MARKET UNCERTAINTY AND SENTIMENTS AROUND USDA ANNOUNCEMENTS

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INTRODUCTION

- We investigate the uncertainty-resolution effect of USDA reports in corn and _ soybeans markets by examining changes in 90-day constant option-implied volatility (Ivol) around scheduled USDA announcements.
- Prior literature tend to focus only on what happens on the day of announcement, with little attention on how lvol evolves in the run-up to the announcement, the role of pre-existing market expectations as well as macroeconomic uncertainty and sentiment around the announcement. These are the innovations of our study.
- We use CBOE's S&P 500 Volatility Index (VIX) as a proxy for macroeconomic uncertainty and sentiment, and Bloomberg's analyst surveys as a proxy for commodity market experts' pre-announcement expectations.
- Our theoretical model is built up on the work of Ederington and Lee (1996) which predicts that, on average, the Ivol will drop following USDA announcements. We extend the model to incorporate these factors and show that the magnitude of the Ivol change is related to them.
- We consider jointly four main USDA reports: WASDE, Grain Stocks (GS), Prospective Planting (PP) and Acreage (AR).

USDA reporting schedules

	WASDE	Grain Stocks (GS)	Prospective Planting (PP)	Acreage (AR)
Frequency	Monthly	Quarterly	Yearly	Yearly
Timing	2 nd week of the month;	End of Quarter	End of March	End of June
Overlaps	1 st GS	1 st WASDE; PP; AR	2 nd GS	3 rd GS
Information surveyed by Bloomberg	Projected U.S. ending stock of the on-going marketing year	U.S. Ending stock estimates as of 1 st Dec, 1 st Mar, 1 st Jun and 1 st Sep	U.S. farmers' planting intention for upcoming crop season	Survey-based estimate of U.S. planted area for current crop season
Baseline for forecast sentiment	WASDE projections in the previous	GS of previous year's same quarter	AR of previous year	PP of current year

month

MULTIPLE COMPARISION - CORN t-5 t-4 announcement t-3 t-2 t-1 USDA relative to t+3 day t+5 -0.040.01 -0.03 -0.02 -0.01 0.02 0.03 Ivol difference compared to 5-day average before Bloomberg survey release

HYPOTHESES AND METHODS

- H₁: Commodity Ivol decrease on the USDA announcement day
- → paired t-test, Wilcoxon test (one-day change), multiple comparison (11-day window)
- H₂: Analyst forecasts modify reports' uncertainty-resolution effect: event-day surprise, forecast dispersion and sentiment matter.

→ No autocorrelation across reporting days → Ordinary Least Squares (OLS); robustness check: Seemingly Unrelated Regression (SUR)

H₃: VIX change "shades" the commodity IVol response.

Controls for overall uncertainty and sentiment in financial markets
OLS, GARCH

Fig.1: Multiple comparison of corn daily Ivol change from 5-day before to 5-day after USDA report release compared to 5-day average Ivol before Bloomberg survey (normal baseline). There is a significant drop in Ivol on the day of USDA announcement, and Ivol remain significantly lower than the normal level for a whole week. Similar result is found for soybean lvol

RESULTS

$\Delta Ivol_{\tau} = \beta_0 + \sum \beta_i^- S_{i\tau}^- + \sum \beta_i^+ S_{i\tau}^+ + \sum \delta_i D_{i\tau} + \sum \gamma_i Sentiment_{i\tau} + \varphi \Delta VIX_{\tau} + \lambda Slope^- + \eta Control_{\tau} + \varepsilon_{\tau}$

bearish WASDE surprise

WASDE dispersion



Fig.2: Standardized regression coefficients and their 90% confidence intervals using Ordinary Least Squares for corn and soybean markets. The sample period is from September 2009 to through October 2019. The coefficients are standardized to reflect the number of standard deviation in log-difference lvol on the day of USDA announcement per standard-deviation change in explanatory variables (except dummies). Report surprises (S) are split into bearish (+) and bullish (-) to reflect asymmetric market's volatility expectation in redundant vs. scarce supply conditions. Forecast dispersion (D) reflects the disagreement among the analysts in the Bloomberg surveys. Sentiment is a dummy which takes the value 1 when the median forecast is below the baseline level (i.e. bullish) and 0 otherwise. VIX change on the same day of USDA announcement proxies overall uncertainty and sentiment in financial market. Truncated slope of the term structure in the week preceding the announcement is positive, and equals the slope itself otherwise. The model also controls for seasonality, day-of-the-week effect, and lagged market returns and Ivol. Seemingly Unrelated Regressions give similar results with insignificant crossmarket correlation of residuals.

Note: Since bullish surprise is signed negative (i.e. reports show lower stock/acreage than analysts expected), a negative coefficient indicates a positive effect on Ivol change, i.e. an Ivol increase, and vice versa.

DISCUSSION & CONCLUSIONS

- For up to five trading days after a scheduled USDA release (WASDE, GS, PP and AR), Ivols are significantly lower than a week earlier. On average, the reports' uncertainty resolution power is similar in magnitude for corn and soybeans, consistent with early findings of Isengildina-Massa et al. (2008)
- The benefit of the USDA information tends to be smaller when the USDA news bring bullish surprise to the market (significant in both corn and soybeans) markets for WASDE, GS). The effect of bearish surprises are more subtle, except GS surprise which cause a significant increase in Ivol.
- The more dispersed the forecasts were in the run-up to a WASDE report, the more both corn and soybean lvol drop following the report release, suggesting that the report is more valuable when there is more disagreement among market analysts. Dispersion of forecasts of other reports does not significantly affect Ivol change.
- Market sentiment matters: the market-calming effect of USDA news is larger when analysts had been pessimistic about stock levels in the upcoming GS report. No significant relationship is found for WASDE, PP and AR reports.
- While commodity IVols are often positively related to financial-market sentiment and to macroeconomic uncertainty (jointly captured by the VIX index), this co-movement breaks down on USDA report days—with the VIX and commodity lvols moving in opposite directions.

REFERENCES

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