

# Commodity Price Outlook & Risks

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

**Outlook.** Futures markets show most commodity prices remaining flat or declining over the next 12 months, with the exception of gasoline, natural gas, and some food products. Oil prices are expected to decline due to an expected rise in non-OPEC supplies, and possible recovery from outages in OPEC nations. Copper and gold futures prices are flat. Soybean and soybean meal prices are expected to fall on the prospect of a large South American crop in 2014, while corn prices are expected to rise due to tighter stocks and disappointing late-harvest yields in the U.S. Midwest.

**Risks.** The likelihood of per barrel prices for WTI falling below \$90 and Brent below \$100 next year (12 months forward) is about 60 percent and 50 percent, respectively, compared to 40 percent for both a month ago. The likelihood of WTI falling below \$60 has declined to 2.7 percent from 3.4 percent, while the probability of WTI rising above \$140 has declined to 0.4 percent from 1.1 percent, indicating declining overall risks for WTI. The probability of Brent prices rising above \$160 has also declined to 0.7 percent from 1.2 percent month ago, while the probability of Brent below \$60 is 1.9 percent compared to 1.2 percent a month ago, indicating that risks for Brent futures have shifted downward slightly given the expected build-up in non-OPEC supply.

The likelihood of per troy ounce gold prices below \$900 (12 months forward) has declined to 3.8 percent from 5.2 percent a month ago, and the probability of gold above \$1800 has declined to 1.4 percent from 3.0 percent a month ago reflecting weakening investor demand. Copper price tail-risks (12 months forward) have decreased as the likelihood of per pound prices below \$2.0 decreased to 0.2 percent from 1.4 percent a month ago, and the likelihood of copper above \$5.0 also decreased to 0.3 percent from 1.1 percent.

The likelihood of per bushel soybean prices below \$8 has decreased to 2.6 percent from 3.3 percent, and prices above \$17 also decreased to 0.2 percent from 1.0 percent a month ago, showing a decline of tail risks. The likelihood of corn prices below \$3.00 has increased to 4.8 percent from 2.9 percent, and prices above \$7.50 also increased to 1.3 percent from 1.0 percent, indicating a small increase of tail risks.

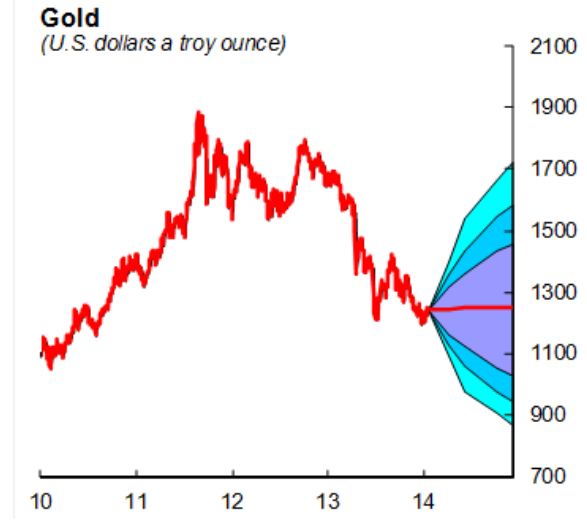
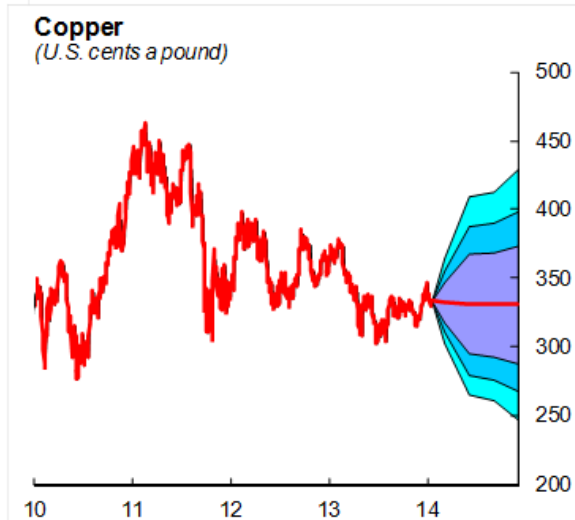
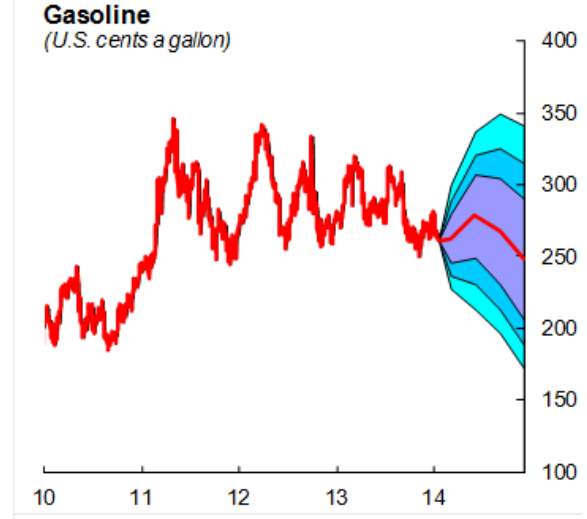
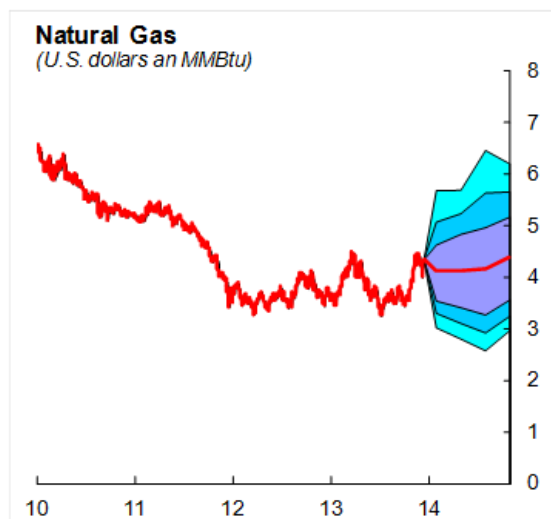
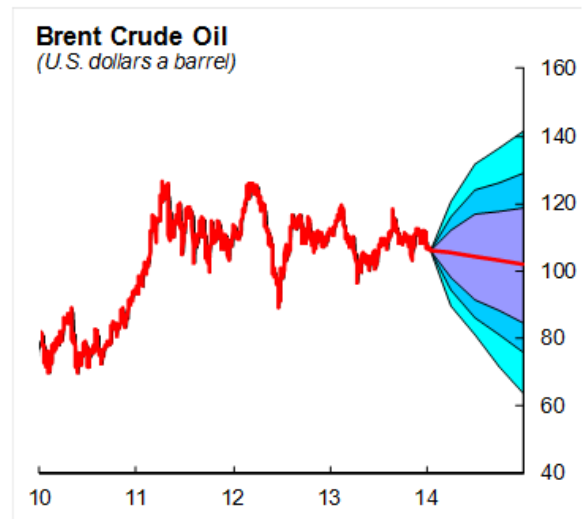
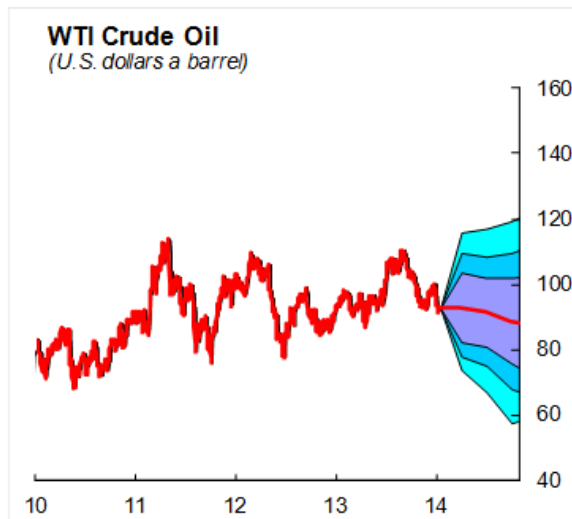
**Contents.** Fan charts (pages 2-3) show historical and forward futures prices (red line), with calculated confidence intervals of +/- 2 standard deviations (in purple/blue). Confidence intervals are derived from prices of options on January 13, 2014. Likelihoods of spot prices rising/falling from specified 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).

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<sup>1</sup> Prepared by Akito Matsumoto, Daniel Rivera Greenwood, Marina Rousset, and Shane Streifel.

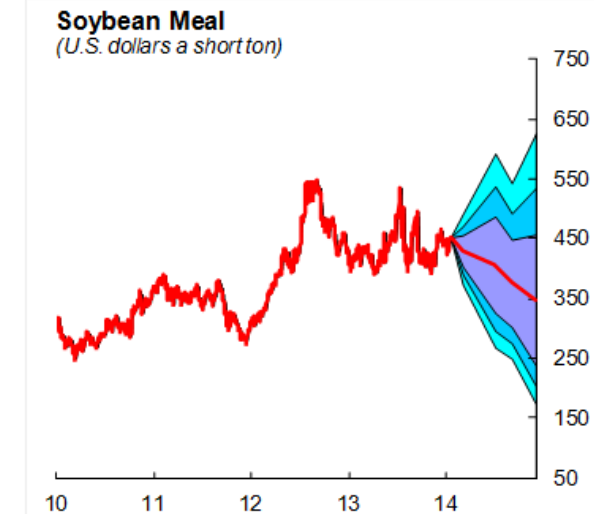
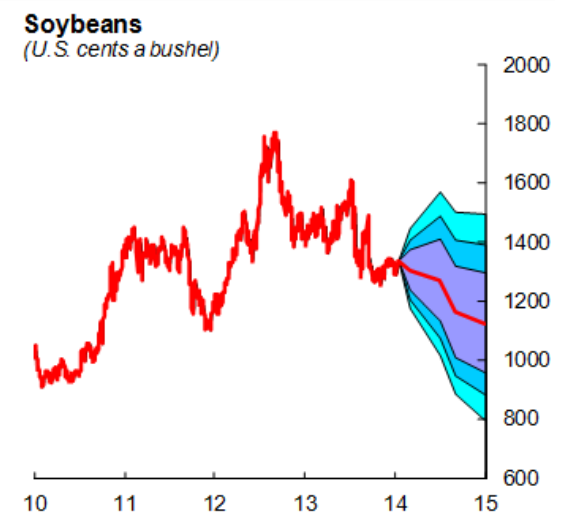
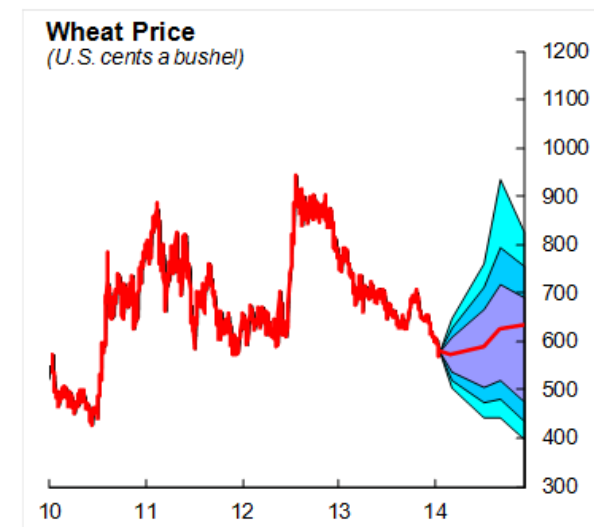
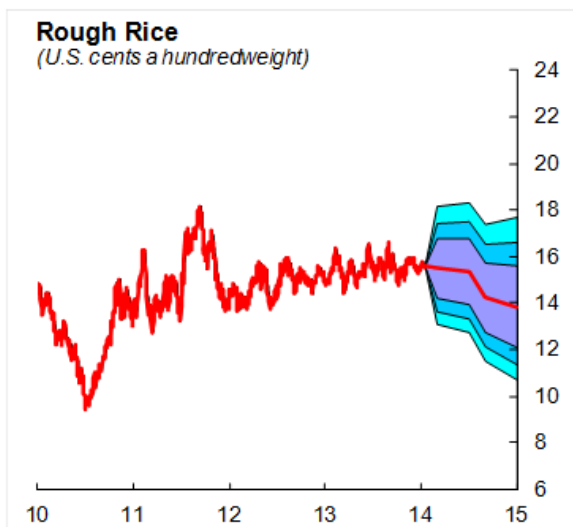
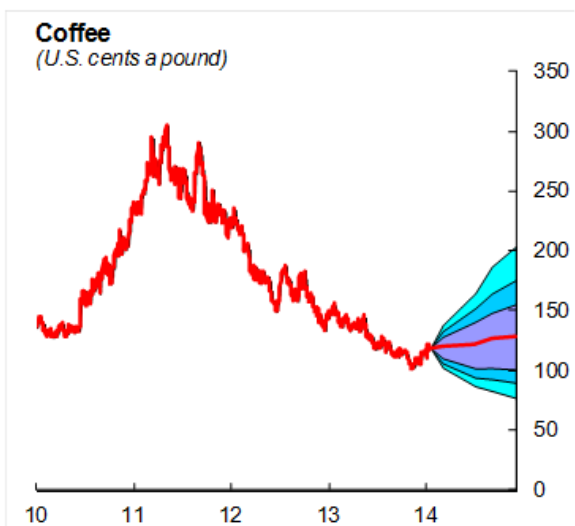
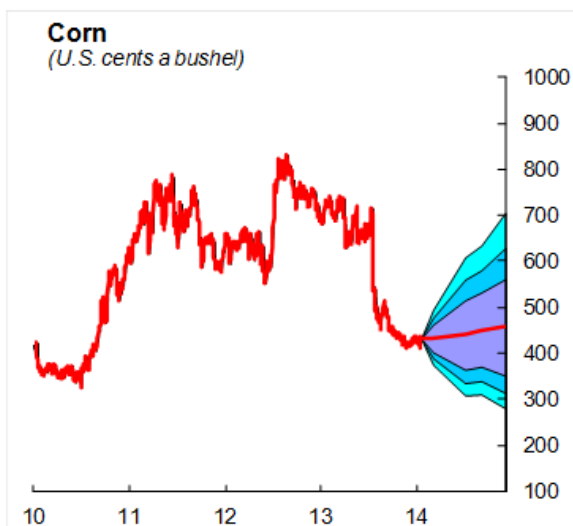
## Selected Commodities—Market Price Outlook and Risks

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
< 50	0.0	0.1	1.0	0.2
< 60	0.0	1.0	3.3	2.7
< 70	0.9	3.7	8.7	13.7
< 80	10.8	14.4	24.8	35.5
< 90	41.3	45.9	54.4	60.4
> 100	24.6	20.5	19.6	20.2
> 110	6.3	5.5	6.6	8.7
> 120	1.1	1.8	2.3	3.4
> 130	0.2	0.8	1.0	1.2
> 140	0.0	0.3	0.5	0.4
> 150	0.0	0.2	0.3	0.1

### Brent Crude Oil

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

Threshold Prices	Months Forward			
	3	6	9	12
< 60	0.0	0.0	0.8	1.9
< 70	0.0	0.1	2.1	4.1
< 80	0.4	1.9	6.1	10.2
< 90	2.6	12.8	18.6	24.7
< 100	22.9	38.9	43.1	47.4
> 110	24.8	31.1	30.6	30.1
> 120	3.1	11.9	13.3	14.9
> 130	0.5	3.4	4.9	6.5
> 140	0.1	0.8	1.9	2.9
> 150	0.0	0.1	0.8	1.4
> 160	0.0	0.0	0.4	0.7

### U.S. Natural Gas

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

Threshold Prices	Months Forward			
	3	6	9	12
< 2.50	0.2	0.6	1.8	0.2
< 3.00	2.2	4.7	8.1	2.6
< 3.50	13.2	18.9	24.5	13.3
> 4.00	53.0	55.3	50.9	65.5
> 4.50	21.3	29.0	29.2	40.9
> 5.00	8.3	12.0	15.7	21.4
> 5.50	3.6	4.2	8.6	9.8
> 6.00	1.5	1.2	4.7	3.9
> 6.50	0.6	0.3	2.5	1.4
> 7.00	0.2	0.1	1.3	0.5
> 7.50	0.1	0.0	0.7	0.2

### Gasoline

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

Threshold Prices	Months Forward			
	3	6	9	12
< 1.50	0.0	0.0	0.0	0.4
< 1.75	0.0	0.1	0.4	3.1
< 2.00	0.0	0.9	3.0	12.2
< 2.25	1.8	5.0	12.3	30.5
< 2.50	23.2	16.8	32.1	54.3
> 2.75	23.2	56.9	41.4	25.3
> 3.00	2.6	23.2	19.2	11.9
> 3.25	0.2	5.7	7.3	4.9
> 3.50	0.0	1.1	2.5	1.7
> 3.75	0.0	0.3	0.8	0.6
> 4.00	0.0	0.1	0.3	0.2

### Copper

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

Threshold Prices	Months Forward			
	3	6	9	12
< 1.5	0.0	0.0	0.0	0.0
< 2.0	0.0	0.0	0.0	0.2
< 2.5	0.0	0.6	1.0	2.9
< 3.0	1.7	19.9	21.7	24.7
> 3.5	12.3	29.4	29.5	31.0
> 4.0	0.0	4.0	4.6	6.8
> 4.5	0.0	0.3	0.4	1.3
> 5.0	0.0	0.0	0.0	0.3
> 5.5	0.0	0.0	0.0	0.1
> 6.0	0.0	0.0	0.0	0.0
> 6.5	0.0	0.0	0.0	0.0

### Gold

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

Threshold Prices	Months Forward			
	3	6	9	12
< 900	0.0	1.0	2.1	3.8
< 1000	0.0	3.2	8.8	12.0
< 1100	2.8	11.6	23.5	26.9
< 1200	30.1	36.3	43.4	45.2
< 1300	77.5	69.1	63.6	63.1
> 1400	2.6	10.8	20.6	22.4
> 1500	0.1	3.7	10.3	12.5
> 1600	0.0	1.6	4.7	6.4
> 1700	0.0	0.8	1.9	3.0
> 1800	0.0	0.4	0.7	1.4
> 1900	0.0	0.2	0.3	0.6

## Options-based Price Thresholds (concluded)

### Corn

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

Threshold Prices	Months Forward			
	3	6	9	12
< 2.5	0.0	0.1	0.1	0.7
< 3.0	0.0	1.7	1.6	4.8
< 3.5	0.2	11.2	9.8	15.8
< 4.0	14.7	32.4	28.5	32.9
> 4.5	26.9	41.4	47.1	47.9
> 5.0	1.6	20.3	25.5	30.7
> 5.5	0.0	8.5	12.0	18.3
> 6.0	0.0	3.1	5.0	10.2
> 6.5	0.0	1.0	1.8	5.3
> 7.0	0.0	0.3	0.6	2.7
> 7.5	0.0	0.1	0.2	1.3

### Coffee

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

Threshold Prices	Months Forward			
	3	6	9	12
< 0.6	0.0	0.0	0.1	0.6
< 0.7	0.0	0.1	0.5	1.5
< 0.8	0.0	0.6	1.7	3.1
< 0.9	0.0	3.9	5.1	6.9
< 1.0	1.0	12.9	13.1	14.5
> 1.1	85.0	70.4	72.9	73.0
> 1.2	46.3	50.3	55.7	58.0
> 1.3	12.8	31.5	38.7	43.0
> 1.4	1.7	17.2	24.6	29.8
> 1.5	0.1	8.6	15.0	20.2
> 1.6	0.0	3.8	8.9	13.3

### Rough Rice

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

Threshold Prices	Months Forward			
	3	6	9	12
< 0.08	0.0	0.0	0.0	0.0
< 0.10	0.0	0.0	0.1	0.7
< 0.12	0.1	0.4	5.8	14.4
< 0.14	12.1	17.3	45.9	55.7
> 0.16	32.7	30.6	12.1	11.7
> 0.18	3.3	3.9	1.2	1.8
> 0.20	0.1	0.2	0.1	0.2
> 0.22	0.0	0.0	0.0	0.0
> 0.24	0.0	0.0	0.0	0.0
> 0.26	0.0	0.0	0.0	0.0
> 0.28	0.0	0.0	0.0	0.0

### Wheat

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

Threshold Prices	Months Forward			
	3	6	9	12
< 4	0.0	0.3	0.8	2.6
< 5	1.6	13.7	10.5	22.9
< 6	77.4	59.2	46.3	59.4
> 7	0.1	9.0	20.1	14.6
> 8	0.0	1.0	6.7	3.8
> 9	0.0	0.1	3.1	0.8
> 10	0.0	0.0	1.8	0.1
> 11	0.0	0.0	1.1	0.0
> 12	0.0	0.0	0.6	0.0
> 13	0.0	0.0	0.4	0.0
> 14	0.0	0.0	0.2	0.0

### Soybeans

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

Threshold Prices	Months Forward			
	3	6	9	12
< 8	0.0	0.0	0.3	2.6
< 9	0.0	0.1	3.2	8.6
< 10	0.0	1.6	14.0	23.3
< 11	0.1	10.3	35.8	45.9
< 12	5.8	32.1	61.5	68.5
> 13	53.4	40.4	19.1	15.7
> 14	8.9	17.8	7.6	6.6
> 15	0.5	6.3	2.7	2.5
> 16	0.0	1.7	0.8	0.8
> 17	0.0	0.4	0.2	0.2
> 18	0.0	0.1	0.0	0.1

### Soybean Meal

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

Threshold Prices	Months Forward			
	3	6	9	12
< 200	0.0	0.0	0.1	6.3
< 250	0.0	1.1	2.5	19.9
< 300	0.0	8.0	14.9	38.4
< 350	0.7	26.2	40.0	57.2
< 400	12.6	50.6	66.1	72.0
> 450	21.5	27.4	15.5	17.2
> 500	1.8	13.2	6.2	10.3
> 550	0.2	5.6	2.1	5.9
> 600	0.0	2.2	0.7	3.4
> 650	0.0	0.8	0.2	1.9
> 700	0.0	0.3	0.1	1.1

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

**WTI Crude Oil**

Price changes	Months Forward			
	3	6	9	12
-50%	0.0	0.0	0.5	0.0
-30%	0.1	2.0	5.3	6.6
-10%	19.3	23.0	34.2	44.4
+10%	19.9	16.3	16.2	17.5
+30%	1.1	1.8	2.3	3.3
+50%	0.0	0.4	0.5	0.4
+100%	0.0	0.0	0.0	0.0

**Brent Crude Oil**

Price changes	Months Forward			
	3	6	9	12
-50%	0.0	0.0	0.3	0.9
-30%	0.1	0.4	3.2	5.9
-10%	8.3	25.0	30.4	36.1
+10%	6.8	17.2	18.2	19.4
+30%	0.2	1.1	2.3	3.5
+50%	0.0	0.0	0.4	0.8
+100%	0.0	0.0	0.0	0.1

**U.S. Natural Gas**

Price changes	Months Forward			
	3	6	9	12
-50%	0.0	0.1	0.5	0.0
-30%	2.7	5.6	9.3	3.3
-10%	40.9	40.4	45.3	30.8
+10%	12.1	17.7	20.3	28.5
+30%	2.7	2.8	6.9	7.2
+50%	0.5	0.3	2.3	1.3
+100%	0.0	0.0	0.1	0.0

**Gasoline**

Price changes	Months Forward			
	3	6	9	12
-50%	0.0	0.0	0.0	0.0
-30%	0.0	0.1	0.8	5.1
-10%	5.8	8.6	19.1	40.1
+10%	8.3	39.1	29.1	17.7
+30%	0.0	2.2	3.9	2.7
+50%	0.0	0.1	0.4	0.3
+100%	0.0	0.0	0.0	0.0

**Copper**

Price changes	Months Forward			
	3	6	9	12
-50%	0.0	0.0	0.0	0.0
-30%	0.0	0.1	0.2	1.3
-10%	1.7	19.9	21.7	24.7
+10%	1.9	16.8	17.4	19.7
+30%	0.0	0.7	0.9	2.2
+50%	0.0	0.0	0.0	0.3
+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
-30%	0.0	0.7	1.3	2.5
-10%	5.1	14.8	26.9	30.2
+10%	5.7	15.3	24.9	26.5
+30%	0.0	1.4	4.0	5.7
+50%	0.0	0.2	0.4	0.8
+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	0.0	0.1
-30%	0.0	1.9	1.8	5.1
-10%	7.0	26.5	23.2	28.4
+10%	8.4	30.0	35.7	39.0
+30%	0.0	6.9	10.0	16.2
+50%	0.0	1.0	1.9	5.5
+100%	0.0	0.0	0.0	0.2

### Coffee

Price changes	Months Forward			
	3	6	9	12
-50%	0.0	0.0	0.1	0.6
-30%	0.0	1.3	2.5	4.1
-10%	8.1	24.0	22.4	22.9
+10%	10.5	29.5	36.8	41.3
+30%	0.0	5.8	11.6	16.4
+50%	0.0	0.7	3.6	6.3
+100%	0.0	0.0	0.4	0.8

### Rough Rice

Price changes	Months Forward			
	3	6	9	12
-50%	0.0	0.0	0.0	0.0
-30%	0.0	0.0	0.7	3.6
-10%	12.8	18.1	46.9	56.6
+10%	10.4	10.8	3.5	4.3
+30%	0.1	0.1	0.0	0.1
+50%	0.0	0.0	0.0	0.0
+100%	0.0	0.0	0.0	0.0

### Wheat

Price changes	Months Forward			
	3	6	9	12
-50%	0.0	0.0	0.0	0.0
-30%	0.0	0.4	0.9	3.1
-10%	7.1	21.5	16.1	30.3
+10%	4.4	25.1	38.7	28.7
+30%	0.0	3.1	11.0	7.4
+50%	0.0	0.2	3.8	1.3
+100%	0.0	0.0	0.8	0.0

### Soybeans

Price changes	Months Forward			
	3	6	9	12
-50%	0.0	0.0	0.0	1.0
-30%	0.0	0.3	6.0	12.9
-10%	6.4	32.9	62.2	69.1
+10%	1.2	8.5	3.6	3.3
+30%	0.0	0.2	0.1	0.2
+50%	0.0	0.0	0.0	0.0
+100%	0.0	0.0	0.0	0.0

### Soybean Meal

Price changes	Months Forward			
	3	6	9	12
-50%	0.0	0.3	0.7	12.5
-30%	0.1	12.9	22.4	45.1
-10%	19.4	54.2	69.4	73.9
+10%	1.9	13.7	6.4	10.5
+30%	0.0	2.7	0.9	3.9
+50%	0.0	0.4	0.1	1.4
+100%	0.0	0.0	0.0	0.1

## 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.



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