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# Price impact asymmetry of futures trades: Trade direction and trade size<sup>☆</sup>



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### ABSTRACT

By analyzing the high-quality intraday transaction dataset of KOSPI200 index futures contracts, one of the most actively traded index futures products in the world, this study examines price impact asymmetry between buyer- and seller-initiated trades and the difference in information content across the size of trades. To measure the permanent price impact incurred by each futures trade, which can be translated into the quality of information content of each trade, we use a modified version of the MRR model ([Madhavan et al., 1997](#)), which is appropriate for gauging the price impact and information content as well as analyzing the intraday price discovery issues that arise in purely order-driven markets.

Consistent with the empirical results of previous studies on market microstructure issues in Korea's index derivatives market (i.e., KOSPI200 index futures and options market), we find that large trades generally incur greater permanent price impacts than small trades. This indicates that large trades generally have greater information content than the smaller ones. However, in contrast to the majority of empirical studies in this area, which have reported that buy trades are more informative than sell trades in global financial markets, we find that the permanent price impact of seller-initiated trades is clearly and substantially larger than that of buyer-initiated trades in the KOSPI200 futures market. This indicates that sell trades are more informed than buy trades in the index futures market, where informed investors can freely submit sell orders without any restrictions. The greater information content of sell trades is also apparent when trades are classified by their size. These results are

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quite remarkable considering that the sample period of this study (2003–2006) corresponds to a recovery period, during which the underlying stock index price and the futures price continued to increase.

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## 1. Introduction

Whether there is a systematic difference in the permanent price impacts of incoming trades depending on their size (large or small) and direction (buy or sell) is an issue of ongoing debate in the field of market microstructure. This issue is quite important because the permanent price impact incurred by a trade can be used as a proxy for the magnitude of the information content embedded in the trade. If a financial market is completely efficient and frictionless and there is little information asymmetry among market participants, investors cannot draw any inferences about the fundamental value of an asset or the information content of an incoming trade based on its size or direction. In other words, in an efficient and frictionless financial market, there should be no consistent difference in the price impacts between buy and sell trades, and the trade size itself should carry no meaningful information content. However, in reality, because of the following reasons, the permanent price impact incurred by each trade may not be arbitrary and show substantial and consistent differences by the types of trades.

The first aspect is related to the trade size. The choice by investors on an optimal trade size is affected not only by liquidity-based reasons, but also by strategic reasons to increase profits by making the best use of information. On the one hand, informed investors are likely to prefer trading in large volumes because their trading profits generally increase with the total amount of transactions in a given period of time (Ahn et al., 2010; Dufour and Engle, 2000; Easley and O'Hara, 1987; Easley et al., 1997; Holthausen et al., 1987, 1990; Kang and Ryu, 2010; Lin et al., 1995). In this case, large trades have greater permanent price impacts on market prices than smaller trades do and, as a result, the trade size itself can provide relevant information. On the other hand, informed investors might split a single large order into several smaller ones to camouflage their trading intention or to reduce the adverse price movement that occurs when large trades dry market liquidity (Alexander and Peterson, 2007; Barclay and Warner, 1993; Chakravarty, 2001; Chou and Wang, 2009; Huang and Masulis, 2003; Kim and Ryu, 2012; Kyle, 1985; Ryu, 2012a). If this is a widespread strategy, small- or medium-size trades can be more informative than large trades.

The second aspect is related to the trade direction. There might be a certain level of inherent asymmetry between buy and sell trades for various reasons such as the inventory holding costs of market makers, financial regulatory systems, and/or the asymmetric payoff structures of assets.

For example, the inventory control cost imposed on market makers who set the bid and ask prices often differs for buy and sell trades (Easley et al., 1996; Neal, 1992; Vijh, 1988, 1990). This cost can result in price impact asymmetry between buy and sell trades in quote-driven or hybrid markets where designated market makers mediate transactions.

Additionally, short-sale restrictions, which are often imposed on stock market traders, can also lead to buy/sell asymmetry. In the presence of short-sale restrictions, even though an investor may possess negative information on individual stocks or the overall stock market, she cannot overcome the restriction and sell the stocks if she does not own them herself. Thus, this short-sale restriction impedes negative information from being reflected in stock prices and might render sell trades less informative compared with buy trades.

Moreover, asymmetry in the price impact of buy and sell trades can result from the asymmetric payoff structure of financial assets. The options contract is a representative asset that provides an asymmetric future payoff. If an investor owns positive (negative) information, she is likely to prefer buying call (put) options rather than writing put (call) options because, if she buys options, her potential gain could be substantial.<sup>1</sup> Additionally, the maximum future loss is limited to the market prices of the options. On the other hand, if the investor decides to write call options, the maximum future loss would be unbounded if her information is

<sup>1</sup> The selling activity of options contracts can be classified into two different cases. First, an options trader already owns the options contracts and she can sell the options that she possesses. We refer to this case as "selling the options." Second, an option trader who does not possess the options contracts can still "sell" the options. We refer to this second case of selling activity as "writing the options." The trader is paid the option premiums when she writes the options. However, this kind of writing can incur substantial losses if her betting is proven to be wrong.

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