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Technology upgrades in emerging equity markets: Effects on liquidity and trading activity ☆

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ABSTRACT

This study examines the effects of technological changes on liquidity of stock markets. Utilizing daily data of 361 stocks from 10 emerging market exchanges, namely Colombia, Indonesia, Johannesburg, Korea, Malaysia, Mexico, Russia, Shanghai, Shenzhen and Thailand, a panel data regression analysis shows that technological upgrade decreases the bid-ask spread and increases trading activity. In other words, launching a more sophisticated trading platform contributes to the overall liquidity of the market.

1. Introduction

For many years, developments in technology have been a core topic on the agenda of the exchange industry. Since technological upgrades modernize the way financial assets are traded, investments in exchange infrastructures improve the strength of the link between investment and savers. With the inclusion of technology in trading activities, the cost incurred by intermediaries decreases, thereby not only enabling more efficient risk sharing, but also improving hedging strategies, liquidity, and efficiency of prices (Hendershott et al., 2011).

☆ The views expressed in this work are those of the authors and do not necessarily reflect those of Borsa İstanbul or its members.

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Following the advance of electronic platforms, institutional investors have switched their focus to fully electronic trading systems, namely algorithmic trading. Algorithmic trading may be defined as the use of computer programmes to enter trading orders where the computer algorithm decides on aspects of execution of the order such as the timing, quantity and price of the order (European Commission, 2010). Currently the most popular type of algorithmic trading is high-frequency trading (HFT) where a large number of orders are sent into the market at high speed, with round-trip execution times measured in microseconds (Brogaard, 2010). Such a trading environment makes the speed and quality of access to the market a crucial component of the competition between the exchanges.

In this paper we investigate the effects of technological changes on bid-ask spreads and trading activity. What is meant by technological change here is an upgrade in trading systems and/or launch of a new trading platform which significantly decreases latency. Changes which do not significantly contribute to reducing latency are not considered as technological upgrades.

While previous studies primarily focus on liquidity and volatility, we particularly give attention to trading activity metrics. The reason for doing so is that, different from advanced markets, emerging stock exchanges expect significant improvements not only in market quality, but also in overall level of trading activity. To the best of our knowledge, we provide one of the first studies in this particular field of research focused on emerging markets. By utilizing stock-level daily data from ten stock exchanges, we determine that liquidity and trading activity are positively affected by technology upgrades. Having controlled for global trends and stock-related variables, our results were found to be robust with different dates of upgrades further strengthening our results.

2. Literature

Using either date of introduction of new technologies or volume of algorithmic/HF trading as a proxy for technological development, number of studies reveal the relationship between several variables -mainly liquidity, efficiency and volatility- and technological changes.

Focusing on the introduction of new technologies is also useful when the reverse side is considered. If algorithmic and/or HFT[1] finds itself as the main concern, using the introduction of new technologies as an instrumental variable reflecting the algorithmic trading/HFT activity solves the endogeneity problem which arises from the fact that such trading activity is also affected by market variables (Hendershott et al., 2011; Boehmer et al., 2014). Difficulty in tracking the algorithmic trading and HFT data is, of course, another reason behind the decision to use such a variable.

There are a number of studies focusing on spreads as liquidity measure. Hendershott and Moulton (2011) document that, by reducing the execution time for market orders from 10 s to less than one second, not only does the cost of immediacy (bid-ask spread) increases due to increased adverse selection, but so is the noise in prices reduced, thereby making prices more efficient. Hendershott et al. (2011), utilizing daily average data, report that for large stocks in particular, algorithmic trading narrows spreads, reduces adverse selection, and reduces trade-related price discovery, which then improves liquidity and enhances the informativeness of quotes. Hasbrouck and Saar (2013) report that rise in the volume of low-latency trades lowers spreads while also increasing the depth of the limit order book.

Riordan and Storkenmaier (2012) provide similar evidence from Europe. They examine the upgrade of the Deutsche Börse trading system with the release of Xetra 8.0., and show that decreasing latency leads to increased liquidity by decreasing bid-ask spreads while also improving the efficiency of prices.

[1] To clarify the descriptions, it is worth noting that high-frequency trading (HFT) is a subset of algorithmic trading, which refers to all trading activity performed through computer algorithms. As Hasbrouck and Saar (2013) suggests, the more structural difference lies in the nature of trading: "We can categorize algorithmic activity as proprietary or agency. We consider HFT a subcategory of proprietary algorithms for which low latency is essential... Agency algorithms are used by buy-side institutions ... to minimize the cost of executing trades in the process of implementing changes in their investment portfolios... Such proprietary algorithms try to make profit from the trading environment itself (as opposed to investing in stocks), employed by hedge funds, proprietary trading desks of large financial firms, and independent specialty firms."