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Anonymity and the Information Content of the Limit Order Book

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ABSTRACT

We investigate the effect of broker anonymity on the information content of the limit order book on the Australian Stock Exchange. We argue that the move to anonymity has stronger impact on institutional than individual investors. We document that anonymity increases the informativeness of institutional limit orders about future volatility but has little effect on individual limit orders. Our findings imply that anonymity allows institutional investors to display informative orders in the limit order book. Prices, however, adjust less sufficiently to institutional investors' order flow. Overall, anonymity may improve liquidity but it comes at the cost of reduced price efficiency.

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1. Introduction

In this paper we examine the information content of the limit order book and the change in this information after the removal of broker identifiers (IDs) on the Australian Stock Exchange (ASX). In doing so, we address three research questions. First, is the limit order book informative about future

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price volatility? Second, are institutional investors' limit orders more informative than individual limit orders about future price volatility? Finally, does the removal of broker IDs have any impact on the informativeness of the limit order book? If it does, are institutional or individual limit orders more affected by this change?

We use the order book slope to reflect the information content of the limit order book. Building on Næs and Skjeltorp (2006), the order book slope can be viewed as an average of various "elasticity" measures, each describing how the quantity supplied in the limit order book changes as we move from one price level to the next in the limit order book. Thus, the order book slope provides a summary of the price and depth dimensions of liquidity provision in the limit order book.

Investigating the informativeness of the limit order book slope about price volatility is important because volatility is essential for pricing options, determining order choices,[2] and making optimal investment decisions.[3] Furthermore, an understanding of the relation between the limit order book slope and future price volatility can provide evidence regarding the order choices of informed traders, and thus yields insights about the process through which information is incorporated into prices. Our investigation of the effect of the removal of broker IDs on the information content of the limit order book is also motivated by the recent trend of removing broker IDs in equity markets.[4] This trend has taken place despite the conventional wisdom that transparency improves market quality and the finding of Swan and Westerholm (2006) that the disclosure of broker IDs lowers trading cost and intraday volatility.[5]

We investigate the informativeness of the slope of the order book for the constituent stocks of the S&P/ASX 100 index. Our examination is based on a natural experiment, the switch to an anonymous trading system by the ASX on November 28, 2005. Prior to this date, the ASX disseminated to the broker community, in real time, the broker ID associated with every order in the central limit order book. Although the release of broker IDs information to third parties was strictly prohibited, institutional clients and very high net worth individuals often requested and received this information from their brokers (ASX, 2005). This created an informational advantage for those investors using full advisory broking services over those making their own trading decisions (ASX, 2003). Since November 28, 2005, the ASX has ceased providing broker IDs to the broker community in real time and provided only market share information at the end of the trading day and releases the full trading history with broker IDs after a delay of three days.[6]

Prior studies often find an improvement in liquidity after the move to an anonymous system (see, for example, Comerton-Forde et al., 2005; Foucault et al., 2007; Frino et al., 2008; Comerton-Forde and Tang, 2009). We add to this literature by analyzing how a reduction in market transparency affects the information content of the limit order book. Our study builds on the work of Foucault et al. (2007), who develop a theoretical model for limit order markets to explain the changing behavior of informed and uninformed traders after the removal of broker IDs. The authors argue that in a transparent market, uninformed investors infer information about future price movements from the limit orders submitted by informed traders. They try to front-run the informed traders to benefit from the information by setting more competitive quotes than those posted by the informed traders. In response, informed traders sometimes adopt "bluffing" strategies by posting non-aggressive orders and setting wider spreads than appropriate.

[2] See, for example, Foucault (1999), Bae et al. (2003), Ranaldo (2004), and Wald and Horrigan (2005) for a discussion on the effect of volatility on investors' order submission strategies.

[3] Fleming et al. (2001, 2003) demonstrate the substantial value of volatility timing in the context of investment decisions. Fleming et al. (2003) suggest that an investor implementing volatility-timing strategies would be willing to pay on the order of 50–200 basis points per year to capture the incremental gains generated by the realized volatility-based estimator.

[4] Several equity markets, such as the Euronext Paris, the Tokyo Stock Exchange, the ASX, and the New Zealand Exchange, have adopted this change.

[5] Market transparency is a broad issue. In this paper, we focus on the identities of the brokers submitting orders into the limit order book. Other papers focus on another aspect of pre-trade transparency, the disclosure of additional levels of the limit order book. For evidence on this line of research, see, among others, Boehmer et al. (2005), Madhavan et al. (2005), and Eom et al. (2007).

[6] One can argue that the disclosure/removal of the IDs of brokers' customers has a more meaningful impact on the market. This information, however, has never been publicly released on the ASX. Linnainmaa and Saar (2012) further show that broker identity is a powerful signal about the identity of the trader who initiates trades.

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