Technical analyses and order submission behaviors: Evidence from an emerging market

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ABSTRACT

The usefulness of technical analyses has never reached a consensus. Unlike most literature studying stock price behaviors surrounding the presence of technical trading signals, this paper examines the heterogeneity in order submission behaviors of investors in the Taiwan Stock Exchange. Our results show that professional institutional investors, particularly foreign investors, behave in a manner consistent with the suggested strategy by the KD trading rule. Namely, after the presence of buy (sell) signals, they intend to buy (sell) the stocks. Conversely, individual investors, acting like liquidity suppliers, tend to net sell (buy) those stocks.

1. Introduction

Academics have long been skeptical about the usefulness of technical analysis, despite its widespread acceptance and adoption by practitioners. Traditional wisdom (e.g., Alexander, 1961; Fama & Blume, 1966; Jensen & Benington, 1970) suggests that technical trading rules imply bounded market rationality and are in conflict with market efficiency.[3] Chartists believe that chart patterns in stock prices tend to repeat themselves and, thus, predict future returns. However, there is no credible explanation as to why these patterns should repeat (Jegadeesh, 2000). Lo and MacKinlay (1988, 1999) argue that stock prices do not entirely follow a random walk and some components of stock returns are still predictable, giving rise to renewed interest in technical analyses.

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[3] As Lo (2005) notes, there is no consensus among finance academics and practitioners as to whether stock market is efficient. While most of finance professors believe that the market is weak-form efficient (Doran, Peterson, & Wright, 2010; Neely, 2003), there are critiques from the behavioral finance documenting irrational, but highly predictable, investor behaviors (e.g., Barber & Odean, 2008; DeBondt & Thaler, 1985). Hong and Stein (1999) develop a model in which slow information diffusion coupled with bounded rationality creates persistent price trends, implying the existence of profitable trading opportunities. Lo (2005) and Ito and Sugiyama (2009) argue that the degree of efficiency varies in a cyclical fashion consistent with the adaptive markets hypothesis (AMH) proposed by Lo (2004). Through the AMH, market efficiency is explained from an evolutionary perspective, shedding light on possible (at least short-term or periodical) effectiveness of trading rules and the associated boundedly rational investor behaviors.

Recent literature shows evidence that simple technical trading rules exhibit some forecasting power for future returns and are thus profitable,[4] presenting a challenge to proponents of efficient markets.

While empirical evidence of the usefulness of technical analysis and the associated price behaviors keeps piling up, little is known about the price-formation process and its driving forces surrounding the presence of trading signals. Unlike mostly prior research, this paper does not intend to join the debate on the market efficiency issue (e.g., Buguk & Brorsen, 2003; Hoque, Kim, & Pyun, 2007). Instead, from a behavioral angle, the goal of this paper is to explore order submission strategies among different investor groups surrounding the presence of effective trading signals. In other words, given distinguishable price behaviors associated with the selected effective trading rules, this paper pays attention to investor behaviors that drive stock demand and supply and ultimately stock price behaviors in the Taiwan Stock Exchange (TSE).[5]

Regarded as a seemingly viable approach to selecting stocks, technical trading in Taiwan draws attention from market practitioners. To encourage trading, brokerage firms circulate charts and technical commentaries to their clients, without extra charge, through on-line trading software with which their clients place limit orders. This paper selects two technical rules, the KD (alternatively called the Stochastic or Momentum Oscillator) and the MA (Moving Average) rules are considered by practitioners be the one of the most, if not the most, simple and popular of the chart patterns.

The initiation of trading signals by a KD (MA) rule relies upon the intersections of two relevant curves — indicators K and D (the moving averages with different time horizons). The standard trading strategy suggests that investors buy (sell) a stock immediately after a buy (sell) signal for the stock is initiated. Mostly Taiwanese trading houses are equipped with the devices that automatically perform both kinds of analyses and notify their customers, once trading signals are initiated. How different types of investors react to the signals reflects their beliefs in those technical trading rules.

Institutional and individual investors are generally believed to be informed and noise traders, respectively (Chakravarty & McConnell, 1997, 1999; Koski & Scruggs, 1998; Lee, Liu, Roll, & Subrahmanyam, 2004; Griffin, Harris, & Topaloglu, 2003; Barber & Odean, 2008). Even sub-rational traders could affect stock price systematically (Barber, Odean, and Zhu, 2009; Hvidkjaer, 2008; Kaniel, Saar, & Titman, 2008; Kumar and Lee, 2006; Richards, 2005). The strategic roles of different investor groups could be instructive and provide guidance on the potential worthiness of these signals.[6]

To make this research feasible, we employ trade and order data for the TSE that can identify investor types, including foreign investors, mutual funds, securities dealers, corporate institutions, and individual investors. Thus, our order data help us undoubtedly identify the *ex-ante* order submission behaviors of investors and their strategic roles — who trade the stocks surrounding the initiation of trading signals and how they trade, in addition to their *ex-post* positions (Ahn, Cai, & Cheung, 2005). To our knowledge, this paper is among the first to examine the behavior issue regarding technical analysis, using such voluminous and comprehensive intraday data.[7]

Painting a different picture of technical analyses, we show that, first, stock prices indeed reverse around the presence of KD signals, while the price pattern associated with the MA rule is less evident, which are only the observations in this paper comparable to those in prior research. Second, investors' order submission behaviors are indeed relevant to the presence of trading signals. From the angle of aggressive limit orders, evidence shows that foreign investors trade stocks more actively around KD signals and their strategic behavior coincides with the suggested trading strategy. From the angle of patient limit orders, individual investors well serve as liquidity suppliers or tend to net sell (buy) the stocks initiating buy (sell) signals at highs (lows), whereas professional institutional investors try to buy (sell) them at highs (lows). Our results are robust to controlling for firm size, market condition, trading volume, and the feedback trading tendency.

The remainder of this paper is organized as follows: Section 2 introduces the selected technical trading rules. Section 3 describes the data sources and the applied methodologies. Section 4 analyzes the price behaviors of the stocks surrounding the presence of trading signals by the selected trading rules and the order submission behavior of each investor group and their strategic roles. Finally, Section 5 concludes this paper.

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[4] For example, Brock et al. (1992), Ito (1999), Bessembinder and Chan (1995), and Lo et al. (2000) show that technical trading rules have significant forecasting power in stock returns. Dooley and Shafer (1984), Sweeney (1986), Levich and Thomas (1993), Kho (1996), Ito (1999), Neely, Weller, and Dittmar (1997), and Osler (2000) document the success of similar technical trading rules for predicting changes in currency exchange rates. However, after introducing trading costs and/or adjustments for non-synchronous trading, the profitability of technical trading rules is found vague (Allen & Karjalainen, 1999; Bessembinder & Chan, 1998; Hudson, Dempsey, & Keasey, 1996; Isakov & Hollistein, 1998; Ready, 2002). Bessembinder and Chan (1998) further claim that technical forecasting power need not be in conflict with market efficiency.

[5] Ratner and Leal (1999), testing the variable moving average rules in Latin America and Asia, find Taiwan, Thailand, and Mexico as the only three profitable markets.

[6] Concerning behaviors among various investor groups, Grinblatt and Keloharju (2000) find that Finnish individual investors are contrarian traders, while foreigners act as momentum traders. Barber and Odean (2008) conclude that attention is a major factor in determining what individual investors trade, but does not apply with equal force to institutional investors. Even among institutions, the trading strategies could be substantially different (e.g., Dennis & Strickland, 2002; Grinblatt et al., 1995). Dennis and Strickland (2002) show that mutual fund managers pursue momentum-based strategies that are more likely to payoff in the short run. Pensioners and banks, by contrast, are conservative and make investment decisions based on long-term criteria. The difference in investor composition, leading to a variation in aggregate order submission behavior, influences dynamic price behavior (Ahn, Bae, and Chan, 2001; Handa, Schwartz, and Tiwari, 2003).

[7] There are two prior studies applying intraday data to analyze investor behaviors. Kavajecz and Odders-White (2004) confirm that technical analysis support and resistance levels explain limit prices with high cumulative depth, and, more importantly, this relationship is tied to order submission strategies. They focus mostly on the status of the limit order book, while this paper pays attention to the imbalances of aggressive (marketable) and patient (nonmarketable) orders. Osler (2003) examines order clustering in currency markets using data on stop-loss and take-profit orders that, differing structurally from limit orders applied in this paper, are market or "at best" orders conditional on rates hitting a certain level. She justifies two predictions of technical analysis: (1) price trends tend to reverse course at pre-identifiable support or resistance levels, which are often round numbers; (2) trends tend to be relatively rapid after rates cross support and resistance levels.