

Project Narrative

Project Title: Assessing the Impact of Weekly Export Sales Reports on Commodity Market Prices

Objective: To determine whether weekly Export Sales Reports (ESR) have a statistically significant impact on commodity futures price levels or implied volatility

Problem statement—The U.S. government places great value on the release of information to enhance price discovery in commodity markets. A large literature documents the benefits of USDA reports in helping to efficiently align commodity futures prices to fair market values (e.g., McKenzie, 2008; Adjemian, 2012). However, the question of whether U.S. Export Sales Reports (ESR) move markets has received little academic attention. The few studies that have investigated the issue are somewhat dated, and in the current climate of volatile markets coupled with the sporadic timing of potentially large unanticipated purchases of U.S. agricultural commodities by China, this is a timely and important research topic.

The ESR was introduced in 1973 in the wake of large, unexpected purchases of US grain by the Soviet Union. These unanticipated purchases contributed to large price spikes in U.S. corn and wheat markets and motivated the U.S. government to more closely scrutinize U.S. grain exports to better anticipate and, if necessary, mitigate potential market disruptions. In addition, at this time there was concern that large firms engaged in substantial trade deals might take advantage of this “inside information” to unfairly profit from futures positions. Aligned to these concerns was the desire to better gauge if price discovery in commodity futures markets could be improved by disseminating export sales information to the market. Efficient price discovery in commodity futures markets is of paramount importance to U.S. commodity producers who use these markets to inform their marketing decisions and to manage their price risk.

Three prior studies (Conklin, 1983; Patterson and Brorsen, 1993; Xie et. al., 2016) have investigated these issues with mixed results. Conklin, found that corn, wheat and soybean futures price reactions are correlated to export sales over the 1975 – 1980 period. He concluded that these commodity futures markets efficiently respond to the report information. In contrast, Patterson and Brorsen found little evidence to suggest that corn, cotton, soybean, and wheat futures react to the reports over the 1980 – 1990 period. However, they did find significant price reactions in corn and wheat futures markets prior to report release dates, indicating that traders may anticipate information in the report prior to its release. Finally, Xie et. al. found cotton futures prices reacted to the reports over the 1995 – 2008 period but not over the 2008 – 2012 period.

Approach and Methodology—We will examine the reactions of futures market prices and option implied volatilities around the release of weekly and—in the case of large export transactions – daily ESR for the major commodities covered by weekly ESR (i.e., corn, wheat, soybeans, cotton, rice, live cattle, feeder cattle and lean hogs). We will further analyze the price impact of information on export sales to specific countries (e.g.,

China). We will use a prototypical event study approach where market reactions are specified as an Ordinary Least Squares (OLS) regression:

$$1) \quad f_{+1} - f_{-1} = \tilde{a} + \tilde{b}(ESR_{it} - \widehat{ESR}_{it}) + e_t,$$

where $f_{+1} - f_{-1}$ represents the future price or IV change over a 10-day event window around the report release. The term, $(ESR_{it} - \widehat{ESR}_{it})$ represent the “news” element of ESR (i.e., the difference between export sales for commodity i , observed in week t (ESR_{it}) and pre-report export sales expectations for commodity i observed in $t-1$ (\widehat{ESR}_{it})), and e_t is a mean zero normally distributed error term. The coefficient \tilde{b} measures the price or IV response to a one-percentage point change in the “news” element of ESR, thus assuming that markets only react to unanticipated information.

Model specification can be modified using standard time series approaches to account for nonlinear and asymmetric adjustments in market prices as well as GARCH effects – typical in commodity futures returns. If ESR contain new information and move futures market prices, models will have power in explaining $f_{+1} - f_{-1}$, and \tilde{b} will be statistically significantly different from zero. Analogously, if ESR contain new information, market volatility (IVs) should increase prior to the report’s release and decline following the report release as uncertainty is removed from the market (McKenzie et. al., 2007).

Data—To implement our models, we will use both end-of-day settlement prices and intra-day futures and option prices (tick data) from CME Group (CME). The use of tick data allows measurement of any instantaneous reactions to the report release, which occurs on Thursday at 7:30am (CST) during electronic trading hours. In addition, historical series of ESR data will be collected from Foreign Agricultural Service (FAS). Publicly available data from the Commitments of Traders (COT) report (divided into the trader groups of interest) will be used to assess any correlations between speculative and hedging positions with price and IVs movements across our event window.

Results Policy Implications—This research will shed light on a number of important issues and extend the extant literature in commodity event studies:

- Do Export Sales Reports contain new and unanticipated information that helps align commodity futures prices?
- Do Export Sales Reports remove market uncertainty?
- Do large unanticipated export sales to specific countries affect markets?
- Do markets react prior to the release of the reports? – implying that information contained in the reports is already anticipated by traders.
- Our results will provide a much-needed update of previous studies, in light of currently high levels of market volatility and large unanticipated purchases of U.S. grains by foreign countries.
- Our results will help inform the FAS as to whether the Export Sales Reporting system should be altered in terms of content and timing.
- Our results will extend the extant literature by measuring market reactions using intra-day futures prices and options IVs.

Key Personnel

Professors Andrew McKenzie, John Anderson and Eunchun Park will administer the project and take the roles of Co-Project Directors.

Dr. McKenzie will be responsible for coordinating all project activities with Co-PDs and proposed graduate student. He will oversee and be directly involved in the model development, data collection, econometric estimation, model programming, write up of the documents and papers, and presenting at professional conferences. He will coordinate biweekly meetings with the Co-PDs and proposed graduate student to ensure the projects progresses in accordance with the specified timeline. The proposed graduate student will be a masters student in the Department of Agricultural Economics and Agribusiness, and will work on the project as part of their masters thesis.

The research project aligns well with Dr. McKenzie's previous research using event studies to analyze market reactions to government information, and is in line with Anderson, McKenzie and Park's commodity futures and applied risk management research programs.

Flexibility

The Co-PD's department provides each faculty member with computers, which are the only equipment required for this research project. Moreover, they have access to the appropriate software for statistical analysis of the data collected. In addition, all graduate students in their Departments are assigned office space and have access to state of the art computer equipment and software to complete this research project. As such, the Co-PD's research programs allow flexibility to accommodate any potential program changes and to respond to unforeseen circumstances. If necessary, due to any delays in recruiting a graduate student to the project, the research team will extend the project timeline into a second year (at no extra cost to FAS).

Timeline

Fall 2021: Purchase the commodity market data from the Chicago Mercantile Exchange (CME), and clean and compile the data, so it can be used in the research project. CME futures and options data will cost \$1,000 per commodity, and we will also purchase volatility data from Barchart. The total cost of data is \$10,000.

Spring – Summer 2022: Estimate and analyze the models outlined in the Approach and Methodology section.

Summer 2022: Write and summarize results of the project. Present and publish the results. The research will be presented at AAEEA 2022 meeting and to FAS in Washington DC. Travel costs of \$4,000 are budgeted for 2 faculty and a graduate student. Targeted publication outlets include Applied Economic Perspectives and Journal of Agricultural and Applied Economics Journals. A total of \$3,600 is budgeted for publication costs.

References

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- McKenzie, A. M. "Pre-harvest price expectations for corn: The information content of USDA reports and new crop futures." *American Journal of Agricultural Economics*, 90 no. 2 (2008):351-366.
- McKenzie, Andrew, Michael Thomsen, and Josh Phelan. "How do you straddle hogs and pigs? Ask the Greeks!" *Applied Financial Economics* 17, no. 7 (2007): 511-520.
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