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by

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The Information Content of The WASDE Report and Intra-Day Price Reactions

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Abstract

An important role of the futures market is to synthesis information into price signals. The efficient market hypothesis predicts that information will be incorporated into the futures price instantly and there will be no opportunity for arbitrage. This study aims to test this immediacy assertion in agricultural commodity markets after the release of the World Agricultural Supply and Demand Estimates (WASDE) report. We leverage intra-day futures price data for corn and soybeans in an event study framework to estimate price reactions at progressively larger intervals from the report release time. We find significant and directionally appropriate price reactions 30 minutes after the report release time. Further, we find that the price reaction for soybeans continues to increase after 30 minutes. These results have implications for understanding market efficiency. This information may also be useful for traders to develop profitable strategies around report releases.

Keywords: Futures Markets, Corn, Soybeans, WASDE, Market Information

Introduction

Commodity futures markets absorb, synthesize, and communicate market information through price signals (Tomek & Gray, 1970). This is one of the major sources of value that these markets provide to the industry. Every trader has a different set of information and expectations about the underlying supply and demand conditions for each commodity and places trades based on that information. Those trades reveal the individual's best forecast about the value of the commodity on the delivery date. In aggregate, the futures price represents a composite of the best forecasts of the individual traders. The key here is that information drives markets and individuals with better private information may profit from that information. However, public information is also a vital driver of futures markets as well. The canonical assumption about public information is that it is instantly incorporated into the market, thus removing any opportunity for profit. This rapid incorporation eliminates any predictable patterns or discrepancies that traders could exploit. However, in practice, prices move as a result of new information precisely because individuals place trades. Therefore, the first responders to public information can exploit the information for profit. But how quickly does a trade need to be placed to be an early mover exploit the information driven market reaction? Lehecka et al., (2014)suggest that market reactions happen quickly and are completed within about 10 minutes.

This study aims to test this immediacy assertion in agricultural commodity markets after the release of the World Agricultural Supply and Demand Estimates (WASDE) report. By examining the immediate price reactions of corn and soybeans, this study seeks to determine how quickly the markets incorporate the new information contained in the report. Specifically, we focus on the world ending stocks for these commodities. The findings will provide insight into the efficiency of these markets and whether they conform to the predictions of the efficient market hypothesis.

We leverage intra-day futures price data for corn and soybeans in an event study framework to estimate price reactions at progressively larger intervals from the report release time. We measure the new information by taking the difference between average analyst projections and the true WASDE ending stocks number. The analyst projections serve as a proxy for pre-report market expectations. Therefore, the difference is new information for the market.

By examining price changes at multiple intervals, we can identify patterns of adjustment and gauge the speed at which information is absorbed.

We do not find a significant market reaction within the first ten minutes after the report release time. However, we do find significant and directionally appropriate price reactions after 30 minutes. Furthermore, the price reaction continues to grow for soybeans between 30 minutes and the daily close. This extended adjustment period indicates that while the market quickly incorporates some information, additional factors or a deeper analysis may cause further price shifts beyond the immediate reaction. For soybeans, this could mean that traders take longer to fully digest the implications of the WASDE report. The continued increase in prices suggests that the market's initial response is refined and adjusted as participants reassess their positions and incorporate additional insights, pointing to a more complex process of information assimilation.

These results have implications for understanding market efficiency. The findings suggest that the process of fully incorporating this information can extend 30 minutes or longer. This result challenges the strict interpretation of the efficient market hypothesis and some previous literature. By measuring the dynamics of price adjustments, this study contributes to a more complete understanding of how information is absorbed into futures prices. This information may also be useful for traders to develop profitable strategies around report releases based on previous patterns of price adjustment.

Methods

In this study we use an event study approach to measure the nearby futures price response to an information shock in the WASDE report. The information shock is measured by,

$$News_{it} = \frac{1}{n}\sum_{j}\left(Ln\left[\frac{WASDE_{it}}{Forecast_{jit}}\right]\right). \quad (1)$$

Where $News_{it}$ is information that is new to the market for commodity *i* at time *t*, $WASDE_{it}$ is the world ending stock number projection from the report, and $Forecast_{jit}$ the analyst projection from analyst *j*. The price reaction is measured by,

$$PriceChange_{wit} = Ln\left[\frac{Close_{wit}}{Open_{wit}}\right]. \quad (2)$$

Where $PriceChange_{wit}$ is the returns over time window *w* for commodity *i* at time *t*, $Close_{wit}$ is the nearby futures price at the end of the time window, and $Open_{wit}$ is the nearby futures price at the beginning of the time window. The time window began when the WASDE report was released or the opening price if the report was released before the market opened. For this paper we chose time windows of 10 minutes, 30 minutes, and the report day close.

The regression model for our event study is,

$$PriceChange_{wit} = \beta_0 + \beta_1 News_{it} + \delta Qtr_t + \gamma EarlyRelease_t + \varepsilon_t. \quad (3)$$

Where, $PriceChange_{wit}$ and $News_{it}$ are defined above, Qtr_t is the quarter of the year that the report is released, and $EarlyRelease_t$ is a dummy to address the change in timing of the WASDE release. The main result of interest is simply β_1. We expect the sign to be negative because positive supply news will decrease prices. We estimate the model separately for each of the various time windows. Estimation was accomplished using seemingly unrelated regression (SUR) with an equation for each commodity.

Data

The data for this research was collected from Bloomberg reports on private analyst projections for world ending stocks, the USDA WASDE world ending stocks projections, and CME nearby futures prices for corn and soybeans. The data in out study spans from 2010 to 2021. Summary statistics are contained in Table 1.

Table 1: Summary Statistics

Statistic	N	Mean	St. Dev.	Min	Max
Corn News	122	0.013	0.074	-0.145	0.658
Soybean News	122	0.001	0.029	-0.070	0.110
Wheat News	122	0.010	0.024	-0.046	0.131
Early Release	122	0.262	0.442	0	1
10 Min Returns Corn	122	-0.001	0.015	-0.075	0.047
10 Min Returns Soybeans	122	-0.001	0.010	-0.054	0.023
30 Min Returns Corn	122	0.000	0.016	-0.062	0.049
30 Min Returns Soybeans	122	-0.001	0.011	-0.045	0.029
Day Returns Corn	122	0.001	0.022	-0.063	0.059
Day Returns Soybeans	122	0.001	0.018	-0.066	0.065

In Figure 1 below, we plot the news variable for our two commodities in the study. A few outliers that are beyond the axis limits are missing from the plot. Figure 2 shows the unconditional distribution of returns at different time intervals. The distribution obviously widens with larger time windows.

Figure 1: News Variable for Corn and Soybeans

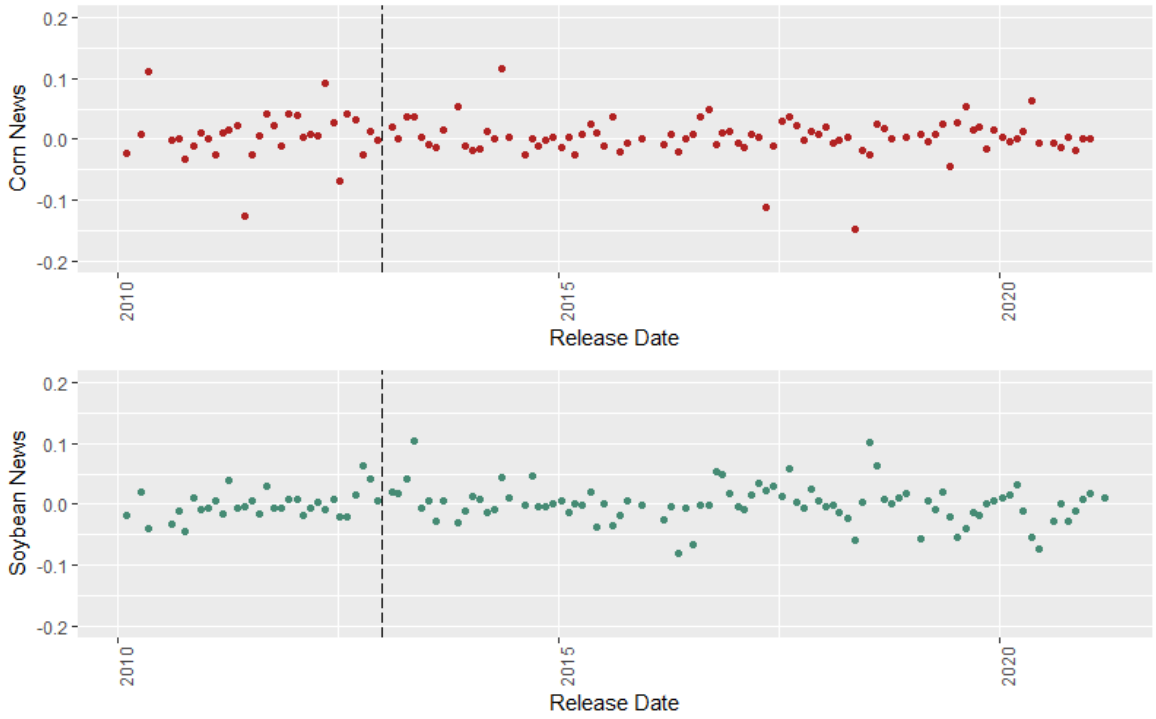
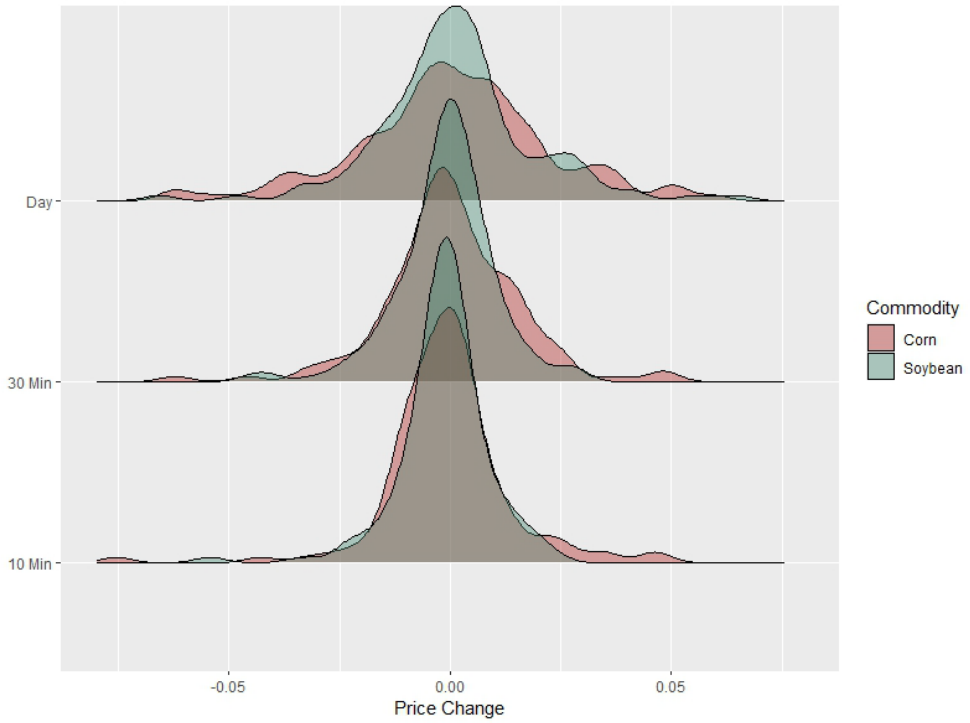


Figure 2: Distribution of Price Changes for Each Time Window



Results

The results of the regression analysis are presented in Table 2. Only the estimates for β_1 are reported here. Each column represents a different time window of futures price returns after the report release. Neither corn nor soybeans have significant price reaction within 10 minutes of the report release. However, both have significant price reactions after 30 minutes of the release. By the end of the release day, the corn reaction doesn't change much but the soybean price reaction grows after 30 minutes. All of the coefficients have the appropriate sign that corresponds with economic theory.

Table 2: Regression Coefficients for Event Study

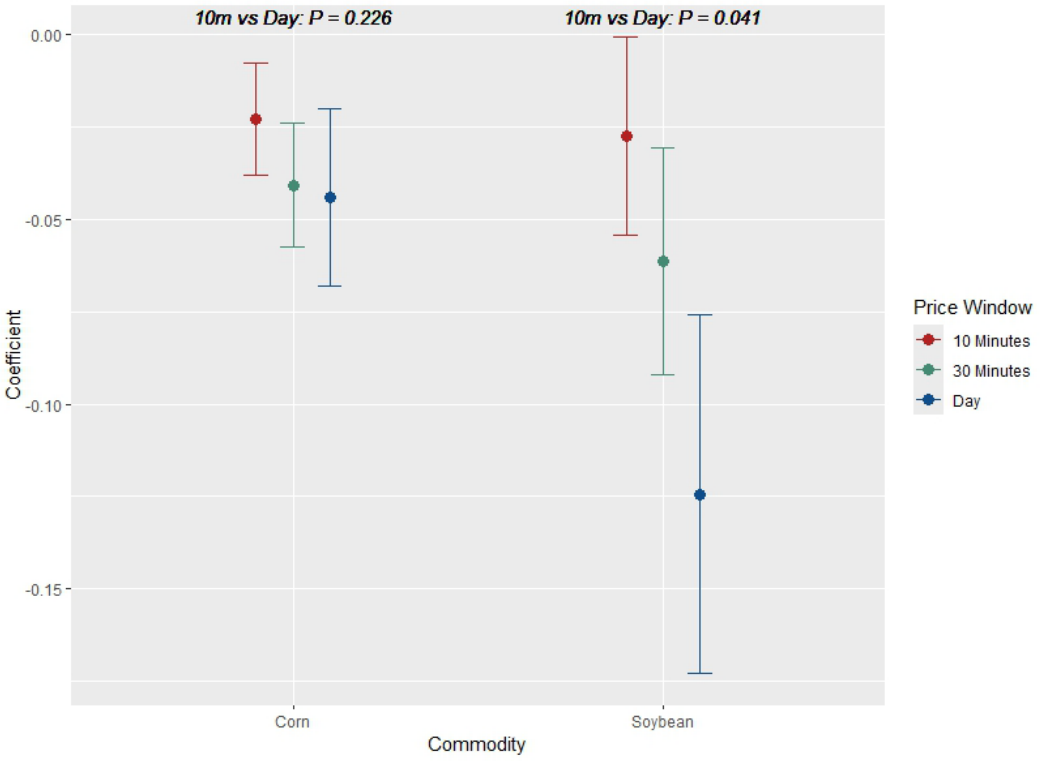
	10 Min	**30 Min**	**Day**
Corn News	-0.023	-0.041**	-0.044*
	(0.015)	(0.017)	(0.024)
Soy News	-0.028	-0.061**	-0.124**
	(0.027)	(0.031)	(0.049)

* p < 0.1, ** p < 0.05, *** p < 0.01

We visualize the coefficient estimates in Figure 3. We also include a test for the difference of the 10-minute vs the day coefficient. This figure makes it clear that corn adjusts very little past the initial 30-minute time window. However, soybeans see significant adjustment after the initial 30-minute window. In fact, the difference between the 10-minute coefficient and the 30-minute coefficient is smaller than the difference between the 30-minute coefficient and the day coefficient. The 10-minute coefficient and day coefficient are statistically different from one another for soybeans only.

These results confirm that the WASDE report provides new information that significantly impacts commodity futures prices. The market reactions are consistent with the expectation that positive supply news leads to a negative price shock. The differences in the speed and magnitude of price adjustments between corn and soybeans highlight the varying market dynamics for these commodities.

Figure 3: Coefficient Estimates for News on Prices Changes by Time Window



Discussion & Conclusion

The results of this analysis suggest that the USDA WASDE report contains information on world ending stocks that is new to the market, as prices react in an appropriate direction in response to our measure of 'news'. Moreover, the new information takes some time to become incorporated into the price. The process appears to happen more rapidly for corn than for soybeans. Notably, the 10 minute and full day coefficients are statistically different from each other for soybeans. These results are in contrast to some existing literature and a strict interpretation of the efficient market hypothesis.

Future studies could extend this analysis by examining a longer time frame, including more observations, and incorporating additional commodities. Another avenue for research is exploring the impact of dispersion in pre-report analyst estimates on the speed and magnitude of price reactions. Such studies could provide deeper insights into the market's information processing dynamics and help refine trading and hedging strategies.

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