LIMsanity

NBA Player Salary Data Analysis

Analyzing 2022–2023 NBA Player Salaries and Performance Metrics



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Introduction & Project Overview

Data Source: Kaggle, NBA Player Salaries 2022–23 Season (Welsh).

Research Question

To what extent are player positions and individual performance metrics, including rebounds, assists, minutes played, and games played correlated with salary differences across the NBA in the 2022 - 2023 season?

Hypothesis

We hypothesize that NBA players with higher scoring averages, more assists and rebounds, and more playing time will earn higher salaries, with **minutes played showing one of the strongest correlations**. We expect these relationships to **vary by position**, with assists more strongly associated with salaries among guards and rebounds among forwards and centers.

Background + Why It Matters

We wanted to learn about which performance metrics are most closely associated with player compensation and whether these relationships differ by position.

Understanding this relationship provides insight into how professional athletes are valued, what skills sets matters, and how money is being allocated.

How Did We Analyze NBA Salaries?

2022–2023 NBA season | 467 players | Salary and performance data

01 — Dataset

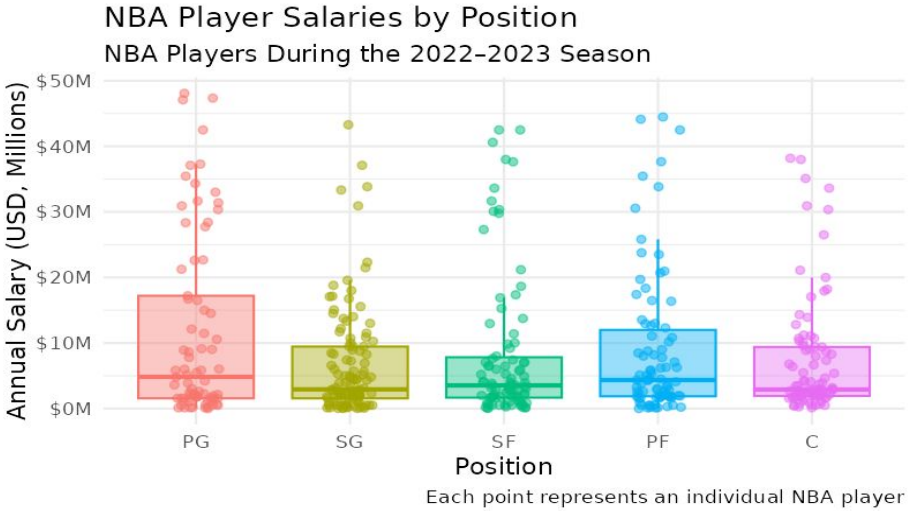
- **Source**
  HoopsHype salaries and Basketball Reference statistics
- **Observations**
  467 NBA players
- **Response Variable**
  Annual salary (USD)
- **Predictor Variables**
  Position, age, PTS, MP, GP, AST, TRB, BPM, FG%

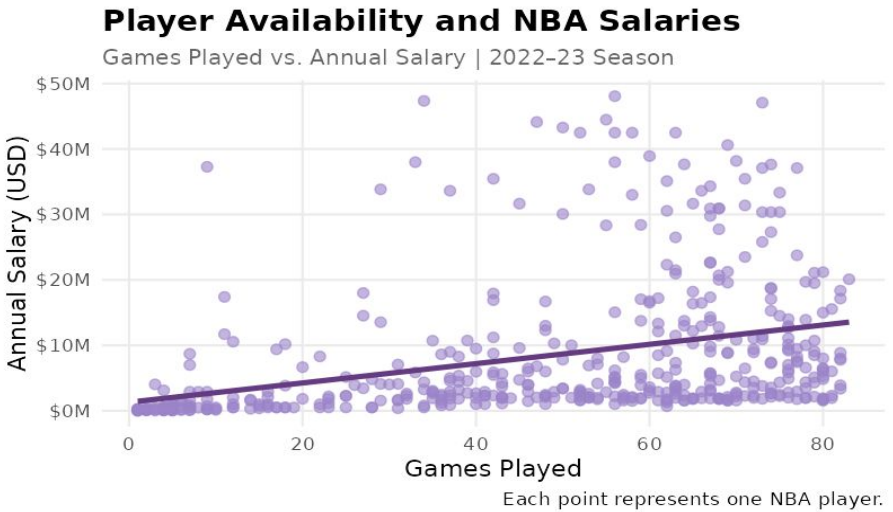
02 — Data Cleaning

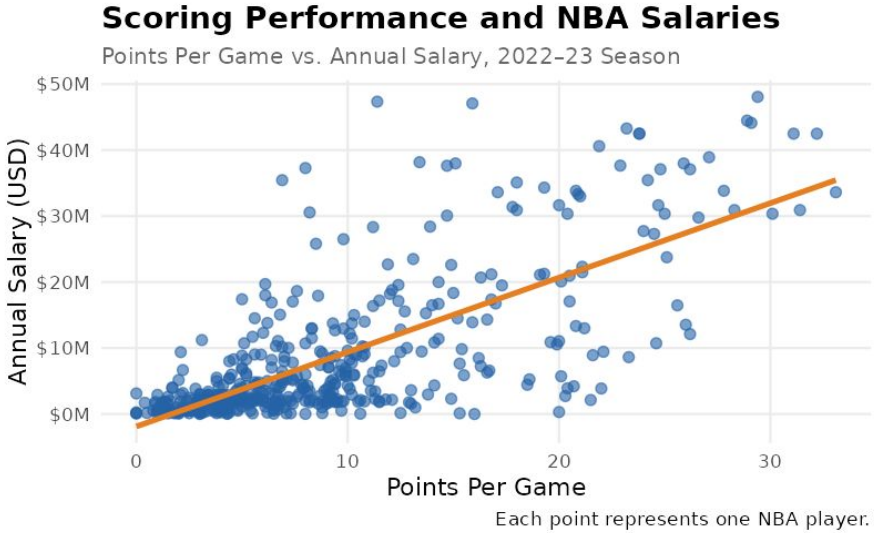
- Reduced 52 original variables to relevant predictors.
- Checked and handled missing observations.
- Grouped players into five primary positions.
- Examined salary outliers and skewness.

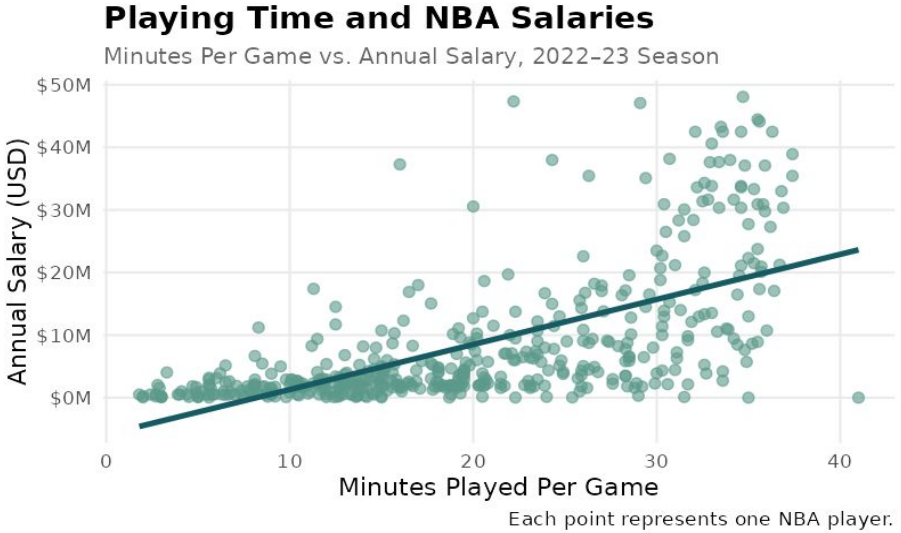
03 — Statistical Methods

- **Descriptive statistics**
  Mean and median salaries
- **Visualizations**
  Scatter Plots and Box Plots.
- **Pearson correlation**
  Linear relationships with salary
- **Kruskal–Wallis test**
  Salary differences by position
- **Regression**
  Performance–salary relationships


NBA Player Salaries by Position
NBA Players During the 2022–2023 Season
Annual Salary (USD, Millions)
$50M
$40M
$30M
$20M
$10M
$0M
PG
SG
SF
PF
C
Position
Each point represents an individual NBA player


Player Availability and NBA Salaries
Games Played vs. Annual Salary | 2022–23 Season
Annual Salary (USD)
$50M
$40M
$30M
$20M
$10M
$0M
0
20
40
60
80
Games Played
Each point represents one NBA player.


Scoring Performance and NBA Salaries
Points Per Game vs. Annual Salary, 2022–23 Season
Annual Salary (USD)
$50M
$40M
$30M
$20M
$10M
$0M
0
10
20
30
Points Per Game
Each point represents one NBA player.


Playing Time and NBA Salaries
Minutes Per Game vs. Annual Salary, 2022–23 Season
Annual Salary (USD)
$50M
$40M
$30M
$20M
$10M
$0M
0
10
20
30
40
Minutes Played Per Game
Each point represents one NBA player.

Which Performance Metrics Mean Higher Pay?

Points Per Game

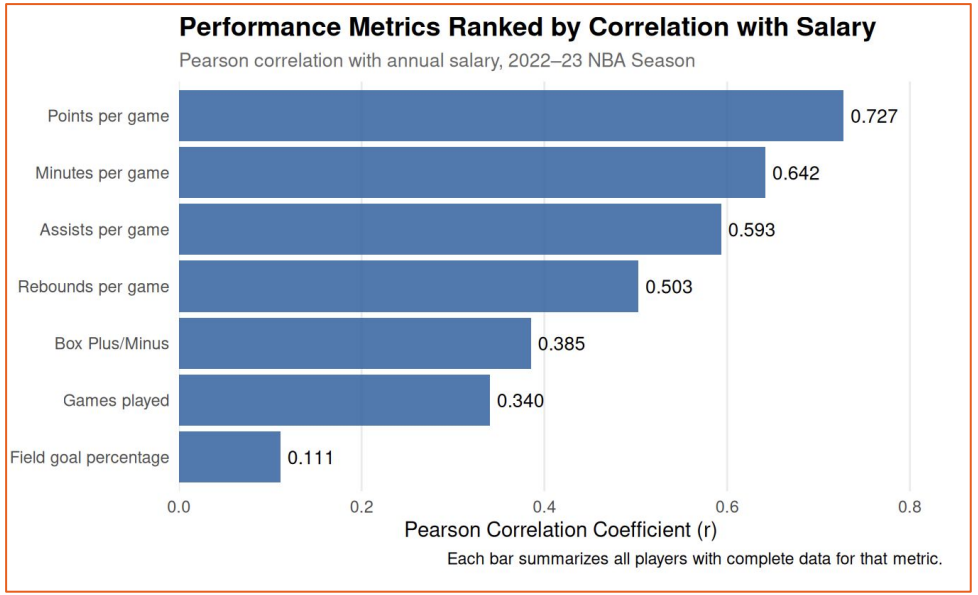
- Highest correlation coefficient → r = 0.727
- Strongest relationship between # of points scored and higher salary

Minutes Per Game

- Second highest → r = 0.642
- Notable outliers, ex. Kemba Walker ($37.3M, 16 mins per game), Derrick Rose ($14.5M, 12.5 mins per game)

Games Played, Shooting efficiency

- Weakest correlations → games played r = 0.340, field goal % r = 0.111



Core Takeaway

Players who score more and play more on average earn higher salaries, but no statistic fully explains compensation.

Does Position Matter?

Performance–salary relationships vary across positions, particularly for assists and rebounds.

Key findings

Assists: Strongest for guards **(r = 0.78)**

Rebounds: Strongest for centers **(r = 0.82)**

Points: Strong associations across all groups

Guard Productivity

Assists should have a stronger salary association among guards.

Supported (r = 0.78)

Frontcourt Impact

Rebounds should have a stronger salary association among forwards and centers.

Supported (centers: r = 0.82)

Position-Based Correlations

Pearson correlations compare how performance metrics relate to salary across player positions

METRIC	GUARDS (PG/SG)	FORWARDS (SF/PF)	CENTERS (C)
Assists Per Game	**r = 0.78**	r = 0.24	r = 0.12
Rebounds Per Game	r = 0.15	r = 0.58	**r = 0.82**
Points Per Game	**r = 0.71**	**r = 0.74**	r = 0.63

Note: Correlation does not imply causation; differences between groups were not formally tested.

Conclusion and Reflection

There is definitely a relationship between NBA player performance and player compensation, but there are also many complexities in how salary is determined.

- **Key Findings:** Points per game (r = 0.727) and minutes played (r = 0.642) showed the strongest positive correlations with salary. Positional differences were not statistically significant, meaning individual performance matters more that position. There are also important right-skewed outliers.
- **Analytical Process:** Some parts of our hypothesis were supported, but comparing performance metrics, positional differences, and outliers challenged our initial assumptions.
- **Limitations and implications:** The data set only covers the 2022 - 2023 season, which does not accounts for salaries influence by player performance in other years. Additionally, the data is observational, meaning direct causal conclusions can't be drawn. Future research can look at even more factors that are not empirical.

Core Analytical Takeaway

NBA salaries are strongly associated with scoring performance and play time, but single season statistics and single metrics cannot fully explain the scope of how compensation is decided. Other factors, such as past performance and experience may contribute to salary differences across the league.