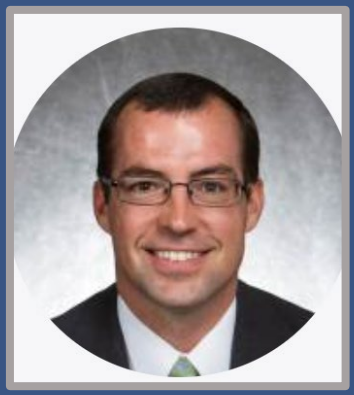
Basketball V

Produced by Dr. Mario

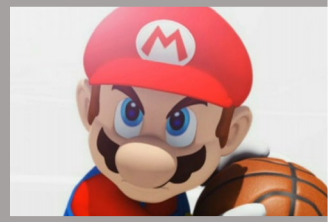
UNC STOR 538

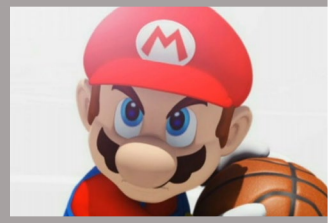
Racial Prejudice of NBA Officials

- Article: *Racial Discrimination Among NBA Referees*
  - Author 1: Joseph Price from Cornell (PhD)
  - Author 2: Justin Wolfers from UPenn (Professor)
  - Claim: More Personal Fouls for Players Officiated by a Refereeing Crew of Different Race



- Breakdown of Refereeing Crew
  - Three Officials and Four Classifications
  - Black Official on Black Player
  - White Official on White Player
  - White Official on Black Player
  - Black Official on White Player

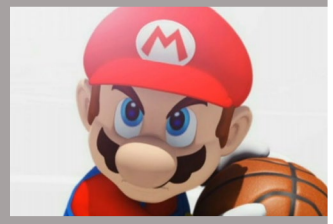


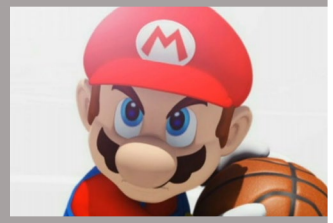


Racial Prejudice of NBA Officials

- Dataset for Referee Bias

Game	Whites	Ref. 1	Ref. 2	Ref. 3	Black minutes	White minutes	Black ref./ Black player	White ref./ White player	White ref./ Black player	Black ref./ White player
1	1	1	0	0	396.8463	83.153734	35	1	6	10
2	2	1	1	0	283.9803	196.01969	14	14	20	8
3	2	1	1	0	274.5583	205.44166	6	14	14	9
4	3	1	1	1	369.2381	110.76186	0	9	38	0
5	3	1	1	1	387.8274	92.172632	0	8	44	0
6	2	1	1	0	350.3648	129.63517	12	6	18	6
7	3	1	1	1	342.2891	137.71092	0	19	35	0
8	2	1	1	0	315.0947	164.90532	9	9	26	5
9	2	1	1	0	337.8692	142.13078	10	11	24	9





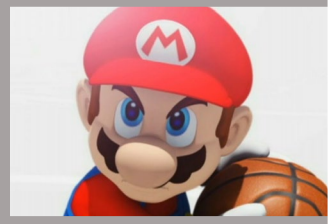

Racial Prejudice of NBA Officials

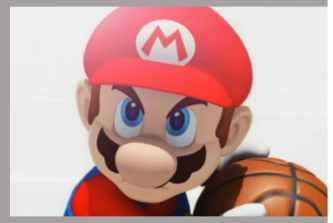
- Fouls Per 48 Minutes
  - Summary Table

	White Player	Black Player
White Referee	1.708	1.454
Black Referee	1.665	1.423

  - Estimation:
    - 9,024 Fouls Called by Black Officials Against Black Players
    - 310,413 Minutes for Black Players When Black Official on Court

$$Fouls\ Per\ 48\ Minutes = \frac{9{,}024}{310{,}413} \times 48 = 1.423$$



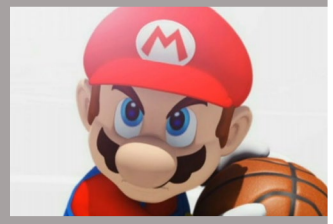


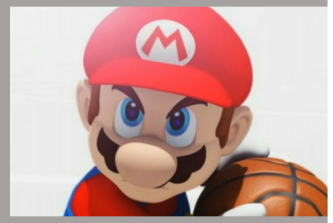

Racial Prejudice of NBA Officials

- Regression Approach of Price and Wolfer
  - Data Gathered
    - Fouls Per 48 Minutes (F)
    - Race of Player (R)
    - Percentage of Game Officials Who are White (W)
  - Model to Predict Fouls Per 48 Minutes

$$E[F] = 5.1 - 0.763 \times R - 0.204 \times W + \underbrace{0.182 \times R \times W}_{\text{Interaction}}$$

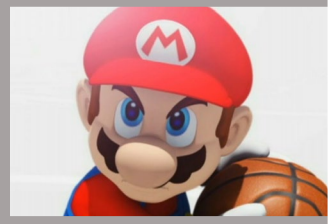
  - All Parameters are Statistically Significant
  - Possible Values for R: White=0 & Black=1
  - Possible Values for W: 0, 1/3, 2/3, 3/3

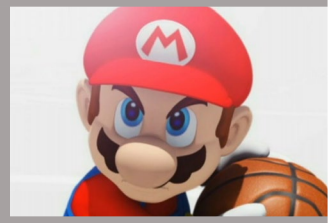





Racial Prejudice of NBA Officials

- Regression Approach of Price and Wolfer
  - Table Showing Predicted Rates for All Scenarios



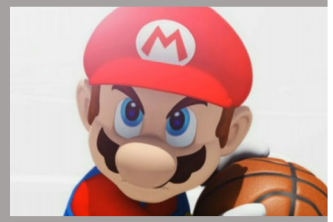


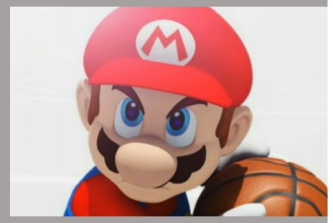
Predicted Foul Rate per 48 Minutes

%Whitereferees	Blackplayer = 1	Blackplayer = 0	Black-White Rate
0	5.10 + .182(0)(1) − .763(1) − .204(0) = 4.337	5.10 − .204(0) = 5.1	−0.763
1/3	5.10 + .182(1/3)(1) − .763(1) − .204(1/3) = 4.329	5.10 − .204(1/3) = 5.032	−0.702
2/3	5.10 + .182(2/3)(1) − .763(1) − .204(2/3) = 4.323	5.10 − .204(2/3) = 4.964	−0.642
1	5.10 + .182(1)(1) −.763(1) − .204(1) = 4.315	5.10 − .204(1) = 4.896	−0.581

Fixing College Basketball Games

- Justin Wolfers
  - Professor of Public Policy at Wharton
  - Claimed 5% of College Basketball Games are Fixed
  - Players Intentionally Play Worse (Point Shaving)
  - Is This Claim Defensible or is Justin Salty Because UPenn Ain't Making it to the Tournament?

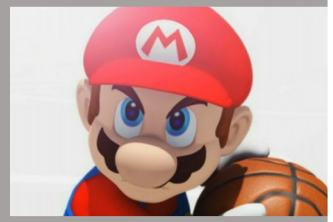


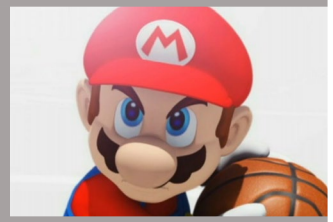


- Assumptions for Point Spreads
  - Prediction Errors are Evenly Distributed Around 0 (Unbiased and Symmetric)
  - Let X = Point Spread of Favorite and E[X] = 7
  - Consider Intervals: A=(1,6) & B=(8,13)
  - We Expect That Over a Long Period…

$$P(X \in A) \approx P(X \in B)$$

Fixing College Basketball Games

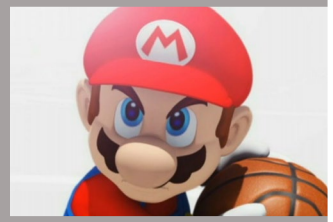


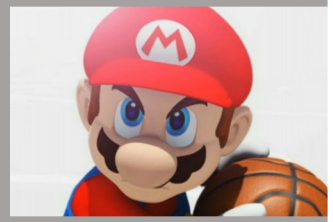


- Justin's Discovery of the Serious Conspiracy
  - Considered Games Where a Team was Favored by More than 12 Points (Strong Favorites)
    Forecast Errors Not Symmetrically Distributed
  - 46.2% of the Time, Favorite Won by Less Points
  - 40.7% of the Time, Favorite Won by More Points
  - The 5.5% Difference Due to Players Cheating?

- Problem With This Conclusion
  - Spreads Change as People Make Bets
  - Therefore, Closing Spreads May not Represent the Actual Expectation of the Spread

Fixing College Basketball Games





- General Notation
  - Let X = Point Spread of Favorite and E[X] = S
  - Consider Intervals: A=(1,S-1) & B=(S+1,2S-1)
- Rebuttal by Heston and Bernhardt
  - Examined Strong Favorites Where the Spread Increased from the Opening Line
  - More Betting on the Favorite Causes this Increase Which Would Lead to a Lack of Incentive for Point Shaving

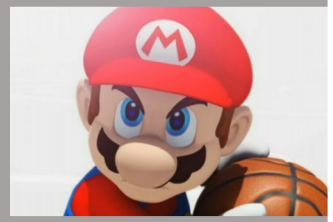
$$P(X \in A) = 45.15\% > 39.54\% = P(X \in B)$$

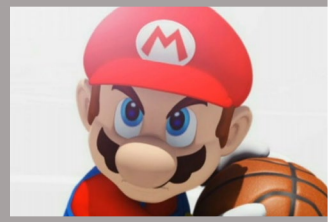
  - Examined Strong Favorites Where the Spread Decreased from the Opening Line
  - More Betting on the Underdog Causes this Decrease Which Would Lead to an Incentive for Point Shaving

$$P(X \in A) = 45.12\% > 39.54\% = P(X \in B)$$

Fixing College Basketball Games

- Conclusion
  - Discrepancy Existed Under Both Scenarios
  - Indicates Another Reason For This Phenomenon
  - Strong Favorites May Actually Care About Winning the Game More Than They Care About Making Vegas Happy
  - Teams Leading By a Wide Margin May Relax the Increase in Points and Focus on Defense and Slowing the Game Down





Final Inspiration

The greatest thing that happened to Cleveland is the worst thing that happened to Lebron James.

- Mahatma Mario