



The price impact of futures trades and their intraday seasonality



Robert I. Webb^a, Doojin Ryu^{b,*}, Doowon Ryu^c, Joongho Han^d

^a *McIntire School of Commerce, University of Virginia, VA, USA*

^b *College of Economics, Sungkyunkwan University, Seoul, Republic of Korea*

^c *Business School, Korea University, Seoul, Republic of Korea*

^d *Business School, Sungkyunkwan University, Seoul, Republic of Korea*

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ABSTRACT

This study examines the price impact of futures trades and their intraday seasonality by analyzing the continuous trading session dataset of KOSPI 200 futures, including the opening and closing periods. For this purpose, the study analyzes the futures dataset that contains information on transaction times, trade directions, order sizes, and the types of investors initiating the transactions. The results suggest several novel findings. First, a substantial portion of the price impact of futures trades is persistent, indicating the presence of informed trading in the futures market. Second, informed trading is concentrated in the opening period and liquidity trading is concentrated in the closing period of the continuous trading session. Third, small trades usually have a greater price impact than large ones, supporting the existence of stealth trading by futures traders. Fourth, trades by institutional investors have a greater price impact than those by individuals, suggesting that institutional investors are better informed and/or more sophisticated than individual investors in the futures market.

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1. Introduction

How trades affect asset prices has long been an important research question in finance and economics. Early financial literature and classic textbooks assume financial markets are perfect and highly liquid with no market frictions; thus, trades have no impact on asset prices and convey no significant information. In practice, however, financial markets are often illiquid and information asymmetry among market participants

* Corresponding author at: College of Economics, Sungkyunkwan University, 25–2 Sungkyunkwan-ro, Jongno-gu, Seoul 03063, Republic of Korea.

E-mail address: doojin.ryu@gmail.com (D. Ryu).

is prevalent. Therefore, trades dissipate liquidity and cause an imbalance between fundamental values and market prices. In such an environment, each trade can carry substantial information, and investigating the price impact of intraday trades will yield meaningful implications for market participants.

Various market microstructure models have been developed to explain the impact of intraday trades on price formation. Studies include those of Admati and Pfleiderer (1988); Demsetz (1968); Easley and O'Hara (1987); Garman (1976); Glosten and Milgrom (1985), and Kyle (1985). Furthermore, theoretical suggestions on the intraday behavior of asset prices and trades from these market microstructure models have been empirically tested. Previous empirical studies, such as Harris (1986); Jain and Joh (1988); McNish and Wood (1992), and Wood et al. (1985), employ transaction datasets to examine intraday trading behavior and its implications. However, their empirical findings are limited. Later empirical studies have analyzed the microstructure of developed equity markets using more advanced microstructure models (such as asymmetric information models, inventory holding cost models, and comprehensive trade indicator models) in an attempt to provide more rigorous and informative results on how intraday trades affect the intraday price process and the movement of bid-ask prices. Recently, more detailed intraday analyses have been conducted owing to the increased availability of high-frequency and more complete financial datasets. These include studies by Foster and Vishwanathan (1990); Huang and Stoll (1997); Keim and Madhavan (1998); Madhavan and Smidt (1991, 1993); Madhavan et al. (1997); Madhavan and Sofianos (1997), and Neal and Wheatley (1998).

Although previous market microstructure studies find relatively consistent results in equity markets, they do not draw consistent conclusions regarding the role and effects of informed trading in derivatives markets. On the one hand, one strand of the literature finds evidence to support the informative role of options trading (Ahn et al., 2008, 2010; Cao et al., 2005; Chakravarty et al., 2004; Pan and Poteshman, 2006). On the other hand, another strand of the literature shows that informed trading plays a limited role in the options market (Chan et al., 2002; Easley et al., 1998; Muravyev et al., 2013).

This inconsistency in the extant findings appears to stem from the complexity of derivatives and heterogeneity of different types of derivative contracts. A recent study by Henderson and Pearson (2011) shows that the demand for retail derivatives by unsophisticated investors hinges on the complexity of the contracts, indicating the importance of controlling for contract heterogeneity in studying the microstructure of derivatives markets. In order to avoid the potential biases resulting from the failure in considering the characteristics of complex and heterogeneous derivatives, we focus on a highly liquid derivatives market with little market friction, specifically the stock index futures market. Among derivatives, futures have the simplest (i.e., linear) payoff structure, and their intraday price dynamics are quite similar to those of their corresponding underlying assets. Index futures play an important role as the underlying asset for other derivatives (Lee and Ryu, forthcoming; Sim, Ryu, and Yang, forthcoming). Further, most studies using index futures trading data find that intraday trading plays an informative role and has significant explanatory power for the price movements of the underlying assets (e.g., Schlag and Stoll, 2005; Yang et al., 2012; Ryu, 2015a,b).

Despite extensive research on the issue, more in-depth studies on derivatives markets are needed to reach a definitive conclusion about the informativeness of intraday derivatives trading. Answering research questions about the role and information content of intraday derivatives trading requires an exclusive and comprehensive intraday dataset. Thus, we consider the intraday transaction dataset of the KOSPI 200 index futures market, which provides not only accurate information on order and trade details, but also valuable information on trade directions and initiating investor types, particularly individual or institutional investors. Such information is not provided by other developed financial markets. Simply stated, the KOSPI 200 futures market provides an ideal setting to examine our research questions.¹

This study takes a basic regression approach rather than using complicated structural microstructure models that require strong distributional assumptions and are often subject to model misspecification biases. We extend the recent works of Chang et al. (2013) and Ryu (2015a), which examine the effects of intraday trades on the Taiwanese and Korean index derivatives markets, respectively, by investigating three market microstructure issues: *i*) the role of informed trading in the intraday price discovery process; *ii*) the information content of order sizes; and *iii*) information asymmetry among different types of investors. Both studies report that only index futures trades are informative, whereas index options trades convey insignificant information content.

¹ In Section 2, we explain why the analysis of the intraday KOSPI 200 futures dataset can significantly expand our knowledge of market microstructure studies in detail.

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