



# NBA Player Value:

---

SAVING NBA GENERAL MANAGERS FROM THEIR MISTAKES

# The Problem

---


General Managers are tasked with the responsibility of constructing and paying a roster composed of high-level athletes—every one of which feels he ought to be paid what he is worth.

All too often, these GMs succumb to external pressures: to sign the player the fans want or that the media has placed on a pedestal, to pay a player more than he is worth out of fear of missing out on a player, offering too little to a player out of pride or fear (or both) and missing out—the reasons go on and on.

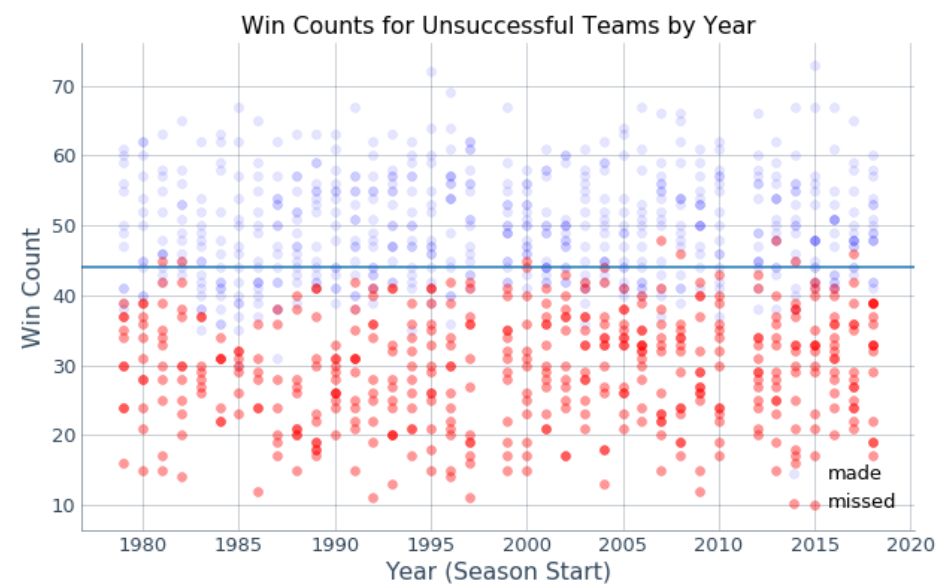
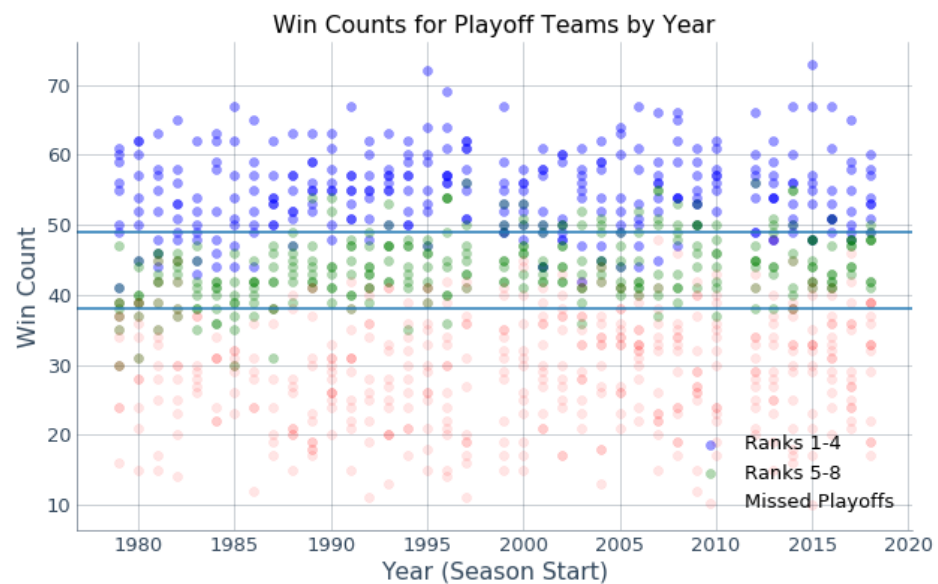
None of these pressures is based in anything objective. GMs need something on which to fall to make such costly and high stakes decisions, a means of defending the decisions they make.

As we saw in Michael Lewis' "Moneyball," professional sports leagues can be ruled by forces other than logic, but the game always has potential to be affected by it.

Using machine learning, we will look to give any GM an upper hand who is willing to take it.

A photograph of several Chicago Bulls players on a basketball court. The players are wearing white jerseys with red trim and the word "BULLS" in red. The jersey numbers 33, 23, 9, and 7 are visible. They are standing on a wooden court with a basketball hoop and backboard in the background. The image is dimmed to serve as a background for the text.

# Step One: Identify Successful Teams

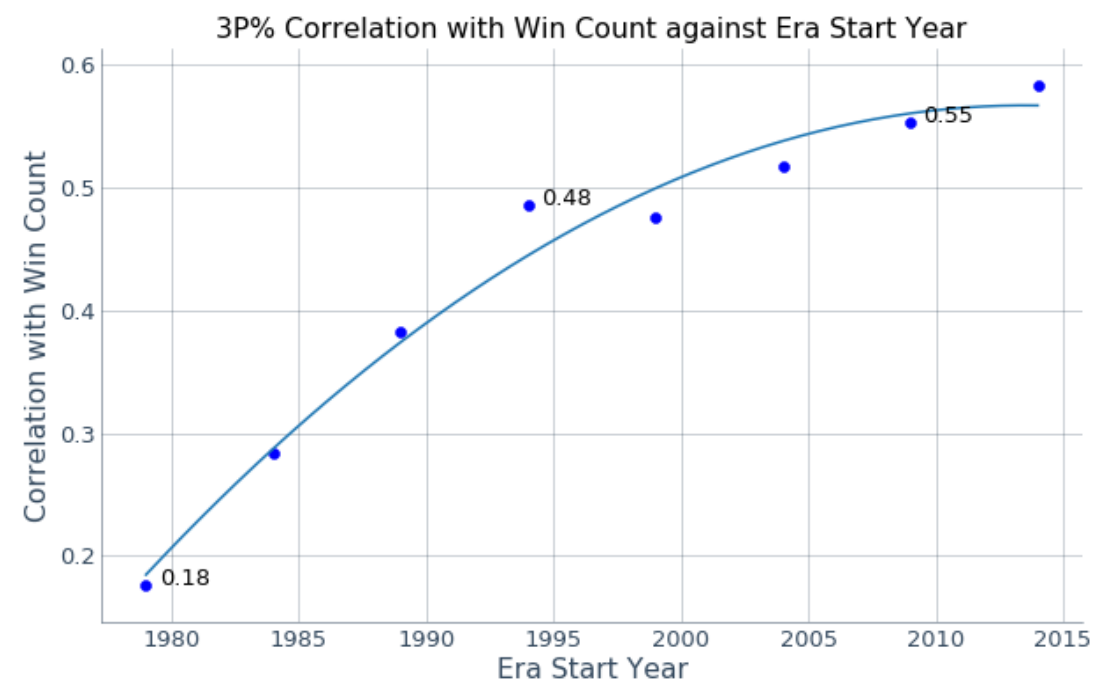
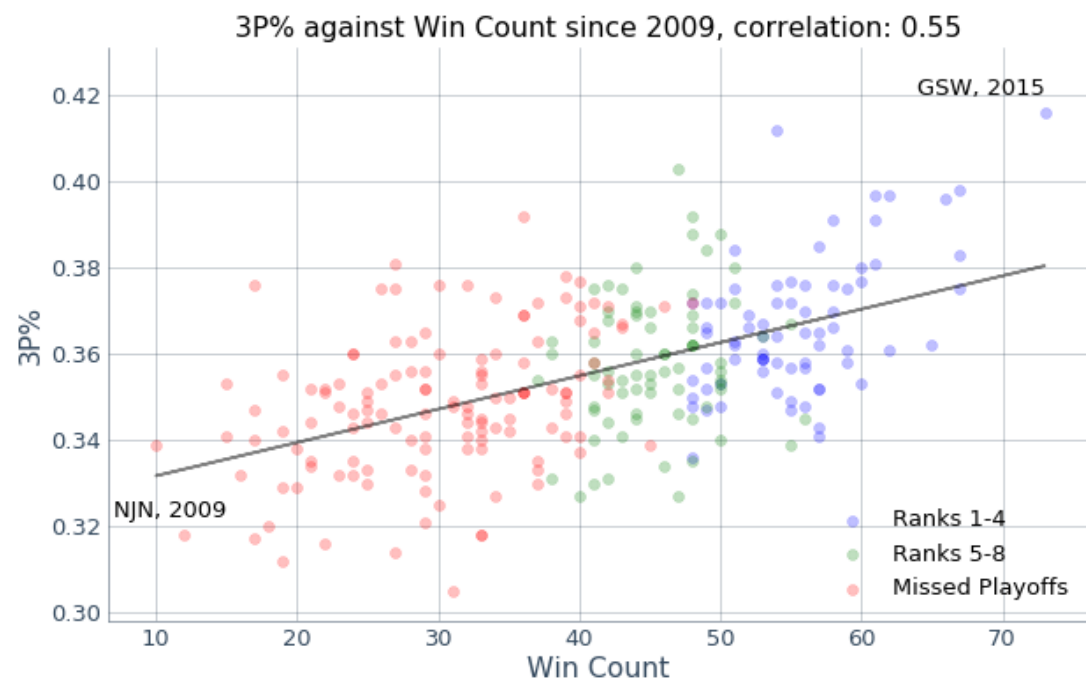




Determine  
What Makes  
Teams  
Successful

---









## Step Two: Determine Player Value

---

Using updated player positions from a linear discriminant analysis, along with key career and year-to-year statistics, develop models that will give the best possible and most objective dollar amount to any specific player

## Step Three: Make Recommendations

---

Using Machine Learning, predict player salary given such features as position, age, and relevant playing statistics

Make recommendations for teams looking to make cuts, sign new players, or restructure contracts

Turn recommendation system into accessible web application





# THE VALUE OF GETTING IT RIGHT

## DIRECT VALUE:

A bad player contract can cripple a team for upwards of a dozen years. For example, someone owed \$25 million but provides \$1 million worth of value to the team effectively gives their team \$24 million less to work with than the average teams elsewhere in the league.

## INDIRECT VALUE:

When the salary cap is handled such that the majority of players on a team are paid only what they are worth and no more, a team can allow for a high-level player or player to be signed for more than they might be worth—a “max-level” player whose impact extends past statistics by increasing ticket sales because of his style of off-court personality.

The screenshot shows the Basketball Reference website. The main navigation bar includes links for Players, Teams, Seasons, Leaders, Scores, Playoffs, Draft, and Play Index. The 'Scores' link is highlighted with a red circle. Below the navigation bar, there's a search bar and a description: 'Basketball Stats and History: Statistics, scores, and history for the NBA, ABA, WNBA, and top European competition.'

The 'Every Player' section on the left features a grid of player headshots and a form to 'View any Active Player' by selecting a team and then a player. Below this is a 'Select a Hall of Famer' section with a dropdown menu.

The 'Every Team' section in the center displays the '2018-19 NBA Standings' table. The table is organized by conference (East and West) and division. The 'Atlantic' division of the 'East' conference is highlighted in yellow. The table columns include Rank, W (Wins), L (Losses), and PCT (Winning Percentage).

The 'What's Hot' section on the right includes 'Site News' with a link to 'Sign up for Stathead's e-mail newsletter', 'Trending' players like Jimmy Butler, James Harden, and Justin Patton, and a 'Hoops R' section with links to various basketball-related content.

# The Data

The data will be scraped from the stats website “basketball-reference.com” and will include team and individual player data dating back to 1979.

Salary data will be scraped from “hoopshype.com” but is only available as far back as the 2000-2001 season and will thereby limit the scope of our full analysis.

# Deliverables

---

Deliverables after completion of this project will include:

1. Source code, shared in GitHub repo across multiple jupyter notebooks
2. A slide deck, detailing what was accomplished and to what degree
3. A blog post or paper, that will go much more in depth concerning the “how”
4. Hopefully, a web application, potentially written in Java, that will allow readers to recreate the important final step of the project’s objectives and find a valuable yet affordable player for their own NBA franchise, a player they’d otherwise most certainly miss.