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## Trading patterns in the TAIEX futures markets: Information- or behavioral-based trades?

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## ABSTRACT

This study investigates the relation between trading patterns and performance in the TAIEX futures market. The research shows that individual investors are poor market timers and earn negative returns; institutional investors have success in timing the market and their trades make positive returns. Individual trading activity is more aggressive in terms of a higher proportion of the market order and a shorter holding period for a round-trip trade. Individual trading is also more motivated by behavioral bias, like overconfidence and disposition effect. Institutional investors exhibit significant overconfidence-based trading when opening extremely small or relatively large positions.

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## 1. Introduction

Institutional and individual investors are two major players who compete to obtain limited profitability in financial markets. Institutions generally differ from individuals due to their size and sophistication (Kaniel, Saar, & Titman, 2005). In particular, individual investors are generally less well informed and prone to misinterpret available information or trade for non-informational reasons. In comparison, institutional investors have better resources and training than do individual investors. Although institutions cannot be immune from the same cognitive biases as individuals, the impacts from behavioral biases may be alleviated since they may overcome these biases through better information and analytical skill. Thus, behavioral biases may have different effects on the trading patterns of institutional and individual traders. Consistent with this, institutions are found to be informed investors (e.g., Chakravarty, 2001; Jones & Lipson, 2004), by contrast, individual investors are irrational noise traders and frequently succumb to their cognitive biases (Bange, 2000; Frazzini & Lamont, 2008). However, some papers posit that individuals make excess returns through providing liquidity for institutional trading demands (Campbell, Ramadorai, & Vuolteenaho, 2005; Kaniel et al., 2005).

Therefore, the evidence so far is mixed regarding the roles of individual and institutional investors.

In view of these conflicting findings, this study uses a new data set with detailed transaction information to explore whether trading decisions are influenced more by knowledge about value (information-based trading) or by psychological biases (behavioral-based trading). The sample used in this study contains 38,684,525 trades of the Taiwan Stock Exchange Capitalization Weighted Stock Index (TAIEX) futures executed by individual investors and 13,057,657 trades of TAIEX futures executed by institutional investment accounts during the period January 2004 through December 2008.

Some previous studies have examined the TAIEX futures markets. The issues include the information conveyed by trade types of different categories of investors (Lin, 2011), the impact of a tax rate reduction on the market quality (Chou & Wang, 2006), the expiration-day effects (Chou, Chen, & Chen, 2006; Chueh & Yang, 2005), the cost–minimization combination of margins, spot price limits, and futures price limits (Chou, Lin, & Yu, 2006), and the daily dynamic relation between returns and trades by institutional and individual investors (Lin, 2011). Other authors compare the information transmission between TAIEX and Mini-TAIEX Stock Index Futures (Lin, Hsu, & Chiang, 2004) and price discovery between TAIEX index futures and SGX MSCI Taiwan index futures (Chen, Lin, Chou, & Hwang, 2002).

The research by Cheng, Lin, and Chuang (2007), Kuo and Lin (2013, 2011) is associated with behavioral-based trades in the TAIEX futures market. Kuo and Lin (2013) investigate the

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performance of individual day traders in the TAIEX market and find that individual day traders incur a significant loss. Cheng et al. (2007) examine the trading behavior and performance of traders in the TAIEX market. They find that the individual traders are positive feedback traders while foreign investors tend to engage in negative feedback trading. Lin (2011) shows that open trading by foreign institutional investors conveys more information regarding the underlying index, and open selling of individual investors is more likely to introduce noise signals to the spot market.

Different from Kuo and Lin (2013), this paper not only investigates the performance of individual traders, but also compares the performance and trading behavior of individual and institutional traders in the TAIEX market. Besides, although Cheng et al. (2007) have examined the trading behavior and performance of traders in the TAIEX market, they do not discuss whether the difference in performance between individual and institutional traders arises from their different behavioral biases. Lin (2011) shows that individuals are more irrational and more prone to misinterpret available information. Nevertheless, she does not address the relationship between trading decisions and behavioral biases. Additionally, to my best knowledge, no research has yet investigated whether behavioral biases, like overconfidence and disposition bias, will affect individual and institutional investors' tendency to open a new contract or close an existing contract. This study intends to fill in this gap. By separating trades into open volume and close volume, it has been possible to examine whether decisions to open a new contract or close an existing contract are more affected by information motives or by behavioral biases.

I first compare the return performance and trading behavior of institutions and individual investors. I find that the average trading return for individual contracts is negative, whereas the average return obtained by institutional investors is positive. Furthermore, institutional investors appear to have some success in market timing. In particular, the TAIEX futures market experiences positive returns after institutional buying and negative returns after institutional selling. By contrast, individual investors are poor market timers; market return is negative after their buying and positive after their selling. Nofsinger and Sias (1999) and Kamesaka, Nofsinger, and Kawakita (2003) posit that a strategy earning positive returns indicates that it is motivated more by information, whereas trading which results in a negative return indicates a higher probability of behavioral-based motivation. When combined with the preliminary findings of this study, this research indicates that the decisions of individuals are more behavioral-based, whereas those of institutional investors are more information-based.

The behavioral-based model argues that investor trading decisions are influenced by behavioral biases, like overconfidence and disposition effect (Daniel, Hirshleifer, & Subrahmanyam, 1998; Gervais & Odean, 2001). Both the overconfidence and disposition biases may have effects in the decisions to close a position. But only overconfidence bias may affect the decisions to open a new contract. The results show that, the round-trip trade of individuals has a shorter period than that of institutional investors; individuals exhibit a tendency toward the disposition effect, but institutional investors display a reverse disposition effect. Individuals are also more aggressive in terms of a higher proportion of the market order and a shorter holding period for a round-trip trade. A further regression test confirms the positive relationship between trading behavior (including both open and close trading) and overconfidence among individual investors, and the disposition effect of individuals occurs when they close an extremely low amount of positions or relatively large positions. Similarly, overconfidence induces institutional investors to open an extremely small amount of positions or relatively large positions, and institutional investors'

desire to realize gains soon and ride on losses contributes a high closing volume. Thus, I conclude that the trading activity of both types of investors shows evidence of behavioral-bias motivation. However, a further comparison of trades by individual and institutional investors in the TAIEX futures markets shows that individual investors are less-informed and their trading decisions are more motivated by behavioral biases.

The remainder of this paper is organized as follows. Section 2 introduces the data used in this study; Section 3 compares the trading performance of individual and institutional investors; Section 4 explores the motivation behind trading and compares the trading behavior for institutions and individual traders; with the conclusions being provided in the final section.

## 2. Data

The data for this study consist of all of the trades of the spot-month Taiwan Stock Exchange Capitalization Weighted Stock Index (TAIEX) futures contracts from the Taiwan Futures Exchange (TAIFEX) during the period January 2004 through December 2008. The TAIEX is a market capitalization weighted index composed of all stocks listed in the Taiwan Stock Exchange. The contract size per contract is the TAIEX index point multiplied by 200 New Taiwan Dollars (NTD). Contract months of TAIEX index futures are spot month, the next calendar month, and the next three quarterly months. The last trading day for each contract month is the third Wednesday of the delivery month for each contract. Since launched on 21 July 1998, TAIEX futures contracts have been growing fast and have made up the largest part of futures contracts in the TAIFEX. According to Futures Industry Association (FIA), the Taiwan Stock Index Futures contract (TX) is the sixth largest one of Asian index futures contracts in 2004 and TAIFEX's global ranking on trading volume rose to rank 17th in 2008 from 57th in 1998 (Lin, 2011).

The data include trader's ID codes, trading directions (buy/sell), transaction prices and volume (in number of contracts), and the time of each transaction. This unique dataset allow me to correctly identify the trade type for each transaction, including open buy, open sell, close buy, and close sell. This helps me to reduce the error likely to occur in studies using the Lee and Ready (1991) algorithm to speculate on buyer-initiated and seller-initiated volume (see e.g., Chan et al., 2002). In addition, different from prior research with mature futures markets where the institutional investors are the major participants, individual investors are the major participants in the TAIEX futures markets. Because of these features and the availability of data with trade- and trader-type classifications, the TAIFEX futures market is an appropriate environment to test the relation between trading decisions and behavioral bias.

To obtain an indication of whether their trading is based more on information or behavioral bias, I first provide the net returns per contract for each investor type. Appendix illustrates the calculation of major relevant variables: the net realized returns, net unrealized returns, duration, numbers of realized gains, numbers of realized losses, numbers of unrealized gains, numbers of unrealized losses, open buy volume, open sell volume, close buy volume, and close sell volume. The procedure is as follows. For each trader and each contract, I first sort trades based on transaction time. Once the first trade is located, I track each subsequent trade. I mark to market after each trade and calculate statistics such as the weighted average costs, open interests (OIs), trading volume, realized gains/losses and unrealized gains/losses. The weighted average cost for trade  $j$  at time  $t + 1$  is defined as:  $AVC_{j,t+1} = \frac{P_{jt}V_{jt} + P_{j,t+1}V_{j,t+1}}{V_{jt} + V_{j,t+1}}$ , where  $P_{jt}$  ( $P_{j,t+1}$ ) is the futures price for trade  $j$  at time  $t$  ( $t + 1$ ) and  $V_{jt}$  ( $V_{j,t+1}$ ) is the numbers of contracts of the trade for trade  $j$  at time  $t$  ( $t + 1$ ). For a long (short) position being closed, the sales (purchase) price is

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