



Arbitrage and sport bets




What is arbitrage?

Arbitrage is the simultaneous purchase and sale of the same asset in different markets in order to profit from tiny differences in the asset's listed price. It exploits short-lived variations in the price of identical or similar financial instruments in different markets or in different forms.



Grape market in City A and City B

	Price (pound)
City A	\$10
City B	\$12



Depend on identifying market "inefficiencies."

Substantial amount of money

Acted upon only with highly sophisticated software



Why is arbitrage important?

In the course of making a profit, arbitrage traders enhance the efficiency of the financial markets. As they buy and sell, the price differences between identical or similar assets narrow. The lower-priced assets are bid up while the higher-priced assets are sold off. In this manner, arbitrage resolves inefficiencies in the market's pricing and adds liquidity to the market.



While making money with arbitrage is easy, the hard thing is finding arbitrage opportunities



Sports bets

Coin flip game betting 1 dollar each time		
	Odds	Return (unfair)
Head	50%	\$1.9
Tail	50%	\$1.9





The odds implied by the return:

Head: $1/1.9=52.63\%$

Tail: $1/1.9=52.63\%$

Total odds: 105.26%

Fri, 7:35 PM			
 ATL Hawks	-1.5 -110	-120	O 225.5 -110
 CLE Cavaliers	+1.5 -110	+100	U 225.5 -110
More wagers >			
Sat, 1:00 PM			
 UTA Jazz	-4.5 -108	-180	O 214.5 -108
 DAL Mavericks	+4.5 -108	+150	U 214.5 -108
More wagers >			
Sat, 3:30 PM			
 MIN Timberwolves	+7.0 -108	+225	O 234.5 -108
 MEM Grizzlies	-7.0 -108	-280	U 234.5 -108
More wagers >			

If the moneyline is positive, it is divided by 100 and add 1.

If the moneyline is negative, 100 is divided by the absolute moneyline amount (the minus signed is removed), and then 1 is added.

Calculate the total odds (in %)



Sports betting arbitrage

Arbitrage in sports betting is when someone places bets on all possible outcomes of an event at odds that guarantee profit, no matter what happens in the event.

An arbitrage bet is usually possible when there is a discrepancy in odds which would allow for a profit to be made by covering all outcomes.

Different bookmakers have different odds

Odds don't change as fast as the stock/financial markets



Sports bet arbitrage

	Pacers	Pistons	Total odds(%)
Wynnbet	-270	+350	101.54
MGM	-370	+450	100.94

However, if we bet \$80 on Pacers at Wynnbet and \$20 on Pistons at MGM ?

<https://www.actionnetwork.com/betting-calculators/betting-odds-calculator>



	Pacers	Pistons	Total odds (%)
Synthetic book	-270	+450	
Odds	1.37	5.5	0.91



Calculate bet amount

w_1 = wager (bet amount / stake) on outcome 1, in dollars

w_2 = wager (bet amount / stake) on outcome 2, in dollars

W = your total wager on the market, which equals $w_1 + w_2$

σ_1 = best available odds for outcome 1

σ_2 = best available odds for outcome 2



Strategy 1: unbiased arbitrage

Suppose we want to bet W amount in total, then:

$$w_1 = W / (\sigma_1/\sigma_2 + 1)$$

$$w_2 = W / (\sigma_2/\sigma_1 + 1)$$

Suppose we want to bet w_1 amount on Pacers, then we should bet:

$$w_2 = w_1 * (\sigma_1 / \sigma_2) \text{ amount on Pistons}$$



Strategy 2: biased arbitrage

suppose we wish to bet a certain amount W on the market, and we believe Pacers (outcome 1) will win.

$$w_2 = W / \sigma_2$$

$$w_1 = W - w_2$$

Conversely if we believe Pistons will win, then:

$$w_1 = W / \sigma_1$$

$$w_2 = W - w_1$$



Strategy 2: biased arbitrage

Now suppose we still believe Pistons will win, and we want to bet w_2 on Pistons

$$w_1 = w_2 / (\sigma_1 - 1)$$



Does not involve knowing anything about sports

While it is legal, it could eventually get you banned from a sportsbook if you're caught.

Still needs to be able to find such discrepancy.

<https://oddsjam.com/nba/game/19957-11464-2022-04-15>



reference

<https://www.investopedia.com/terms/a/arbitrage.asp>

https://en.wikipedia.org/wiki/Fixed-odds_betting

<https://www.rotowire.com/betting/faq/question.php?q=arbitrage-sports-betting-4f11b36a>

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