

Market Making Mechanisms and Liquidity Dynamics in Blockchain-Based Prediction Markets

Parshant Singh

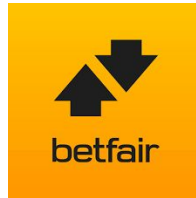
Masters Thesis Kick-Off Presentation, 26.05.2025

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1. Motivation and Background Information
2. Research Questions
3. Methodology
4. Timeline

- Prediction markets are platforms for betting on outcome of future events.
- Users can bet on an outcome by buying shares of outcome token.
- Price of the token reflect crowd-sourced probability estimates

Kalshi



Centralised



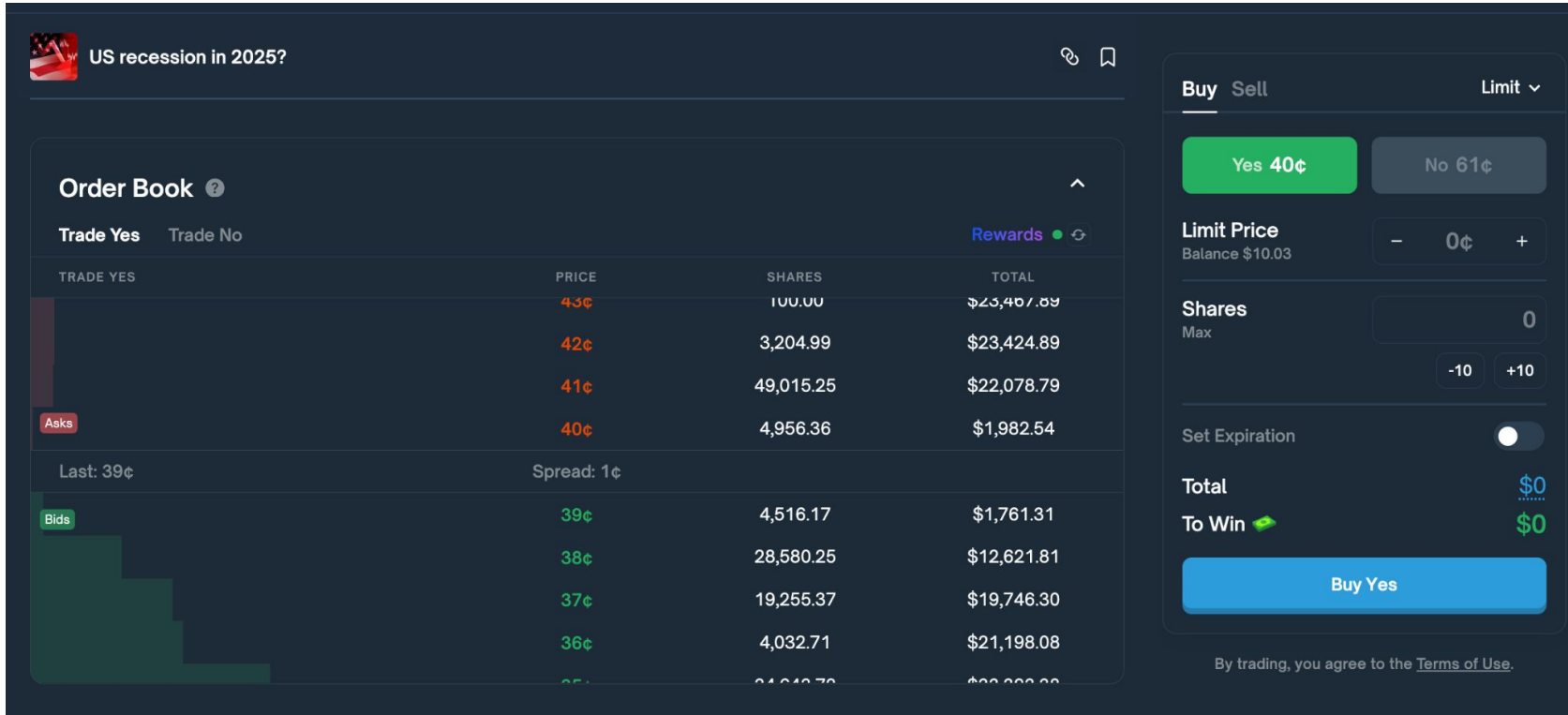
AUGUR



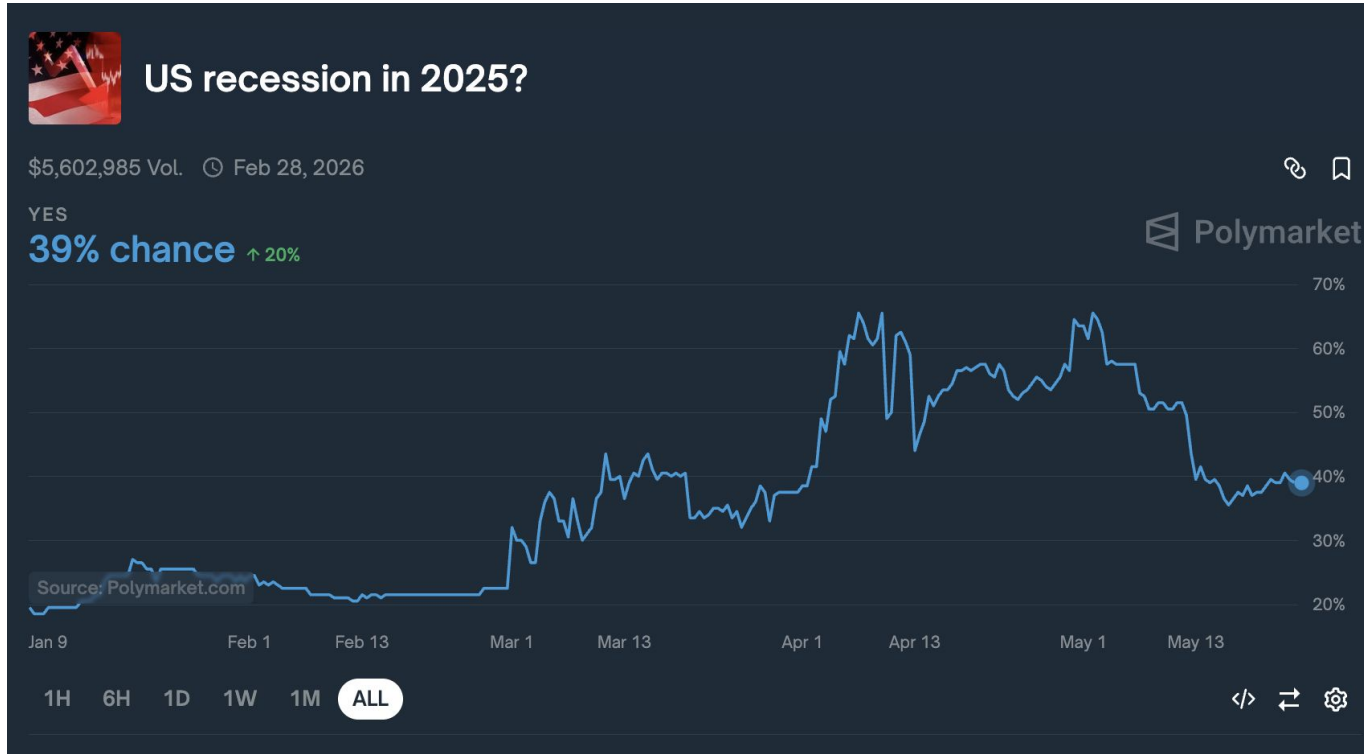
Polymarket

Decentralised

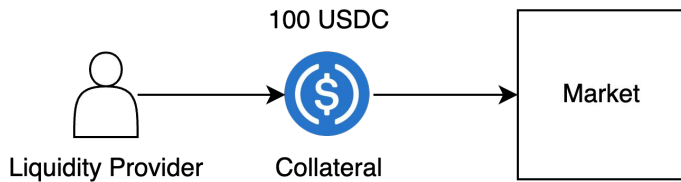
How do decentralised prediction markets work ? (Limit Order Book)



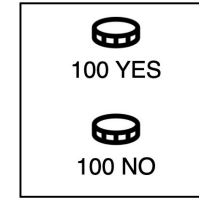
How do prediction markets work ?



How pricing in prediction markets work (AMM)



1. Add Liquidity



2. Splitting
(Price of each token = \$0.50)

$$100 * 100 = 10,000$$

- An Automated Market Maker (AMM) is a decentralized trading mechanism that facilitates the buying and selling of cryptocurrencies without relying on a centralized exchange or order book.
- Examples are Constant Product Market Makers ($x * y = k$)

How pricing in prediction markets work (AMM)

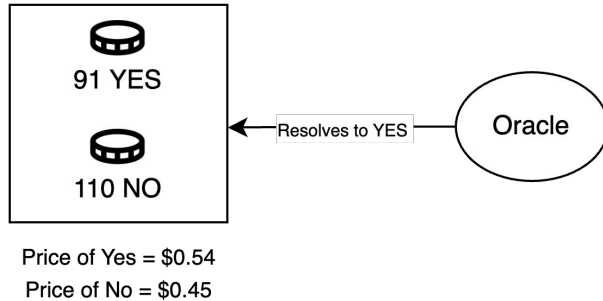


3. Trading

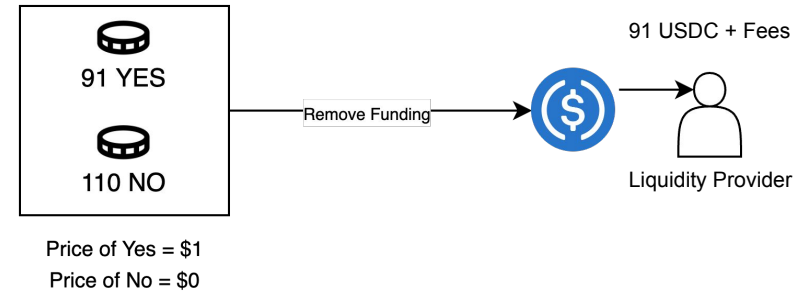
$$(100 - x) * (100 + 10) = 10000 \Rightarrow x = 9.09$$

- Trader is left with 19 YES tokens
- Pool has 110 NO tokens and 91 Yes tokens.
- Price of YES token: $110/201 = \$0.54$, Price of No token: $91/201 = \$0.45$

How pricing in prediction markets work (AMM)



4. Resolution



5. Remove Funding

Impermanent loss is a temporary reduction in value experienced by liquidity providers (LPs) in Automated Market Maker (AMM) pools due to price fluctuations.

Types of Decentralised Prediction Markets

AMM Based

- Usually based on constant function algorithm



- + Low fees for traders (easy access to liquidity)
- LPs Suffer from Impermanent loss

CLOB Based (Central Limit Order Book)

- Orders matched off chain and settled on-chain



- + Higher spread (more fee for LPs)
- Requires active market making

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RQ1: What factors determine the profitability of liquidity provision in AMMs on Polymarket prediction markets ?

- Analyse whether it is profitable, how high is profitability, relationship of volume and profitability
- Whether higher volumes results in higher profits for the liquidity providers.
- Historical data upto 2022.

Currently we are analysing ~2.5M transactions from 17,000 unique markets on polymarket.

RQ2: How can liquidity providers optimize their strategies to improve profitability in prediction market AMMs ?

- Behavior of LP for liquidity provision, whether they have any strategies.
- Analyse the historic patterns

RQ3: What determines the profitability of market making strategies in Central Limit Order Books for prediction markets?

- Analyse the data to find the maker/taker of trades and average out the buys/sells to find the total profit/loss
- Track the incentives for the liquidity providers

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Data Fetching:

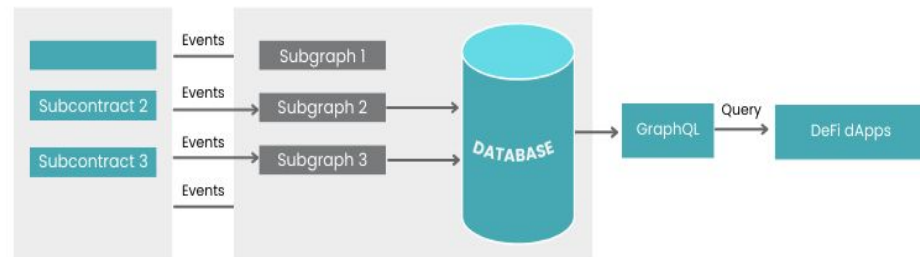
- Subgraph
 - These are used for Indexing and querying on-chain data through graphql API
 - Fetch structured on-chain data for Polymarket until 2022
- Polymarket Gama API
 - To obtain CLOB data after the migration to order book
- Polygon RPC nodes for historical data
 - Fetch detailed transaction data and capture events

Data Cleaning

- Parsing raw onchain data
- Grouping by unique AMMs
- Filtering relevant transactions

Data Analysis

- Finding profitability of the LPs
- Finding patterns in LP behavior



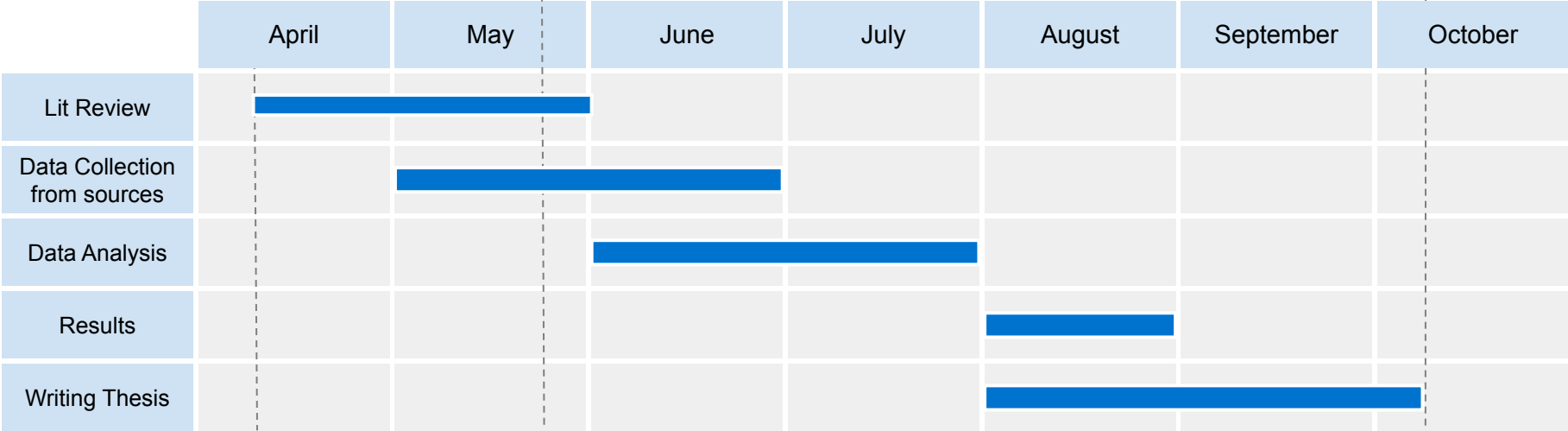
Subgraphs

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8th April, Registration

26th May, Kick-Off

8th October, Submission





Prof. Dr.

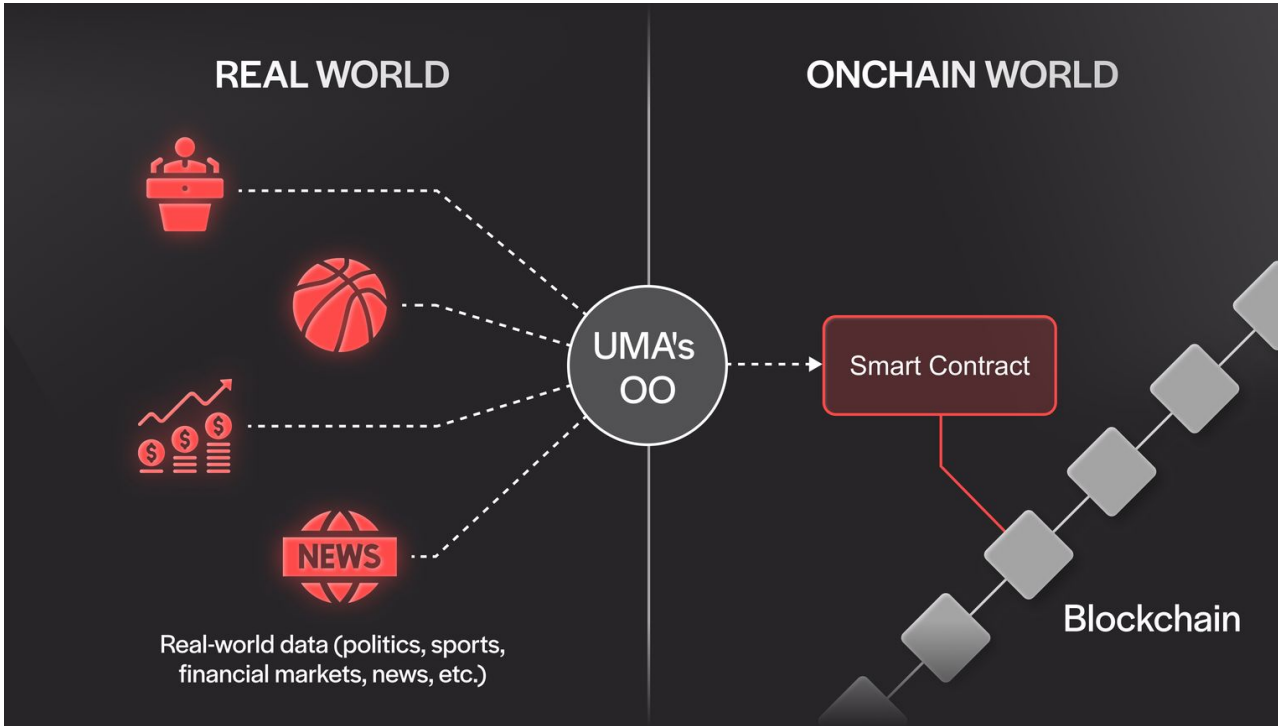
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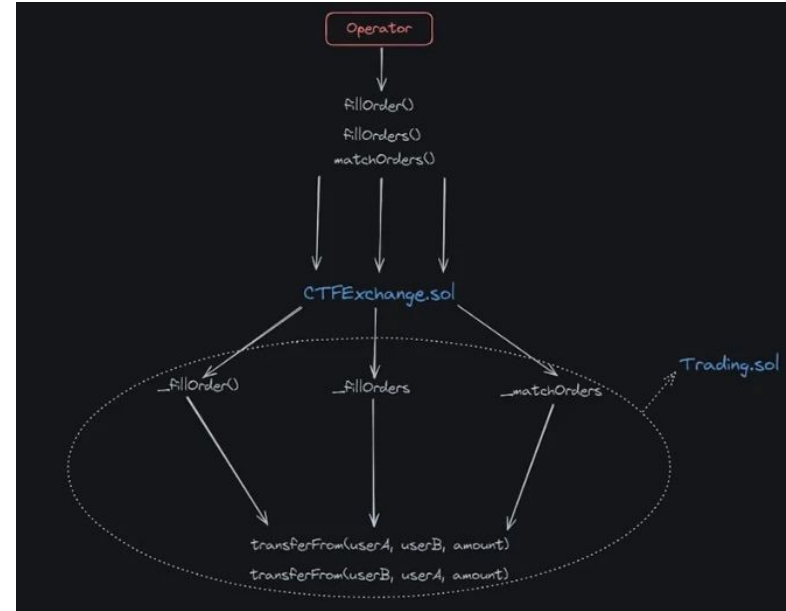
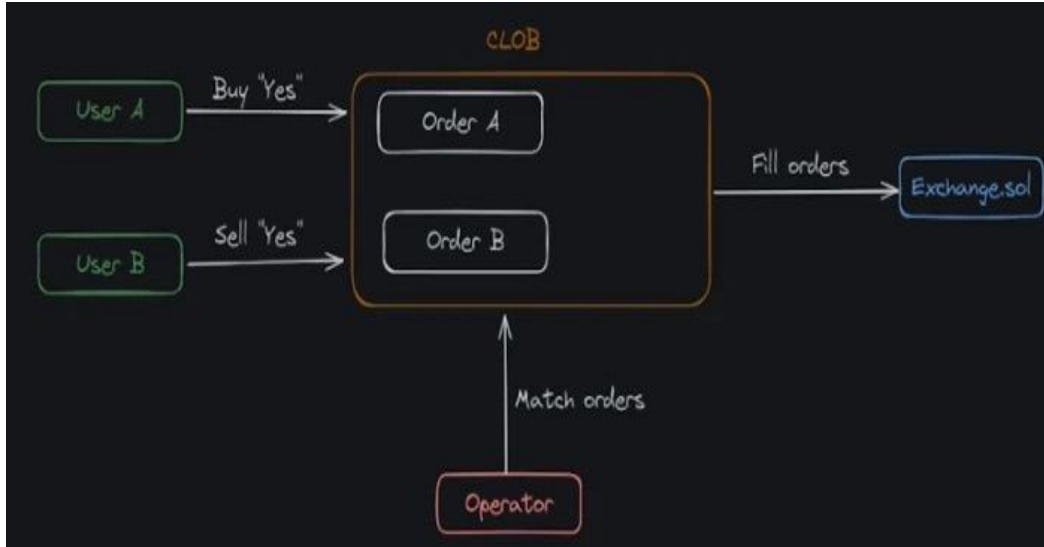
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CLOB Polymarket



Motivation and Background Information



- P

Topic

- Subtopic
-

Topic

- Subtopic

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 - YYMMDD Author Short Title
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