

Chapter Five Notes

Modeling Where Quarterbacks are Selected in the NFL Draft

p. 192 (footnote 30): *The model considered a player's height, BMI, BMI squared, Wonderlic score, 40 yard dash time, dummy variables for each year our model considered (except one), a dummy variable for a player who played for a Football Championship Subdivision team, the number of games a quarterbacks' team achieved his last year in college, and the quarterback's performance his last year in college. Berri and Simmons (2009b) considered a linear specification, as well as a model where the dependent variable was logged. In addition, a negative binomial specification was estimated. In general, the results reported were similar for all specifications. The data set Berri and Simmons (2009b) examined began in 1999 and concluded in 2008. The sample consisted of 121 quarterbacks. Performance data on college quarterbacks since 2000 was taken from the NCAA's website reporting Division I Football Statistics (<http://web1.ncaa.org/d1mfb/mainpage.jsp?site=org>). College data for quarterbacks selected in the 1999 and 2000 drafts was taken from CNNSI.com. The complete estimation results are reported in Berri and Simmons (2009b) and at stumblingonwins.com.*

The quarterback draft model was reported in Berri, David J. and Rob Simmons. (2009) "Catching a Draft: On the Process of Selecting Quarterbacks in the National Football League Amateur Draft." **Journal of Productivity Analysis**. On-line citation: DOI 10.1007/s11123-009-0154-6 (available in print in 2011).

Here is the specific equation estimated in the article (the third equation in the article):

$$\text{PICK} = a_0 + a_1 * \text{Height} + a_2 * \text{BMI} + a_3 * \text{BMI}^2 + a_4 * \text{Wonderlic} + a_5 * \text{40 Yard Dash Time} + a_6 * \text{Dummy for non-Division I-A quarterbacks} + a_7 * \text{PERFORMANCE} + e_t \quad (3)$$

Where

- Pick = where a quarterback is chosen in the draft
- Height = quarterback's height in inches
- BMI = Body Mass Index
- Wonderlic = Score on the Wonderlic test
- Performance is measured as
 - Wins Produced
 - Net Points
 - QB Score
 - Career Plays and Wins Produced per play
 - Career Plays and Net Points per play
 - Career Plays and QB Score per play
 - Career Plays and QB Rating
 - Career Plays, Completion Percentage, Interceptions per Attempt, and Passing Yards per Attempt

Dependent Variable is PICK
White Heteroskedasticity-Consistent Standard Errors & Covariance
t-statistics reported beneath each coefficient

Variable	Eq. 3a	Eq. 3b	Eq. 3c	Eq. 3d	Eq. 3e	Eq. 3f	Eq. 3g	Eq. 3h	Eq. 3i
Constant	4963.03	5069.79	5065.02	5069.76	4425.82	4446.79	4441.62	4213.52	4559.40
	3.04	3.06	3.05	3.05	2.27	2.29	2.29	2.19	2.45
Height	-19.55	-18.82	-18.85	-18.90	-15.31	-15.23	-15.26	-15.55	-14.87
	-4.24	-4.11	-4.12	-4.13	-2.51	-2.50	-2.51	-2.50	-2.39
BMI	-272.67	-277.33	-276.98	-277.06	-249.66	-251.20	-250.71	-233.46	-269.85
	-2.42	-2.40	-2.40	-2.40	-1.81	-1.83	-1.82	-1.71	-2.03
BMI Squared	4.68	4.76	4.75	4.75	4.24	4.27	4.26	3.96	4.59
	2.33	2.33	2.32	2.32	1.74	1.75	1.75	1.63	1.95
Wonderlic	-1.94	-2.09	-2.09	-2.09	-2.72	-2.71	-2.72	-2.63	-2.70
	-1.82	-2.00	-2.00	-2.00	-2.37	-2.37	-2.37	-2.26	-2.29
40 Yard Dash	128.81	119.65	120.07	119.94	134.91	134.57	134.67	138.43	153.21
	3.16	2.81	2.82	2.82	2.53	2.53	2.53	2.58	2.81
Division I-AA Dummy	55.96	57.60	57.43	57.27	56.36	57.23	56.95	53.75	63.02
	3.31	3.23	3.22	3.21	2.30	2.34	2.33	2.15	2.64
Career Plays	-	-	-	-	-0.03	-0.03	-0.03	-0.03	-0.03
	-	-	-	-	-1.98	-1.99	-1.98	-1.61	-1.95
Wins Produced	-	-13.77	-	-	-	-	-	-	-
	-	-3.00	-	-	-	-	-	-	-
Net Points	-	-	-0.36	-	-	-	-	-	-
	-	-	-2.95	-	-	-	-	-	-
QB Score	-	-	-	-0.03	-	-	-	-	-
	-	-	-	-2.95	-	-	-	-	-
Wins Produced per Play	-	-	-	-	-15.09	-	-	-	-
	-	-	-	-	-2.46	-	-	-	-
Net Points per Play	-	-	-	-	-	-72.39	-	-	-
	-	-	-	-	-	-2.58	-	-	-
QB Score per Play	-	-	-	-	-	-	-191.75	-	-
	-	-	-	-	-	-	-2.54	-	-
QB Rating	-	-	-	-	-	-	-	-0.79	-
	-	-	-	-	-	-	-	-1.89	-
Completion Percentage	-	-	-	-	-	-	-	-	46.75
	-	-	-	-	-	-	-	-	0.35
Interceptions per Attempt	-	-	-	-	-	-	-	-	1574.60
	-	-	-	-	-	-	-	-	2.62
Yards per Attempt	-	-	-	-	-	-	-	-	-10.41
	-	-	-	-	-	-	-	-	-1.17
Adjusted R-Squared	0.196	0.225	0.224	0.224	0.214	0.217	0.216	0.198	0.222
Number of Observations	124	121	121	121	98	98	98	98	98

Additional notes on the model (beyond what is in the book):

- Players are asked to run the 40 yard, 20 yard, and 10 yard dash at the combine. In addition, measurements are taken of each player's vertical jump, his broad jump, and his speed in running the shuttle and cone test. Unfortunately data on the 20 yard and 10 yard dash, vertical jump, broad jump, and the shuttle and cone test was reported for fewer than 90 quarterbacks in our sample. Consequently these variables were not included in our study.
- From 1999 to 2008 there were 132 quarterbacks selected in the NFL draft. For all of these we have data on draft position, height, and weight. But the other elements of our data set were not consistently available. Specifically, for one quarterback we could not find a 40 yard dash time. For another three quarterbacks we could not locate college performance statistics. And for eight quarterbacks there was no report of a Wonderlic test score. In all, we only had complete data for 121 quarterbacks.
- The model considered a player's height, BMI, BMI squared, Wonderlic score, 40 yard dash time, dummy variables for each year our model considered (except one), a dummy variable for a player who played for a Football Championship Subdivision team, the number of games a quarterbacks' team achieved his last year in college, and the quarterback's performance his last year in college. To estimate our model we considered a linear specification as well as a model where we logged the dependent variable. In addition, we also considered a negative binomial specification. In general, the results we report were similar for all specifications.
- The NCAA used to divide its members into Division I-A, Division I-AA, Division II, and Division III. Today, though, Division I-A is known as the Football Bowl Subdivision (FBS) while Division I-AA is known as the Football Championship Subdivision (FCS). Our analysis indicates that playing for an FCS school generally costs a player between two to four rounds in draft position (depending on whether we look at a linear or logged model). This result was obtained with Joe Flacco in the sample. Flacco moved from the University of Pittsburgh to the University of Delaware. Pittsburgh is a FBS program while Delaware plays in the FCS. Despite this move, Flacco was chosen in the first round of the 2008 draft.
- We also considered looking at specific statistics such as completion percentage, touchdowns per pass attempt, yards per attempt, interceptions per pass attempt, and rushing yards per rushing attempt. The results suggested that interceptions did cost a quarterback in the draft while the other factors were statistically insignificant.
- We should note that there are differences in the Wonderlic score by race. Specifically the 30 black quarterbacks in our sample averaged only a 20.2 score while the white quarterbacks scored a 27.7. These are not the only differences we see by race. White quarterbacks were also taller (75.3 inches vs. 74.3) but slower in the 40 yard dash (4.85 seconds vs. 4.68). When we turn to performance, blacks on average offered more. In college, blacks on average have a higher QB rating and Wins Produced per 100 plays (with respect to QB Rating, blacks posted an average mark of 100.6 vs. 92.6 for whites and Wins Produced per 100 play the differences were 0.818 vs. 0.673). Despite these differences, though, the average black quarterback was only selected six slots ahead of the average white signal caller (118.0 vs. 124.5). We didn't find a direct link between race and draft position and interaction terms (i.e. race*wonderlic or race*height) were

also insignificant. Still, it does seem like race plays a role in this process. By the way, Jason Chung (2004) examines these differences in Wonderlic scores for black and white quarterbacks and observes: “A study by David Chan et. al. (1997) noted that African-Americans adults in general have a lower regard in general for aptitude tests than their Caucasian counterparts which caused them to score lower on the tests. After motivation was given to black test-takers their scores improved until there was no discernible difference between black test scores and white test scores.” Chung goes on to add that “[from Farkas (2003) we also learn that] social psychologist Claude Steele notes that African-Americans often suffer from “race-related test anxiety” which is described as “sensitivity that their performance will be weighed as a measure of inherent black ability”. This distraction, Steele maintains, lowers black test-takers’ performances in tests where they are asked to identify their race. [Farkas (2003)]. Not only are blacks afraid of failing, they are also afraid of doing too well. Michael Lovaglia observes that African-Americans fear reprisals for succeeding and subsequently accused of “acting white”.”