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Are NBA Fans Becoming Indifferent to Race? Evidence from the 1990s*

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Previous studies, using data from the 1980s, found that racial composition of NBA teams is positively correlated with racial composition of the metropolitan markets in which the teams are located. Researchers have interpreted this evidence as consistent with a “customer discrimination” hypothesis. We reconsider this hypothesis by examining evidence from the 1990s and generate three principal findings. First, based on player performance statistics, we find no evidence of discrimination at the league level—that is, the best players appear to be playing in the league regardless of race. Second, players, categorized by race, are not randomly distributed across teams. Instead, the relationship between team racial composition and metropolitan area racial composition, while weaker than in the 1980s, persists in the NBA in the 1990s. Hence, teams located in areas with greater concentration of white population may find it revenue enhancing to cater to customer demand for viewing teams that include white players. Our third finding, based on revenue from home game attendance, is that as the number of white players declined significantly over the decade, the revenue product of a white player increased on the margin. This effect appears to be more pronounced for teams located in cities with larger white populations. We also find evidence that, in recent years, the top-performing white players in the NBA tend to locate in cities with larger white populations, suggesting that teams in these cities place a higher marginal value on such players.

JEL codes: J15, J71

Keywords: Customer Discrimination, Race, Sports, National Basketball Association

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Are NBA Fans Becoming Indifferent to Race? Evidence from the 1990s

Applied to professional sports, Becker's (1971) concept of racial discrimination by customers implies a fan preference for watching players of their own race. The "customer discrimination" hypothesis suggests that teams lose revenue and profits when they adopt color-neutral hiring practices. Accordingly, unlike discrimination by employers and by fellow workers, discrimination by customers is unlikely to disappear even in the long run (Nardinelli and Simon, 1990). While discrimination by customers generally cannot be disentangled from other influences on hiring practices and wage scales, a recent survey of four major metropolitan areas provides evidence that customer discrimination may be quite pervasive in today's economy--with strong discrimination effects emerging when employees have significant contact with customers (Holzer and Ihlanfeldt, 1998).

It is hard to imagine a business where employees are more "visible" to customers than professional basketball. Consistent with the customer discrimination hypothesis, a number of studies, using data from the 1980s, found that National Basketball Association (NBA) teams located in more white-dominated market areas consistently had a disproportionately large share of white players (Koch and Vander Hill, 1988; Brown, Spiro and Keenan, 1991; Burdekin and Idson, 1991; Hoang and Rascher, 1999; Bodvarsson and Partridge, 2001).¹ Evidence is mixed, however, as to whether teams can increase their attendance and revenues by "matching" the racial profile of their players with their market's racial profile. Burdekin and Idson (1991) and Hoang and Rascher (1999) found that a positive match between team racial composition and the racial composition of the

¹ Early studies using 1970s data find similar results. See Markham (1976) and Karabel and Karen (1982).

SMSA area increases attendance. Kahn and Sherer (1988) add that white players increased attendance more than enough to compensate for the white salary premium they identify for the 1980-86 period. On the other hand, Dey (1997), using data from 1987-93, and McCormick and Tollison (2001), using data from 1980-88, saw no relationship between the racial match and NBA attendance.²

In this paper we use NBA team data from the 1990s to re-examine the customer discrimination hypothesis. Our approach has three parts. We first analyze trends in the racial composition of NBA teams and document the distribution of players, classified by race, across teams. We then analyze differences in the performance of black and white players to test the hypothesis that teams in the league engage in “window dressing” by adding white players to their rosters who are not as strong as black players. Finally, we examine what determines the racial composition of NBA teams and assess whether a team can increase its attendance by matching its racial composition with the racial composition of the metropolitan area where the team is located.

Team Racial Composition and Player Performance in the NBA in the 1990s

Using annual data over the 1990-1999 period, we find that total white representation in the NBA shrank considerably over our sample period, from just over 25% in the 1990-91 season to 20% in the 1998-99 season (see Figure 1). This result corresponds with declining white representation on the bench, which fell from 30% to 23%. There has been little change in the percentage of starters who are white, however, which remained below 15% across most of the sample period.

²Discrimination by customers may have an impact not only at the professional level but also at the college basketball level. Brown and Jewell (1994, 1995) find that white players in the 1988-89 NCAA season generated significantly more team (school) revenue than did black players of comparable ability.

As Table 1 shows, white players and black players are unevenly distributed across NBA teams. While on average the Chicago Bulls and Utah Jazz teams were just over 33% white during the 1990s, at the other extreme the New York Knicks and Toronto Raptors were under 10% white. Many factors besides customer preferences could lie behind the varying racial compositions of NBA teams, including the race of available draft picks, existing contractual obligations, the availability of free agents, and increased player demand arising from two expansion teams (Toronto Raptors and Vancouver Grizzlies).

While the number of white players in the NBA has declined over the decade, we do not find any systematic change in the allocation of white players across teams, or of white starters across teams. This finding is based on calculating Herfindahl-Hirshman measures of the concentration of white players across the league to assess whether there has been a shift toward more concentration of white players in cities with proportionally larger white populations.³

Further, there is no evidence, at least in recent years, that fan preferences for watching players of their own race have led to inferior white players entering the NBA in place of more skilled black counterparts. Not only has the overall representation of white players in the NBA declined in recent years, but also the performance levels of white players and black players appear similar. In Table 2 we use annual player statistics for 1996-97 through 1998-99 to compare the average performance of whites and blacks. We examine starters and bench players separately across a broad range of measures, and include points scored, assists, rebounds, blocks, steals, field-goal percentage and free-throw percentage.⁴ “Starters” are the top five players on each team in terms of minutes

³ The Herfindahl-Hirshman Index (HHI) is calculated as $HHI = \sum_{i=1}^n s_i^2$ where s_i is team i 's share of the league's players who are white and n = number of teams in the league.

⁴ We include all of the variables incorporated by Hofler and Payne (1997) in their measure of the overall efficiency of

played per game. “Bench players” constitute the remainder. Although there are differences in a few specific skill measures for black players and white players, Table 2 reveals no systematic tendency for players of one race to outperform those of the other. For example, black starters and bench players outperform white players in average number of steals per minute played, and white starters outperform black starters in field-goal and free-throw percentages.

Because team managers do not select players based on only one skill (e.g., three-point percentage or steals per game), we also examine whether there is any difference in the breadth of skills that black players and white players possess on average. Table 3 reveals that correlations *between* pairs of performance measures are similar for white and blacks. The table shows that the correlations between performance measures are always the same sign and are of similar magnitudes whether the player is white or black. That is, whites and blacks appear to possess similar combinations of skills as well as exhibiting similar individual performance statistics.

An alternative way of measuring player performance is to compile a composite performance index for each player. We construct such an index by standardizing and averaging the following nine performance statistics: field-goal percentage, free-throw percentage, three-point percentage, offensive rebounds per minute, defensive rebounds per minute, assists per minute, steals per minute, blocks per minute, and total points per minute. Each of the nine statistics is standardized by the mean of the sample (starters or bench) for that statistic, and then we equally-weight and sum the standardized statistics to arrive at the composite performance index for a player. While the index is significantly higher for white starters than for black starters (0.084 versus -0.014, t -statistic = -3.10), the difference of only a 0.098 standard deviation in average performance does not appear to

NBA teams. Classifying players according to their playing position (Appendix A) does not alter the overall picture apparent in Table 2.

be economically significant. Further, the average performance of white starters may be inflated by the fact that they play about two minutes less per game (30.52 minutes versus 32.65 minutes, t -statistic = -2.25), and hence may be fresher when they do play. In contrast, the performance index for white bench players is lower than for black bench players, but not significantly so (-0.068 versus 0.019, t -statistic = -1.10), while they also play slightly fewer minutes per game (14.18 minutes versus 15.45 minutes, t -statistic = -2.02). Though weighting the performance statistics equally is arbitrary, the evidence does not support the hypothesis that the league engages in “window dressing” by hiring and playing whites when better-performing blacks are available.

We base our white and black performance level findings on player data from the last three seasons of the 1990s; a period during which there is little evidence of overall salary discrimination against blacks in the NBA. Indeed, the NBA appears to have changed markedly in this regard since the 1980s, when a number of studies found that whites were paid more than blacks for the same level of performance (see Kahn, 2000).⁵ While most of the salary-based studies focus on aggregate measures of performance and salaries, a few consider how the fan base in a metro area may differentially affect salaries. For example, Bodvarsson and Partridge (2001) find that black players in two seasons (1985/86 and 1990/91) were paid more in areas where the black population was higher. They argue that this finding may reflect “black fans wanting to see a team with a greater percentage of blacks” (Bodvarsson and Partridge, 2001: 413). While no such population effect was significant in their regressions of white player salary levels, the possibility that black-white salary levels may vary with the racial composition of the market area is consistent with the customer

⁵ Hoang and Rascher (1999) also find evidence of “exit discrimination” in the 1980s with white players facing 36% less risk of being cut from a team than did black players with otherwise similar characteristics. However, as Kahn (2000) documents, data from the early to mid-1990s generally offer much less support for salary discrimination against blacks in the NBA (see, for example, Dey, 1997, Hamilton, 1997; Guis and Johnson, 1998; Bodvarsson and Brastow, 1999).

discrimination hypothesis. Even if *average* performance-adjusted salary levels of whites and blacks are equal, so that there is no aggregate discrimination, this does not preclude team-specific, or market-area-specific, differences in the relative salaries of whites and blacks.⁶

Determinants of the Racial Composition of NBA Teams

A match between the racial composition of an NBA team and the racial composition of its metropolitan market suggests that teams are responding to customer discrimination. We examine the relation between the racial composition of teams and their respective markets using SMSA and NBA team data from the 1990-91 through 1998-99 seasons. We measure team racial composition in three ways: the percentage of all team members who are white; the percentage of a team's bench players who are white; and the percentage of a team's starting players who are white. Appendix B gives the variable definitions and sources. Customer discrimination implies a positive relationship between the team racial composition and the metro area racial composition.

We also expect team racial composition will be more important in smaller metropolitan markets because such markets have fewer potential customers to fill an arena's seats. Assuming that some fraction of local customers have a propensity to discriminate, a team's management would be less likely to accommodate such customers if it could fill its arena seats with non-discriminating customers. It is more likely that non-discriminating customers are marginal demanders of seats when the market area population is large relative to stadium size. In the regressions below we account for this by entering the ratio of stadium capacity to total population in the market area as an independent variable. We expect an inverse relationship between the ratio of stadium capacity to population and

⁶ Bodvarsson and Partridge (2001) also point to possible co-worker discrimination through the effect of team composition on salaries. They find that white players are paid more, *ceteris paribus*, when the team becomes less white. It is not clear, however, whether any such effect really implies co-worker discrimination. It could instead reflect an attempt by teams to maintain at least some measure of ethnic diversity. Former owner of the Cleveland Cavaliers, Ted Stepien even went on record claiming: "You need a blend of black and white. I think that draws, and I think that's a better team." (see

the percentage of white players on a team. A time trend variable controls for time-dependent changes in the racial composition of teams.

Table 4 gives the regression results for the three dependent variables that measure team racial composition. We use a clustering technique (where each team is a cluster) to reflect the possibility that observations are independent across clusters, but not necessarily independent within clusters. Hence, the reported t-statistics for the coefficients are based on robust standard errors estimated with clustering.⁷ Results are consistent with expectations. As a determinant of overall team composition, and of starters, the percent white of the SMSA population (POPWHITE) is significant at the 95% confidence level. It is not significant in the bench regression, however, suggesting that the primary focus of customer discrimination is on starters. The stadium capacity variable is significant in the three regressions at the 95%, 90% and 85% confidence levels, respectively, while the time trend is significant at the 95% level in the full-team and bench regressions but not in the starter regression.⁸ As documented earlier, the ratio of white to black starters remained relatively constant over the decade.

Although there appears to have been sufficient player mobility to allow teams to “sort” the racial composition of players over our 1990s sample period, there is still a question as to whether the teams or the free agents themselves determine who plays on what team. Researchers typically assume that the teams’ preferences are dominant. Nevertheless, we acknowledge that any influence

Karabel and Karen, 1982: 24).

⁷ Given that the percentages are, of course, censored at 0 and 100, we also examined the effects of re-estimating our equations using a Tobit procedure. This did not materially affect the coefficient estimates but, as we cannot correct the standard errors for clustering when applying Tobit, we place more confidence in the OLS results reported in Table 4. The need to correct for clustering follows from the fact that our multiple observations of the same teams cannot reasonably be viewed as independent from year to year.

⁸ Our empirical finding (of a statistically significant relationship between the racial composition of teams and the racial composition of corresponding metropolitan areas) holds whether or not we exclude the two expansion teams, for which data are available only from 1995 onward.

of player preferences would also likely militate towards a matching of white players with whiter market areas. In an extreme expression of such player preferences, Isaiah Rider, a black Trailblazer team member, called the relatively white city of Portland a “racist area” (see Wertheim, 2001: 44).

Despite its shock value, this quote offers support for the premise that team preferences are what ultimately matter most. Rider remained with the Portland Trailblazers for three seasons and, after becoming a free agent, eventually signed with the Denver Nuggets in October 2001—another team located in a smaller NBA city not noted for having a large black population. The implication is that players may have preferences for particular teams, but in a competitive market for players, they do not have sufficient market power to select teams and teammates that match their individual preferences.⁹ However, we leave open the possibility that some players, most likely top-performing starters, have sufficient monopsony power to select among NBA teams.

Racial Matching and Revenue Gains

Basketball teams generate revenue primarily from two sources: television contracts and home game attendance. The NBA bylaws and constitution require that teams pool and share television and cable revenue, but allow teams to retain all home game attendance revenue (less a 4% assessment fee). For our purposes, the NBA’s revenue-sharing arrangement is important because a substantial fraction of a team’s revenue comes from local sources.¹⁰ Accordingly, if customer

⁹ Meanwhile, teams’ abilities to bid freely for the players they want do not seem to have been constrained in any meaningful way by the post-1983 “salary cap” as there are numerous exceptions to this limit—including the “Bird Exception,” which allows a team to acquire players from other teams up to the level of the salary cap and then freely bid *above* the salary cap to keep any of its own players who have become free agents (Hill and Grotthuis, 2001: 133). Wage setting in the NBA does seem to have been significantly altered by the subsequent 1998 collective bargaining agreement, with Hill and Grotthuis (2001) documenting a reduction in wage dispersion after this new policy took effect. This could have no more than a minimal impact on our empirical work, however, as we end our sample in 1999.

¹⁰ Although the influence of national broadcasting revenue has grown in recent years, over 65% of the average NBA team’s revenue still came from local sources in 1996 (Wilson, 2001). Under the NBA Constitution and By-laws, the teams receive all revenue from the sale of tickets to regular season home games (subject to the NBA gate assessment of 4%) and no revenue from sale of tickets to regular season away games. Generally, the teams retain all revenues from the sale of tickets to home exhibition games. Based on SEC annual report filings by the only publicly traded NBA team,

demand for tickets depends on a team's racial profile, profit-maximizing managers will internalize the revenue impact of the local market's racial preferences.¹¹

In a cross-sectional analysis, the empirical effect that team racial composition has on ticket revenue is complicated. Assuming that black and white players are of equal performance quality, finding no relation between team racial composition (TWHITE) and ticket revenue is consistent with either of two hypotheses: (1) fans are indifferent to race so that team race, *per se*, does not affect ticket revenue, or (2) fans are not indifferent, but markets are in equilibrium with regard to race except for random errors. Similarly, finding a positive relationship between TWHITE and revenue also raises two possible interpretations: (1) black players and white players are of equal quality but customers are not indifferent to race and demand a greater percentage of white players on the team than managers supply, or (2) consumers do not care about race but players are sorted across teams such that the average quality of white players on a team is positively correlated with the percent of the team that is white (TWHITE). Applying these possible interpretations to our cross-sectional analysis of team racial composition, window dressing implies that the coefficient on TWHITE will be positive if all markets have similar demand for white players, and that the ratio of TWHITE to PWPOP will be positive if demand for white players is higher in markets with higher white populations. Finally, if higher quality white players tend to play for teams with relatively high percentages of white players, then the cross-sectional coefficient on TWHITE will be positive due

the Boston Celtics, we find that over the period 1993-2000, ticket sales represented 49.3% of total revenue and TV revenues represented 39.3%. Other sources of revenue made up the remainder.

¹¹ Looking at Nielsen ratings for local broadcasts of NBA games during the 1996-97 season, Kanazawa and Funk (2001) found that these ratings were positively related to the number of white players represented on the two teams. A qualification is that the Chicago Bulls, shown in our Table 1 to be the whitest NBA team over the 1990-1999 period, may have boosted the Nielsen ratings not only through the Bulls' racial profile but also by featuring the returning superstar Michael Jordan. Thus the findings of Kanazawa and Funk for the 1996-97 season may, to some extent, conflate a fan response to greater white representation with a "Michael Jordan effect."

to the correlation between white player quality and TWHITE. To examine how these relationships have changed over the years of our study, we interact the measure of the racial mix of the team with a time trend (TIME).¹²

Table 5 presents three alternative specifications. We measure home-game revenue as average ticket price times average attendance at home games. We include variables to control for the effect of team winning percentage, the number of competing major professional sport franchises (NFL, NHL and MLB), stadium capacity, SMSA average income, and SMSA total population. The coefficient estimates are based on robust standard errors. All the control variables are significant at the 95% confidence level or better, and have the expected signs. In addition, the time trend is significant and positive, reflecting both rising attendance and rising ticket prices during the 1990s.¹³

The three specifications use alternative measures to reflect the racial mix of a team. The first regression is the most parsimonious and includes the percentage of team members who are white (TWHITE) as an independent variable. The coefficient on TWHITE is positive, but attains only the 80% confidence level. Statistically, game revenue is more dependent on such variables as the size of the population in the SMSA market area, stadium capacity, the team's winning percentage, and the number of professional sports franchises in the SMSA. Nonetheless, interpreting the coefficient as a best estimate, a one percent increase in TWHITE would yield approximately \$1,000 in extra revenue per game, other things constant (approximately \$8,000 per white player). As a benchmark, average revenue per game was \$512,000 over the decade so the incremental revenue of adding a white player is less than 2% of total revenue.

¹² We interact team white with time rather than using a random effects model because of the degrees of freedom limitations. The restriction appears to be reasonable given the systematic change (approximately linear) in team composition apparent from Figure 1.

The estimated coefficient on TWHITE, however, conflates both time series and cross-sectional effects. Consequently, we cannot be certain how to interpret the positive coefficient. In a cross-sectional regression, a positive sign is consistent with discrimination by customers (managers undersupplying white players relative to demand) but is also consistent with the hypothesis that higher quality white players participate on teams with more white players. Nevertheless, we know from Figure 1 that time series considerations are important because TWHITE was higher in the earlier part of the decade. Hence, higher customer demand to see white players in the early 1990s could drive TWHITE's positive relationship with revenue.

To control for time-series effects, our second specification adds a variable that interacts time with TWHITE (TIME *TWHITE). The level of the percentage white on a team, by itself, is now negative but not statistically significant. When interacted with time, however, the percentage white has a significant positive value. For example, according to the second set of results, and ignoring statistical significance, TWHITE had a negative total effect on revenue (the implied coefficient is -0.69 , i.e., $-1.25 + 1*0.56$) during the 1990-91 season. This suggests an excess supply of white players relative to demand but is also consistent with the hypothesis that white players, on the margin, were of lower quality than black players. In contrast, during the 1998-99 season, TWHITE had a positive impact on revenue (the implicit coefficient is 3.70 , i.e., $-1.25 + 9*0.56$). Over the 1998-99 season, the marginal revenue product of adding one white player (an 8.3% increase in TWHITE) was \$31,000 per home game, or about \$1.35 million of home-game revenue during the regular season. As discussed above, the positive coefficient supports both hypotheses of customer discrimination: that fan demand for white players exceeds the supply, and that teams with higher concentrations of white players also have higher caliber white players.

¹³ Again, results are not sensitive to inclusion of the two expansion teams, Toronto and Vancouver.

The third specification uses an alternative measure of racial mix: the ratio of the percent of the team that is white to the percent of the SMSA population that is white (TWHITE/POPWHITE).

While not shown, this variable, if included by itself without a time interaction, has a marginally significant positive impact on revenue (as in the first case). When we interact the matching variable with time, however, the results are similar to those of our second specification: the statistical and economic importance of racial matching becomes more pronounced over time, and gives rise to similar-sized incremental revenues when evaluated at the white population mean. The driving factor is clearly the interaction with the time trend. As shown in Table 5, this compound variable is significant at the 90% level and the positive sign supports the hypothesis that higher quality white players go to teams with higher white SMSA populations. Furthermore, the 1998-99 results imply that customers discriminate in conjunction with white-player undersupply--higher quality white players go either to the whiter teams or to cities with higher white populations.¹⁴

Our third specification suggests that the player selection process has led the better white players (the “stars”) to locate in cities with larger white populations. Using the composite measure of performance discussed earlier in the paper, we examine the cross-sectional differences in both bench and starter performance measures. For bench players, we find no significant relation between the performance index and race and population. We do find such a systematic relation for starters, however. Equation (1) below gives the results of an OLS regression with 435 observations of

¹⁴ It appears that toward the end of the decade, teams in whiter areas may well have placed increasingly greater emphasis on retaining any white players that they had. We attempt to examine this issue indirectly by looking at the turnover of white players and black players over our sample period. While we find no evidence that the turnover of starters varies by race, we do identify a possible distinction in the turnover of bench players. Black bench players have a turnover ratio of 20.2% (number of times a player switched teams divided by the total number of teams played on) whereas the turnover rate for white bench players is only 16.3%. The difference is significant at just the 86% level, however, making it impossible to draw any definite conclusions.

starters, where an observation is a player-year (t-statistics appear in parentheses). The performance data cover three seasons, 1996-97, 1997-98, and 1998-99.

$$\begin{aligned} \text{Performance} = & -081 - .803\text{RACE} - .090\text{POPWHITE} + 1.142(\text{RACE} * \text{POPWHITE}) \\ & (-2.561) \quad (0.600) \quad (2.871) \end{aligned} \quad (1)$$

In the regression, the dependent variable is the standardized composite performance measure for players based on three seasons of data and an equal weighting of the nine performance measures referred to earlier: RACE takes on the value of 1 for white players and 0 for non-white; POPWHITE is percentage of the SMSA population that is white expressed in decimal form. The last term is an interacted variable. The regression coefficients show that in the last three NBA seasons of the 1990s, the performance of white starters was higher in cities with larger white populations. In combination with the Table 5 results, Equation (1) suggests that the better-performing white starters have navigated toward locations that place a higher premium on their performance.¹⁵ Such a result is consistent with customer discrimination, although of a more limited type than was documented in studies using 1980s data.

Conclusion

Evidence from the 1990s is mixed on whether basketball fans are becoming indifferent to the race of NBA players. Clearly, the NBA and its franchised teams have prospered in the 1990s, as both revenue from televised games and arena attendance have increased steadily. These increases have occurred at the same time that black player participation has increased and white player

¹⁵ Recent evidence on salary distribution in the NBA shows that, even though the overall black-white wage differential appears to have diminished, the degree of dispersion in NBA wages nevertheless increased over much of the 1990s. Hill and Grotthuis (2001) show that, whereas the mean NBA salary rose approximately 78.5% between the 1993-94 and 1997-98 seasons, the median salary increased by just 31.3%. Hamilton (1997), examining salary data in the mid-90s, finds evidence that at the upper-end of the salary distribution (75th and 90th percentiles) whites earn more than their black counterparts, although finds no statistical difference in salary at lower percentiles.

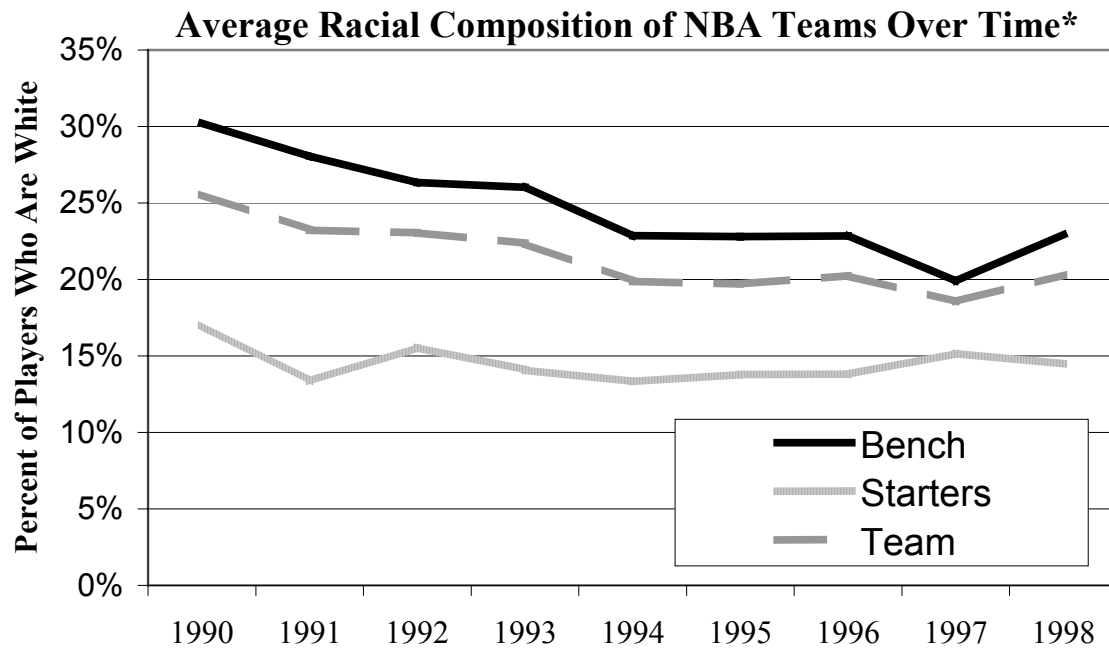
participation has decreased. Further, our results on player performance indicate that NBA teams are employing the most talented players irrespective of race, whether player performance is compared by position or by starter/bench designation. It may be premature to conclude that fans do not care about race, however. The tendency of teams in whiter areas to have more white players certainly has *not* disappeared since the 1980s. We continue to see a non-random “sorting” of players across teams over our 1990-1999 sample period. Moreover, after correcting for other factors, we find that a “matching” of the team’s racial composition and the racial composition of the market area positively boosts home-game-attendance revenue. The sorting has taken on an interesting characteristic: the most highly skilled white starters appear to locate in cities with relatively larger white populations. Thus, we cannot conclusively determine whether the sorting of players across teams (or the positive revenue benefits of matching white players with a white fan base) are findings attributable to customer discrimination alone or also to a player-quality effect.

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Figure 1



*Note- A regression of percent of team that is white (TWHITE) on a time trend generates a negative coefficient (t-statistic of -2.80, significant at the .01 level). A corresponding regression of percent of bench that is white (BWHITE) on time generates a negative coefficient (t-statistic of -3.30, significant at the .01 level). However, the coefficient in the regression of percent of starters who are white (SWHITE) on time is not statistically different from zero (t-statistic of -0.36).

Table 1

Racial Composition of NBA Teams, 1990-1998

The table shows, by NBA team, the mean percent of players on the team's roster who are white, averaged over nine seasons (1990-91 to 1998-99 season).

Team	Percent White 1990-1999 Seasons
Chicago	34.80%
Utah	33.29%
Phoenix	29.33%
Cleveland	29.16%
Orlando	27.92%
Golden State	25.71%
Seattle	25.23%
New Jersey	25.16%
Indiana	24.84%
Milwaukee	24.33%
Washington	24.29%
Atlanta	23.56%
Minnesota	21.63%
Dallas	21.46%
Charlotte	21.27%
Sacramento	21.00%
Boston	20.71%
Houston	20.59%
Miami	20.44%
San Antonio	17.01%
Denver	16.82%
Vancouver*	16.10%
Detroit	15.11%
LA Clippers	14.19%
Philadelphia	13.46%
LA Lakers	13.01%
Portland	12.21%
New York	9.87%
Toronto*	5.80%
All Teams	20.97%
US Teams	21.72%

*Data are available for only four seasons (1995-1998) for expansion teams, Toronto and Vancouver.

Table 2**Performance Statistics for NBA Starters and Bench Players**

The table shows the mean values of 12 performance measures for, in panel A), 228 NBA players classified as starters and, in panel B), 476 NBA players classified as bench players. The measures are averaged over three seasons (1996-1998) that the player played as a starter, or bench player, respectively. A player is classified as a starter if he is one of the five players on the team who played the most total minutes over the course of the season. A player is classified as a bench player if he is on the team's roster but it not one of the five players on the team who played the most total minutes over the course of the season. Except as noted, all performance measures are standardized by total minutes played in the season.

A) Starters

Performance Measure	Mean Performance Measure		t-test of Difference in Means
	Black Players	White Players	
Assists	.0915	.0903	0.102
Blocks	.0193	.0259	-1.386
Defensive rebounds	.1167	.1296	-1.423
Field-goal percentage	.4514	.4729	-2.394**
Free-throw percentage	.7402	.7713	-1.951*
Offensive rebounds	.0514	.0555	-0.632
Personal fouls	.0845	.0888	-0.825
Points	.4082	.3969	0.703
Steals	.0353	.0307	2.070**
Three-point percentage	.2504	.2432	0.243
Turnovers	.0608	.0601	0.214
Rebounds	.1681	.1853	-1.160

B) Bench Players

Performance Measure	Mean Performance Measure		t-test of Difference in Means
	Black Players	White Players	
Assists	.0659	.0637	1.936**
Blocks	.0203	.0235	-1.169
Defensive rebounds	.1089	.1261	-2.517***
Field goals percentage	.4076	.4025	0.407
Free throw percentage	.6388	.6640	-1.001
Offensive rebounds	.0607	.0569	0.087
Personal fouls	.1155	.1426	-2.650***
Points	.3348	.3128	1.654**
Steals	.0366	.0296	2.602***
Three-point percentage	.1828	.1985	-0.736
Turnovers	.0686	.0725	-0.407
Rebounds	.1693	.1823	-1.303

Note—In panel A, total sample size equals 228 (35 starters who are white and 193 starters who are black). In panel B, total sample size equals 476 (110 bench players who are white and 366 who are black)

* = significant at the .10 level, two tailed test

** = significant at the .05 level, two tailed test

*** = significant at the .01 level, two tailed test

Table 3**Pairwise Correlations Between Performance Measures**

The table shows the correlations between key performance variables. Correlations are measured based on average performance statistics for all NBA players for the 1996-97, 1997-98, 1998-99 seasons. Only those correlations greater than .30 for both categories of players are shown in the table. The table is based on 704 observations of NBA players. Performance statistics are averaged over the number of seasons the player played in the league as either a starter or bench player.

Performance Measures: Simple Correlations*	Black Players	White Players
Field goal percentage/three-point percent	-.507	-.448
Field goal percentage/free-throw percent	-.442	-.343
Field goal percentage/offensive rebounds	.545	.516
Field-goal percentage/defensive rebounds	.598	.469
Field goal percentage/assists	-.330	-.383
Field goal percentage/steels	-.307	-.212
Field goal percentage/blocks	.503	.344
Field goal percentage/personal fouls	.342	.403
Three-point percentage/free-throw percent	.487	.791
Three-point percentage/offensive rebounds	-.676	-.806
Three-point percentage/defensive rebounds	-.666	-.603
Three-point percentage/assists	.463	.594
Three-point percentage/steels	.275	.427
Three-point percentage/blocks	-.653	-.496
Free-throw percentage/offensive rebounds	-.611	-.681
Free-throw percentage/defensive rebounds	-.516	-.590
Free-throw percentage/assists	.333	.434
Free-throw percentage/blocks	-.475	-.587
Free-throw percentage/personal fouls	.468	.588
Free-throw percentage/points	.294	.317
Offensive rebounds/defensive rebounds	.857	.829
Offensive rebounds/assists	-.577	-.640
Offensive rebounds/steels	-.351	-.366
Offensive rebounds/blocks	.573	.737
Offensive rebounds/personal fouls	.555	.746
Defensive rebounds/assists	-.468	-.537
Defensive rebounds/steels	-.327	-.465
Defensive rebounds/blocks	.617	.773
Defensive rebounds/personal fouls	.428	.644
Assists/steels	.477	.630
Assists/blocks	-.440	-.561
Assists/personal fouls	-.472	-.626
Steels/blocks	-.254	-.463
Blocks/personal fouls	.411	.626

*The performance correlations are less than 0.30 for the following combinations: field goal percentage/steels; field goal percentage/points; three-point percentage/points; free-throw percentage/steels; offensive rebounds/points; defensive rebounds/ points; assists/points; steels/personal fouls; steels/ points; blocks/points; personal fouls/points. While the correlations are low, each correlation of skill combination is of the same sign and approximate magnitude for black and white players.

Table 4**Models of Racial Composition of NBA Teams**

The dependent variables in the models below are: percent of the team members who are white, percent of bench players who are white, and percent of the starters who are white. We report the results of regressions with robust standard errors that are corrected for clustering. The results are based on 251 observations over nine seasons (1990-1999).

	(1) Percent of Team White (TWHITE) %	(2) Percent of Bench White (BWHITE) %	(3) Percent of Starters White (SWHITE) %
Explanatory Variables	Coefficient (t-statistic)	Coefficient (t-statistic)	Coefficient (t-statistic)
POPWHITE: Percent White of SMSA Population (%)	0.14*** (2.07)	0.10 (1.12)	0.19*** (2.60)
STADIUMCAP (000)/ POP (000,000): Stadium Capacity Per Thousand Population	0.27*** (2.18)	.031** (1.74)	0.74* (1.64)
TIME (1-9)	-0.69*** (-3.94)	-1.03*** (-4.52)	-0.10 (-0.35)
CONSTANT	11.41*** (2.21)	18.78*** (2.99)	-3.03 (-0.54)
Adj. R ²	0.08	0.07	0.05

* = t-Statistic significant at .15 level

** = t-Statistic significant at .10 level

*** = t-Statistics significant at .05 level

Table 5

Team Revenues from Home Game Attendance

The models below show the natural log of home game revenue, estimated as average ticket price times average attendance (TICKET PRICE * ATTENDANCE) as a function of explanatory variables, including the variables describing the racial composition of the team. The results are based on 252 observations over nine NBA seasons (1990-1999). T-ratios are calculated using robust standard errors. Variable definitions and data sources appear in Appendix B.

Dependent Variable: Home Game Revenues (\$000)	Model (1)	Model (2)	Model (3)
Explanatory Variables:	Coefficient (t-ratio)	Coefficient (t-ratio)	Coefficient (t-ratio)
WINPER: Team winning percentage (%)	4.57*** (8.68)	4.44*** (8.38)	4.52*** (8.57)
COMPETITORS: Number of competing professional sports franchises in the city	-27.73** (-2.42)	-28.02** (-2.46)	-27.60** (-2.41)
STADIUMCAP: Stadium capacity (000)	22.02*** (6.77)	23.30*** (6.88)	23.28*** (6.85)
INCOME (000)	11.22*** (3.32)	11.89*** (3.51)	11.84*** (3.48)
POP: Total SMSA Population (millions)	2.62*** (4.67)	2.53*** (4.52)	2.43*** (4.36)
TIME: Time trend (1-9)	29.39*** (5.88)	16.18*** (1.86)	16.51** (1.86)
TWHITE: percent of team who are white (%)	1.05 (1.26)	-1.25 (-0.84)	
TWHITE*TIME		0.56* (1.85)	
(TWHITE/POPWHITE): Ratio of percent of team who are white to percent of SMSA population who are white			-130.49 (-1.14)
(TWHITE/POPWHITE)*TIME			40.80* (1.75)
CONSTANT	-595.25	-549.94	-539.21
Adj. R ²	0.61	0.62	0.61

Robust standard errors

*=t-Statistic significant at .10 level

**=t-Statistic significant at .05 level

***=t-Statistic significant at .01 level

Appendix A

Performance Statistics for NBA Guards

The table shows the mean values of 12 performance measures for 205 NBA players classified as starters at the guard position and 407 classified as bench guards. The measures are averaged over three seasons (1996-97, 1997-98, and 1998-1999). A player is classified as a starter if he is one of the five players on the team who played the most total minutes over the course of the season. Except as noted, all performance measures are standardized by total minutes played in the season.

Performance Measure	Mean Performance Measure for Starters		t-test of Difference in Means	Mean Performance Measure for Bench		t-test of Difference in Means
	Black Players	White Players		Black Players	White Players	
Assists	.124	.139	-.776	.115	.115	.007
Blocks	.009	.004	4.084***	.010	.007	1.581
Defensive rebounds	.078	.079	-.284	.077	.086	-1.086
Field-goal percentage	.429	.436	-.453	.401	.403	-.512
Free-throw percentage	.780	.814	-2.282**	.670	.796	-4.070***
Offensive rebounds	.026	.019	2.336**	.035	.026	1.615
Personal fouls	.073	.062	2.720**	.095	.094	.227
Points	.405	.360	2.009*	.348	.322	1.187
Steals	.040	.037	.892	.043	.037	1.732*
Three-point percentage	.332	.374	-2.784***	.259	.314	-2.386**
Turnovers	.062	.059	.672	.072	.066	.960
Rebounds	.104	.099	.703	.111	.111	.012
Number of observations	94	13		162	29	

Note—Total sample size equals 205 starters (25 who are white and 180 who are black) and equals 407 bench players (61 who are white and 346 who are black)

* = significant at the .10 level, two-tailed test

** = significant at the .05 level, two-tailed test

*** = significant at the .01 level, two-tailed test

Appendix A, cont.

Performance Statistics for NBA Centers

The table shows the mean values of 12 performance measures for 90 NBA players classified as starters at the Center position and 233 classified as bench Centers. The measures are averaged over three seasons (1996-97, 1997-98, and 1998-1999). A player is classified as a starter if he is one of the five players on the team who played the most total minutes over the course of the season. Except as noted, all performance measures are standardized by total minutes played in the season.

Performance Measure	Mean Performance Measure for Starters		t-test of Difference in Means	Mean Performance Measure for Bench		t-test of Difference in Means
	Black Players	White Players		Black Players	White Players	
Assists	.044	.049	-.620	.034	.034	.011
Blocks	.047	.050	-.357	.046	.034	1.995**
Defensive rebounds	.171	.175	-.386	.171	.146	2.021**
Field-goal percentage	.487	.500	-1.002	.468	.400	2.632***
Free-throw percentage	.662	.703	-1.583	.580	.603	-.531
Offensive rebounds	.086	.088	-.212	.098	.078	2.944***
Personal fouls	.104	.115	-1.733*	.143	.177	-1.658
Points	.408	.406	.078	.322	.307	.575
Steals	.026	.025	.480	.027	.021	1.917*
Three-point percentage	.097	.099	-.061	.040	.134	-2.661***
Turnovers	.059	.061	-.422	.067	.081	-.719
Rebounds	.257	.262	-.399	.269	.223	2.877***
Number of observations	31	15		61	51	

Note— Total sample size equals 90 starters (25 who are white and 65 who are black) and equals 233 bench players (99 who are white and 134 who are black)

* = significant at the .10 level, two-tailed test

** = significant at the .05 level, two-tailed test

*** = significant at the .01 level, two-tailed test

Appendix A, cont.

Performance Statistics for NBA Forwards

The table shows the mean values of 12 performance measures for 232 NBA players classified as starters at the Forward position and 415 classified as bench Forwards. The measures are averaged over three seasons (1996-97, 1997-98, and 1998-1999). A player is classified as a starter if he is one of the five players on the team who played the most total minutes over the course of the season. Except as noted, all performance measures are standardized by total minutes played in the season.

Performance Measure	Mean Performance Measure for Starters		t-test of Difference in Means	Mean Performance Measure for Bench		t-test of Difference in Means
	Black Players	White Players		Black Players	White Players	
Assists	.066	.074	-.788	.048	.049	-.241
Blocks	.022	.016	1.567	.025	.023	.422
Defensive rebounds	.133	.126	.753	.126	.126	-.007
Field-goal percentage	.463	.464	-.010	.427	.419	.500
Free-throw percentage	.727	.802	-2.862**	.631	.688	-1.620
Offensive rebounds	.063	.050	1.737	.076	.056	3.540***
Personal fouls	.090	.083	1.135	.123	.117	.690
Points	.417	.402	.458	.345	.328	.751
Steals	.033	.031	.932	.033	.030	.689
Three-point percentage	.222	.287	-1.372	.147	.209	-1.987*
Turnovers	.058	.056	.436	.065	.057	1.401
Rebounds	.197	.176	1.268	.202	.182	1.890*
Number of observations	107	11		167	36	

Note— Total sample size equals 232 starters (22 who are white and 210 who are black) and equals 415 bench players (64 who are white and 351 who are black)

* = significant at the .10 level, two-tailed test

** = significant at the .05 level, two-tailed test

*** = significant at the .01 level, two-tailed test

Appendix B

Variable Definitions and Data Sources

Variables	Definition	Data Source
A) Player Performance Measures: Tables 2, 3, Appendix A		
All variables are measured over three NBA seasons, 1996-98		
Assists	Total number of assists per minute played	www.nba.com (statistics)
Blocks	Total number of blocks per minute played	
Defensive rebounds	Total number of defensive rebounds per minute played	
Field-goal percentage	Percent of the player's field goal attempts that were successfully completed	
Free-throw percentage	Percent of the player's free-throw attempts that were successful	
Offensive rebounds	Total number of offensive rebounds per minute played	
Personal fouls	Total number of personal fouls called on the player per minute played	
Points	Total number of points scored per minute played	
Steals	Total number of steals per minute played	
Three-point percentage	Percent of successful three point throw attempts by the player	
Turnovers	Total number of turnovers by the player per minute played	
Rebounds	Total defensive and offensive rebounds per minute played	
B) Variables in Regressions: Tables 4, 5		
ATTENDANCE	Average home attendance for each team (000)	NBA Register (Sporting News): various years and www.nba.com (statistics)
BWHITE	Percent of bench players who are white, where an observation is a player year; a player is classified as a bench player if the player is not a starter	NBA Register, Sporting News, St Louis, Missouri (various years), the number of minutes each player played in from the Official NBA Guide, Sporting News, St. Louis, Missouri (various years).
CHAMPION	Indicator variable that equals 1 if team won the NBA Championship that year; otherwise equals 0	www.nba.com
COMPETTORS	Number of competing professional sports franchises (MLB, NBA, NFL, NHL) in the SMSA area in which the NBA team is located	Websites for the four professional sports leagues: www.nba.com , www.mlb.com , www.nhl.com www.nfl.com
INCOME	Per capita income of the population in the team's SMSA (\$000)	NBA Register, Sporting News, St. Louis, Missouri (various years)

POP	Total SMSA Population (000,000)	US 1990 Census, and US Census County and City Extra: <u>Annual Metro, City and County Data Book: For Toronto and Vancouver, Canadian Ministry of Finance, http://www.becstats.gov.bc.ca/index.htm.</u>
POPWHITE	Percent white of the population in the SMSA in which the NBA team is located	US 1990 Census, and County and City Extra: <u>Annual Metro, City and County Data Book</u>
STADIUMCAP	Capacity of the stadium in which the team plays its home games (000)	<u>www.nba.com</u> , supplemented by data from and from telephone calls to teams to verify capacity in various years.
SWHITE	Percent of team starters who are white, where an observation is a player year; a player is classified as a starter if he is one of the five team members who played the most total minutes over the course of the season	<u>NBA Register</u> , Sporting News, St. Louis, Missouri (various years)
TICKET PRICE	Average ticket price (\$) for home games during regular season	<u>http://www.teammarketing.com</u> by NBA team, by season, 1990-1999
TIME	Time trend (1-9)	
TWHITE	Percent of the team members who are white, where an observation is a player year	<u>NBA Register</u> , Sporting News, St. Louis, Missouri (various years)
WINPER	Log of the percent of total games that the team won over the course of the regular season	<u>Official NBA Guide</u> (various years)