Less moneyball?

The influence of the Competitive Balance Tax on Major League Baseball from 1985 to 2015

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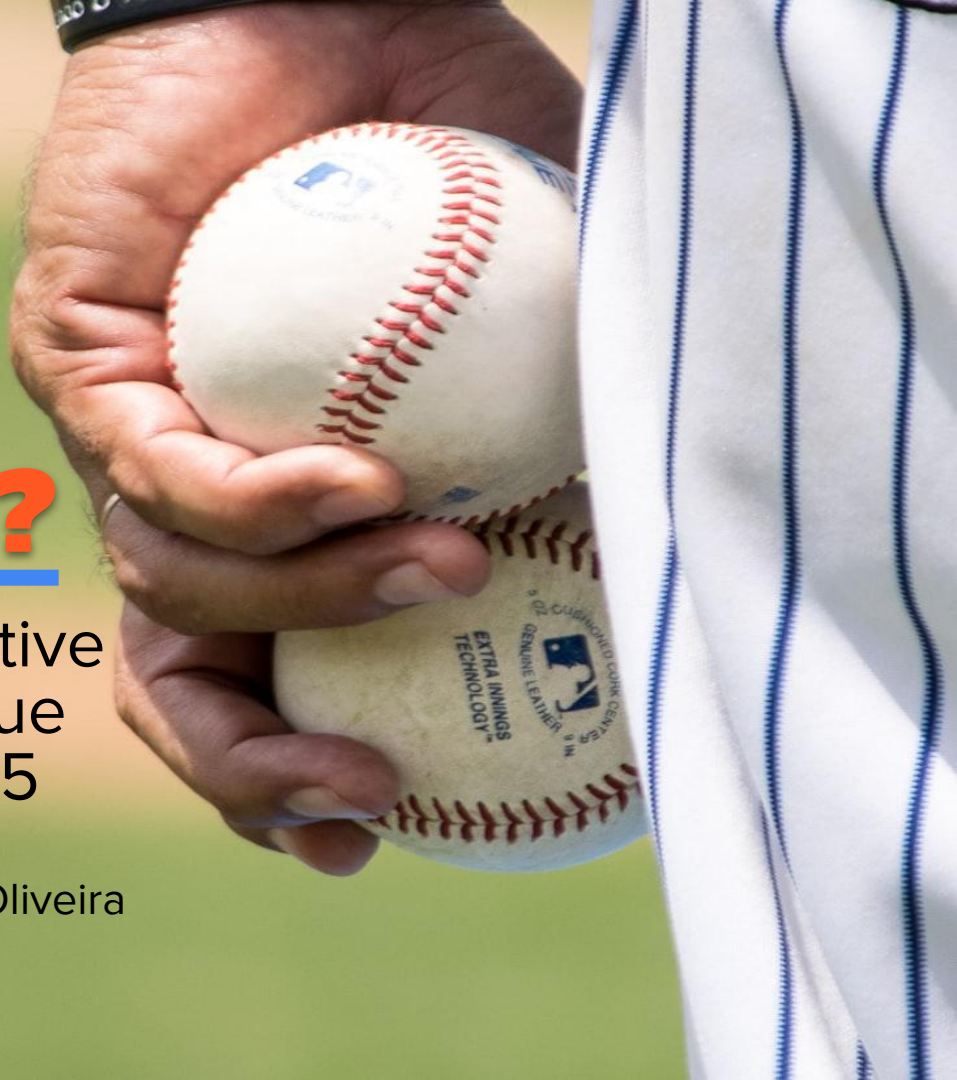

Motivation and Question

- How much are players worth? How do teams acquire talent? Can you buying all the best players? Is it fair? Does it make for good games?

- Major League Baseball says no
  - Competitive Balance Tax started in 1997

- We ask:
  - Did the CBT change team spending on player salaries?
  - Does having expensive players mean more winning?
  - Did the CBT help better distribute player talent?

Data

- MLB team level data for the season in year 1985 - 2015
- 26 teams (franchises) who existed during the full study period
- 806 observations
- Focus on win-loss record, total player salaries, and team performance stats
- Data Source: [Baseball Databank via kaggle by Sean Lahman]

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Baseball Databank

Data on baseball players, teams, and games from 1871 to 2015

MLB luxury tax or "Competitive Balance Tax" (CBT)

The MLB implemented the competitive balance tax in 1997 to reduce anti-competitive behavior in the league.The first agreement stated that the top five salary teams in each year would pay a 34% fine on each dollar a team spent beyond halfway between the salaries of the fifth and sixth teams.

For example, if the fifth-highest salary team had a payroll of $100 million and the sixth-highest salary team had a payroll of $98 million, the top five teams would pay 34% on each dollar they spent over $99 million.

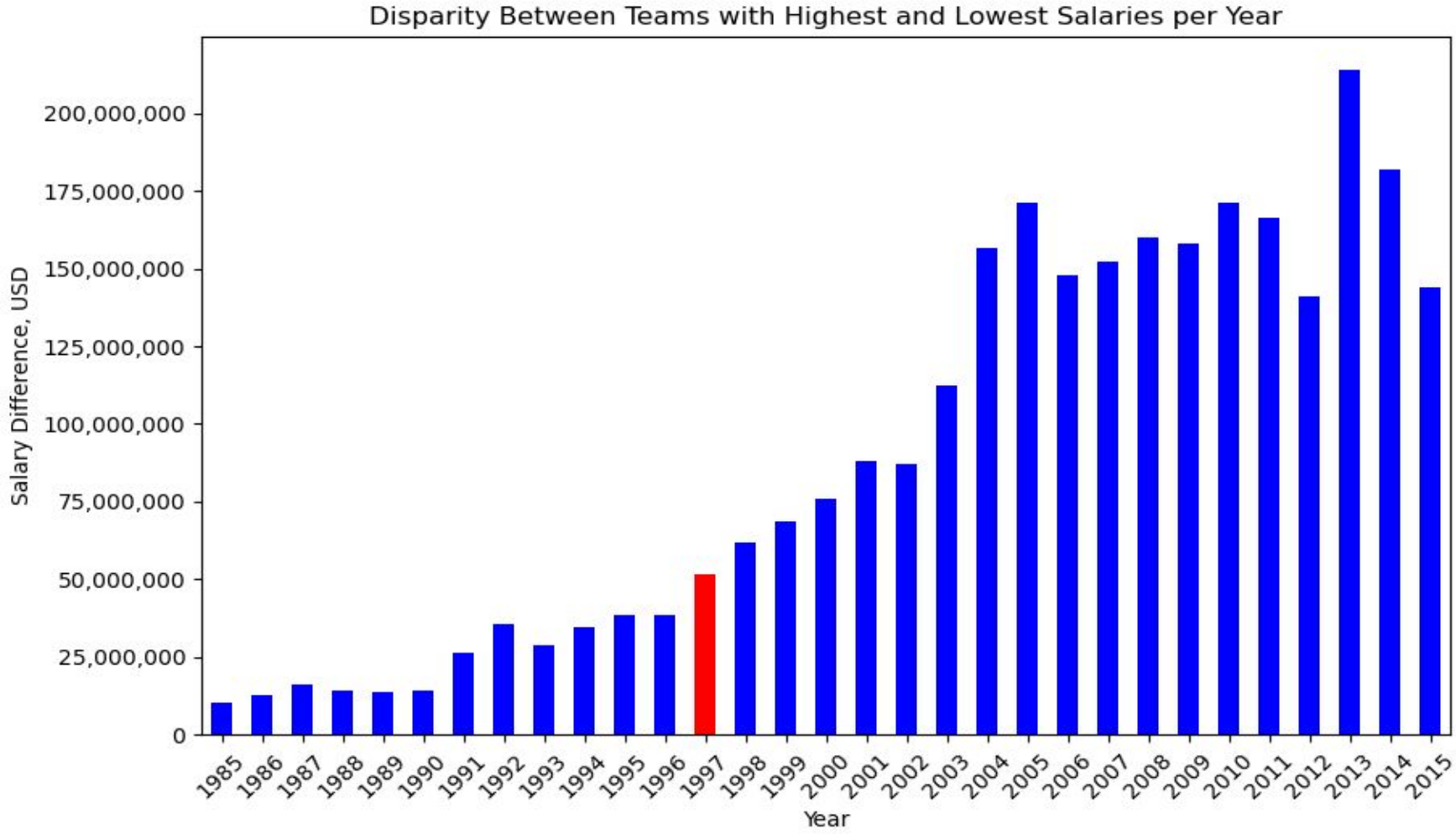
The MLB luxury tax was eliminated from 2000 to 2002, and MLB brought it back with a new change to the system.

MLB luxury tax or "Competitive Balance Tax" (CBT)

The system today is based on the 2002 collective bargaining agreement. Instead of putting a level between the 5th and 6th teams, they decided to set a threshold that a team could not pass without a fee. Taxes are factored on each dollar going over the threshold.

2003 - 2011, first-time offenders would pay a fee of 17.5% of excess payrolls (later increased to 22.5%), second-time offenders would pay 30%, and third-time offenders would pay 40%.

2012 - 2015, after seeing teams go over more than three times, the agreement added a 50% taxation level when teams went over the limit four or more times. (These offenses must be in consecutive years for these percentages. If a team falls below the threshold one year the penalty resets the next year to the "first offense")


Disparity Between Teams with Highest and Lowest Salaries per Year
Salary Difference, USD
200,000,000
175,000,000
150,000,000
125,000,000
100,000,000
75,000,000
50,000,000
25,000,000
0
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
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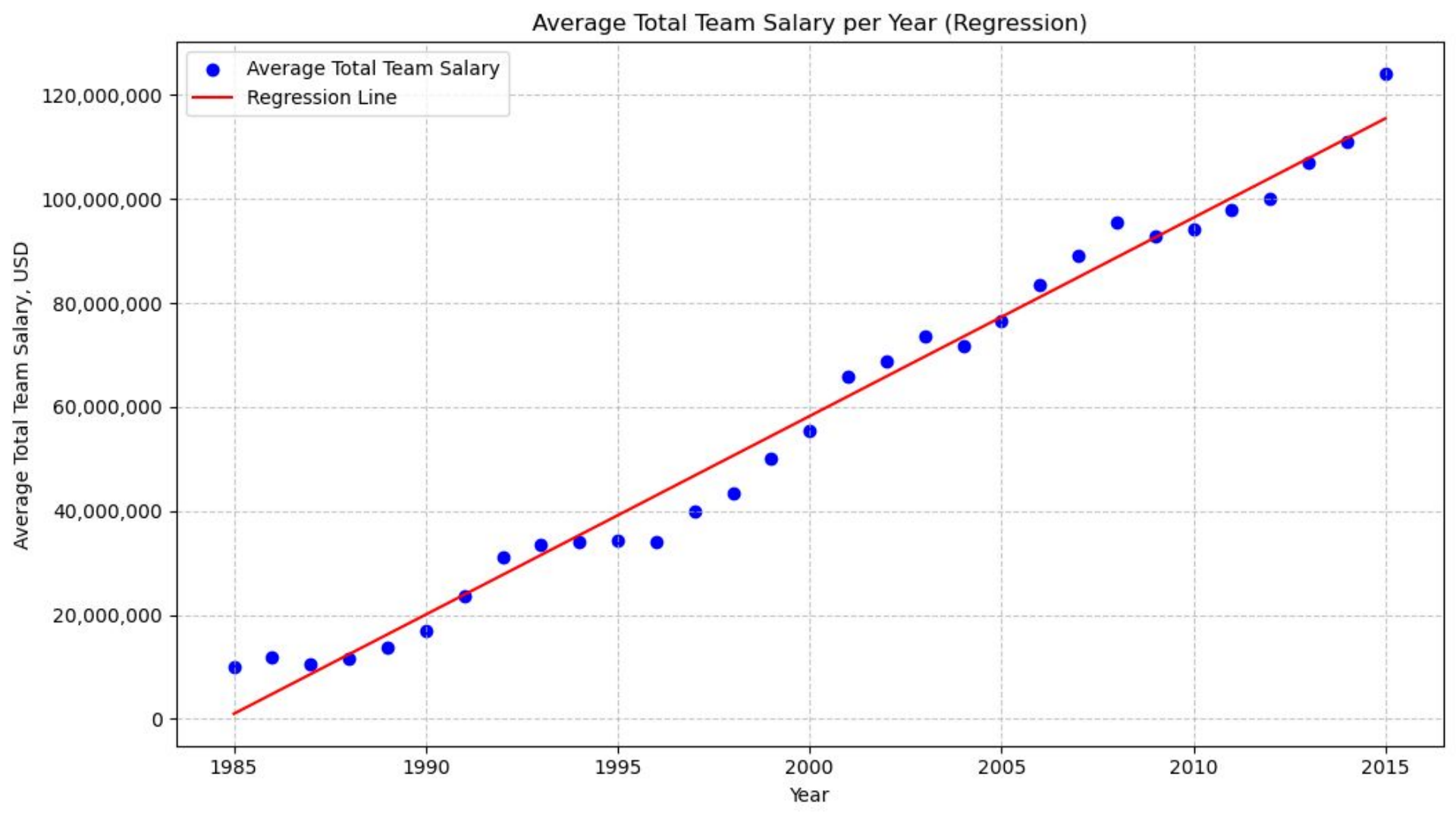
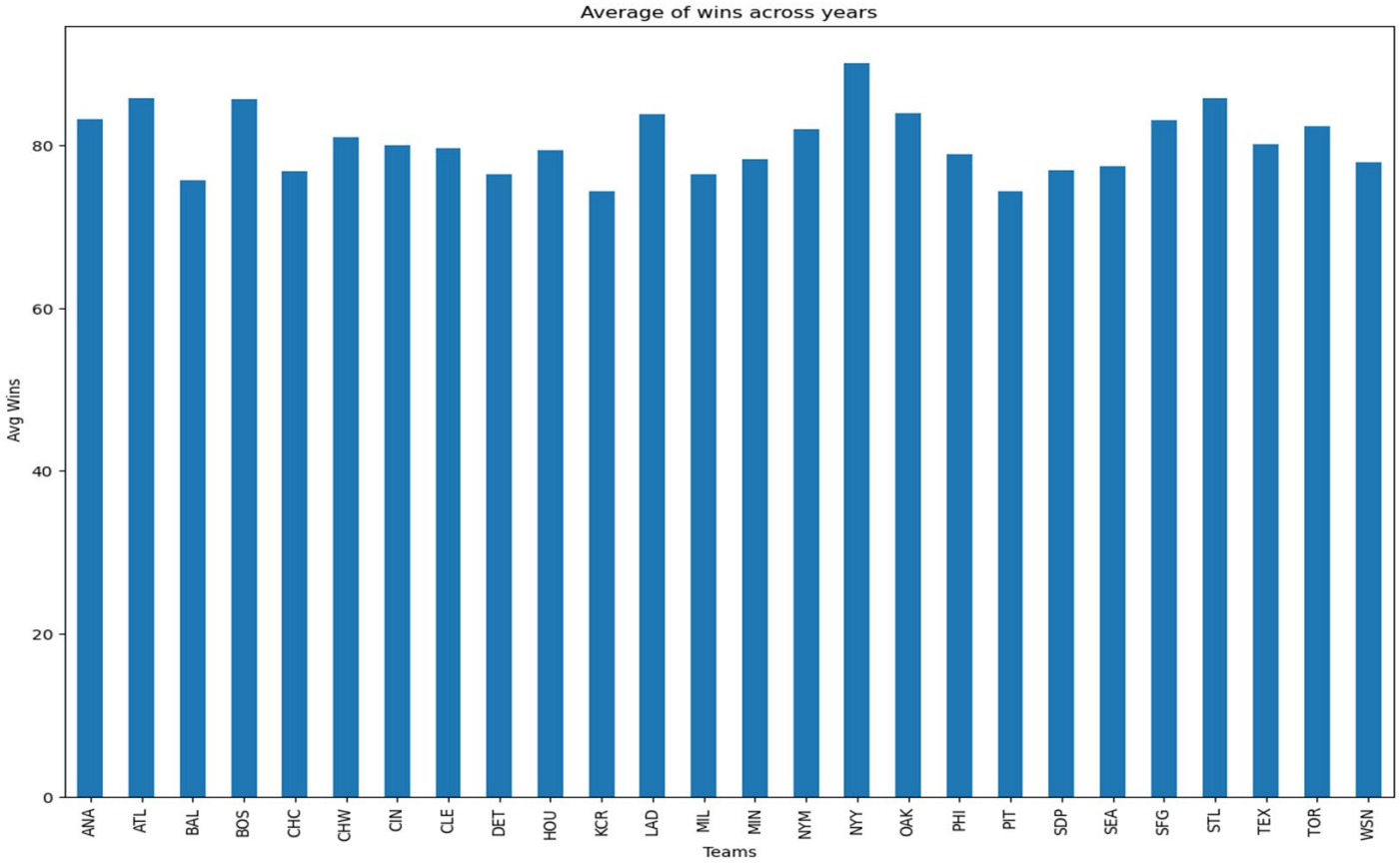
2015
Year

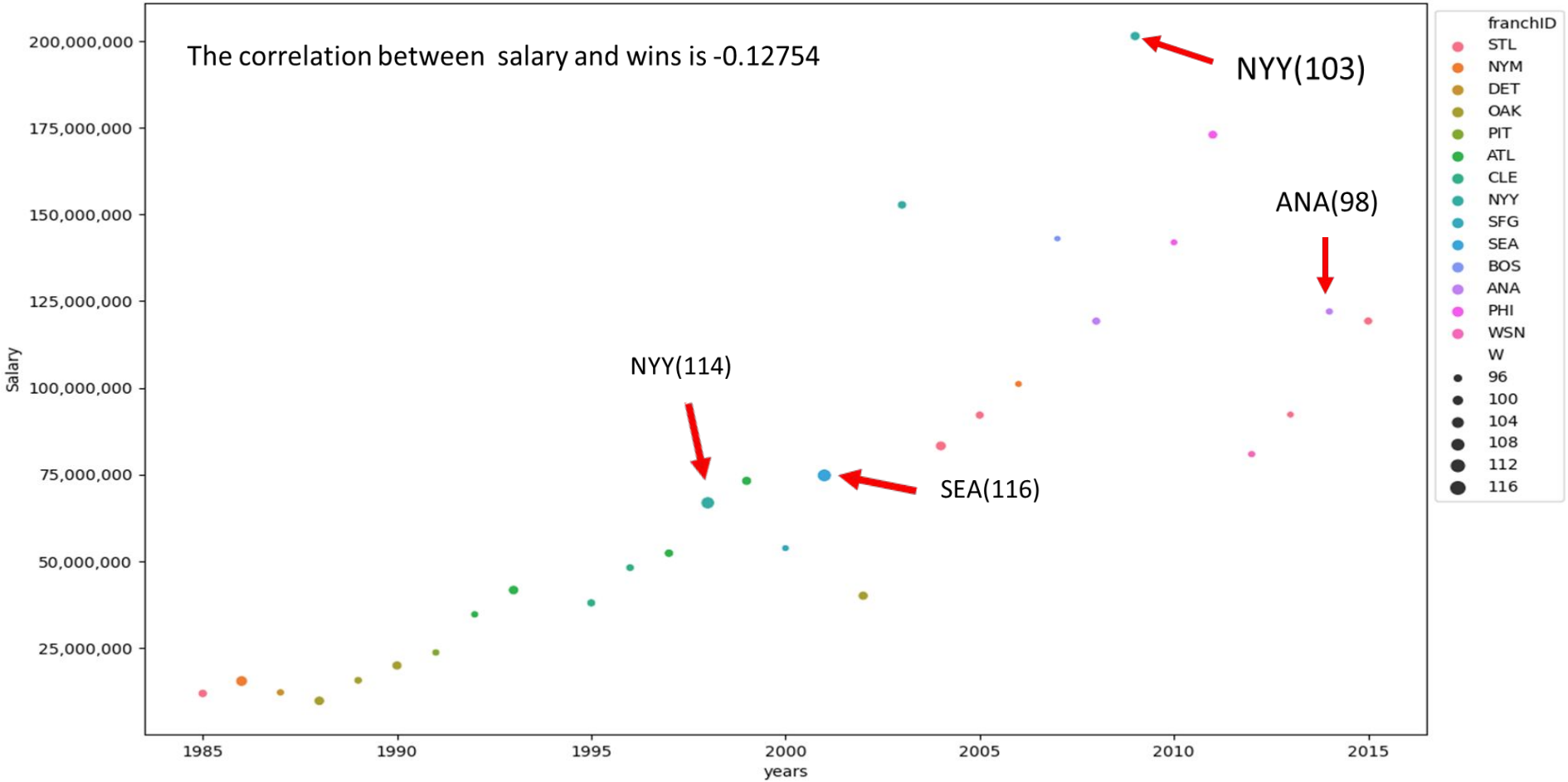

Average Total Team Salary per Year (Regression)
Average Total Team Salary
Regression Line
120,000,000
100,000,000
80,000,000
60,000,000
40,000,000
20,000,000
0
Average Total Team Salary, USD
1985
1990
1995
2000
2005
2010
2015
Year

Avg Season Wins by Team from 1985 -2015



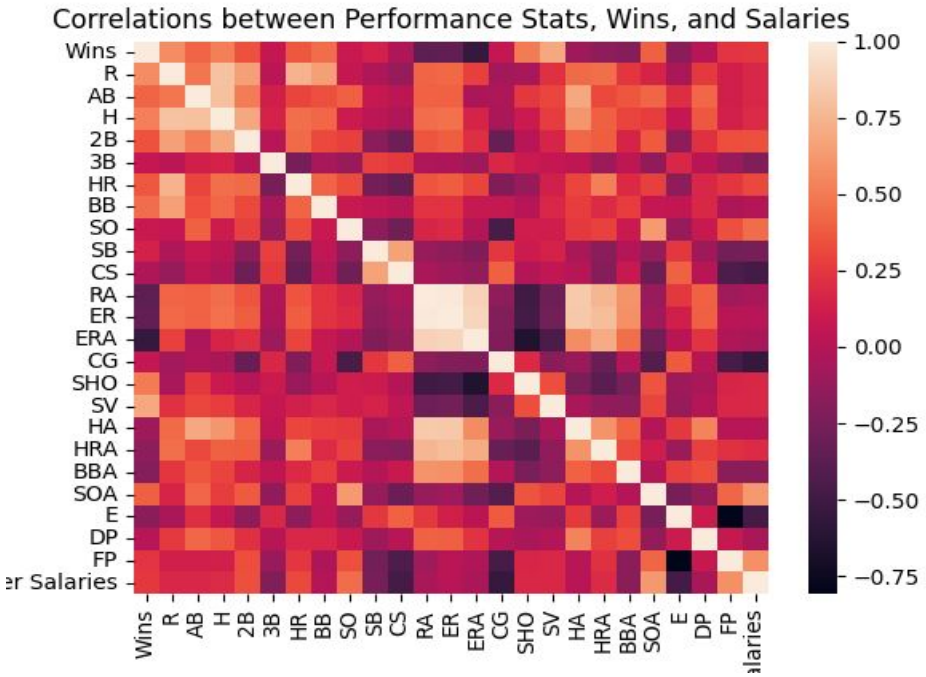
- 26 Teams
- 162 games
- (1985-2015)

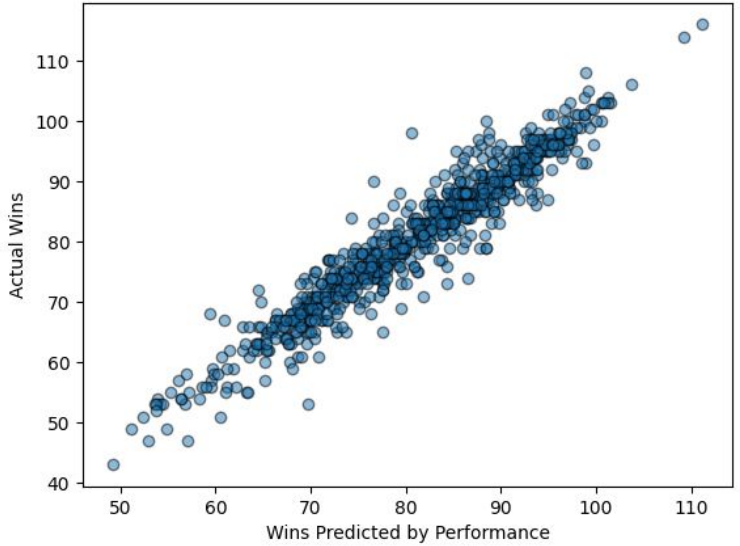
Team with most wins and Team Salary



Measuring team performance

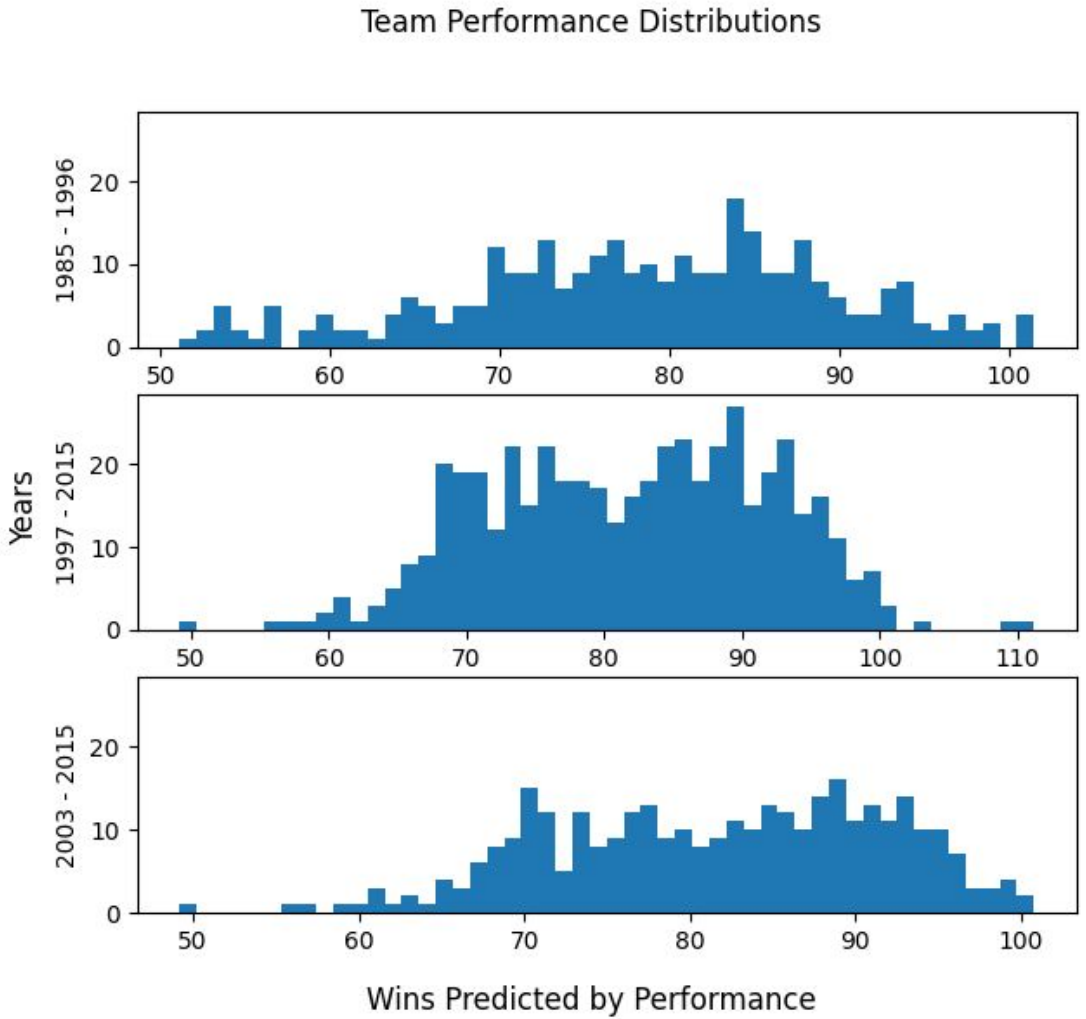
- Run Random Forest using only performance stats
- Used predictive model as performance measure





How well was player talent distributed?

- Distributions are statistically different (F-test)
- Mean performance in the post-CBT years is statistically greater than in the pre-CBT years (T-test)



Conclusion and Limitations

- What we found?
  - Teams didn't change their spending post CBT
  - Player salaries are minimally related to team's win-loss records
  - Team performance is (at least a little bit) more balanced post CBT
- There's surely reasons some teams spend lots of money on players, but that reason is not to win World Series
- Limitations
  - Our focus was on team data, we did not account for player level characteristics
  - We have not controlled for any other League changes during this time period (expansions, union negotiations, draft changes, etc.)