

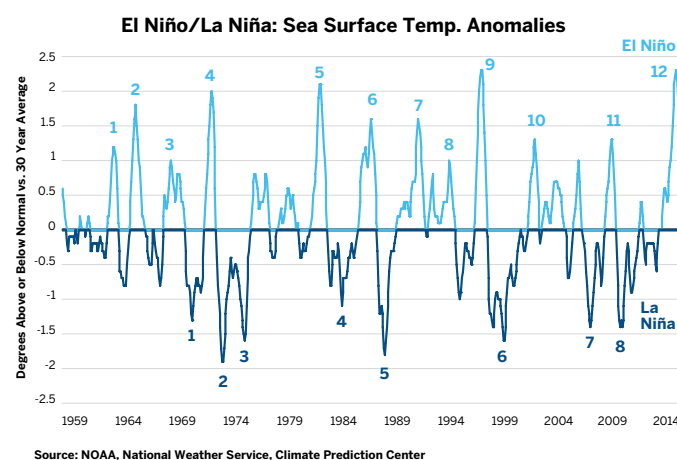
La Niña Can Spike Volatility in Ag Markets



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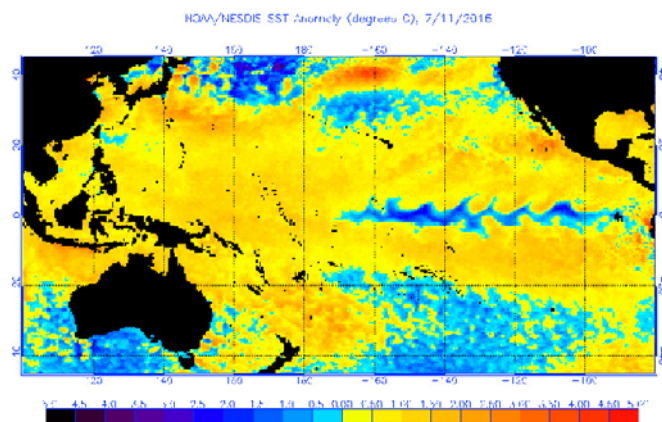
The El Niño of 2015-16 tied the one in 1997-98 as the strongest on record, with Central and East-Central Equatorial Pacific Ocean temperatures peaking at 2.3°C above seasonal norms (Figure 1). Since reaching their peak in December 2015, temperatures have begun to slide. In May, they averaged just 0.7°C above normal, and by July large patches of cooler-than-normal water had cropped up along the Equator on the Americas-facing side of the Pacific (Figure 2). This begs the question: Is the latest El Niño about to develop into a powerful La Niña? La Niña is associated with cooler, wetter conditions along the U.S.-Canadian border and warmer, drier conditions in much of the southern United States, and impacts weather patterns worldwide. Past La Niñas have roiled agricultural markets, sending crop prices on wild rides, with prices often moving lower amid exceptionally high levels of volatility.

Figure 1: The Most Recent El Niño Tied the 1997-98 Episode in Strength but is Rapidly Fading.



The risk of a La Niña is significant. If one looks at the past three El Niños that peaked at 2°C or more above normal, they all transformed into La Niñas within two years, and in one case (1972-73), in as little as six months.

Figure 2: Colder-Than-Normal Water Appearing Along Central, East-Central Equatorial Pacific.



Since 1959, the world has experienced eight significant episodes of La Niña and 12 significant episodes of El Niño. For the purposes of this paper, we consider an episode to be significant if the National Oceanic and Atmospheric Administration's (NOAA) Climate Prediction Center Oceanic Niño Index (ONI) falls to or below -1°C of normal in the case of La Niña, and rises to or above $+1^{\circ}\text{C}$ of normal in the case of El Niño.

Figure 3 shows what happened, on average, to the inflation-adjusted spot prices of agricultural goods in the 12 months after the past dozen El Niños and past eight La Niñas reached our significance threshold. The result is very clear: El Niño tends to be rather bullish for crop prices whereas La Niña tends to be rather bearish. Soy products (beans, oil and meal) have all tended to react more strongly to El Niños and La Niñas than most of the other agricultural goods.

However, it should be noted that among the eight previous episodes of La Niña there had been a wide variety of price responses from one episode to the next and from one product to another. This makes sense to us for several reasons. First, no two La Niñas are exactly like. Each one had a differing degree of intensity and a unique duration. Second, each La Niña had its own specific impact on temperatures and precipitation in the world's various crop growing areas. Finally, each La Niña occurred during its own set of economic circumstances. The most recent La Niña in 2010, for instance, occurred at a time when the U.S. Federal Reserve was initiating its (near) zero rates and quantitative easing policies. Commodity prices and equities markets soared in 2009 and 2010, taking the prices of most agricultural goods higher along with them despite whatever impact the La Niña might have had.

Figure 3: Real Spot Price Average Change in 12 months After El Niño/La Niña Crosses 1°C Threshold.

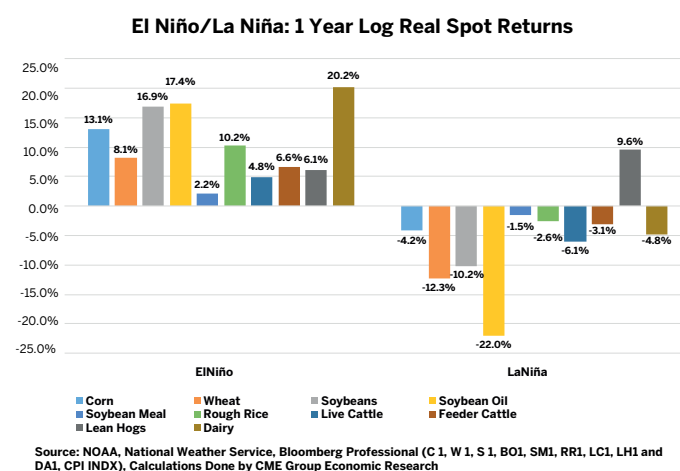


Figure 4: A Wide Variety of Outcomes From One La Niña to Another.
Change in Inflation Adjusted Spot Prices for 12 Months After a La Niña Passes -1°C Threshold

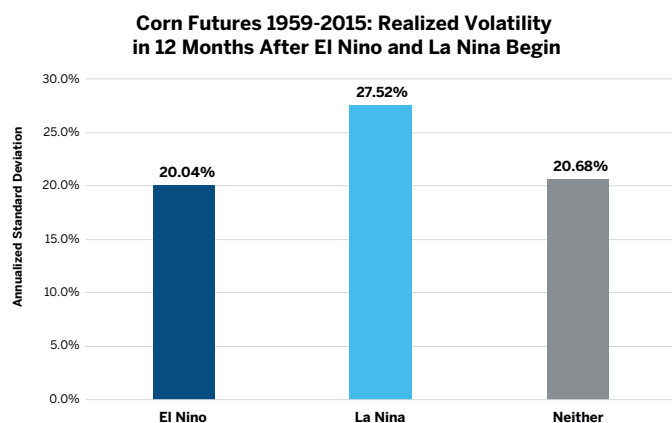
La Niña Episode Beginning In	Corn	Wheat	Soybeans	Soybean Oil	Soybean Meal	Rough Rice	Live Cattle	Feeder Cattle	Lean Hogs	Dairy
Jan '71	-28.3%	-5.7%	-0.9%							
Aug '73	6.7%	-18.6%	-22.1%				-28.5%	-65.6%		
Jul '75	-6.5%	-14.2%	7.9%				-20.5%	17.5%		
Dec '84	-10.7%	-4.4%	-15.6%	-26.2%			-8.7%	-7.7%		
Jun '88	-15.5%	-0.3%	-31.3%	-34.4%			-2.1%	8.9%		
Sep '88	1.1%	3.7%	-8.7%	-39.3%	10.1%	-49.0%	8.6%	14.8%	10.5%	-1.8%
Oct '07	8.7%	-45.2%	-11.0%	-14.3%	-8.9%	26.8%	-9.0%	-14.0%	-1.4%	-16.8%
Aug '10	10.8%	-13.4%	0.3%	4.4%	-5.8%	14.3%	17.5%	24.6%	19.7%	4.2%
Average	-4.2%	-12.3%	-10.2%	-22.0%	-1.5%	-2.6%	-6.1%	-3.1%	9.6%	-4.8%

Source: NOAA, National Weather Service, Bloomberg Professional (C 1, W 1, S 1, BO1, SM1, RR1, LC1, FC1, LH1 and DA1, CPI INDX). Calculations Done by CME Group Economic Research

To the extent that La Niñas follow on the heels of El Niños, some of the price declines that occur during the ensuing 12 months after a La Niña reaches -1°C below normal on the ONI might simply represent reversals of price increases that took place during the preceding El Niños. This should come as some comfort to those who are concerned about the possibilities of further price declines in the agriculture markets. For the most part, agricultural goods prices are already trading at low levels. Outside of soybeans and soymeal, for the most part, agricultural goods prices did not get a substantial boost out of the recent El Niño. Please see our recent study on the impact of the [2015-16 El Niño](#).

In addition to somewhat lower average prices, the other key feature of La Niña is exceptionally high levels of market volatility. Realized volatility during periods of La Niña have averaged about 1.5x the realized volatility level during neutral and El Niño periods for corn, soy and wheat. Here, too, however, there are wide varieties of volatility levels from one La Niña to the next. Generally speaking, the more intense the La Niña episode (the more negative the minimum reading on the ONI), the greater the degree of volatility in agricultural goods prices (Figures 5 through 10).

Figure 5: La Niña Often Implies an Exceptionally High Level of Corn Volatility.



Source: Bloomberg Professional (NOAAONI and C 1) for raw data with calculations from CME Group Economics

Figure 6: Stronger La Niñas Often Imply Higher Levels of Realized Corn Volatility.

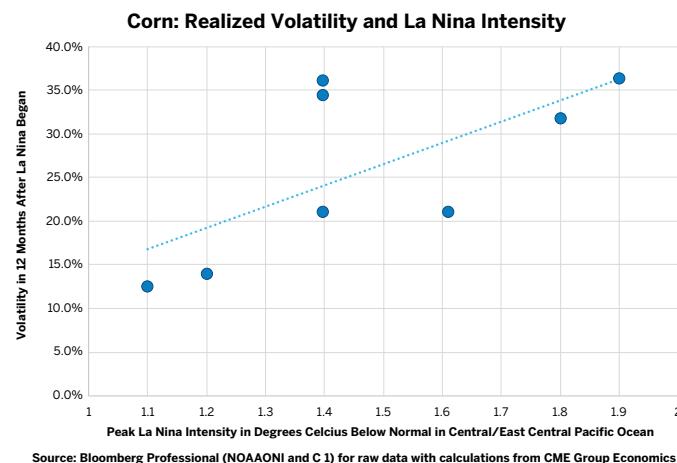
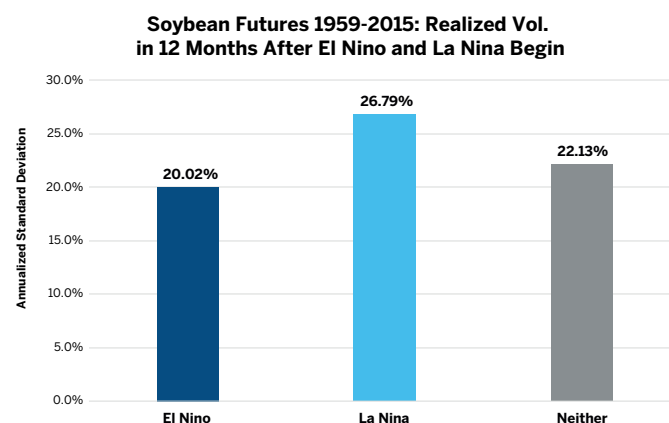
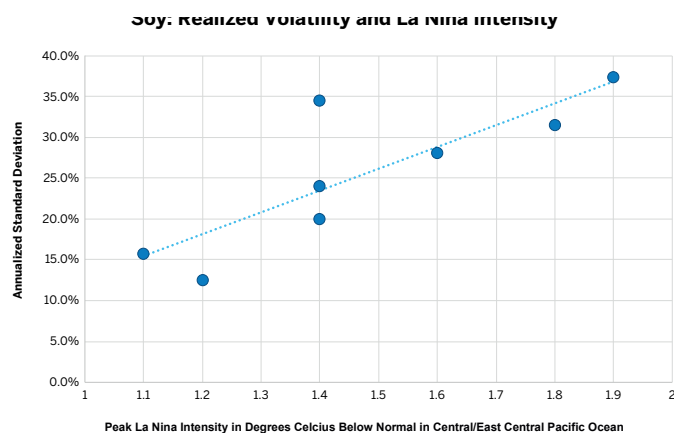


Figure 7: Soy Volatility Tends to be Exceptionally High During La Niña.



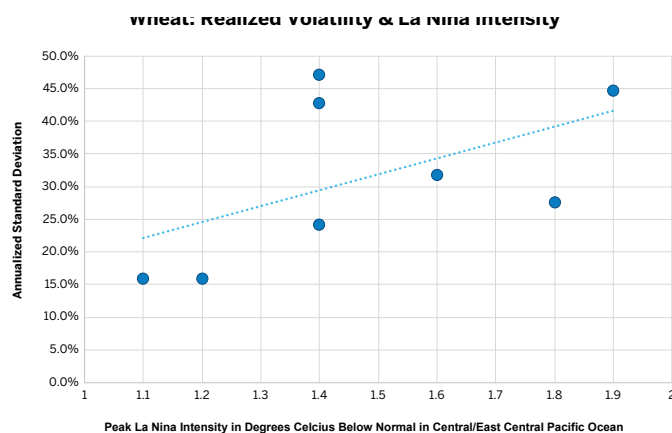
Source: Bloomberg Professional (NOAAONI and S 1) for raw data with calculations from CME Group Economics

Figure 8: The Stronger the La Niña, the More Likely an Exceptionally High Level of Soy Volatility.



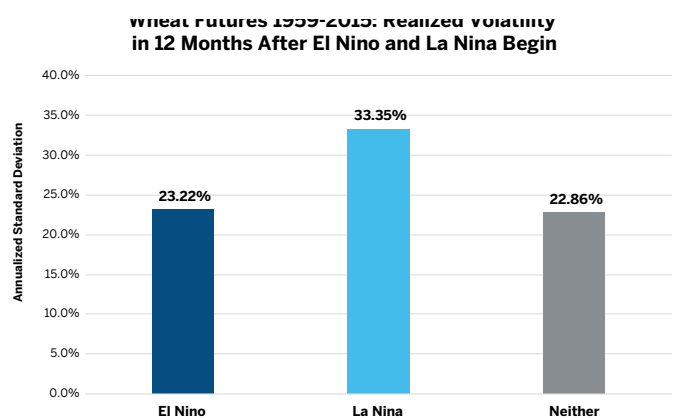
Source: Bloomberg Professional (NOAAONI and S 1) for raw data with calculations from CME Group Economics

Figure 10: The Stronger the La Niña, the More Likely Exceptionally High Realized Wheat Volatility.



Source: Bloomberg Professional (NOAAONI and S 1) for raw data with calculations from CME Group Economics

Figure 9: Wheat Also Tends to be Exceptionally Volatile During La Niñas.



Source: Bloomberg Professional (NOAAONI and W 1) for raw data with calculations from CME Group Economics

Bottom Line:

- Past La Niñas have tended to be bearish for crop prices, but there has been a wide variety of responses from one episode to the next.
- Crop prices are already fairly depressed, so if a La Niña develops there is no guarantee that they will fall further.
- La Niña tends to correlate with exceptionally high levels of volatility in agricultural goods markets that far outpace realized volatility experienced during El Niños, and neutral periods, when the ONI is between -1°C and +1°C of its seasonal normal.
- Generally speaking, the stronger the La Niña, the higher the degree of volatility in agricultural goods markets.

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