

Are performance and salary in the NBA related?

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Motivation

- Kobe Bryant made \$25M in 2011
- Main question: Is this salary justified?
- Based on historical data from 2009, 2010, 2011 we can look at:
 - Salaries for each player per year
 - Specific statistics per player such as
 - Positions (Forward, Center, Guard)
 - # of Wins in the season
 - PPG (points per game)
 - RPG (rebounds per game)
 - MPG (minutes per game)
 - APG (assists per game)

Data Collection 1

Data available online on: <http://www.basketball-reference.com>

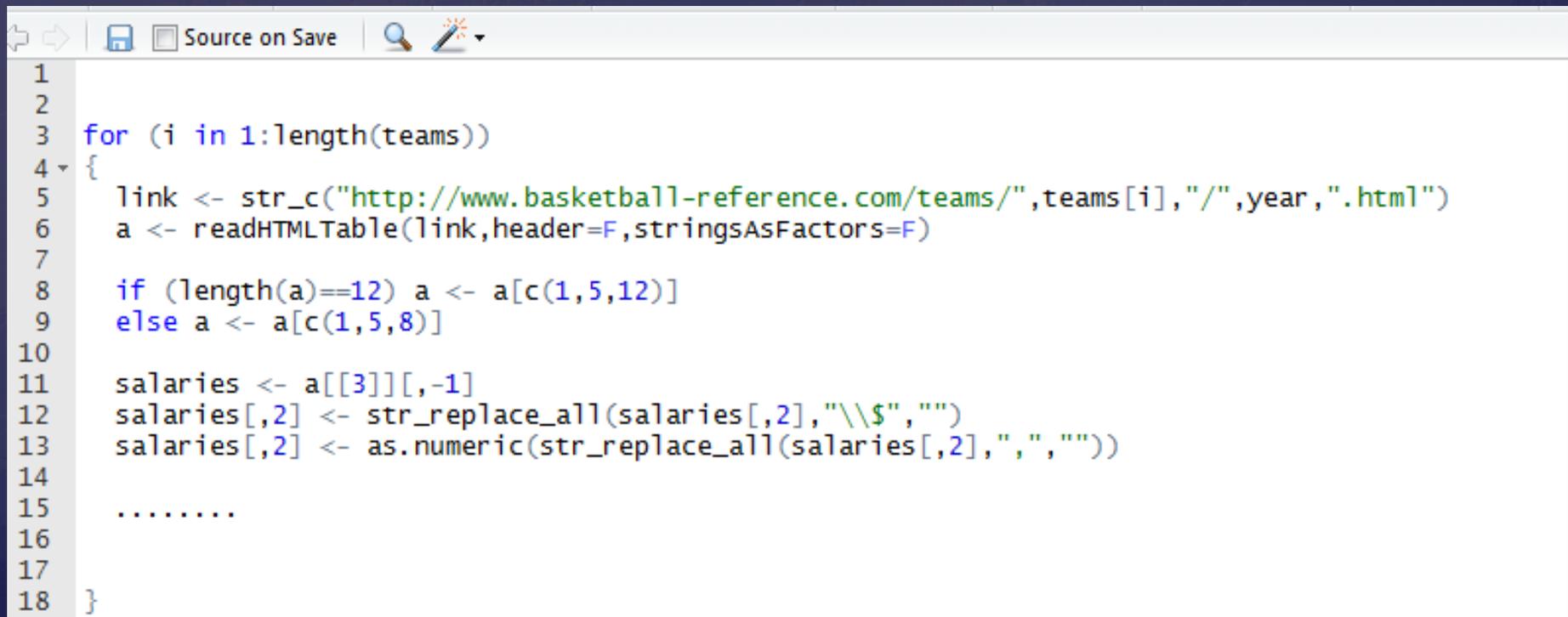
Roster							
Glossary · SHARE · Embed · CSV · PRE · LINK · ?							
No.	Player	Pos	Ht	Wt	Birth Date	Exp	College
9	Matt Barnes	F	6-7	235	March 9, 1980	7	University of California, Los Angeles
5	Steve Blake	G	6-3	172	February 26, 1980	7	University of Maryland
12	Shannon Brown	G	6-4	205	November 29, 1985	4	Michigan State University
24	Kobe Bryant	G	6-6	200	August 23, 1978	14	
17	Andrew Bynum	C	7-0	285	October 27, 1987	5	
45	Derrick Caracter	F	6-9	275	May 4, 1988	R	University of Texas at El Paso
3	Devin Ebanks	F	6-9	215	October 28, 1989	R	West Virginia University
2	Derek Fisher	G	6-1	200	August 9, 1974	14	University of Arkansas at Little Rock
16	Pau Gasol	F-C	7-0	227	July 6, 1980	9	
10	Trey Johnson	G	6-5	218	August 30, 1984	1	Jackson State University
7	Lamar Odom	F	6-10	220	November 6, 1979	11	University of Rhode Island
50	Theo Ratliff	C-F	6-10	225	April 17, 1973	15	University of Wyoming
1	Joe Smith	F	6-10	225	July 26, 1975	15	University of Maryland
18	Sasha Vujacic	G	6-7	193	March 8, 1984	6	
4	Luke Walton	F	6-8	235	March 28, 1980	7	University of Arizona
15	Metta World Peace	F	6-6	244	November 13, 1979	11	St. John's University

Salaries		
Rk	Player	Salary
1	Kobe Bryant	\$24,806,250
2	Pau Gasol	\$17,823,000
3	Andrew Bynum	\$13,700,000
4	Lamar Odom	\$8,200,000
5	Metta World Peace	\$6,322,320
6	Luke Walton	\$5,260,000
7	Steve Blake	\$4,000,000
8	Derek Fisher	\$3,700,000
9	Shannon Brown	\$2,200,000
10	Matt Barnes	\$1,765,000
11	Theo Ratliff	\$1,352,181
12	Joe Smith	\$1,352,181
13	Devin Ebanks	\$473,604
14	Derrick Caracter	\$473,604

```
link <- str_c("http://www.basketball-reference.com/teams/" , teams[i], "/" , year , ".html")
a <- readHTMLTable(link,header=F,stringsAsFactors=F)
```

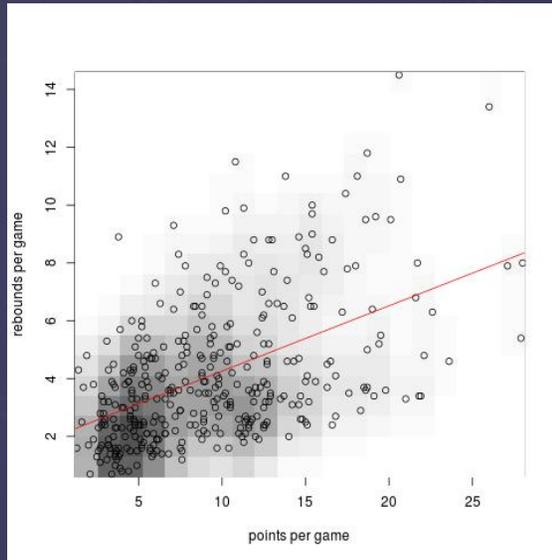
Data Collection 2

How we got the data into R – extracting data from online HTML tables:

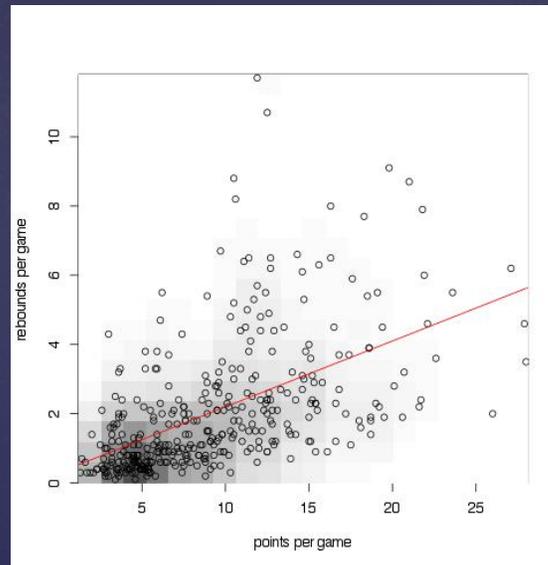


```
1
2
3 for (i in 1:length(teams))
4 {
5   link <- str_c("http://www.basketball-reference.com/teams/" , teams[i], "/" , year , ".html")
6   a <- readHTMLTable(link,header=F,stringsAsFactors=F)
7
8   if (length(a)==12) a <- a[c(1,5,12)]
9   else a <- a[c(1,5,8)]
10
11   salaries <- a[[3]][,-1]
12   salaries[,2] <- str_replace_all(salaries[,2],"\\$", "")
13   salaries[,2] <- as.numeric(str_replace_all(salaries[,2],"", ""))
14
15   .....
16
17
18 }
```

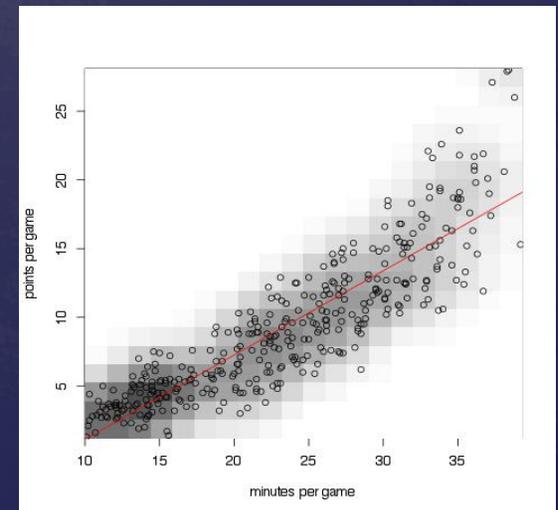
Player's performance \neq Athletic Ability



PPG vs RPG ($p < 2e-16$)

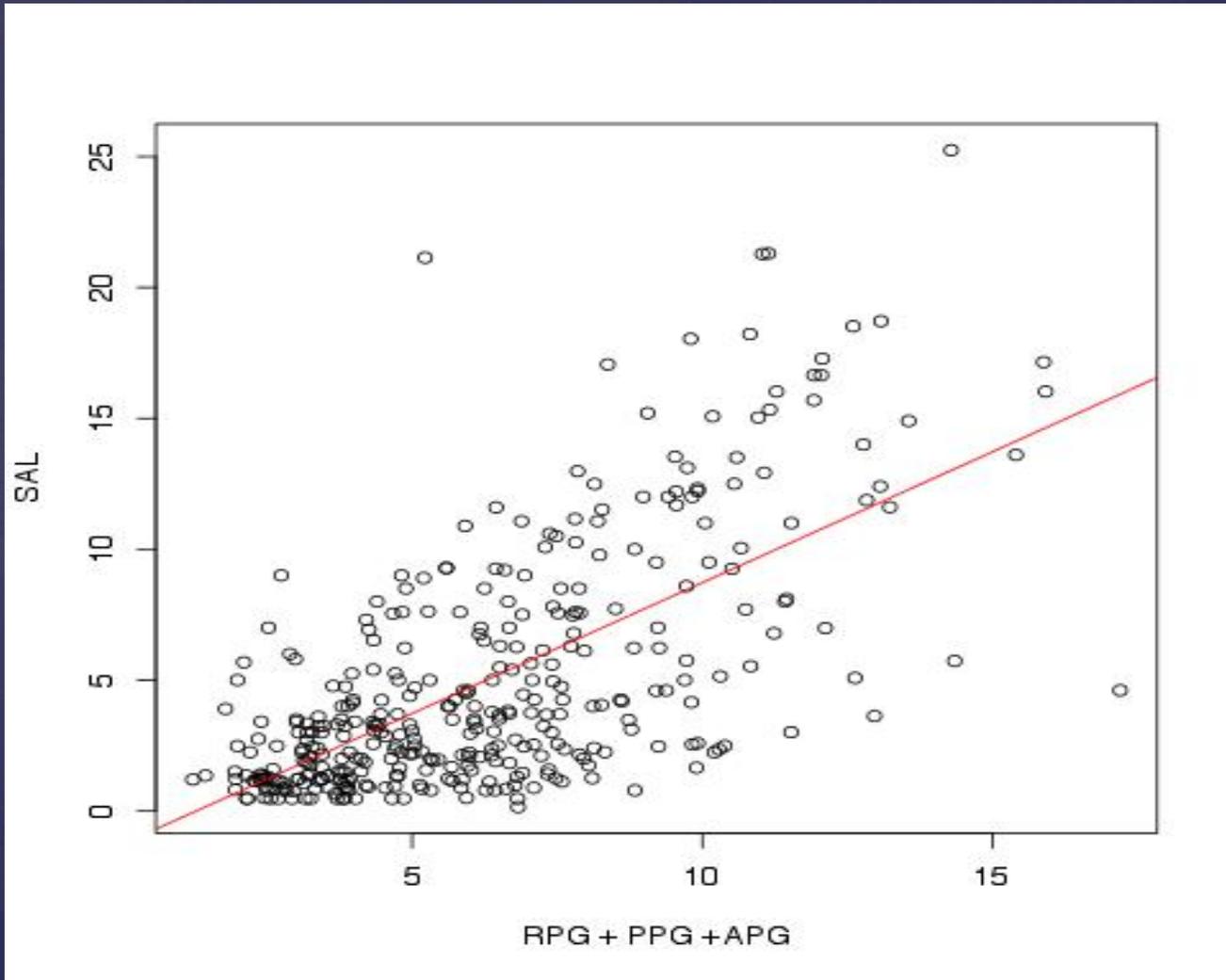


PPG vs APG ($p < 2e-16$)



MPG vs PPG ($p < 2e-16$)

SAL~PPG+RPG+APG



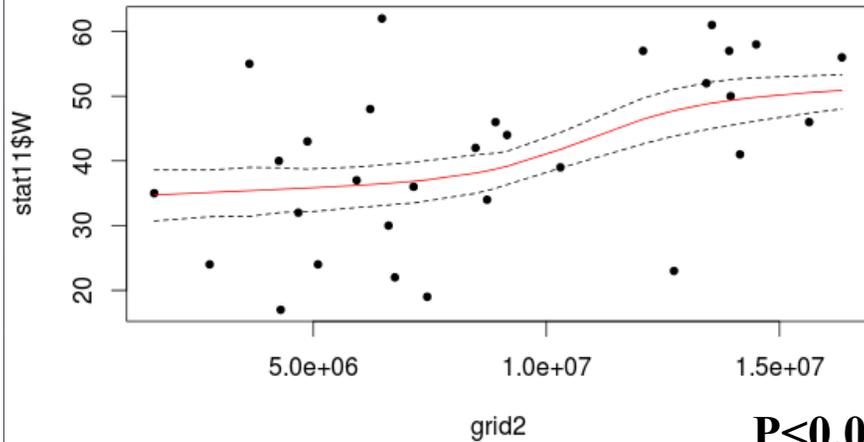
PPG ($p < 3.74e-11$)

RPG ($p < 2.13e08$)

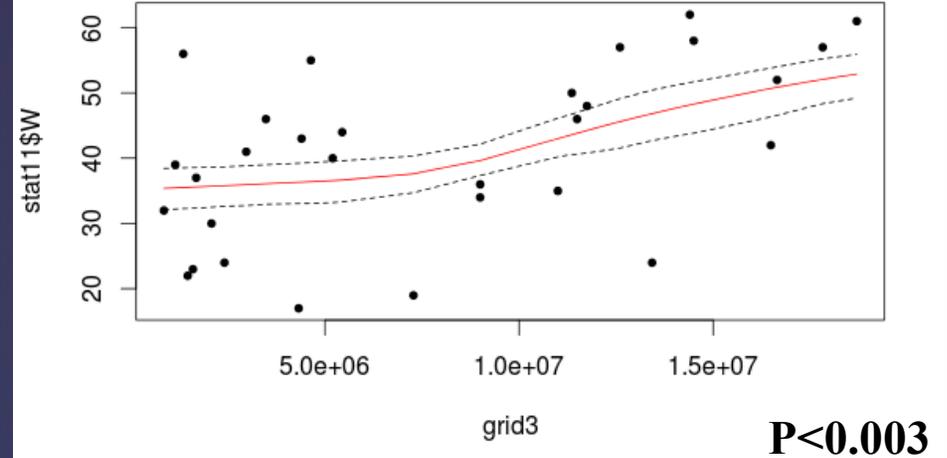
APG ($p < 0.009$)

Salary and Wins relationship (2011)

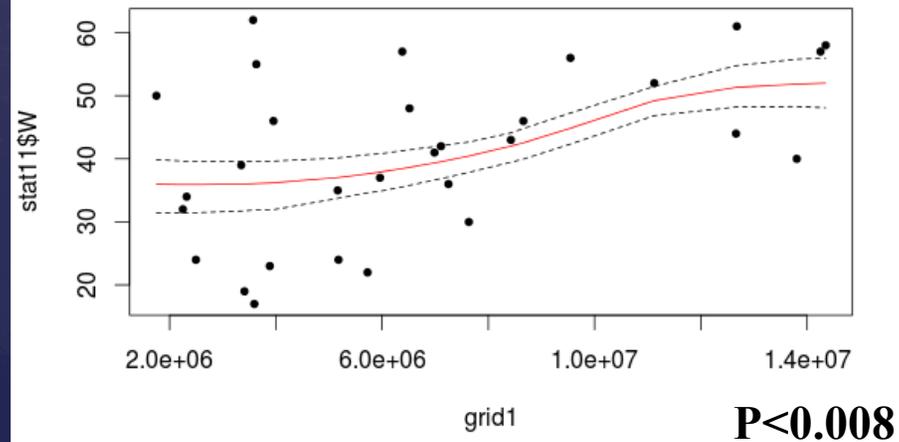
Forward Salaries vs Wins



Center Salaries vs Wins

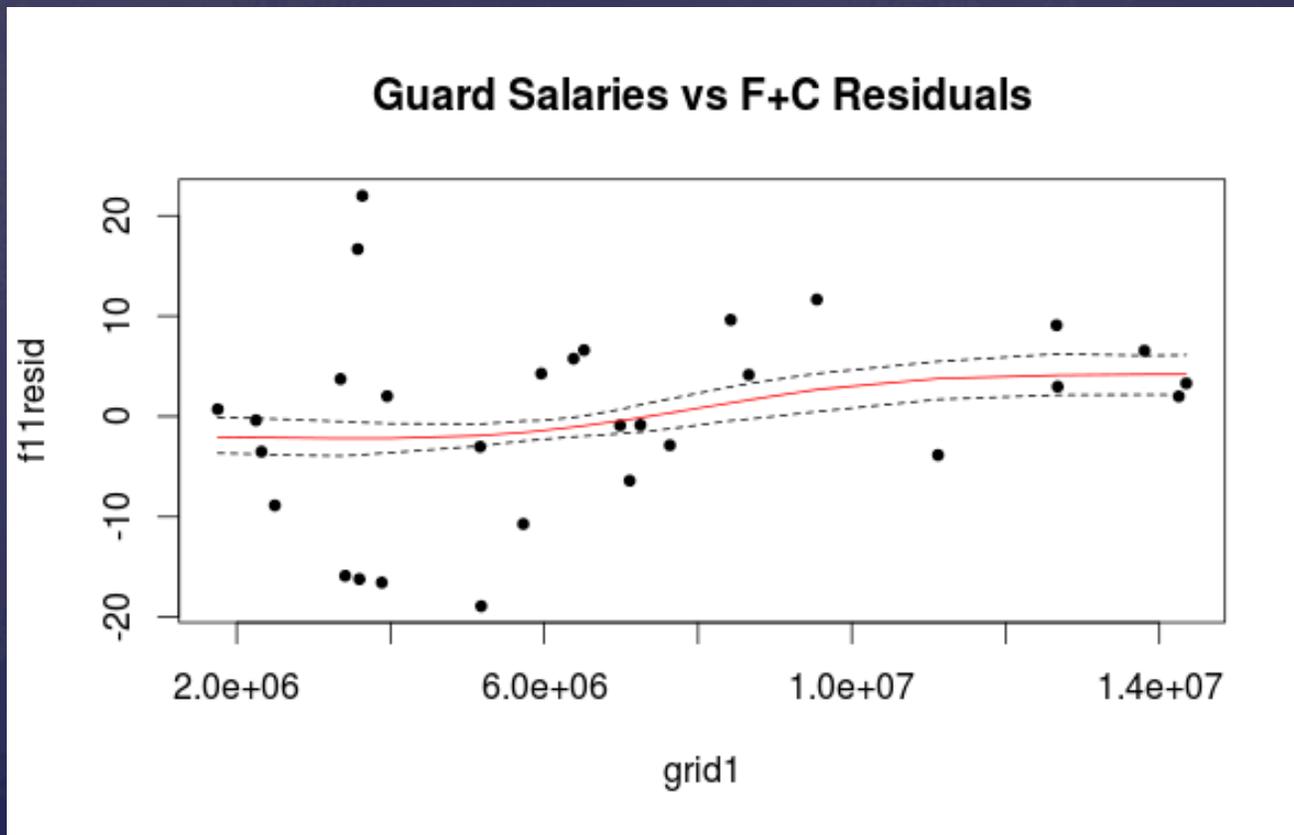


Guard Salaries vs Wins



Salary and Wins relationship

Does position matter? Likely not



Summary of Results

Statistically significant linear relationships between:

- ✓ Performance variables RPG, PPG, MPG, APG
- ✓ Salary and individual player performance/ability as measured by PPG, RPG, and APG
- ✓ Salary and team performance as measured by wins

Limitations of Current Analysis/Future Directions

- Tracking team roster changes
- Outlier players (e.g. Kobe Bryant)
- Outlier teams (e.g. Lakers)
- Other individual differences between players such as age
- Are contracts based on past performance?

THANKS!