Financial market manipulation refers to the practice of submitting spurious orders to mislead other traders’ beliefs and make profits. Detecting manipulation of each individual case is difficult:

- Search through massive order submissions and cancellations;
- Establish the manipulation intent behind trading activities.

Mitigate Manipulation – Trading Strategy Design

- Construct the dataset by selectively ignoring orders at certain price levels, particularly where spoof orders are likely to be placed.
- Adjust offer prices by a constant offset to correct biases in learned price beliefs either caused by manipulation or the intrinsic limitation built in the belief function.

Intelligent Mechanisms to Improve Market Efficiency

Standard financial markets offer underlying securities of predetermined features in independent markets, leaving complexity to the investors to compose the security bundle they want.

- Bundling can be manual, expensive, and risky;
- Market can obfuscate true best prices, sacrificing market efficiency.

Log-time Prediction Markets for Interval Securities

Standard prediction markets provide certain outcome representations, e.g., pre-specified outcome intervals with determined precisions. Naïve implementation of Log Market Scoring Rule (LMSR) runs in time linear to the number of outcomes.

Idea: A log-time prediction market builds upon LMSR tree that embeds the modularity properties of LMSR into the binary tree data structure.

- Provide arbitrary betting intervals of different granularities;
- Need log-time to do price, cost inquiry, and trade operations.

An Intelligent Financial Options Market via Linear Programming

Financial options markets provide options with predetermined strike prices and expiration dates, with each treated as an independent market.

Idea: Using linear program (LP) to identify arbitrage violations and, in the absence of arbitrage, find the tightest pricing bounds for a family of options associated with a single security.

- Offer quotes at any requested strike price and expiration date;
- Provide liquidity to its maximum extent at no loss to the exchange.