

# Commodity Price Outlook & Risks

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***This monthly report presents a price outlook and risk assessment for selected commodities as depicted from futures and options markets.***

**Outlook.** After falling below 27 dollars on mid-January, oil spot prices rebounded to 35 dollars, following recent discussions among major oil producers regarding a potential production freeze. Futures markets show prices modestly increasing over the next year; nonetheless, there is substantial uncertainty about its outlook. Risks to the downside include sustained oil production growth and subdued aggregate demand. On the upside, production freeze talks and geopolitical tensions in the Middle East could potentially cause oil market disruptions. Gasoline prices are expected to moderately decline in the coming months, while U.S. natural gas prices are still projected to rise. Metal prices are expected to remain broadly unchanged on long-term slowdown of Chinese demand and general ample supply. Agricultural prices are projected to modestly increase over the next twelve months, with El Nino event still pushing up some food prices.

**Risks.** The likelihood of per-barrel prices for WTI falling below \$20 in the next 12 months dropped to 3 percent from 13 percent, and the likelihood of Brent falling below \$20 decreased to 2 percent. The likelihood of WTI and Brent oil prices rising above \$50 increased, signaling an upward shift in the balance of risks. Overall uncertainty stays at a significantly high level.

The likelihood of per-MMBtu U.S. natural gas prices below \$1.5 (12 months forward) increased to 12 percent from 9 percent, while the probability of prices rising above \$3.5 decreased to 3 percent from 6 percent, suggesting a downward shift in price uncertainty.

For metals, the risk of copper prices falling below \$1.5 a pound decreased to 6 percent from 14 percent, and the probability of prices increasing above \$3.0 a pound increased from 2 percent to 5 percent, signaling an upward shift in the balance of risks. The probability of gold prices falling below \$900 a troy ounce decreased to 6 percent from 9 percent, while the probability of an increase beyond \$1400 increased to 13 percent from 11 percent last month.

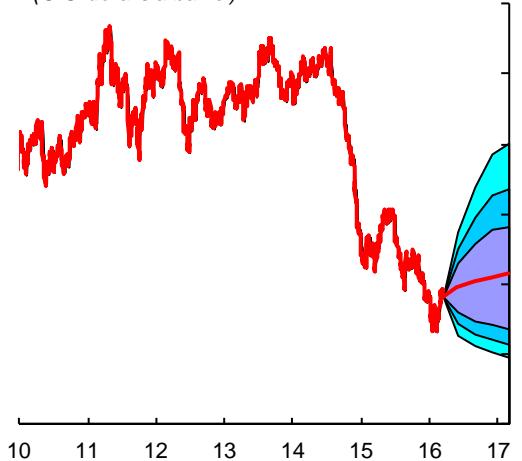
The likelihood of per bushel corn prices below \$2.5 remains broadly unchanged, while the probability of prices increasing above \$5 dropped to 2 percent from 3 percent in February. The likelihood of soybean meal prices rising above \$350 a short ton slide to 7 percent from 8 percent. Meanwhile, the likelihood of per-bushel soybean prices below \$6 decreased to 7 percent from 12 percent, and the probability of an increase above \$11 increased to 12 percent from 10 percent last month, reflecting some weather concerns for the next harvest.

**Contents.** Fan charts (pages 2-3) show historical and forward futures prices (red line), with calculated confidence intervals of +/- 2 standard deviations (in purple/blue). Confidence intervals are derived from prices of options on March 15, 2016. Likelihoods of spot prices rising/falling from specified price thresholds occurring at the 3-, 6-, 9- and 12-month forward (or closest available) horizons for each commodity are shown in tabular form (pages 4-5). In addition to price thresholds, the probability of each commodity spot price rising/falling by a certain percentage is shown (pages 6-7). Relevant contract specifications for each commodity are also shown (page 8).

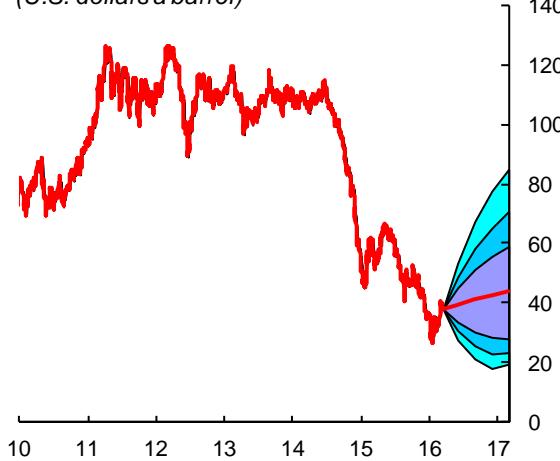
## Selected Commodities—Market Price Outlook and Risks

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

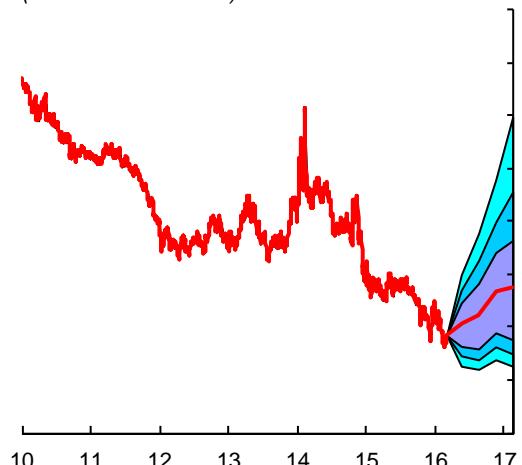
**WTI Crude Oil**  
(U.S. dollars a barrel)



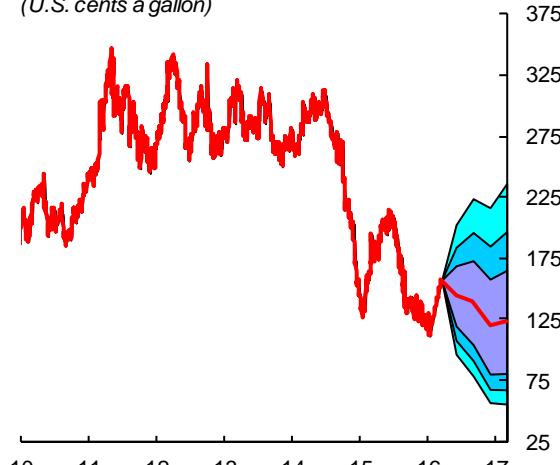
**Brent Crude Oil**  
(U.S. dollars a barrel)



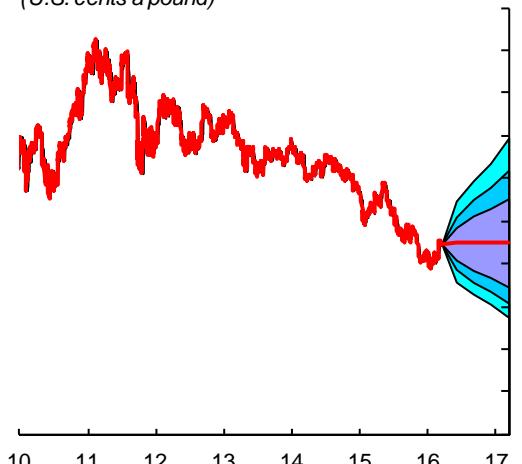
**Natural Gas**  
(U.S. dollars a MMBtu)



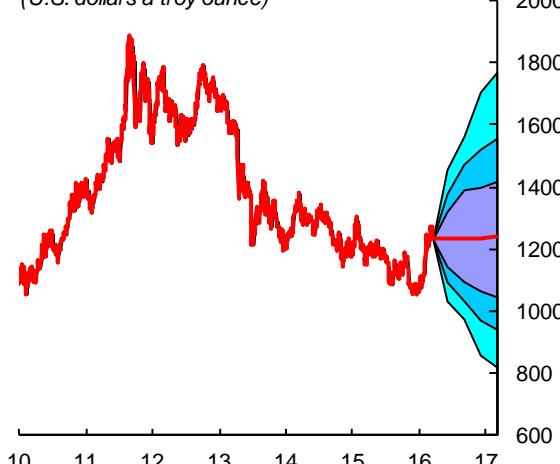
**Gasoline**  
(U.S. cents a gallon)



**Copper**  
(U.S. cents a pound)

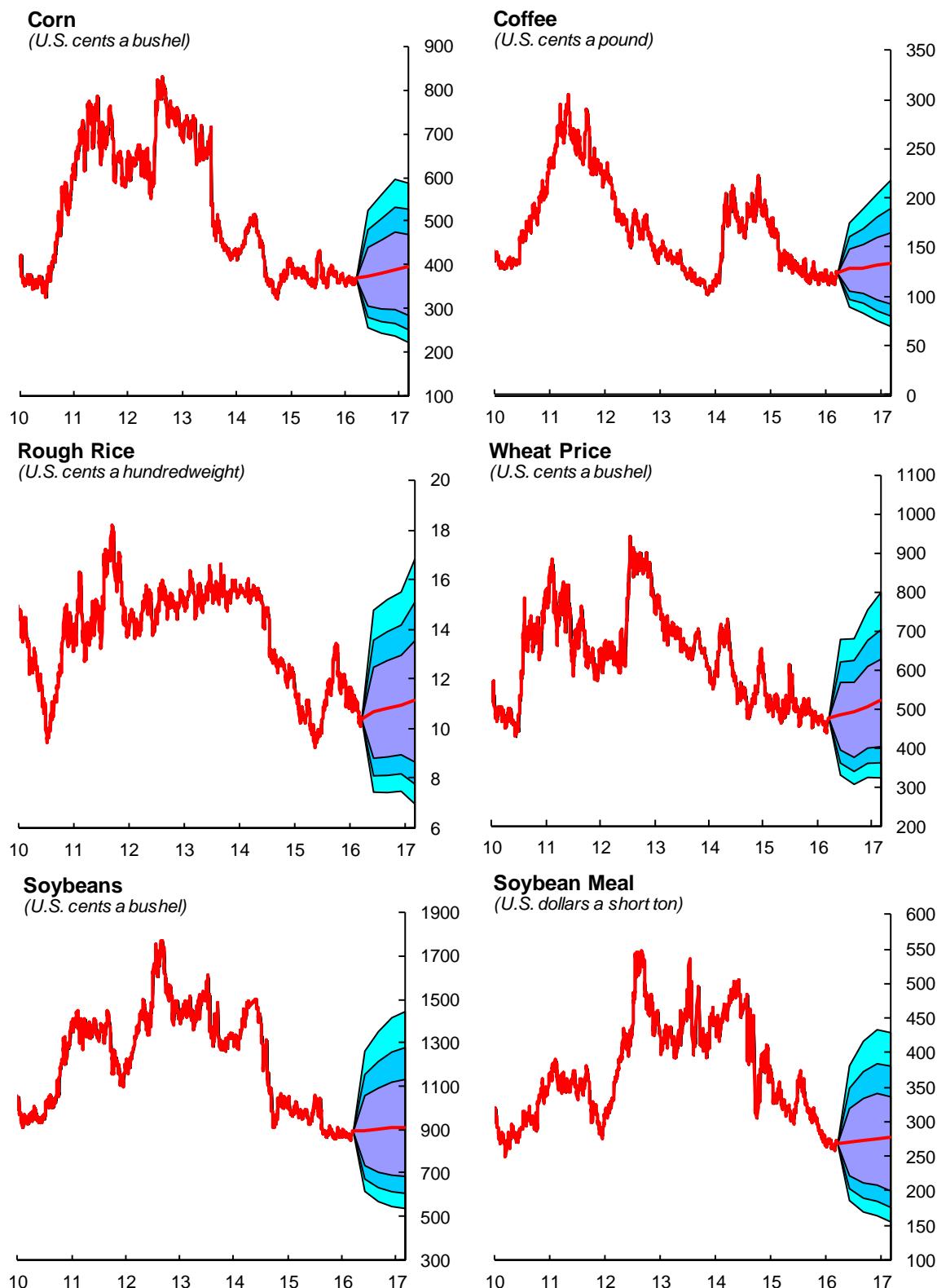


**Gold**  
(U.S. dollars a troy ounce)



## 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
< 15	0.0	0.0	0.1	0.2
< 20	0.2	0.9	1.9	3.1
< 25	2.6	7.0	10.1	13.1
< 30	12.1	23.0	26.6	30.6
> 35	64.3	54.6	53.0	49.6
> 40	33.9	33.6	34.4	32.3
> 45	12.9	18.4	20.6	19.6
> 50	3.9	9.2	11.6	11.3
> 55	1.0	4.3	6.2	6.3
> 60	0.3	1.9	3.2	3.4
> 65	0.1	0.8	1.6	1.8

### Brent Crude Oil

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

Threshold Prices	Months Forward			
	3	6	9	12
< 15	0.0	0.1	0.3	0.2
< 20	0.0	1.3	2.8	2.3
< 25	1.0	6.2	9.7	10.6
< 30	6.5	17.9	22.5	26.0
> 35	73.3	62.2	59.6	55.3
> 40	37.3	39.6	40.6	37.8
> 45	12.0	21.5	24.9	24.2
> 50	3.1	10.4	13.9	14.7
> 55	0.8	4.7	7.4	8.6
> 60	0.2	2.0	3.8	4.9
> 65	0.1	0.9	1.9	2.7

### U.S. Natural Gas

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

Threshold Prices	Months Forward			
	3	6	9	12
< 1.00	0.5	0.4	0.3	0.5
< 1.50	10.4	15.7	7.4	12.2
< 2.00	57.0	56.0	35.3	44.8
> 2.50	8.1	14.8	30.7	25.1
> 3.00	0.8	3.8	10.7	9.5
> 3.50	0.1	0.9	3.2	3.4
> 4.00	0.0	0.2	0.9	1.2
> 4.50	0.0	0.0	0.3	0.4
> 5.00	0.0	0.0	0.1	0.2
> 5.50	0.0	0.0	0.0	0.1
> 6.00	0.0	0.0	0.0	0.0

### 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	0.3	0.3
< 0.75	0.1	1.3	7.9	7.8
> 1.00	96.0	86.8	66.1	67.1
> 1.25	74.1	56.1	35.3	37.3
> 1.50	32.4	25.5	15.1	17.0
> 1.75	7.5	8.9	5.5	6.9
> 2.00	1.4	2.7	1.9	2.6
> 2.25	0.3	0.8	0.6	1.0
> 2.50	0.0	0.2	0.2	0.4
> 2.75	0.0	0.1	0.1	0.1

### 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	0.0
< 1.25	0.0	0.0	0.1	0.8
< 1.50	0.2	0.6	2.1	5.9
< 1.75	2.2	6.5	12.0	20.0
> 2.00	87.2	73.4	66.2	58.7
> 2.25	41.6	41.0	39.4	37.0
> 2.50	7.6	16.0	18.7	20.5
> 2.75	1.6	4.8	7.5	10.2
> 3.00	0.4	1.2	2.6	4.7
> 3.25	0.1	0.3	0.8	2.0

### Gold

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

Threshold Prices	Months Forward			
	3	6	9	12
< 700	0.0	0.0	0.3	0.5
< 800	0.0	0.0	1.3	2.1
< 900	0.1	0.5	4.2	5.5
< 1000	1.6	4.8	10.4	12.7
> 1100	91.1	80.4	75.3	72.2
> 1200	60.6	54.6	50.8	49.3
> 1300	18.8	28.5	26.4	27.2
> 1400	4.1	11.5	11.6	13.0
> 1500	1.0	3.7	5.1	6.1
> 1600	0.2	1.0	2.4	3.0
> 1700	0.0	0.2	1.3	1.6

## Options-based Price Thresholds (concluded)

Corn		Months Forward				Coffee	
		3	6	9	12		
< 2.0	0.0	0.2	0.3	0.7		< 0.6	0.0
< 2.5	15.7	19.1	20.1	25.2		< 0.8	0.4
< 3.0	45.6	46.5	45.5	50.4		< 1.0	10.4
> 3.5	25.3	27.7	30.4	27.5		< 1.2	45.0
> 4.0	8.9	11.6	14.3	13.3		> 1.4	20.2
> 4.5	2.5	4.2	5.9	5.7		> 1.6	4.8
> 5.0	0.6	1.3	2.2	2.3		> 1.8	0.8
> 5.5	0.1	0.4	0.8	0.9		> 2.0	0.1
> 6.0	0.0	0.1	0.3	0.3		> 2.2	0.0
> 6.5	0.0	0.0	0.1	0.1		> 2.4	0.0
> 7.0	0.0	0.0	0.0	0.0		> 2.6	0.0

Rough Rice		Months Forward				Wheat	
		3	6	9	12		
< 0.06	0.1	0.1	0.1	0.4		< 2.0	0.0
< 0.07	1.2	1.3	1.2	3.0		< 2.5	0.0
< 0.08	7.2	7.2	6.7	10.9		< 3.0	0.6
< 0.09	22.7	21.9	20.4	25.5		< 3.5	5.5
< 0.10	45.6	43.5	41.2	44.2		< 4.0	20.5
> 0.11	32.0	34.7	37.3	37.5		> 4.5	55.5
> 0.12	16.0	18.4	20.5	22.8		> 5.0	31.7
> 0.13	7.0	8.6	10.0	12.8		> 5.5	15.1
> 0.14	2.7	3.6	4.4	6.8		> 6.0	6.2
> 0.15	1.0	1.4	1.8	3.4		> 6.5	2.3
> 0.16	0.3	0.5	0.7	1.6		> 7.0	0.8

Soybeans		Months Forward				Soybean Meal	
		3	6	9	12		
< 5	0.1	0.5	0.9	1.1		< 100	0.0
< 6	1.9	4.5	6.1	6.8		< 150	0.1
< 7	11.8	17.6	20.0	20.9		< 200	6.7
< 8	34.2	39.4	40.9	41.5		< 250	41.9
< 9	60.9	62.2	62.0	62.0		> 300	19.6
> 10	18.7	20.2	21.5	22.0		> 350	4.0
> 11	7.4	9.6	11.0	11.6		> 400	0.6
> 12	2.6	4.1	5.2	5.7		> 450	0.1
> 13	0.8	1.7	2.3	2.7		> 500	0.0
> 14	0.2	0.6	1.0	1.2		> 550	0.0
> 15	0.1	0.2	0.4	0.5		> 600	0.0

## Options-based Probabilities of Price Changes (in percent)

WTI Crude Oil		Brent Crude Oil			
Price changes		Months Forward			
		3	6	9	12
-50%	0.1	0.3	0.8	1.4	
-30%	3.0	8.0	11.3	14.4	
-10%	23.0	34.8	37.6	41.3	
+10%	34.1	33.7	34.5	32.4	
+30%	7.7	13.6	16.0	15.4	
+50%	1.2	4.7	6.6	6.7	
+100%	0.0	0.2	0.6	0.7	

U.S. Natural Gas					
Price changes		Months Forward			
		3	6	9	12
-50%	0.2	0.2	0.1	0.3	
-30%	3.3	5.5	2.5	4.6	
-10%	22.3	27.9	14.2	21.4	
+10%	39.3	41.2	62.1	52.7	
+30%	11.8	18.6	36.2	29.7	
+50%	2.4	7.2	17.7	14.9	
+100%	0.0	0.5	1.9	2.2	

Gasoline					
Price changes		Months Forward			
		3	6	9	12
-50%	0.0	0.7	5.2	5.1	
-30%	3.4	11.9	32.1	31.1	
-10%	28.4	46.3	66.5	64.5	
+10%	25.3	21.1	12.5	14.4	
+30%	4.4	6.1	3.9	5.1	
+50%	0.7	1.5	1.1	1.7	
+100%	0.0	0.0	0.0	0.1	

Copper					
Price changes		Months Forward			
		3	6	9	12
-50%	0.0	0.0	0.0	0.2	
-30%	0.4	1.3	3.5	8.5	
-10%	13.6	27.5	34.6	42.0	
+10%	10.7	19.5	21.8	23.1	
+30%	0.7	2.2	4.0	6.5	
+50%	0.0	0.2	0.5	1.4	
+100%	0.0	0.0	0.0	0.0	

Gold					
Price changes		Months Forward			
		3	6	9	12
-50%	0.0	0.0	0.0	0.0	0.1
-30%	0.0	0.2	2.8	3.9	
-10%	10.1	21.3	26.3	29.4	
+10%	8.2	18.0	17.1	18.4	
+30%	0.2	1.0	2.4	3.0	
+50%	0.0	0.0	0.5	0.7	
+100%	0.0	0.0	0.0	0.0	

## Options-based Probabilities of Price Changes (concluded)

*(in percent)*

Corn		Months Forward				Coffee	
		3	6	9	12		
-50%	0.0	0.0	0.1	0.2		-50%	0.0
-30%	3.0	5.0	6.1	9.2		-30%	1.6
-10%	33.6	35.9	35.7	41.0		-10%	28.3
+10%	22.9	25.4	28.2	25.6		+10%	25.0
+30%	4.3	6.5	8.7	8.2		+30%	4.3
+50%	0.5	1.2	2.1	2.2		+50%	0.5
+100%	0.0	0.0	0.0	0.1		+100%	0.0

Rough Rice		Months Forward				Wheat	
		3	6	9	12		
-50%	0.0	0.0	0.0	0.0		-50%	0.0
-30%	2.0	2.1	2.0	4.4		-30%	3.1
-10%	29.8	28.6	26.8	31.5		-10%	34.2
+10%	24.6	27.3	29.8	31.0		+10%	22.4
+30%	4.5	5.7	6.8	9.5		+30%	4.2
+50%	0.5	0.8	1.1	2.2		+50%	0.5
+100%	0.0	0.0	0.0	0.0		+100%	0.0

Soybeans		Months Forward				Soybean Meal	
		3	6	9	12		
-50%	0.0	0.1	0.2	0.2		-50%	0.0
-30%	3.2	6.7	8.6	9.4		-30%	3.1
-10%	34.9	40.0	41.5	42.0		-10%	34.1
+10%	21.8	23.0	24.1	24.6		+10%	22.4
+30%	4.0	5.9	7.1	7.7		+30%	4.2
+50%	0.5	1.2	1.7	2.0		+50%	0.5
+100%	0.0	0.0	0.0	0.0		+100%	0.0

## Commodity Derivative Contract Specifications

Commodity	Exchange	Contract	Physical Characteristics	Contract Size	Pricing Unit	Months Traded
<b>Brent crude oil</b>	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		
<b>WTI crude oil</b>	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		
<b>Natural Gas</b>	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		
<b>Gasoline</b>	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		
<b>Gold</b>	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		
<b>Corn</b>	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		
<b>Coffee</b>	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		
<b>Rough rice</b>	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)		
<b>Wheat</b>	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		
<b>Soybean meal</b>	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		
<b>Soybeans</b>	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.



I N T E R N A T I O N A L M O N E T A R Y F U N D

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