An Introduction to Sports Betting!

with Alex Kolar

Does anyone here have any experience sports gambling?

What is sports betting?

- Betting on the outcome of something during sporting event, typically via a website or app
- Can be on the result of a game
- Can be on individual player statistics
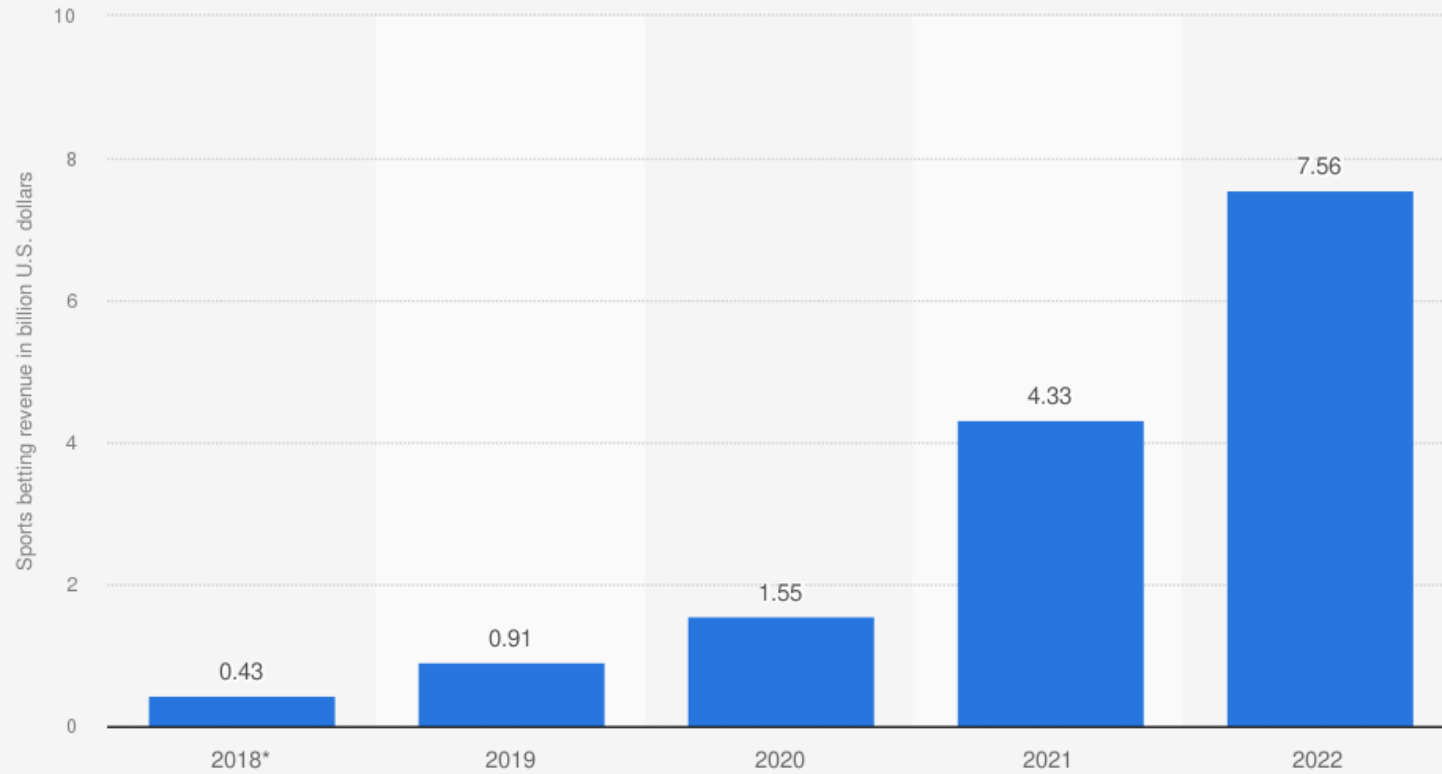- Can be on a combination of a lot of things!

Why should I care?

According to a 2023 NCAA Survey:

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- 42% of that population bets at least once a month

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- 66% of men aged 18-22 have participated

- 51% of women aged 18-22 have participated

Total sports betting revenue in the United States from 2018 to 2022 (in billion U.S. dollars)

Sports betting revenue in billion U.S. dollars

0.43 — 2018*
0.91 — 2019
1.55 — 2020
4.33 — 2021
7.56 — 2022

- Over 300 billion dollars have been bet on sports in the U.S. since 2018
- In 2023, Virginia's sports betting handle was 5.5 billion dollars

So what does betting look like?

What does this mean?

+100

How about this?

-150

Reading Odds

- British Odds: Of the form N/D
  - Total Payout = Stake * N/D + Stake
  - Ex. Liverpool vs. Luton (EPL). Liverpool are ¼ favorites
    - If you put 5 dollars on Liverpool you would win 5 * ¼ + 5 = $6.25

Reading Odds

- European Odds: Represented as a decimal (D)
    - Total Payout = Stake * D
    - Ex. Barcelona vs. Napoli (CL). Napoli are 2.95 underdogs
        - If you put 10 dollars on Napoli you would win 10 * 2.95 = $29.50

Reading Odds

- American Odds: Represented as a number of 100 or more (N)

  - + Numbers are underdogs (Not Likely to occur)

    - Total payout = Stake * $N/_{100}$ + Stake

    - + Represents the dollar total you'd win if you bet $100 (not including stake)

  - - Numbers are favorites (Likely to occur)

    - Total payout = Stake * $100/_{N}$ + Stake

    - - Represents the dollar total you'd have to bet to win $100 (not including stake)

Examples

The Detroit Pistons are +350 underdogs to beat the Los Angeles Lakers

Say we bet $100 on the Pistons:

Total payout = $100 * \frac{350}{100} + 100 = \$450$

We can also think of +350 as 7/2 in British Odds

Examples

The Baltimore Ravens are -150 favorites to beat the Dallas Cowboys

Say we bet $100 on the Ravens:

Total payout = $100 * {}^{100}/_{150} + 100 = 66.67 + 100 = \$166.67$

We can also think of -150 as 2/3 in British Odds

Q: If I put $10 on the GSW to beat the Celtics at -120, what is the total payout if GSW wins?

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Total payout = $10 * ^{100}/_{120} + 10 = 8.33 + 10 = \$18.33$

Odds vs Probability

Probability

$$\frac{\text{# of successes}}{\text{# of outcomes}}$$

Odds

$$\frac{\text{# of successes}}{\text{# of failures}}$$

Implied Probability

What "chance" of winning do I have if I bet on -350 odds?

1) Convert to -350 fractional odds: 100/350 = 2/7

2) Convert from odds to probability: 2/7 => 2/9

3) 2/9 is actually the probability that the house wins (the bookie sets the odds)

So we take the complement, $1 - {}^2/_9 = {}^7/_9 \approx 78\%$

Implied Probability

What "chance" of winning do I have if I bet on +270 odds?

1) Convert to +270 fractional odds: 270/100 = 27/10

2) Convert from odds to probability: 27/10 => 27/37

3) Take the complement, $1 - {}^{27}/_{37} = {}^{10}/_{37} \approx 27\%$

Decimal Odds	American Odds	Implied Probability
1.500	-200	66.67%
1.526	-190	65.52%
1.556	-180	64.29%
1.588	-170	62.96%
1.625	-160	61.54%
1.667	-150	60.00%
1.714	-140	58.33%
1.769	-130	56.52%
1.833	-120	54.55%
1.909	-110	52.38%
2.000	+100	50.00%
2.100	+110	47.62%
2.200	+120	45.45%
2.300	+130	43.48%
2.400	+140	41.67%
2.500	+150	40.00%
2.600	+160	38.46%
2.700	+170	37.04%
2.800	+180	35.71%
2.900	+190	34.48%
3.000	+200	33.33%

Types of Bets

Moneyline

Simplest. Who will win?

Point Spread

How much will they win by?

How do the sportsbooks make their money?

Example

Across all bets, $1,000,000 is bet on the over at -110 and $1,000,000 is bet on the under at -110. They both have a 50% chance of occurring

No matter what, the sportsbook has to payout $1,000,000 $*\frac{100}{110} \approx$ $909,091

And the sportsbook keeps the other $1,000,000 from the losing bettors

Assuming they set the line right, meaning bettors are split 50-50, they will profit $90,909 or about 4.54% of the total stake.

Minimizing the percentage

So how should we choose our bets?

Minimizing the percentage

So how should we choose our bets?

We want to minimize the advantage the bookie over us.

Not all bets have the standard 4.78% vig.

Example

Vig of 4.09%

Video time?!