

Project 28 - Names: Alex Tang, Michael Beers, Joseph Beltrand, Lucas Sickels

<https://www.kaggle.com/datasets/ehallmar/nba-historical-stats-and-betting-data/data>

Question: Will a parley of heavy favorites beat a straight bet of equal odds?

## Dataset Description

This dataset includes betting lines for different NBA games with a lot of columns about the money lines for that specific game, the teams playing, the home and away teams, the result of the game and other data. We will be looking at mainly the moneyline odds, the results of the game and we can look at certain parameters (like home vs away team) and see if this has significant implications for our results.

We are going to use logistic regression to calculate the odds of a team winning based on the money line odds. For example, we can group all games together where a team has a moneyline line of -400 and see that they historically have had a “p” chance of winning. We can do this for any line, account for other factors like home and away and win percentage up to that game and tweak our model.

We want to make all our bets have +100 odds so for a bet with -400 odds, we can find the number of bets needed to reach +100 odds, even if it is a fractional number of bets, and raise our probability “p” to this power to find the probability that all the bets hit and the parlay cashes. From this, we can find out expected value and compare betting on heavy favorites in a lengthy parlay or straight betting close games.

Code:

```
In [3]: 1 import pandas as pd
        2 import os
        3 games = pd.read_csv(os.path.join("nba_games_all.csv"))
        4 bets = pd.read_csv(os.path.join("nba_betting_money_line.csv"))
        5 data = bets.merge(games[["game_id", "team_id", "a_team_id", "is_home", "wl", "season_year"]], on=["game_id", "team_id", "a_team_id", "is_home", "wl", "season_year"])
        6
        7 data
```

```
Out[3]:
```

	game_id	book_name	book_id	team_id	a_team_id	price1	price2	is_home	wl	season_year
0	41100314	Pinnacle Sports	238	1610612759	1610612760	165.0	-183.0	f	L	2011
1	41100314	5Dimes	19	1610612759	1610612760	165.0	-175.0	f	L	2011
2	41100314	Bookmaker	93	1610612759	1610612760	160.0	-190.0	f	L	2011
3	41100314	BetOnline	1096	1610612759	1610612760	165.0	-190.0	f	L	2011
4	41100314	Bovada	999996	1610612759	1610612760	155.0	-175.0	f	L	2011
...	...	...	...	...	...	...	...	...	...	...
125281	41700215	Heritage	169	1610612755	1610612738	105.0	-125.0	f	L	2017
125282	41700215	Intertops	180	1610612755	1610612738	100.0	-120.0	f	L	2017
125283	41700215	YouWager	139	1610612755	1610612738	105.0	-125.0	f	L	2017
125284	41700215	JustBet	1275	1610612755	1610612738	100.0	-120.0	f	L	2017
125285	41700215	Sportsbetting	999991	1610612755	1610612738	105.0	-125.0	f	L	2017

125286 rows × 10 columns