Commodity Market Monthly

Research Department, Commodities Unit

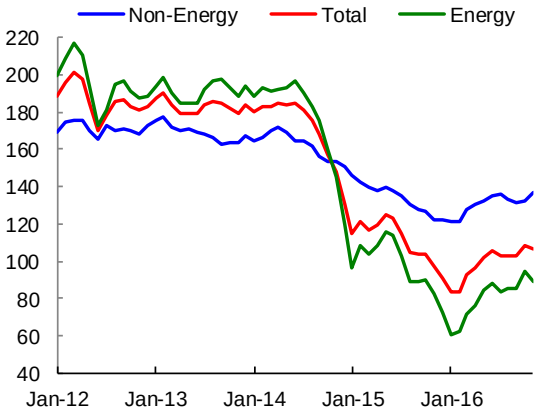
December 20, 2016 **www.imf.org/commodities** **commodities@imf.org**

Commodity prices fell by 1.4 percent in November. This slight decrease in the IMF's commodity price index comes on account of a substantial decrease of 5.4 percent in energy prices, a jump in the price of metals, by 12.2 percent, and a moderate price increase of 0.5 percent for raw agricultural materials (Figure 1). Prices of food and beverages stayed roughly constant. For the first eleven months of 2016 commodity prices climbed 18 percent, led by a 23 percent surge in crude oil prices, followed by increases in metals and agriculture prices of 29 and 7 percent, respectively. Over the last twelve months, the costs of solar photovoltaic (PV), onshore wind and offshore wind have fallen by 17.5, 17.4 and 27.5 percent respectively.

Figure 1

IMF Commodity Price Indices

(2005 = 100)



Energy

Monthly average crude oil prices declined 8.1 percent in November to $45.28/bbl. During the month of November (the end of November from the end of October), Average Petroleum Spot Price (simple average. of U.K. Brent, Dubai Fateh, and West Texas Intermediate; APSP) increased 4.1 percent.

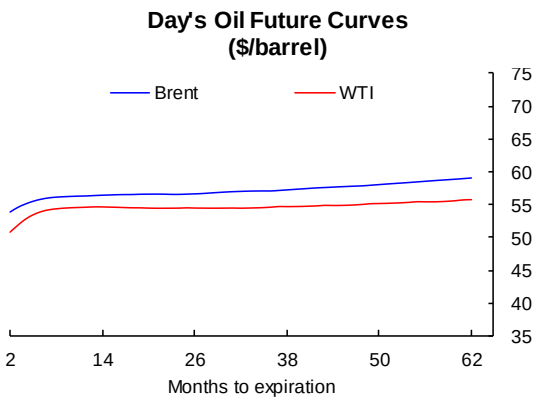
On November 30, the Organization of Petroleum Exporting Countries (OPEC) agreed to reduce crude oil output to 32.5 million barrels per day (mbd), effective January 2017 and for a duration of six months (extendable for another six months). That deal would imply a cut in production by 1.2 mbd from its current production level. While Saudi Arabia, Iraq, UAE and Kuwait will bear the brunt of the cuts, other member countries such as Iran, Nigeria, and Libya have been exempted. Indonesia's membership that accounted for 0.75 mbd of production has been suspended. At OPEC and non-OPEC meeting on December 10 in Vienna, additional cuts amounting to about 0.60 mbd have been agreed upon. Russia, a non-OPEC member, has committed to reducing production by 0.3 mbd, ten other non-OPEC countries will contribute the

remainder. [1] Following the agreement, Saudi Arabia has indicated it could cut production beyond its initial commitment in a bid to further support the rally in oil prices.

The actual impact of the agreement will depend on the degree of compliance by OPEC countries, non-OPEC oil producers' cooperation, and shale responses. In the past, OPEC members tended to produce more than their quota to meet their finance needs. In addition to the issue of quota compliance, an exempted Nigeria can produce 500 kbd more once they control the Niger delta. Libya's production is hard to predict as its civil war situation determines export.

Most importantly, shale production might rebound strongly with future prices hovering around $55. Future curves are almost flat around the 2017-2018 horizon just below $55, implying shale producers might have already taken hedge positions. The breakeven cost of shale production has dropped dramatically following the oil price collapse due to a reduction in service cost, a focus on extraction from the most productive fields, and technological progress. The oil rig count has rebounded by 50 percent after reaching its lowest level in May 2016. The U.S. Energy Information Administration (EIA) sees that shale production has stabilized already and will increase gradually next year. With the recent increase of the oil price, markets might see another upside in shale production.

Figure 2



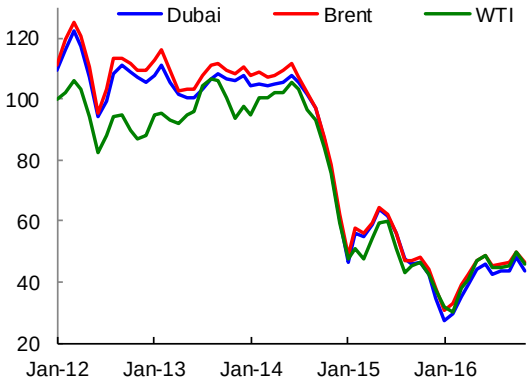
On the demand side, the International Energy Agency (IEA) maintained its 1.2 mbd oil demand growth projection for 2016 and 2017. A slowdown in China or India may have significant effects on oil demand as they account for roughly a quarter of demand growth. According to the International Energy Agency (IEA), China and India's oil demands are expected to grow by 0.26 and 0.27 mbd respectively next year. If protectionist measures were to spread widely global trade could slow down significantly, which in turn would reduce oil demand. In the 2016 October WEO the IMF projected global growth to slow to 3.1 percent in 2016 before recovering to 3.4 percent in 2017.

After hitting record low prices of $42.71 in 2016, futures contracts point to oil prices (APSP) increasing gradually to $51.22 in 2017 and $53.05 in 2018 (Figure 2).

[1] The list of non-OPEC countries involved in the OPEC non-OPEC agreement consists of Azerbaijan, Bahrain, Brunei, Equatorial Guinea, Kazakhstan, Malaysia, Mexico, Oman, Russia, Sudan and South Sudan.

Figure 3

Crude Oil Prices ($/barrel)



Average monthly natural gas price in the U.S. fell sharply by 15.2 percent in November, averaging $2.50/MMBtu compared to October's $2.95/MMBtu due to warm weather. However, as the weather is getting colder, natural gas prices increased to $3.30 at the end of November from 2.79 at the end of October. In Europe, long term contract prices have increased 13.2 percent to $4.54/MMBtu; however, spot prices have been relatively flat due to ample supply from Gazprom. The long term contract prices follow moving average of oil prices with a lag of a few quarters. If oil prices stabilize as future prices indicates, then long term contract prices are expected to grow gradually. LNG spot prices in Asia have been increasing gradually on account of rising demand during the winter.

Coal prices (Australia) continued to increase, rising by 7.3 percent to a 2-year high. On the supply side, this is driven by a shortage in China on account of industry restructuring that reduced supply and the economic stimulus that increased demand. Supply disruptions in Australia further added to the shortfall. In response to higher costs facing steel producers, from increased coking coal prices, China has begun slowing down the restructuring process of the coal industry by allowing more production. Since the surge in coal prices is mostly a temporary phenomenon, coal prices are expected to decline sharply within six months or so.

Figure 4

IMF Commodity Price Indices

(2005 = 100)

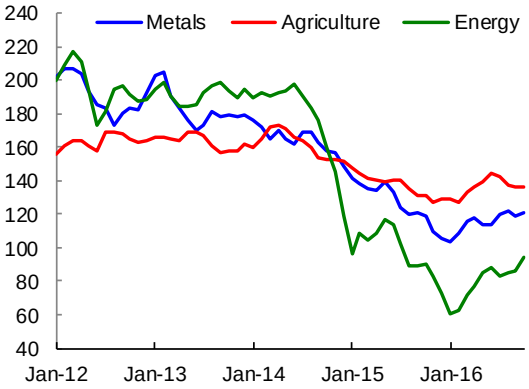


Figure 5

IMF Commodity Price Indices

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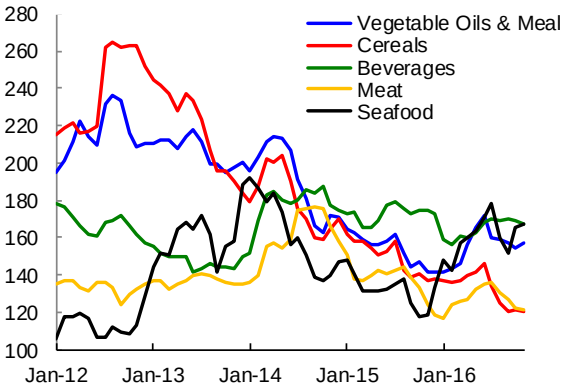


Metals

Base Metal Market

The IMF's metal index (based on 8 base metals) increased 12.1 percent in November. Except for uranium, which continues to decline, all base metals show a substantial increase from the strong Chinese demand and expectations of increased infrastructure demand after the U.S. presidential election. China's manufacturing Purchasing Managers Index (PMI) remains above 50 since July indicating expansion. That

contributed to ease the pessimism over the Chinese economy.

During November, iron ore and copper prices increased sharply, thereby accounting for the bulk of the price increase of the index. Indeed, much of the price increase of iron ore is explained by Chinese demand for steel for its construction industry. The same is true for zinc (used to produce galvanized steel), nickel (used to produce stainless steel), and copper (used in electric wiring) to varying degrees. Following the win of Donald Trump in the U.S. presidential election metal prices have rallied further on account of his announced $1 trillion infrastructure spending plan. This year's price rally is also attributable to supply constraints resulting from declining investments and the closure of high-cost mining operations during the past era of low prices. Other factors affecting specific markets include: (i) the Philippine government mandated closures of nickel mines for environmental violations, (ii) Indonesia's recent announcement that it is unlikely to lift its ore export ban (bauxite and nickel ore), and (iii) China's closure of tin mines for environmental concerns.

Despite these recent bullish developments, it must be noted that the steel industry is still characterized by excess capacity and iron ore future prices show significant decline. The potential growth in copper demand from the U.S. should not be overestimated as the U.S. share of world copper consumption is relatively small and they rely heavily on recycled copper.

Lead prices continued to rise, due to strong seasonal demand for batteries and reduced supply from zinc mine closures, lead being a byproduct of zinc mining. Aluminum prices remained flat in November, on account of oversupply and large inventories. After a large increase this year, tin prices flattened in November, as shipments from Myanmar offset supply drops caused by China and Indonesia.

Table 1: Current Base Metal Prices and % changes
(as of November 30, 2016 closing)

Metal	Price (USD)	% change	
		Monthly	Year-to-Date
Copper	5,813/MT	18.45	23.54
Aluminum	1,731/MT	-0.17	15.40
Tin	21,320/MT	1.45	46.12
Nickel	11,196/MT	7.99	27.51
Zinc	2,688/MT	9.55	68.76
Lead	2,351/MT	14.41	30.80
Iron Ore	74.5/MT	13.74	70.09
Uranium	17.75/lb	-6.08	-48.40

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).

Precious Metals Market

Precious metal prices declined sharply in November as long term yield started to increase. Gold prices fell 11% in November. Before the US Presidential election, gold prices had been increasing in spite Fed officials hinting at a rate hike in the near term. Since the election, with markets expecting an increase in fiscal spending, the price of gold has fallen sharply, standing at USD 1,178/troy ounce as of November 30th.

Table 2: Current Precious Metal Prices and % changes
(as of November 30, 2016)

Metal	Price (USD)	% change	
		Monthly	Year-to-Date
Gold	1,178/toz	-8.56	11.14
Silver	16.7/toz	-8.61	20.62
Platinum	920/oz	-7.54	5.99
Palladium	770/oz	22.03	30.74

Sources: ICE Benchmark Administration (gold), London Bullion Metal Association (silver), and London Metal Exchange (platinum and palladium)

Agriculture

The price index of food and beverages changed very little in the month of November. The food price index remained roughly constant on a month-to-month basis, increasing by 0.1 percent, but the price index of beverages declined by 1.2 percent. While aggregate indices thus show little price changes for food and beverages in November, they hide a considerable variety across different commodities; cocoa, pork and sugar recorded heavy losses, but others such as soybean, coffee Arabica and oranges experienced moderate to large gains. Agricultural raw material prices increased by 4.1 percent.

Food prices decline substantially over the last few years, but they had been steadily increasing again in the first half of the year, mainly supported by a surge in prices of sugar and pork, as well as substantial increases for barley, oranges, palm oil and soybeans. Since July this year, grains, pork, soybeans and cocoa have recorded sizeable losses, thereby putting downward pressure on the IMF's price index of food and beverages, and undoing most of the gains that were made in the first six months of 2016.

Annual food prices now are projected to stay broadly unchanged in 2016 and decrease by 3 percent in 2017; while current price levels are down by more than 20 percent since their record high in 2011, prices in 2016 were still up by more than 40 percent from their pre-crisis 2005 level. In 2017, prices of many major food products, such as cereals and seafood, are expected to decline from current levels. Vegetable oils, which are expected to increase by 2.5 percent, constitute a noteworthy exception to the price decline. Rising costs of energy and weather variability, including concerns over La Niña, constitute upside risks to the price forecast. Downside risks include increased agricultural supplies from China, which is bringing its accumulated stocks to market now that the Chinese government is dismantling its price floor systems.

The price of wheat stayed roughly constant in November. Wheat prices have been falling for six consecutive years; USDA agricultural supply and demand estimates from December 9 indicate that the 2016-2017 crop in many major producers, including the US, Russia, Australia and Canada, is very good. The stock-to-use ratio, a measure of the abundance of supply relative to demand, is expected to reach 34 percent in 2016-2017, well above the 10-year average. Wheat consumption is expected to increase with 2.8 percent this year, suggesting that demand is now stimulated by low prices.

Higher-than-expected yield estimates of the US corn harvest have fostered a decline in future prices, which was also fueled by appreciation of the US dollar following the election of Donald Trump as the next president of the United States. This month's loss stands at 1 percent, with the annual price expected to fall by 5 percent. Annual corn prices have fallen for four consecutive years. This year's crop is the largest ever, exceeding 1 billion metric tons, with exports at a record high of more than 0.14 billion metric tons. While

demand has been growing at 3.5 percent over the last 10 years, the stock-to-use ratio is expected to reach 21.6 percent throughout 2016, similar to 2014 and 2015, and well above the 10-year average.

Prices of vegetable oils, those of soybeans and palm oil in particular, increased in November. Palm oil has climbed almost 29 percent this year after one of the strongest El Nino events on record damaged plantations and depressed inventories in top producer countries Indonesia and Malaysia, reaching price levels not seen in more than three years. The palm oil market also benefitted from a rally in rival soybean oil after the U.S. government raised its 2017 biofuel quotas in the month of November. Palm oil may extend its bull market surge into next year as tight supply and a weak Malaysian ringgit boost demand for the world's most-consumed cooking oil. Soybean prices increased 2.8 percent this month on account of the before mentioned announcement of higher US biofuel quotas. While the US soybean harvest this year is of exceptional quantity and quality, ongoing strength in animal protein demand will probably increase global consumption of soybeans by as much as 6 percent in 2016-2017, the strongest rate for major grains and oilseeds.

Pork prices fell in November, by 7.2 percent. In the beginning of the year environmental regulations and disease lowered production of piglets in China, increasing demand for imports in the largest consumer of pork meat in the world, sending prices in the US upwards. While US prices were up almost 60 percent during summer, they have been in a free fall ever since, as more piglets were born in China during the summer months, and demand from China weakened. In addition, in the US the number of hogs flowing into slaughter plants continue to overwhelm the cash hog markets, causing prices to drop. Existing slaughter capacity in the US is stretched very thin and production is at an all-time high.

The price of cocoa decreased substantially in November, by 8.1 percent. This drop in prices comes at a time when the main cocoa crop in West Africa, which has started to flow into ports since November, seems very good. Weather conditions in the region have been better than last year. The annual price of cocoa is likely to fall for the first time in 4 years. With production this season exceeding demand, prices have decreased. Excess supplies could last into 2017-2018, but recovery of demand may support prices next year.

The price of Arabica coffee increased by 4 percent this month. Coffee has risen by more than 25 percent since the beginning of this year, as supply falls short of demand and consumers in Asia continue to substitute away from tea towards coffee. Potential setbacks to harvests in top producer countries such as Columbia and Vietnam, as well as concerns over Brazil's supply in 2017-2018, have put upward pressure on prices. The stocks-to-use ratio, a measure of the abundance of supply relative to demand, is expected to equal 20.9 throughout 2016, which is below the 10-year average. The net long position held by hedge funds in New York Arabica futures has reached its highest level in ten years. However, a bearish market may lie ahead because higher local coffee prices due to a stronger U.S. dollar encourage selling.

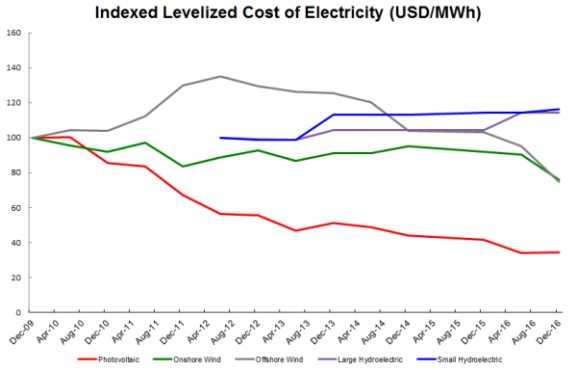
Climate Change and Renewable Energy

One of the most remarkable trends in the energy sector in recent history is the substantial decline in the cost of renewable energy. Figure 6 displays the evolution of the levelized cost of electricity (LCOE), which measures the dollar cost per MWh

of electricity generated by technology, for solar, wind and hydropower. Figure 6 shows that between 2009-2016, the cost of solar PV was reduced by 66 percent. Over the last twelve months alone, solar PV fell by 17.5, while onshore and offshore wind recorded cost reductions of 17.0 and 27.5 percent, respectively.

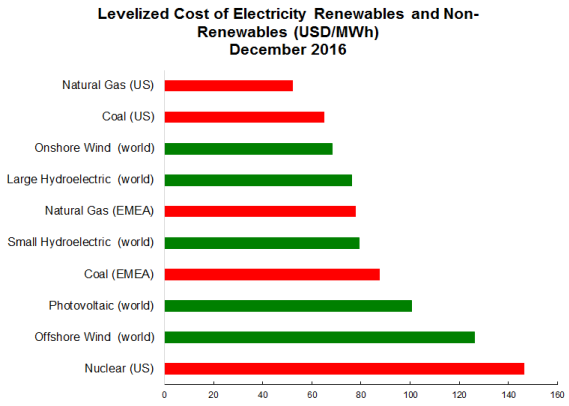
As a direct result of these cost reductions, renewables are now competing head-to-head with coal and gas in Europe, Middle East and Africa (EMEA) and, to a lesser extent, in the US. According to December 2016 estimatesfrom Bloomberg, the cost of coal ($88/MWh) and gas ($78/MWh) in EMEA exceed the cost of onshore wind ($68/MWh). As shown in Figure 7, coal and gas are still cheaper than onshore wind in the US, but the cost difference is small.

Figure 6



Sources: Bloomberg; and IMF staff calculations

Figure 7

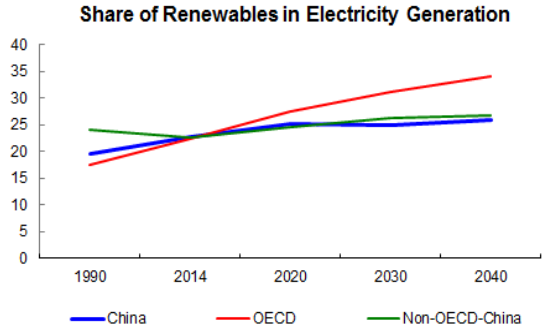


Sources: Bloomberg; and IMF staff calculations

While the LCOE is an important factor driving investment, it is most certainly not the only determinant. This explains why solar PV ($100/MWh) and offshore wind ($126/MWh) have been popular investment choices in the US and Europe during recent years.

The economics of cheap(er) renewable energy is supporting the energy transition. A wave of investment in solar PV panels and wind turbines has increased the share of renewable electricity generation in both OECD and non-OECD countries shown in Figure 8 below.

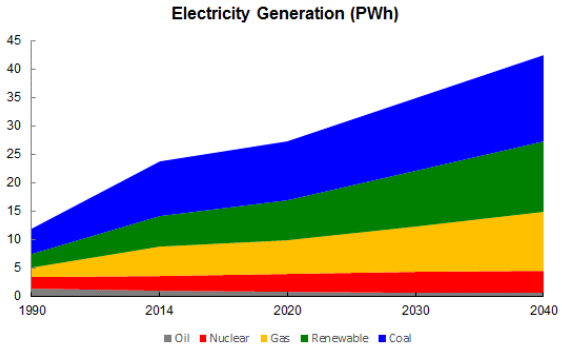
Figure 8



Sources: International Energy Agency; and IMF staff calculations.
Note: These shares relate to electricity generation only and exclude the heating sector.
OECD = Organisation for Economic Co-operation and Development.

Moving forward, the IEA predicts the share of renewables in world electricity production to increase to 29 percent by 2040, up from 20 percent today, under current policies.

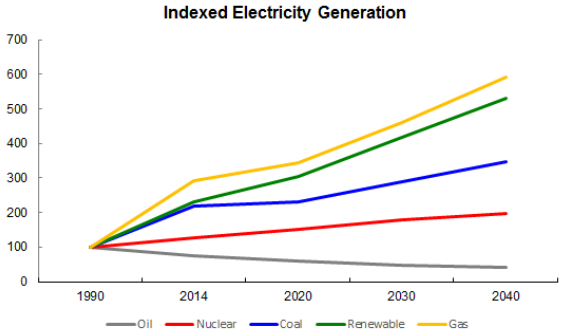
Figure 9



Sources: International Energy Agency; and IMF staff calculations.
Note: These shares relate to electricity generation only and exclude the heating sector.

Additionally, renewable electricity generation is projected to grow more than oil, nuclear and coal through 2040 according to IEA estimates. In Figure 10 below, only natural gas surpasses the growth in renewable electricity generation.

Figure 10



Sources: International Energy Agency; and IMF staff calculations.
Note: These shares relate to electricity generation only and exclude the heating sector.

Despite the rapid growth of renewable energy, global coal-fired power generation is still expected to grow by more than 30 percent between 2014-2040 (Figure 9). While this is clearly not enough to limit the global increase in temperatures to the 2 degree Celsius ceiling that was agreed on during last year's Paris deal, the global climate change agreement that was signed by more than 200 countries in December 2015, and which entered into force on November 4 this year, further cost reductions may make more ambitious policies and targets possible in the near future.

November 2016 saw the unexpected election of Donald Trump as the next president of the United States. The question now arises: how will the Trump administration affect the outlook for climate change and renewable energy?

Figure 11

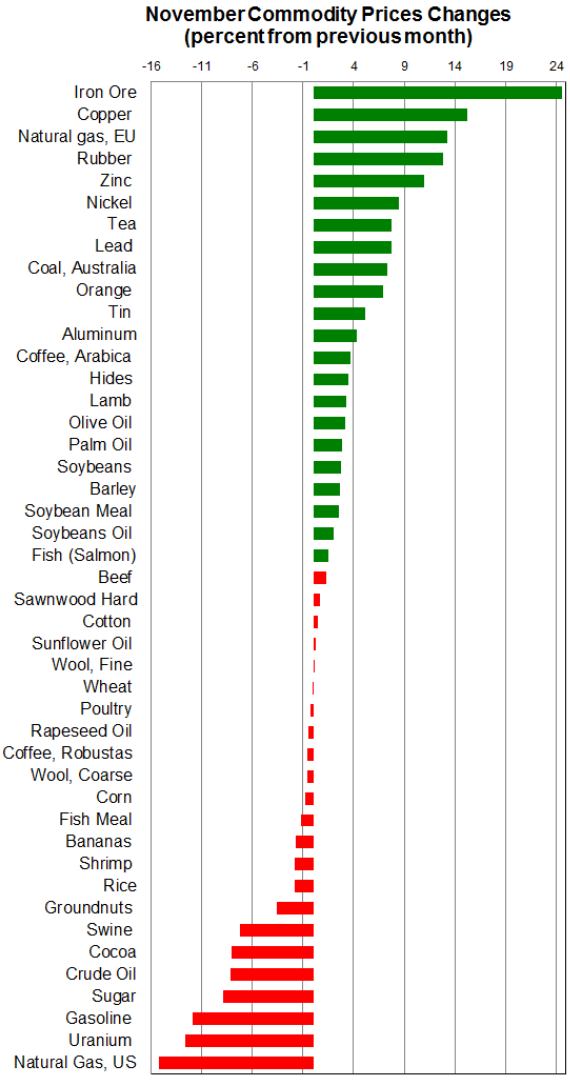


Table 1. Market Prices for Non-Fuel and Fuel Commodities

	Units	2013	2014	2015	2015Q4	2016Q1	2016Q2	2016Q3	Oct-16	Nov-16
Food										
Cereals										
Wheat	$/MT	265.8	242.5	185.6	162.3	162.6	159.2	128.2	122.5	122.5
Maize	$/MT	259.0	192.9	169.8	167.1	159.9	171.1	153.4	152.6	151.3
Rice	$/MT	518.8	426.5	380.0	357.7	367.7	401.8	418.2	367.7	360.8
Barley	$/MT	206.4	146.1	127.9	123.2	119.7	137.4	131.1	128.1	131.5
Vegetable oils and protein meals										
Soybeans	$/MT	517.2	457.8	347.4	323.3	323.4	387.8	372.2	358.4	368.4
Soybean meal	$/MT	477.3	467.0	352.7	320.8	294.9	392.9	370.0	337.1	345.7
Soybean oil	$/MT	1011.1	812.7	672.2	638.6	686.9	719.7	701.4	757.3	772.4
Palm oil	$/MT	764.2	739.4	565.1	518.0	586.9	647.8	647.0	651.4	670.0
Fish meal	$/MT	1710.5	1921.5	1759.2	1701.9	1466.4	1511.5	1409.7	1296.3	1280.6
Sunflower Oil	$/MT	1341.1	1080.3	1022.2	1042.1	1024.5	1028.6	982.0	998.4	1000.5
Olive oil	$/MT	3816.7	3911.8	4927.1	4658.3	4418.8	4125.3	3903.4	3660.6	3776.3
Groundnuts	$/MT	2314.5	2148.3	1946.2	1731.8	1821.3	1855.4	1804.7	1727.3	1665.0
Rapeseed oil	$/MT	1081.2	904.4	774.6	798.1	774.7	797.7	810.6	900.4	896.4
Meat										
Beef	cts/lb	183.6	224.1	200.5	176.2	168.9	179.3	185.4	180.8	183.1
Lamb	cts/lb	106.7	130.6	107.9	95.3	95.5	100.6	110.8	118.2	122.0
Swine Meat	cts/lb	86.5	102.8	67.9	60.5	60.3	72.6	66.6	50.2	46.6
Poultry	cts/lb	103.8	110.1	114.7	113.6	112.1	111.8	110.9	110.1	109.8
Seafood										
Fish	$/kg	6.8	6.6	5.3	5.3	6.5	7.3	7.2	7.2	7.3
Shrimp	$/kg	14.0	16.6	14.1	10.0	11.0	10.6	10.7	12.3	12.1
Sugar										
Free market	cts/lb	17.7	17.1	13.2	14.6	14.8	17.6	20.8	22.9	20.9
United States	cts/lb	21.2	24.9	24.8	25.4	25.6	26.4	27.2	28.6	28.8
EU	cts/lb	26.0	27.4	25.4	25.2	23.8	23.9	21.8	20.5	20.7
Bananas	$/MT	926.4	931.9	958.7	932.7	1028.2	993.0	1023.2	976.4	959.9
Oranges	$/MT	967.3	782.5	675.0	732.6	686.2	784.7	992.5	1064.7	1137.8
Beverages										
Coffee										
Other milds	cts/lb	141.1	202.8	160.5	150.8	150.7	158.5	173.6	178.6	185.1
Robusta	cts/lb	100.5	105.6	94.2	87.9	82.1	90.4	98.5	107.5	106.9
Cocoa Beans	$/MT	2439.1	3062.8	3135.2	3301.3	2980.8	3099.9	2987.9	2711.4	2492.0
Tea	cts/kg	266.0	237.9	340.4	363.0	290.3	251.4	284.7	304.9	328.6
Agricultural raw materials										
Timber										
Hardwood										
Logs 1/	$/M3	305.4	282.0	246.0	245.2	258.2	275.7	290.7	286.9	275.1
Sawnwood 1/	$/M3	852.8	897.9	833.3	827.1	780.3	782.3	716.2	672.9	677.3
Softwood										
Logs 1/	$/M3	164.5	174.3	162.0	159.3	168.4	143.5	151.7	155.0	155.0
Sawnwood 1/	$/M3	301.4	307.3	308.7	319.6	267.2	309.2	307.6	315.3	315.4
Cotton	cts/lb	90.4	83.1	70.4	69.5	66.9	71.2	79.7	78.5	78.9
Wool										
Fine	cts/kg	1197.7	1074.4	1005.8	995.8	1023.4	1092.8	1140.3	1188.1	1189.3
Coarse	cts/kg	1128.1	1030.4	925.4	909.3	960.5	1009.4	1082.6	1033.3	1027.4
Rubber	cts/lb	126.8	88.8	70.7	57.0	59.3	75.2	76.1	75.6	85.3
Hides	cts/lb	94.7	110.2	87.7	72.2	72.8	73.5	74.2	74.6	77.3

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	2013	2014	2015	2015Q4	2016Q1	2016Q2	2016Q3	Oct-16	Nov-16
Metals										
Copper	$/MT	7331.5	6863.4	5510.5	4884.9	4674.7	4736.4	4779.6	4731.3	5450.9
Aluminum	$/MT	1846.7	1867.4	1664.7	1493.9	1514.5	1571.8	1620.2	1665.9	1737.1
Iron Ore	$/MT	135.4	97.4	56.0	46.7	47.7	55.3	57.9	58.0	72.3
Tin	$/MT	22281.6	21898.9	16066.6	15077.2	15438.6	16902.1	18584.3	20099.8	21126.1
Nickel	$/MT	15030.0	16893.4	11862.6	9423.0	8507.7	8822.5	10263.5	10259.7	11128.9
Zinc	$/MT	1910.2	2161.0	1931.7	1611.8	1677.3	1916.9	2251.6	2311.5	2566.2
Lead	$/MT	2139.7	2095.5	1787.8	1681.7	1738.0	1717.6	1872.7	2024.5	2180.6
Uranium	$/lb	38.5	33.5	36.7	35.9	32.6	27.5	25.5	21.2	18.5
Energy										
Spot Crude 2/	$/bbl	104.1	96.2	50.8	42.2	32.8	44.8	44.7	49.3	45.3
U.K. Brent	$/bbl	108.8	98.9	52.4	43.4	34.4	46.0	45.8	49.7	46.4
Dubai	$/bbl	105.4	96.7	51.2	41.2	30.7	42.9	43.4	48.3	43.8
West Texas Intermediate	$/bbl	97.9	93.1	48.7	42.0	33.3	45.5	44.9	49.9	45.6
Natural Gas										
Russian in Germany	$/mmbtu	11.2	10.5	7.3	5.9	4.7	4.0	4.2	4.0	4.5
Indonesian in Japan (LNG)	$/mmbtu	17.3	17.0	11.0	10.0	8.2	6.9	7.4	7.5	8.5
US, domestic market	$/mmbtu	3.7	4.4	2.6	2.1	2.0	2.1	2.8	2.9	2.5
Coal										
Australian, export markets	$/MT	90.6	75.1	61.6	56.1	54.5	55.6	72.3	99.8	107.1

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, 2013-2016

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

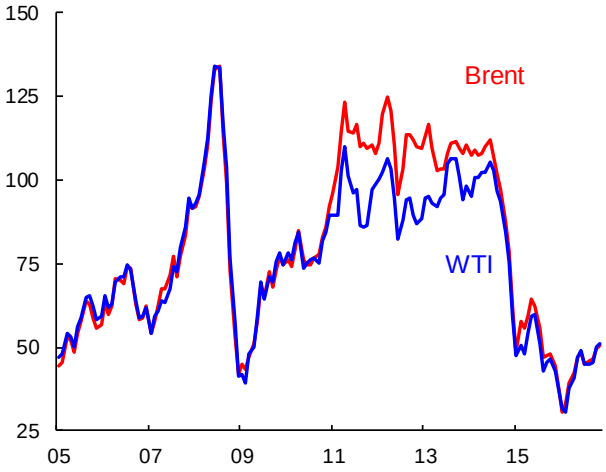
	(weights) 1/	2013	2014	2015	2015Q4	2016Q1	2016Q2	2016Q3	Oct-16	Nov-16
All Primary Commodities 2/	100.0	183.3	171.9	111.2	97.3	86.5	101.4	102.7	108.2	106.7
Non-Fuel Commodities	36.9	169.0	162.3	134.0	123.7	123.7	132.7	133.3	132.1	136.8
Agriculture	26.2	163.3	161.5	137.1	128.8	129.5	139.8	138.6	136.6	137.2
Food	16.7	177.5	170.2	141.0	132.2	136.4	149.3	145.9	142.9	143.1
Cereals	3.6	218.2	180.2	149.0	138.2	136.5	142.0	126.4	120.8	120.2
Vegetable oils and protein meals	4.4	206.4	190.7	153.6	143.3	143.5	164.1	158.5	154.6	157.3
Meat	3.7	136.8	160.5	137.4	125.2	122.3	131.4	130.9	122.0	121.2
Seafood	3.2	160.1	162.0	131.7	123.0	149.1	164.8	163.0	165.6	167.2
Beverages	1.8	147.4	178.0	172.6	173.7	158.7	163.5	169.8	168.8	166.8
Agricultural raw materials 3/	7.7	136.2	138.8	120.1	110.9	107.6	113.7	115.5	115.2	117.4
Timber	3.4	107.3	109.3	104.5	105.8	96.7	103.0	101.6	101.2	100.7
Metals	10.7	182.9	164.4	126.5	110.9	109.5	115.1	120.3	121.0	135.7
Edibles 4/	18.5	174.6	171.0	144.1	136.2	138.6	150.7	148.2	145.5	145.4
Industrial Inputs 5/	18.4	163.3	153.6	123.8	110.9	108.7	114.5	118.3	118.6	128.0
Energy 6/	63.1	191.7	177.4	97.9	81.8	64.7	83.0	84.8	94.2	89.1
Petroleum 7/	53.6	195.9	181.1	95.6	79.3	61.5	84.1	84.0	92.6	85.0
Natural Gas	6.9	164.9	159.9	106.8	90.6	73.5	64.1	69.3	69.0	75.6
Coal	2.6	176.8	149.1	121.3	110.0	107.8	110.8	141.7	192.7	206.7

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.

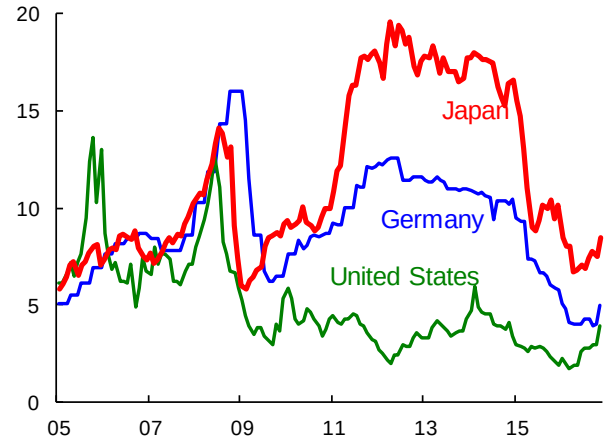
Commodity Prices Movements

Monthly (from 2005)

Crude oil ($/bbl)

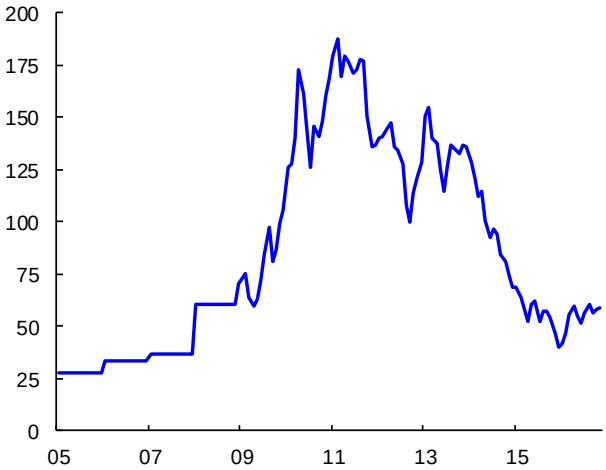


Natural Gas ($/mmbtu)



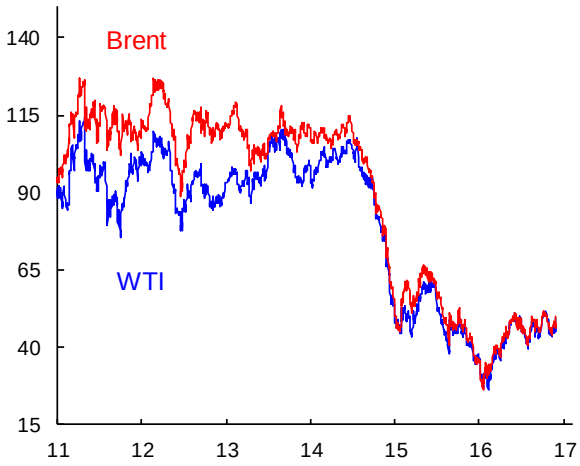
Sources: Energy Intelligence; Bloomberg, L.P.

Iron Ore ($/ton)

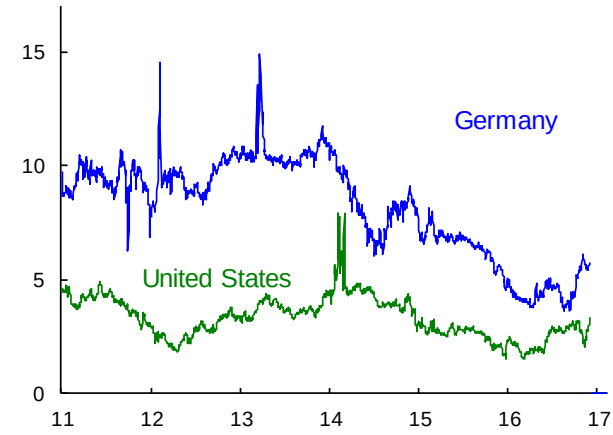


Daily (from 2011)

Crude oil ($/bbl)



Natural Gas ($/mmbtu)



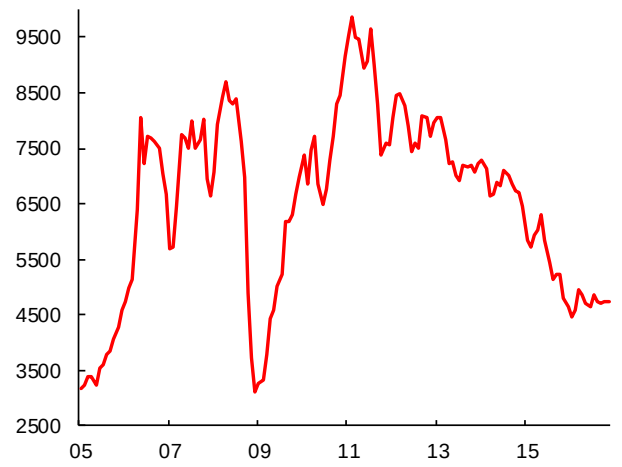
Source: Bloomberg, L.P.

Iron Ore ($/ton)

Commodity Prices Movements (Continued)

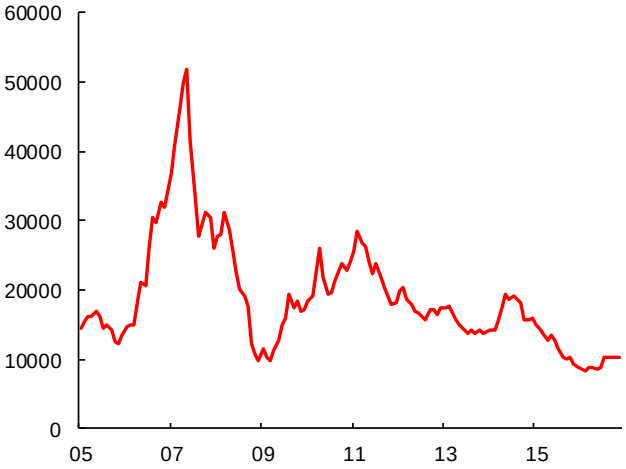
Monthly (from 2005)

Copper ($/ton)



Aluminium ($/ton)

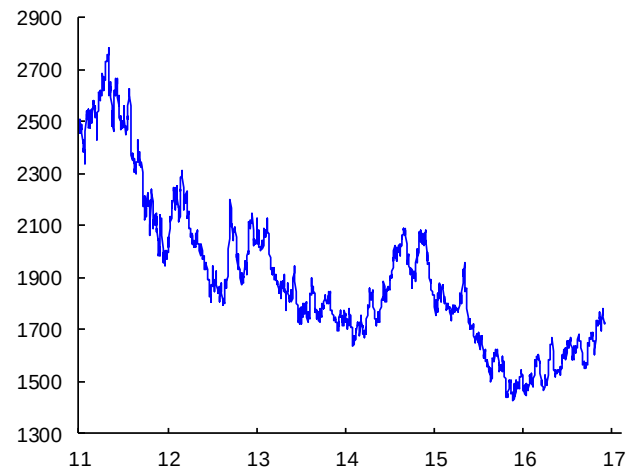
Nickel ($/ton)



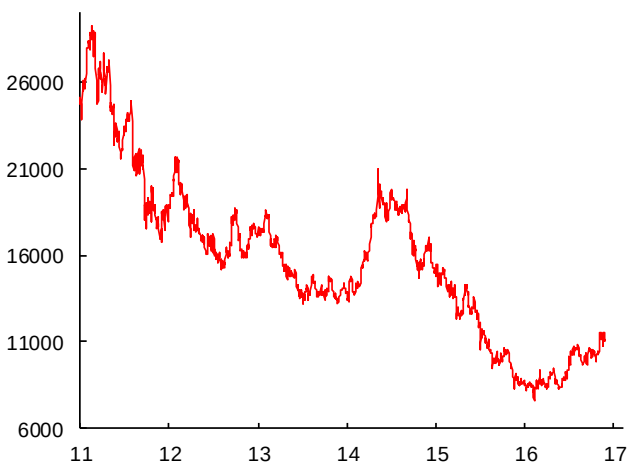
Daily (from 2011)

Copper ($/ton)

Aluminium ($/ton)



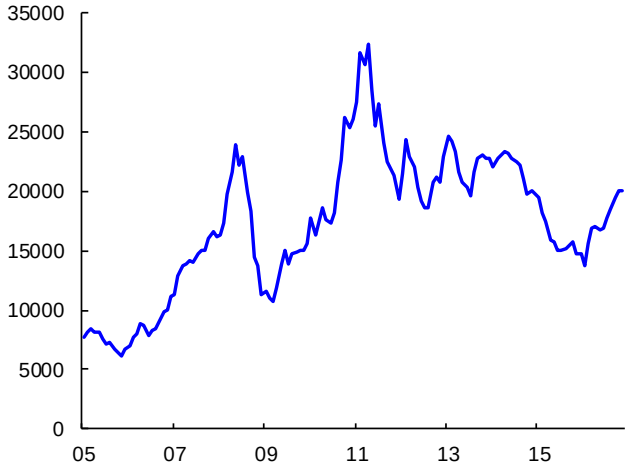
Nickel ($/ton)



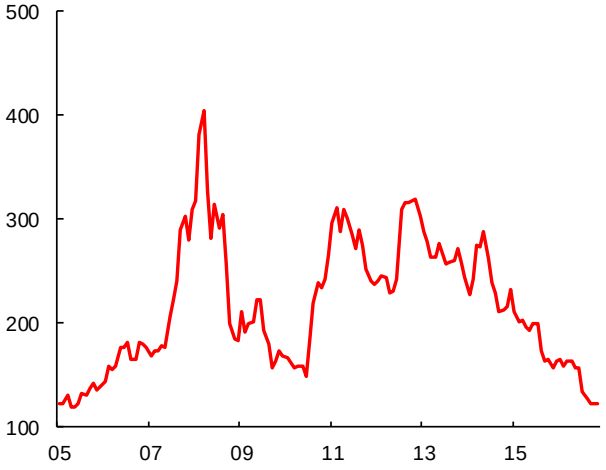
Commodity Prices Movements (Continued)

Monthly (from 2005)

Tin ($/ton)



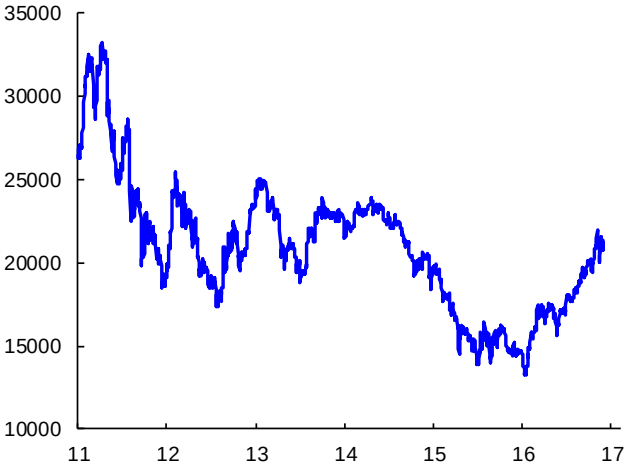
Wheat ($/ton)



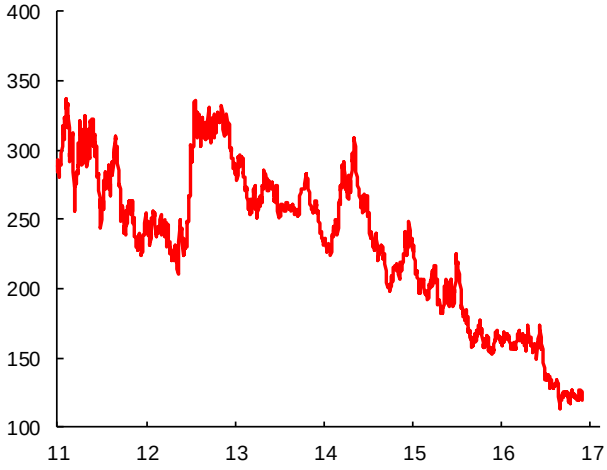
Corn ($/ton)

Daily (from 2011)

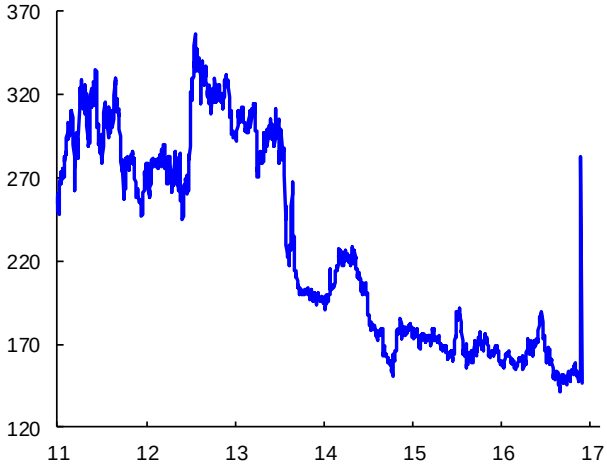
Tin ($/ton)



Wheat ($/ton)



Corn ($/ton)



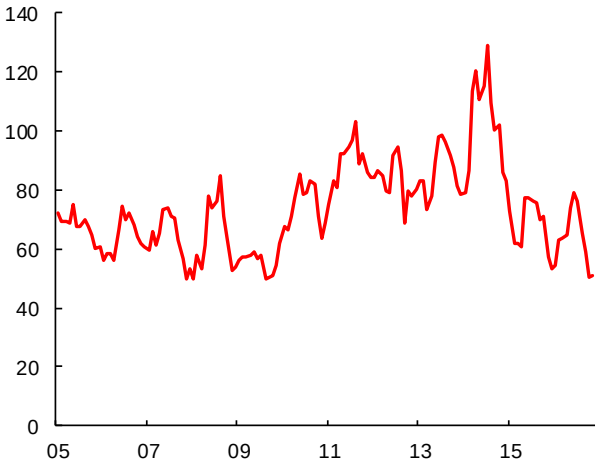
Commodity Prices Movements (Continued)

Monthly (from 2005)

Cocoa ($/ton)

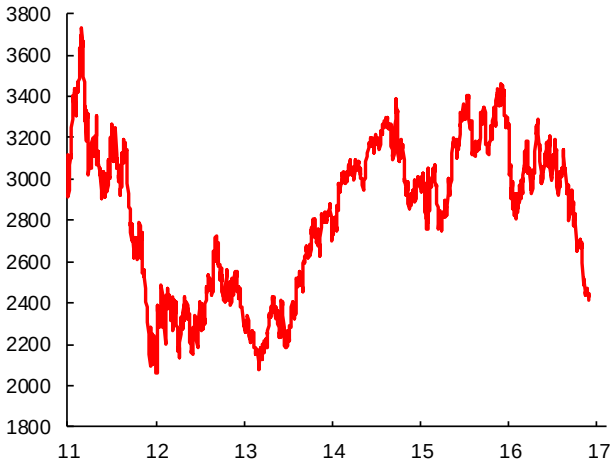
Coffee (cents/lb)

Swine (cents/lb)

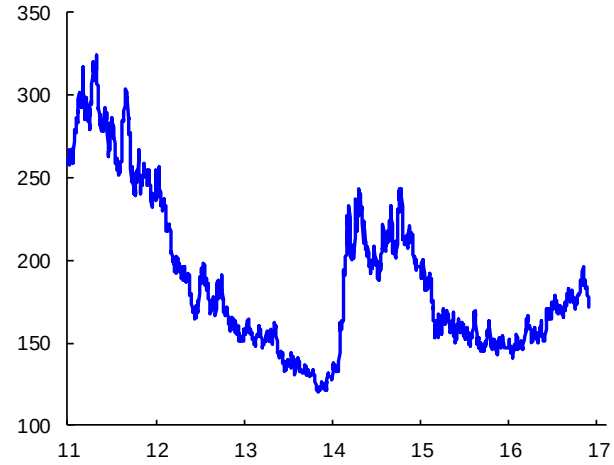


Daily (from 2011)

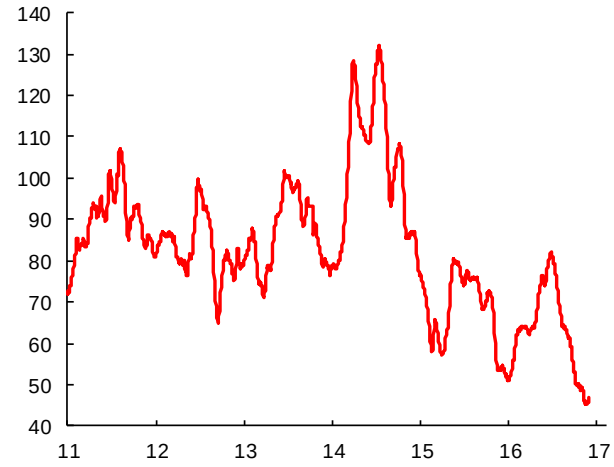
Cocoa ($/ton)



Coffee (cents/lb)



Swine (cents/lb)



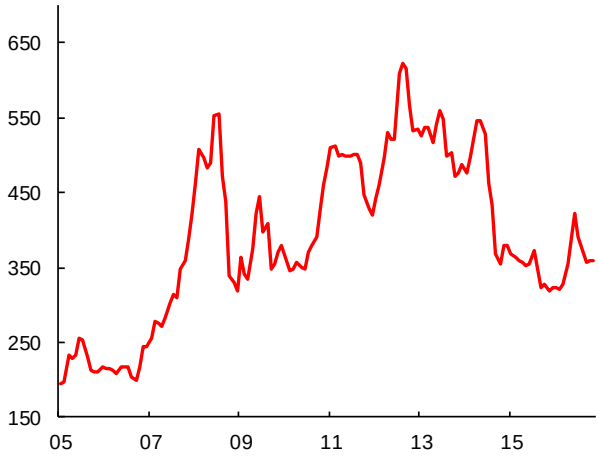
Commodity Prices Movements (Continued)

Monthly (from 2005)

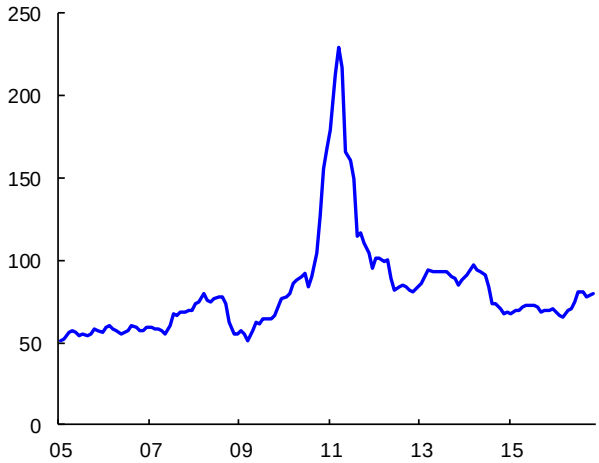
Beef (cents/pound)

Source: Meat & Livestock Australia.

Soybeans ($/ton)



Cotton (cents/pound)



Daily (from 2011)

Beef (cents/lb)

Source: Bloomberg, L.P.

Soybeans ($/ton)

Cotton (cents/lb)

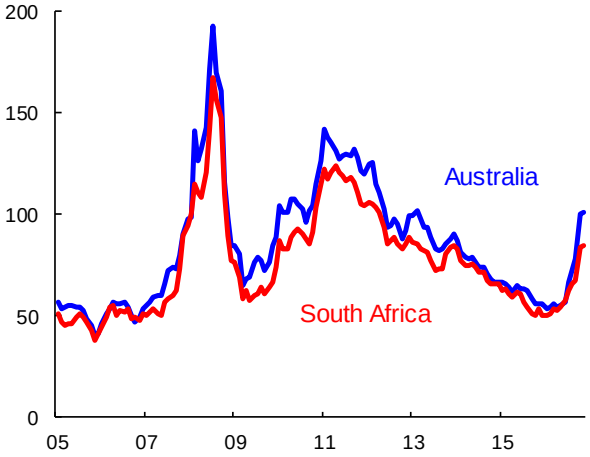
Commodity Prices Movements (Continued)

Monthly (from 2005)

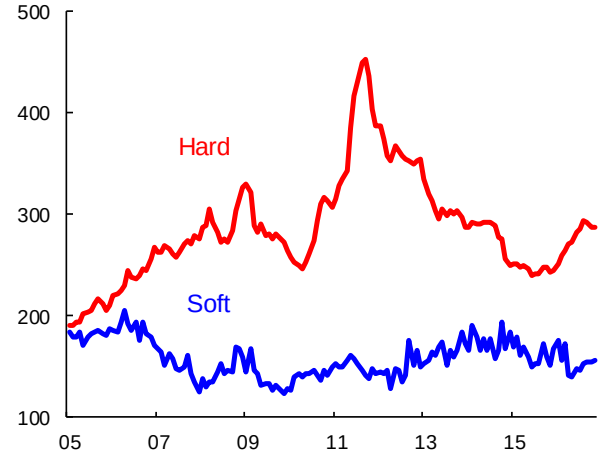
Uranium($/lb)

Zinc ($/ton)

Coal ($/ton)

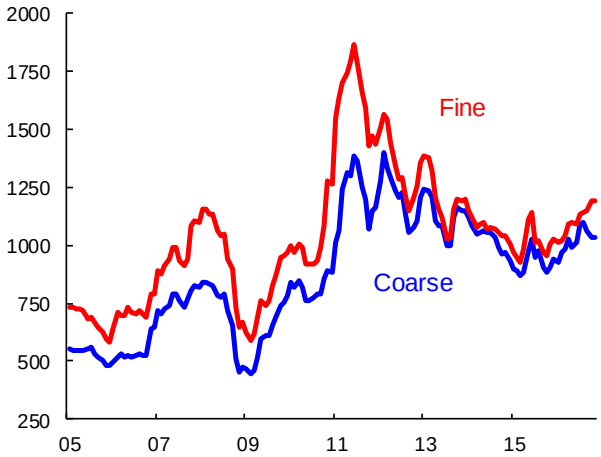


Logs ($/cubic meter)



Rubber ($/lb)

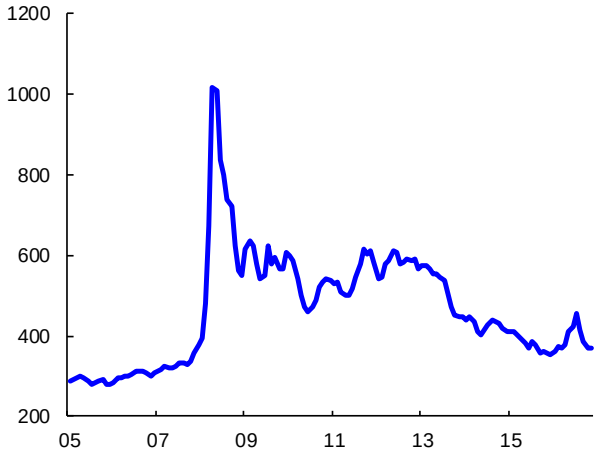
Wool (cents/kg)



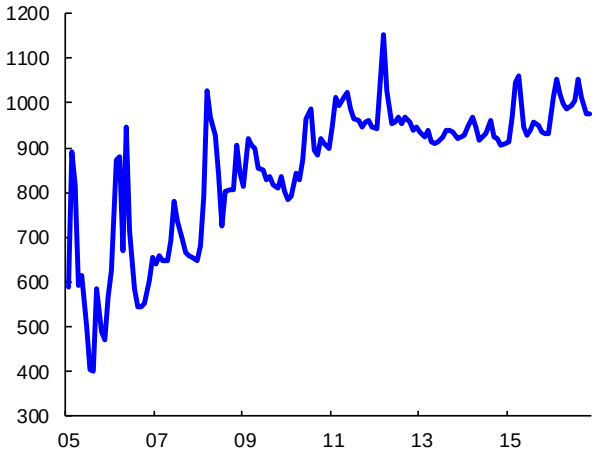
Commodity Prices Movements (Continued)

Monthly (from 2005)

Rice ($/ton)

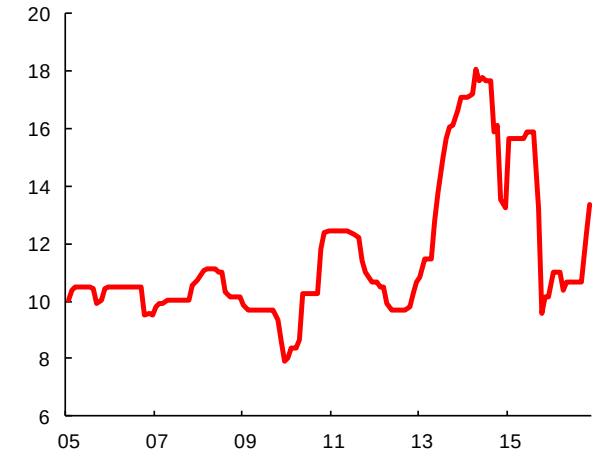


Bananas ($/ton)



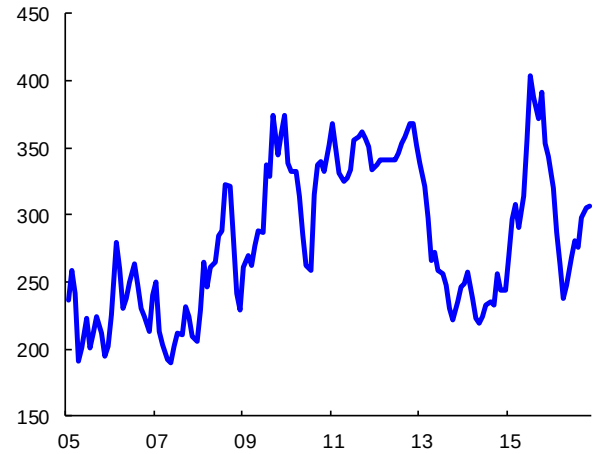
Palm Oil ($/ton)

Shrimp ($/kg)



Sugar (cents/pound)

Tea (cents/kg)

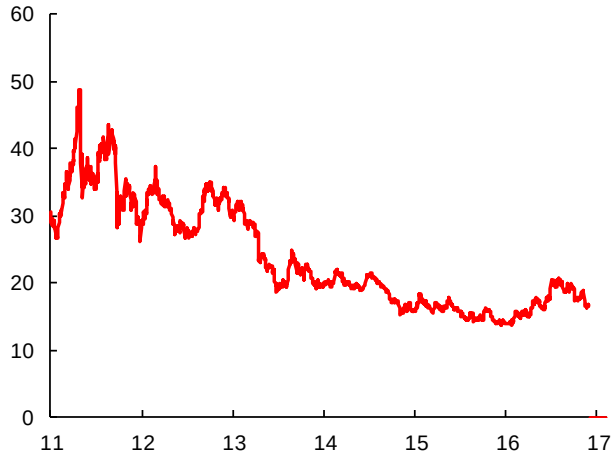


Commodity Prices Movements (Continued)

Daily (from 2011)

Gold ($/troy ounce)

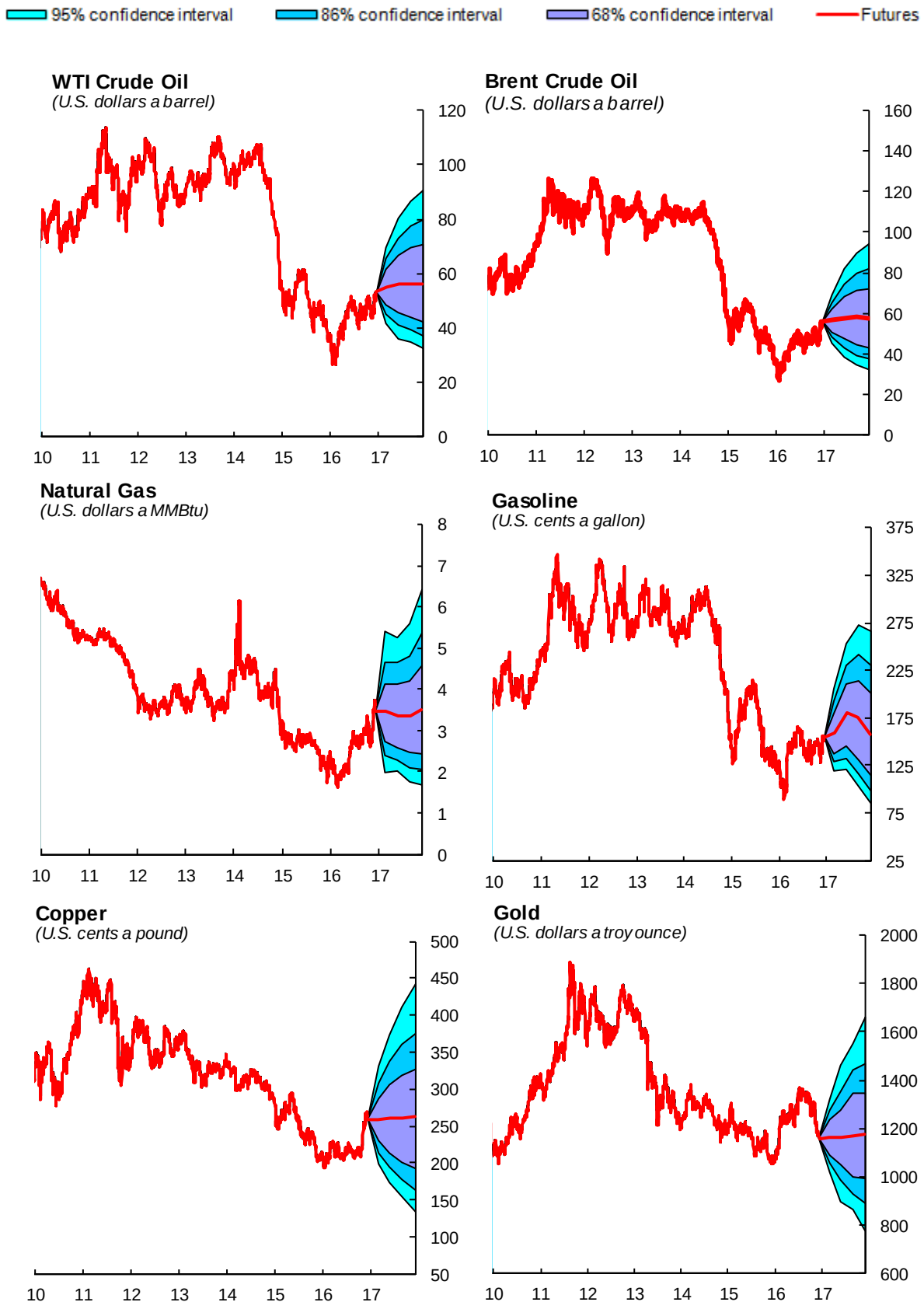
Silver ($/troy ounce)



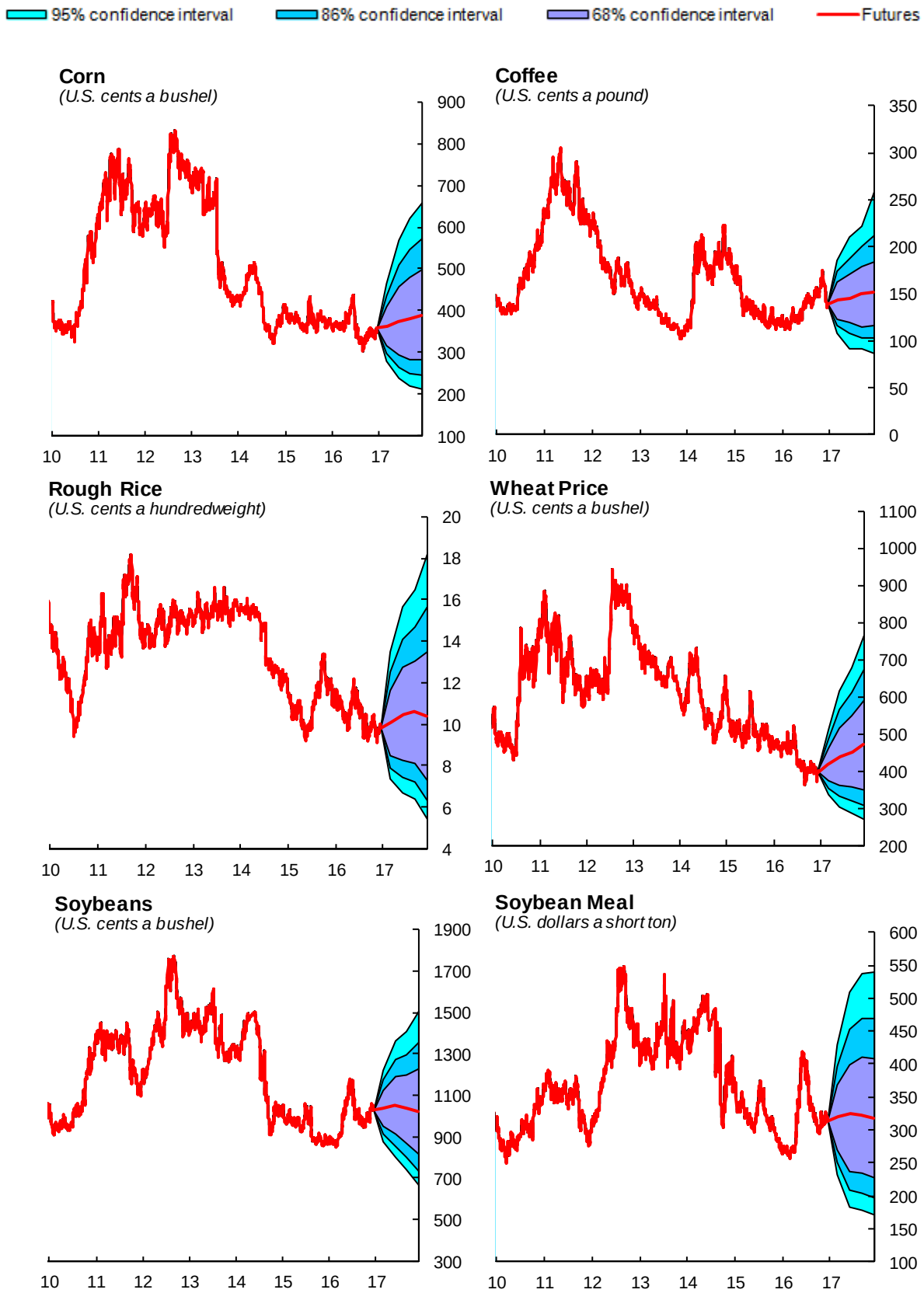
Platinum ($/ounce)

Palladium ($/ounce)

Selected Commodities—Market Price Outlook and Risks



Selected Commodities—Market Price Outlook and Risks (concluded)



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	0.0
< 25	0.0	0.0	0.0	0.1
< 30	0.0	0.4	0.4	1.0
< 35	0.3	2.1	2.9	4.9
< 40	1.9	6.9	10.4	14.2
< 45	8.5	17.6	24.1	28.7
> 50	72.0	64.7	58.1	54.1
> 55	41.8	43.7	40.2	37.8
> 60	17.2	25.5	25.6	24.7
> 65	5.3	13.0	15.0	15.1
> 70	1.4	6.0	8.3	8.8

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	0.0
< 25	0.0	0.0	0.1	0.2
< 30	0.0	0.2	0.6	1.3
< 35	0.1	1.1	2.9	4.7
< 40	0.5	4.5	9.0	12.1
< 45	2.4	13.0	20.3	24.2
> 50	85.3	71.3	63.7	60.1
> 55	54.0	50.8	46.3	43.9
> 60	21.6	30.9	30.5	29.6
> 65	5.7	16.5	18.6	18.7
> 70	1.2	7.9	10.5	11.2

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	0.0	0.0
< 1.50	0.1	0.1	0.4	0.6
< 2.00	2.0	2.1	4.1	5.1
< 2.50	9.8	14.2	17.8	19.2
< 3.00	32.0	40.4	43.0	42.3
> 3.50	35.8	31.7	31.2	34.6
> 4.00	13.8	13.5	14.2	18.2
> 4.50	4.7	5.0	5.8	8.7
> 5.00	1.7	1.6	2.2	4.0
> 5.50	0.7	0.5	0.9	1.8
> 6.00	0.3	0.2	0.3	0.8

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	0.0	0.0
< 0.50	0.0	0.0	0.0	0.0
< 0.75	0.0	0.0	0.0	0.6
< 1.00	0.1	0.2	2.1	7.6
< 1.25	5.7	4.9	15.2	29.1
> 1.50	60.6	73.2	58.2	42.5
> 1.75	17.4	39.7	31.2	20.6
> 2.00	2.5	15.3	13.8	8.6
> 2.25	0.3	4.5	5.2	3.3
> 2.50	0.0	1.1	1.8	1.2
> 2.75	0.0	0.2	0.6	0.4

Copper

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

Threshold Prices	Months Forward			
	3	6	9	12
< 0.75	0.0	0.0	0.0	0.0
< 1.00	0.0	0.0	0.0	0.2
< 1.25	0.0	0.0	0.2	1.0
< 1.50	0.0	0.3	1.8	3.5
< 1.75	0.2	2.7	6.7	9.3
< 2.00	3.0	10.6	17.2	20.5
> 2.25	85.9	73.3	66.3	63.0
> 2.50	58.2	50.1	46.4	44.5
> 2.75	23.0	27.9	28.5	28.3
> 3.00	7.2	13.3	15.8	16.6
> 3.25	2.2	5.9	8.3	9.2

Gold

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

Threshold Prices	Months Forward			
	3	6	9	12
< 700	0.0	0.1	0.0	1.1
< 800	0.0	0.7	0.8	3.4
< 900	0.1	2.9	5.4	8.3
< 1000	1.6	9.6	19.2	19.5
< 1100	22.3	32.3	41.8	40.6
< 1200	72.6	68.2	65.4	65.2
> 1300	3.2	9.6	16.9	16.5
> 1400	0.3	2.9	7.1	7.2
> 1500	0.1	1.1	2.6	3.2
> 1600	0.0	0.4	0.8	1.6
> 1700	0.0	0.2	0.2	0.8

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	0.3	1.0	1.3
< 2.5	0.3	5.1	8.2	9.3
< 3.0	10.2	22.6	26.8	27.7
> 3.5	52.1	49.8	48.4	49.0
> 4.0	16.0	25.6	27.2	28.8
> 4.5	2.7	10.9	13.3	15.2
> 5.0	0.3	4.0	5.9	7.3
> 5.5	0.0	1.3	2.5	3.3
> 6.0	0.0	0.4	1.0	1.5
> 6.5	0.0	0.1	0.4	0.6
> 7.0	0.0	0.0	0.1	0.3

Coffee

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

Threshold Prices	Months Forward 3	6	9	12
< 0.6	0.0	0.1	0.0	0.1
< 0.8	0.0	0.9	0.5	1.3
< 1.0	0.7	4.4	6.3	6.2
< 1.2	13.7	19.1	25.9	22.7
> 1.4	47.9	48.6	45.9	49.3
> 1.6	14.8	19.3	22.7	24.3
> 1.8	2.7	5.8	9.3	10.1
> 2.0	0.3	1.7	3.3	4.0
> 2.2	0.0	0.6	1.1	1.7
> 2.4	0.0	0.2	0.3	0.8
> 2.6	0.0	0.1	0.1	0.4

Rough Rice

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

Threshold Prices	Months Forward 3	6	9	12
< 0.05	0.0	0.0	0.1	1.0
< 0.06	0.1	0.7	1.4	5.1
< 0.07	1.4	4.8	6.7	14.8
< 0.08	9.6	16.0	18.9	29.5
< 0.09	30.5	34.3	36.6	46.4
> 0.10	41.9	45.1	44.4	37.8
> 0.11	19.9	27.5	28.2	25.1
> 0.12	7.6	15.0	16.4	15.8
> 0.13	2.4	7.6	9.0	9.6
> 0.14	0.7	3.6	4.6	5.6
> 0.15	0.2	1.6	2.3	3.2

Wheat

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

Threshold Prices	Months Forward 3	6	9	12
< 2.5	0.0	0.1	0.5	1.4
< 3.0	0.1	2.6	4.7	7.6
< 3.5	6.4	15.0	18.1	21.8
< 4.0	40.8	40.0	40.4	41.6
< 4.5	81.7	66.9	63.3	61.3
> 5.0	2.8	14.6	19.4	23.1
> 5.5	0.2	5.3	9.0	12.7
> 6.0	0.0	1.7	3.8	6.6
> 6.5	0.0	0.5	1.5	3.2
> 7.0	0.0	0.1	0.6	1.5
> 7.5	0.0	0.0	0.2	0.7

Soybeans

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

Threshold Prices	Months Forward 3	6	9	12
< 5	0.0	0.0	0.0	0.0
< 6	0.0	0.0	0.1	0.6
< 7	0.0	0.2	1.1	4.6
< 8	0.1	2.8	7.8	16.2
< 9	5.3	15.9	25.5	35.4
> 10	63.1	57.5	49.2	43.0
> 11	20.6	29.4	26.3	25.0
> 12	3.1	11.3	11.6	13.0
> 13	0.2	3.4	4.4	6.2
> 14	0.0	0.8	1.4	2.7
> 15	0.0	0.2	0.4	1.1

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	0.3	0.5
< 200	0.2	5.2	6.1	7.5
< 250	7.7	24.9	26.2	28.9
> 300	57.8	46.0	45.8	43.5
> 350	20.0	22.5	23.3	22.0
> 400	4.1	9.2	10.1	9.7
> 450	0.6	3.4	4.0	3.9
> 500	0.1	1.1	1.5	1.5
> 550	0.0	0.4	0.5	0.5
> 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	0.1	0.2
-30%	0.6	3.6	5.3	8.1
-10%	17.0	26.3	33.4	37.8
+10%	24.2	31.1	30.1	28.8
+30%	1.9	7.1	9.5	10.0
+50%	0.1	1.2	2.3	2.9
+100%	0.0	0.0	0.0	0.1

Brent Crude Oil

Price changes	Months Forward			
	3	6	9	12
-50%	0.0	0.0	0.2	0.5
-30%	0.3	2.7	6.0	8.7
-10%	10.4	24.7	32.6	36.3
+10%	22.5	31.6	31.0	30.1
+30%	0.9	7.1	9.7	10.4
+50%	0.1	1.1	2.4	3.0
+100%	0.0	0.0	0.1	0.1

U.S. Natural Gas

Price changes	Months Forward			
	3	6	9	12
-50%	0.6	0.4	1.4	1.9
-30%	8.1	11.6	15.1	16.6
-10%	40.1	48.0	50.0	48.5
+10%	19.9	18.7	19.2	23.2
+30%	4.6	4.8	5.6	8.5
+50%	1.2	1.0	1.5	2.9
+100%	0.1	0.0	0.1	0.2

Gasoline

Price changes	Months Forward			
	3	6	9	12
-50%	0.0	0.0	0.1	0.9
-30%	0.6	0.7	4.8	13.3
-10%	21.1	15.2	29.7	45.8
+10%	23.2	45.4	35.5	23.7
+30%	2.2	14.3	13.0	8.1
+50%	0.2	3.0	3.8	2.4
+100%	0.0	0.0	0.1	0.1

Copper

Price changes	Months Forward			
	3	6	9	12
-50%	0.0	0.0	0.4	1.3
-30%	0.5	4.1	8.8	11.6
-10%	21.1	34.0	40.3	43.2
+10%	14.3	20.9	22.6	22.9
+30%	1.1	3.9	6.0	6.9
+50%	0.0	0.6	1.5	1.9
+100%	0.0	0.0	0.0	0.1

Gold

Price changes	Months Forward			
	3	6	9	12
-50%	0.0	0.0	0.0	0.1
-30%	0.0	0.8	1.0	3.7
-10%	5.4	16.2	27.7	27.0
+10%	6.4	13.7	21.0	20.6
+30%	0.1	1.0	2.5	3.1
+50%	0.0	0.1	0.2	0.7
+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	0.2	0.4
-30%	0.3	4.9	8.0	9.2
-10%	22.9	33.6	37.0	37.3
+10%	20.2	28.9	30.1	31.7
+30%	1.6	8.5	10.9	12.6
+50%	0.1	1.9	3.3	4.3
+100%	0.0	0.0	0.1	0.2

Coffee

Price changes	Months Forward 3	6	9	12
-50%	0.0	0.3	0.1	0.5
-30%	0.4	3.5	4.8	5.0
-10%	21.5	25.9	32.7	29.1
+10%	24.1	28.1	30.0	32.1
+30%	2.6	5.6	9.1	9.9
+50%	0.1	1.0	2.1	2.8
+100%	0.0	0.0	0.0	0.2

Rough Rice

Price changes	Months Forward 3	6	9	12
-50%	0.0	0.0	0.1	0.8
-30%	0.9	3.8	5.6	13.0
-10%	25.6	30.4	32.9	43.1
+10%	24.3	31.2	31.7	27.8
+30%	3.4	9.2	10.7	11.0
+50%	0.3	2.1	2.9	3.9
+100%	0.0	0.0	0.1	0.2

Wheat

Price changes	Months Forward 3	6	9	12
-50%	0.0	0.0	0.0	0.1
-30%	0.0	0.9	2.1	4.0
-10%	9.7	18.3	21.3	24.8
+10%	26.3	39.2	42.0	43.3
+30%	1.2	10.5	15.1	19.0
+50%	0.0	1.8	4.0	6.8
+100%	0.0	0.0	0.1	0.3

Soybeans

Price changes	Months Forward 3	6	9	12
-50%	0.0	0.0	0.0	0.0
-30%	0.0	0.3	1.8	6.2
-10%	10.1	21.5	31.5	40.9
+10%	12.5	22.6	20.9	20.7
+30%	0.1	2.1	3.0	4.6
+50%	0.0	0.1	0.3	0.8
+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	10.9	12.2	14.2
-10%	27.0	43.5	44.2	46.8
+10%	22.9	24.4	25.1	23.8
+30%	3.1	8.0	8.8	8.5
+50%	0.2	2.2	2.7	2.6
+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.