

# Performance and Salaries of NBA Players

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# Presentation Outline

- ▶ Project Description
- ▶ Source of Data
- ▶ Methodology
- ▶ EDA
- ▶ Results
- ▶ Conclusion

# Project Description

- ▶ Analyzing basketball players data from the NBA League in the 2015-2016 season

Our Aim: In the 2015-2016 season, how do the skills of a player relate to his salary?

# Source of Data

- ▶ Basketball Reference
- ▶ Roster, Total, and Salaries tables

Sports Reference Basketball Football (college) Basketball (college) Hockey Olympics Soccer Blog Surf Ad-FREE Create Account Login Questions or Comments?

## BASKETBALL REFERENCE


Enter Person, Team, Section, etc

Search

Players Teams Seasons Leaders Scores Playoffs Draft Play Index Full Site Menu Below ▼

Statistics, scores, and history for the NBA, ABA, WNBA, and top European competition.

### Every Player



**View any Active Player:**  
Choose a Team ▼  
Then a player ▼ **Go!**

**Select a Hall of Famer:**  
Select a player ▼

### Recent Debut

[Marshall Plumlee](#) (NYK), [Derrick Jones](#) (PHO), [Jonathan Gibson](#) (DAL), [DeAndre Houston-Akins](#) (MEM), [Myst Frazier](#) (BRO)

### Every Team

#### 2016-17 NBA Standings

[Summary](#) [Schedule](#)

East			West		
	W	L		W	L
CLE (1)	F C	13 3	GSW (1)	F C	16 2
TOR (2)	F C	12 6	SAS (2)	F C	15 4
CHI (3)	F C	10 7	LAC (3)	F C	14 5
BOS (4)	F C	10 8	HOU (4)	F C	11 7
CHO (4)	F C	10 8	OKC (5)	F C	12 8
ATL (6)	F C	10 9	UTA (6)	F C	11 8
MIL (7)	F C	8 8	MEM (6)	F C	11 8
NYK (7)	F C	9 9	POR (8)	F C	10 10
DET (7)	F C	10 10	LAL (8)	F C	10 10
IND (10)	F C	9 10	DEN (10)	F C	7 11
ORL (11)	F C	7 11	SAC (10)	F C	7 11
WAS (12)	F C	6 11	NOP (12)	F C	7 12
MIA (13)	F C	6 12	PHO (13)	F C	6 13
BRK (14)	F C	5 12	MIN (14)	F C	5 13
PHI (15)	F C	4 14	DAL (15)	F C	3 14

### What's Happening

#### Trending Player Pages

[LeBron James](#), [Russell Westbrook](#), [Stephen Curry](#), [Giannis Antetokounmpo](#), [Anthony Davis](#), [Kevin Durant](#), [Michael Jordan](#), [Kobe Bryant](#), [James Harden](#), [Kristaps Porzingis](#)

#### Hoops Rumors

[Sixers Notes: Embiid, Okafor, Noel, Simmons](#)  
[And-Ones: Postponement, Goodwin, Adams, Smith](#)  
[Isaiah Austin Cleared To Play Basketball Again](#)  
[Kings Notes: Cousins, Casspi, Gay, Stauskas](#)  
[Danuel House Has Fractured Wrist, Out At Least 6 Weeks](#)  
[Dion Waiters Expected To Miss At Least Two Weeks](#)  
[Community Shootaround: Grizzlies' PG Situation](#)  
[NBA D-League Assignments/Recalls: 11/30/16](#)  
[Reggie Bullock Expected To Miss 2-4 Months](#)  
[New York Notes: Nets, Knicks, Noah, Kilpatrick](#)

#### Sports Reference Blog

[Top 2016 Recruits Added to Basketball Reference](#)  
[The Best Thanksgiving Teams in NFL History](#)  
[1984-85 NBA Salaries Added to Basketball Reference](#)  
[Triple-Double, Quadruple-Double & 50-Pt Game](#)  
[Leaderboards Added to Basketball Reference](#)  
[NCAA Basketball Freshman Orientation](#)

# Methodology - Data Acquisition

- ▶ Two phases of webscraping
  1. Get list of team abbreviations
  2. Get the roster, salary, and totals tables via their IDs

# Methodology - Data Cleaning

- First we cleaned the data, then we merged the tables

32K 15ms (52s 41ac) 99.2 KB Run Edit History

Search this file...

	Player	Team	Number	Position	Height	Weight	Birth Date	Country	Experience	College
2	Al Horford	ATL	15	C	1.86	111.13	1986-06-03	DO	8	University of Florida
3	Dennis Schroder	ATL	17	PG	1.86	78.02	1993-09-15	DE	2	N/A
4	Jeff Teague	ATL	0	PG	1.89	84.37	1986-06-10	US	6	Wake Forest University
5	Justin Holiday	ATL	7	SG	2.01	83.91	1989-04-05	US	2	University of Washington
6	Kent Bazemore	ATL	24	SF	1.88	91.17	1989-07-01	US	3	Old Dominion University
7	Kirk Hinrich	ATL	12	PG	1.93	86.18	1981-01-02	US	12	University of Kansas
8	Kris Humphries	ATL	43	PF	2.1	106.58	1985-02-04	US	11	University of Minnesota
9	Kyle Korver	ATL	26	SG	2.04	96.76	1981-03-17	US	12	Creighton University
10	Lamar Patterson	ATL	19	SG	1.90	102.06	1981-08-12	US	9	University of Pittsburgh
11	Mike Muscala	ATL	31	C	1.86	108.88	1991-07-01	US	2	Bucknell University
12	Mike Scott	ATL	32	PF	2.07	107.5	1980-07-16	US	3	University of Virginia
13	Paul Millsap	ATL	4	PF	2.07	111.58	1985-02-10	US	9	Louisiana Tech University
14	Shelvin Mack	ATL	8	PG	1.82	92.08	1990-04-22	US	4	Butler University
15	Terran Pettway	ATL	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
16	Thabo Sefolosha	ATL	25	SF	2.04	99.79	1994-05-02	CH	9	N/A
17	Tyago Splitter	ATL	11	C	1.86	111.13	1985-01-01	BR	5	N/A
18	Tim Hardaway	ATL	10	SG	2.01	92.99	1982-03-18	US	2	University of Michigan

39 15ms (18 41ac) 3.5 KB Run Edit History

Search this file...

	rosterNo.	rosterPlayer	rosterPos	rosterHT	rosterWT	rosterBirthDate	roster...	rosterExp	rosterCollege
2	24	Kent Bazemore	SF	6-5	201	July 1, 1989	us	3	Old Dominion University
3	10	Tim Hardaway	SG	6-6	205	March 16, 1982	us	2	University of Michigan
4	12	Kirk Hinrich	PG	6-4	190	January 2, 1981	us	12	University of Kansas
5	7	Justin Holiday	SG	6-6	165	April 5, 1989	us	2	University of Washington
6	15	Al Horford	C	6-10	245	June 3, 1986	do	8	University of Florida
7	43	Kris Humphries	PF	6-9	235	February 6, 1985	us	11	University of Minnesota
8	26	Kyle Korver	SG	6-7	212	March 17, 1981	us	12	Creighton University
9	8	Shelvin Mack	PG	6-3	203	April 22, 1990	us	4	Butler University
10	4	Paul Millsap	PF	6-8	246	February 10, 1985	us	9	Louisiana Tech University
11	31	Mike Muscala	C	6-11	240	July 1, 1991	us	2	Bucknell University
12	13	Lamar Patterson	SG	6-5	225	August 12, 1981	us	8	University of Pittsburgh
13	17	Dennis Schroder	PG	6-1	172	September 15, 1993	de	2	
14	32	Mike Scott	PF	6-8	237	July 16, 1980	us	3	University of Virginia
15	25	Thabo Sefolosha	SF	6-7	228	May 2, 1984	ch	9	
16	11	Tyago Splitter	C	6-11	245	January 1, 1985	br	5	
17	22	Walter Tavares	C	7-3	260	March 22, 1992	cv	8	
18	0	Jeff Teague	PG	6-2	189	June 10, 1988	us	6	Wake Forest University

# EDA

- ▶ Split data into qualitative and quantitative
- ▶ Qualitative - used `dplyr` and `frequency` to analyze
- ▶ Quantitative - used `summary()` to get a summary of statistics

# Data Analysis - EFF

- ▶  $EFF = (\text{total points} + \text{total rebounds} + \text{assists} + \text{steals} + \text{blocks} - \text{missed field goals} - \text{missed free throws} - \text{turnovers}) / (\text{games played})$



$$EFF = \frac{|w_1|x_1}{\sigma_1} + \dots + \frac{|w_8|x_8}{\sigma_8}$$

where  $x_i = \frac{\text{basic individual statistics}}{\text{GamePlayed}(GP)}$

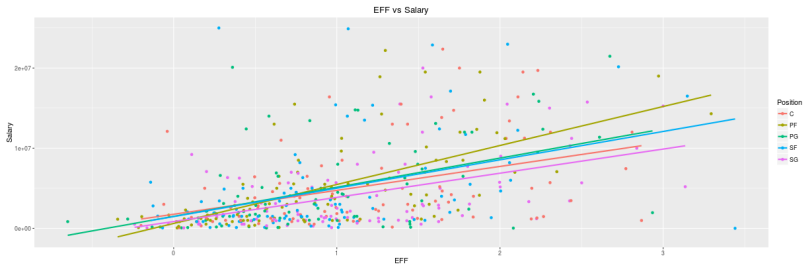
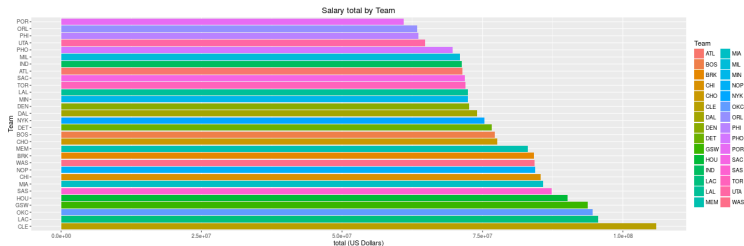


Figure 1: Correlation between EFF vs Salary



# Data Analysis - Salary Aggregates

## ► Aggregated salary data by team



# Shiny Apps:

- ▶ Check out our nifty apps:

1. Team Salaries app -

<https://stat133.shinyapps.io/team-salaries/>

2. Statistic Salaries app -

<https://stat133.shinyapps.io/stat-salaries/>

# Results

- ▶ EFF and salary are positively correlated ( $r = 0.474$ )
- ▶ Experience showed relatively weak correlation with EFF ( $r = 0.209$ )
- ▶ EFF is weakly correlated with points while strongly correlated with steals ( $r = 0.605$ ) and defensive rebounds ( $r = 0.698$ ,  $r = 0.706$ )

# Conclusions

- ▶ While there is a positive correlation between EFF and salary, it is only moderate
- ▶ Our results can help managers better decide salaries for recruits
- ▶ We hypothesize that, in general, the salary is highly correlated with the number of wins that players bring in to the team