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Sentiment bubbles[☆]

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ABSTRACT

We examine cumulative changes in investor sentiment and find that these changes relate to extended periods of increasing overvaluation, followed by price corrections. The relation between sentiment and returns is path dependent—short-term increases in sentiment precede strong positive returns, while prolonged periods of increasing sentiment precede negative returns. Positive short-run returns are consistent with bubble dynamics and mitigate the backwards induction conundrum described by [Abreu and Brunnermeier \(2003\)](#). Our results hold for the market portfolio, and are especially strong for opaque portfolios with high levels of uncertainty, as well as portfolios with greater market frictions that limit arbitrage.

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1. Introduction

Negative returns following periods of high investor sentiment are reported in multiple studies. These studies examine sentiment sensitivities in the cross-section (e.g., [Baker and Wurgler, 2012, 2006](#); [Berger and Turtle, 2012](#); [Neal and Wheatley, 1998](#)), in aggregate domestic portfolios (e.g., [Brown and Cliff, 2005](#)), and in international markets (e.g., [Baker et al., 2011](#); [Schmelming, 2009](#)). Considering the apparently robust role of sentiment as a contrarian indicator, it remains unclear why rational traders fail to use publicly available data to correct predictable price movement. [Abreu and](#)

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Brunnermeier (2003) summarize this backwards induction problem succinctly: essentially, if sentiment predicts a correction tomorrow, then rational arbitrageurs should sell today, and prices should fall immediately, eliminating the informational content of investor sentiment. Yet, empirical evidence suggests a consistent predictive role for sentiment.²

To examine how cumulative sentiment changes affect equity returns, we link investor sentiment with economic bubble models. De Long et al. (1990) present a bubble model in which rational speculators trade in advance of positive feedback noise traders, and the buying pressures from both groups exacerbate price deviations. Abreu and Brunnermeier (2002) suggest that rational traders initially ride the bubble to capture strong returns due to the increased buying pressure of behavioral or noise traders. Abreu and Brunnermeier (2003) also model a role for rational traders in the evolution of bubble episodes. To correct mispricing, arbitrageurs must engage in coordinated action, whereas their lack of immediate synchronization allows the bubble to persist, prompting them to increase or maintain their long positions to capture returns as the overvaluation builds. Consequently, prices increase substantially above their fundamentals, before the ultimate correction. Matsushima (2013) presents a similar model in which there is a small, uncertain probability that some arbitrageurs display behavioral biases and remain committed to riding a bubble.

Recent anecdotal work contends that sophisticated arbitrageurs may contribute to mispricing. Griffin et al. (2011) and Brunnermeier and Nagel (2004) reveal that institutions actively purchased technology stocks during the tech bubble; Xiong and Yu (2011) conclude that rational arbitrageurs chose to ride a bubble for Chinese warrants between 2005 and 2008. In an investigation of Hoare's Bank, a sophisticated economic agent, during the South Sea Bubble, Temin and Voth (2004) provide evidence that the bank actively rode the bubble to reap substantial profits. According to Guenster et al. (2013), it is optimal for investors to ride asset bubbles, given plausible utility specifications and a real-time indicator for bubble periods. McQueen and Thorley (1994) also find that the probability of observing an end to a run of consecutive positive abnormal returns decreases with the length of the run. In addition, DeVault et al. (2014) argue that institutional traders appear on both sides of most sentiment-related trades and that most sentiment trades are due to managerial discretion, not forced, flow-related trades.

In turn, Abreu and Brunnermeier (2003) suggest several testable hypotheses with respect to price dynamics during a bubble period. Initially, mispricing should increase, due to buying pressure from rational arbitrageurs who choose to ride the bubble, so we hypothesize that initial positive changes in sentiment provide a positive indicator of future returns. However, as the bubble persists, an increasing number of rational arbitrageurs liquidate their holdings and potentially establish positions against the bubble. Therefore, the initial positive relation between behavioral trader optimism and subsequent returns might dampen over the bubble period, as selling pressure from rational arbitrageurs increases. We also anticipate a price correction when the selling pressure from arbitrageurs exceeds the absorption capacity of noise traders, so in the long run, indicators of overly optimistic behavioral trading should relate negatively to future returns.

Our findings align with these predictions and clarify the role of investor sentiment in asset pricing. In the short run, increases in sentiment precede positive, large subsequent returns, consistent with building overvaluation early in a bubble episode. This novel result contrasts with the literature in which sentiment appears solely as a contrarian indicator.³ After an extended overvaluation period, we find an even larger offsetting reversal. These empirical results highlight the impact of cumulative sentiment changes on returns, because they are economically larger than the impact of sentiment levels, although neither impact subsumes the other. That is, the strong short-run returns provide incentive for arbitrageurs to remain in the market, which represents a possible explanation for the backward induction problem. We also capture nonlinearity in the relation between investor sentiment and subsequent returns by including a quadratic measure of sentiment; the significant

² Rosenthal (1981) also provides experimental evidence that economic agents often violate backwards induction principles –agents continue to play when stopping is the only rational strategy.

³ It also contrasts with experimental results that indicate bubbles can be mitigated by rational arbitrageurs, such as Smith et al. (1988) finding that trader experience dampens bubbles, and Hommes et al. (2005) assertions that bubbles do not occur in the presence of fundamentalist traders.

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