Assessing Racial Discrimination of Quarterbacks in the NFL Draft

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Introduction

In recent years, the National Football League, known as the NFL, has been riddled with controversy regarding racial issues. One such controversy was brought to the national spotlight with Colin Kaepernick's kneeling protest of the national anthem, which he began in 2016. As a result of his act of defiance against police brutality and racial profiling, Kaepernick was not offered a job from a single NFL team when his contract expired, despite a strong performance in the prior season (Mather, 2019). Kaepernick sued the NFL for colluding to keep him out of the league, and in February 2019, the league paid settlements to both him and fellow protester Eric Reid (Mather, 2019).

This event brought racial issues in the NFL to the forefront of public attention, but it is by no means the first racial controversy to face the league. For one, 94% of NFL franchise owners are white (Harper, 2018), and there is currently only one minority general manager in the league (Corner, 2019). This dismal minority representation is in stark contrast with the racial makeup of the NFL's players, 70% of whom are black (Harper, 2018). The quarterback position is a notable exception, as 82% of NFL quarterbacks are white. Until 1993, only 8 black quarterbacks had ever played in the NFL (Berri & Simmons, 2009).

The exceptionally low number of minority quarterbacks is at least partially due to longstanding stereotypes regarding minority athletes. The quarterback position is widely considered the most important in the game, and success depends heavily on mental traits like leadership ability and football acumen. Early in their athletic careers, minority youth players are often ushered away from the quarterback position due to stereotypes about their capacity to learn these intangible skills (Ferrucci & Tandoc, 2018). Stereotypes have been shown to play out at the professional level as well. A Washington Post study found racially-stratified language in quarterback draft profiles hosted on the NFL's website; while minority quarterbacks tend to be discussed in terms of their physical attributes, white quarterbacks are more often praised for their intelligence, understanding of the game, command of the team, and poise under pressure (Boylan et al., 2017).

To address the potential effect of racial stereotypes on NFL players, this study will use quantitative methods to determine whether minority quarterbacks are systematically undervalued in the NFL Draft. By comparing empirical data on draft decisions and outcomes, statistical methodology may be used to isolate the potential effect of racial stereotypes on draft day.

Prior Studies

Previous studies have reached differing conclusions in evaluating quantitative evidence for discrimination in the NFL. Overall, researchers have employed similar methodologies, but certain nuances in their analyses and assumptions have resulted in conflicting findings.

The earliest relevant studies were performed by labor economist Lawrence M. Kahn in 1992 and Mark Gius and Donn Johnson in 2000. These authors developed log-linear regression models to determine whether race influences salary while controlling for exogenous variation. In his final model specification, Kahn observed no significant effect of race on salary when controlling for other known determinants of player wages (Kahn, 1992). Gius & Johnson observed a 10.27% pay premium for minority players (Gius & Johnson, 2000), a surprising result given the NFL's history of racial controversy. However, I argue that the results in these papers

are not reliable, given the sensitivity of the models employed to crucial omitted variables. Both of the papers fail to include a numerical measure of on-field performance, which is a key influencer of player salary. As such, any existing pay discrimination against minorities could easily be washed out by residual performance differences that are left unaccounted for in these analyses.

James Doran and David Doran (2004) provide a more reliable study by including a measure of performance in their analysis. Their log-linear regression approach is largely similar to the papers discussed above, but Doran & Doran notably include a "skill" variable in their model to predict salary, which they define as an unspecified combination of on-field statistics (Doran & Doran, 2004). Additionally, Doran & Doran narrowed their focus to analyzing the quarterback position, and found 28% higher wages for white quarterbacks when controlling for player skill and other factors (Doran & Doran, 2004). David Berri and Rob Simmons conducted a similar study in 2009, and also found evidence for discrimination against minority quarterbacks at salary quantiles above 50% (Berri & Simmons, 2009). As such, both of these papers conclude that minority quarterbacks are paid lower wages for comparable performance and contract characteristics.

The inconsistent results in the prior literature highlight the perils of omitted variable bias, or OVB, and the importance of adequate model specification in the study of discrimination. If a key variable is omitted that is also correlated with race, the discrimination that we seek to detect may be washed out by OVB. Additionally, every existing study has been constrained by using wage discrepancy as the basis on which to assess discrimination. NFL salaries are largely influenced by external bargaining factors (Therber, 2016), which dilute the effect of a team's decisions on salary outcomes and inhibit the interpretation of discrepancies as team/owner racial preference. In this study, I will use NFL Draft decisions as a tool to better understand these preferences.

Methodology and Findings

Methodology Overview

As a starting point to develop models to detect discrimination among NFL quarterbacks, I rely on a generalized labor market research methodology outlined by the National Academy of Sciences (NAS; Blank et al., 2004). To detect discrimination in observational data, it is critical to adequately control for variables that are correlated with both race and the outcome in question, in order to avoid mistakenly attributing non-discriminatory racial differences as due to employer racial preference (Blank et al., 2004). Following the guidelines set forth in the NAS report, I developed several statistical models to tease apart these non-discriminatory racial differences, thus isolating the residual differences that may be due to discriminatory behavior.

To build these models, we require an outcome variable on which to assess racial differences. No prior literature has used the NFL Draft to assess discrimination, which is a missed opportunity to observe the preferences of NFL teams. At the beginning of each season, teams are given the chance to select top young players emerging from college football to play for their franchise. Each team is assigned a number of draft picks, and players are selected sequentially until all 250 picks have been used. The draft provides a strong basis on which to observe decisions behind the evaluation of players, as outcomes are ordered, easily comparable, and entirely at the discretion of NFL teams.

I use both collegiate and NFL data to assess two distinct research questions regarding racial differences in the NFL Draft. I will first use pre-draft information to examine whether race influences teams' quarterback assessments, controlling for factors related to college career and performance. I will then flip this research question and use professional career data to examine whether minority quarterbacks are systematically under-valued in the draft based on how they go on to perform in the NFL.

My methodology is not exempt from potential estimation biases resulting from unobservable variables. It should be noted that NFL teams rely primarily on qualitative scouting to evaluate collegiate quarterbacks. We must then consider the potential for OVB arising from differences between our quantitative proxy and the true scouting evaluation. Generally, omitting a factor that is important in predicting an outcome variable leads to misspecification bias in the model, such that the expected value of the estimated parameters differ from their true population values (Wooldridge, 2012). In developing a model where this OVB is unavoidable, it is valuable to understand the direction and magnitude of the biases on the coefficients of interest.

The bias is dependent on the pairwise correlations between race, scouting evaluation, and the other covariates (Wooldridge, 2012). It can be shown that that the bias on the race coefficient, say γ, is $Bias\,(\tilde{\gamma}) = \beta_k \tilde{\delta}_\gamma$, where β_k is the slope coefficient for the effect of scouting evaluation on draft pick in the population model, and $\tilde{\delta}_\gamma$ is the slope coefficient for the effect of race on scouting evaluation in an auxiliary regression — see full text for detailed analysis. We assume β_k will be negative, as higher scouting evaluations will lead to earlier selection in the draft. The effect of race on scouting evaluation, $\tilde{\delta}_\gamma$, is unknown. However, we can infer that any effect of race on scouting will be due to the same discriminatory behavior that we are seeking to assess in our estimated model, and expect the bias to work in the same direction as our observed discrimination coefficient. As such, our estimate of the race effect may be an inflated overestimate, but the directionality will be reliable.

Because of the potential for OVB, it is critical to find an adequate proxy for scouting. This proxy should be directly indicative of a quarterback's value to his team. For this purpose, I rely on a metric employed by Berri & Simmons that they label "Net Points." To benchmark a quarterback's in-game contributions, Berri et al. regressed points scored by a team's offense on factors associated with moving and possessing the ball. (Berri et al., 2012). These models provide marginal effects of the performance of an individual quarterback, or QB, on the outcome of a typical game.

Given the marginal effects, the authors normalize the value of plays and turnovers around one yard, thus obtaining an intuitive metric that they label "QB Score" (Berri & Simmons, 2009). The weights on these three quarterback statistics are outlined as follows in Equation 1:

$$(1) \quad QB\ Score = All\ Yards - 3 * Plays - 30 * Turnovers$$

QB Score provides a straightforward metric on which to evaluate quarterbacks based on their direct statistical contributions to a team's probability of winning.

Assessing Relationship between Race and Draft Evaluation

The first component of this analysis will examine whether race influences NFL teams' evaluation of quarterbacks, controlling for information available before the draft. I seek to answer two questions at this stage in the analysis. First, does race influence draft order among

players who are drafted, all else equal? Second, among collegiate players, does race influence the likelihood of being drafted at all?

The sample contains NFL Draft data for 2002-2018, and collegiate passing statistics and other factors from 2002-2017. This information was available for 849 NCAA Football Bowl Subdivision (FBS) quarterbacks, 180 of whom were selected in the NFL draft. All collegiate and draft data were obtained from ProFootballReference.com. All data manipulation and statistical analyses were performed using R software version 3.5.3.

In an effort to isolate the effect of race, we must identify covariates that are known to influence a player's pre-draft evaluation. Because in-game performance will certainly affect a player's perceived value, I include the "QBScore" metric outlined in the preceding section. Player evaluations are also influenced by the caliber of competition faced by a QB in his college career (Kerkhoff, 2014). To account for this, I include "Conference," a 6-factor categorical variable. To control for team success, I define "Ranked25" as a binary variable taking a value of 1 if the player's team finished in the top 25 in AP polling in more than half of his seasons, and "WinPercent" as the proportion of games won during his career. Finally, because the data span over a 16-year time period, bias may arise from aggregate changes in the value of the QB position over time. Thus, I include yearly fixed effects terms to account for variability of quarterback value in the draft.

The literature suggests that the effect of race will not be consistent at differing levels of on-field performance; for example, Doran & Doran observed a significant effect of race only at certain salary quantiles (Doran & Doran, 2002). This differential race effect by skill level makes sense intuitively, as teams may moderate discriminatory behavior in order to land a highly-touted player. Slope-variant effects are captured by interacting race and QBScore in the model.

I will first focus on the 180 quarterbacks drafted between 2002 and 2018 to determine whether race affects the order in which players are selected in the draft. Overall draft pick is used as the outcome variable, and is treated as numeric. A linear model to predict overall draft pick using the established set of covariates is shown below in Equation 2:

$$(2) \quad Pick_i = \beta_0 + \gamma R_i + \beta_1 (R_i \times QBScore_i) + \sum_{j=2}^{5} \beta_j X_{ij} + \sum_{t=1}^{15} \delta_t Year_{it} + \varepsilon_i$$

where R_i represents a race indicator taking on a value of 1 for minority players, X_{ij} represents the value of covariate j for player i, γ represents the race difference at QBScore = 0, and β_1 represents the rate of change of the race effect at differing values of QBScore. A significant and positive γ coefficient in this model would signify lower average all-else-equal draft selections for minority quarterbacks.

Estimated parameters for the regression model and their standard errors are shown in Table 1. The estimated coefficients are statistically insignificant on both the race dummy variable ($p = .509$) and the race-QBScore interaction term ($p = .805$). As such, we fail to reject the null hypothesis that the effect of race on overall draft pick is equal to zero, and conclude that

Table 1: *Coefficient Estimates for Linear Model to Predict Draft Order*

	Dependent variable:
	Pick
Race	11.439 (17.276)
QBScore	−0.648*** (0.179)
Big 12	22.363 (25.442)
Other Conference	42.797** (20.655)
Pac-12	10.092 (23.933)
SEC	46.299** (23.302)
WinPercent	48.065 (57.493)
RankedAP	−56.415*** (18.631)
Race*QBScore	0.077 (0.311)
Intercept	70.649 (46.264)
Observations	180
R²	0.277
F Statistic	2.477*** (df = 24; 155)

race does not seem to influence draft order among players selected in the draft.

Though race does not appear to affect the order that a player is taken in the draft, there is still the potential for racial differences to play out among fringe players who are on the cusp of being selected. To address this question, I include all 849 FBS quarterbacks in the sample period and construct a logistic regression model to predict the likelihood of being drafted, again controlling for quantitative information available to teams before the draft. The covariate model specification is identical to the preceding analysis. A generic form of the logistic regression model is shown in Equation 3:

$$(3) \quad ln\left(\frac{P_i}{1-P_i}\right) = \beta_0 + \gamma R_i + \beta_1 (R_i \times QBScore_i) + \sum_{j=2}^{5} \beta_j X_{ij} + \sum_{t=1}^{15} \delta_t Year_{it}$$

where the symbols on the right-hand side of the equation are identical to those in Equation 2, and P_i represents the probability that player i is selected in the draft. In order to develop a more useful interpretation of the model, the coefficients may be exponentiated to obtain odds ratios, as demonstrated in Equation 4. The interpretation on the odds ratio is more intuitive; a unit increase in X multiplies the odds of being drafted by the odds ratio. Thus, in the presence of discrimination, we would expect the sum of the exponentiated γ coefficient and interaction coefficient to be less than 1, implying decreased odds of being drafted for minority quarterbacks.

Odds ratios for the estimated parameters in the logistic regression model and their standard errors are shown in Table 2. In this model, we observe a significant ($p = .002$) odds ratio on the race dummy coefficient of 0.436, and an odds ratio on the interaction coefficient of 1.017 ($p = .012$). Thus, race has a significant negative effect in predicting the odds of being drafted, with the negative effect diminishing and eventually flipping at higher levels of QBScore.

The sign of the race effect flips at a QBScore of 48.765, which is in percentile 92 of the QBScore distribution. Thus, for the 92% of quarterbacks in our sample below this performance threshold, being a minority decreases the odds of being selected in the draft, all else equal. At a QBScore of 100, the race effect is insignificant, with 95% confidence bounds [.484, 10.817]. As such, we may infer that among high skill quarterbacks with high levels of QBScore, there is no significant effect of minority status on the odds of being drafted, while for lower-skill quarterbacks, there is a strong and significant negative effect.

This result is represented visually in Figure 1. Each point represents a predicted probability of being drafted for each player in the sample, as generated by fitted values for the logistic regression model. Logistic regression estimates are

Table 2: *Odds Ratio Estimates for Logistic Model to Predict Draft Probability*
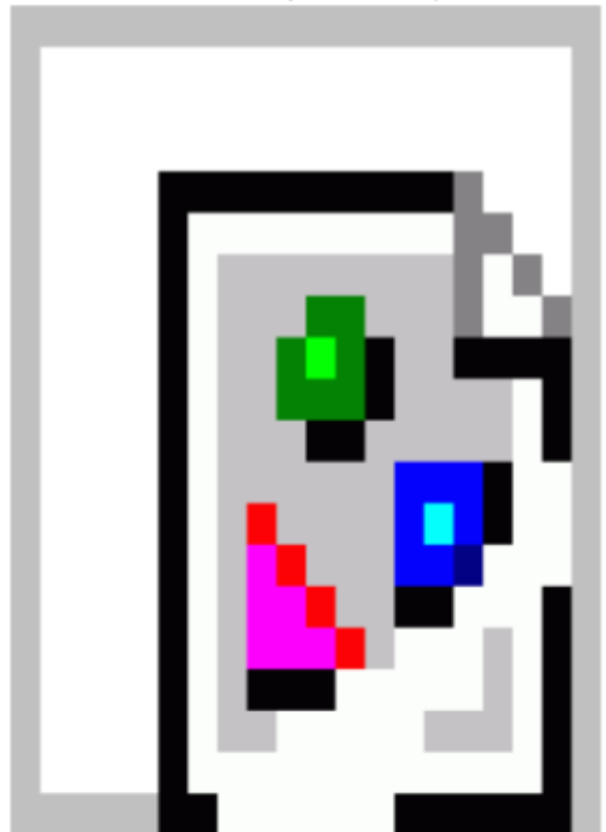
shown for white and nonwhite subsets on the data. The selective effect of race on low-skill quarterbacks can be observed by noting the lower predicted probabilities for nonwhite players on the left side of the figure.

Assessing Racial Differences in Draft Error

        I will now flip the question in the prior analysis and use post-draft NFL performance data to determine whether minority players are systematically under-drafted. The idea is similar to that used in a 2008 paper by Stefan Syzmanski and Ian Preston in detecting discrimination in English soccer. The authors compared the success of soccer clubs to determine whether teams with higher minority representation tend to perform better. The logical basis in the analysis is that, in the presence of discrimination, the discriminated group will receive less compensation for comparable performance. If this is true, a team that employs more of the discriminated group will receive greater output per unit cost, and thus perform better over time (Syzmanski & Preston, 2008).

        I will extend Syzmanski & Preston's logic to player-level characteristics. In the presence of discrimination, minority quarterbacks will be drafted later on average than under purely skill-based evaluation. As such, minority quarterbacks will have higher average performance for comparable draft placement. Under this framework, I will determine whether there are systematic racial differences in "draft error;" that is, examine whether minority quarterbacks tend to out-perform their draft ranking to a greater degree than white players.

        To employ this strategy, we need outcome variables that are indicative of a quarterback's career success at the professional level. I again use QBScore from Berri et al. (2012) to account for per-game on-field performance factors. To assess team success, I will use career win percentage and number of wins over the quarterback's career. Longevity is also an important factor, so I include games started over a player's entire career.

The sample contains NFL passing and team statistics from 2000-2018, and NFL Draft data from 2000-2011. To avoid censoring bias, I only include players drafted in or before 2011 to allow sufficient career development. This procedure resulted in a sample of 99 quarterbacks.

To detect racial differences in draft error, I regress each outcome measure on race and overall draft pick. Once again, to account for differential effects of race across the skill spectrum, race and draft pick are interacted in each model. I observed a non-linear, decaying relationship between overall draft pick and the longevity outcomes, so I assign an inverse functional form to the pick variable in the models for "Wins" and "Games Started."

A generic regression equation for this analysis is shown in Equation 5 below:

$$(5) \quad Y_i = \beta_0 + \gamma R_i + \beta_1 (R_i \times QBScore_i) + \beta_2 Pick + \varepsilon_i$$

where Y_i represents the outcome for each model, and the "Pick" independent variable is assigned an inverse transformation for the Wins and Games Started models. Estimated coefficients and their standard errors are shown for each model in Table 3.

Table 3: Coefficient Estimates for Models to Predict NFL Outcomes

	QBScore	WinPercent	Games Started	Wins
Pick	−0.308***	−0.001***	2,173.537***	1,177.821***
	(0.056)	(0.0003)	(276.705)	(167.463)
Race	−3.404	−0.005	−29.413**	−16.504*
	(14.116)	(0.069)	(14.699)	(8.896)
Race*Pick	0.247	0.001*	0.281*	0.168*
	(0.150)	(0.001)	(0.157)	(0.095)
Constant	93.314***	0.460***	−2,048.388***	−1,112.706***
	(6.755)	(0.033)	(266.475)	(161.272)
Observations	99	99	99	99
R^2	0.268	0.241	0.402	0.349
F Statistic (df = 3; 95)	11.585***	10.044***	21.309***	16.945***

Notes: *p<.1, **p<.05, ***p<.01. Standard errors are displayed in parentheses below the estimates. Pick variable was transformed to an inverse relationship for models on right-hand side of the table.

As anticipated, overall draft pick is significant and negatively associated with each performance outcome ($p < .001$ in all models), that is, players taken earlier in the draft tend to perform better in the NFL. Both the race dummy variable and the interaction term are insignificant in predicting QBScore and career winning percentage. However, turning to the longevity outcomes on the right half of the table, we observe significant coefficients for both the race dummy variable and the interaction term.

In the model to predict games started, we observe a coefficient of -29.410 ($p = .048$) on the race dummy variable, and an offsetting positive coefficient of 0.281 ($p = .077$) on the race-pick interaction term. Given these parameters, the sign of the effect flips in the early fourth

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round of the draft, at pick 104. As such, we infer that, with regard to longevity, minority players tend to be under-valued relative to white players in the later rounds of the draft and over-valued in the early rounds.

We observe a similar result in the model for career wins, with a coefficient of -16.50 ($p = .067$) on the race dummy and a positive coefficient of 0.168 ($p = .081$) on the interaction term. With similar interpretation to the prior result, we infer that minority players are under-valued relative to white players in the later rounds of the draft.

The results for games started and wins are represented visually in Figure 2. Each player in the sample is represented by a point, and model estimates are shown for white and nonwhite subsets of the data for the regression with an inverse transformation on the pick variable. We can observe the differential effect of race over the draft range by inspecting the varying slopes of the subset models.

Figure 2: Regression Model Representations for Games Started, Wins

Discussion

Though the present analysis does not escape the limitations inherent in detecting racial discrimination through observational data, several of the shortcomings in the prior literature were addressed and palliated through this new methodology. The use of the draft as an outcome variable improves upon past research, as the draft is not diluted by guidelines surrounding contract negotiations. Additionally, this study improves upon existing methodology by adequately controlling for individual player characteristics, most notably in-game performance. In using NFL data to detect differences in outcomes controlling for draft order, there is no need to make assumptions about the NFL's consensus player evaluations. Rather, I am able to use differences in factual outcomes to determine whether minority players are systematically overlooked.

There are still limitations inherent in this analysis. In addition to the omitted variable bias discussed above affecting the collegiate data models, there is a limited sample size of minority quarterbacks available for the NFL analysis. Of the 99 quarterbacks in the sample, only 19 were nonwhite. Having such an unbalanced sample limits the precision of estimates. Though these results may point to the presence of discrimination in the draft, the limitations inherent in observational analysis as well as those specific to this study make it difficult and unjust to label the differences as outright discrimination.

However, the historical evidence for racial controversy in the NFL makes the present results worth considering. In both stages of the analysis, I observe racial differences only at the lower end of the skill spectrum. This selective effect among low-skill quarterbacks may have a meaningful practical interpretation. Highly valued minority players are unlikely to be discriminated against given their well-known potential to add value to an NFL team, which could likely offset any discriminatory tendencies. In addition, these players are highly touted and discussed in the media before the draft, and discrimination against these players would have to be played out much more visibly in the public eye.

Further, minority players with lower natural ability may be easier targets for discrimination. While higher draft picks are primarily evaluated on their raw athletic talent that they demonstrated in college, lower draft picks will be highly scrutinized based on their potential to learn and improve. Evaluation of these "intangible" skills may be influenced to a greater degree by racial biases. This point is well illustrated by the Washington Post study cited earlier, which found that white players are more often praised for their intelligence, understanding of the game, and command of the team (Boylan et al., 2017). These are the "intangible" assets that NFL teams are looking for in late-round draft picks, which may partially explain the selective effect of race on low-skill quarterbacks observed in this study.

Though these findings must be taken with a grain of salt due to fundamental limitations, they do point in the direction of an ongoing and problematic trend in the NFL. The issues surrounding race in the league, such as the anthem protest, the Kaepernick lawsuit, and the weak representation of minorities in ownership have often escalated into full-blown controversies and have become politicized beyond the point of productive dialogue. Given the sensitivity of these issues, empirical study is critical in order to understand the problem from a neutral perspective. This study serves as an attempt to uncover and understand the controversies that have faced the NFL for years, and hopefully future research in this area will spur the league to address any problematic tendencies.

Acknowledgements

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