Mispricing and trader positions in the S&P 500 index futures market

Ya-Wen Lai, Chiou-Fa Lin *, Mei-Ling Tang

Department of Finance, National Formosa University, No.64, Wunhua Rd., Huwei Township, Yunlin County 632, Taiwan

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This study examines the effect of traders’ net positions on mispricing in the S&P 500 index futures market. We find that while positive mispricing is associated with hedgers’ net short and speculators’ net long positions, negative mispricing is related to hedgers’ net long and speculators’ net short positions. This relationship is stable for speculators across the pre- and post-2004 periods; however, it is dominant for hedgers particularly during the pre-2004 period. Contrary to the popular belief, our analysis finds no evidence that speculators are responsible for irrational movements in futures prices by enlarging the size of mispricing. Furthermore, a high magnitude of hedgers’ net positions signals the convergence of mispricing. We also found that according to a recent new disaggregation for trader positions, asset managers tend to delay the convergence of mispricing and hedge funds help shrink the size of mispricing. However, these relationships are not stronger than those implies by the hedger/speculator classification. These findings support the view that speculators’ positions are informative about the direction of index futures mispricing, while hedgers’ positions determine the convergence of mispricing.

1. Introduction

Since the introduction of the S&P 500 stock index futures in 1982, stock index futures have grown to become the second most significant futures market, following the interest rate futures market. Stock index futures have since served as an important risk management vehicle for equity asset managers to hedge systematic risk or achieve efficient portfolio beta. The popularity of passive index investment strategies in the past 20 years further promotes stock index futures as a proxy for the addition or withdrawal of index funds (Chicago Mercantile Exchange (CME), 2013). Many strategies designed by speculative investors to pursue high alpha returns, for example, the index arbitrage or other statistical arbitrage strategies, heavily involve index futures positions. The successful execution of the aforementioned strategies largely depends on the degree of the mispricing (or tracking error) in stock index futures.

In frictionless markets, costless arbitrage trades guarantee zero mispricing. Thus, in the real world, implementation cost becomes the most attributable factor for significant mispricing, because it prevents arbitrageurs from maintaining zero mispricing (e.g., Bühler & Kempf, 1995; Neal, 1996). However, mispricing can be affected by flow of orders and difference of opinions among participants with varying motivations (Fung, 2007; MacKinlay & Ramaswamy, 1988). This study aims to...
examine the effect of net positions by trader type on mispricing in the S&P 500 index futures market. Using the net positions of large hedgers and speculators and small traders, we explore the effects of net positions on the direction, size, and convergence time of mispricing.

Prior studies have mostly investigated the impact of futures’ net positions on return or volatility and draw implications for hedging pressure theory or noise trading theory (e.g., Bessembinder, 1992; De Roon, Nijman, & Veld, 2000; Wang, 2002; Wang, 2003). Mispricing, which is defined as the deviation of the futures price from its fair value, differs with the futures return in the following areas. First, mispricing in futures prices measures the risk premium or market price to compensate traders who are willing to take the risk (Bessembinder, 1992). It is the largest profit an arbitrageur can earn from arbitrage trades and the cost difference in hedging the spot risk exposure between using futures contracts and spot asset financing. Examining the relationship between mispricing and net positions by trader type can help understand which trader type determines the risk premium. Second, mispricing measures the return component stemming from the misalignment between the futures price and its fair value, whereas the futures return measures both the mispricing component and price change arising from fair value changes. Using the mispricing measure, one can determine the trader type that drives futures prices away from their fundamental values. Third, mispricing is characterized by its mean reverting property, which allows us to investigate the impact of net positions on convergence time of mispricing.

This study uses data from the Commitments of Traders (COT) report provided by the US Commodity Futures Trading Commission (CFTC) to construct hedgers, speculators, and small traders’ positions. The present empirical investigation makes several important contributions to the literature. First, using index futures returns, numerous studies have evidenced that the hedging pressure effect does not exist in finance contracts, including S&P 500 index futures (Bessembinder, 1992; De Roon et al., 2000; Schwarz, 2012; Wang, 2003). This study, however, shows that hedgers and speculators’ net positions significantly affect mispricing in S&P 500 futures, although not in a way predicted by traditional hedging pressure theory. In particular, positive mispricing occurs when hedgers hold net short and speculators hold net long positions, whereas negative mispricing can be observed when hedgers hold net long and speculators hold net short positions. In addition, the effect of hedgers on mispricing is dominant particularly during the pre-2004 period, while that of speculators is stable across the pre- and post-2004 periods. This suggests the reliability of speculators’ positions as an informative trading signal, as documented by Schwarz (2012) and Chen and Maher (2013).

Second, many pioneering works have emphasized the importance of distinguishing whether the effect on price is temporary or permanent (e.g., Liang, 1999; Scholes, 1972). The significant effect of net positions on mispricing might be a permanent effect or simply a temporary price pressure. The latter indicates that the significant contemporaneous influence of net positions on mispricing would lead to a reverse in the subsequent period. By contrast, the permanent effect predicts that the contemporaneous influence of net positions sticks, implying that the new mispricing level holds even in the subsequent period. We find that both hedgers and speculators’ net positions have permanent effects on mispricing, even though the speculators’ effect remains more stable over time. From these findings, we conclude that the net positions of speculators are an important and reliable determinant of the premium or discount in futures prices.

Third, the recent financial crisis has elevated concerns about the increasing participation of speculators in financial markets. To this effect, the noise trading theory (De Long, Shleifer, Summers, & Waldmann, 1990) casts theoretical support, because it predicts that irrational speculative trading generally drives prices away from the fundamental values and destabilizes prices. In contrast to the noise trading theory, traditional speculative stabilizing theory (Friedman, 1953) asserts that rational speculators profit from “buy cheap and sell dear,” thus increasing low prices and lowering high ones. Prior studies have largely focused on price changes or volatility to explore this empirical question (Brunetti, Buyukshahin, & Harris, 2016; Buyukshahin & Harris, 2011; Irwin & Sanders, 2012; Kim, 2015). This study rather uses the size of mispricing and finds no evidence supporting the destabilizing view of speculative trading, although we found that speculators drive the direction of mispricing. In addition, this study reveals that a large amount of hedgers’ net positions signal the shrink in mispricing during the post-2004 period. This suggests that a high degree of imbalance between hedgers’ long and short positions predicts the reversion of mispricing in the subsequent period. We argue that hedgers’ contribution to price efficiency during the post-2004 period can be attributed to an increasing number of hedge fund positions classified by the CFTC as commercial (hedgers) positions, because hedge funds help mitigate mispricing by implementing various arbitrage strategies such as the index arbitrage strategy.

Fourth, in terms of convergence time of mispricing, the results support the findings on the size of mispricing mentioned above. Here as well, we confirm hedgers’ contribution to price efficiency because a high magnitude of hedgers’ net positions accelerates the convergence in mispricing. We also analyze the varying effects of trader positions on the convergence time of positive and negative mispricing. We find that speculators’ net long positions and hedgers’ net short positions delay the convergence of positive mispricing, and conversely, speculators’ net short positions and hedgers’ net long positions delay the convergence of negative mispricing. This supports the view that the mean reversion could be influenced by differences of opinions among participants regarding the mean reversion speed of mispricing (Boswijk, Hommes, & Manzan, 2007; Brock & Hommes, 1998).

Finally, in addition to classifying large traders on the basis of their trading motives (hedger/speculator), we repeat all empirical investigations using a recent new disaggregation by the CFTC in 2009, which divides large traders into several specialist categories: dealers, asset managers, and hedge funds. Among these specialist traders, we find that asset manager positions tend to delay the convergence of mispricing and those of hedge funds help decrease the size of mispricing. However,
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