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Trading behavior in S&P 500 index futures

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ABSTRACT

This article examines the determinants of trading decisions and the performance of trader types, in the context of the E-Mini S&P 500 futures and S&P 500 futures markets. Speculators and small traders tend to follow positive feedback strategies while hedgers dynamically adjust positions in response to market returns. Such strategies apparently reverse during the 2008–09 financial crisis. Investor sentiment and market volatility play an important role in determining the net trading position of traders across the sample period. While all trader types are better at foreseeing market upturns, an out-of-sample test suggests that speculators and small traders have some predictive ability for short-term market returns.

1. Introduction

Following its introduction in 1982, the S&P 500 index futures contract quickly became the most actively traded equity index contract in the world, and the focus of much attention from the media, traders, and academics. Following significant increases in the standard contract size, as a result of increases in the index value, the electronically traded E-Mini S&P 500 futures contract[1] was introduced in 1997. The establishment of this E-Mini contract allows for the study of investor behavior across two closely related equity index futures markets, and goes some way towards exploring whether the introduction of the new contract was a worthwhile exercise for the Chicago Mercantile Exchange (CME).

While there is clear evidence (e.g. Karagozoglu and Martell, 1999; Karagozoglu, Martell, and Wang, 2003) that smaller contract sizes have positive impacts on the market in terms of increasing volume, smoother trading, and encouraging more small traders to trade, the literature on the quality of open outcry versus electronic trading is not so clear as to the preferred method. Tse and Zabotina (2001) suggest that while electronic markets have lower bid-ask spreads, the market quality and trade informativeness are greater in the open outcry market. Pirrong (2003) argues that miscommunication between traders reduces the efficiency of open outcry markets, while several studies find that execution time is reduced in electronic markets. Martinez et al. (2011) suggest that transaction costs are higher in an open-outcry market and volume migrates away as a result. Whatever the result from empirical evidence, it is clear from the migration to electronic exchanges, which side of the argument is winning in the minds of the exchanges themselves.

A literature has developed around sentiment indicators and investment performance. Clarke and Statman (1998) find that the Bullish Sentiment Index, a measure of the bullishness of newsletter writers, does not have significant forecasting power. Fisher and Statman (2000) consider the sentiment of newsletter writers, small investors, and Wall Street strategists, while Simon and Wiggins (2001) use market-based sentiment measures, all of which are found to be contrarian indicators. More recently, Baker and Wurgler (2007) demonstrate that waves of investor sentiment have clearly discernible, and regular, effects on both individual firms and the stock market as a whole. Another approach has Brown and Cliff (2004) note that market sentiment is driven mainly by returns, but also by indicators such as the net trading position of investors.

The Commodity Futures Trading Commission (CFTC) has published data on positions taken by three types of traders – speculators, hedgers, and small traders – in U.S. futures markets periodically since the 1980s.

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[1] A contract trading with the same underlying index as the original "big" contract but with a value per index point equal to 1/10th of the value of the larger contract — $50 v $500.

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The unique trader-position information contained in such Commitment of Traders (COT) reports has been promoted by financial analysts as valuable for timing the market, and recent academic research has utilized the reports in order to estimate *position-based sentiment*. Wang (2002, 2003a) and Salm and Schuppli (2010) provide strong evidence of positive feedback trading by speculators in equity index futures, whereas Wang (2001) finds that hedger sentiment is a contrary indicator for returns on agricultural futures. Wang (2003b) controls for market risk factors and finds that speculators (hedgers) positions are positively (negatively) correlated with subsequent abnormal returns.

Consistent with sentiment theories of initial under-reaction and delayed over-reaction, Moskowitz, Ooi, and Pedersen (2012) document significant time series momentum across a range of futures markets and report that speculators profit from momentum at the expense of hedgers. The response of volatility to this activity is unclear with Chen, Liu, and Hsu (2010) reporting that conditional volatility increases with speculative trading activity, while Miffre and Brooks (2013) suggest that speculators do not impact volatility of commodity futures in their portfolios. Most recently, Fishe and Smith (2012) use data from the CFTC's Large Trader Reporting System (LTRS) to identify informed traders across 12 commodity markets, and find that while money traders/hedge funds tend to be well informed, commercial hedgers do not. Lutzenberger (2014) finds that investor sentiment is the best in-sample predictor of short-horizon returns in commodity futures. The theory of normal backwardation proposed by Keynes (1923) explains the deviation of futures prices from expected future cash prices; this *hedging pressure* theory suggests that hedgers use futures markets to transfer risk to speculators, and speculators receive a premium to compensate them for accepting this additional risk. Bessembinder (1992) reports that, after controlling for systematic risk, futures market returns vary with the net holding of hedgers.

Essentially, this article seeks to answer two key questions. First, is there a relationship between the net position of different trader types and measures of investor sentiment and market volatility? Second, do the net positions of different trader types hold any explanatory power in forecasting future market returns?

This article adds to the literature in several ways. Firstly, the determinants of trading behavior in closely related markets may be better understood; in particular the influence of changes in economic conditions on that behavior. Secondly, this article adds to the discussion of whether specific trader-types are able to forecast market returns with any significance. Finally, an additional benefit of considering both the behavior and performance of a trader type is that it allows for the inference of whether a trader type has a destabilizing effect on futures prices; an important consideration for market regulators.

The principal findings suggest that although the E-Mini S&P 500 futures and S&P 500 futures markets are very similar there are some important differences in trading behavior, and this behavior changes as a result of the financial crisis of 2008–2009. The trading behavior of speculators and small traders is significantly related to changes in investor sentiment, and measures of market volatility. Speculators and small traders tend to follow positive feedback[2] strategies while hedgers adopt strategies[3] which suggest the presence of dynamic hedging; this is not inconsistent with conventional thought on the behavior of futures traders, and suggests that hedgers have helped to stabilize prices in the future market. There is evidence that trader behavior is not static in the sense that investment style is reflective of changes in the economic environment. Generally, traders are better at predicting market upturns than market downturns, and the net positions of both speculators (S&P 500 futures) and small-traders (E-Mini and S&P 500 futures) appear to offer some predictive ability over the short-run, although this capability is greater for positions that are classified as extreme. The results have implications for academics seeking to understand investment behavior, for market regulators concerned with systemic stability during financial crisis, and for market practitioners seeking to develop trading systems.

The remainder of this article is organized as follows. Section 2 discusses the nature of the S&P 500 Index Futures market, and the reporting of market positions by trader type together with the data utilized in this article. Section 3 investigates the determinants of trading decisions and the influence of the global financial crisis (GFC) on those decisions. Section 4 examines the predictive ability and profitability of market timing by traders. Section 5 concludes.

2. S&P futures and trader position reporting data

2.1. Data for S&P 500 index futures contracts

The S&P 500 Futures[4] contract was introduced in April 1982, and remained the pre-eminent equity index futures contract for more than two decades. However, as the value of the contract became too large for many small traders the Chicago Mercantile Exchange (CME) introduced the E-Mini S&P 500 contract in September 1997; at this time one S&P futures contract was valued at nearly $500,000.[5] While the big S&P 500 contract trades using the open outcry method in the Chicago pit[6] the E-Mini contract is traded solely through the all-electronic Globex system. The possibility that the two contracts will attract a different clientele provides motivation for studying the positioning of traders in each market separately.

Since the introduction of the E-Mini futures, aggregate trading volume (combined values of the "big" and "mini" contracts) has increased markedly, however a significant portion of this volume has migrated away from the "big" contract and towards the E-Mini market. This is illustrated in Fig. 1. As at March 2013,[7] the average daily volume of the E-Mini contract was over 2 million contracts with open interest of 3.3 million, while the S&P 500 contact was trading just 34,982 per day with open interest of 199,904. The benefits of trading electronically, in terms of speed and accuracy of execution, has appeal to high-frequency traders and hedge funds and, together with the smaller contract size, has likely resulted in liquidity moving towards the E-Mini contract during the sample period.

A series of futures returns is created for both the E-Mini and S&P 500 futures contract, using data collected from Datastream, for the period September 1997-December 2012. The return is measured as the percentage change in settlement prices of the contract in excess of the risk free rate.[8] Returns are calculated using the nearest delivery date contract and a standard roll-over strategy, such that the contract is switched to the second-nearest contract in the delivery month. To match the data on trader positions, which reflects positions on a Tuesday of each week, a weekly return series is constructed based on a week that runs from Tuesday-to-Tuesday.[9]

2.2. Data on trader positions

The information on trader positions is obtained from the weekly Commitment of Traders (COT) report issued by the U.S. Commodity Futures Trading Commission (CFTC.). The COT report provides a

[2] That is, they buy following market upturns and sell following market declines — accentuating market movements.

[3] They sell (buy) following market upturns (downturns) — helping to limit market movements.

[4] S&P 500 Futures Ticker: SP, E-Mini S&P 500 Futures Ticker: ES.

[5] $500 × 927.6 — the index value as of 1st September 1997. The E-Mini contract was introduced with a notional value of $50 per index point — 1/10th the value of the S&P 500 contract at the time, although this has since been reduced to $250 per index point.

[6] The S&P 500 futures contract (SP) trades using open outcry from 8:30–3:15 and on Globex at other times.

[7] Source: CME Average Daily Volume Report, April 2013.

[8] This excludes any return on collateral.

[9] This strategy for calculating returns is analogous to Wang (2003b) although CFTC data is now provided weekly as opposed to monthly.