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(G*) Revealing universal statistical behaviours in prediction markets

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In a prediction market, traders buy and sell contracts linked to the outcome of real-world events such as "Will Donald Trump be Re-Elected President on November 5, 2024". Each contract (share) pays the bearer 1 dollar if the event happens by the given date, and expires worthless (0 dollars) otherwise. Because contracts trade between 0 and 1 dollar, the price at any given time represents the aggregate investors perceived likelihood of a given event's outcome (e.g. 0.63 dollars = a 63% probability). In addition, these prices fluctuate quickly in response to new information –such as revealed scandals, political successes or failures, and economical changes –thereby representing a change in investor opinion. Due to this probability analog, most prediction market literature focuses on how accurate these "crowdsourced"assessments are in predicting final outcomes. Yet little attention has been paid as to how investor interactions and the flow of information can push the price of a contract toward (or away) from an accurate price.

Here, we use an approach rooted in statistical physics and information theory to analyze statistical trends linked to investor behaviors within prediction markets. We analyze over 4,800 unique contracts from a popular online prediction market –PredictIt –covering a wide range of events; including election outcomes, legislative votes, and career milestones of politicians. Our novel technique uncovers striking universal patterns not only in contract price and trade volume fluctuations, but also where these fluctuations occur in time. Moreover, we find that these universal patterns persist regardless of the heterogeneous nature of our dataset. Our findings suggest that the interactions between investors that give rise to price dynamics in prediction markets can be embedded in a relatively low-dimensional space of variables. This work opens the door to mechanistic modeling of apparently high-dimensional socio-financial systems, and offers a new way of analyzing economic data.

Keyword-1

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Keyword-2

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Keyword-3

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