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Duration, trading volume and the price impact of trades in an emerging futures market ☆

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ABSTRACT

This paper examines the price impact of trading intensity on the MexDer TIIE28 interest rate futures contract, one of the world's most actively traded contracts. A novel volume-augmented duration model of price discovery decomposes trading intensity into liquidity and information components. Duration between transactions exerts a positive influence on price changes, while increases in order flow and trade volume exert positive and negative influences, respectively. The liquidity component dominates the information measure, suggesting that liquidity considerations dictate trade timing. These findings are rationalized with reference to MexDer's organizational structure, specifically the affirmative obligations placed upon marketmakers to trade a minimum volume.

1. Introduction

Theoretical microstructure models of financial markets are generally underpinned by information- or liquidity-based explanations of trading patterns. Understanding the relationship between asset prices, trading volume and duration (the time between consecutive trades) in the context of a particular trading

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architecture, is critical to analyze both the information and liquidity aspects of trading activity and the resulting value of a financial asset. This study examines the price impact of the various components of trading intensity utilizing a novel volume-augmented duration model of price discovery. A globally significant futures contract, the 28-day equilibrium interbank interest rate futures contract (*Tasa de Interes Interbancaria de Equilibrio* or TIIE28) trading on the Mexican Derivatives Exchange (MexDer) is selected for analysis. At the end of the data sample period (October 2006), the TIIE28 ranked as the world's 3rd most actively traded futures contract behind the CME's Eurodollar and Eurex's euro-bund contracts (Holz, 2007).[1]

The paper's focus is upon the relationship between key trading process variables, specifically; order flow, duration, and trading volume, and the subsequent changes in the TIIE28 futures price. Prior research generally analyzes the asset price impact of one or two specific trade process variables in isolation, rather than considering their combined effects. For example, Madhavan et al. (1997) concentrate solely on the price impact of order flow assuming trade size to be constant. They maintain that this allows for a more parsimonious model, and argue that if markets are anonymous, informed traders will split up their large trades. Their model implies that trade direction is usually more informative than trade size. In contrast, in DeJong et al. (1996) trade size constitutes one of the key determinants of the bid-ask spread, while several other theoretical market microstructure models (Easley and O'Hara, 1987; Engle, 2000; Manganelli, 2005) maintain that patterns in trading volume are the manifestation of the presence or absence of market relevant information.

The key contribution of this paper lies in its specification of a model which explicitly includes trading volume as a component of the trade direction indicator. The prior literature rationalizes this choice along several dimensions. Easley and O'Hara (1987) argue that considerations of both liquidity and optimal trading strategy dictate that informed traders will sometimes engage in high volume intensive trading, while at others will segment their order flow to generate a larger number of informationally based trades over a given period of time. Thus, trade volume conveys information relating to market conditions and may directly affect prices. Engle (2000) and Manganelli (2005) model volume as a stochastic process when estimating the trading impact of duration. Moreover, DeJong et al. (1996) provide evidence that transaction size (and by association trading volume) is positively related to measured pricing effects.

In addition to the above theoretically motivated reasons for including a trading volume variable in the estimated model, the organizational structure governing trading in MexDer's TIIE28 contract, in particular the affirmative obligations placed upon marketmakers as established in the markets "Liquidity Terms and Conditions", dictates that volume should be incorporated when modeling trading intensity and liquidity. To provide the requisite institutional context, MexDer commenced operations on 15th December 1998, trading Mexican Peso–US Dollar futures contracts.[2] The market operated *via* open outcry until the introduction of electronic trading in May 2000, transforming MexDer into a fully automated electronic limit order book market. However, low trading volumes continued, until a decisive development in a series of procedures designed to enhance market liquidity occurred in May 2001, namely the introduction of exchanged-designated marketmakers.[3] Marketmakers are committed among other responsibilities, to (i) offer buy and sell quotes with a maximum spread to create liquid markets in a minimum number of TIIE28 contract maturity dates, and (ii) trade a minimum number of TIIE28 contracts each month (the minimum volume rule). They are also granted with certain exclusive trading rights. Specifically, rather than having to submit orders through the electronic order book, marketmakers are also allowed exclusive access to a voice trading-by-phone service by which they can request MexDer's Trading Floor personnel to enter, modify or cancel orders. Moreover, the MexDer "Manual of Policies and Procedures"

[1] Measured by volume, in number of contracts. In 2006, the TIIE28 contract accounted for 93% of total MexDer trading volume and 98.9% of the exchange's open interest. In 2006 MexDer ranked as the world's 8th largest derivatives exchange by volume of contracts traded (Holz, 2007).

[2] Trading on a stock index (IPC) contract started on April, 15 1999, and in interest rate futures, including the TIIE28 one month later.

[3] Marketmakers were introduced by MexDer only in the TIIE28 contract. Panayides (2007) studies the impact of affirmative obligations to provide liquidity under the NYSE's "price continuity" rule on designated marketmaker inventory positions.