THE REACTION OF CORN FUTURES PRICES TO U.S. AND BRAZILIAN CROP REPORTS

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ABSTRACT

The purpose of this work is to investigate the impact of the U.S. (WASDE) and Brazilian (CONAB) crop report releases on CME corn futures return volatilities and trading volume. Using an intraday announcement effect analysis, we evaluate the volatility and volume reactions to the release of the crop reports. For every minute (between 15 minutes pre-report and 60 minutes post-report release), returns and volumes on report days (WASDE and CONAB) were compared with pre- and post-report five days. Using parametric and non-parametric tests, results show a strong effect of WASDE report releases. For CONAB, return volatility reactions were verified on the days of the announcements, but much smaller than the effects observed on WASDE reports days.

Keywords: corn, price reaction, crop reports.

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INTRODUCTION

Information on the evolution of grain crops, including projections of crop acreage, harvested areas, yields, and other production data, has been provided by government agencies in important producing countries, such as the U.S. Department of Agriculture (USDA) and the Brazilian Food Supply Company (CONAB). These reports are published periodically, providing new information to the marketplace and generally influencing the decision-making of different agents involved in the supply chain.

Several studies have already investigated the reaction of different reports on grain markets. Most of them have explored the price response to USDA reports using event study methodology. Overall, results have indicated the existence of market price response to the release of USDA reports, suggesting that these reports have informational value (Colling et al, 1996; Isengildina-Massa et al., 2008 and 2020; Lehecka et al., 2014; Joseph and Garcia, 2018; Karali et al., 2019 and 2020; Cao and Robe, 2022; McKenzie, A. M. and Ke, 2022).

Focusing on the corn market, Brazil and the United States are the world's main exporters. Brazilian corn production expanded around sixfold between 1980 and 2023, reaching around 5.19 billion bushels in 2022-23. During this period, the total corn planted area in Brazil rose from around 30 million acres to 55 million acres, while yield increased from 28 to around 94 bushels/acre. Brazil's corn exports more than doubled between 2012/2013 and 2022/2023, when the country was the largest exporter. Considering the relevant share of Brazilian corn exports, information on the country's harvest has become increasingly relevant to market participants for decision-making purposes.

The growth of Brazilian corn production is partly explained by its capacity to harvest three crops per year. The first corn ("summer crop") is harvested throughout the country from late January to April. The second crop ("winter crop") is mostly harvested in the central-west and southeast regions from June to August. The winter crop increased from 0.303 billion bushels in 2004-2005 to 4.03 billion bushels in 2022-2023 and represented about 77.6% of Brazilian total production (CONAB, 2023). At last, the production of the third

crop is more recent and smaller (less than 2% of the total crop in 2022-2023) and harvested mostly in northeastern Brazil between October and December.

Due to methodological differences[1] and unstable weather conditions, along with the aforementioned changes in corn production in Brazil, the USDA and CONAB crop estimates have presented significant differences over the last years. The average difference between the USDA and CONAB's estimates for Brazil's corn production was around 11 million bushels during the period 2000-2023. However, the difference between the two agencies' estimates increased substantially. The average difference has grown from 12 billion in the 2010s to around 100 billion in the 2020-2023 period (CONAB, 2023; USDA, 2024).

In this context, the purpose of this study is to analyze the impact of crop reports released by the USDA and CONAB on prices in the CME corn futures market. The trading volume reactions are also evaluated. We adopt an event study method to investigate the announcement effect of CONAB and USDA reports. The data set consists of crop reports and high-frequency corn futures prices and volumes from the CME Group between 2018 and 2024. We explore how prices and trading volume react immediately after the announcement of the reports. In addition, as USDA and CONAB reports are usually not released on the same day and time, it will be possible to compare the reaction of prices and volumes to the announcement of each agency.

This study can provide new insights into how new information from USDA and CONAB crop reports influence the price and trading dynamics in the corn futures market. Results should offer relevant information for marketing and risk management strategies adopted by market participants. In addition, findings from this study may also be useful to evaluate the importance of public data to commodity markets in a scenario of budget reductions within federal governments and increasing participation of the private sector in the collection of market data.

[1] While USDA reports also offer information about Brazilian crops, the data collection and methodologies differ from those of CONAB (Mattos and Silveira, 2016). CONAB employs a multifaceted approach encompassing field surveys, remote sensing techniques, georeferenced data, satellite positioning, and statistical models to formulate forecasts for the Brazilian grain harvest. In contrast, the Brazilian crop assessments released by the USDA are based on information gathered by overseas posts of the Foreign Agricultural Service (FAS) Attachés, supplemented by data from various sources globally, including private and public entities, satellite imagery, and meteorological data, among others.

REPORTS AND PRICE DATA

The dataset used in this study consists of USDA and CONAB crop reports and corn futures prices. For USDA reports, The World Agricultural Supply and Demand Estimates (WASDE) monthly releases prepared by the World Agricultural Outlook Board (WAOB) were considered. WASDE reports provide crop production forecasts and supply and demand balances in the U.S. and globally. On the other hand, CONAB monthly reports provide information about Brazilian corn crops. The analysis considers the announcement of all reports from April 2018 to Apr 2024. During this period (73 months), 72 WASDE and 73 CONAB reports were released – Table 1.

Table 1. Report release dates between April 2018 and April 2024.

Year	WASDE report release date	CONAB report release date
2018	January 12th, February 8th, March 8th, April 10th, May 10th, June 12th, July 12th, August 10th, September 12th, October 11th, November 8th, and December 11th.	April 11th, May 10th, June 12th, July 10th, August 9th, September 11th, October 11th, November 9th, and December 11th.
2019	January 11th, February 8th, March 8th, April 9th, May 10th, June 11th, July 11th, August 12th, September 12th, October 10th, November 8th, December 10th.	January 10th, February 12th, March 12th, April 11th, May 9th, June 11th, July 11th, August 8th, September 10th, October 10th, November 13th, December 10th.
2020	January 10th, February 11th, March 10th, April 9th, May 12th, June 11th, July 10th, August 12th, September 11th, October 9th, November 10th, December 10th.	January 8th, February 11th, March 10th, April 9th, May 12th, June 9th, July 8th, August 11th, September 10th, October 8th, November 10th, December 10th.
2021	January 12th, February 9th, March 9th, April 9th, May 12th, June 10th, July 12th, August 12th, September 10th, October 12th, November 9th, December 9th.	January 13th, February 11th, March 11th, April 8th, May 12th, June 10th, July 8th, August 10th, September 9th, December 9th.
2022	January 12th, February 9th, March 9th, April 8th, May 12th, June 10th, July 12th, August 12th, September 12th, October 12th, November 9th, December 9th.	January 11th, February 10th, March 10th, April 7th, May 12th, June 30th, July 1st, July 7th, August 11th, September 8th, October 6th, November 9th, December 8th.
2023	January 12th, February 8th, March 9th, April 11th, May 12th, June 9th, July 12th, August 11th, September 12th, October 12th, November 9th, December 8th.	January 12th, February 8th, March 9th, April 13th, May 11th, June 13th, July 13th, August 10th, September 6th, October 10th, November 9th, December 7th.
2024	January 12th, February 8th, March 8th, April 11th	January 10th, February 8th, March 12th, April 11th

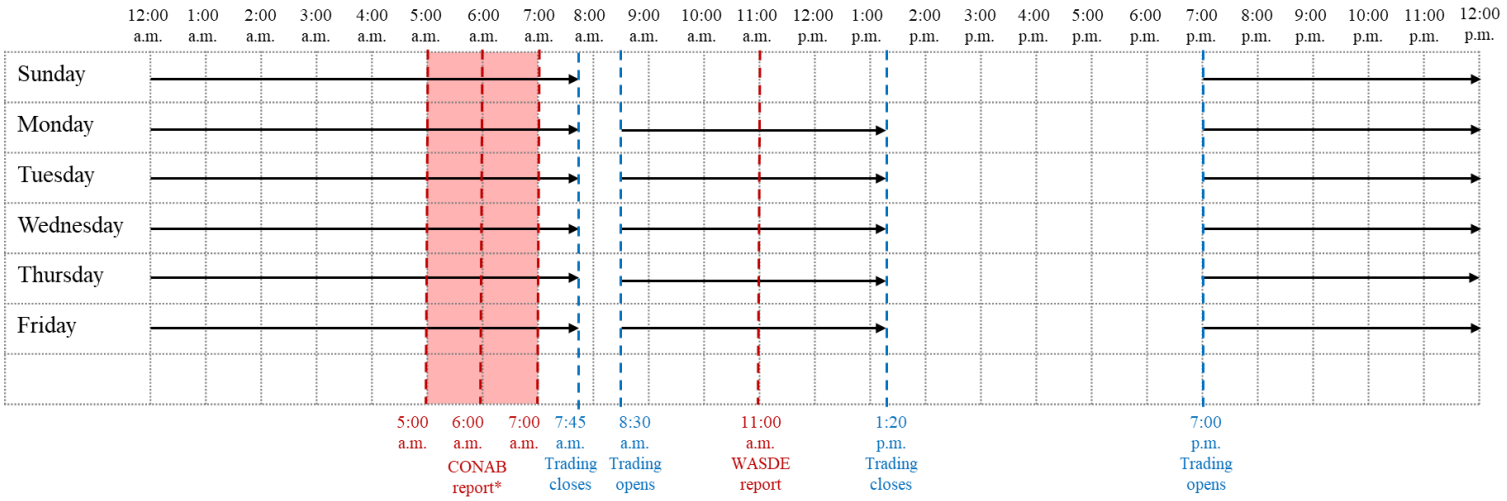
The announcements of the reports coincided in 25 months. CONAB released its report before the USDA in 30 days when the average time lag between releases was 2.4 days (median equals 1.5 days). Conversely, there were 16 days in which the USDA released its report before CONAB – the average time lag between announcements was 3.4 days (median equals 2.0 days) – Table 2.

Table 2: The time lag between the WASDE and CONAB report releases.

	CONAB before WASDE	WASDE before CONAB
Average (days)	2.4	3.4
Median (days)	1.5	2.0
Maximum (days)	1.0	20.0
Minimum (days)	11.0	1.0
SD (days)	2.2	4.6
Obs. (months)	30	16

While the WASDE reports are released at 11:00 am CST, the CONAB announcements occur between 5:00 am and 7:00 am CST, depending on daylight saving time in both Brazil and the U.S. – Figure 1.

Figure 1. Trading hours for corn futures contracts in the CME group and WASDE and CONAB report release time between April 2018 and April 2024



* Note: the release time of CONAB reports varies between 5 a.m. and 7:00 a.m. because of the daylight savings time in Brazil and the U.S.,

For price and volume data, we used corn intraday futures prices and volumes per minute, taking into account the nearest-to-maturity CME contracts from electronic trading between April 2018 and April 2024. Nearby corn futures contracts were considered because, in general, they exhibit higher trading volumes and liquidity (Karali, 2012;

Isengildina-Massa et al., 2008; Lehecka et al., 2014). The trading hours for corn futures contracts in the CME Group are Sunday - Friday, between 7:00 p.m. and 7:45 a.m. CST, and Monday - Friday, between 8:30 a.m. and 1:20 p.m. CST – Figure 1.

Corn returns were calculated using the last price per minute – equation (1).

$$R_{m,d} = ln\left(P_{m,d}/P_{m-1,d}\right) \times 100 \quad (1)$$

Where $P_{m,d}$is the last price of the nearby corn futures contract in each 1-minute interval m (m = 1, …, 1440) in a trading day (d = 1, …, D).

In addition, we used the average absolute deviation as a measure of volatility – equation (2).

$$AAD_m = \frac{1}{D}\sum_{d=1}^{D}\left|R_{m,d} - Med_m\right| \quad (2)$$

Where, Med_m is the median of $R_{m,d}$ in the minute m.

Table 3 shows the descriptive statistics for returns and volumes. We calculated the minute-to-minute returns using the last price of the nearby futures contract for the period between April 2018 and April 2024.

Table 3. Descriptive statistics of intraday returns and volumes for the nearest-to-maturity CME corn futures contracts (April 2018 – April 2024).

	Returns [a]	*Volumes*
Mean (%)	0.000021	117.006416
Median (%)	0.000000	22.000000
Minimum (%)	-4.300000	1.000000
Maximum (%)	3.960000	26,214.000000
Std. Deviation (%)	0.084578	312.679621
Skewness	1.471773	12.373176
Kurtosis	372.130938	378.558373
Jarque-Bera stat.	319.9582 10^6 *	709.64753 10^6 *
Observations (n)	1,183,413	1,183,413

Notes: [a] Returns are computed following equation (1). * Significant at the 1% level.

Table 4 presents the comparison between the mean, median, and standard deviation of the returns on report and non-report days. The return volatility and tranding volume, on

the days with reports (WASDE and CONAB), were higher than on days without report releases (pre-/post-report days). Moreover, the return variability and volume levels on WASDE report days were significantly greater than on CONAB report days.

Table 4. Descriptive statistics of intraday returns and volumes for the nearest-to-maturity CME corn futures contracts (April 2018 – April 2024), considering the report and the non-report days.

	WASDE report days	WASDE non-report days	CONAB report days	CONAB non-report days
Return				
Mean (%)	0.000021	0.000022	0.000350	0.000005
Median (%)	0.000000	0.000000	0.000000	0.000000
Std Dev. (%)	0.084578	0.071761	0.067217	0.072663
Obs.	55,448	1,127,965	56,473	1,126,940
Comparison between report days and non-report days [a]				
t Stat	-0.002892		1.182188	
W Stat	312.4323 10^8		318.4842 10^8	
F Stat	1.389116 *		1.168592 *	
Comparison between WASDE report days and CONAB report days [a]				
t Stat	-0.718805			
W Stat	15.6303 10^8			
F Stat	1.583271 *			
Volume				
Mean	159.58058	114.913574	132.860305	116.211949
Median	23	22	23	22
Std Dev.	485.218848	23024	372.829279	309.336668
Comparison between report days and non-report days [a]				
t Stat	21.473809 *		10.43319 *	
W Stat	322.6229 10^8 *		321.6776 10^8 *	
F Stat	2.589847 *		1.452664 *	
Comparison between WASDE report days and CONAB report days [a]				
t Stat	10.317189 *			
W Stat	15.9686 10^8 *			
F Stat	1.693773 *			

Notes: * Significant at the 1% level.

[a] To test if returns and volumes are equal for report days and pre-/post-report days, we used *t* and Wilcoxon tests. In addition, to test the equality of variance, *F* tests were applied.

RESEARCH METHOD

The empirical analysis of this study is based on the theory of efficient markets. Since futures prices represent the conditional expectation of spot prices at the maturity date of the contract, if crop reports influence the perception of market participants regarding the supply and demand conditions of a specific commodity, it is expected a spike in futures return variability on the release of the reports. Under semi-strong market efficiency, futures prices instantaneously react to the announcements (Isengildina-Massa et al., 2008; Lehecka et al., 2014).

To evaluate the price and volume reactions to the release of reports in the corn futures markets, we used an intraday announcement effect analysis, following Lehecka et al. (2014) and Joseph and Garcia (2018). We compared minute-to-minute returns from electronic trading platforms when reports were released with those for the same time of the day on pre- and post-announcement days.

Volumes were obtained and returns were calculated from 15 minutes before the report was released to 60 minutes afterward[2], i.e. 75-minute intervals. For WASDE reports (released at 11:00 a.m. – Figure 1), the first (last) data was obtained at 10:46 a.m. (12:00 p.m.). On the other hand, for CONAB reports (in general, released at 7:00 a.m.), the first (last) data was computed at 6:46 a.m. (8:00 a.m.).

In addition, for each report release (by WASDE and CONAB), we obtained intraday returns and volumes per minute for five trading days before and five trading days after the release date. It was considered the same time window as the days on which the reports were released. This procedure is in line with previous studies, such as Joseph and Garcia (2018), Lehecka et al. (2014), and Isengildina-Massa et al. (2008a). That is, for every minute ($m = 1, \ldots, 75$), 72 returns and volumes for WASDE (and 73 returns and volumes for CONAB) observed on report days were compared with 720 pre- and post-report days. Parametric non-parametric tests were used to investigate the difference in return volatility and volume for report and non-report days. For returns, to test the variance (absolute returns), we used the two-tailed F test (the Kruskal-Wallis χ^2 test). For volume, to test if volumes are equal on report days and pre-/post-report days, we used t and Wilcoxon tests.

[2] Previous studies found evidence that market participants in the corn futures market adjust their positions during this interval (Kauffman, 2013; Wang and Garcia, 2014; Joseph and Garcia, 2018). Kauffman (2018) indicated that, in general, the impact on volatility is observed 30 to 60 minutes after the USDA announcement.

RESULTS

We tested the impact of the WASDE and CONAB's report announcements on minute-to-minute return volatility and volume using parametric and non-parametric tests – Tables 5, 6, and 7. All tables show the test results starting with periods 15 minutes before the time of the announcements ($t - 15$), at the announcements (minute marker = 0), and every minute after that for 60 more minutes ($t + 60$).

Table 5 shows the test results, considering return volatility variability. We used the two-tailed *F* tests to evaluate if returns variability for report days and pre-/post-report days are equal. Findings suggest that return volatilities of corn futures prices during announcement days are significantly different from those from non-report days during the 75-minute range. The averages for one-minute return volatility calculated for report days were higher than on non-report days. The findings indicate that WASDE reports provide relevant information to the corn market. These results for WASDE were confirmed using nonparametric tests (Kruskal-Wallis) applied on absolute returns – Table 6.

As shown in Figure 2, the return volatility during the days of the WASDE report reaches its peak at the time of the announcement when it is nearly 18 times higher than the average volatility during non-announcement days. Even though return volatilities during report days are statistically higher during the entire range period, they continue at much higher levels after the announcement of the WASDE report. For instance, the average volatility for the 15 minute-window before the report is 0.09%/minute (versus 0.07% on non-report days), and the same volatility level is only observed again after 51 minutes of the announcement (using a rolling window). This result suggests that prices may take almost an hour to reflect all the information contained in the WASDE reports, which could be an indication of semi-strong efficiency. These results are somehow similar to those found by Lehecka, Wang, and Garcia (2014), with the difference that announcements of the WASDE report seem to have a lower but longer impact on intraday return volatilities[3].

Moreover, most return volatilities during the days of the release of CONAB's reports were statistically different from those calculated on non-report days. Unlike the result obtained for the WASDE report, one-minute return volatilities were lower than on non-

[3] Lehecka, Wang, and Garcia (2014) found that "the return variance for the first minute of the day trading session is forty times as much on days when a report is released as on days without a report is released". According to the same authors, the market needs ten minutes to fully reflect the new information contained in the WASDE reports.

report days in 81% of the period before the Conab report was released, from $t - 15$ through $t - 1$ (Figure 3). Return volatilities were found to be 30% higher at the time of the Conab report announcement. A significant variability follows from $t + 0$ through $t + 60$, with 34% of calculated volatilities on report days lower than those from non-report days. One minute after Conab's report is released, the average return volatility is only 1% higher than the average on non-report days. After two minutes of the announcement, average volatilities calculated on report days become 12% lower than on non-announcement days. Average return volatility during CONAB report days reaches its peak after 44 minutes of the report release and then varies around a zero average over the next 16 minutes. The lowest volatility during the report day occurs 53 minutes after the report is released. The analysis using the AAD as a measure of volatility only showed statistically significant differences between report and non-report days for only 10 periods, including the time of the announcement.

Table 5. Intraday announcement effect test for corn futures return volatility to the release of WASDE and CONAB reports.

Minute Marker	Mean Ret. (WASDE Report Day)	Mean Ret. (WASDE Non-Report Day)	Std Dev, (WASDE Report Day)	Std Dev. (WASDE Non-Report Day)	F Stat. (WASDE)	p-value		Mean Ret, (CONAB Report Day)	Mean Ret, (CONAB Non-Report Day)	Std Dev, (CONAB Report Day)	Std Dev, (CONAB Non-Report Day)	F Stat. (CONAB)	p-value	
-15	0.0000	0.0000	0.0006	0.0007	1.1916	0.0000	*	0.0000	0.0000	0.0004	0.0005	14.6098	0.0000	*
-14	0.0000	0.0000	0.0008	0.0007	1.3849	0.0000	*	0.0000	0.0000	0.0004	0.0005	13.1379	0.0000	*
-13	0.0001	0.0000	0.0005	0.0007	2.1406	0.0000	*	0.0001	0.0000	0.0004	0.0005	13.9718	0.0000	*
-12	-0.0001	0.0000	0.0007	0.0007	1.0516	0.0000	*	0.0001	0.0000	0.0004	0.0005	10.2694	0.0149	**
-11	-0.0002	0.0000	0.0008	0.0009	1.1163	0.0000	*	0.0000	0.0000	0.0005	0.0005	11.5821	0.0000	*
-10	0.0000	0.0000	0.0007	0.0009	1.3858	0.0000	*	-0.0001	0.0000	0.0005	0.0005	11.0441	0.0000	*
-9	0.0001	0.0000	0.0008	0.0007	1.4180	0.0000	*	-0.0001	0.0000	0.0005	0.0005	10.3321	0.0038	*
-8	0.0000	0.0000	0.0008	0.0007	1.3518	0.0000	*	-0.0001	0.0000	0.0007	0.0005	18.4515	0.0000	*
-7	-0.0001	0.0000	0.0006	0.0006	1.2395	0.0000	*	-0.0001	0.0000	0.0005	0.0006	10.8789	0.0000	*
-6	0.0000	0.0000	0.0008	0.0006	1.5683	0.0000	*	0.0001	0.0000	0.0004	0.0005	15.0821	0.0000	*
-5	0.0000	0.0000	0.0010	0.0008	1.5159	0.0000	*	0.0000	0.0000	0.0004	0.0005	13.6633	0.0000	*
-4	-0.0001	0.0000	0.0009	0.0007	1.7384	0.0000	*	0.0000	0.0000	0.0005	0.0005	11.2996	0.0000	*
-3	0.0001	0.0000	0.0007	0.0006	1.3121	0.0000	*	0.0001	-0.0001	0.0005	0.0006	13.4543	0.0000	*
-2	0.0002	0.0000	0.0009	0.0007	1.7151	0.0000	*	-0.0001	0.0000	0.0004	0.0005	11.2797	0.0000	*
-1	0.0006	0.0001	0.0032	0.0007	20.0456	0.0000	*	0.0001	0.0000	0.0005	0.0005	12.5871	0.0000	*
0	-0.0003	-0.0001	0.0127	0.0007	322.5408	0.0000	*	0.0000	0.0000	0.0007	0.0005	16.9031	0.0000	*
1	-0.0008	0.0000	0.0043	0.0007	39.9622	0.0000	*	0.0000	0.0000	0.0006	0.0006	10.1742	0.0791	***
2	0.0007	0.0000	0.0041	0.0007	33.3204	0.0000	*	0.0000	0.0000	0.0005	0.0005	12.8775	0.0000	*
3	0.0009	0.0000	0.0033	0.0007	20.9767	0.0000	*	0.0000	0.0000	0.0006	0.0005	11.5532	0.0000	*
4	0.0002	0.0000	0.0034	0.0007	23.9163	0.0000	*	0.0000	0.0000	0.0005	0.0006	12.9276	0.0000	*
5	0.0001	0.0000	0.0028	0.0007	16.8465	0.0000	*	-0.0001	0.0000	0.0006	0.0006	11.9102	0.0000	*
6	-0.0002	0.0000	0.0031	0.0007	20.4437	0.0000	*	-0.0001	0.0000	0.0005	0.0005	10.0185	0.4400	
7	0.0001	0.0000	0.0024	0.0007	12.3512	0.0000	*	0.0001	0.0000	0.0005	0.0006	13.1148	0.0000	*
8	-0.0007	0.0000	0.0022	0.0006	13.7131	0.0000	*	0.0000	0.0000	0.0006	0.0006	11.1164	0.0000	*
9	0.0003	0.0000	0.0022	0.0007	10.3818	0.0000	*	-0.0001	0.0001	0.0005	0.0006	13.6247	0.0000	*
10	0.0001	0.0000	0.0024	0.0007	11.5731	0.0000	*	0.0000	0.0000	0.0006	0.0006	11.2000	0.0000	*
11	-0.0002	0.0000	0.0020	0.0007	8.7487	0.0000	*	0.0002	0.0000	0.0007	0.0006	14.6076	0.0000	*
12	0.0000	0.0000	0.0017	0.0007	6.5951	0.0000	*	-0.0001	0.0000	0.0005	0.0006	14.8341	0.0000	*
13	0.0001	0.0000	0.0019	0.0006	8.7723	0.0000	*	0.0001	0.0000	0.0005	0.0006	12.7225	0.0000	*
14	-0.0002	0.0000	0.0017	0.0007	5.5526	0.0000	*	0.0000	0.0000	0.0007	0.0006	13.7846	0.0000	*
15	-0.0001	0.0000	0.0014	0.0007	3.8222	0.0000	*	-0.0002	0.0000	0.0008	0.0006	18.9573	0.0000	*
16	0.0002	0.0000	0.0016	0.0007	5.1181	0.0000	*	0.0000	0.0000	0.0007	0.0006	13.7828	0.0000	*
17	0.0000	0.0000	0.0016	0.0007	4.5766	0.0000	*	-0.0001	0.0000	0.0006	0.0005	13.2775	0.0000	*
18	-0.0001	0.0000	0.0020	0.0006	9.8679	0.0000	*	-0.0001	0.0000	0.0005	0.0005	10.0785	0.2613	
19	0.0002	0.0000	0.0016	0.0007	6.2512	0.0000	*	0.0001	0.0000	0.0006	0.0005	12.7038	0.0000	*
20	0.0002	0.0000	0.0014	0.0007	3.6222	0.0000	*	0.0000	0.0000	0.0005	0.0005	10.8423	0.0000	*
21	0.0001	0.0000	0.0016	0.0006	6.8537	0.0000	*	0.0001	0.0000	0.0005	0.0005	10.5913	0.0000	*
22	-0.0001	0.0000	0.0013	0.0006	5.2479	0.0000	*	-0.0001	0.0000	0.0006	0.0006	10.1205	0.1639	
23	0.0001	0.0000	0.0011	0.0007	2.8737	0.0000	*	0.0000	0.0000	0.0006	0.0005	12.2514	0.0000	*
24	0.0001	0.0000	0.0011	0.0006	3.3031	0.0000	*	0.0001	0.0000	0.0005	0.0006	13.1230	0.0000	*
25	-0.0002	-0.0001	0.0013	0.0007	3.5796	0.0000	*	-0.0001	0.0000	0.0006	0.0006	10.0750	0.2707	
26	0.0003	0.0001	0.0015	0.0006	6.0478	0.0000	*	0.0000	0.0000	0.0005	0.0006	11.2243	0.0000	*
27	0.0001	0.0000	0.0009	0.0006	2.2140	0.0000	*	0.0000	0.0000	0.0005	0.0005	11.9014	0.0000	*
28	0.0002	0.0000	0.0012	0.0007	2.6515	0.0000	*	0.0000	0.0000	0.0006	0.0006	11.7692	0.0000	*
29	-0.0002	0.0000	0.0010	0.0006	2.6216	0.0000	*	0.0000	0.0000	0.0006	0.0006	10.8286	0.0000	*
30	0.0001	0.0001	0.0011	0.0007	2.9088	0.0000	*	-0.0001	-0.0001	0.0008	0.0007	10.7370	0.0000	*
31	-0.0001	0.0000	0.0011	0.0007	2.5944	0.0000	*	-0.0001	-0.0001	0.0007	0.0006	11.5422	0.0000	*
32	0.0001	0.0000	0.0013	0.0006	4.8433	0.0000	*	0.0001	0.0000	0.0006	0.0006	10.8840	0.0000	*
33	0.0003	-0.0001	0.0013	0.0007	3.6411	0.0000	*	-0.0001	0.0000	0.0006	0.0006	10.5998	0.0000	*
34	0.0000	0.0000	0.0008	0.0006	1.4332	0.0000	*	0.0001	0.0000	0.0008	0.0006	19.2246	0.0000	*
35	0.0001	0.0000	0.0010	0.0006	2.6002	0.0000	*	-0.0001	0.0000	0.0007	0.0006	12.6255	0.0000	*
36	-0.0001	0.0000	0.0011	0.0007	2.8796	0.0000	*	0.0001	0.0000	0.0005	0.0006	14.8466	0.0000	*
37	0.0002	0.0000	0.0011	0.0006	3.1459	0.0000	*	0.0000	0.0000	0.0007	0.0006	16.3463	0.0000	*
38	0.0001	0.0000	0.0011	0.0006	3.4720	0.0000	*	-0.0001	0.0000	0.0006	0.0006	10.3904	0.0009	*
39	0.0000	0.0000	0.0009	0.0006	2.1406	0.0000	*	0.0001	-0.0001	0.0006	0.0006	11.2319	0.0000	*
40	-0.0002	0.0000	0.0010	0.0007	2.3501	0.0000	*	-0.0001	0.0001	0.0006	0.0006	10.4944	0.0000	*
41	-0.0001	0.0000	0.0009	0.0007	2.0391	0.0000	*	0.0000	0.0000	0.0006	0.0006	11.0463	0.0000	*
42	-0.0001	0.0000	0.0011	0.0006	3.2080	0.0000	*	0.0001	0.0000	0.0005	0.0006	13.9415	0.0000	*
43	0.0001	0.0000	0.0009	0.0006	2.1958	0.0000	*	0.0000	0.0000	0.0006	0.0006	10.3802	0.0011	*
44	-0.0002	0.0000	0.0009	0.0007	1.6270	0.0000	*	-0.0001	0.0000	0.0008	0.0006	17.9791	0.0000	*
45	-0.0001	0.0000	0.0010	0.0007	1.8688	0.0000	*	-0.0001	0.0000	0.0006	0.0006	10.8653	0.0000	*
46	0.0001	0.0000	0.0008	0.0006	1.4631	0.0000	*	0.0000	0.0001	0.0005	0.0005	10.2802	0.0120	**
47	0.0001	0.0000	0.0009	0.0006	1.9056	0.0000	*	0.0000	0.0000	0.0003	0.0005	33.3659	0.0000	*
48	0.0001	0.0000	0.0009	0.0006	2.3411	0.0000	*	0.0000	-0.0001	0.0006	0.0005	11.9551	0.0000	*
49	-0.0001	0.0000	0.0009	0.0006	2.2832	0.0000	*	0.0000	0.0000	0.0004	0.0005	14.7838	0.0000	*
50	0.0000	0.0000	0.0009	0.0006	2.0223	0.0000	*	0.0000	0.0000	0.0004	0.0005	12.4145	0.0000	*
51	0.0000	0.0000	0.0009	0.0006	1.8567	0.0000	*	0.0000	0.0000	0.0005	0.0005	11.5338	0.0000	*
52	0.0000	0.0000	0.0010	0.0007	2.1859	0.0000	*	0.0001	0.0001	0.0006	0.0005	12.2291	0.0000	*
53	-0.0001	0.0000	0.0009	0.0006	2.0601	0.0000	*	0.0000	0.0000	0.0003	0.0004	29.1201	0.0000	*
54	0.0000	0.0000	0.0009	0.0006	1.8139	0.0000	*	0.0000	0.0000	0.0005	0.0004	12.2790	0.0000	*
55	0.0000	0.0000	0.0008	0.0006	1.9156	0.0000	*	0.0000	0.0000	0.0005	0.0005	12.2109	0.0000	*
56	-0.0002	0.0000	0.0009	0.0006	2.4649	0.0000	*	0.0000	-0.0001	0.0005	0.0005	10.2871	0.0104	*
57	0.0000	0.0000	0.0009	0.0006	1.9811	0.0000	*	-0.0001	0.0000	0.0006	0.0005	15.0088	0.0000	*
58	0.0000	0.0000	0.0009	0.0006	2.5425	0.0000	*	0.0002	-0.0001	0.0005	0.0005	10.6868	0.0000	*
59	-0.0001	0.0000	0.0008	0.0006	1.7193	0.0000	*	0.0000	0.0000	0.0005	0.0005	12.2103	0.0000	*
60	0.0000	0.0000	0.0009	0.0006	2.1441	0.0000	*	-0.0001	0.0000	0.0006	0.0005	16.9743	0.0000	*

Note: * significant at 1% level, ** significant at 5% level, *** significant at 10% level.

Table 6. Intraday announcement effect test for corn futures absolute returns to the release of WASDE and CONAB reports.

Minute Marker	AAD (WASDE Report Day)	AAD (WASDE Non-Report Day)	χ2 (WASDE)	p_value		AAD (CONAB Report Day)	AAD (CONAB Non-Report Day)	χ2 (CONAB)	p-value	
-15	0.0005	0.0005	2.1022	0.1471		0.0003	-0.0001	0.3373	0.5614	
-14	0.0006	0.0005	0.3380	0.5610		0.0003	0.0000	0.0201	0.8872	
-13	0.0004	0.0005	1.3606	0.2434		0.0003	0.0000	0.0016	0.9684	
-12	0.0005	0.0005	0.2479	0.6186		0.0003	0.0000	0.3916	0.5315	
-11	0.0005	0.0005	0.3631	0.5468		0.0003	0.0000	0.0060	0.9382	
-10	0.0005	0.0005	1.7944	0.1804		0.0003	0.0000	0.8756	0.3494	
-9	0.0005	0.0005	0.0132	0.9086		0.0003	0.0000	0.0013	0.9709	
-8	0.0006	0.0005	1.3887	0.2386		0.0003	0.0000	0.1033	0.7479	
-7	0.0004	0.0004	0.1897	0.6631		0.0003	0.0000	0.0056	0.9406	
-6	0.0005	0.0004	0.9541	0.3287		0.0003	-0.0001	15.9135	0.2071	
-5	0.0007	0.0005	6.8595	0.0088	*	0.0003	0.0000	0.2211	0.6382	
-4	0.0007	0.0005	7.8869	0.0050	*	0.0004	0.0000	0.1531	0.6955	
-3	0.0005	0.0004	0.4681	0.4938		0.0004	-0.0001	17.4978	0.1859	
-2	0.0007	0.0005	8.9375	0.0028	*	0.0003	-0.0001	29.9172	0.0837	***
-1	0.0013	0.0005	21.4305	0.0000	*	0.0003	0.0000	0.0393	0.8429	
0	0.0083	0.0005	103.8400	0.0000	*	0.0003	0.0001	60.1050	0.0142	**
1	0.0031	0.0005	99.7403	0.0000	*	0.0004	0.0000	0.0033	0.9543	
2	0.0029	0.0005	75.9002	0.0000	*	0.0003	0.0000	0.0030	0.9560	
3	0.0025	0.0005	103.5290	0.0000	*	0.0004	0.0001	12.9260	0.2556	
4	0.0024	0.0004	83.2694	0.0000	*	0.0004	0.0000	0.2040	0.6515	
5	0.0020	0.0005	66.5947	0.0000	*	0.0004	0.0000	0.3246	0.5688	
6	0.0022	0.0005	76.5127	0.0000	*	0.0003	0.0000	0.6601	0.4165	
7	0.0017	0.0005	58.8094	0.0000	*	0.0004	-0.0001	0.7448	0.3881	
8	0.0017	0.0004	88.5744	0.0000	*	0.0004	0.0000	11.1340	0.2913	
9	0.0016	0.0004	76.4594	0.0000	*	0.0004	0.0000	0.4604	0.4974	
10	0.0017	0.0005	62.8388	0.0000	*	0.0004	0.0000	0.1648	0.6848	
11	0.0014	0.0004	40.1111	0.0000	*	0.0004	0.0001	18.9356	0.1688	
12	0.0013	0.0004	40.2305	0.0000	*	0.0004	0.0000	0.0730	0.7870	
13	0.0014	0.0004	52.5923	0.0000	*	0.0004	0.0000	0.3982	0.5280	
14	0.0012	0.0004	35.8847	0.0000	*	0.0004	0.0001	38.9078	0.0486	**
15	0.0011	0.0005	25.9062	0.0000	*	0.0004	0.0001	11.9774	0.2738	
16	0.0013	0.0005	48.3307	0.0000	*	0.0004	0.0000	0.3016	0.5829	
17	0.0012	0.0005	34.4689	0.0000	*	0.0003	0.0001	0.6443	0.4222	
18	0.0014	0.0004	40.2778	0.0000	*	0.0003	0.0000	0.9105	0.3400	
19	0.0011	0.0004	27.6856	0.0000	*	0.0003	0.0001	14.0157	0.2365	
20	0.0011	0.0005	32.7893	0.0000	*	0.0004	0.0000	0.0706	0.7904	
21	0.0010	0.0004	19.6735	0.0000	*	0.0003	0.0000	0.2480	0.6185	
22	0.0009	0.0004	21.3424	0.0000	*	0.0004	0.0001	48.6261	0.0274	**
23	0.0009	0.0005	23.8417	0.0000	*	0.0003	0.0001	14.2291	0.2329	
24	0.0008	0.0004	14.8243	0.0001	*	0.0004	0.0000	0.0070	0.9333	
25	0.0010	0.0005	28.0217	0.0000	*	0.0004	0.0000	0.1048	0.7462	
26	0.0011	0.0004	32.9416	0.0000	*	0.0004	0.0000	0.3049	0.5808	
27	0.0006	0.0004	8.7683	0.0031	*	0.0003	0.0000	0.1949	0.6588	
28	0.0008	0.0005	7.3715	0.0066	*	0.0004	0.0001	10.0905	0.3151	
29	0.0007	0.0004	10.0208	0.0015	*	0.0004	-0.0001	21.5859	0.1418	
30	0.0009	0.0004	25.2209	0.0000	*	0.0005	0.0000	0.0287	0.8654	
31	0.0009	0.0005	28.6574	0.0000	*	0.0004	0.0001	15.3736	0.2150	
32	0.0010	0.0004	34.9371	0.0000	*	0.0004	0.0000	0.2381	0.6256	
33	0.0010	0.0005	26.2404	0.0000	*	0.0004	0.0000	12.2127	0.2691	
34	0.0006	0.0004	3.2314	0.0722	***	0.0004	0.0002	73.9689	0.0065	*
35	0.0007	0.0004	10.9993	0.0009	*	0.0004	0.0001	25.1977	0.1124	
36	0.0008	0.0005	15.9353	0.0001	*	0.0004	0.0000	0.0045	0.9465	
37	0.0008	0.0004	14.8830	0.0001	*	0.0003	0.0001	0.0082	0.9277	
38	0.0008	0.0004	21.4627	0.0000	*	0.0004	0.0000	11.5777	0.2819	
39	0.0007	0.0004	17.5219	0.0000	*	0.0004	0.0001	0.6867	0.4073	
40	0.0007	0.0004	6.0477	0.0139	*	0.0004	0.0000	0.4847	0.4863	
41	0.0006	0.0004	3.8780	0.0489	**	0.0004	0.0000	0.0054	0.9413	
42	0.0008	0.0004	9.7786	0.0018	*	0.0004	-0.0001	0.2644	0.6071	
43	0.0006	0.0004	5.1671	0.0230	**	0.0004	0.0000	0.0075	0.9311	
44	0.0006	0.0005	3.3661	0.0666	***	0.0004	0.0002	27.3481	0.0982	***
45	0.0007	0.0005	1.7006	0.1922		0.0003	0.0001	40.1303	0.0451	**
46	0.0005	0.0004	0.0041	0.9489		0.0003	0.0001	10.4901	0.3057	
47	0.0006	0.0004	5.1399	0.0234	**	0.0003	-0.0001	19.9019	0.1583	
48	0.0007	0.0004	10.8196	0.0010	*	0.0004	0.0000	0.0341	0.8536	
49	0.0006	0.0004	5.7939	0.0161	**	0.0003	0.0000	0.0007	0.9795	
50	0.0006	0.0004	5.0211	0.0250	**	0.0003	0.0000	0.0343	0.8531	
51	0.0006	0.0004	8.6549	0.0033	*	0.0003	0.0001	41.8339	0.0408	**
52	0.0007	0.0004	5.7364	0.0166	**	0.0003	0.0000	0.0067	0.9346	
53	0.0006	0.0004	5.3528	0.0207	**	0.0003	-0.0002	46.6463	0.0308	**
54	0.0006	0.0004	5.4570	0.0195	**	0.0003	0.0001	21.3267	0.1442	
55	0.0006	0.0004	9.0731	0.0026	*	0.0003	0.0000	0.1348	0.7135	
56	0.0007	0.0004	12.2910	0.0005	*	0.0003	0.0000	0.1058	0.7449	
57	0.0007	0.0004	15.0183	0.0001	*	0.0003	0.0000	0.1285	0.7200	
58	0.0007	0.0004	14.0283	0.0002	*	0.0003	0.0000	0.0373	0.8469	
59	0.0006	0.0004	3.0310	0.0817	***	0.0003	0.0001	0.8740	0.3499	
60	0.0006	0.0004	1.9804	0.1594		0.0003	0.0002	34.5587	0.0630	***

Note: * significant at 1% level, ** significant at 5% level, *** significant at 10% level.

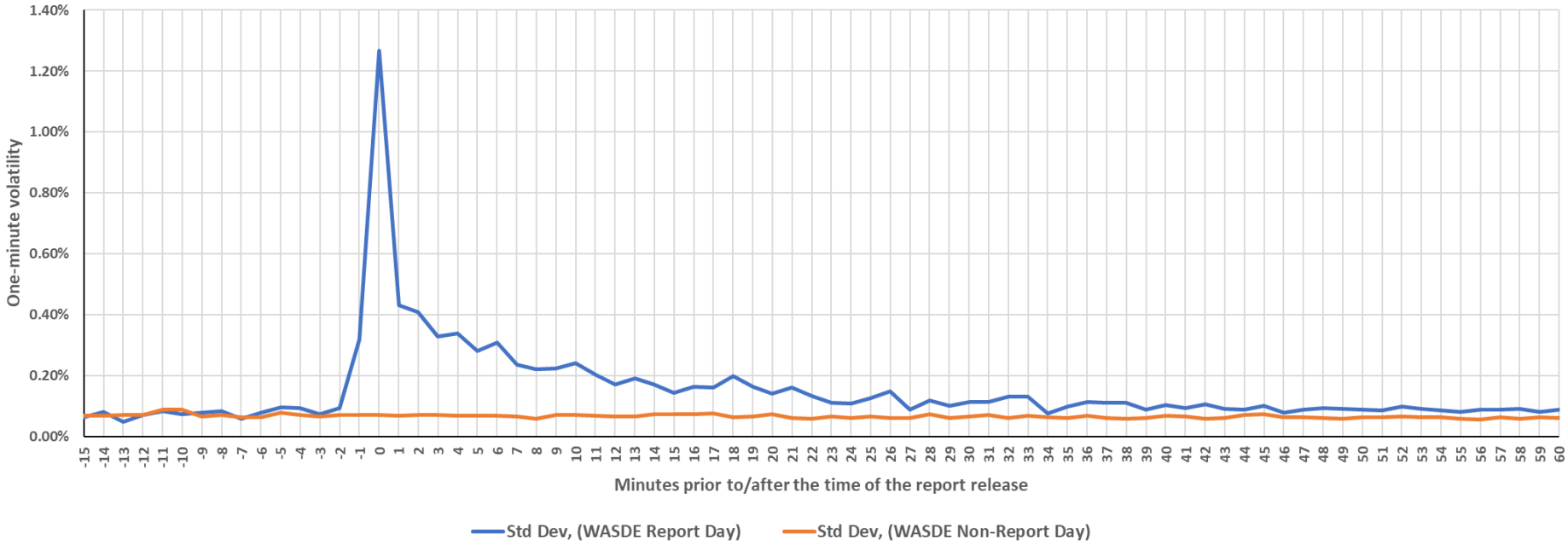


Figure 2: Intraday return volatility during WASDE report days and non-report days

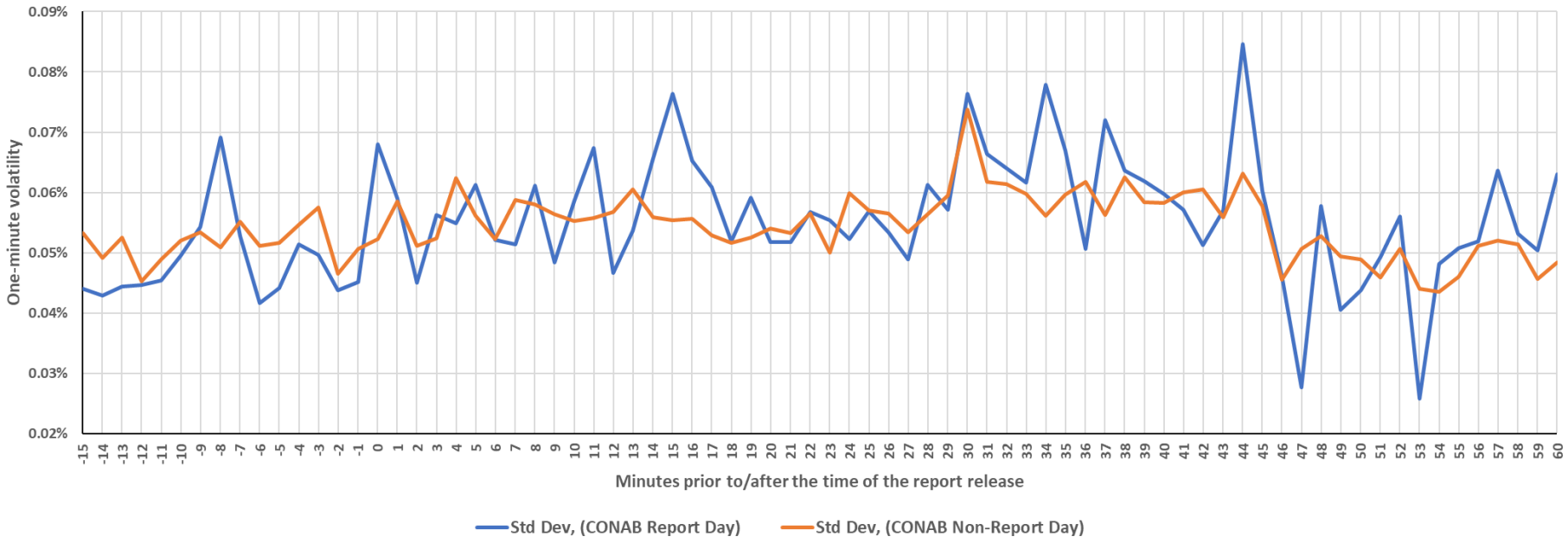


Figure 3: Intraday return volatility during Conab report days and non-report days

The volume test results are reported in Table 7. Mean trade volumes are especially higher in the minutes following the release of the WASDE reports than mean volumes on days when no WASDE report was released, and the difference is statistically distinguishable from zero. The trading volume during report days is, on average, higher than those on non-trading days during the entire 75 minutes of our analysis, except for $t + 0$ and $t + 1$.

When analyzing the impact of Conab's report on trading volume, we could not reject the null hypothesis of no difference in trading volumes on the report and non-report days for most periods. This result suggests a very minor reaction of market liquidity to the announcement of Conab's report.

Table 7. Intraday announcement effect test for corn futures volume to the release of WASDE and CONAB reports.

Minute Marker	Mean Vol (WASDE Report Day)[a]	Mean Vol (WASDE Non-Report Day) [a]	t Stat. (WASDE)	p-value		W Stat. (WASDE)	p-value		Mean Vol (CONAB Report Day) [a]	Mean Vol (CONAB Non-Report Day) [a]	t Stat, (CONAB)	p-value		W Stat. (CONAB)	p-value	
-15	4963	4959	21.0219	0.1471		189365	0.0000	*	5089	5065	0.3373	0.5614		98820	0.2244	
-14	4963	4959	0.3380	0.5610		181405	0.0001	*	5121	5063	0.0201	0.8872		88970	0.9478	
-13	4963	4959	13.6056	0.2434		175195	0.0008	*	4995	5032	0.0016	0.9684		94415	0.3322	
-12	4963	4959	0.2479	0.6186		174115	0.0012	*	5009	5059	0.3916	0.5315		104765	0.3718	
-11	4963	4960	0.3631	0.5468		172320	0.0019	*	5024	5020	0.0060	0.9382		90235	0.2044	
-10	4962	4959	17.9440	0.1804		178555	0.0003	*	4975	5100	0.8756	0.3494		81495	0.2033	
-9	4963	4961	0.0132	0.9086		182395	0.0000	*	5150	5039	0.0013	0.9709		98790	0.4107	
-8	4963	4959	13.8866	0.2386		183300	0.0000	*	5088	5052	0.1033	0.7479		88615	0.4062	
-7	4963	4959	0.1897	0.6631		189695	0.0000	*	5135	4984	0.0056	0.9406		82480	0.6711	
-6	4963	4959	0.9541	0.3287		207390	0.0000	*	5174	5038	15.9135	0.2071		84085	0.1898	
-5	4962	4959	68.5950	0.0088	*	204885	0.0000	*	5099	5028	0.2211	0.6382		87035	0.7583	
-4	4962	4959	78.8693	0.0050	*	214690	0.0000	*	5089	5060	0.1531	0.6955		92965	0.8572	
-3	4962	4959	0.4681	0.4938		208715	0.0000	*	5022	5041	17.4978	0.1859		77670	0.0690	***
-2	4963	4959	89.3749	0.0028	*	216590	0.0000	*	5081	5028	29.9172	0.0837	***	90750	0.7230	
-1	4965	4960	214.3049	0.0000	*	230105	0.0000	*	4967	5041	0.0393	0.8429		91195	0.2261	
0	4964	4966	1038.4005	0.0000	*	274810	0.0000	*	5029	5055	60.1050	0.0142	**	120885	0.1204	
1	4960	4961	997.4026	0.0000	*	274540	0.0000	*	4999	5013	0.0033	0.9543		118390	0.2366	
2	4963	4959	759.0021	0.0000	*	270425	0.0000	*	5021	5036	0.0030	0.9560		103405	0.6710	
3	4968	4959	1035.2901	0.0000	*	260920	0.0000	*	5011	5063	12.9260	0.2556		119310	0.1472	
4	4969	4962	832.6943	0.0000	*	266235	0.0000	*	4936	5039	0.2040	0.6515		109685	0.7323	
5	4969	4959	665.9470	0.0000	*	259160	0.0000	*	5006	5016	0.3246	0.5688		122805	0.2505	
6	4968	4959	765.1267	0.0000	*	261160	0.0000	*	5117	5020	0.6601	0.4165		111975	0.1016	
7	4969	4959	588.0943	0.0000	*	258160	0.0000	*	4961	5036	0.7448	0.3881		93095	0.3605	
8	4965	4959	885.7441	0.0000	*	255260	0.0000	*	4909	5013	11.1340	0.2913		89425	0.0619	***
9	4967	4959	764.5943	0.0000	*	259145	0.0000	*	5069	5033	0.4604	0.4974		107195	0.3063	
10	4967	4958	628.3882	0.0000	*	253400	0.0000	*	5089	5006	0.1648	0.6848		106360	0.7886	
11	4965	4961	401.1109	0.0000	*	238240	0.0000	*	5093	5029	18.9356	0.1688		100790	0.7346	
12	4966	4959	402.3051	0.0000	*	247010	0.0000	*	5136	5027	0.0730	0.7870		98505	0.3450	
13	4967	4959	525.9227	0.0000	*	245765	0.0000	*	5019	5051	0.3982	0.5280		89465	0.1652	
14	4966	4960	358.8467	0.0000	*	241280	0.0000	*	5078	5024	38.9078	0.0486	**	101090	0.8149	
15	4966	4960	259.0620	0.0000	*	244580	0.0000	*	4983	5040	11.9774	0.2738		106245	0.5395	
16	4967	4960	483.3067	0.0000	*	237840	0.0000	*	5048	4992	0.3016	0.5829		101990	0.5379	
17	4967	4960	344.6895	0.0000	*	242925	0.0000	*	5089	5057	0.6443	0.4222		94745	0.4972	
18	4966	4960	402.7777	0.0000	*	231005	0.0000	*	5023	5022	0.9105	0.3400		118180	0.2869	
19	4967	4959	276.8561	0.0000	*	232915	0.0000	*	4974	5064	14.0157	0.2365		108735	0.3209	
20	4968	4960	327.8931	0.0000	*	226445	0.0000	*	4921	5046	0.0706	0.7904		99335	0.9065	
21	4968	4962	196.7348	0.0000	*	218800	0.0000	*	5027	5028	0.2480	0.6185		104795	0.8472	
22	4968	4961	213.4245	0.0000	*	223795	0.0000	*	4996	5023	48.6261	0.0274	**	114240	0.8693	
23	4968	4960	238.4174	0.0000	*	219130	0.0000	*	4963	5045	14.2291	0.2329		109270	0.7688	
24	4969	4959	148.2431	0.0001	*	225450	0.0000	*	5009	5007	0.0070	0.9333		107340	0.9986	
25	4968	4962	280.2168	0.0000	*	217045	0.0000	*	5025	5037	0.1048	0.7462		104785	0.9589	
26	4970	4959	329.4160	0.0000	*	220075	0.0000	*	5008	5035	0.3049	0.5808		95405	0.0478	**
27	4971	4959	87.6832	0.0031	*	212120	0.0000	*	5042	5002	0.1949	0.6588		95935	0.1070	
28	4972	4959	73.7151	0.0066	*	220030	0.0000	*	5038	5021	10.0905	0.3151		107540	0.4239	
29	4971	4959	100.2084	0.0015	*	209085	0.0000	*	5074	5012	21.5859	0.1418		102760	0.5697	
30	4971	4959	252.2087	0.0000	*	214745	0.0000	*	4999	5021	0.0287	0.8654		111455	0.3886	
31	4971	4959	286.5740	0.0000	*	214535	0.0000	*	5059	5004	15.3736	0.2150		127850	0.0731	***
32	4971	4960	349.3709	0.0000	*	226325	0.0000	*	5064	4999	0.2381	0.6256		115555	0.8164	
33	4973	4959	262.4036	0.0000	*	216325	0.0000	*	5060	5014	12.2127	0.2691		132885	0.0164	***
34	4973	4962	32.3143	0.0722	***	210905	0.0000	*	5067	5006	73.9689	0.0065	*	108060	0.8009	
35	4973	4964	109.9931	0.0009	*	209410	0.0000	*	4995	5028	25.1977	0.1124		119360	0.4596	
36	4973	4962	159.3526	0.0001	*	216560	0.0000	*	5001	5021	0.0045	0.9465		109535	0.6710	
37	4974	4963	148.8301	0.0001	*	204565	0.0000	*	5036	4987	0.0082	0.9277		103970	0.9864	
38	4974	4959	214.6265	0.0000	*	221445	0.0000	*	5037	5010	11.5777	0.2819		121360	0.3542	
39	4974	4959	175.2191	0.0000	*	210835	0.0000	*	5017	4997	0.6867	0.4073		116655	0.7231	
40	4973	4963	60.4768	0.0139	**	197475	0.0000	*	5069	5029	0.4847	0.4863		120585	0.0431	
41	4973	4961	38.7802	0.0489	**	207820	0.0000	*	5061	5021	0.0054	0.9413		116635	0.6723	
42	4972	4959	97.7862	0.0018		201045	0.0000	*	5057	4984	0.2644	0.6071		113125	0.9435	
43	4973	4959	51.6706	0.0230	**	203870	0.0000	*	5001	5000	0.0075	0.9311		108820	0.6068	
44	4972	4959	33.6607	0.0666	***	194285	0.0000	*	5036	5013	27.3481	0.0982	***	128095	0.2226	
45	4972	4959	17.0056	0.1922		190495	0.0000	*	5633	5253	40.1303	0.0451	**	12445	0.9597	
46	4972	4962	0.0041	0.9489		186880	0.0000	*	5674	5308	10.4901	0.3057		14100	0.3600	
47	4998	4959	51.3986	0.0234	**	176625	0.0002	*	5514	5253	19.9019	0.1583		14275	0.4093	
48	4972	4958	108.1958	0.0010	*	204800	0.0000	*	5501	5276	0.0341	0.8536		15555	0.5124	
49	4972	4959	57.9388	0.0161	**	191870	0.0000	*	5498	5321	0.0007	0.9795		14865	0.6782	
50	4972	4959	50.2106	0.0250	**	188870	0.0000	*	5521	5270	0.0343	0.8531		15935	0.1543	
51	4972	4959	86.5493	0.0033	*	185260	0.0000	*	5538	5280	41.8339	0.0408	**	12780	0.7206	
52	4972	4959	57.3642	0.0166	**	190600	0.0000	*	5295	5294	0.0067	0.9346		15775	0.7885	
53	4972	4959	53.5277	0.0207	**	182045	0.0001	*	5350	5236	46.6463	0.0308	**	15390	0.6837	
54	4972	4959	54.5704	0.0195	**	186195	0.0000	*	5505	5244	21.3267	0.1442		13935	0.7889	
55	4972	4959	90.7307	0.0026	*	182505	0.0001	*	5451	5291	0.1348	0.7135		11765	0.3354	
56	4988	4959	122.9105	0.0005	*	185540	0.0000	*	5529	5285	0.1058	0.7449		13110	0.9630	
57	4971	4958	150.1831	0.0001	*	181895	0.0001	*	5426	5271	0.1285	0.7200		15055	0.7206	
58	4971	4959	140.2831	0.0002	*	183905	0.0000	*	5238	5294	0.0373	0.8469		14560	0.6459	
59	4971	4959	30.3104	0.0817	***	175610	0.0007	*	5330	5340	0.8740	0.3499		13315	0.7754	
60	4971	4959	19.8035	0.1594		180080	0.0001	*	5299	5305	34.5587	0.0630	***	16125	0.9534	

Note: * significant at 1% level, ** significant at 5% level, *** significant at 10% level.

[a] Volume expressed in billion contracts.

CONCLUSIONS

This study investigates the impact of new public information using intraday futures prices and volumes in the CME corn futures market. Price and volume reactions to the release of the USDA and CONAB crop reports were evaluated between April 2018 and April 2024. To the best of our knowledge, this is the first study that explores the price and volume reactions to grain report announcements from different countries (the U.S. and Brazil) using intraday data.

Initial findings show the importance of USDA and CONAB reports in providing new information to grain markets. During both report days, return volatilities were in general higher than the return variability observed in non-report days. Traded volume was also higher when the WASDE reports were released, but variable during the announcement of the Conab reports. Moreover, the comparison between WASDE and CONAB report days indicates greater volatility and volume on the days of WASDE report announcements.

These findings were confirmed by additional analysis. For every minute (between 15 minutes pre-report and 60 minutes post-report release), returns and volumes on report days (WASDE and CONAB) were compared with pre- and post-report five days. Parametric and non-parametric tests were used to investigate the difference in return volatility and trading volume for report and non-report days. In general, results show a strong effect of WASDE report releases using intraday futures prices and volumes in the CME corn futures market. For CONAB, return volatility reactions were verified on the days of the announcements, but much smaller than the effects observed on WASDE reports days.

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