Research in International Business and Finance xxx (2014) xxx–xxx

Contents lists available at ScienceDirect

Research in International Business and Finance

journal homepage: www.elsevier.com/locate/ribaf

Liquidity, information, strategic trading in an electronic order book: New insights from the European carbon markets☆

Yves Rannou*

University of Poitiers, 20, rue Guillaume VII le Troubadour, Lab. CEREGE, EA 1722, TSA 61116, 86073 Poitiers Cedex 9, France

ARTICLE INFO

Available online xxx

JEL classification:
G13
G19
G32
E44

Keywords:
Carbon futures
Market microstructure
Asymmetric information
Order book data
Informed trading

ABSTRACT

The electronic limit order book (*LOB* hereafter) has rapidly become the primary way of trading European carbon assets over the 4 years of the EU ETS programme (2008–2012). In this first attempt of examining the informational content of an electronic order book, we evidence that order flow imbalances have a moderate capacity to predict short term price changes. However, we find that both *LOB* slope and immediacy costs help to forecast quote improvements and volatility in the next 30 min. Further, we explain why informed trading is highly influential and show that it consists in mixing order splitting strategies and posting fleeting orders once the asymmetric information is reduced (Rosu, 2009). Overall, the consolidated status of the order book mirrors a high level of market uncertainty and a low degree of informational efficiency. In this way, strategic trading can in itself explain some of order book properties, independently of the degree of traders' sophistication and market competition.

☆ The draft version of this paper was presented at the occasion of the 3rd International Symposium in Computational Economics and Finance (ISCEF) held in Paris in April 10–12, 2014. The author is very grateful to the two anonymous referees for their valuable comments and the editors in charge of the Special Issue ISCEF 2014. He finally thanks Prof. P. Barneto, O. Brandouy for their helpful suggestions and the Chair of Quantitative Finance of Ecole Centrale Paris for supplying the data used in this paper. Any remaining errors or omissions are the responsibility of the author.

* Tel.: +33 06 08 00 77 64.
E-mail address: yves.rannou@univ-poitiers.fr

http://dx.doi.org/10.1016/j.ribaf.2014.09.008
0275-5319/

1. Introduction

Electronic order books are the state-of-the-art and the most popular version of financial markets. They provide an immediate and valuable source of information for market participants who can select and adjust their strategies among a variety of orders: buy or sell, order type (limit or market[1]), size, time to trade, cancellation, etc. Their own market expectations based on this publicly available information may directly influence the informational efficiency or liquidity dynamics. Glosten (1994) find four advantages making electronic order books inevitable to trade: (1) limit orders should profit from small trades, given a low positive bid-ask spread; (2) sufficient liquidity provision during extreme volatility; (3) better transparency, and stronger competition; (4) handle extreme adverse selection problems. In the view of these advantages, five European carbon marketplaces have rapidly decided to adopt an electronic order book system to foster the liquidity of two markets: European Allowances (*EUA*) and Certified Emissions Reductions (*CER*).[2]

Quite surprisingly, no academic paper has yet investigated its full informational content beyond the best quotes despite a burgeoning market microstructure literature on carbon futures markets. Mizrach and Otsubo (2014) estimate the predictive power of order imbalances on *EUA* and *CER* futures returns for up to 3 days. Using high frequency transaction data, Medina et al. (2013) found that *EUA*s dominate price discovery, but the contribution of *CER*s is disproportionately large compared with their share in trading volume. They conclude on an overly large concentration of information-motivated trading for both markets. Frino et al. (2010) give evidence that higher spreads during higher volatility periods outweight informational advantages of compliant actors (informed traders) leading prices to reflect less available information to the market. Ibikunle et al. (2013) identifies a liquidity premium for *EUA* futures owing to higher (lower) competition for the supply (consumption) of market depth at lower (higher) prices especially for sell orders. However, little attempts have been done on identifying strategic trading through non-price related order flow variations apart from the studies of Kalaitzoglou and Ibrahim (2013). They find that a higher proportion of identical trades (same price, direction: buy or sell, volume) reveals the presence of informed traders in order to lower their non execution risks. Interestingly, they increase the size of their orders once discretionary liquidity (uninformed) traders react faster to the information contained in the order flow to avoid detectable order flow imbalances. Since almost 90% of trading activity occurs in ECX futures markets, our examination of limit order book dynamics may bring additional insights in terms of price discovery, trading strategies and order flow dynamics.

Mainstream market microstructure models often assume that informed traders are the initiating party in a trade in an order book. Based on this assumption, Foucault (1999) is the first to demonstrate the existence of a liquidity–volatility link. When the available volume of orders at best quotes is low, any market order has a price impact inducing higher volatility. The model of Goettler et al. (2009) predicts that the accumulation of pending orders at lower limits indicates that quotes are mispriced. We argue that, in the latter case, price movements are more plausible, which leads to higher future volatility and lower informational efficiency (Pascual and Veredas, 2010).

Many other papers have investigated the effects of order volume on the investor decisions on stock markets (Ranaldo, 2004; Cao et al., 2009; etc.). They generally conclude that available quantity of orders at and farther away from the top of *LOB* play different roles in order placement decisions.

Cao et al. (2009) precise that order flow imbalance measure including the first 10 order book limits help to better predict the 3 and 15 min returns on the Australian Stock Exchange (ASX) in comparison to trade imbalance (i.e. difference between buyer-initiated and seller-initiated trades (see Chordia et al.,

[1] If traders can choose to place limit orders when current quotes are close to the fundamental value, they may strategically submit market orders if they are far away from the fundamental value to avoid high execution risks. In the latter case, investors can choose to trade aggressive limit orders if bid-ask spread are widened (Goettler et al., 2009).

[2] The volume of electronic order book derivatives rose in 2013 by +6.4% compared to 2012 achieving a record of 55,000 bn USD while commodity derivatives experienced the highest increase (+20.5%) (Source: WFE, 2014).

Please cite this article in press as: Rannou, Y., Liquidity, information, strategic trading in an electronic order book: New insights from the European carbon markets. Res. Int. Business Finance (2014), http://dx.doi.org/10.1016/j.ribaf.2014.09.008