Do Behavioral Biases Affect Prices?

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Recently, numerous studies espousing theories from experimental psychology have attempted to explain asset-pricing anomalies. The empirical evidence, however, is fraught with conflicting findings because many of the behavioral theories rely on biases that are quite different from each other. This article studies the trading behavior of Chicago Board of Trade traders and directly tests for biases in their behavior and for the impact of such biases on asset prices. Findings show that traders are highly loss averse and that losing traders actively purchase contracts at higher prices and sell contracts at lower prices than those that prevailed previously. However, price changes as a result of the behavior of loss-averse traders are reversed more quickly than those set by "unbiased" traders.

Behavioral models are gaining popularity among researchers in finance, but empirical tests linking investor biases to asset prices prove to be a quite challenging task. The reasons include a lack of detailed information on the trading behavior of market participants, problems associated with identifying investors' time horizons, and difficulties in demonstrating that the biases are not simply caused by noise trading. The authors overcome some of these hurdles by studying the trading behavior of T-bond futures traders to establish the link between trading biases and security prices, thereby alleviating the previously reported empirical ambiguities. The study uses all transactions (audit trail data) with over 5 million futures transactions made by 1,082 different CBOT (Chicago Board of Trade) T-bond futures traders during 1998. The data include 426 local traders, each with at least 100 days of trading and 1,500 trades on personal accounts during the course of the year. About 97.4 percent of trades are front-month contracts—the focus of empirical tests in the study.

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The null hypothesis is that traders follow a standard, rational behavior. The authors test against different alternative hypotheses—self-attribution bias, representativeness bias, the house-money effect, and loss aversion. The argument is that profit-making traders are likely to take more risks if they overcredit their past trading success to their own ability, believe that past success is representative of future opportunity, or take excessive risks when investing their previous profits, and thus these traders' risk taking would be positively associated with the growth in profits. In contrast, the loss-averse behavioral model argues that traders will take fewer risks when they make trading profits.

The authors test the above hypotheses empirically by splitting the trading day into two periods (morning and afternoon) and examining the traders' afternoon behavior relative to their profits (or losses) in the morning hours. Their findings reveal that CBOT traders are "highly loss-averse." The chance of taking above-average risk was found to be higher for traders with morning losses than for those who had morning profits (31.2 percent versus 27 percent). Specifically, traders with morning losses place more trades, make larger trades, and accumulate more inventory during their afternoon trading than other traders. Empirical tests were done in different ways (pooled OLS regressions, panel regressions, and Fama–MacBeth-style averages of trader-by-trader [time-series] or day-by-day [cross-sectional] regressions), and most of them showed robust results. The results were also robust with alternate measures of risk.

Next, the authors examined if the behavior of loss aversion by traders with losses during morning sessions would influence prices in the afternoon sessions. For this testing, the authors classified traders as "marginal" or "price-setting" depending on whether they purchased at a higher price or sold at a lower price than the immediately preceding trade. The findings showed that traders with morning losses, on average, tend to place price-moving trades during the afternoon. More specifically, the probability of a trader with morning losses making a price-moving trade was about 15 percent higher than that of a trader with a profitable morning. Also, traders with morning losses accounted for 38 percent of all price-setting trades by market makers. The results also showed differences in reversals of price changes induced by loss-averse traders versus others: The price-setting

trades of traders with morning losses were less permanent than the average price-setting local trade.

Another empirical question addressed in the paper relates to volatility during afternoons following widespread losses during morning sessions. For this analysis, the authors identified morning sessions when losses were one standard deviation higher than usual and examined the afternoon volatilities at different time intervals. At the one-second frequency, the increase in afternoon volatility was 11.5 percent, but for longer time intervals (10-minute horizon) the increase in volatility was much smaller (6.4 percent) and was not statistically significant. The authors, however, caution that the volatility-related results are inconclusive as they did not have time-series data for a long enough period.

In sum, the findings show that (1) T-bond traders are loss averse; (2) they assume significantly more afternoon risk following morning losses than following morning gains; and (3) the afternoon prices set by traders with morning losses reverse more quickly than those set by traders with morning gains. Because the impact on afternoon prices from the behavior of losing traders is only temporary, other traders view them as "noise traders" and trade aggressively against them. Thus, trading activity of other market participants seems to correct any price changes emanating from behavioral biases of certain traders.

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