ECON30580 Economics of Betting Markets
16. Betting Exchanges and Prediction Markets

Karl Whelan

School of Economics, UCD

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Betting Exchanges and Prediction Markets

- Betting exchanges operate very differently from traditional bookmakers.
  - Instead of betting against the bookmaker, customers bet against each other.
  - The exchange simply matches people who want to take opposite sides of a bet.
  - The exchange makes profits by charging fees, not by taking positions.
  - Two features of exchange interfaces are particularly notable:
    - ★ Odds are always quoted in decimal format.
    - ★ The interface shows how much money is available at each price.
- Prediction markets are essentially the same but have different conventions.
  - Instead of decimal odds, they quote prices between 1c and 99c.
  - For instance, I can agree to bet that something will happen by risking 5c; the other side risks 95c. If the event happens, I get the €1 and if it doesn't happen, the other side gets it.
  - Prediction markets have often focused on non-sporting events, like political races, whereas exchanges are dominated by sports.

Part I

A Simple Model of Betting Exchanges

Assumptions

- Let's consider a simple model of how betting exchanges might work.
- Suppose there is an event that may or may not happen. Let's say the event is Everton to win a specific game.
- Members of the public have their own subjective beliefs such that person i believes the probability of Everton winning is p_i.
- The median value of this subjective probability is p^*: Half the population has $p_i \geq p^*$ and the other half has $p_i \leq p^*$.
- The betting exchange allows people to make and accept offers quoted as decimal odds.
- They are limited to making 1 unit bets.
- People are risk-neutral, so they will make a bet if they think it has a positive expected profit.

Demand for Bets

- Consider decimal odds of D on Everton to win.
- Risk-neutral people will accept a bet with decimal odds of D on Everton to win if their expected payout on a 1 unit bet is greater than one

$$p_i D \geq 1 \Longrightarrow p_i \geq \frac{1}{D}$$

- On the other side, people would take the other side of that bet on the exchange if they believed the bet on Everton had negative expected profit, so you make a profit taking the other side. So people bet against Everton to win if their beliefs satisfy

$$p_i \leq \frac{1}{D}$$

Odds on the Exchange

- Suppose the median belief is $p^* = 0.5$.
- Consider decimal odds to back Everton of $D = 3$. People with $p_i \geq \frac{1}{3}$ would be willing to accept it. People with $p_i \leq \frac{1}{3}$ would be willing to take the other side.
- But there are more people with $p_i \geq \frac{1}{3}$ than there are with $p_i \leq \frac{1}{3}$ because $\frac{1}{3}$ is below the median belief.
- There would be an imbalance on the exchange: More people would want to accept decimal odds of $D = 3$ than would want to take the other side.
- How does this get resolved? One way is for those with high values of p_i to make offers to accept the bet on Everton to win for less than 3. This will attract new people with low values of p_i to come in and take those offers.
- The odds that would balance the market, with equal amounts of people offering and accepting bets would be $D = 2 = \frac{1}{p^*}$.
- The odds of $D = \frac{1}{p^*}$ are a natural equilibrium in the market.
- This shows how market prices on an exchange can reveal the median public belief about a probability. Take the inverse of the decimal odds and you can find out what p^* is.

Prediction Markets and the Wisdom of Crowds

- You can repeat the same argument for prediction markets only in this case you can directly associate the market price with p^*.
- Remember the idea of the wisdom of crowds? Over the years, there has been a lot of interest in the idea that governments and firms could use prediction markets to get better estimates of probabilities of uncertain outcomes by tapping into the vast amounts of knowledge that the public has.
- An early example was a project to forecast political events run by researchers at the University of Iowa.
- Iowa Electronic Markets, as it became known, was used to generate forecasts of many different elections.
- Researchers showed that the prices on the IEM were excellent predictors of election outcomes, generally better than opinion polls.
- Many economists and other social scientists called for more widespread use of prediction markets, so the "wisdom of crowds" could be harnessed for the greater good across a wide range of subjects.

Regulatory Problems in the US

- One problem with the development of prediction markets was there were regulatory issues in the US.
- Some argued this was gambling (which was subject to a federal ban until 2018), others that these were financial contracts and thus had to be regulated by the the Commodity Futures Trading Commission (CFTC).
- The IEM was allowed to operate because it was considered a research project. It limited participation to students and the maximum amount you could bet was \$500.
- Other prediction markets got shut down by US regulators.
- In 2008, a team of social scientists (including 4 Economics Nobel winners) published an article in *Science* arguing for "the promise of prediction markets" and making the case that these markets should be allowed to operate and for society to benefit from "the wisdom of crowds."
- In November 2020, the CFTC decided to license a market of this type offered by startup firm Kalshi (which is Arabic for "Everything"), which now offers a wide range of markets and allows users to invest up to \$25,000 on a single contract.

Part II

Real World Betting Exchanges

Three Features of Real Exchanges

Real world betting exchanges operate differently to the simple model.

1. **Fees**: IEM did not charge fees because it was a research project funded by a university. But exchanges like Betfair are not charities. For example, Betfair charges a fee on winnings, typically 2%.
2. **Decentralised Matching**: Exchanges do not use a centralised mechanism to come up with a single market price that equates supply and demand. Instead, they just facilitate bilateral matches. These matches always feature
   - **A Maker**: The person who initiated the trade, making the offer.
   - **A Taker**: The person who accepted the offer.
3. **Multiple Odds for the Same Bet**: You can find odds to accept an offer to back an outcome and also odds from people who are making offers hoping to back that outcome.

Both of these features make betting exchanges more interesting than the simple market we just described and incorporating them into a model generates some interesting testable predictions.

Example: Betfair Exchange

- Let's take a close look at how the Betfair exchange actually works.
- The next page shows a replica of the Betfair Exchange interface for England vs Serbia in November 2025.
- It shows odds quoted a few hours before kick-off.
- The three best odds are displayed for both backing and laying each outcome.
- The numbers beneath each price show how much money is available to be matched.
- There are four different ways to place bets on an exchange.
- We will go through each of these in turn.

Example: England versus Serbia

Betfair Interface for England versus Serbia, November 2025

	100.8%		*Back All*	*Lay All*		*99.4%*
England	1.27	1.28	1.29	1.30	1.31	1.32
	£43,459	£34,877	£15,759	£20,472	£18,663	£8,236
Serbia	13.00	13.50	14.00	14.50	15.00	15.50
	£773	£548	£567	£827	£365	£1,167
The Draw	5.90	6.00	6.20	6.40	6.60	6.80
	£207	£6,126	£1,727	£1,051	£3,223	£4,311

Method 1: Accepting an Offer to Back

- The simplest way to use an exchange is just to accept the best available backing odds.
- These appear on the left-hand side under the heading **Back All**, shaded in blue.
- In the example shown, at the best available odds
  - England can be backed at 1.29
  - Serbia can be backed at 14.0
  - The draw can be backed at 6.2
- Click the odds, choose a stake and the exchange matches you with someone offering those odds.
- Taking this option means you are effectively using the exchange as an alternative way to back a team to using a bookmaker.
- But one difference is that exchanges tell you how much is available at each odds. For example, there is €15,759 available to back England at 1.29.

Exchange Margins

- The interface shows an overround of **100.8%** based on the best available back odds.
- This suggests an expected loss rate of less than 1%.
- However exchanges charge commission on winnings.
- Betfair's typical commission is about **2% of winnings**.
- So you are not really backing England at 1.29. If they win, your payout on a unit bet would be

$$1 + 0.98(1.29 - 1) = 1.284$$

- After adjusting all odds for commission, the true overround is about **101.6%**.
- This is an implied margin of **1.6%**.
- So it is not as good as the 100.8% looks but this is still a very low margin: Odds are generally better with exchanges than with bookmakers.

Comparison with Bookmakers

- The next table compares bookmaker odds on the same match.
- Odds on the favourite (England) are broadly similar to those offered on Betfair exchange.
- But bookmaker odds on the draw and the longshot (Serbia) are much worse.
- Average bookmaker odds on Serbia were about **10.25**.
- Effective Betfair odds after commission were about **13.7**.
- Even the lowest bookmaker margin is about three times larger than the post-fee margin on Betfair.
- The lowest margin with bookmakers was 4.7% and the highest was 8.5%. Much higher than the 1.6% effective margin on the exchange.
- And there is another advantage. Exchanges don't restrict bettors for winning: It's not their money you are winning, it is the person who agreed to take the other side of your bet.
- The exchange makes money off the commission no matter who wins, so they don't discourage winners.

Example: Bookmakers' Odds on England versus Serbia

Bookmaker	*England*	*Draw*	*Serbia*	*Margin*
Ladbrokes	1.29	5.75	10.0	4.7%
bet365	1.29	5.50	10.0	5.3%
Betfred	1.25	5.50	12.0	6.1%
William Hill	1.30	4.80	9.0	8.2%
Betway	1.29	5.00	8.50	8.5%
Unibet	1.23	6.00	12.0	5.9%

Method 2: Accepting an Offer to Lay

- In this case, you place a "lay" bet, betting against something happening.
- The simplest way to place a lay bet is to accept an offer to do so. These offers show up on the right-hand side of the interface. The odds are quoted from the perspective of someone backing not laying, so it works as follows.
  - The three lay bet odds on England displayed are 1.30, 1.31 and 1.32.
  - If you clicked on 1.30 and agreed to accept a €1 bet from the other side, then
    - ★ **If England don't win**, you win €1 minus commission.
    - ★ **If England win**, you lose 30c.
  - There is €20,472 on offer for people to place lay bets in which they agree to the back side getting odds of 1.30. If you accept a €10 offer, this figure falls to €20,462.
- Here, 1.30 is the best option for lay bettors. Betfair's interface lists the best available offers for lay bettors under Lay All with these entries shaded in pink.
- The overround here is 99.4%. This means accepting these offers to lay will on average lose money.

Method 3: Backing by Making an Offer to Lay Bettors

- We have shown how to accept offers to back and lay. Those offers don't come from Betfair. They come from other bettors on the exchange.
- You can make offers as follows. You want to back England at better odds than 1.29. You click on the 1.29 and toggle a button and move the odds up to 1.30.
- You select how much money you want to bet at those odds and that money is added to the existing €20,472 potential England backers seeking to get matched at 1.30.
- An advantage of being a Maker is that if your offer is successfully matched, then you get **better odds**.
- The disadvantage is that **you might not get matched**. Offers from Makers at each price are filled sequentially based on who made the offers first. So, seeking odds of 1.30 to bet on England would place your offer behind €20,472 in offers from others.
- In a high-volume market like this one, your offer may eventually rise to the top of the queue and get matched, but it might not. And odds might change so that this is no longer the best price available to lay bettors.

Method 4: Laying by Making an Offer to Back Bettors

- This is just being a market maker as a lay bettor.
- Instead of accepting the offer to lay England by agreeing to give the other side odds of 1.30, you ask if someone will accept 1.29.
- This puts you behind the €15,759 in offers already made at this price.
- Which brings us back to where we started.
- For those coming into Betfair to back England, they see the offer to place that bet at 1.29 — and that offer comes from you and the others who picked this option.

The Bid/Ask Spread

- Note that for each of the possible bets, there is a gap between the best decimal odds definitely available for backing an outcome (the blue box) and the best decimal odds definitely available for laying an outcome (the pink box).
- Unlike our simple exchange model from earlier, there is not just one price, but two and the gaps between them vary.
- This phenomenon is common in financial markets.
- For example, in the stock market, typically there is one price if you are looking to buy a stock (the bid price) and another if you are trying to sell it (the ask price) with the buy price being higher than the sell price.
- The gap between these prices is known as a **bid/ask spread**.
- In many markets, this is because there is a broker that buys stocks from people and sells them to others and they make a profit by buying for a lower price than they sell at.
- That's not what's happening here. Betfair matches up buyers and sellers but does not take positions itself. This bid/ask spread emerges from people on both sides trying to get the best deal they can.

Other Features: Limited Pricing Points and API Trading

- **Limited Pricing Points**
  - Exchanges don't allow you to seek any possible odds: you can't ask for 1.303. Allowing offers like this would confuse customers because there would be many different prices and liquidity would be spread thinly across them.
  - On Betfair, the minimum "tick size" — the minimum increment you can make when offering odds — is 0.01 and this tick size gets bigger as the odds rise.
  - In our England-Serbia example, each of the gaps between the best back odds available to accept and the next highest odds sought equals the minimum tick size.
- **Automated Trading**
  - A large share of exchange trading is automated via Betfairâs **Application Programming Interface (API)**.
  - Bots place orders when certain conditions are met.
  - This allows traders to act as market makers across many markets simultaneously.

Supply, Demand and Prices

- Exchanges are an incredibly powerful way of translating the beliefs of bettors into odds.
- Suppose the England team-sheet drops an hour before kick-off and it turns out Harry Kane and Declan Rice aren't playing because they have minor injuries.
- Money comes in backing Serbia because it looks more attractive at the current prices. Many of the offers to back Serbia at 13 and up are accepted; other unmatched offers are cancelled.
- Quickly, the best odds to back Serbia is down to 12.
- Traders interested in seeking better odds to back Serbia will now come in and look for 12.5, which becomes the new number in the pink box under "Lay All".
- Within seconds, all the listed odds on Serbia have shortened, as the extra demand for betting on them has moved the odds down. In the same way, money will come in laying England at odds of 1.30 and these odds will move upwards.
- This shows how, without bookmakers being involved, the judgement of the public translates new information rapidly into odds.

Betfair market-implied probability of a Chelsea win in two matches

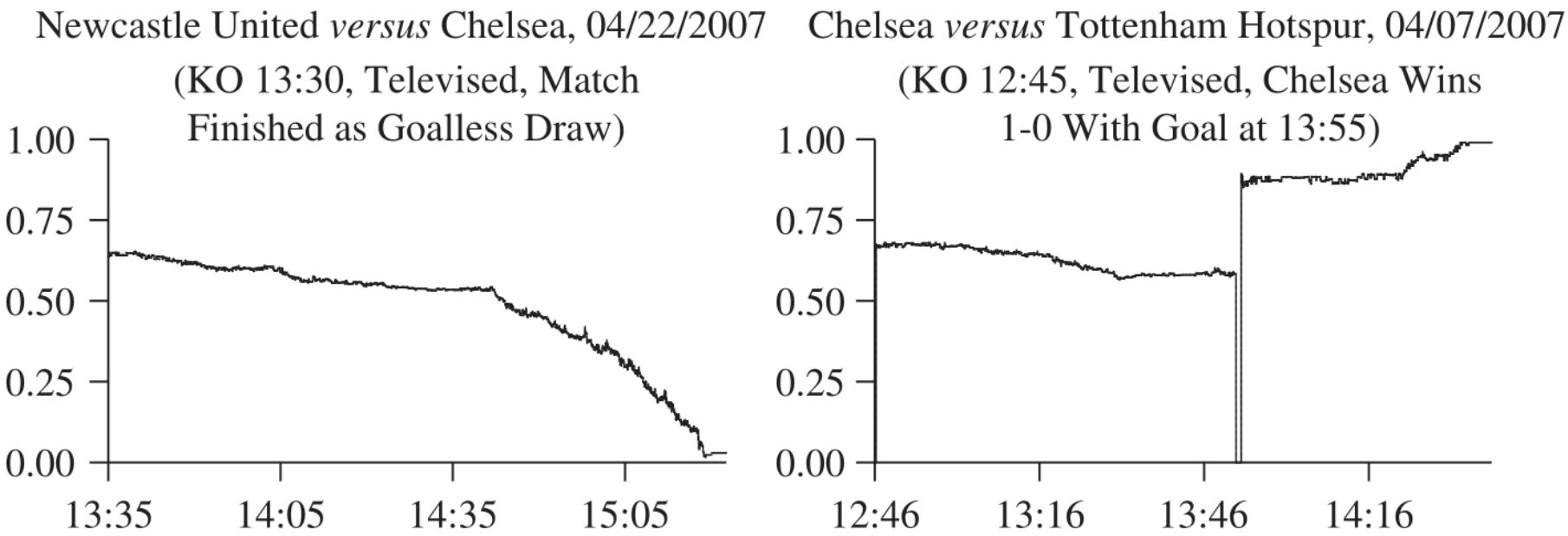


Fig. 5. *Illustrative Time-related Drift: Evolution of Chelsea-win Probability*

Part III

Makers and Takers: A Simple Theory

Makers and Takers

The options available on betting exchanges suggest there are perhaps two different kinds of people that participate in these markets.

1. **Takers**: People who click on the blue and pink boxes and take the odds offered.
   - These people may be impatient and just want to get their bet on.
   - And they know the Back odds are better than you would get at retail bookmakers while Lay bets are not usually available from bookies.
   - Perhaps they have a strong belief that taking these offers is profitable and don't want to risk looking for better odds but not getting matched.
2. **Makers**: These people don't take the odds on offer in the blue and pink boxes but instead seek better odds.
   - These people may be less impatient and are willing to wait to get a better price or accept that they won't get a bet placed in this market.
   - They may be aware that whatever edge they may have is small and making any profit after commission requires being careful about which prices to accept.

You might imagine being a Taker is worse for your finances than being a Maker. Let's think about this a bit more.

Model Assumptions

- Again, we consider an exchange market where people can bet for or against Everton to win.
- Everton have a probability p of winning.
- The exchange charges a commission fee, c, on each euro of winnings e.g. $c = 0.03$ implies a 3% commission.
- There are two types of agents
  1. **Makers**: These people know what p is and make offers on the exchange that allow them to break even after commission (perhaps competition among Makers drives their profit rate to zero).
  2. **Takers**: These people accept the offers in the blue and pink boxes made by Makers. We can presume they don't know p and may be too optimistic about the chance of their bet winning.
- Let's see what happens in this market.

Back odds offered by Makers (blue box)

- If a Maker offers to accept a back bet of 1 on Everton at odds D^B (so they are making a lay bet) then
  - There is a probability p that Everton win and the Maker loses $D^B - 1$
  - And a probability $1 - p$ that Everton lose and the Maker wins $1 - c$ after commission.
- To expect to break even on average, the expected payoffs in the two outcomes (the payouts that occur in those outcomes times the probabilities of the outcomes) must be equal.
- This means, the Maker would need to be offering back odds that satisfy

$$p\left(D^B - 1\right) = (1 - p)(1 - c)$$

- This can be re-arranged to give a simple expression:

$$D^B = 1 + \frac{(1 - p)(1 - c)}{p} < \frac{1}{p}$$

- This is less than fair odds $(\frac{1}{p})$ so Back Takers will on average lose money. If $c = 0$, $D^B = \frac{1}{p}$.

Lay odds offered by Makers (pink box)

- If a Maker seeks to make a back bet of 1 on Everton at odds D^L (so they are looking for someone to take the Lay bet on the other side)
  - There is a probability p that Everton win and the Maker wins $\left(D^L - 1\right)(1 - c)$ after commission.
  - And a probability $1 - p$ that Everton lose and the Maker loses 1.
- To expect to break even on average, the expected payoffs in the two outcomes (the payouts that occur in those outcomes times the probabilities of the outcomes) must be equal.
- This means, the Maker would need to be offering lay odds that satisfy

$$p\left(D^L - 1\right)(1 - c) = 1 - p$$

- This can be re-arranged to give

$$D^L = 1 + \frac{1 - p}{p(1 - c)} > \frac{1}{p}$$

- This is more than fair odds $(\frac{1}{p})$ so Lay Takers will on average lose money. If $c = 0$, $D^L = \frac{1}{p}$.
-

Average Odds Are About Right

- So back odds are lower than fair value and lay odds are higher than fair value.
- What about the average of back and lay?
- This is

$$\bar{D} = \frac{1}{2}\left[D_B + D_L\right] = \frac{1}{2}\left[2 + \frac{(1-p)(1-c)}{p} + \frac{1-p}{p(1-c)}\right]$$

- This solves to give

$$\bar{D} = \frac{1}{p} + \frac{c^2(1-p)}{2p(1-c)}$$

- The squared term c^2 will be very small, so the average of the odds will be very close to the inverse of the probabilities used by the Makers to set odds.
- This is a very strong prediction: Average odds across back and lay will not display a favourite-longshot bias.

How Much Do Takers Lose After Commission?

- Consider Takers taking the back odds. On average, once you factor in commission on winnings, their loss on a 1 unit investment is

$$1 - p - p\left(D^B - 1\right)(1 - c)$$

- Remembering that

$$D^B - 1 = \frac{(1 - p)(1 - c)}{p}$$

- Plugging this in, the post-commission loss rate for Takers is

$$1 - p - p\left(D^B - 1\right)(1 - c) = 1 - p - (1 - p)(1 - c)^2 = (1 - p)\left(2c - c^2\right)$$

- Again, Takers should lose more on longshot bets. Losses are approximately $2c(1 - p)$.
- For $p \approx 1$, loss rates are approximately zero.
- For $p \approx 0$, loss rates are approximately 4% at Betfair's commission rate of $c = 0.02$.

Why Do Takers Lose More on Longshots?

- The incidence of the fees falls on Takers.
- Fees are charged on the amount won by the winner. And average winnings (and thus also average losses) rise as the probability of a bet falls.
- For example, suppose bets are priced fairly so a back bet's odds are $D = \frac{1}{p}$.
- If $p = 0.5$, $D = 2$. Whichever outcome, somebody is going to win 1.
- If $p = 0.2$, then there is a one-fifth chance the back bettor will win 4 and a four-fifths chance the lay bettor will win 1. The average is $4(1/5) + 4/5 = 8/5$ which is greater than one.
- More formally, there is a probability p that winnings will be $\frac{1}{p} - 1$ and a probability $1 - p$ that winnings will be one. Expected winnings are $2(1 - p)$.
- The odds in our Takers-Makers model are not fair odds but the point about average winnings being higher for low values of p remains true.
- We have focused on people who click on Back but the logic is the same for people who click on Lay. The formula for their expected loss rates as a function of probability of bet winning is the same.

Part IV

Makers and Takers: A Disagreement-Based Theory

Why Be a Taker Not a Maker?

- Let's think more about who decides to be a Maker and who decides to be a Taker.
- One explanation is that these are just two different groups, with Makers being more sophisticated than Takers.
- There probably is something to that.
  - For new participants, accepting offers to back by clicking on the blue buttons is the simplest option, followed by accepting offers to lay by clicking on the pink buttons.
  - The fact that exchanges only get about 10% of betting volume shows most people prefer just accepting an offer.
- But anyone who uses exchanges for a while gets to grips with the four options available for any bet.
- An alternative (or additional) explanation is that people choose to be a Maker or a Taker based not on differences in patience or intelligence but on **differences in beliefs**.
- Let's go back to the England versus Serbia example.

Being a Taker Backing the Draw

- I am thinking of backing the draw and I can accept an offer to back at 6.2 or I could seek better odds of 6.4.
- Suppose there is an 80% chance I will get matched when seeking 6.4. Which option do I pick?
- Consider the expected payoff from a €1 bet. If I accept 6.2, my expected payoff is

$$p \times 6.2$$

  If I seek 6.4, there is an 80% chance my bet gets matched and a 20% chance I get my €1 returned to my account un-matched. In that case, my expected payoff is

$$(0.8 \times p \times 6.4) + (0.2 \times 1)$$

- Accepting the offer to back at 6.2 has a higher expected payoff if

$$p \times 6.2 > (0.8 \times p \times 6.4) + (0.2 \times 1)$$

- A quick calculation shows this will hold if $p > 0.185$.

Being a Maker Versus Not Backing

- At back odds of 6.2 and lay odds of 6.4, you will not be a Taker backing the draw if you have $p < 0.185$
- But you will be a Maker (backing by making offers to lay bettors at 6.4) as long as

$$p \times 6.4 > 1 \Longrightarrow p > 0.156$$

- So the decisions on backing the draw will be
  - Those with $p > 0.185$ will accept the offer to back at 6.2.
  - Those with $0.156 < p \leq 0.185$ will seek to back at 6.4.
  - Those with $p < 0.156$ will not back the draw.

Five Options

For each outcome, the disagreement model predicts participants will take one of these five options, ranking them from high values of p to low

- **High-conviction backers**: Confident enough the outcome will happen to accept the back odds offered.
- **Low-conviction backers**: Less confident the outcome will happen but believe it is worth backing at the odds offered to lay bettors.
- **Fence-Sitters**: Neither confident enough that the outcome will or wonât happen to either back or lay.
- **Low-conviction layers**: Think the event is worth betting against at the current odds offered to backers.
- **High-conviction layers**: Confident enough the outcome will not happen to accept the lay odds offered.

Equilibrium in the Disagreement Model

- The four groups that don't sit on the fence interact with each other:
  - High-conviction backers accept offers from low-conviction layers.
  - High-conviction layers accept offers from low-conviction backers.
- The market produces odds that result in there being more low-conviction bettors posting offers than high-conviction bettors taking them.
- Like pari-mutuel markets, exchange odds are determined by prices and volumes interacting with each other.
- An "equilibrium" on an exchange is a set of odds and volumes so that everyone is happy with their choice to take one of the five possible decisions.
- For example, if 80% is the equilibrium matching rate, then the odds need to produce just the right number of high-conviction and low-conviction bettors to play their roles.
- The equilibrium has to be solved numerically on a computer but the results it gives are **very similar to the Maker-breaks even** model.

Part V

Evidence from Betfair

Average Betfair Odds Are Extremely Accurate

- These models predict average back and lay odds will reflect the average beliefs of the participants.
- Are these probability estimates likely to be good ones? Before we show some evidence, there are clear arguments suggesting they should be.
  - There are no bookmakers setting odds with a deliberate bias.
  - And exchanges are designed to attract highly skilled bettors. Their commissions on winnings translate into lower effective margins than you get from betting with most bookmakers. There is no bookmaker profiling them and throwing them out for winning too much.
  - Betfair's high volume markets and API system allow serious participants to place large amounts of money.
- The table on the next page groups pre-match bets on over 200,000 football matches on Betfair from 2022 to 2024 by their calculated implied probability of the bet winning based on the "last traded price". Half are from back odds and half are from lay odds.
- The accuracy of the Betfair odds is striking. The predicted probabilities are all extremely close to the actual win rates.

Average Betfair Odds Are Highly Accurate Predictors

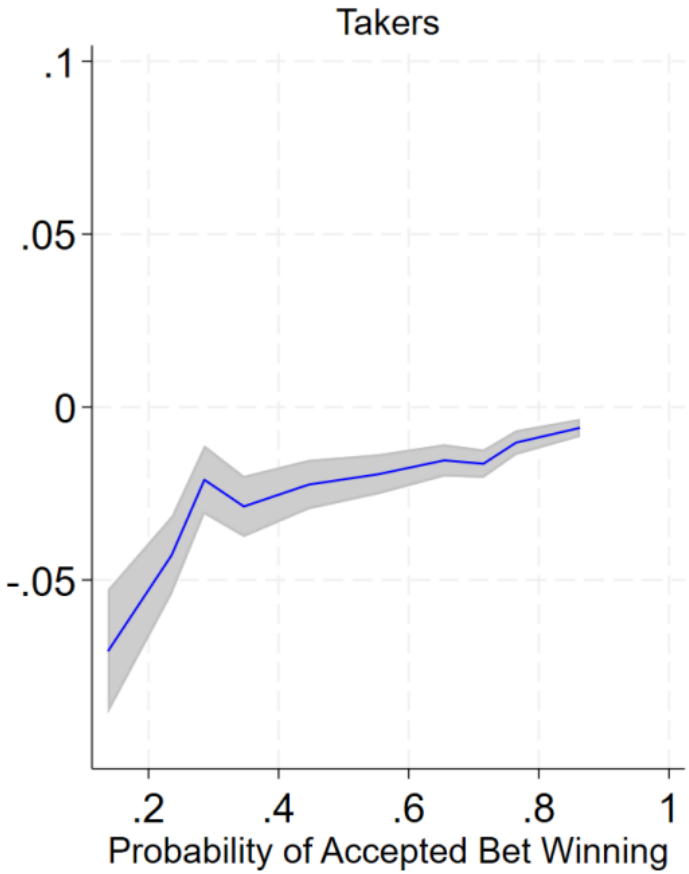
Betfair implied probability of winning and actual win rate for bets on home/away/draw in football from 2022-2024.

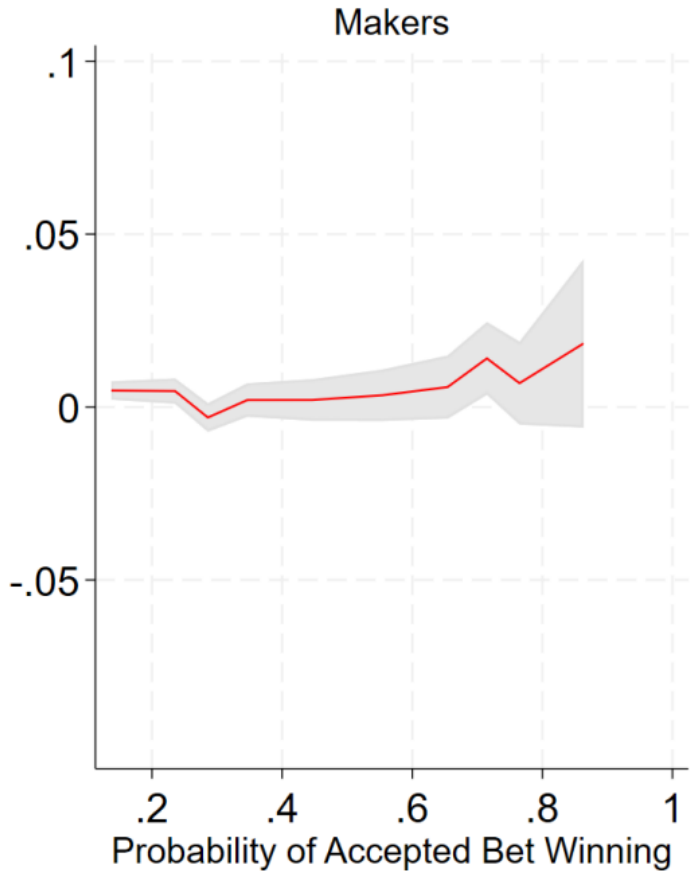
Betfair implied probability of winning	*Average win rate*
0.0934	0.0936
0.1771	0.1794
0.2223	0.2238
0.2536	0.2530
0.2797	0.2819
0.3076	0.3101
0.3484	0.3457
0.4201	0.4175
0.5203	0.5179
0.7110	0.7106

Evidence on Makers and Takers

- Betfair make second-by-second data available showing individual trades and the order book.
- If the best available back odds for the draw are 6.2 and we see a trade happen at 6.2, we know that what happened is the Taker is backing a draw and the Maker is laying a draw.
- Incorporating this information into the over 600,000 soccer bets in our dataset, we can see how Makers and Takers perform.
- The results are in line with the models just developed.
- Makers tend to break even on average and Takers tend to lose about the percentages predicted by the models.
- Late in-play trading on exchanges, however, shows similar favourite-longshot biases to those seen in bets with bookmakers, with both Makers and Takers losing money on late in-play longshots.

Takers Do Worse On Longshot Bets (Shaded areas are standard error bands)





Part VI

Prediction Markets

What Are Prediction Markets?

Prediction markets have the same structure as betting exchanges but have different conventions.

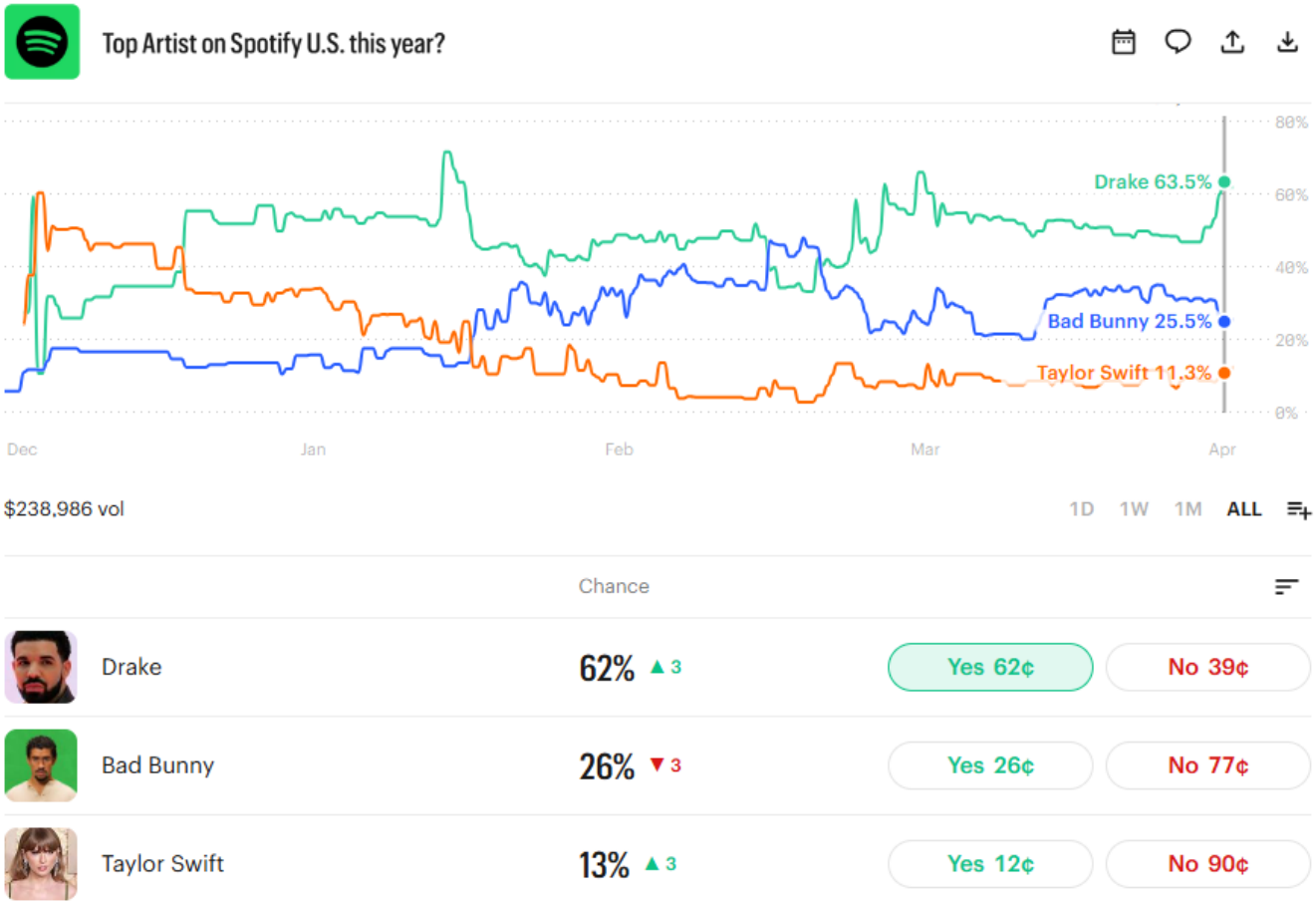
1. **Price Quotes**: Rather than quote decimal odds, contracts in prediction markets are quoted as a number q between 1c and 99c.
   - If I buy a contract at 25c on Everton to win, then I have agreed to put in 25c from my account and the other party has agreed to put in 75c. We see who wins and that decides who gets the combined €1.
   - Suppose Jane agreed to buy 40 of these 25c contracts with Mary taking the other side.
     - ★ If Everton win, Jane will win €30 (= 0.75*40) and Mary will lose €30.
     - ★ If Everton lose, Jane loses €10 (= 0.25*40) and Mary will win €10
   - You can see now that the 25c/75c contracts are the same as agreeing on decimal odds of 4 on Everton. A price of \$q implies decimal odds of $\frac{1}{q}$.
2. **Events**: Prediction markets take bets on a wider range of events than betting exchanges like Betfair, which focus mainly on sports. You can bet on politics, the economy, the Oscars, even the weather.

The Kalshi Prediction Market

Works pretty much the same as the Betfair exchange with a few differences.

1. **Pricing**: Kalshi quotes prices as between 1c and 99c with each contract being a contest to win a dollar. This is just another way to express the same information as decimal odds.
2. **Terminology**:
   - Kalshi don't use the back/lay terminology, instead using Yes/No and describe their order book differently.
   - Look at the Kalshi market on who will be the top artist on Spotify this year. The Yes/No buttons are like the back and lay buttons on Betfair.
   - Instead of showing more prices left and right of the main clickable buttons, you can click into each artist and see their order book.
   - You could back Drake by accepting to buy at 62c or making an offer to buy at 61c (this is the No offer of 39c).
3. **Commission**: Kalshi does not charge a fee on winnings. Instead, if a contract is agreed at price $\$q$, Kalshi charges a fee of $0.07 * q\,(1-q)$.

Who is going to be the top artist on Spotify in 2026?



Order Book for Drake

Drake

62% ▲ 3

Yes 62¢ | No 39¢

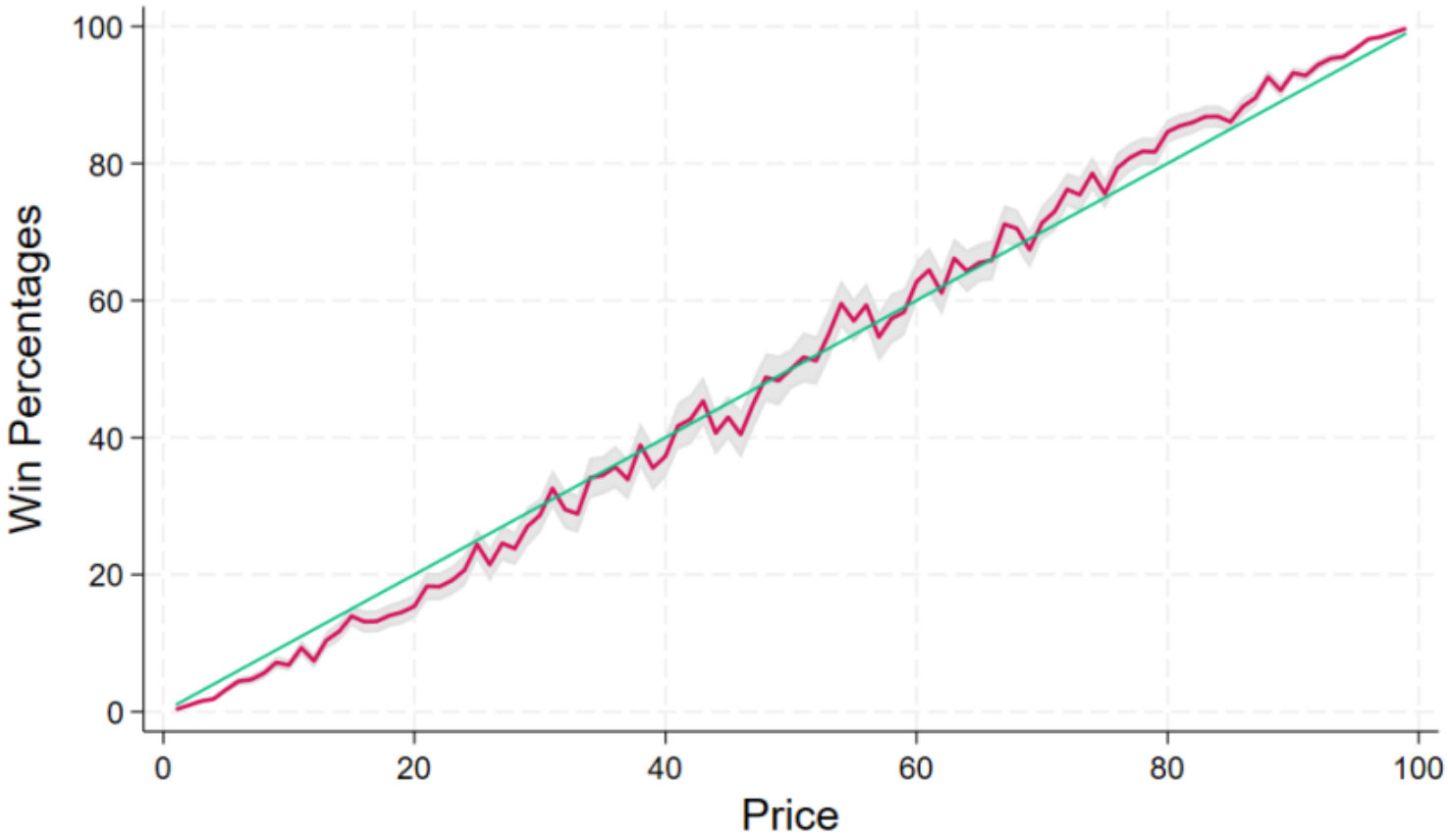
Trade Yes | Trade No | Graph

	Price	Contracts	Total
	83¢	47	$754.33
	73¢	10	$715.32
	64¢	26	$708.02
	63¢	1,000	$691.38
Asks	62¢	99	$61.38
	Trade Yes Last 62¢		
Bids	61¢	2,010	$1,226
	60¢	884	$1,757
	59¢	1,000	$2,347

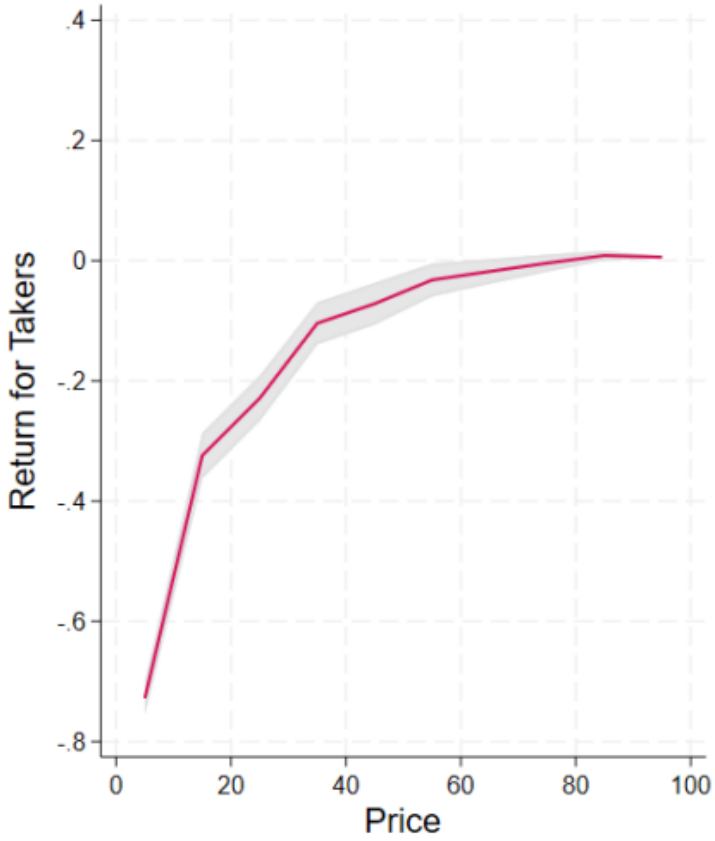
Evidence from the Kalshi Prediction Market

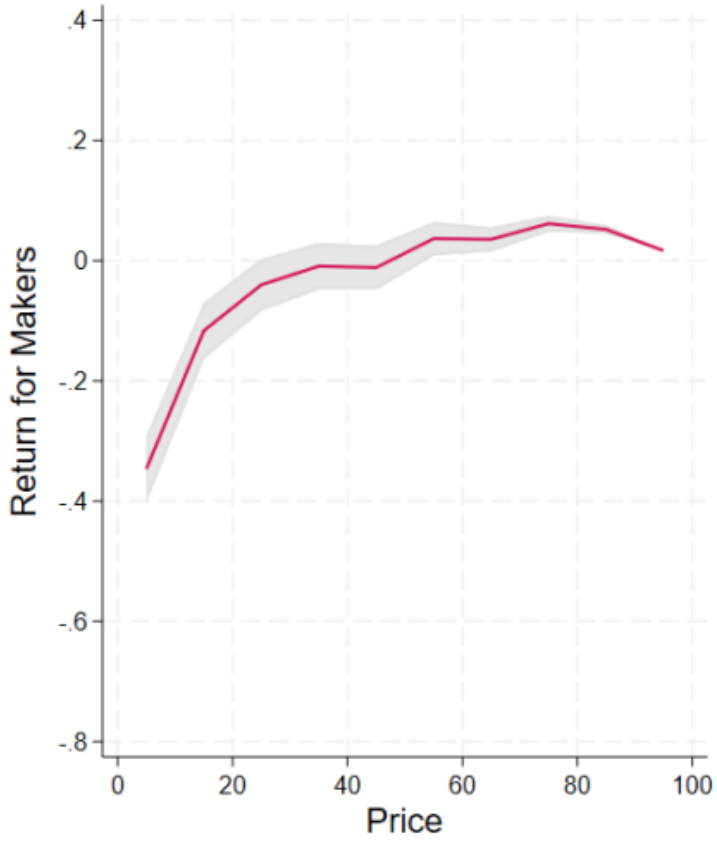
- In a paper with Constantin Burgi and Wanying Deng, we obtained contract-level data from Kalshi.
- 313,972 prices for purchased contracts from 10 days before market closing to the final price.
- Kalshi identify which side is the Maker and which is the Taker.
- We find Kalshi prices are pretty good predictors of outcomes but they are not perfect.
- Plotting Kalshi prices and the fraction of contracts that win, unbiasedness implies a 45 degree line but this is not what we see.
- Yet again, we see a **favourite-longshot bias**: Cheap longshot contracts win less than they should and expensive favourite contracts win more than they should.
- The consequence is big losses for both Makers and Takers when buying cheap contracts: We show this can only fit with the disagreement exchange model if traders systematically over-state small probabilities.

Fraction of Kalshi contract wins plotted against price



Returns on offered and accepted Kalshi contracts





Supplementary Material in the Draft Book

- Chapter 25: How Betting Exchanges Work
- Chapter 26: Makers, Takers and Returns