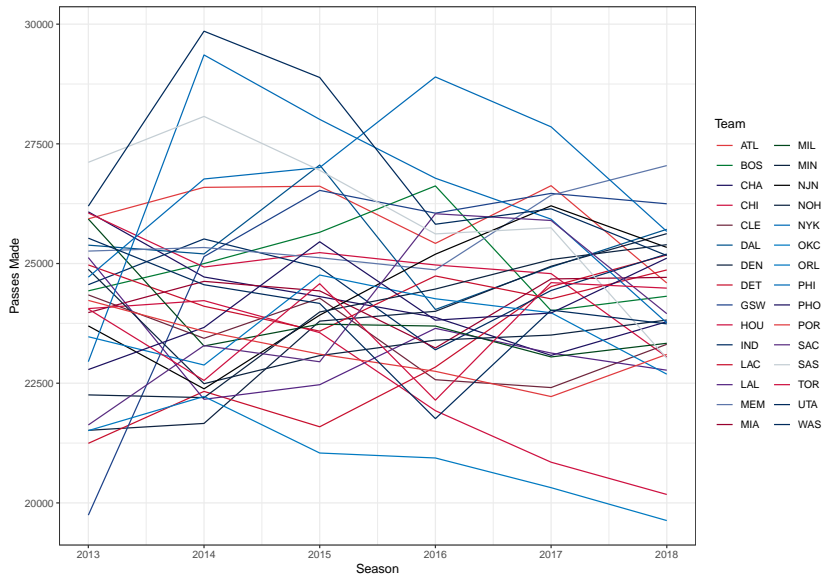# Passing in the NBA

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# Questions

- ▶ Has the passing rate increased in the NBA?
- ▶ Do assists correlate with winning percentage?

# Passes made per season

# Passing model selection

I compared:

- ▶ Random intercept for team only
- ▶ Random intercept for team and random slope across season
- ▶ Random intercept for team with AR(1) structure for repeated measures
- ▶ Random intercept for team and random slope across season with AR(1) structure for repeated measures
- ▶ All models above adjusted for total minutes played

# Passing results

The best model by AIC was random intercept for team with AR(1) structure for repeated measures. Minutes played did not affect the results, and there were no polynomial effects for time:

Table 1: Fixed Effects

|                    | Value      | Std.Error | DF  | t-value | p-value |
|--------------------|-----------:|----------:|----:|--------:|--------:|
| (Intercept)        | 24349.989  | 235.835   | 146 | 103.250 | <1e-04  |
| poly(Season, 4)1   | -40.362    | 2004.510  | 146 | -0.020  | 0.984   |
| poly(Season, 4)2   | -1941.549  | 1404.499  | 146 | -1.382  | 0.169   |
| poly(Season, 4)3   | 360.020    | 1088.741  | 146 | 0.331   | 0.741   |
| poly(Season, 4)4   | -465.829   | 925.730   | 146 | -0.503  | 0.616   |

# Break point

The segmented package in R suggests there's a knot at 2015:

```
## Call: segmented.lm(obj = linmod)
##
## Meaningful coefficients of the linear terms:
## (Intercept)      Season    U1.Season
##   -547034.4       283.7       -421.6
##
## Estimated Break-Point(s):
## psi1.Season
##        2015
```
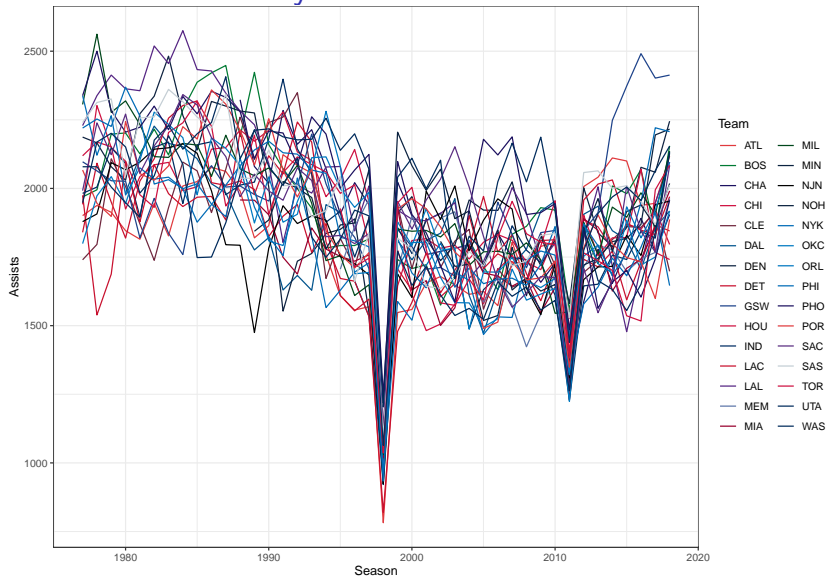
# Piecewise model

Table 2: Fixed Effects

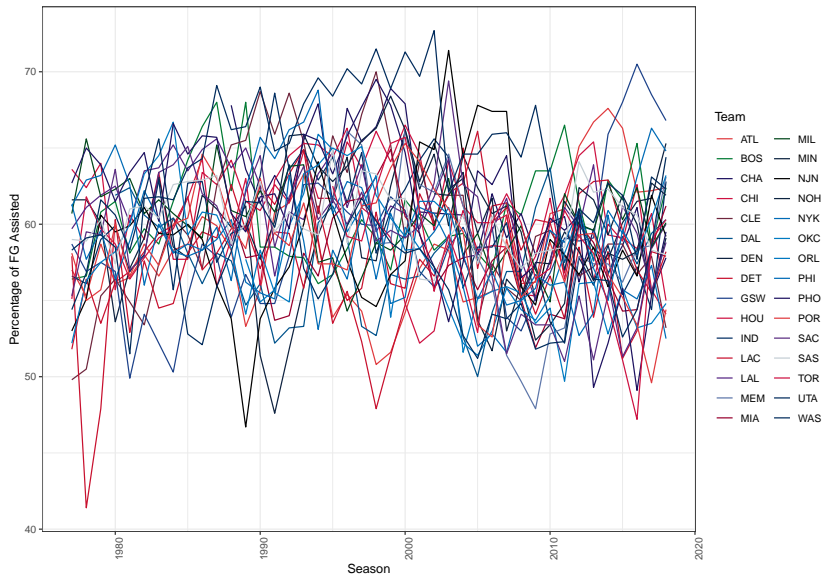|                  | Value      | Std.Error  | DF  | t-value | p-value |
|------------------|------------|------------|-----|---------|---------|
| (Intercept)      | 164836.019 | 213588.290 | 148 | 0.772   | 0.441   |
| Season           | -69.854    | 106.029    | 148 | -0.659  | 0.511   |
| Change in Slope  | 0.181      | 0.154      | 148 | 1.178   | 0.241   |

So, the overall passing rate doesn't appear to have changed since 2013.
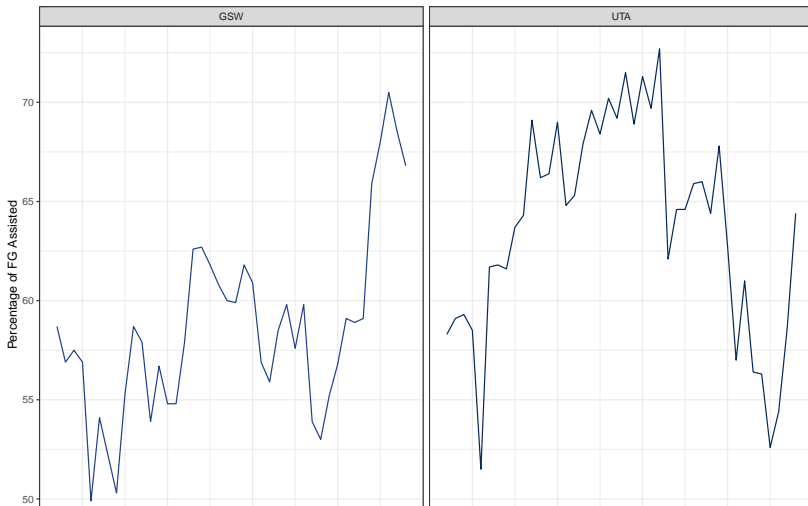
# Raw assist numbers by team and season



Will need to use percentage of baskets assisted because of the lockout years in 1998 and 2011, but at least the data appear to be

# Percent assisted

# The Warriors and John Stockton

▶ Steph Curry was drafted in 2009 and unanimous MVP in the 2015-2016 season.

▶ Stockton is the NBA all-time assist leader and played 1984–2003

# Does

# R Markdown

This is an R Markdown presentation. Markdown is a simple formatting syntax for authoring HTML, PDF, and MS Word documents. For more details on using R Markdown see http://rmarkdown.rstudio.com.

When you click the **Knit** button a document will be generated that includes both content as well as the output of any embedded R code chunks within the document.

# Slide with Bullets

- Bullet 1
- Bullet 2
- Bullet 3

# Slide with R Output

```r
summary(cars)
```

```
##      speed           dist
##  Min.   : 4.0   Min.   :  2.00
##  1st Qu.:12.0   1st Qu.: 26.00
##  Median :15.0   Median : 36.00
##  Mean   :15.4   Mean   : 42.98
##  3rd Qu.:19.0   3rd Qu.: 56.00
##  Max.   :25.0   Max.   :120.00
```

# Slide with Plot