6	28.4		
> 1.75	16.2	10.5		
> 2.00	4.3	3.2		
> 2.25	0.9	0.9		
> 2.50	0.2	0.2		
> 2.75	0.0	0.1		

Copper

(probabilities in percent; prices in U.S. dollars a pound)

Threshold Prices	Months Forward			
	3	6	9	12
< 1.00	0.0	0.0	0.1	0.5
< 1.50	0.1	2.0	6.1	10.5
< 1.75	1.4	9.1	16.7	22.8
< 2.00	10.0	23.5	32.1	38.0
< 2.25	31.3	42.9	49.0	53.2
> 2.50	41.1	38.1	35.6	33.5
> 2.75	19.2	22.9	23.4	23.0
> 3.00	7.3	12.7	14.6	15.3
> 3.25	2.3	6.6	8.8	9.9
> 3.50	0.6	3.2	5.2	6.3
> 4.00	0.0	0.7	1.7	2.5

Gold

(probabilities in percent; prices in U.S. dollars a troy ounce)

Threshold Prices	Months Forward			
	3	6	9	12
< 700	0.0	0.8	1.0	1.1
< 800	0.5	3.8	4.5	4.7
< 900	3.7	11.4	12.6	12.8
< 1000	13.8	24.5	25.8	25.8
< 1100	32.1	41.0	41.9	41.7
> 1200	45.7	42.1	41.9	42.4
> 1300	26.3	27.8	28.1	28.8
> 1400	13.1	17.1	17.7	18.4
> 1500	5.7	9.9	10.6	11.1
> 1600	2.3	5.5	6.0	6.5
> 1700	0.8	2.9	3.3	3.6

Options-based Price Thresholds (concluded)

Corn

(probabilities in percent; prices in U.S. dollars a bushel)

Threshold Prices	Months Forward			
	3	6	9	12
< 2.0	0.0	0.1	0.2	0.2
< 2.5	0.8	1.5	1.9	1.7
< 3.0	5.8	7.8	8.8	8.8
< 3.5	30.1	32.0	32.2	31.4
> 4.0	25.4	30.8	34.2	37.1
> 4.5	6.3	10.1	13.0	15.9
> 5.0	1.9	3.6	5.0	6.4
> 5.5	0.6	1.5	2.2	2.7
> 6.0	0.2	0.6	1.0	1.2
> 6.5	0.0	0.2	0.5	0.5
> 7.0	0.0	0.1	0.2	0.2

Coffee

(probabilities in percent; prices in U.S. dollars a pound)

Threshold Prices	Months Forward			
	3	6	9	12
< 0.6	0.0	0.0	0.1	0.1
< 0.8	0.2	0.8	1.1	1.2
< 1.0	2.7	5.2	6.1	7.4
< 1.2	16.6	22.7	24.5	27.3
> 1.4	38.0	40.4	42.2	42.6
> 1.6	8.6	13.8	16.9	19.4
> 1.8	2.2	4.5	6.1	7.7
> 2.0	0.6	1.7	2.5	3.1
> 2.2	0.2	0.7	1.1	1.4
> 2.4	0.0	0.3	0.5	0.7
> 2.6	0.0	0.1	0.2	0.3

Rough Rice

(probabilities in percent; prices in U.S. dollars a hundredweight)

Threshold Prices	Months Forward			
	3	6	9	12
< 0.05	0.0			
< 0.06	0.0			
< 0.07	0.1			
< 0.08	1.3			
< 0.09	7.3			
< 0.10	34.6			
> 0.11	23.8			
> 0.12	6.7			
> 0.13	2.2			
> 0.14	0.7			
> 0.15	0.2			

Wheat

(probabilities in percent; prices in U.S. dollars a bushel)

Threshold Prices	Months Forward			
	3	6	9	12
< 2.5	0.1	0.9	0.9	0.8
< 3.0	2.6	5.9	5.8	5.1
< 3.5	14.2	19.2	18.0	16.2
< 4.0	37.6	39.2	36.4	33.7
> 4.5	36.3	40.0	43.9	46.9
> 5.0	17.1	23.4	27.3	29.9
> 5.5	6.8	12.4	15.6	17.6
> 6.0	2.4	6.1	8.3	9.7
> 6.5	0.7	2.9	4.3	5.1
> 7.0	0.2	1.3	2.1	2.5
> 7.5	0.1	0.5	1.0	1.2

Soybeans

(probabilities in percent; prices in U.S. dollars a bushel)

Threshold Prices	Months Forward			
	3	6	9	12
< 5	0.0	0.0	0.1	0.0
< 6	0.0	0.3	0.8	0.2
< 7	0.0	2.2	3.8	2.8
< 8	1.5	9.2	12.1	14.1
< 9	22.1	31.6	34.1	36.7
> 10	31.9	30.6	33.8	37.7
> 11	5.5	9.2	12.7	18.2
> 12	0.4	3.0	4.6	7.4
> 13	0.0	1.1	1.9	2.6
> 14	0.0	0.4	0.8	0.8
> 15	0.0	0.1	0.4	0.2

Soybean Meal

(probabilities in percent; prices in U.S. dollars a short ton)

Threshold Prices	Months Forward			
	3	6	9	12
< 100	0.0	0.0	0.0	0.0
< 150	0.0	0.2	0.4	0.5
< 200	0.2	5.4	6.5	7.3
< 250	7.8	25.3	27.2	28.4
> 300	57.1	45.9	44.7	44.1
> 350	19.4	22.7	22.5	22.5
> 400	3.8	9.5	9.7	9.9
> 450	0.5	3.5	3.8	4.0
> 500	0.1	1.2	1.4	1.5
> 550	0.0	0.4	0.5	0.6
> 600	0.0	0.1	0.2	0.2

Options-based Probabilities of Price Changes

(in percent)

WTI Crude Oil

Price changes	Months Forward			
	3	6	9	12
-50%	0.0	0.1	0.4	0.8
-30%	0.2	6.2	10.1	12.4
-10%	20.3	34.6	41.4	41.4
+10%	19.4	26.4	26.6	27.6
+30%	1.1	6.4	9.2	9.6
+50%	0.0	1.3	2.7	2.9
+100%	0.0	0.0	0.1	0.1

Brent Crude Oil

Price changes	Months Forward			
	3	6	9	12
-50%	0.0	0.0	0.3	0.8
-30%	0.3	3.4	7.4	11.1
-10%	17.7	29.6	35.3	39.8
+10%	18.8	25.5	27.2	27.3
+30%	1.1	4.9	7.5	9.1
+50%	0.1	0.8	1.8	2.6
+100%	0.0	0.0	0.0	0.1

U.S. Natural Gas

Price changes	Months Forward			
	3	6	9	12
-50%	0.0	0.8	3.9	3.0
-30%	3.6	9.9	22.8	26.3
-10%	28.0	38.1	50.6	66.7
+10%	23.8	25.6	26.6	10.5
+30%	5.5	8.3	12.9	3.2
+50%	1.2	2.8	5.9	1.1
+100%	0.0	0.2	0.7	0.1

Gasoline

Price changes	Months Forward			
	3	6	9	12
-50%	0.0	1.1		
-30%	4.7	19.2		
-10%	38.3	58.8		
+10%	21.0	13.3		
+30%	4.2	3.2		
+50%	0.6	0.6		
+100%	0.0	0.0		

Copper

Price changes	Months Forward			
	3	6	9	12
-50%	0.0	0.2	1.2	3.1
-30%	1.3	8.7	16.2	22.3
-10%	30.0	41.8	48.1	52.4
+10%	20.3	23.7	24.0	23.6
+30%	2.5	6.9	9.2	10.2
+50%	0.2	1.6	3.1	4.1
+100%	0.0	0.0	0.2	0.4

Gold

Price changes	Months Forward			
	3	6	9	12
-50%	0.0	0.1	0.1	0.2
-30%	1.6	7.1	8.2	8.4
-10%	31.5	40.5	41.5	41.2
+10%	20.1	22.9	23.4	24.1
+30%	2.6	6.0	6.6	7.1
+50%	0.2	1.2	1.5	1.7
+100%	0.0	0.0	0.0	0.0

Options-based Probabilities of Price Changes (concluded)

(in percent)

Corn

Price changes	Months Forward			
	3	6	9	12
-50%	0.0	0.0	0.1	0.1
-30%	1.0	1.9	2.3	2.1
-10%	15.4	18.5	19.6	19.5
+10%	24.2	29.7	33.1	36.1
+30%	3.4	5.9	7.9	10.1
+50%	0.6	1.5	2.3	2.8
+100%	0.0	0.1	0.1	0.1

Coffee

Price changes	Months Forward			
	3	6	9	12
-50%	0.0	0.1	0.2	0.3
-30%	1.4	3.2	3.9	4.5
-10%	17.8	24.0	25.7	28.5
+10%	22.2	27.6	30.6	32.1
+30%	3.1	6.0	8.0	9.9
+50%	0.6	1.6	2.3	2.9
+100%	0.0	0.1	0.2	0.2

Rough Rice

Price changes	Months Forward			
	3	6	9	12
-50%	0.0			
-30%	0.1			
-10%	7.9			
+10%	22.0			
+30%	2.0			
+50%	0.2			
+100%	0.0			

Wheat

Price changes	Months Forward			
	3	6	9	12
-50%	0.0	0.1	0.1	0.1
-30%	2.2	5.4	5.3	4.6
-10%	28.0	31.4	29.1	26.8
+10%	29.0	33.9	37.9	40.8
+30%	6.6	12.2	15.4	17.3
+50%	1.0	3.6	5.2	6.1
+100%	0.0	0.1	0.2	0.3

Soybeans

Price changes	Months Forward			
	3	6	9	12
-50%	0.0	0.0	0.0	0.0
-30%	0.0	1.4	2.7	1.6
-10%	10.8	21.0	24.4	27.9
+10%	12.9	15.5	19.6	25.3
+30%	0.1	1.8	2.9	4.4
+50%	0.0	0.2	0.6	0.5
+100%	0.0	0.0	0.0	0.0

Soybean Meal

Price changes	Months Forward			
	3	6	9	12
-50%	0.0	0.4	0.6	0.8
-30%	1.1	11.3	12.9	14.0
-10%	27.7	43.9	45.5	46.4
+10%	22.0	24.4	24.2	24.1
+30%	2.8	8.1	8.4	8.6
+50%	0.2	2.3	2.5	2.7
+100%	0.0	0.1	0.1	0.1

Commodity Derivative Contract Specifications

Commodity	Exchange	Contract	Physical Characteristics	Contract Size	Pricing Unit	Months Traded
Brent crude oil	ICE Europe	Futures	Light sweet crude oil	1,000 barrels	U.S. dollars per barrel	Consecutive months up to and including February 2020
		Options		One crude oil futures contract of 1,000 barrels		
WTI crude oil	New York Mercantile Exchange	Futures	Light sweet crude oil	1,000 barrels	U.S. dollars per barrel	Consecutive months are listed for the current year and the next five years; in addition, the Jun and Dec contract months are listed beyond the sixth year.
		Options		One crude oil futures contract of 1,000 barrels		
Natural Gas	New York Mercantile Exchange	Futures	Natural gas delivered at Henry Hub, LA	10,000 MMBtu	U.S. dollars per MMBtu	Consecutive months for the current year plus the next twelve full calendar years.
		Options		One natural gas futures contract of 10,000 MMBtu		
Gasoline	New York Mercantile Exchange	Futures	New York Harbor RBOB	42,000 gallons	U.S. cents per gallon	Consecutive months for 36 months
		Options		One gasoline futures contract of 42,000 gallons		
Gold	Chicago Mercantile Exchange	Futures	Gold (a minimum of 995 fineness)	100 troy ounces	U.S. dollars per troy ounce	Current calendar month; the next two calendar months; any Feb, Apr, Aug, and Oct falling within a 23-month period; and any Jun and Dec falling within a 72-month period beginning with the current month.
		Options		One COMEX Gold futures contract		
Corn	Chicago Mercantile Exchange	Futures	Yellow corn grade #2	5,000 bushels (127 MT)	U.S. cents per bushel	Mar, May, Jul, Sep, Dec. The monthly option contract exercises into the nearby futures contract.
		Options		One corn futures contract (of a specified month) of 5,000 bushels		
Coffee	ICE	Futures	Arabica coffee from 19 countries of origin	37,500 lbs	U.S. cents per pound	Mar, May, Jul, Sep, Dec. The monthly option contract exercises into the nearby futures contract.
		Options		One coffee futures contract (of a specified month) of 37,500 lbs		
Rough rice	Chicago Mercantile Exchange	Futures	U.S. #2 long grain rough rice with a total milling yield of 65%+	2,000 hundredweights (CWT)	U.S. cents per hundredweight	Jan, Mar, May, Jul, Sep, Nov. The monthly option contract exercises into the nearby futures contract.
		Options		One rough rice futures contract of 2,000 hundredweights (CWT)		
Wheat	Chicago Mercantile Exchange	Futures	#2 soft red winter wheat	5,000 bushels (136 MT)	U.S. cents per bushel	Mar, May, July, Sep, Dec. The monthly option contract exercises into the nearby futures contract.
		Options		One Wheat futures contract (of a specified month) of 5,000 bushels		
Soybean meal	Chicago Mercantile Exchange	Futures	Meal with minimum protein of 48%	100 short tons	U.S. dollars per ton	Jan, Mar, May, Jul, Aug, Sep, Oct, Dec. The monthly option contract exercises into the nearby futures contract.
		Options		One soybean meal futures contract (of a specified month) of 100 short tons		
Soybeans	Chicago Mercantile Exchange	Futures	Yellow soybean grade #2	5,000 bushels (136 MT)	U.S. cents per bushel	Jan, Mar, May, Jul, Aug, Sep, Nov. The monthly option contract exercises into the nearby futures contract.
		Options		One soybean futures contract (of a specified month) of 5,000 bushels		

Sources: Chicago Board of Trade, ICE, Bloomberg, L.P.



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