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Liquidity, liquidity risk, and information flow: Lessons from an emerging market

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ABSTRACT

This paper examines the role of public and private information flows in intraday liquidity and intraday liquidity risk in the Tunisian stock market. Our empirical results are based on ARMA and GARCH-type models and show that, for major Tunisian stocks, gradually elapsed public information together with gradually elapsed private information in the market is the dominant factor in liquidity improvements in the Tunisian stock market. Liquidity improvements are generated by a decrease in the bid-ask spread accompanied by an increase in the depth at best limit. Our results clearly indicate that the arrival of public information in a sequential manner is the dominant factor generating increases in liquidity risk related to the bid-ask spread, while the advent of private information in a contemporaneous manner is the dominant factor generating increases in liquidity risk related to the depth at best limit. Additionally, our results show that liquidity risk persistence disappears when trading volume and order imbalance are included as explanatory variables in the conditional variance equation.

1. Introduction

The market microstructure theory has challenged the fundamental assumption of the efficiency theory, which assumes that hazard is the main determinant of asset price. Anderson (1996) suggests that the market microstructure theory shows that asset returns are generated from new information arriving on the market. Pioneering studies on the microstructure theory initially investigated the impact of trading volume on liquidity, particularly in the stock markets of developed countries. Lamoureux and Lastrapes (1990) considered trading volume a latent measure of public information. The authors show that the public information may be unequally accessible among market actors and may be interpreted differently. The authors also note that the diffusion of information in the market motivates investors to conduct transactions (purchases and sales). Many researchers have attempted to provide evidence of the relationship between return and return volatility with variables measuring transaction activities. The intuition concerning this relationship is based on two theoretical explanations: The mixture of distribution hypothesis (MDH)[1] and the sequential information arrival hypothesis (SIAH).[2] According to these

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[1] This hypothesis was be developed by Clark (1973).
[2] This assumption was developed by Copeland (1976).

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assumptions, larger, active markets are usually more liquid, and more frequently traded stocks have lower bid-ask spreads (Demsetz, 1968). According to Demsetz (1968), the results are a consequence of competitive intermediation. Higher transaction demand leads to more profit for dealers and hence cheaper provision of liquidity services. Additionally, lower costs naturally elicit more trade, as in any other product market. Underlying this view is the concept of liquidity as the output of a sector with access to a particular intermediation technology. The same conclusion is verified in some classical models of asymmetric information. Kyle (1985) shows that the equilibrium in the game between liquidity suppliers and informed traders requires that informed demand (and hence volume) scales with uninformed demand, while illiquidity (Kyle's lambda) is inversely proportional to the scale of uninformed demand because more noise renders total order flow less informative. Therefore, more volume implies higher liquidity. The same result is verified in a third class of model. Lippman and McCall (1986) suggest that search activity, for whatever reason, reduces liquidity.

However, the lack of a dynamic relationship between liquidity and information flow (mainly the volume of information flow) constitutes a challenge for the literature. During the last three decades, many researchers have attempted to analyze the relationship between liquidity, liquidity risk, and information.

The initial literature investigated the relationship between liquidity, liquidity risk, and traded volume. Many studies have shown a negative relationship between bid-ask spread as a price proxy for liquidity and trading volume (Bagehot, 1971; Copeland and Galai, 1983; Glosten and Milgrom, 1985; Kyle, 1985). Other researchers have attributed the depth of impact on trading volume to quantity-proxy of liquidity. Lee et al. (1993) showed that market makers protect themselves against the arrival of informed investors by increasing the bid-ask spread. In this situation, the market makers must also reduce the depth at best limit. The authors showed that a high trading volume generated an increase in the bid-ask spread and a decrease in the depth at best limit and, consequently, a deterioration in liquidity. More recently, Vo (2007) used intraday data from the Toronto stock market during the period September 1999 to November 1999. The author showed that trading volume is inversely related to both the quoted bid-ask spread and the effective bid-ask spread. However, trading volume is directly related to depth at best limit. This result implies that a high trading volume generates significant liquidity. Chen and Wu (2008) affirmed that depth at best limit cause-grangers the trading volume while the trading volume does not cause-granger depth at best limit. Chung et al. (2009) revealed a positive relationship between trading volume and liquidity in the Korean stock market. In the London stock market, Kyaw and Hillier (2011) showed that, for large companies, an increase in trading volume generates a decrease in the proportional bid-ask spread and hence an improvement in liquidity. For small companies, an increase in trading volume causes an increase in the proportional bid-ask spread and, therefore, a deterioration in liquidity. Chai et al. (2010) clearly explained the effect of trading characteristics on six liquidity measures in the Australian stock market. They showed that trading volume is the main determinant of liquidity. In the same market, Frino et al. (2011) tested the impact of trading halts on liquidity. The authors showed that this type of trading increases bid-ask spreads and reduces market depth at the best quotes in the immediate post-halt period. The results of this study illustrate that trading halts deteriorate market quality in markets that operate with open electronic limit order books. Fathi et al. (2012) investigated the effect of transaction activity measurements (price, return volatility, and trading volume) on liquidity. The authors found evidence that trading volume affects liquidity in the Tehran stock market. Malinova and Park (2013) studied the impact of the organization of trading on volume, liquidity, and price efficiency in a quote-driven dealer market and an order-driven limit order book. They showed that the trading volume released in a limit order market is higher, making this system most attractive for trading venues. More recently, Cao and Petrasek (2014) supported the hypothesis that, in the US context, institutional ownership affects the liquidity risk of stocks differently than individual ownership. Stocks held by institutions, on average, have lower liquidity risk than stocks held by individual investors during the period from 1990 to 2012. Referring to the NYSE ReTrac EOD database between March 15, 2004 and December 31, 2011, Wang and Zhang (2015) showed that heavily traded stocks by individual investors have higher liquidity. The positive effect of individual investor trading on stock liquidity is stronger for firms with greater information asymmetry, consistent with individual investor trading that reduces information asymmetry. These results suggest that trading volume generated by the individual investor improves stock liquidity by reducing information asymmetry.

Such studies have focused only on the traded volume (public information) and have ignored the private information and the trading direction in the analysis of the relationship between liquidity, liquidity risk, and information flow.[3] The second strand of literature considers public and private information in analyses of the relationship between asset return and information flow. Chan and Fong (2000) and Chordia et al. (2002) suggested that order imbalance might be a proxy for private information. The authors showed that the existence of order imbalance obliges market makers to move away from their optimal inventory position. When the deviation is significant, the associated costs will also be significant. To overcome this problem, the market makers adjust the bid-ask spread to attract the orders back to their optimal inventory position. This intuition coincides with the adverse selection theory: the order flow imbalances contribute to increasing costs generated by incorrect positioning inventory from market makers (Stoll, 1978; Ho and Stoll, 1981). From an empirical perspective, few studies have examined the relationship connecting order imbalance with the dimension-quantity of liquidity. Shen and

[3] Chordia et al. (2001) adequately explained the limits of trading volume as follows. Given a quantity of 1,000,000 traded shares, there are many possible situations. In the first case, the traded quantity can be interpreted as 1,000,000 sold shares, or it can be interpreted as 1,000,000 purchased shares. In the second case, the quantity may be divided into 500,000 shares initiated by sellers and 500,000 shares initiated by buyers. The authors suggested that, for each case, there are different implications for price and for liquidity.