

# Performance and Salaries of NBA Players

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# Presentation Outline

- ▶ Project Description
- ▶ Source of Data
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- ▶ EDA
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# 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

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<a href="#">CLE</a> (1) <a href="#">F</a> <a href="#">C</a> <a href="#">S</a> 13 3			<a href="#">GSW</a> (1) <a href="#">F</a> <a href="#">C</a> <a href="#">S</a> 16 2		
<a href="#">TOR</a> (2) <a href="#">F</a> <a href="#">C</a> <a href="#">S</a> 12 6			<a href="#">SAS</a> (2) <a href="#">F</a> <a href="#">C</a> <a href="#">S</a> 15 4		
<a href="#">CHI</a> (3) <a href="#">F</a> <a href="#">C</a> <a href="#">S</a> 10 7			<a href="#">LAC</a> (3) <a href="#">F</a> <a href="#">C</a> <a href="#">S</a> 14 5		
<a href="#">BOS</a> (4) <a href="#">F</a> <a href="#">C</a> <a href="#">S</a> 10 8			<a href="#">HOU</a> (4) <a href="#">F</a> <a href="#">C</a> <a href="#">S</a> 11 7		
<a href="#">CHO</a> (4) <a href="#">F</a> <a href="#">C</a> <a href="#">S</a> 10 8			<a href="#">OKC</a> (5) <a href="#">F</a> <a href="#">C</a> <a href="#">S</a> 12 8		
<a href="#">ATL</a> (6) <a href="#">F</a> <a href="#">C</a> <a href="#">S</a> 10 9			<a href="#">UTA</a> (6) <a href="#">F</a> <a href="#">C</a> <a href="#">S</a> 11 8		
<a href="#">MIL</a> (7) <a href="#">F</a> <a href="#">C</a> <a href="#">S</a> 8 8			<a href="#">MEM</a> (6) <a href="#">F</a> <a href="#">C</a> <a href="#">S</a> 11 8		
<a href="#">NYK</a> (7) <a href="#">F</a> <a href="#">C</a> <a href="#">S</a> 9 9			<a href="#">POR</a> (8) <a href="#">F</a> <a href="#">C</a> <a href="#">S</a> 10 10		
<a href="#">DET</a> (7) <a href="#">F</a> <a href="#">C</a> <a href="#">S</a> 10 10			<a href="#">LAL</a> (8) <a href="#">F</a> <a href="#">C</a> <a href="#">S</a> 10 10		
<a href="#">IND</a> (10) <a href="#">F</a> <a href="#">C</a> <a href="#">S</a> 9 10			<a href="#">DEN</a> (10) <a href="#">F</a> <a href="#">C</a> <a href="#">S</a> 7 11		
<a href="#">ORL</a> (11) <a href="#">F</a> <a href="#">C</a> <a href="#">S</a> 7 11			<a href="#">SAC</a> (10) <a href="#">F</a> <a href="#">C</a> <a href="#">S</a> 7 11		
<a href="#">WAS</a> (12) <a href="#">F</a> <a href="#">C</a> <a href="#">S</a> 6 11			<a href="#">NOP</a> (12) <a href="#">F</a> <a href="#">C</a> <a href="#">S</a> 7 12		
<a href="#">MIA</a> (13) <a href="#">F</a> <a href="#">C</a> <a href="#">S</a> 6 12			<a href="#">PHO</a> (13) <a href="#">F</a> <a href="#">C</a> <a href="#">S</a> 6 13		
<a href="#">BRK</a> (14) <a href="#">F</a> <a href="#">C</a> <a href="#">S</a> 5 12			<a href="#">MIN</a> (14) <a href="#">F</a> <a href="#">C</a> <a href="#">S</a> 5 13		
<a href="#">PHI</a> (15) <a href="#">F</a> <a href="#">C</a> <a href="#">S</a> 4 14			<a href="#">DAL</a> (15) <a href="#">F</a> <a href="#">C</a> <a href="#">S</a> 3 14		

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# 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 Rows (525 cols) | 99.2 KB

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

39 Rows (18 cols) | 3.5 KB

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

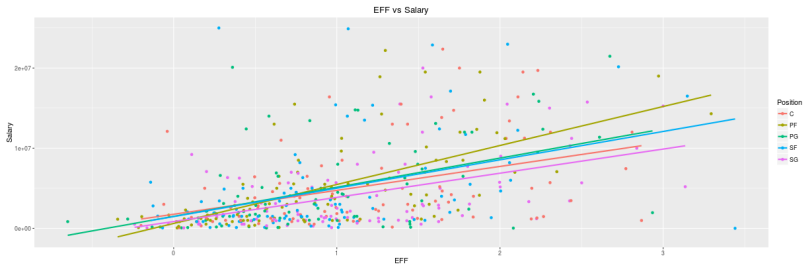
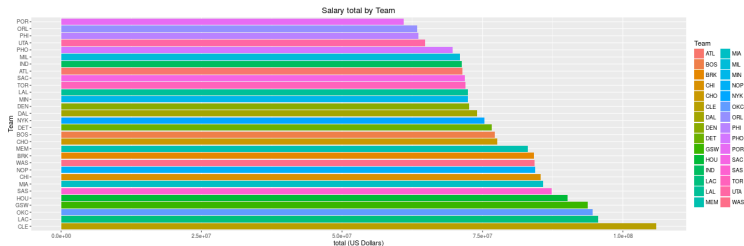


Figure 1: Correlation between EFF vs Salary



# 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