Prediction Markets

When Crowds Beat Experts

Day 9 of 10

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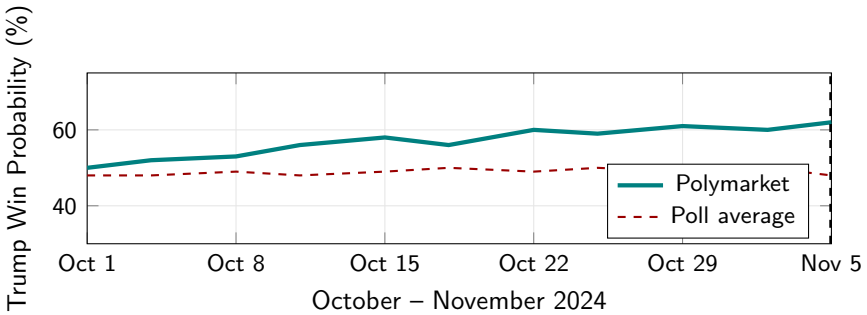
Polymarket Predicted the Election Better Than the Polls



Polymarket: 60% Trump (correct). **Polls:** 50/50 toss-up (wrong).

But Prediction Markets Are Not Perfect

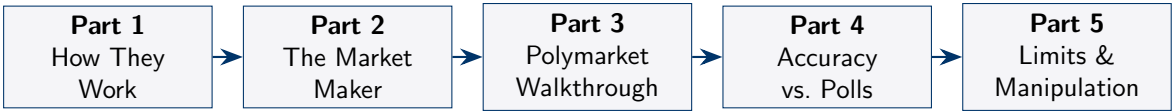
The Good

- More accurate than polls on the 2024 election
- Updates in **real time** as new information arrives
- Traders have **skin in the game** (money, not just opinions)
- \$3B+ traded on Polymarket in 2024

The Bad

- \$40M in arbitrage extracted (inefficiency)
- $\sim$25% of volume may be **wash trading**
- One whale ("Fredi") bet \$30M on Trump — informed trading or manipulation?
- Banned or restricted in many countries

Today's Agenda



Outline

The Basic Idea: Price = Probability

How It Works

A prediction market trades contracts that pay **$1 if an event happens** and **$0 if it does not**.

If a "Yes" share trades at **$0.72**, the crowd estimates a **72% probability** of the event occurring.

	"Yes" Share	**"No" Share**
Current price	$0.72	$0.28
Pays if event happens	$1.00	$0.00
Pays if event doesn't	$0.00	$1.00
Implied probability	72%	28%

Key: Yes + No always = $1.00 (by construction).
It is a continuous, incentivized poll where traders put money behind beliefs.

Worked Example: Fed Rate Cut Market

Setup

Market: "Will the Fed cut rates in June 2026?"
"Yes" share = \$0.72 "No" share = \$0.28
You buy 100 "Yes" shares at \$0.72 each. Cost: \$72.

Scenario A: Fed cuts rates

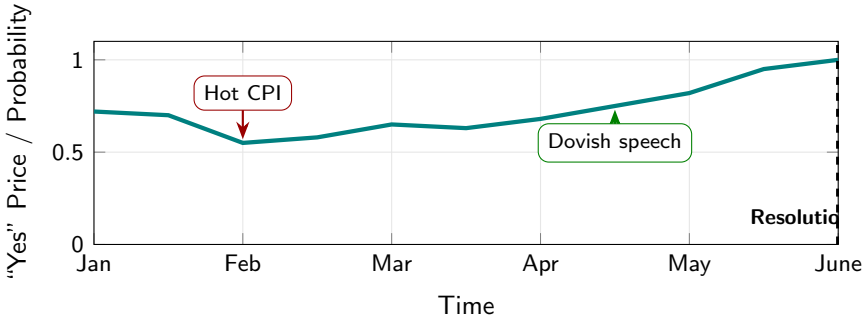
- Each share pays \$1
- Revenue: $100 \times \$1 = \$100$
- **Profit: \$28** (39% return)

Scenario B: No rate cut

- Each share pays \$0
- Revenue: \$0
- **Loss: \$72** (100% of investment)

New information: CPI comes in hot at 4.5% $\rightarrow$ rate cut less likely $\rightarrow$ "Yes" price drops to \$0.55 $\rightarrow$ your 100 shares now worth \$55 (paper loss of \$17).

Prices Update with New Information



Each event shifts the price (= probability). At resolution: price jumps to 1 or 0.

Why Markets Often Beat Polls

	Opinion Poll	Prediction Market
Incentive	None (free talk)	**Money at stake**
Update speed	Days to weeks	**Real-time**
Information used	Survey sample	**All sources**
Sample size	1,000 people	**All traders**
Weighting	Equal	**By conviction** (bet more = more weight)
Cost to be wrong	None	**You lose money**

Skin in the game matters. When your money is on the line, you research harder, update faster, and do not just repeat what you think sounds good [2].

Outline

LMSR: The "Vending Machine" for Probability Shares

The Problem

In a new prediction market with no traders, who provides the first price? Who offers to buy and sell shares before anyone else shows up?

The Solution: LMSR (Hanson, 2003) [ ]

An automated algorithm that:

- Always offers to buy AND sell any outcome
- Starts at 50/50 (no information)
- Adjusts prices as people trade
- The more you buy, the more expensive it gets
- Works like Uniswap, but for probabilities instead of tokens

LMSR: Step-by-Step Example

Setup

Binary market (Yes/No). Liquidity parameter $b = 100$. Start: 50/50.

Step 1: Initial prices = \$0.50 each. No one has traded.

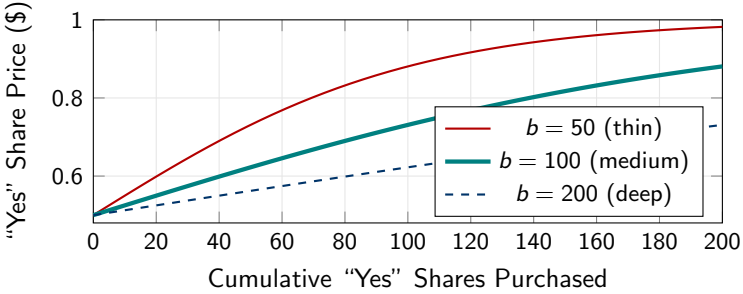
Step 2: Trader buys 10 "Yes" shares.

- Cost: **\$5.13** (slightly above \$0.50 per share on average)
- New "Yes" price: **\$0.525** (52.5%)
- New "No" price: **\$0.475** (47.5%)
- Prices still sum to \$1.00 ✓

Step 3: What if someone buys 100 "Yes" shares?

- Price moves more (to $\sim$62%)
- Each additional share costs more than the last
- Like a vending machine where each item is more expensive than the previous

The Liquidity Parameter b: How "Stiff" Is the Machine?



Small b: 10 shares move the price a lot (easy to manipulate).
Large b: 10 shares barely move the price (expensive to manipulate).

Two Types of Prediction Market Structure

Feature	CLOB (Polymarket)	AMM / LMSR (Augur)
How it works	Order book (like stocks)	Algorithm (like Uniswap)
Liquidity from	Human market makers	Protocol subsidizes
Spread	Tight (1–3 cents)	Wider (varies with b)
Best for	Popular markets	New/niche markets
Price discovery	Excellent	Good
Manipulation	Expensive (deep book)	Cheaper (bounded loss)

CLOB = stock exchange for bets (Polymarket uses this).
LMSR = vending machine for bets (good for bootstrapping new markets).

Outline

Polymarket: The Biggest Prediction Market

Key facts:

- Launched 2020, on Polygon blockchain
- Uses USDC stablecoin for trading
- $3B+ total volume in 2024
- Order book model (CLOB)
- Categories: politics, sports, crypto, economics, culture, science

How to trade:

1. Connect crypto wallet
2. Deposit USDC
3. Find a market (e.g., "Fed cuts in June?")
4. Buy "Yes" or "No" shares
5. Wait for resolution
6. Winning shares pay $1 each

No KYC for most users (decentralized). But: US users face restrictions under CFTC rules.

Case Study: 2024 US Presidential Election

Source	Trump Win Probability	Correct?
Polymarket (election morning)	**60%**	✓ Closest
538 model	48%	✗
The Economist model	46%	✗
RealClearPolitics average	50%	✗
Major polls	Within margin	✗
Actual result	**Trump won**	

Why was Polymarket better?

- Traders integrated information *beyond* polls: early voting data, social media sentiment, on-the-ground reports
- Money was at stake — no incentive to be "polite" about predictions
- Continuous updating vs. snapshot polls

Arbitrage: "Free Money" Between Platforms

Scenario

Polymarket: "Fed cuts" Yes = \$0.72 Kalshi: "Fed cuts" Yes = \$0.68

Strategy:

1. Buy 1,000 "Yes" on Kalshi at \$0.68 = \$680
2. Sell 1,000 "Yes" on Polymarket at \$0.72 = \$720

If event occurs: Kalshi pays \$1K, Polymarket costs \$1K. Net = \$0.
If event doesn't: Both pay \$0. Net = \$0.
Guaranteed profit: \$720 − \$680 = **\$40** (5.6% return).

Why Doesn't Everyone Do This?

Capital lockup (months), settlement mismatches, regulatory barriers, withdrawal delays. \$40M was extracted this way in 2024–2025.

Outline

Five Problems with Prediction Markets

1. **Thin liquidity:** Many markets have $<$\$100K volume. One whale can move the price.
2. **Wash trading:** $\sim$25% of Polymarket volume may be self-dealing to inflate apparent activity.
3. **Whale manipulation:** "Fredi" bet \$30M on Trump. Informed or manipulating?
4. **Regulatory uncertainty:** Election betting banned in many jurisdictions. Is it gambling?
5. **Moral hazard:** If you can bet on a bad event, do you have incentive to *cause* it?

How Expensive Is Manipulation?

Thin market ($b = 50$):

- Move price from 50% to 80%
- Cost: $\sim$\$460
- **Cheap** to distort
- Price reverts quickly when informed traders sell back

Deep market ($b = 5{,}000$):

- Move price from 50% to 80%
- Cost: $\sim$\$46,000
- **Expensive** to distort
- Market self-corrects as more traders pile in

Key Insight

Manipulation is expensive and temporary. The deeper the market, the more it costs to move the price — and informed traders push it back. Market accuracy **improves with volume**.

So Can We Trust Prediction Markets?

When markets are reliable	When markets are unreliable
High volume ($1M+)	Thin volume (<$100K)
Many diverse traders	Few traders / one whale
Information flows freely	Information is restricted
Clear resolution criteria	Ambiguous resolution
Enough time for prices to adjust	Flash events with no lead time

Bottom line: Prediction markets are a powerful tool for information aggregation, but they are **not infallible**. They work best for high-profile events with deep liquidity and diverse participants.

Outline

Exercise: Simulated Prediction Market

The Market

"Will the university announce a tuition increase by December 2026?"
Starting price: Yes = \$0.50 / No = \$0.50. You start with \$100 play money.

Round 1: No new information. Trade based on your prior belief.
Round 2: News: "Budget committee meets next week."
Round 3: News: "University president says 'costs are under control.' "
Round 4: News: "Internal memo leaked: 5% increase planned."
Round 5: Resolution. **Track:**

1. How does the class price change with each piece of news?
2. Who made the most money? Who lost the most?
3. Was the final price close to the truth?

Exercise: Key Questions to Discuss

1. Did the market price react "correctly" to each piece of news?
2. Did anyone try to **bluff** (trade against their belief)? What happened?
3. Was the market more accurate than a simple show-of-hands poll at the start?
4. What would happen if one student had \$10,000 play money ($10\times$ more than everyone else)?
5. If this were **real money**, would you trade differently?

Key lesson: The market aggregates *distributed knowledge*. No single trader knows everything, but the price reflects what everyone collectively knows.

Day 9: Key Takeaways

1. Prediction markets trade contracts where **price = probability**. Buy "Yes" at \$0.70 $\Rightarrow$ you think the probability is $>70\%$.
2. The **LMSR** is a "vending machine" for probability shares — always available, prices adjust with each trade.
3. **Polymarket** predicted the 2024 election better than polls because traders had skin in the game.
4. **Markets aggregate information:** thousands of traders with different knowledge produce a better forecast than any single expert.
5. **Limitations are real:** thin liquidity, wash trading, whale manipulation, and regulatory uncertainty.

Discussion Questions

1. If prediction markets are so accurate, why are they banned in many countries? Is that justified?
2. Should companies use prediction markets internally to forecast product launches or deadlines?
3. If you could create one prediction market for any future event, what would it be?
4. Is a whale who bets \$30M "manipulating" or just "putting money where their mouth is"?

Next Time: Tokenization – When Your House Becomes a Token

Day 10: The Final Frontier — Real-World Assets on Blockchain

- What is tokenization? (Slice assets into digital pieces)
- The $9B tokenized Treasury market
- Benefits: 24/7 trading, fractional ownership
- Risks: liquidity, legal, and technical challenges
- The future: everything tokenized?

References I

[1] Robin Hanson. "Combinatorial Information Market Design". In: *Information Systems Frontiers* 5.1 (2003), pp. 107–119.

[2] Justin Wolfers and Eric Zitzewitz. "Prediction Markets". In: *Journal of Economic Perspectives* 18.2 (2004), pp. 107–126.