

# ECON30580 Economics of Betting Markets

## 13. Betting with a Point Spread

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# Part I

## Points Spread Bets versus “Moneyline” Bets

# Spread Bets

- US bookmakers (who call themselves “sportsbooks”) offer bets on which team is going to win a game.
- They call these “moneyline” bets.
- Consider the NBA game on the next page: Orlando Magic vs Washington Wizards.
  - ▶ Orlando’s moneyline odds are -290, which is decimal odds of  $1 + 100/290 = 1.34$ .
  - ▶ Washington’s moneyline odds at +235, which is decimal odds of  $1 + 235/100 = 3.35$ .
- However, traditionally, the more popular approach to betting in the US has been **points spread** bets where you are not betting which team wins but on the outcome if the underdog team had been given extra points.
- Here, the points spread is 7.5: A bet on Orlando only pays out if Orlando wins by 8. If they win but by less than 8, the bet loses.
- The odds for both of these bets are -110, equivalent to decimal odds of 1.909 (a 4.5% margin).

# Orlando Magic vs Washington Wizards

NBA	SPREAD	MONEY
 Orlando Magic	<b>-7.5</b> <b>-110</b>	<b>-290</b>
@  Washington Wizards	<b>+7.5</b> <b>-110</b>	<b>+235</b>

# Rationale for Points Spread Bets and How Odds Are Set

## ● Why are points spread bets popular in the US?

- ▶ They can keep gamblers interested in the game even if it is not close.
- ▶ If it turns out the Magic are beating the Wizards comfortably, the gambler may still be interested to the end of the game because their bet depends on the size of the victory margin, not on which team wins.
- ▶ This fits with the idea that gamblers get a “utility value” from combining watching sports with having a “live” bet.

## ● How odds are set

- ▶ This game is typical because the most common situation is odds on both sides of a spread bet are -110.
- ▶ But sometimes bookmakers will feel one of the bets is still a favourite even with a spread. Look at the next page: At the spread of 7 points, Cleveland are still favourites, so their spread bet odds are a bit worse.
- ▶ Typically, once the gap between the odds gets above a certain size, US bookmakers adjust the spread to keep the odds on both sides close to each other.
- ▶ They will react to news (injuries, changes in form) by changing the spread not the odds.

# Cleveland Cavaliers vs Phoenix Suns



Cleveland Cavaliers

@



Phoenix Suns

**-7**  
**-112**

**-275**

**+7**  
**-108**

**+225**

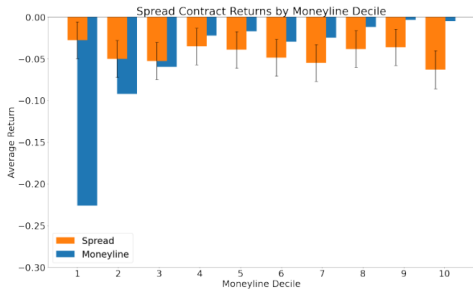
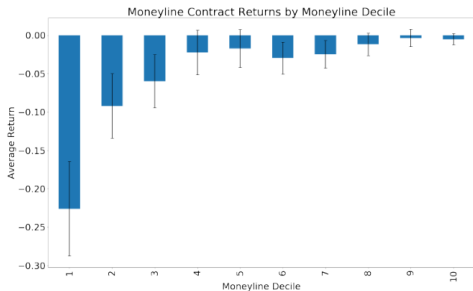
# Spread Bets and Favourite-Longshot Bias

- Spread bets are generally set so that the odds on both bets are the same (or at least very close to each other).
- Within the actual match, there may be a favourite to win but the bets against the point spread are equally likely to win and have the same expected return.
- One possible explanation of favourite-longshot bias is that people just like rooting for underdogs.
- Comparing returns on spread bets with returns on moneyline bets from the same set of matches can tell us something about whether this is true.
- If it is, then the “compensating differentials” argument would imply that returns from taking the spread bet on longshots would be worse than taking the spread bet on the favourites.
- Alternatively, if our disagreement-based models are correct, then we should see spread bet returns being the same across all bets, no matter what the moneyline odds are. The bets against the spread are all 50/50 bets and thus should have the same returns.

## Moscowitz and Kasudevan (2022)

- Tobias Moscowitz is a famous financial economist at Yale who also has an interest in sports, publishing an excellent best-selling book *Scorecasting* on the economics of sports.
- His paper with Kaushik Vasudevan “Betting with Beta” examines 36,609 US college and professional basketball and football games for which both spread bet odds and moneyline odds are available.
- They sort the bets into deciles according to their moneyline odds, going from the highest odds bets (weakest teams) on the left to the lowest odds bets (strongest teams) on the right. They then report the average returns to the moneyline bets and the corresponding spread bets.
- They find the standard favourite-longshot bias pattern applies to moneyline bets but not to the corresponding spread bets. See the next page.
- Average loss rates on spread bets are essentially the same across all of the moneyline deciles.
- Spread bets lose more on average than moneyline for teams in the top 7 deciles but lose a lot less for teams in the bottom 3 deciles.

# Comparing Returns on Moneyline and Spread Bets



## Moscowitz and Kasudevan's Explanation

- Moscovitz and Kasudevan argue their results can be explained by people having a preference for high variance longshot bets.
- This allows the bookmakers to get away with offering bad odds on these bets.
- They say "*the only explanation for the return difference across the two contracts has to be driven by the risk of payoffs.*"
- But that is not the only explanation: The disagreement-based model gives exactly the same prediction and its model features risk-neutral investors.
- The disagreement model says there is no room to exploit differing elasticity of demand when the outcome is a coin toss.
- Even if Moscovitz and Kasudevan were right about this, it would still leave open the question of why the big profits bookmakers are making on longshot moneyline bets are not being competed away.
- Imperfect competition in the bookmaking market must be part of the answer.

# Why the US Sportsbooks Promote Moneylines

- The evidence suggests the sportsbooks earn more money on moneyline bets on longshots but less on moneyline bets on favourites.
- It may be that these things even out so the profit rates on both types of bets are the same but I suspect they make more money on moneylines than spreads.
- We don't get to see the volume taken on different kinds of bets by the bookmakers but our monopoly model makes predictions for volumes as well as prices.
- From that, we could calculate the average profit rates on games earned by the bookmaker, averaging across all bets.
- The model predicted that bookmakers made more money on uneven competitions than on 50/50 events, so more money would be made on moneylines than on spreads.
- Either way, they want to have long-odds moneyline bets as part of their portfolio of offerings, given that loss rates for bettors are so high on them.

## Part II

# Asian Handicap Betting on Soccer

# The Asian Handicap

- Asian Handicap is a style of betting on soccer.
- Payouts on Asian Handicap bets depend on an adjustment of the match result that applies a deduction (known as a handicap) to the goals total of the team considered more likely to win.
- For example, if Manchester City play Everton at home and the Asian Handicap is quoted at -2 (meaning a two goal deduction is applied to City's total) then a bet on Everton would pay out even if they lost the game by one goal. If the result precisely matches the handicap (in the above example, City beat Everton by two goals) then all bets are refunded.
- Unlike in US spread betting, the handicaps do not usually equalise the chances of the two sides of bet winning, so differing payout odds are generally offered for the bets on the two teams.
- From being almost unheard of outside Asia in the 1990s, it seems likely the Asian Handicap market now accounts for a high share of global betting on European soccer matches.

# A Competitive Market

- While Asian Handicap bets are now available from retail European bookmakers, the market is dominated by specialist “sharp” online bookmakers such as Pinnacle.
- These bookmakers compete with each other on price. They earn low profit margins per bet and seek to offset this by taking high betting volumes.
- This market’s low margins make it particularly attractive for well informed bettors and professional betting syndicates. These bettors provide the high volumes that make this business model work.
- If our models are correct, then we should not see variations in the expected payout across Asian Handicap bets that have different probabilities of success.
- To test this, we need a way to extract probabilities from Asian Handicap odds.
- First, let’s discuss a bit more how Asian Handicap betting works.

# Four Types of Handicaps

There are four different types of handicaps offered in this market

- 1 **Half-goal handicaps:** For example, the weaker team is given 1.5 goals. If the stronger team wins by more than one goal, the bet on the stronger team wins. Otherwise, the bet on the weaker team wins.
- 2 **Integer handicaps:** For example, the weaker team is given a 1 goal advantage. If the stronger team wins by more than one goal, the bet on them stronger team. If they stronger team wins by one, the bets are refunded. If the game is a draw or the stronger team loses, the bet on the weaker team wins.
- 3 **Quarter-goal handicaps:** This splits the bet between two different other bets. A 1.25 handicap splits the bet equally between half on a handicap of 1 and half on a handicap of 1.5.
- 4 **Three-quarters-goal handicaps:** Again, this splits the bet between two different other bets. A 1.25 handicap splits the bet equally between half on a handicap of 1.5 and half on a handicap of 2.

# Calculating Probabilities from Asian Handicap Odds

- For handicaps ending in .5, there are only two possible outcomes. With 2 odds and 2 probabilities, you can calculate normalised probabilities using the usual method.
- But, for the other 3 types of handicaps (where the handicap is an integer or ends in 0.25 or 0.75), there are 3 possible outcomes: Strong bet wins, weak bet wins and an outcome in which there is either a full or partial refund.
- With 2 odds and needing to calculate 3 probabilities, you can't use the normalisation method to calculate probabilities.
- In my paper with Tadgh Hegarty, "Forecasting Soccer Matches With Betting Odds: A Tale of Two Markets," we show that it is possible to accurately model the probability of bets ending in refunds.
- For each type of handicap, we use the average fraction of refunds in the data to measure the probability of the refund outcome. Given this, it is then possible to use a normalisation-style method to calculate the probabilities of the other 2 outcomes given the 2 odds, assuming a constant expected return for each bet on a match.
- I won't get into the details—you can consult the paper in Brightspace.

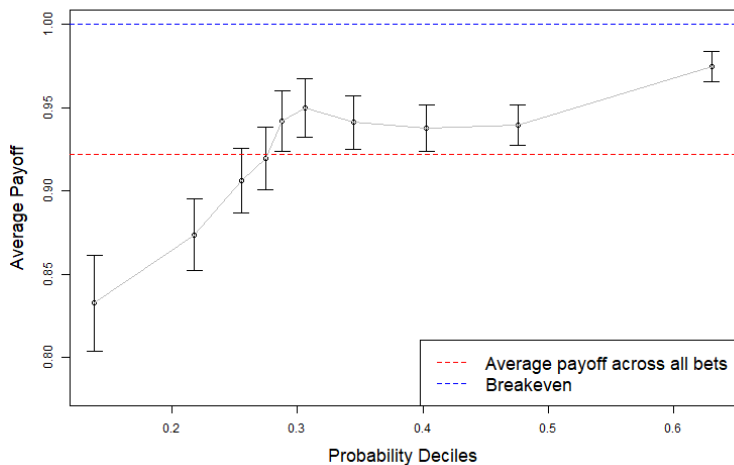
# A Relatively Wide Range of Probabilities

- Spread bets offered on high scoring sports are generally set to equate the odds of each side of the bet winning.
- This means the implied probabilities of success of each bet are equal and the odds offered on each bet are typically the same.
- This is not the case with the Asian Handicap market. The implied probabilities of full bet success that we calculate range from about 0.25 to about 0.55.
- There are for a few reasons for this wide spread in implied probabilities.
  - ① Handicaps are set in quarter-goal increments and these will rarely correspond precisely to the market's expected goal difference. Bettors will generally think a bet on one of the teams in a match is more likely to win than the other, which will be reflected in differing odds.
  - ② For US spread bets, bookmakers normally react to new information by adjusting the spread. Asian Handicap bookmakers adjust the odds.
  - ③ For the hybrid quarter-point handicap bets have the feature that bets on one team can earn a profit in two of the three possible outcomes while the other side only makes a profit in one of the three outcomes. For these bets to be equally attractive, the bets that only make a profit in one outcome must to have a higher probability of a full payout.

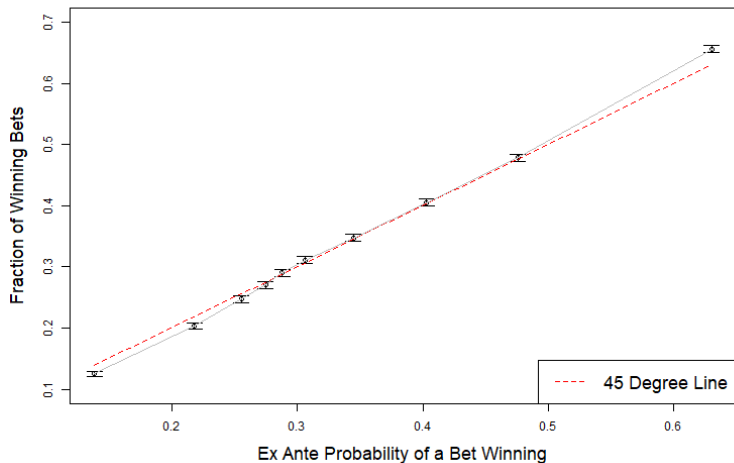
# Comparing Home/Away/Draw and Asian Handicap Odds

- Our paper used data on the average Asian Handicap odds across a wide range of bookmakers for the same sample of 84,230 European soccer matches that we have discussed before when examining the properties of home/away/draw betting.
- Previously, we showed that for home/away/draw betting
  - 1 Loss rates increase as normalised probabilities fall.
  - 2 Normalised probabilities over-estimate the chances of longshots and under-estimate the chances of favourites.
  - 3 The overround calculation over-states the average return on the available bets on a match.
- See the charts on the next 3 pages for the charts demonstrating this in the paper. The lines above and below the circled data points are 95% confidence intervals.
- In contrast, the 3 charts after that show that for the Asian Handicap
  - 1 There is no evidence of favourite-longshot bias in average payouts.
  - 2 Normalised probabilities are not biased.
  - 3 Predicted returns for bets are similar to the actual average returns on bets.

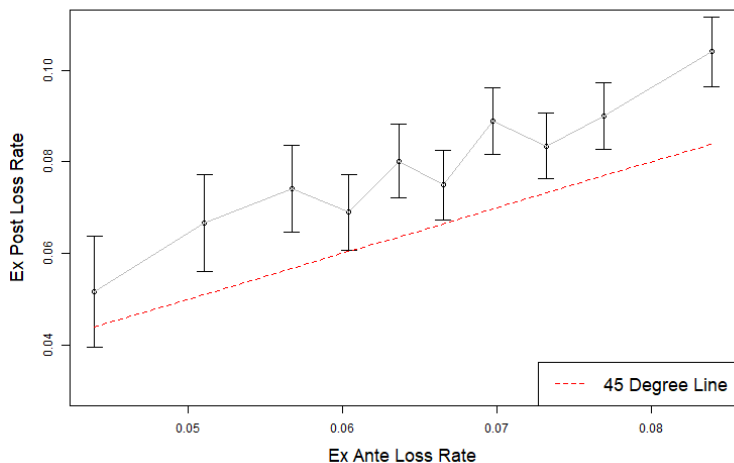
# Returns on home/away/draw bets sorted by normalised probability deciles (includes 95% confidence intervals)



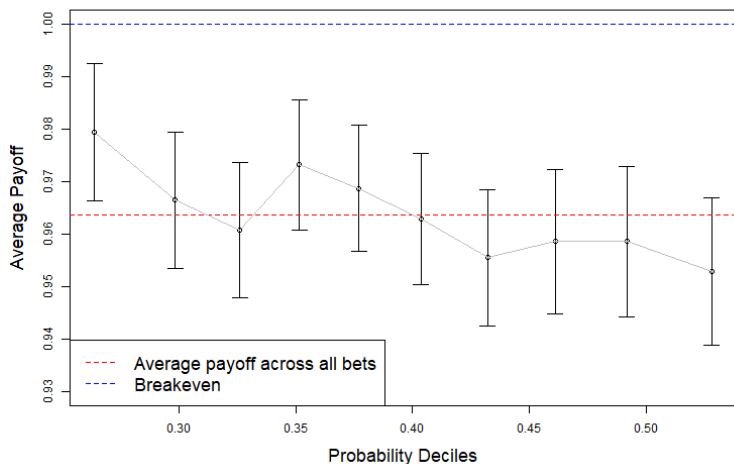
# Normalised probabilities from home/away/draw bets are biased (includes 95% confidence intervals)



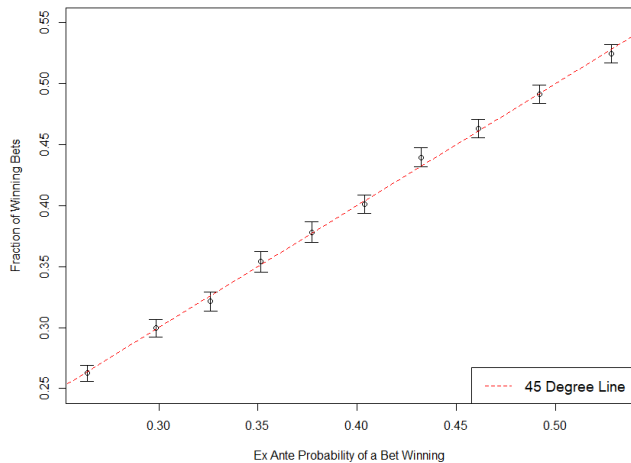
Average loss rates on home/away/draw bets are higher than predicted (includes 95% confidence intervals)



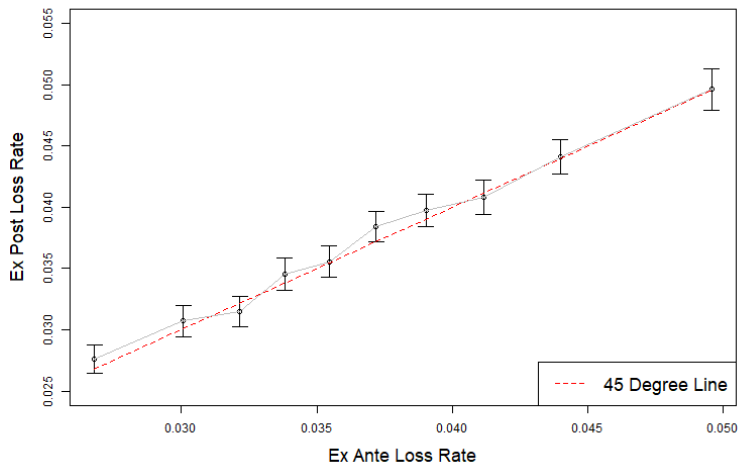
# Average payoffs on Asian Handicap bets sorted by deciles of predicted probability (includes 95% confidence intervals)



# Predicted probabilities for Asian Handicap bets are unbiased (includes 95% confidence intervals)



# Average loss rates on Asian Handicap bets are as predicted



# Comparing Home/Away/Draw and Asian Handicap Odds

- I think the explanation for the difference between the properties of Asian Handicap and home/away/draw odds is the level of competition among bookmakers.
- The Asian Handicap market is dominated by sharp bookmakers that compete against each other on odds and set low gross margins.
- They also don't seem to worry too much about risk, instead trying to maximise expected profit.
- Our models predict that competitive markets with risk-neutral bookmakers won't feature favourite-longshot bias and the odds should reflect the underlying probabilities, so this explains the results for the AH market.
- Note that when assessing favourite-longshot bias, the range of probabilities for AH bets is lower than for home/away/draw but within this same range there is a clear bias in the home/away/draw market.
- Because AH bets differ in their expected probability of success, the Moskowitz and Kasudevan argument that bets with lower probabilities of success have lower expected returns should also apply to these odds. But we don't see this.

# Part III

## An Asian Handicap Inefficiency

## An Interesting Inefficiency

- The Asian Handicap market does not display the most common inefficiency seen in fixed-odds betting markets, the favourite-longshot bias.
- In an efficient market, we would expect the average return on all of these bets to be the same. However, in our paper “Returns on Complex Bets: Evidence From Asian Handicap Betting on Soccer” Tadhg and I found there is a strict ranking in average loss rates
  - 1 Bets with handicaps ending in .5 have the highest average loss rates.
  - 2 Bets with handicaps ending in .25 and .75 have the next highest average loss rates.
  - 3 Bets with integer handicaps have the lowest average loss rates.
- Our explanation is that gamblers don't seem to factor in that you get a full refund sometimes for integer handicap bets, a half refund sometimes for bets with .25 and .75 handicaps but never get a refund for .5 handicaps.
- Note that the average odds are basically the same for all four types of bets, showing the bookmakers don't adjust the odds to account for the fact that some bets have refunds (and in betting, a refund outcome—not losing—is a good outcome) and some do not.

# Average loss rates and odds on all bets, by Asian Handicap type

	Handicap Type			
	Integer	Ending .25	Ending .5	Ending .75
	Mean	Mean	Mean	Mean
Loss Rate	0.0324	0.0361	0.0416	0.0357
Odds	1.9240	1.9241	1.9226	1.9231
Matches	23,730	29,250	20,762	10,488

# Supplementary Material in the Draft Book

- Chapter 17: Asian Handicap Football Bets