Abstract

This paper finds that NBA coaches give greater minutes per game to players of their own race even after controlling for player quality using performance statistics and player fixed effects. Having the same race as the coach increases playing time by one minute per game between 1991 and 2004 and by over three minutes per game during the 2002 and 2003 seasons. The player and coach racial match has a weaker impact on which players start the game. These results suggest that own race biases emerge more strongly in choices made under pressure than in decisions made after careful consideration.

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I. INTRODUCTION

A number of research papers have examined discrimination in professional sports, with most focusing on whether pay was influenced by a player’s race. Research using data from the NBA in the 1980s, such as Kahn and Sherer (1988), found that minorities received lower salaries than white players did. Studies using data from more recent time periods, such as Hamilton (1997) and Bodvarsson and Brastow (1999), have typically not found significant evidence of pay discrimination on average in the NBA after the 1980s although racial pay differences may remain within certain groups of players. Hamilton (1997) finds pay discrimination among the most highly compensated players, while Kahn and Shah (2005) find differences in pay by race among players over whom teams have monopsony power.

Even if pay discrimination has declined, racial biases remain in sports. Price and Wolfers (2007), for example, find an own-race bias in the way that referees make calls – they tend to call more fouls per minute on players of a different race. Similarly, Parsons, et al (2007) find that umpires in major-league baseball call more strikes for pitchers of the same race. One key difference between salary offers and refereeing decisions may be that the former are made after careful consideration while the latter are split-second decisions. Thus, it may be that implicit biases toward members of one’s own race may emerge more strongly in decisions made under pressure. In voting for the NBA most valuable player, an example of a decision made after a period of reflection, Coleman, DuMond and Lynch (2008) find no significant impact of race on the voters’ ballots. Own-race biases need not emerge in every type of split-second decision made, of course. Lefgren, Price, and Tappen (2009) find no evidence that NBA players are more likely to complete an assist to a player of their own race.
This paper estimates the impact of own-race bias on coaching decisions about which players should be on the basketball court at any given moment. NBA coaching decisions provide a useful way of examining own-race bias because the same set of coaches make choices after careful consideration about which players should start the game and make choices under pressure during the game. Thus, we can estimate whether own-race bias emerges more strongly in split-second decisions than in decisions made in less pressure-filled circumstances.

The estimates reveal that there is significant own-race bias in coaching decisions affecting the minutes each player gets in a game. Having a coach of the same race increased a player’s playing time by over three minutes per game on average during the 2002 and 2003 seasons and about one minute per game between 1991 and 2004 even after controlling for player quality with performance statistics and with player fixed effects. We find more mixed evidence on whether an own-race bias influences which players start NBA games. For the 2002 and 2003 seasons, players who have a coach of the same race are significantly more likely to start the game. For the longer time period from 1991 to 2004, however, there is no significant impact of having a coach of the same race on the probability that a player starts the game. Thus, own-race bias has a stronger and more robust effect on the decisions coaches make under pressure during the games than on their choices made after a period of careful consideration.

The next section discusses the literature on the impact of race in professional basketball. Section 3 presents the empirical model and the data that we use to estimate the impact of the race of a player and his coach on playing time. Section 4 presents the results of our estimates and section 5 concludes.
II. LITERATURE ON RACE IN PROFESSIONAL BASKETBALL

Research on discrimination in sports has emphasized several different reasons why otherwise equal players may be treated differently because of their race. One possibility is known as statistical discrimination. Since a player’s true ability is only imperfectly observed, a coach or general manager may base an evaluation of the player’s productivity level on the perceived average ability of the player’s racial group.

A second explanation for discriminatory behavior is that people have a preference for members of their own race and are willing to pay some cost to indulge this preference. Gary Becker (1971) introduced the idea of measuring individuals’ “taste for discrimination” by their willingness to pay in order to satisfy racial preferences. If white owners have a preference for players of their own race, for example, teams could be willing to pay a premium for white players. Bodvarsson and Brastow (1999) show that in the 1985-86 season, the race of the manager affected the salary that black and white NBA players earned, suggesting some discrimination by employers existed during that time period. This racial pay difference had disappeared by the 1990-91 season. Hoang and Rascher (1999) investigate whether the race of the coach is related to the players’ race. They find that teams with a black coach have a smaller percentage of white players, although the difference between teams with white coaches and teams with black coaches is not statistically significant at the 10% level.

Racial pay differences among players could also emerge if a majority of fans have a racial preference for white players. There is considerable evidence in the literature of this type of consumer or fan discrimination in the NBA. Kanazawa and Funk (2001) found that Nielsen television ratings for NBA games rise with greater participation by white players. Kahn and Sherer (1988) and Hamilton (1997) showed that home attendance was higher if the team had
more white players. Brown, Spiro, and Keenan (1991) find that the percentage of minutes played by black players has no impact on home attendance, however. Since studies were indicating that having white players on the team raises attendance but having white players on the court does not, Brown, Spiro, and Keenan (1991) suggest that biased fans may settle for seeing white players on the bench. More evidence of fan discrimination comes from Hoang and Rascher (1999), who found that a larger percent of white population in a metropolitan area was positively correlated with a larger fraction of white players on the team during the 1980s.

Burdekin, Hossfeld, and Smith (2005) found a similar result for the late 1990s for higher quality white players: teams in mostly white metropolitan areas had a higher percentage of starters who were white. Kahn and Shah (2005) argue that the evidence for fan discrimination and for racial compensation discrimination declined after the 1980s.

A final explanation provided in the literature for pay differences between the races relies on the fact that NBA teams have monopsony power in some cases over their players. As McCormick and Tollison (2001) point out, teams with monopsony power can price discriminate between the races in their hiring decisions, and black players may have more inelastic labor supply elasticities than white players. If so, profit-maximizing NBA teams will pay black players lower wages. McCormick and Tollison (2001) find only weak evidence of fan discrimination, and thus they conclude that monopsony power and different labor supply elasticities is a better explanation of racial pay differences. Kahn and Shah (2005) provide supporting evidence for this interpretation. They find that among players over whom teams have some monopsony power (players who were not free agents and not on the rookie salary scale), nonwhite players had lower salaries, compensation, and contract duration in 2001-02 than white
players did. For other groups such as veteran free agents, however, there were no significant pay differences between the races.

Several papers have examined the determinants of minutes per game in the NBA. Staw and Hoang (1995) find that a player’s average minutes per game during the season increase over the first five years in the league if he is picked more highly in the NBA draft, even after controlling for how well the player performs. They interpret this result as being due to a perhaps irrational escalation of commitment to players in whom the team has invested considerable sunk costs. Camerer and Weber (1999) investigate some other possible explanations and they conclude that an escalation of commitment effect explains at least some of the greater playing time for high draft picks over their first three years in the league.

Only one paper (to our knowledge) has examined whether coaches give players of their own race more time on the court. McCormick and Tollison (2001) estimate the determinants of a player’s average minutes per game over the course of a season between 1980 and 1988. Their main conclusion is that black players average more minutes per game than nonblacks, a result we also find in the data for the 1990s and early 2000s. In unreported regressions, they note that there is no significant difference between black and white coaches in how race affects minutes played.

III. DATA AND EMPIRICAL MODEL

The data set we use in this paper comes from Price and Wolfers (2007). It includes information on coach and player race, minutes played and performance statistics for each player in each game during the NBA from 1991 to 2004. Each player and coach’s race is coded based on an examination of players’ photographs into categories of either black or not black (which we
An observation in the data set is for a player in a particular game. The data set does not include an observation in the cases where a player never enters the game, however, which is a potentially serious shortcoming for our study since we cannot rule out the possibility that race affects the coach’s choice never to insert a player into a game. Thus, for the 2002-03 and 2003-04 seasons, we examined the box scores for each game and added in an observation with minutes equal to zero for each player who is listed as receiving a “Did not play – coach’s decision” for the game. We exclude players from the data set for games in which they did not play for reasons other than the coach’s decision, such as injury or league suspensions.

Table 1 presents the definitions of each variable used in this study as well as the mean values for black and white players in the 2002-03 and 2003-04 seasons. Nearly 78% of the players in the NBA during these seasons were black, and the last two columns in Table 1 show that there were significant differences in the mean values of each variable. Black players are more likely than whites to be on teams with a black coach and in metropolitan areas with a high percentage of black residents. There were also differences in performance between the two groups: black players averaged significantly more points, assists, and steals per minute while white players averaged more rebounds, blocked shots, and fouls per minute. Some of these differences are due to disparities in the positions played. About 44% of black players are guards compared to only 26% of white players. Over 31% of white players are centers as opposed to only 13% of black players.

One of the most striking differences in Table 1 is that black players averaged 4.6 more minutes per game (22.5) than white players (17.9) did. One possible explanation for this difference is that lower quality white players may be more likely to remain with an NBA team than lower quality black players. Hoang and Rascher (1999) find evidence of exit discrimination
in the 1980s that would be consistent with this explanation – white players remained on an NBA team for two years longer than an equivalent black player. They interpret this result as being driven by customer discrimination that encourages profit-maximizing teams to retain white players. If marginal white players are likely to be retained by NBA teams but play very few minutes, while marginal black players are cut from the roster, then white players will average fewer minutes per game. In the 2002-03 and 2003-04 seasons, coaches held white players out of the entire game 15.7% of the time while black players received no minutes in only 10.4% of the games. Brown, Spiro, and Keenan (1991) also found that marginal black players outperformed marginal white players in points per minute and points per game but did not outperform marginal white players in other statistics. Burdekin, Hossfeld, and Smith (2005) found that black bench players had significantly higher points and assists per minute than white bench players did but there was no significant difference in their blocks and rebounds per minute or in field goal percentage. Black and white starters, on the other hand, were not significantly different in any performance category except field goal percentage, where whites had an advantage. This explanation for the black-white minutes gap is weakened, however, by the fact that Groothuis and Hill (2004) find no evidence of exit discrimination against black players between 1989 and 1999.

Statistical discrimination in favor of black basketball players could also provide an explanation for why a black player is on the court between four and five minutes longer on average game than a white player. Since more than three-fourths of the players in the NBA are black, a coach who makes a judgment about a player in part based on the average ability of the player’s racial group may view a black player more favorably. In the regressions presented in the next section, some (but not all) of the 4.6 minute difference in average playing time between
white and black players can be explained by differences in their performance statistics. Thus, exit discrimination in favor of marginal white players and statistical discrimination in favor of black players might both contribute to the racial difference in average minutes played.

The key dependent variable we examine is the minutes a player is in the game. The estimation tests whether the player receives more minutes if the coach and the player are of the same race. If coaches tend to give players of their own race more minutes, then there is evidence of employer discrimination. In order to test whether coaching decisions are influenced by fan discrimination, we add a variable to the data set that measures the black percentage of the population in the team’s metropolitan statistical area from the 2000 Census for US cities and from the 2001 Canadian Census. If white players’ minutes decline on average as the city population becomes less white, then there is evidence of fan discrimination.

The basic empirical model we estimate is:

\[
\text{Minutes} = \beta_1 P_{Black} + \beta_2 C_{Black} + \beta_3 (P_{Black} \times C_{Black}) + \beta_4 MSA + \beta_5 (MSA \times P_{Black}) + \beta_6 X + \epsilon,
\]

where \( P_{Black} = 1 \) if the player is black, \( C_{Black} = 1 \) if the coach is black, \( MSA \) is the black percentage of the population in the team’s metropolitan statistical area, \( X \) is a vector of control variables including a constant, and \( \epsilon \) is an error term. The key parameter of interest is \( \beta_3 \), which measures the own race bias of the coach, or the impact of having the same race as the coach on player minutes. An estimate of \( \hat{\beta}_3 > 0 \) would provide evidence of own-race bias by coaches. The parameter \( \beta_4 \) measures the effect of an increase in the black percentage of the city’s population on white player minutes and \( \beta_4 + \beta_5 \) shows the effect of an increase in the black percentage of the city’s population on black player minutes. Coefficient estimates of \( \hat{\beta}_4 < 0 \) and \( \hat{\beta}_3 + \hat{\beta}_5 > 0 \) would be consistent with fan discrimination.
The control variables include the total minutes played by all the team’s players in the game as an explanatory variable to account for the fact that some games go into overtime. In order to control for measures of player quality, the vector $X$ also includes measures of the player’s performance (points, rebounds, assists, blocks, steals, and turnovers per minute played) over the team’s previous ten games or since the start of the season for the first ten games of the year. These variables are missing (and thus the observations are excluded from the analysis) for the team’s first game of the season and for players who did not play in any of the team’s previous ten games. An alternative set of control variables uses player performance variables and fouls per minute from the current game, and the key results are not affected by which set of control variables are included.

The player performance variables provide some indication of player quality, but the coaches have better information on the player’s true quality than the observable statistics. Because we have a panel data set, it is possible to control for unobserved player characteristics (such as inherent talent or competitiveness) that are constant over the sample period by including a fixed effect for each player in the regression. With fixed effects for each player, the coefficients are estimated by examining how changes in each explanatory variable over the games of the 2002-03 and 2003-04 seasons are related to changes in the minutes per game the player is on the court. Variables that never change for a player (such as his own race) are captured in the fixed effect and thus drop out of the regression. The parameter $\beta_3$ is estimated by comparing the minutes played per game for a player before and after a change in the race of the player’s coach. The parameters $\beta_4$ and $\beta_5$ are estimated by examining how minutes per game change for a player who moves to a city with a different racial composition.
In addition to minutes played per game, we also estimate the factors that determine which players start the game. Here the dependent variable is a binary variable that equals one if the player starts and zero if he does not. Since the dependent variable is binary, we use a logit rather than a linear regression. The explanatory variables are identical to those in equation (1) except that we exclude the total minutes played by the team. The length of the game (i.e. whether it goes into overtime) would have no impact on which five players start.

Figure 1 shows how minutes played per game during the 2002-03 and 2003-04 seasons vary depending on the race of the coach and of the player. The key result shown in Figure 1 for this paper is that controlling for player’s own race, a player receives more minutes on the court if he is of the same race as the coach. Black players played 22.8 minutes under black coaches on average but only 22.4 minutes per game under white coaches. White players, on the other hand, averaged 2.6 minutes per game more under white coaches (18.7 minutes per game) than under black coaches (16.1 minutes per game). The next section presents the results of estimating the empirical model, which allows us to determine whether the own-race bias suggested in Figure 1 remains after player quality is controlled for.

IV. RESULTS

Table 2 presents the results of estimating equation (1) using data from the 2002-03 and 2003-04 seasons. The first two columns include observations for all players who either entered the game or were listed as “Did not play – coach’s decision” in the box score. Column 1 estimates equation (1) by ordinary least squares while column 2 adds player fixed effects into the regression. Both the ordinary least squares and the fixed effects regressions give strong evidence of own-race bias in the minutes a coach allocates to each player. In the ordinary least squares
regression, a white player’s minutes per game drop by 1.43 on average if he has a black coach instead of a white one. A black player’s minutes, on the other hand, rise by 0.27 if he has a black coach instead of a white one. In the fixed effect regression, a white player’s minutes drop by 2.87 per game if he has a black coach rather than a white one. A black player’s minutes rise by 0.71 if his coach is black rather than white. These racial differences in minutes played are (easily) statistically significant at the 1% level – the t-statistic on the coach-player race interaction term in the fixed effects regression is over 10.

How meaningful is the estimated increase in playing time due to having a coach of the same race? The fixed effects regression estimates that having a coach of the same race increases a player’s time on the court by 3.6 minutes, which would be a 17% increase over the average minutes per game. A player could raise his expected playing time, all else equal, by 3.6 minutes per game if his scoring per minute over the previous ten games were to rise by 0.53 points per minute. For a player with the average minutes per game of 21.4, this change in the rate at which he scores would have increased his scoring from 7.6 to 18.9 points per game over the team’s previous ten games. The ordinary least squares estimates of the own-race bias are smaller: a player gains 1.7 minutes per game if he has a coach of the same race. In the OLS regression, the impact of having a coach of the same race on minutes played is equivalent to the effect of the player raising his scoring from 7.6 to 8.8 points per game.

The ordinary least squares regression in column 1 suggests that black players get more time on the court than white players even after controlling for observable player quality and the coach’s race. Under white coaches, a black player gets 2.2 more minutes per game than a white player. Under a black coach, a black player gets 3.9 more minutes per game than a white player. This result is consistent with McCormick and Tollison (2001), who found that black players
received more playing time during the 1980s even after controlling for player quality. As we discussed in section 3, this result could be due to unmeasured quality differences between the races (with the average black NBA player being of higher quality than the average white player) or to statistical discrimination by coaches in favor of black players.

The estimates in Table 2 also suggest that the minutes a player gets are influenced by the racial composition of the city’s fans. If there is a rise of 10 percentage points in the fraction of a city’s metropolitan area that is black (an increase in the MSA variable of 0.1), a white player’s minutes per game drop by 0.65 in the OLS regression. A black player’s time on the court, however, would rise by 0.11 minutes per game. In the fixed effects regression, a white player’s expected time on the court declines by 2.0 minutes if the black fraction of the city’s population rises by ten percentage points. Surprisingly, a black player’s minutes per game are also estimated to fall slightly (by 0.19 minutes) if the black fraction of the city that is black increases by ten percentage points. The impact of the racial composition of a team’s fan base on minutes does not depend on whether the game is home or away. There was no significant difference between the coefficients on the two MSA variables when the sample was split into home and away games.

The estimates for most of the control variables in the regressions are quite reasonable. Players get more playing time if they have more points, rebounds, and assists and fewer turnovers per minute over the team’s previous ten games. Surprisingly, more blocks and steals per minute over the previous ten games are negatively associated with playing time in the fixed effects regression, although neither coefficient is significant at the 5% level in the OLS regression. The R-squared value shows that 18% of the variation in minutes played can be predicted by the explanatory variables. Thus, much of the difference in playing time across
players and games is due either to random variation or to factors that are unobserved by the researcher.

Since the data set with games from 1991 to 2002 includes only players who entered each game, we use the information from the 2002-03 and 2003-04 seasons to test how this restriction on the data affects the estimates. In order to make this comparison, columns three and four in Table 2 drop observations in which a player never enters the game. This restriction eliminates 5,388 observations, or about 10.5% of the full sample in these two years. The results are quite similar to those in the first two columns where all uninjured players are included in the sample. If anything, excluding players who did not play reduces the estimates of own-race bias as the coefficients on the player-coach race interaction term drop in both the OLS and fixed effects regressions. The coefficients on the metropolitan area – player interaction term also decline in both types of regressions when the sample is restricted. Based on the results for these two years, then, using the longer data set with only players who enter the game is likely to provide conservative estimates of own-race bias by coaches and fans.

The final column of Table 2 estimates the determinants of the coach’s decision about which player to start. The dependent variable is equal to one if a player starts the game and zero if he does not start (all uninjured players are included in this regression). The factors affecting whether a player starts are similar to those affecting total minutes played. Black players are more likely to start than white players, all else equal, but a player’s chance of starting the game rises significantly if the coach is of the same race. For a white player with average performance statistics in an all-white city, the predicted probability of starting the game is 37.1% if the coach is white. His probability of starting falls to 28.9% if the coach is black. For a black player, the probability of starting is 48.1% if the coach is white and 50.2% if the coach is black.
Table 3 presents a similar set of regressions examining the determinants of minutes played for all players and games from 1991 to 2004. This sample includes only players who entered the game. For these regressions we add the player’s fouls per minute in the current game as a control variable since players who get into foul trouble or foul out of the game are limited in the number of minutes they can play. We excluded this variable from the regressions in Table 2 because fouls per minute is undefined for players who do not enter the game and we did not wish to drop those observations from the regression. Columns 1 and 2 in the table use player performance statistics over the team’s previous ten games to control for measurable player quality while columns 3 and 4 use player performance during the current game.

The estimates in Table 3 again provide very strong evidence of own-race bias in the minutes a coach gives to each player. In the ordinary least squares regression (column 1), a white player’s minutes per game decline by 0.376 if he has a black coach rather than a white one, while a black player’s minutes per game rise by 0.296 if his coach is black. The estimates of own-race bias are larger when unobserved player quality is controlled through fixed effects in column 2. A change in the coach’s race from white to black would lower a white player’s predicted minutes per game by 0.40 while raising a black player’s minutes per game by 0.60. As in Table 2, these estimated effects of own-race bias are statistically significant at very high levels – the t-statistic in the fixed effects regression is over 7. The estimated impact of coach and player race on minutes played during the 1991-2004 season is smaller than the estimated impact in the last two seasons. Thus, unlike the conclusion in the literature that pay discrimination has diminished, there is no evidence that own-race bias on the part of coaches is falling over time.

The conclusion that coaches give more playing time to members of their own race stands in contrast to McCormick and Tollison (2001), who mentioned finding no impact of the coach’s
race on minutes played. In addition to the different time periods being examined (they look at data from the 1980s), there are several possible explanations for the contrasting results. One is that an observation in McCormick and Tollison’s data set is based on a player’s average minutes over the course of the season while this paper uses minutes played in each game. Aggregating over the whole season loses some information since some players (through trades or coaching changes) experience a change in the coach’s race during the season. Including an observation for each game allows a comparison of how black and white players’ minutes are affected by the coaching change during the season. A second difference is our use of player fixed effects to control for unobserved player quality. The coefficients on the coach-player race interaction term remains similar in magnitude to those in Table 3 if we aggregate our data to include only one observation on a player’s average minutes per game over the course of the year and duplicate to the extent possible the regression in McCormick and Tollison (2001). ¹ Including only one observation per player-year means, however, that the coefficient on the coach-player race interaction term is statistically significant only in the fixed effect regression ($p = .015$).

Having a coach of the same race can increase a player’s salary if more minutes per game translate into higher compensation. Hamilton (1997) estimates the determinants of player salaries for the 1994-95 season, and he finds that a player’s salary rises by nearly 4% for each extra minute per game that he plays.² The fixed effect estimate in column 2 of Table 3 would thus translate into a predicted rise of 3.9% in a player’s salary due to the extra minutes he gets if he has a coach of the same race. Black player salaries may be depressed on average by the fact that whites are overrepresented in the coaching ranks – black players accounted for 80% of all

¹ We have 18 of the 22 variables used in Table 5 of McCormick and Tollison (2001), and we add a dummy variable indicating whether or not the coach was black and a coach-player race interaction term.
² We use column 2 of Table 3 in Hamilton (1997) for this calculation. Brown, Spiro, and Keenan (1991) find a coefficient on minutes per game of .048, which is slightly larger than the one we use from Hamilton (1997).
games played between 1991 and 2004 but black coaches accounted for only 23% of games coached. Our fixed effects estimates suggest that black player salaries would have risen by 2.2% on average between 1991 and 2004 if 80% of coaches had been black instead of only 23%.

Unlike the overrepresentation of whites in the coaching ranks, the result that black players get more playing time than white players tends to inflate black player salaries. The OLS regression in column 1 of Table 3 estimates that a player receives 2.1 more minutes per game on average if he is black. Using Hamilton’s estimated impact of minutes played on salary, this extra playing time translates into a salary gain of 8.7% on average for black players. It is likely, however, that some of the positive relationship between minutes per game and salary in the data is because playing time is correlated with unobserved player quality. In that case, the real effect of an extra minute of playing time on salary (holding true player quality constant) is smaller and the salary implications of the coach and player race calculated here are overstated.

The estimates of own-race bias are very similar in Table 3 whether the player performance variables are measured during the current game or over the team’s previous ten games. Interestingly, the $R^2$ value of the regression is somewhat higher when player performance is measured over the previous ten games as in column 1 ($R^2 = 0.213$) than when current game performance measures are used as in column 3 ($R^2 = 0.173$). Thus, coaching decisions about a player’s minutes appear to be more strongly influenced by a player’s consistent performance over the past several weeks than by whether he has a “hot hand” during the game in progress.

As in the 2002-03 and 2003-04 seasons, the estimates using data from the longer time period also provide strong evidence that the racial composition of a team’s fans affects playing time. If the fraction of a city’s population that is black rises by ten percentage points, then a
white player on the team loses 0.1 to 0.25 minutes per game on average in the estimates from columns 1 through 4. A black player on the team, on the other hand, gains 0.3 to 0.4 minutes per game as the city’s minority share of the population rises. The coefficients on the MSA-player race interaction term have t-statistics above six in all four regressions, so they are statistically significant at very high levels.

The final column in Table 3 presents a logit regression estimating the determinants of whether a player starts the game (the dependent variable equals one if the player started the game and zero otherwise). As in Table 2, the player performance statistics in this regression are measured over the team’s previous ten games. These estimates provide a very interesting result: there is no significant evidence from the 1991-2004 data of an own-race bias in which players start the game. A white player with average performance statistics in an all-white city is estimated to start 43.2% of the games under both black and white coaches. An otherwise identical black player has a 50.1% probability of starting the game under a white coach and a 50.9% probability of starting under a black coach. Given the uncertainty of these predictions, however, we can not reject the hypothesis at even the 10% significance level that a player is equally likely to start the game whether his coach is of the same race or not.

Why might there exist an own-race bias in the minutes a coach gives to a player over the course of the game but not an own-race bias in the coach’s decision about which players to start? One likely explanation is that implicit biases in favor of members of a person’s own race emerge more strongly in decisions made under pressure than in choices made during a period of reflection. The decision about which player to start is made under considerably less time pressure than the decisions about which players to substitute onto the court during the course of a
game. If a person makes carefully considered decisions with his head and split-second decisions with his gut, then the gut appears to be where the implicit own-race bias resides.

Could the conclusion that coaches give more minutes to players of their own race, even after controlling for player quality, be explained by something other than own-race bias? The robust and highly significant coefficients on the race variables make it unlikely. For the key results to be caused by omitted variable bias, for example, the omitted variable would need to have a strong impact on minutes played and be correlated with both the player and coach’s race. The omitted variable would also need to change over time for a player – otherwise its effect on minutes is captured by player fixed effects. The player’s position (guard, center, forward), for example, is essentially constant and thus the fixed effect for each player controls for its impact on minutes. If we add player positions to the OLS regressions, our basic results remain unchanged.

We have investigated one story that might provide an alternative explanation for the results in this paper: the possibility that players move or are traded to teams where they can expect to get more playing time, and that they tend to move to teams with a coach of their own race. In our data set, players who switched teams before or during the year actually end up with less playing time at their new destinations. Those who switch teams are also not significantly more likely (at even the 10% level) to gain a coach of their own race: 36.3% of those changing teams started with a coach of their own race and 36.7% of them end up with a coach of their own race. The coach presumably has some influence over the decision to trade for a player or to offer him a free agent contract. Thus the result that coach and player race do not significantly affect player movement is consistent with the conclusion that any own-race bias can be overcome during decisions made after careful consideration.
V. CONCLUSION

This article uses data from 1991 to 2004 to estimate whether NBA coaches have an own-race bias when designating playing time to players. Controlling for player performance, city demographic variables, and unobserved player quality, we find strong statistical evidence of racial bias in the minutes per game a player gets. The fixed effect regression estimates show that having a coach of the same race raises a player’s expected time on the court by about one additional minute per game between 1991 and 2004 and by 3.6 additional minutes per game during the 2002-03 and 2003-04 seasons.

The evidence on whether an own-race bias affects which players start the game is less clear. Having a coach of the same race significantly influences whether a player started during the 2002-03 and 2003-04 seasons but has no significant impact on which players started in the full time period we examined. These results are consistent with the hypothesis that own-race bias emerges strongly in decisions made under pressure but that people can overcome implicit biases when making decisions after careful consideration. We also find evidence that playing time is influenced by consumer discrimination. Controlling for player performance and the coach’s race, a player’s time on the court rises if the player’s race more closely matches the racial composition of the city population. Overall, the results suggest that playing time in the NBA is influenced by racial biases on the part of both the coach and the fans.
References


Table 1: Variable definitions, sources, and means for the 2002-03 and 2003-04 seasons

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<th>Variable</th>
<th>Definition</th>
<th>Source</th>
<th>Means</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black player</td>
<td>=1 if player is black, =0 for other players</td>
<td>Price and Wolfers (2007)</td>
<td>0.776</td>
</tr>
<tr>
<td>Black coach</td>
<td>=1 if coach is black, =0 for other coaches</td>
<td>Price and Wolfers (2007)</td>
<td>0.370 ≠ 0.313</td>
</tr>
<tr>
<td>MSA black</td>
<td>Percent of population in MSA that is black, 2000</td>
<td>2000 US Census, 2001 Canadian Census</td>
<td>0.152 ≠ 0.133</td>
</tr>
<tr>
<td>Points per minute</td>
<td>Points per minute in team’s previous 10 games</td>
<td>Price and Wolfers (2007)</td>
<td>0.358 ≠ 0.338</td>
</tr>
<tr>
<td>Assists per minute</td>
<td>Assists per minute in team’s previous 10 games</td>
<td>Price and Wolfers (2007)</td>
<td>0.082 ≠ 0.074</td>
</tr>
<tr>
<td>Blocks per minute</td>
<td>Blocks per minute in team’s previous 10 games</td>
<td>Price and Wolfers (2007)</td>
<td>0.021 ≠ 0.024</td>
</tr>
<tr>
<td>Rebounds per minute</td>
<td>Rebounds per minute in team’s previous 10 games</td>
<td>Price and Wolfers (2007)</td>
<td>0.172 ≠ 0.187</td>
</tr>
<tr>
<td>Turnovers per minute</td>
<td>Turnovers per minute in team’s previous 10 games</td>
<td>Price and Wolfers (2007)</td>
<td>0.059 0.060</td>
</tr>
<tr>
<td>Steals per minute</td>
<td>Steals per minute in team’s previous 10 games</td>
<td>Price and Wolfers (2007)</td>
<td>0.033 ≠ 0.030</td>
</tr>
<tr>
<td>Fouls per minute</td>
<td>Fouls per minute in team’s current game</td>
<td>Price and Wolfers (2007)</td>
<td>0.100 ≠ 0.116</td>
</tr>
<tr>
<td>Total team</td>
<td>Total minutes played by all the team’s players in the current game</td>
<td>Price and Wolfers (2007)</td>
<td>241.141 240.982</td>
</tr>
</tbody>
</table>

≠ Indicates that the two means are significantly different at the 1% level.
Table 2: Determinants of minutes played during the 2002-03 and 2003-04 seasons

<table>
<thead>
<tr>
<th></th>
<th>All players</th>
<th>Only players in the game</th>
<th>Starting Decision</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OLS Fixed effects</td>
<td>OLS Fixed effects</td>
<td>Logit</td>
</tr>
<tr>
<td>Black player</td>
<td>2.165 **</td>
<td>2.652 **</td>
<td>0.450 **</td>
</tr>
<tr>
<td>Black coach</td>
<td>-1.431 ** -2.870 **</td>
<td>-1.337 ** -2.617 **</td>
<td>-0.371 **</td>
</tr>
<tr>
<td>Black player * black coach</td>
<td>1.703 ** 3.582 **</td>
<td>1.435 ** 2.940 **</td>
<td>0.457 **</td>
</tr>
<tr>
<td>MSA black percent</td>
<td>-6.524 ** -20.197 **</td>
<td>-1.797 -18.122 **</td>
<td>0.871 **</td>
</tr>
<tr>
<td>MSA black % * black player</td>
<td>7.638 ** 18.308 **</td>
<td>1.348 16.228 **</td>
<td>-1.243 **</td>
</tr>
<tr>
<td>Points per minute</td>
<td>29.099 ** 6.766 **</td>
<td>30.875 ** 7.782 **</td>
<td>4.485 **</td>
</tr>
<tr>
<td>Assists per minute</td>
<td>36.954 ** 9.754 **</td>
<td>34.749 ** 12.338 **</td>
<td>6.548 **</td>
</tr>
<tr>
<td>Blocks per minute</td>
<td>5.276 -4.456 *</td>
<td>5.474 -5.967 **</td>
<td>3.928 **</td>
</tr>
<tr>
<td>Rebounds per minute</td>
<td>8.087 ** 3.661 **</td>
<td>6.733 ** 2.625 *</td>
<td>2.375 **</td>
</tr>
<tr>
<td>Steals per minute</td>
<td>-5.785 -5.495 **</td>
<td>-5.417 -4.232 *</td>
<td>-3.500 **</td>
</tr>
<tr>
<td>Total team minutes</td>
<td>0.081 ** 0.086 **</td>
<td>0.145 ** 0.129 **</td>
<td></td>
</tr>
</tbody>
</table>

R² 0.180 0.207
Observations 51,288 51,288 45,900 45,900 51,288

*, ** Indicate that the coefficient is statistically significant at the 5% and 1% levels, respectively

Significance levels are calculated using robust standard errors

The dependent variable in the first four columns is the minutes played in the current game

The dependent variable in the final column equals one if the player is a starter

The first two columns include observations for all players who entered the game or were listed as Did Not Play – Coach’s decision

Columns three and four include observations only for players who entered the game.
Table 3: Determinants of minutes played from 1991 to 2004

<table>
<thead>
<tr>
<th></th>
<th>Ten game performance</th>
<th>Current game performance</th>
<th>Starting Decision</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OLS Fixed effects</td>
<td>OLS Fixed effects Logit</td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>-20.481 **</td>
<td>-10.940 **</td>
<td>-16.885 **</td>
</tr>
<tr>
<td>Black player</td>
<td>2.193 **</td>
<td>2.590 **</td>
<td>-9.463 **</td>
</tr>
<tr>
<td>Black coach</td>
<td>-0.376 **</td>
<td>-0.401 **</td>
<td>-2.546 **</td>
</tr>
<tr>
<td>Black player * black coach</td>
<td>0.672 **</td>
<td>1.004 **</td>
<td></td>
</tr>
<tr>
<td>MSA black percent</td>
<td>-2.393 **</td>
<td>-1.179</td>
<td></td>
</tr>
<tr>
<td>MSA black % * black player</td>
<td>6.830 **</td>
<td>5.125 **</td>
<td></td>
</tr>
<tr>
<td>Points per minute</td>
<td>23.354 **</td>
<td>12.166 **</td>
<td></td>
</tr>
<tr>
<td>Assists per minute</td>
<td>32.407 **</td>
<td>17.717 **</td>
<td></td>
</tr>
<tr>
<td>Blocks per minute</td>
<td>15.299 **</td>
<td>-1.074</td>
<td></td>
</tr>
<tr>
<td>Rebounds per minute</td>
<td>11.181 **</td>
<td>0.987 *</td>
<td></td>
</tr>
<tr>
<td>Steals per minute</td>
<td>-9.010 **</td>
<td>-6.966 **</td>
<td></td>
</tr>
<tr>
<td>Turnovers per minute</td>
<td>-20.696 **</td>
<td>-11.705 **</td>
<td></td>
</tr>
<tr>
<td>Fouls per minute</td>
<td>-24.720 **</td>
<td>-16.896 **</td>
<td></td>
</tr>
<tr>
<td>Total team minutes</td>
<td>0.135 **</td>
<td>0.129 **</td>
<td></td>
</tr>
<tr>
<td>R²</td>
<td>0.213</td>
<td>0.173</td>
<td></td>
</tr>
<tr>
<td>Observations</td>
<td>282,951</td>
<td>282,951</td>
<td>290,276</td>
</tr>
</tbody>
</table>

*, ** Indicate that the coefficient is statistically significant at the 5% and 1% levels, respectively

Significance levels are calculated using robust standard errors

This table excludes players who never entered the game

Ten game performance: the performance statistics are player performance in team’s previous ten games

Current game performance: the performance statistics are player performance in the current game

The dependent variable in the first four columns is the minutes played in the current game

The final column dependent variable equals one if the player is a starter

The final column uses player performance statistics from the team’s previous ten games
Figure 1: Minutes played by race in 2002-03 and 2003-04

Minutes played and race, 2002 and 2003 seasons

Player race

Minutes played

Coach race

black  white  black  white

22.8  18.7  16.1  18.7

0  5  10  15  20  25