Data 400: Capstone in Data Analytics

Idea Proposal 1

Pham Duy Anh Vu

**The Impact of Big-Market Status on NBA Betting Odds**

1. **Introduction**

The explosion of legalized sports betting across the U.S., following the 2018 Supreme Court decision to strike down the Professional and Amateur Sports Protection Act (PASPA), has led to a dramatic surge in sports betting participation. According to reports, over half of American adults have placed a sports bet since legalization, contributing to a market now worth over $93 billion annually (CNN Sport, 2024). The NBA has become one of the focal points of this booming industry, with billions of dollars wagered each season on its games. Given the magnitude of financial stakes and the growing accessibility of betting platforms, understanding the dynamics of market inefficiencies in NBA betting lines is more critical than ever. However, one prominent inefficiency is the “big-market” status of a team. In the NBA, team popularity, market size, and media attention vary widely between teams. As a result, the perception of "big-market" teams often influences public sentiment. These big-market teams (typically characterized by higher valuations, larger fan bases, and extensive media coverage) are more visible and may attract a disproportionate share of bets. This raises a crucial question: Does the big-market status of an NBA team skew betting odds?

1. **Metadata:**

* The NBA game data consists of by-game information of every NBA game played in the

2021-2022 regular season, including date, final scores, and arena capacity. These statistics were aggregated from the Basketball Reference page. The data is divided into 7 smaller datasets as I was only able to export one month at a time, from October 2021 to April 2022; each dataset can be found in the links below as an Excel workbook file (.xls)

* + October 2021: [October games](https://www.basketball-reference.com/leagues/NBA_2022_games-october.html)
  + November 2021: [November games](https://www.basketball-reference.com/leagues/NBA_2022_games-november.html)
  + December 2021: [December games](https://www.basketball-reference.com/leagues/NBA_2022_games-december.html)
  + January 2022: [January games](https://www.basketball-reference.com/leagues/NBA_2022_games-january.html)
  + February 2022: [February games](https://www.basketball-reference.com/leagues/NBA_2022_games-february.html)
  + March 2022: [March games](https://www.basketball-reference.com/leagues/NBA_2022_games-march.html)
  + April 2022: [April games](https://www.basketball-reference.com/leagues/NBA_2022_games-april.html)
* Key variables include: “date” (Game date), “final\_scores” (Final scores for each team)

“arena\_capacity” (Seating capacity of the host team’s arena)

* Forbes' 2021-2022 NBA franchise valuations for market size categorization
* The NBA odds data consists of by-game betting odds (money line, point spreads, over under, and second half lines) of every NBA game played from 2008 – 2023 taken from a Kaggle Notebook called “[NBA Odds Data](https://www.kaggle.com/datasets/christophertreasure/nba-odds-data)” by Christopher Treasure.
  + Key variables: moneyLine, opponentMoneyLine, spread, total

1. **Analysis:**

* Regression model: evaluate the relationship between market size and betting odds along with the analysis of interaction effects between home and visiting team market sizes, using money line odds as the primary measure of betting market inefficiencies
* Categorization of teams into big, medium, and small markets based on franchise valuations
* Machine learning models: Implement more complex predictive models (e.g., random forests or neural networks) using scikit-learn or TensorFlow to capture non-linear relationships between market size and betting odds.
* Data visualization: Create interactive plots and dashboards using libraries like matplotlib or seaborn to better illustrate the relationships between variables

1. **Implications for Stakeholders:**

* Bettors: Awareness of potential biases in odds for big-market teams, especially when playing against small-market teams
* Bookmakers: Opportunity to adjust odds-setting strategies to account for market size effects
* NBA teams: Understanding of how market size impacts public perception and betting behavior
* Regulators: Insights into potential market inefficiencies that may require oversight

1. **Ethical, Legal, and Societal Implications:**

* Ethical: Raises questions about fairness in sports betting markets and potential exploitation of bettor biases
* Legal: May inform discussions on sports betting regulations and the need for consumer protection measures
* Societal: Highlights how public sentiment and media attention can influence financial markets beyond just team performance
* Potential for increased awareness of cognitive biases in decision-making, particularly in high-stakes environments like sports betting