



# The Impact of Public Information on Commodity Market Performance: The Response of Corn Futures to USDA Corn Production Forecasts

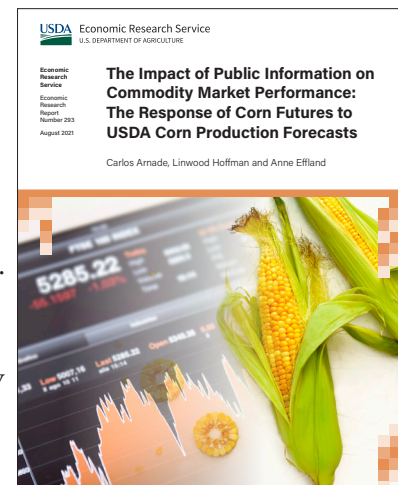
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## What Is the Issue?

The U.S. Department of Agriculture (USDA) releases its *World Agricultural Supply and Demand Estimates (WASDE)* report monthly, which contains projections of numerous agricultural variables, such as expected production and stocks. Over the past five decades, various studies have tested whether publicly releasing *WASDE* reports influences an agricultural commodity's futures price. Some previous studies have found *WASDE* reports can influence the expected volatility of a commodity's futures price, and most studies agree these reports do ultimately impact a commodity's futures price. Although these findings are important, these studies often fail to identify which variables projected by USDA are primarily responsible for futures market impacts. Currently, no study has attempted to determine how the accuracy of USDA projections can affect futures market prices. Another overlooked issue is whether USDA projections are a better or worse predictor of harvest prices for a particular commodity. This issue remains a concern for thousands of market participants using the futures price to make decisions. Finally, previously conducted studies evaluated projections from 1 or 2 specific months of the year. By doing so, these evaluations fail to relate the projections' impact to USDA's changing projections as information improves over the cropping season.

## What Did the Study Find?

This study found USDA corn-output projections are a crucial variable in influencing corn futures. USDA corn-production projections significantly impact corn futures, even when accounting for the impact of other *WASDE* projections, such as projected stocks, consumption of the commodity, and season average prices. The magnitude of the projection's impact varies across the calendar year. August and September reports have a stronger influence on prices than reports from earlier in the cropping season. Additionally, this study found USDA corn-production projections influence the market's daily variance of corn futures, represented in this report as the differences between the daily high price and daily low price.



ERS is a primary source of economic research and analysis from the U.S. Department of Agriculture, providing timely information on economic and policy issues related to agriculture, food, the environment, and rural America.

Errors in past USDA corn-output projections have had small yet statistically significant effects, which shape more recent USDA projections on corn futures prices. Notably, this study shows that USDA projections—on average—drive the futures price closer to the actual October harvest price. For example, over a 19-year period, corn futures in May are, on average, 1.01 percent closer to the harvest price than they would have been without the release of USDA's *WASDE* report. Additionally, USDA projections bring the futures price in June 4.18 percent closer to the October harvest price. In July, USDA projections have a neutral impact; in August, the projections bring corn futures 1.11 percent closer to the harvest price; and in September, the projections bring corn futures 3.56 percent closer to the harvest price.

Moreover, this report shows how the release of USDA's *WASDE* report dissimilarly influences different representations of the daily future prices. Impacts on the daily open price are distinct from the daily closing price. Notably, impacts on the daily high price are distinct from impacts on the daily low price. Finally, this study shows the USDA's influence on corn prices remains embodied in corn futures for several days after the release of USDA's *WASDE* report.

## How was the Study Conducted?

Daily corn futures were regressed on several explanatory variables. Two explanatory variables were used to represent USDA projections. These included a dummy variable set equal to zero for most days of a month and one variable on the day of USDA's *WASDE* announcement. There were other variables—such as daily lags—which included a second, third, and fourth zero/one variable to test impacts over several days after the report's release.<sup>1</sup>

The regressions estimated in this report differed from previous literature by including a second variable to represent USDA projections: USDA projected corn output. The USDA projection variable was also set equal to zero until the day of the release and was then represented by the difference between the new USDA projection and the projection issued in the previous month. For example, in testing the impact of the August projection on corn futures, we used the difference between USDA's August projection of annual corn output and the projection made in July. In effect, we tested the impact of new USDA information on corn's futures-price projections.

Data for each month were used to estimate a separate model; that is, separate models were estimated for the days in May, separate models were estimated for the days in June, and so on, through October. Creating specific monthly models is consistent with methods used in previous studies. Each of the 6 month-specific models consisted of daily data from 1999 to 2017.<sup>2</sup> We also analyzed subperiods of fewer years. By deriving the relationship between corn futures and USDA's corn output projections, we estimated which of the projections' impact makes corn futures a better or worse predictor of the October harvest price.

We also included a 3-year weighted average of output projection errors from preceding years in our model (e.g., for our 2004 observation, we used errors from 2001, 2002, and 2003). These errors represented the difference between USDA projections from the month in question and that year's actual output of corn. This setup allowed us to test if the accuracy of past errors influenced the impact that current projections have on corn futures.

Unlike earlier USDA impact studies, this study measured the difference in USDA's impact on the daily high futures price and daily low futures price to calculate USDA impacts on the variability of the daily futures price. In one trial we conducted, the model tested and measured USDA's impact on both the level of corn futures and the daily variability of corn futures.

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<sup>1</sup>Two months of model data were pretested for random breaks in futures prices. In doing so, ERS found no indication that markets anticipate a *WASDE* release.

<sup>2</sup>One table in this report uses data from 1992 to 2017.