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## Study of N.B.A. Sees Racial Bias in Calling Fouls

By [ALAN SCHWARZ](#)

Editors' Note Appended

An academic study of the National Basketball Association, whose playoffs continue tonight, suggests that a racial bias found in other parts of American society has existed on the basketball court as well.

A coming paper by a [University of Pennsylvania](#) professor and a [Cornell University](#) graduate student says that, during the 13 seasons from 1991 through 2004, white referees called fouls at a greater rate against black players than against white players.

Justin Wolfers, an assistant professor of business and public policy at the Wharton School, and Joseph Price, a Cornell graduate student in economics, found a corresponding bias in which black officials called fouls more frequently against white players, though that tendency was not as strong. They went on to claim that the different rates at which fouls are called "is large enough that the probability of a team winning is noticeably affected by the racial composition of the refereeing crew assigned to the game."

N.B.A. Commissioner [David Stern](#) said in a telephone interview that the league saw a draft copy of the paper last year, and was moved to do its own study this March using its own database of foul calls, which specifies which official called which foul.

"We think our cut at the data is more powerful, more robust, and demonstrates that there is no bias," Mr. Stern said.

Three independent experts asked by The Times to examine the Wolfers-Price paper and materials released by the N.B.A. said they considered the Wolfers-Price argument far more sound. The N.B.A. denied a request for its underlying data, even with names of officials and players removed, because it feared that the league's confidentiality agreement with referees could be violated if the identities were determined through box scores.

The paper by Mr. Wolfers and Mr. Price has yet to undergo formal peer review before publication in an economic journal, but several prominent academic economists said it would contribute to the growing literature regarding subconscious racism in the workplace and elsewhere, such as in searches by the police.

The three experts who examined the Wolfers-Price paper and the N.B.A.'s materials were Ian Ayres of [Yale](#) Law School, the author of "Pervasive Prejudice?" and an expert in testing for how subtle racial bias, also known as implicit association, appears in interactions ranging from the setting of bail amounts to the tipping of taxi drivers; David Berri of [California State University-Bakersfield](#), the author of "The Wages of Wins," which analyzes sports issues using statistics; and Larry Katz of [Harvard University](#), the senior editor of the *Quarterly Journal of Economics*.

"I would be more surprised if it didn't exist," Mr. Ayres said of an implicit association bias in the N.B.A. "There's a growing consensus that a large proportion of racialized decisions is not driven by any conscious race discrimination, but that it is often just driven by unconscious, or subconscious, attitudes. When you

force people to make snap decisions, they often can't keep themselves from subconsciously treating blacks different than whites, men different from women."

Mr. Berri added: "It's not about basketball — it's about what happens in the world. This is just the nature of decision-making, and when you have an evaluation team that's so different from those being evaluated. Given that your league is mostly African-American, maybe you should have more African-American referees — for the same reason that you don't want mostly white police forces in primarily black neighborhoods."

To investigate whether such bias has existed in sports, Mr. Wolfers and Mr. Price examined data from publicly available box scores. They accounted for factors like the players' positions, playing time and All-Star status; each group's time on the court (black players played 83 percent of minutes, while 68 percent of officials were white); calls at home games and on the road; and other relevant data.

But they said they continued to find the same phenomenon: that players who were similar in all ways except skin color drew foul calls at a rate difference of up to 4 ½ percent depending on the racial composition of an N.B.A. game's three-person referee crew.

[Mark Cuban](#), the owner of the [Dallas Mavericks](#) and a vocal critic of his league's officiating, said in a telephone interview after reading the paper: "We're all human. We all have our own prejudice. That's the point of doing statistical analysis. It bears it out in this application, as in a thousand others."

Asked if he had ever suspected any racial bias among officials before reading the study, Mr. Cuban said, "No comment."

Two veteran players who are African-American, Mike James of the [Minnesota Timberwolves](#) and Alan Henderson of the [Philadelphia 76ers](#), each said that they did not think black or white officials had treated them differently.

"If that's going on, then it's something that needs to be dealt with," James said. "But I've never seen it."

Two African-American coaches, Doc Rivers of the [Boston Celtics](#) and Maurice Cheeks of the Philadelphia 76ers, declined to comment on the paper's claims. Rod Thorn, the president of the [New Jersey Nets](#) and formerly the N.B.A.'s executive vice president for basketball operations, said: "I don't believe it. I think officials get the vast majority of calls right. They don't get them all right. The vast majority of our players are black."

Mr. Wolfers and Mr. Price spend 41 pages accounting for such population disparities and more than a dozen other complicating factors.

For the 1991-92 through 2003-4 seasons, the authors analyzed every player's box-score performance — minutes played, rebounds, shots made and missed, fouls and the like — in the context of the racial composition of the three-person crew refereeing that game. (The N.B.A. did not release its record of calls by specific officials to either Mr. Wolfers, Mr. Price or The Times, claiming it is kept for referee training purposes only.)

Mr. Wolfers said that he and Mr. Price classified each N.B.A. player and referee as either black or not black by assessing photographs and speaking with an anonymous former referee, and then using that information to predict how an official would view the player. About a dozen players could reasonably be placed in either category, but Mr. Wolfers said the classification of those players did not materially change the study's findings.

During the 13-season period studied, black players played 83 percent of the minutes on the floor. With 68 percent of officials being white, three-person crews were either entirely white (30 percent of the time), had two white officials (47 percent), had two black officials (20 percent) or were entirely black (3 percent).

Mr. Stern said that the race of referees had never been considered when assembling crews for games.

With their database of almost 600,000 foul calls, Mr. Wolfers and Mr. Price used a common statistical technique called multivariable regression analysis, which can identify correlations between different variables. The economists accounted for a wide range of factors: that centers, who tend to draw more fouls, were disproportionately white; that veteran players and All-Stars tended to draw foul calls at different rates than rookies and non-stars; whether the players were at home or on the road, as officials can be influenced by crowd noise; particular coaches on the sidelines; the players' assertiveness on the court, as defined by their established rates of assists, steals, turnovers and other statistics; and more subtle factors like how some substitute players enter games specifically to commit fouls.

Mr. Wolfers and Mr. Price examined whether otherwise similar black and white players had fouls-per-minute rates that varied with the racial makeup of the refereeing crew.

"Across all of these specifications," they write, "we find that black players receive around 0.12-0.20 more fouls per 48 minutes played (an increase of 2 ½-4 ½ percent) when the number of white referees officiating a game increases from zero to three."

Mr. Wolfers and Mr. Price also report a statistically significant correlation with decreases in points, rebounds and assists, and a rise in turnovers, when players performed before primarily opposite-race officials.

"Player-performance appears to deteriorate at every margin when officiated by a larger fraction of opposite-race referees," they write. The paper later notes no change in free-throw percentage. "We emphasize this result because this is the one on-court behavior that we expect to be unaffected by referee behavior."

Mr. Wolfers and Mr. Price claim that these changes are enough to affect game outcomes. Their results suggested that for each additional black starter a team had, relative to its opponent, a team's chance of winning would decline from a theoretical 50 percent to 49 percent and so on, a concept mirrored by the game evidence: the team with the greater share of playing time by black players during those 13 years won 48.6 percent of games — a difference of about two victories in an 82-game season.

"Basically, it suggests that if you spray-painted one of your starters white, you'd win a few more games," Mr. Wolfers said.

The N.B.A.'s reciprocal study was conducted by the Segal Company, the actuarial consulting firm which designed the in-house data-collection system the league uses to identify patterns for referee-training purposes, to test for evidence of bias. The league's study was less formal and detailed than an academic paper, included foul calls for only two and a half seasons (from November 2004 through January 2007), and did not consider differences among players by position, veteran status and the like. But it did have the clear advantage of specifying which of the three referees blew his whistle on each foul.

The N.B.A. study reported no significant differences in how often white and black referees collectively called fouls on white and black players. Mr. Stern said he was therefore convinced "that there's no demonstration of any bias here — based upon more robust and more data that was available to us because we keep that data."

Added Joel Litvin, the league's president for basketball operations, "I think the analysis that we did can stand on its own, so I don't think our view of some of the things in Wolfers's paper and some questions we have actually matter as much as the analysis we did."

Mr. Litvin explained the N.B.A.'s refusal to release its underlying data for independent examination by saying: "Even our teams don't know the data we collect as to a particular referee's call tendencies on certain types of calls. There are good reasons for this. It's proprietary. It's personnel data at the end of the day."

The percentage of black officials in the N.B.A. has increased in the past several years, to 38 percent of 60 officials this season from 34 percent of 58 officials two years ago. Mr. Stern and Mr. Litvin said that the rise was coincidental because the league does not consider race in the hiring process.

Mr. Wolfers and Mr. Price are scheduled to present their paper at the annual meetings of the Society of Labor Economists on Friday and the American Law and Economics Association on Sunday. They will then submit it to the National Bureau of Economic Research and for formal peer review before consideration by an economic journal.

Both men cautioned that the racial discrimination they claim to have found should be interpreted in the context of bias found in other parts of American society.

"There's bias on the basketball court," Mr. Wolfers said, "but less than when you're trying to hail a cab at midnight."

*Pat Borzi contributed reporting from Minneapolis and John Eligon from East Rutherford, N.J.*

Editors' Note: May 5, 2007

A front-page article on Wednesday about an academic study that detected a racial bias in the foul calls of referees in the National Basketball Association noted that The New York Times had asked three independent experts to review the study and materials from a subsequent N.B.A. study that detected no bias.

The experts, whose names the authors of the two studies did not learn until after the article was published, all agreed that the study that detected bias was far more sound. That study was conducted by Justin Wolfers, an assistant professor of business and public policy at the Wharton School, and Joseph Price, a Cornell graduate student in economics.

After the article was published, The Times learned that one of the three experts, Larry Katz of Harvard University, was the chairman of Mr. Wolfers's doctoral thesis committee, as Mr. Wolfers had acknowledged in previous studies. Because of this, Mr. Katz should not have been cited as an independent expert.

An updated version of the Wolfers-Price study added acknowledgments for Mr. Katz and a second expert The Times had contacted, David Berri of California State University-Bakersfield. They were thanked for brief "helpful comments" about the paper they made to Mr. Wolfers via e-mail messages after reviewing it for The Times. These later comments would have been mentioned in the article if editors had known about them.

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