

Report on Master Thesis

Institute of Economic Studies, Faculty of Social Sciences, Charles University

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| Student: | Pavel Řežábek |
| Advisor: | Ladislav Křišťoufek |
| Title of the thesis: | Analysis of Prediction Markets in Crypto: Investigating Convergence in Time, Volatility, and Biases in Polymarket |

OVERALL ASSESSMENT (provided in English, Czech, or Slovak):

Short summary

The thesis explores the dynamics of decentralized prediction markets, focusing on Polymarket, a platform for trading contracts based on future event outcomes. Through empirical analysis, the thesis investigates the convergence of market predictions over time, volatility compared to other financial instruments, and the presence of cognitive biases such as overconfidence and acquiescence bias. The research emphasizes the potential of prediction markets for accurate event forecasting and highlights the need for advanced risk management strategies given their higher volatility compared to traditional markets.

Contribution

The thesis makes a notable contribution by exploring a relatively under-researched area—blockchain-based, decentralized prediction markets—focusing specifically on Polymarket. The empirical analysis of time convergence, volatility, and biases in prediction markets provides novel insights into the functioning of these platforms, which have not been extensively studied before. The identification of cognitive biases affecting market predictions adds to the literature on behavioral finance and can help traders refine their strategies. The research is valuable due to the novelty of its subject matter and its relevance to the growing field of decentralized finance.

Methods

The methodology is sound and appropriate for the research objectives. The author uses both linear regression and t -tests to analyze the convergence of predicted probabilities and volatility in prediction markets, while also examining cognitive biases through statistical models. The data sources are clearly explained, and the author uses a rigorous approach to ensure the validity of the results.

Literature

The literature review is comprehensive, covering relevant studies in prediction markets, behavioral finance, and volatility in financial instruments. However, while the thesis cites key papers on prediction markets and cognitive biases, it could have benefited from more recent sources, especially given the fast-evolving nature of the cryptocurrency market. The discussion of gaps in the literature is strong, which highlights the novelty of the research, but the review could have integrated more critical analysis of the existing studies.

Manuscript form

The manuscript is well-structured, with a clear progression from introduction to conclusion. The figures and tables are well-designed and aid in understanding the data and analysis. The use of LaTeX for formatting ensures that the thesis is professionally typeset, contributing to its readability. However, there are a few minor typos and occasional awkward phrasing in some sections that could have been improved with additional proofreading.

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Overall evaluation and suggested questions for the discussion during the defense

This is a strong thesis that presents a well-researched and novel analysis of decentralized prediction markets in the cryptocurrency space. The empirical work is rigorous, and the author effectively demonstrates the predictive capabilities and challenges of Polymarket. The thesis is poised to make a meaningful contribution to both academic research and practical applications in cryptocurrency markets, especially in the realm of behavioral finance. The novelty of the topic and results makes the thesis well positioned to be transformed into a research paper.

Suggested Questions:

- Could alternative models, such as ARIMA or GARCH, improve the analysis of volatility and time convergence in prediction markets?
- Given the fast-evolving nature of cryptocurrency markets, how do you think your findings on Polymarket would hold up in a rapidly changing financial environment?
- What are some potential practical implications of your findings for traders and developers working within prediction markets? How can they mitigate the biases you've identified?
- Could you elaborate on the specific challenges you faced when working with decentralized market data, particularly in terms of ensuring data reliability and accuracy?

The TurnItIn analysis has not uncovered any suspicious practices (score of 16% with no large portions of overlapping text).

SUMMARY OF POINTS AWARDED (for details, see below):

| CATEGORY | POINTS |
|---|---------------|
| <i>Contribution (max. 30 points)</i> | 29 |
| <i>Methods (max. 30 points)</i> | 29 |
| <i>Literature (max. 20 points)</i> | 17 |
| <i>Manuscript Form (max. 20 points)</i> | 18 |
| TOTAL POINTS (max. 100 points) | 93 |
| GRADE (A – B – C – D – E – F) | A |

NAME OF THE REFEREE: *Ladislav Kristoufek*

DATE OF EVALUATION: *10 September 2024*

Referee Signature