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Has the NFL's Rooney Rule Efforts "Leveled the Field" for African American Head Coach Candidates?

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Keywords

Affirmative action, African American, Coaching, Defensive coordinator, Discrimination, Football, Head coaches, Hiring disadvantage, NFL, Offensive coordinator, Performance advantages, Race, Racial differentials, Regression analysis, Rooney Rule, Sports

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Abstract

Madden (2004) and Madden and Ruther (2009) provide evidence that African American National Football League (NFL) head coaches significantly out-performed their white counterparts between 1990 and 2002. They conclude that this evidence is consistent with the hypothesis that African Americans had to be better coaches than whites in order to be hired as a head coach in the NFL. In 2002, the NFL promulgated the Rooney Rule requiring NFL teams to interview a minority candidate when appointing new head coaches, as well as other affirmative efforts. This paper analyzes whether the performance advantage of African American head coaches has been eliminated in the time since the Rooney Rule's affirmative efforts have been in effect. The paper also examines racial differentials in performance in other NFL coaching positions that were less affected by Rooney Rule affirmative efforts, finding no similar time trends in performance differentials by race.

Madden (2004) and Madden and Ruther (2009) provide evidence that African American National Football League (NFL) head coaches significantly out-performed their white counterparts between 1990 and 2002. They conclude that this evidence is consistent with the hypothesis that African Americans had to be better coaches than whites in order to be hired as a head coach in the NFL. In December of 2002, the NFL established the "Rooney Rule," which requires NFL teams to interview a minority candidate when making a new appointment to a head coaching position. In addition to the interview requirement, the NFL also established a data bank that included all members of minority groups currently in other coaching positions in the NFL and expanded minority training and internship programs. When we refer to the Rooney Rule in this paper, we include all aspects of the NFL's new efforts, including (but not isolating) the interview requirement.

Figure 1 shows the number of African American NFL head coaches from 1990 (when Art Shell became the first African American coach in the modern era) until 2009. There were two African American head coaches in the NFL when the Rooney Rule was put in place. Only four years later, there were seven African American head coaches. The increase in the number of African American coaches over the seven years since the Rooney Rule was established is truly remarkable. The time pattern of the increases suggests that the Rooney Rule affirmative efforts were effective.

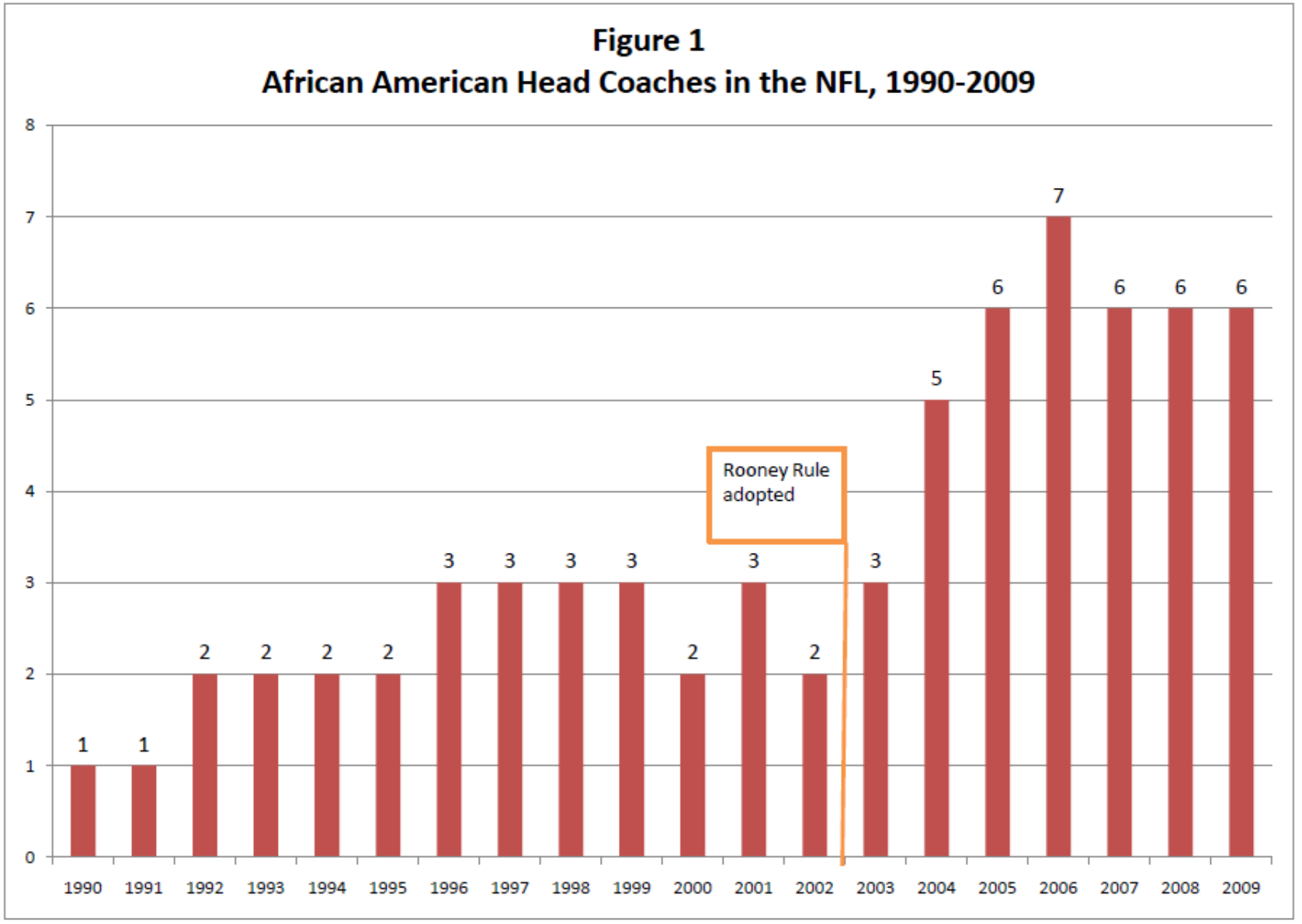
Figure 1
African American Head Coaches in the NFL, 1990-2009
Rooney Rule adopted
1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009
1 1 2 2 2 2 3 3 3 3 2 3 2 3 5 6 7 6 6 6
0 1 2 3 4 5 6 7 8

In this paper we use Madden's analytical approaches to test whether the performance advantage of African American head coaches has been eliminated in the time since the Rooney Rule hasbeen in effect. This outcome would be consistent with Rooney Rule-type affirmative effort reducing the hiring disadvantage for African Americans. We examine whether the Rooney Rule has allowed African Americans with the same skills as whites to be hired; that is, we analyze whether African American and white head coaches now have equivalent performance records. We find that the significant and large performance advantages of African American coaches in the pre-Rooney Rule period of 1990 through 2002 disappear in the post-Rooney Rule period of 2003 through 2009. This study provides new evidence that, for the time period since the implementation of the Rooney Rule, the African American head coach performance advantage has been eliminated. This evidence is consistent with successful African American and white head coach candidates meeting comparable performance standards to be hired and continued in their jobs.

The tier of NFL coaching positions below head coach, offensive and defensive coordinators, is not covered by the Rooney Rule interview requirement, although these positions are affected by the other affirmative efforts described above. We also examine racial differences in performance for this group, pre and post Rooney Rule, in order to consider other potential influences on the time patterns of performance differentials by race among head coaches and also to provide additional evidence on pre and post Rooney Rule hiring. We find no similar time trends in performance patterns by race for coordinators. We believe that the observed patterns—in particular, the post Rooney Rule increase in African American head coaches, the elimination of the performance advantages of African American head coaches, and the stronger evidence of racial differentials in pre-Rooney Rule hiring relative to firing of head coaches—are consistent with the Rooney Rule activities improving racial neutrality in head coaching employment within the NFL post-2002 period.

The next section presents the analyses comparing the 1990-2002 and 2003-2009 performance of head coaches by race, the third section analyzes racial performance differentials among offensive and defensive coordinators, and the last section summarizes our conclusions.

Head Coach Records by Race, 1990-2002 and 2003-2009

Madden (2004) examines the regular season performance of all coaches, first year coaches, and fired coaches, documenting large, statistically significant racial differences in performance for all coaches and for first year coaches (in spite of the small number of African American head coaches) and smaller differences, that is, less likely to be statistically significant, for fired coaches. She interprets her results as consistent with African Americans being held to higher standards when being appointed as head coaches.

The small numbers of African American coaches forced Madden to compare average performances by race.[1] She acknowledges that discrimination in hiring does not necessarily yield racial differences in performance among the average coaches, but racial differences at the margin -- that is, discrimination occurs when the marginal or last African American coach hired must be better than the marginal white coach.[2] Because the performance levels of the few African American coaches hired

[1] The small number of African American coaches inevitably creates problems in the precision of the estimates of the effects of race. With small numbers, outliers will have greater effects on coefficients. As Madden (2004) showed, however, there were no "outlier" performances, either at the high or low end, for African American coaches during the 1990-2002 period. For the 2003-2009 period, however, two African American coaches went to the Super Bowl, creating two potential upper end "outliers." If we remove the year-coach observations for all such outliers—that is, Super Bowl participants—from our analyses, the racial differentials for 1990-2002 increases and the findings of no racial differentials for 2003-2009 remain. In the absence of outliers affecting the coefficients, however, the main issue is the lack of precision. The small population of African American coaches makes it more difficult to detect racial disparities when they truly exist. The finding of racial disparities with small populations, then, is consistent with a strong pattern.

[2] Richard Posner noted that discrimination usually only affects decisions at the margins, arguing that the very talented are appointed in spite of their status. He writes: "Proof of discrimination is always difficult. Defendants of even minimal sophistication will neither admit discriminatory animus nor leave a paper trail demonstrating it; and because most employment decisions involve an element of discretion, alternative hypotheses (including that of simple mistake) will always be possible and often plausible. Only the very best

between 1990 and 2002 were tightly clustered above the mean (that is, they were not in the tails of the distribution of performance, neither attaining the Super Bowl nor having losing records), however, analyses of average racial differentials in performance were consistent with different treatment at the lower margin, that is at lower levels of performance. There were no losing African American coaches, only losing white coaches during the 1990 through 2002 time period.

For the longer period of 1989 through 2007, Branham (2008) confirms Madden's results as he also finds that African American coaches outperform whites in the regular season and perform at similar levels in the playoffs. He does not consider, however, whether performance differences by race change after the initiation of the Rooney Rule affirmative efforts.

All coaches. The significant and large regular season performance advantages of African American coaches that Madden finds in the pre-Rooney Rule period of 1990 through 2002 have disappeared in the post-Rooney Rule 2003 through 2009 period. The top panel of Table 1 shows the significantly higher season wins and likelihood of making the playoffs for African American coaches between 1990 and 2002, which Madden reported. The bottom panel repeats the same analysis for the post-Rooney Rule period of 2003 through 2009. In the period since the Rooney Rule was adopted and the number of African American coaches has increased, there is no difference in the performance of white and African American coaches.

The t-statistics reported in Table 1, and for the tables that follow, are based on the coefficients of race in regression analyses. For the analyses of season wins, we use truncated (from above and below) linear regression specifications in all of the tables. For the analyses of proportions in the playoffs, we use logit regression specifications. For all regression analyses, we compute robust

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workers are completely satisfactory, and they are not likely to be discriminated against -- the cost of discrimination is too great. The law tries to protect average and even below-average workers against being treated more harshly than would be the case if they were of a different race, sex, religion, or national origin, but it has difficulty achieving this goal because it is so easy to concoct a plausible reason for not hiring, or firing, or failing to promote, or denying a pay raise to, a worker who is not superlative." Riordan v. Kempiners 831 F.2d 690 (7th Circuit, 1987)

standard errors to compute t-statistics, clustering the multiple observations for the same individual coach.

Fee et al (2006) develop another measure of team performance that we use in Table 1. They construct a variable, standardized team performance, based on a team's winning percentage. Teams were reverse-ranked based on the percentage of games won, and these rankings were normalized over the numerical range 0 to 1 for each season.[3] Teams with identical records received the same ranking and had identical team performance measures. The highest winning team is ranked at 1 and the lowest at 0, with the mean equal to 0.5. The normalization technique results in a measure that has similar statistical properties within each season, making comparisons across different seasons more accurate. It also minimizes the influence of outlying values in any of the performance variables. For this measure of coaching performance, as well, African American coaches out-performed white coaches before the Rooney Rule was adopted and have equivalent performance to their white counterparts after the Rooney Rule.

Table 1
Average Season Wins and Probability of Making the Playoffs for Full Season NFL Coaches by Race, 1990-2002 and 2003-2009

	African American Coaches	White Coaches	t-statistic for difference by race
1990-2002			
Average wins per year	9.1	8.0	2.57
Proportion in playoffs	69%	39%	3.51
Standardized team performance	0.623	0.499	3.24
Number of coach- year observations	29	345	
2003-2009			
Average wins per year	8.1	8.2	-0.06
Proportion in playoffs	38%	39%	-0.08
Standardized team performance	.517	.514	0.08
Number of coach- year observations	39	175	

[3] The team with the worst win-loss record was given a ranking of 1 and the team with the best win-loss record was given a ranking equal to the number of teams in the league during that season. The normalized statistic is calculated as the rank of the team minus one, divided by the total number of teams minus one.

Because the teams that hired African American coaches in the 1990 to 2002 period had better records prior to the hires,[4] Madden uses the ratio of team payroll to league mean payroll as an index of team quality when analyzing racial differences in overall records. With these controls, she still finds significantly better season records for African American coaches for 1990 through 2002. Table 2a repeats those analyses for the pre-Rooney Rule and post-Rooney Rule periods and adds analyses of standardized team performance.[5] For the post-Rooney period of 2003 to 2009, African American coaches are performing at levels similar to white coaches when their teams paid equivalent salaries to

Table 2a
Regular Season Wins, Probability of Making the Playoffs, and Standardized Team Performance by Race, 1990-2002 and 2003-2009, Controlling for Team Salaries
(numbers in parentheses are t-statistics)

Independent variables and time period	Regular Season Wins	Whether in Playoffs	Standardized Team Performance
1990-2002			
Coach is African American	1.11 (2.26)	1.25 (3.14)	0.13 (2.76)
Ratio of Team Payroll to League Mean	4.77 (3.93)	2.99 (3.67)	0.52 (3.98)
Constant	3.22 (2.62)	-3.43 (-4.14)	-0.02 (-0.14)
2003-2009			
Coach is African American	0.02 (0.02)	-0.02 (-0.04)	0.01 (0.15)
Ratio of Team Payroll to League Mean	5.58 (3.10)	1.56 (1.45)	0.47 (2.63)
Constant	2.57 (1.42)	-2.00 (-1.89)	0.04 (0.25)

[4] Madden (2004) shows that teams hiring African American head coaches between 1990 and 2002 had won more games in the prior season. Also, Goff and Tollison (2008) find weak evidence that teams with more wins in the prior year were more likely to have an African American coach in the 1987 through 2007 period.

[5] The regression results for standardized team performance are also based on a truncated linear regression with t-statistics computed using robust standard errors clustered for each coach.

players. Table 2b uses another measure of team quality, the *Sports Illustrated* pre-season ranking of the team.[6] Using that index, African American coaches have statistically insignificant better season win records and statistically significant better likelihoods of making the playoffs than white coaches in the1990 through 2002 period. For the 2003 to 2009 period, there are no racial differences in either the win records or the odds of being in the playoffs.

Table 2b
Regular Season Wins, Probability of Making the Playoffs, and Standardized Team Performance by Race 1990-2002 and 2003-2009, Controlling for *Sports Illustrated* Pre-Season Team Rank (numbers in parentheses are t-statistics)

Independent variables and time period	Regular Season Wins	Whether in Playoffs	Standardized Team Performance
1990-2002			
Coach is African American	0.66 (1.43)	1.11 (2.62)	0.08 (1.84)
***Sports Illustrated* Pre-Season Rank**	-0.17 (-9.23)	-0.12 (-6.35)	-0.02 (-9.24)
Constant	10.61 (33.29)	1.30 (4.42)	0.78 (22.25)
2003-2009			
Coach is African American	0.15 (0.22)	0.04 (0.10)	0.03 (0.43)
***Sports Illustrated* Pre-Season Rank**	-0.13 (-4.80)	-0.06 (-2.70)	-0.01 (-4.94)
Constant	10.22 (21.79)	0.44 (1.28)	0.72 (16.43)

[6] These rankings appeared in the NFL preview issue of *Sports Illustrated* each year. While *Sports Illustrated* does not consistently rank the teams each year, they do produce a predicted win-loss record, which we convert into a ranking. As a pre-season ranking predicts season outcomes based on *all* the characteristics that influence team outcomes, coaching ability (and possibly race) contributes to the ranking. For this reason, the preseason ranking does not reflect team quality net of coaching quality, which is the desired measure. Rather, preseason ranking reflects the combined effects of perceived coaching and team quality.

In order to assess the potential endogeneity of pre-season ranking and race, we estimated a two stage least squares model predicting wins for first year coaches, controlling for race and pre-season ranking. The first stage regressed ranking on the team's previous year record (i.e., number of wins). While the first stage for 1990-2002 showed that teams with new African American coaches had a significantly poorer ranking (and an insignificantly poorer one for 2003-2009), a Hausman specification test rejected endogeneity for both time periods.

First year coaches. As with overall records, the significant advantage of African Americans in their first year as the team's head coach has also become an insignificant advantage for white coaches. Table 3 shows the season wins, likelihoods of making the playoffs, and standardized team performance measures for first year coaches by race from 1990 to 2002 and for the post-Rooney period of 2003 to 2009. As with the overall records, there is no longer evidence that African American coaches are out-performing white coaches.

Table 3
Average Season Wins and Probability of Making the Playoffs
In First Full Season as an NFL Coach by Race, 1990-2002 and 2003-2009

	African American Coaches	White Coaches	t-statistic for difference by race
1990-2002			
Average wins per year	9.6	7.0	3.61
Proportion in playoffs	71%	23%	3.46
Standardized team performance	0.66	0.40	3.83
2003-2009			
Average wins per year	7.1	7.0	0.23
Proportion in playoffs	30%	28%	0.14
Standardized team performance	0.43	0.41	0.17

Fired coaches. We also analyze racial differentials in likelihood of being fired as a head coach. Madden (2004) and Madden and Ruther (2009) find evidence that African American coaches were disproportionately fired given their performance records between 1990 and 2002, albeit at a weaker level than they found for differences in performance. Fired coaches are a selected group. Teams that hired African American coaches are not necessarily representative of those who failed to hire them. If teams that hire African American coaches were, on average, more racially neutral in their decision making than those who did not, we would expect smaller racial disparities in firing than in hiring.[7]

[7] We are grateful to a referee who brought this point to our attention.

Madden (2004) and Madden and Ruther (2009) regress the probability of being fired on the regular-season win record, whether the team made the playoffs, the total years the coach is head coach of the team, and race. The results are shown in Table 4a. Between 1990 and 2002, African American coaches were more likely to be fired, conditional on performance. In the post Rooney Rule period, however, African Americans were insignificantly less likely to be fired.[8]

Table 4a
Determinants of Being Fired, Full Season NFL Head Coaches, 1990-2002 and 2003-2009, Logit Regression with "Whether Fired" as Dependent Variable

	1990-2002		2003-2009	
Independent variables	**Coefficient**	**t-statistic**	**Coefficient**	**t-statistic**
Coach is African American	0.892	2.15	-0.448	-0.81
Regular season wins	-0.450	-4.62	-0.451	-3.29
Whether in playoffs	-0.727	-1.01	-1.114	-1.05
Total years with team	0.816	3.04	0.643	1.80
Square of total years with team	-0.058	-2.30	-0.044	-1.25
Constant	-0.264	-0.47	-0.258	-0.29

There are two potential problems with the analyses of firing reported in Table 4a. First, they exclude head coaches who were fired during the season.[9] Second, the independent variables measuring performance are potentially endogenous. Above, we establish that performance outcomes, such as regular season wins and whether in playoffs, are endogenous to race (Tables 1, 2a, 2b). We also establish that the relative level of player compensation is a predictor of winning (Table 2a). In Table 4b, we re-analyze firing. Table 4b differs from Table 4a in two ways: first, we include all NFL coaches who

[8] We also analyzed head coach turnover using the model of total turnover (that is, both voluntary and involuntary) that Fee et al (2006) use in their Table 6. There is no significant differential in overall turnover by race for the 1990-2002 time period, but African American head coaches are more likely to be fired using the Fee et al model. There were no African American coaches who voluntarily left their head coach job in the 1990-2002 period.

[9] Madden and Ruther (2009) responded to this issue, as initially raised by Malone et al (2008). Madden and Ruther show that the Madden (2004) results hold after adding the "within season" fires as long as the specification and the data are correct (both of which were not the case for the Malone et al analysis). To include partial seasons, the specification of the performance variable obviously must be changed from total wins in season to percentage wins in season.

start the season, including those who are fired before the season is completed; and second, we use two probit regression analyses, one that is equivalent to the logit analyses in Table 4a and one that instruments performance (percentage of games won in current season) with the variable measuring the ratio of team payroll to the league mean team payroll. It is apparent that the instrumentation of win records has little effect on the estimate of the effect of race on firing (although it has substantial effects on the estimate of the effects of performance in the first period). Our results are robust to these

Table 4b
Determinants of Being Fired, NFL Head Coaches at Start of Each Season, 1990-2002 and 2003-2009, Probit Regression with "Whether Fired" as Dependent Variable With and Without Instrumental Variable for Win Record (numbers in parentheses are t-statistics)

	1990-2002		2003-2009	
Independent variables	**Probit**	**IV Probit**	**Probit**	**IV Probit**
Coach is African American	0.44 (1.76)	0.42 (2.11)	-0.37 (-1.24)	-0.38 (-1.25)
Percentage wins	-4.02 (-4.55)	2.66 (0.50)	-3.70 (-3.55)	-2.76 (-0.62)
Total years with team	0.46 (3.72)	0.31 (1.36)	0.39 (2.62)	0.38 (2.45)
Square of total years with team	-0.03 (-2.87)	-0.02 (-1.41)	-0.03 (-1.98)	-0.03 (-1.97)
Whether made playoffs	-0.42 (-1.18)	-2.00 (-1.98)	-0.53 (-1.20)	-0.81 (-0.58)
Constant	-0.15 (-0.45)	-2.15 (-1.64)	-0.27 (-0.61)	-0.59 (-0.39)

specification differences. Between 1990 and 2002, African American coaches were more likely to be fired, conditional on performance. In the post Rooney Rule period, however, African Americans were insignificantly less likely to be fired.

Playoff records. The only part of coaching where Madden finds evidence of inferior performance by African American coaches between 1990 and 2002 is with respect to wins in the playoffs. Because African American coaches were bringing weaker teams into the playoffs (in that they seemingly produced more season wins out of a team than white coaches and so made the playoffs with

weaker players), it is necessary, but very difficult, to control for the difference by race of head coach in the underlying quality of the team when comparing wins in the playoffs. Interestingly, the racial disparity in playoff wins for 1990 through 2002, which favored white coaches, also disappears post-Rooney Rule.[10] There is no difference in playoff wins by race between 2003 and 2009 for those coaches who made the playoffs; both African American and white coaches average 0.9 wins if they make the playoffs. Table 5 shows the results of regressions of playoff wins on race of coach, playoff seed, pre-season *Sports Illustrated* ranking, and number of regular season wins for coaches who made the playoffs between 1990 and 2002 and between 2003 and 2009. African American coaches fared worse in the 1990-2002 period. After 2002, however, there is no racial difference in the likelihood of winning a playoff game, given seeding in the playoffs, regular season win record, and pre-season ranking.[11]

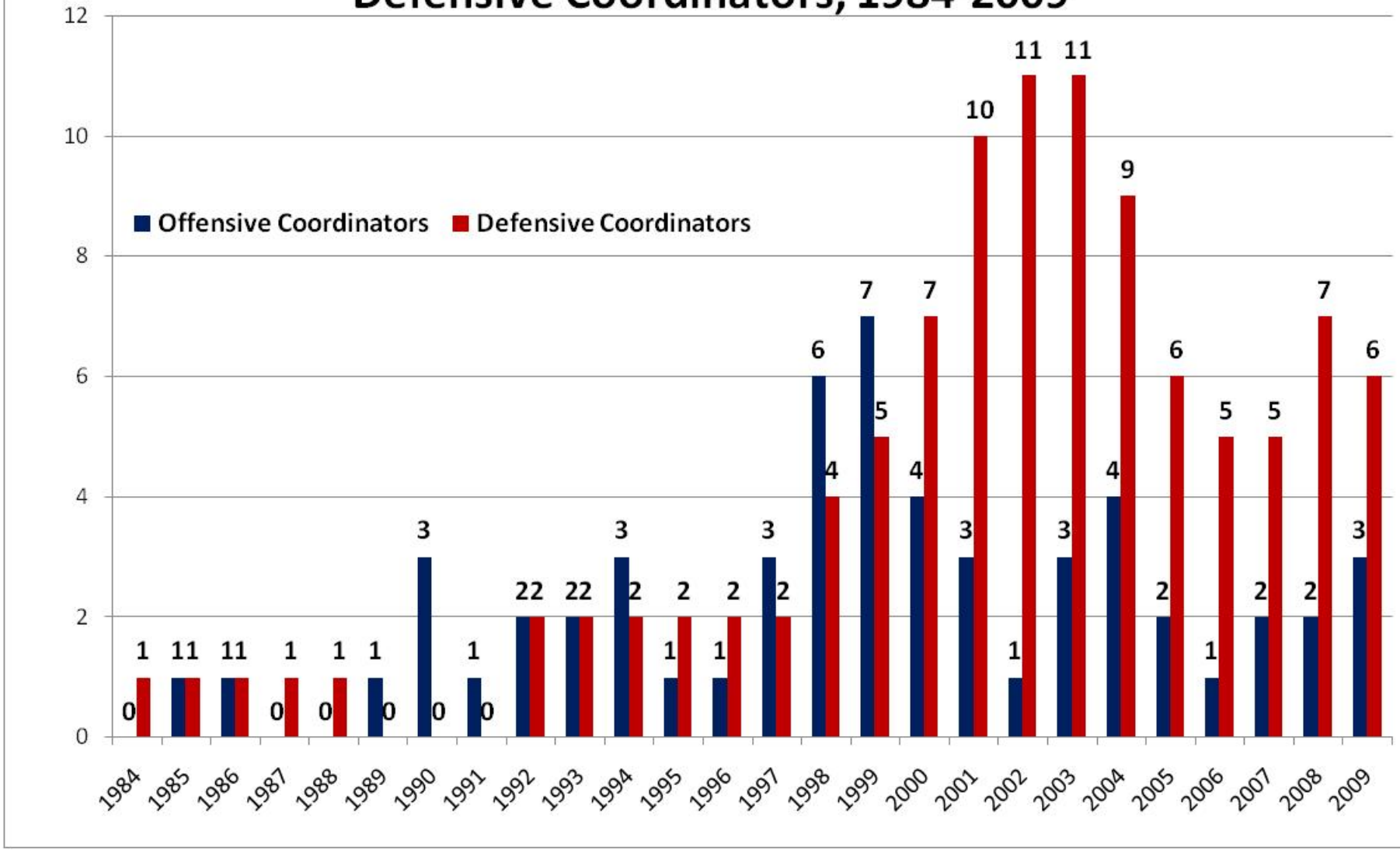
Table 5
Determinants of Playoff Wins, Full Season NFL Head Coaches Who Make the Playoffs, 1990-2002 and 2003-2009

	1990-2002		2003-2009	
Independent variables	**Coefficient**	**t-statistic**	**Coefficient**	**t-statistic**
Coach is African American	-0.38	-2.17	-0.25	-0.68
Regular season wins	0.18	1.60	0.15	0.72
Playoff seeding	-0.27	-2.74	0.03	0.12
***Sports Illustrated* Pre-Season Rank**	-0.008	-0.43	-0.05	-1.78
Constant	-0.36	-0.24	-0.88	-0.31

[10] Of course, this relative improvement in playoff wins for African American coaches is due in part to Lovie Smith's and Tony Dungy's teams playing in the Super Bowl in 2007.

[11] Branham (2008) used playoff seeding in his analyses of racial differences in playoff success. Of course, seeding in the playoffs, regular season win record and pre-season ranking are highly correlated. With the smaller number of observations between 2003 and 2009, the coefficients of multi collinear variables were more difficult to measure. These variables are used as control variables in order to increase the precision of the measured racial effects once quality of team is controlled and not to yield measures of the individual effects of these indicators of team performance or quality on playoff results.

Figure 2
Number of African American NFL Offensive and Defensive Coordinators, 1984-2009



Offensive and Defensive Coordinators

Appointments to offensive and defensive coordinator coaching positions are not covered by the interviewing requirement part of the Rooney Rule. Figure 2 shows the numbers of African American offensive and defensive coordinators between 1984 and 2009. The numbers do not increase starting with the 2003 season. Rather, the numbers increase in the late 1990s, actually peaking (both in the total number and as a proportion of all coordinators) in 2003.

Performance. We analyze racial differences in performance in these two positions using similar approaches. We use the Fee et al (2006) standardized measures of coordinator performance, which are similar to the standardized measures of team performance that we discuss above. The performance measure for the offensive coordinators is based on a ranking of the total points scored in the season, with ties broken using the number of yards gained during the season. The performance measure for the defensive coordinators is based on a ranking of the total points allowed in the season, also breaking ties using the number of yards allowed during the season. The individual performance measures were then normalized within each season. Points for the season are translated into percentiles for all teams, giving the offensive coordinator rank of 1 to the largest number of points scored by a team in a season and the smallest number a rank of 0. Similarly, the defensive coordinator of the team with the smallest number of points scored against his defense receives a rank of 1 and the defensive coordinator with the most points scored against his team receives a rank of 0. The normalization technique results in a measure that has similar statistical properties within each season, making comparisons across different seasons more accurate. It also minimizes the influence of outlying values in any of the performance variables.

Table 6 reports the averages of these indicators for African American and white defensive and offensive coordinators for 1984-2002 and for 2003-2009.[12] There was no racial difference in coordinator

[12] We use 1984 as the start point for the data because 1984 is the first year with an African American coordinator (Tony Dungy as defensive coordinator for the Pittsburgh Steelers).

performance before the Rooney Rule. From 2003 to 2009, African American defensive coordinators have insignificantly stronger performance and African American offensive coordinators have insignificantly poorer performance.

Table 6
Average Standardized Measures of Performance for
Defensive and Offensive Coordinators by Race, 1984-2002 and 2003-2009

	African American Coordinators	White Coordinators	t-statistic for difference by race*
1984-2002			
Defensive	0.486	0.503	-0.20
Offensive	0.470	0.510	-0.50
2003-2009			
Defensive	0.542	0.488	1.23
Offensive	0.340	0.517	-1.59

The records for offensive and defensive coordinators by race may seem surprising. If there were under hiring of African American head coaches and coordinators were the pool from which head coaches were selected, then one might expect that some of the better performing African American coordinators were not promoted while comparably performing white coordinators were, leading to better average performance for African American coordinators relative to their white counterparts, at least in the 1990-2002 period. In addition, if there were discrimination in coordinator hiring against African Americans, this might also lead to African Americans being held to higher standards when hired, also resulting in African Americans outperforming white coordinators.

As discussed above, the real indicator of discrimination in hiring is not whether there are racial differences in performance of the average coach, but whether there are racial differences at the margin, that is, whether the marginal or last African American coach hired is better than the marginal white coach. It is possible to have white coordinators performing better than African American coordinators on average and still have discrimination in the hiring of African American coordinators. This situation could arise if some white coordinators perform extremely well while the marginal white coordinator is

worse than the marginal African American coordinator. In fact, we find that there is no significant racial difference in the likelihood that a coordinator performs at a level placing him in either the top quartile or the bottom quartile and also that there is no racial difference in performance among coordinators in either the bottom quartile or the top quartile of performance.

There is no evidence of racial differences in performance of offensive or defensive coordinators. This is consistent with no racial differences in hiring into the coordinator positions. Because the head coach position is the better job, however, it is quite possible for racial barriers to be stronger for head coach positions than for coordinator positions.

Promotion to head coach. In the case of coordinators, we can measure the effects of race on likelihood of promotion to head coach, and on likelihood of dismissal or demotion from the coordinator position, after controlling for performance and other characteristics. Fee et al (2006) studied the job mobility of NFL coordinators from 1970 to 2001, finding that coordinators who perform better in their positions are more likely to obtain a head coaching job with another team and that those who performed more poorly were more likely to be dismissed. While they did not report their regression results on racial differences (a topic that was not relevant to the main work of their paper), they write that between 1970 and 2001 they found no significant racial differences in the likelihood of offensive or defensive coordinators being appointed a head coach by another team and that African American coordinators were significantly (at the 10% level) more likely to receive an internal promotion to head coach and significantly less likely to be dismissed or demoted. They do not draw any conclusions, however, citing the small representation of African Americans among coordinators.

We have used the data generously provided by Fee et al, but exclude observations from the irrelevant time period (1970-1983) when there were no African American coordinators to promote. While the data provided to us do not include racial identifiers, we believe that Fee et al must have miscoded some coordinator race entries in the database they used to analyze race. As there has never

been a within-team promotion of an African American coordinator to head coach, African American coordinators cannot be significantly more likely to receive such a promotion, as reported by Fee et al. As no team has ever hired an African American offensive coordinator from another team to be head coach, there is no way that a logit analysis of hires could yield a racial coefficient, either significant or insignificant.

Using the relevant years for an analysis of racial differentials, which are the years when there are both African American and white coordinators available, Table 7 confirms Fee et. al.'s finding that African American defensive coordinators are insignificantly less likely to be promoted to head coach in the 1984 to 2002 period and had the same experience as white defensive coordinators in the 2003 to 2009 period.

Table 7
Determinants of Promotion to Head Coach for Defensive Coordinators 1984-2002 and 2003-2009: A Logit Analysis

	1984-2002		2003-2009	
Independent variables	**Coefficient**	**t-statistic**	**Coefficient**	**t-statistic**
Coordinator is African American	-0.28	-0.74	-0.07	-0.09
Standardized team defensive performance	1.60	2.47	3.06	2.78
Standardized team offensive performance	-1.43	-1.77	2.36	1.70
Years in position	0.29	2.34	0.20	1.49
Years with team	-0.15	-1.43	0.002	0.02
Age	-0.05	-2.14	-0.14	-2.66
Constant	-0.75	-0.66	0.27	0.11

Because there has never been an African American offensive coordinator promoted to head coach, it is not possible to analyze racial disparity in these promotions using an independent variable for race with a logit model. Therefore, we estimated the expected number of promotions of African Americans promotions from offensive coordinators based on coefficients estimated for the model in Table 7, but estimated for offensive coordinators only. The expected values are shown in Table 8. The expected numbers of African American promotions, predictions based on the logit regression estimated for whites, are the same as those computed using the unadjusted (for characteristics) African American

share of offensive coordinators, implying that there are no racial differentials in the effects of the independent variables on promotion. We evaluate the statistical significance of the shortfall in African

Table 8
Effect of Race on Promotions to Head Coach for Offensive Coordinators 1984-2002 and 2003-2009

	1984-2009	1984-2002	2003-2009
Actual number of African Americans promoted	0	0	0
Expected number of African Americans promoted	2.8	2.1	0.8
Likelihood-ratio Chi Squared	7.19	5.03	2.15
Probability that actual equals expected	0.007	0.025	0.142

American promotions, then, based on a two by two table of counts of offensive coordinators and promotions by race. We expect about three African American offensive coordinators to be promoted between 1984 and 2009, a number that is significantly more than the actual outcome of no African American offensive coordinators being promoted. The racial difference is also significant for 1984-2002, and of a comparable magnitude, but not significant due to the small sample sizes, for 2003-2009.

After finding that the bar was higher for African American coaches to be appointed as head coach before the Rooney Rule, Madden (2004) did not identify the positions from which the African American potential head coaches were not hired. We find some evidence suggesting that more African American offensive coordinators could have been hired in head coaching positions. Table 9 shows the last position held before appointment to a head coaching position for all new appointments made between 1990 and 2002 and between 2003 and 2009. A little over half of these appointments were from the coordinator positions in both time periods,[13] with slightly more coming from defensive coordinator positions. The most obvious racial discrepancy in Table 9 is the total absence of African American head coaches among the 32 appointed from offensive coordinator positions, which account for about a quarter of all new appointments.

[13] Fee et. al. (2006) find that only about 30% of NFL head coaches appointed between 1970 and 2001 were in defensive and offensive coordinator positions immediately prior to their appointments and about 25% were head coaches for another team. Their results imply that promotions from coordinator positions became more likely in the 1990 to 2002 period than they were in the 1970 to 1989 period.

Table 9 Last Position Held before Hire as Head Coach, by Race, Hires between 1990-2002 and 2003-2009												
	1990-2002						2003-2009					
	White		African American		Total		White		African American		Total	
	#	%	#	%	#	%	#	%	#	%	#	%
Head Coach	21	25.0%	2	28.6%	23	25.3%	3	8.1%	1	10.0%	4	8.5%
Offensive Coordinator	21	25.0%	0	0.0%	21	23.1%	11	29.7%	0	0.0%	11	23.4%
Defensive Coordinator	23	27.4%	2	28.6%	25	27.5%	10	27.0%	4	40.0%	14	29.8%
Offensive Positional Coach	6	7.1%	1	14.3%	7	7.7%	3	8.1%	1	10.0%	4	8.5%
Defensive Positional Coach	2	2.4%	1	14.3%	3	3.3%	4	10.8%	2	20.0%	6	12.8%
College	11	13.1%	1	14.3%	12	13.2%	4	10.8%	0	0.0%	4	8.5%
Other*	0	0.0%	0	0.0%	0	0.0%	2	5.4%	2	20.0%	4	8.5%
Total	84	100.0%	7	100.0%	91	100.0%	37	100.0%	10	100.0%	47	100.0%

* All four coaches (Bill Parcells, Joe Gibbs, Dennis Green, and Art Shell) who move from "other" positions were previously head coaches, but more than two years had passed since their previous assignment. Green was out for 3 years, Parcells for 4 years, and Gibbs and Shell for more than 10 years.

Conclusions

The affirmative efforts to open more head coaching positions in the NFL to African Americans has greatly reduced, and likely eliminated, the racial disadvantage in hire into these positions. Since the Rooney Rule was put into place, there are no racial differences in performance among head coaches in the NFL. We find no evidence of a similar time pattern in performance by race for offensive and defensive coordinator positions. For these positions, our evidence is consistent with no racial disadvantages in appointments, either before or after the Rooney Rule affirmative efforts.

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