Analyzing the Development of Market Bubbles in Experimental Economics

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Introduction

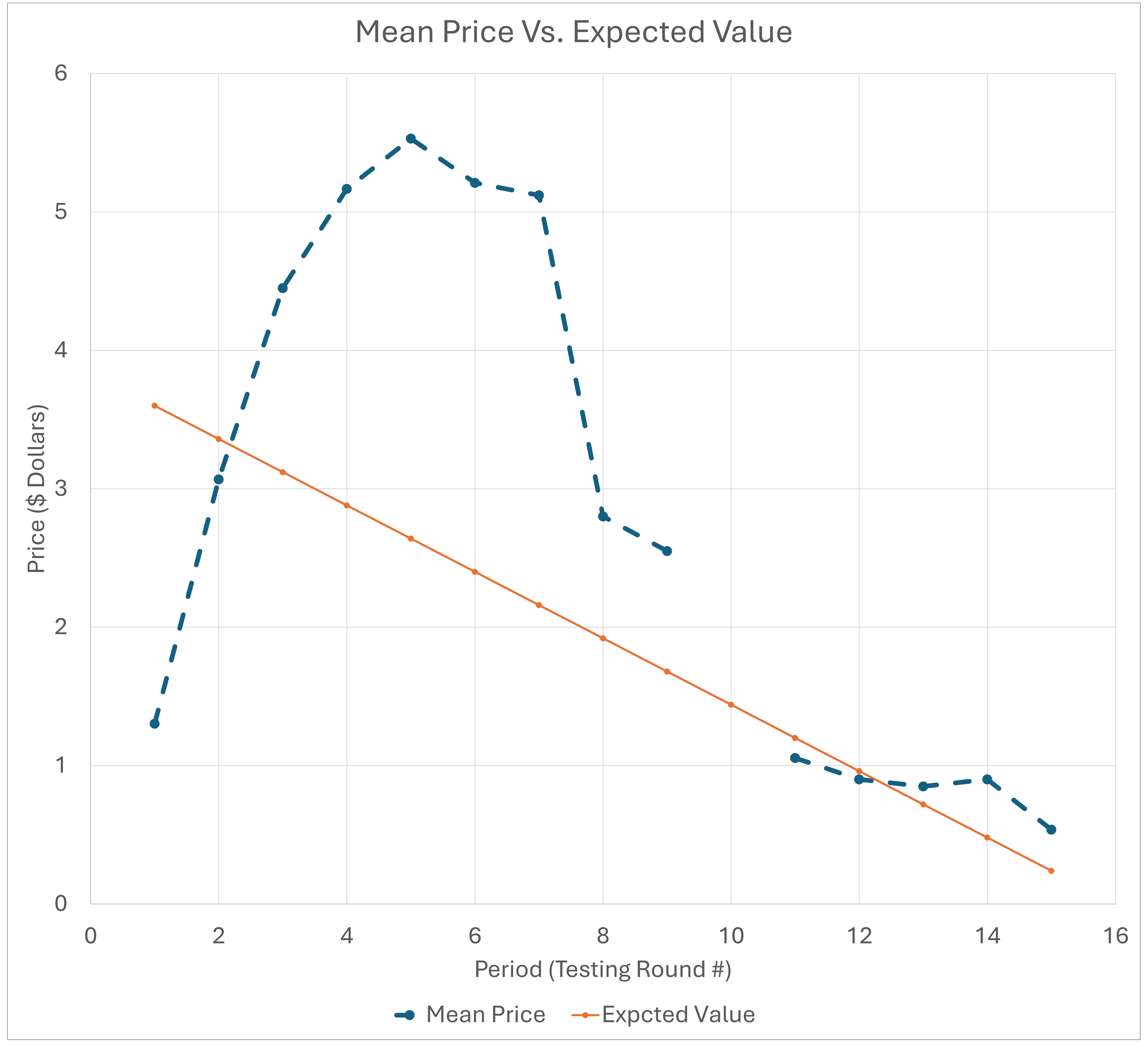
- Experimental economics studies how markets function in controlled laboratory environments, where variables such as dividend structures, trading rules, and information sets are specified (Smith, 1982).
- According to the rational expectations theory, prices should converge to the assets intrinsic value (Tirole, 1982; Fama, 1970).
- One crucial study was conducted by Smith, Suchanek, and Williams (1988), that showed that experimental spot asset markets frequently generate price bubbles followed by crashes.
- Some research shows that institutional design and incentive structures can influence markets as well. Tournament-style compensation, where individuals are rewarded for outperforming others, can change risk-taking and price dynamic behavior in asset markets (James & Isaac)
- Market bubbles are very relevant today as modern prediction and sports betting markets, such as Polymarket, reflect rapid price swings by changing expectations, momentum, and headlines rather than stable fundamentals.
- The purpose of the research is to investigate how and why bubbles form in controlled experimental asset markets, analyze how incentives and expectations influence price dynamics, develop a deeper understanding of experimental economic theory, and create future research questions addressing distortions in real-world markets.

Methods

- **Participants**: The main subject of this study is experimental asset market literature and its evolution over time. It focused on foundational and modern research in experimental economics, examining how researchers have studied bubble formation in controlled laboratory markets. In addition to literature analysis, I became certified, participated, and led live laboratory experiments at the XFXS lab, contributing to controlled experiment economics studies.
- **Key takeaways**: Asset markets provide structed environment to study bubbles, research has evolved from early rational expectations to examine incentives and behavioral influences, and the lab experiments reinforced understanding of experimental design and implementation.
- **Materials/Measures Literature Review**: This study was conducted by reviewing academic journal articles, working papers, and historical studies on experimental Spring Semester asset markets. We measured price deviations from intrinsic value, trading volume, expectation formation, and of incentive structures.
- **Materials/Measures Lab**: In the lab we observed real-time data, bids, and transaction patterns. We also assisted in tracking experimental controls and participant behavior.
- **Procedures Literature Review**: Began with foundational experimental asset market studies, tracing the development of bubble research across decades. The goal was to outline key themes such as adaptive learning incentives and rational expectations, then comparing early theoretical predictions with more recent behavioral and institutional findings.
- **Procedures Lab**: Completed training at XFXS lab. Assisted in facilitating controlled experimental sessions helping monitor participants, ensure compliance with lab protocols (no deception, harm, or manipulation of subjects), and observing implementation of controlled trading environments.
- **Data Analysis Literature Review**: Brought findings from across time periods to reveal patterns in bubble formation and how modern market activities influence these bubbles. Compared methodological approaches across time periods, evaluating how changes in incentives and institutional design of experiment changed outcomes. These findings were integrated with observations from live laboratory experiments.

Results

- Despite knowing the dividend structure and limited asset life, asset prices on continuous occurrences deviated away from the intrinsic value of the assets. In addition to this, a pattern of a gradual raise, to then reaching a peak overevaluation, and then to a rapid decline was consistent. As the traders became more experienced, the less market bubbles formed, but they were still occurred. Expectation by traders to sell at higher future prices to future buyers motivated them to buy assets above the intrinsic value (Smith, Suchanek, & Williams, 1988).
- Expectation based trading was very prevalent as traders often ignored dividend valuation, choosing to focus on price trends and observed trades to insight decisions. Further fueling this was inventive structures which increased risk-taking and led to further price increases away from the intrinsic value (James & Isaac, 2000).
- Markets can effectively aggregate dispersed private information into prices, while the information structure of markets can influence convergence towards rational expectations" (Plott & Sunder, 1982; 1988).
- The formation of market bubbles tended to have more to do with regular trading behavior then other external factors including misinformation and irrationality (Smith 1982; Smith et al., 1988).



Duncan James and R. Mark Isaac, "Asset Market Efficiency: The Effects of Tournament Incentives for Individuals," American Economic Review 90:995-1004, 2000.

Conclusion

- **Research question**: The research explored the formation of market bubbles within controlled experimental economic labs, while further exploring how trading behavior and varying reward structures caused assets to sell further away from their intrinsic value.
- **Key Takeaways**: This study showed that even with information on dividends and asset lifespan, asset prices continued to trade above the intrinsic value. In addition, resale value was placed as a high priority than dividend earnings, as investment were incited by price trends and recent transactions.
- **Significance of the Findings**: This study showed that markets are not only influenced by valuations but by future expectations, the behaviors of other, and confidence in beating the market. Also, the research yielded the idea that market bubbles are influenced in part by social and behavioral dynamics in addition to economic fundamental concepts .Through the use of these experimental economics studies, we are able to better understand real-world speculative events in financial markets like what is happening with the AI bubble currently.
- **Strengths**: Using controlled lab experiments allowed for the isolation of market variables. Through the use of clear rules and known asset values confusion was eliminated. Furthermore, direct observation of behavior allowed for insights beyond modern economic theory.
- **Limitations**: Many of the studies read about were older and more outdated. Lab settings included low amounts of capital and simplified trading environments.
- **Future Research**: In modern markets, investing is becoming increasingly dominated by coordinated group traders such as hedge funds and private equity firms. The basis of this study is to look at how asset markets are affected by assets that hold other assets, including mutual funds, hedge funds, and private equity firms. Future investigation can examine whether these structures amplify or dampen market bubbles in individual equities.

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