

**Price Discovery and Information Asymmetry in Equity and
Commodity Futures Options Markets**

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Fake it till you make it.

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Certificate of Authorship

I certify that the work in this dissertation has not previously been submitted for a degree, nor has it been submitted as part of the requirements for a degree except as fully acknowledged within the text.

I also certify that the dissertation has been written by me. Any help that I have received in my research work and the preparation of the dissertation has been acknowledged. In addition, I certify that all information sources and literature used are indicated in the thesis.

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Marc Bohmann, 1 January 2020

Abstract

This dissertation contributes to the existing literature by examining trading behaviour around security-level and market-wide events. The research focuses on equity and futures options and continues by providing insights into the price discovery process of futures and options in commodity markets.

The first essay examines informed options trading around a sample of 352 Food and Drug Administration announcements from 166 United States (US)-listed firms between 1996 and 2016. Using implied volatility (IV) spreads and options trading volume as proxies for informed trading, it is found that informed traders are aware of the timing of the upcoming announcement at least five days in advance and at least some informed traders have knowledge of the finer details that affect the price impact of the announcement. These findings have implications for regulators, investors and relevant firms.

The second essay analyses the behaviour of United States (US) commodity futures and options IV-based measures as proxies for information leakage around macro-economic and commodity-specific news announcements between 2007 and 2017. In the three days preceding news releases, abnormal changes in the levels of futures options IV spreads and skew were reported. In addition, a statistically significant relationship between announcement date returns and abnormal changes in pre-announcement IV spreads and skew were reported. Universally, the findings indicate that at least some investors are informed about the price impact of the upcoming news announcements in seven commodity markets.

The third essay investigates the extent of the importance of commodity futures or options markets in the price discovery process in the six most-actively traded markets: crude oil, natural gas, gold, silver, corn and soybeans. Using new information and leadership techniques, new evidence has reported that, in recent times, both markets make a meaningful contribution to price discovery. However, on average, options lead futures in reflecting new information for most of these commodities. In addition, it was found that increased speculation—rather than hedging activity—in commodity derivatives is a key determinant of price discovery in the options markets.

The fourth essay sheds light on high versus low-frequency (LF) liquidity measures in times of information asymmetry. Market microstructure data availability has significantly improved and it is now possible to estimate liquidity measures at the nanosecond level. However, this level of data are not available in all markets and time periods and there is a significant cost and computational burden of high-frequency (HF) data. Goyenko et al. (2009) and Fong et al. (2017) show that various LF liquidity measures can proxy for HF benchmarks and show that the results are robust across countries and time. However, liquidity measures do not always behave in the expected fashion during periods of information asymmetry (Collin-Dufresne & Fos, 2015). Drawing from Ball and Brown (1968), an event study methodology is used to investigate whether the LF measures of liquidity can proxy for HF measures around earnings announcements (i.e., periods of information asymmetry). It was found that the closing-percent-quoted-spread is the best proxy for the percent-cost HF benchmarks. In contrast, using cross-sectional, portfolio and individual time-series correlations, the most consistent LF proxies are the high-low impact and closing-percent-quoted-spread impact. However, the performance of these proxies weakens in the pre- and post-announcement periods around the earnings announcement.

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List of Abbreviations

ARET	average abnormal return
ASX	Australian Securities Exchange
ATM	at-the-money
CBOE	Chicago Board of Options Exchange
CBOT	Chicago Board of Trade
CFTC	Commodity Futures Trading Commission
CMCRC	Capital Markets Cooperative Research Centre
CME	Chicago Mercantile Exchange
COMEX	Commodity Exchange
COT	Commitment of Traders
CPI	Consumer Price Index
CPQS	closing-percent-quoted spread
CPQSI	closing-percent-quoted-spread-impact
CS	component share
DITM	deep in the money
DOTM	deep out of the money
FDA	Food and Drug Administration
GDP	gross domestic product
GFC	global financial crisis
HF	high-frequency
HL	high-low
HLI	high-low-impact
ILS	information leadership share
IP	industrial production
IS	information share
IV	implied volatility
LF	low-frequency
MAPP	Manual of Policies and Procedures
NDA	new drug approvals
NYMEX	New York Mercantile Exchange
OTM	out-of-the-money

OTC	over the counter
QTT	quote-to-trade ratio
RFQ	request for quote
RMSE	root-mean-squared-error
SEC	Securities and Exchange Commission
SIC	Standard Industrial Classification
SVOL	stock volume
TRTH	Thomson Reuters Tick History
US	United States
UTS	University of Technology Sydney
VECM	vector error correction model
WASDE	World Agricultural Supply and Demand Estimates Report