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Stock Market Liquidity: Behavior of Short-Term and Long-Term Traders During Crashes

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1. Introduction

A liquid and stable stock market plays a critical role in the economy. It channels savings into long-term investments that are necessarily illiquid while simultaneously providing liquidity to investors by providing access to their capital when needed by trading with others, thereby promoting economic growth. Due to advances in technology, trading through anonymous open electronic order book markets (where there are no clearly designated market makers who are primarily responsible for liquidity provision) has become the preferred avenue for trading stocks. The popular view is that this has increased short-term trading, which in turn has adversely affected the liquidity and short-term volatility in the market, thereby contributing to its potential fragility. The extant empirical findings are mixed. In this study, we contribute to this debate by identifying short-term and long-term traders and examining their role in liquidity provision during normal and fragile market conditions.

2. Our Study

Using a unique database, we are able to track individual traders and their transactions over time, identify liquidity providers based on their trading behavior, and classify traders

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into short-term and long-term traders, since traders with different investment horizons are known to have differing liquidity provision characteristics, especially during market crashes.

We use order book and transactions data for three months in 2006 related to the shares of a large firm traded on the National Stock Exchange of India (NSE), which provides a unique identifier for each broker-trader combination. During this period, there were 108,542 distinct traders transacting a total of 115.6 million shares in the spot market for shares of the stock. The NSE became the largest stock exchange in India by volume of trading at the end of 1995, overtaking the Bombay Stock Exchange (BSE). The NSE was the third largest exchange worldwide in 2006 based on the number of trades, after NYSE and NASDAQ.

The NSE classifies traders in terms of their legal affiliations. We find that these legal classifications of traders (such as retail, institutions, etc.) are not adequate for understanding liquidity provision in the market. Liquidity provision is an action, and as such, it is dynamic. Under some circumstances, several traders could become liquidity providers, and under different scenarios, they may become liquidity demanders. Several types of traders are short-term liquidity providers, i.e., they tolerate deviations from their desired inventory positions for short periods of time. Some are longer-term liquidity providers, who can tolerate persistent deviations from their target inventory positions. Therefore, we go beyond the legal classification of traders and directly identify short-term and long-term liquidity providers based on their trading behavior.

3. Results

We find that short-term traders (STTs), who carry relatively small amounts of inventory intra-day relative to their trading volume and/or carry little inventory overnight, were important providers of liquidity during normal times; they accounted for over 75% of the shares traded. During normal price fluctuations, STTs buy when prices decline and sell when prices rise, thereby providing liquidity and stabilizing prices. Order modification is an important tool they use in managing their inventory risk. When STT inventories are large and positive (large and negative), the ask-side (bid-side) becomes more liquid, and the bid-side (ask-side) becomes less liquid due to order modifications.

While STTs contribute to about 75% of the total trading volume in the spot market for the stocks in our sample period, three-fourth of their trades are among themselves.

This pattern is similar to what has been observed in foreign exchange markets and in the London Stock Exchange. This phenomenon is often referred to as *hot potato trading*. A typical short-term trader, who also provides liquidity in the market, protects herself against trading with those having superior information through the bid-ask spread. However, there is also the need to process information as it arrives over time, requiring quote revisions, which consumes time. Holding inventories over shorter periods of time by passing on some of the inventory to other traders while processing information that arrives in the interim through *hot potato trading* and *order modifications* helps in managing inventory risk. We develop new methods for identifying and measuring *hot potato trading* and *order modifications*. Our findings are consistent with the view that STTs use *hot potato trading* and *order modifications* as inventory risk management tools.

There are two fast crashes in the spot market in our sample—days when the price for the stock declined by more than 3% and then sharply recovered by more than 3% during a 15-minute time span. The unusually large liquidity shocks were due to large selling by foreign institutional investors. Buying by STTs (who provide liquidity during normal times) was not enough. *Order modifications* by STTs—presumably to manage inventory risks—led to the drying up of liquidity. Buying by mutual funds (which have a natural advantage in making a market in the basket of stocks they hold) and other long-term traders provided the much needed price support and helped price recovery to take hold. This process took time; price recovery due to liquidity infusion by institutions does not occur instantaneously. Our findings are consistent with what is reported in the extant academic literature; this phenomenon is known as “slow moving capital” and provides one justification for trading halts that give time for market making capital to move in.

4. Conclusion

During the two fast crashes in our sample, order modifications played an important role. This contributed to the evaporation of liquidity and the suspension of trading during one of the crashes, thereby highlighting the role of order modifications in inventory risk management during such episodes, which accentuates market fragility.

The *flash crash* of May 6, 2010 focused the attention of exchanges and regulators on the need to understand what causes market fragility; the initial focus was on the role of high-frequency traders (HFTs). There is now some degree of consensus that HFTs were not

the cause of that flash crash. Our findings in the context of a market where there were no HFTs highlight the importance of forces other than HFTs that influence short-term liquidity and the occurrence of crashes in stock markets. The sudden influx of sell orders concurrent with bad news about the economy or about the stock and *slow-moving market making capital* may be the primary drivers of market crashes. Since HFTs are similar to STTs, our findings suggest that while HFTs are unlikely to be the cause of crashes, they are also unlikely to be in a position to provide liquidity when it is needed most for the market to recover from crashes (when they do occur).