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Section I: Introduction

One of the main issues in finance is determining how to value an asset; how can one determine the present discounted value of an asset when its future performance is unknown? Investors can look at past trends in earnings per share or the price to earnings ratio to get some idea of how a stock is trending, but this information is at best a noisy signal as to the stock's future performance. The labor economics literature looks at a similar problem that is present in employment decisions. When hiring, firms must estimate a potential employee's expected marginal revenue product before deciding to hire them. But in this instance, the available information signals are less reliable. Employers don't have full information about the employee, so they must make decisions based on inferior and imprecise market signals as to a candidate's quality.

These problems are both very much present in the NFL Draft. Given a limited number of draft picks from which to select players, teams must estimate a player's present discounted value or expected future productivity and choose the \$ \cdot Q t re ta al

others in the football literature by using player earnings and plays as a measure of player performance in the NFL.

It is important to note that the data used in this study are not publicly available. Specifically, I am able to study offensive line men as well as defensive players, which has not yet been studied. Secondly, player salaries and plays should also be an unreliable measure of player performance in the NFL.

The draft order is determined by each team's win-loss record in the previous season and

least equal to forty seven percent of the league's adjusted revenues. As a result, when building team rosters, teams must determine how much of their cap space they want to spend on any given player. Thus, player contracts are sort of zero sum game; more spent by a team on one player necessarily means less money to spend on other players. Players' salaries are essentially rank ordered, meaning that player earnings are directly comparable to one another.

touchdowns and rushing yards per attempt. Pover5 is an indicator variable that indicates if the

to be a ready draft selection, then they can't union to get a player with the right team. As a

1% more snaps in the NFL. This may be because the skill set required to score touchdowns is a better reflection of a receiver's ability. Touchdowns are generally scored in the red zone—near the other team's end zone—where there is less space for receivers to get open. Thus, they have to rely on their hands and their ability to find open space. These are two skills which would

Just as with offensive linemen, the bench press is a statistically significant predictor of playtime for defensive linemen and line backs (Tables 10 and 11). Again, this is also a significant term. This may be because it is better for defensive linemen to be able to stay further away from offensive linemen while blocking so that they can disengage their block and run after the quarterback or the ball carrier during a play. There also appears to be significant playtime returns to being an All-American, which could again suggest better technique. Line backs in particular are often responsible for being the leaders of the defense and calling plays, so being an All-American may indicate that the player has the requisite football IQ to be successful as a defensive leader at the next level.

Defensive backs (Tables 12 and 13) also see a return on being an All-American, both in terms of snaps played in general as well as snaps played above expected. Again, this could be an indicator of a player having solid technique that they are able to pair with their athleticism in order to defend the better wide receivers.

Overall, it appears that college statistics and NFL Combine measurements are very poor predictors of a player's future performance in the NFL. Despite this, being an All-American does seem to generally result in a player seeing more playtime. Given that many All-Americans are selected early, however, teams are essentially throwing darts at the board in the later rounds of the NFL Draft.

Section VII. Conclusion

In short, I have analyzed which college statistics and NFL Combine measurables best predict future player success in the NFL, as measured by player earnings. Sabermetrics was invented for baseball by teams so that they could better predict players' future performance and identify market inefficiencies, but similar analysis in the context of American football has been

limited, given the very team-oriented nature of the sport, individual statistics and performance are thought to be very dependent upon a player's teammates and coaches. This study adds to the literature by proposing a new proxy for player performance: player earnings. In doing so, I was able to test for defensive positions and offensive linemen. Ultimately, I found that there are a few reliable indicators of future performance for most players. Offensive skill position players, particularly running backs and quarterback, seem to be extremely hard to predict. For the positions with fewer available statistics, being an All-American in college seems to yield returns at the next level. Overall, it seems that the use of general statistics provides little value in predicting how a player will perform in the NFL. It may be that play-by-play data or more advanced metrics are needed, or that the traditional scouting methods of watching film and interviewing players are actually more reliable. In the end, though, it would appear that NFL teams face an extremely difficult task in selecting new players every year and are unlikely to be able to consistently yield a good draft class using college statistics as they currently are.

Pitts, Joshua D, and Bert Evans 2019 "Drafting for Success: How Good Are NFL Teams at Identifying Future Productivity at Offensive Skill Positions in the Draft?" *The American Economist* 64(1): 102-22

Mirabile, McDonald P. 2005 "Intelligence and Football: Testing for Differentials in Collegiate Quarterback Passing Performance and NFL Compensation" *The Sports Journal* 8(2).

Table 1: Summary Statistics

	Mean	Standard Deviation	Count
Earnings	701e+07	535e+07	791
Snap	1237111	1630297	4310
Height (in)	7373084	2631462	6984
HandSize (in)	9566895	.6081737	5871
ArmLength (in)	3233708	1.476817	5863
40YardDash (sec)	481055	.3227457	6507
BenchPressReps	208085	6431747	4738
VerticalJump (in)	3260128	4273606	5622
BroadJump (in)	113312	9725137	5507
3Cone (sec)	7342198	.4543001	4372
Completion%	5870816	59185	1329
PassingYards	2373354	806163	1329
Passing Yards/Attempt	729044	1.107909	1329
PassingTD	168761	87469	1329
Interceptions	935816	379241	1329
Rushing Yards/Attempt (QB)	108284	2599163	1329
RushingYards (RB)	4195219	4192516	6694
Rushing Yards/Attempt (RB)	4571776	401886	5885
RushingTD (RB)	411697	490244	6694
Receiving Yards/Catch (RB)	871691	5401964	2808
ReceivingTD (RB)	.5922171	.973394	3058
Receiving Yards/Catch (WR)	1268368	3308087	5422
ReceivingTD (WR)	3635559	3198006	5422

Table2 Quatebads

	Quatebads	
	ln(Earnings)	ln(Steps)
Height(in)	-00198 (0855)	0227 (0130)
HandSize(in)	-0401 (0236)	-00860 (0814)
ArmLength(in)	-00457 (0771)	-0313 (0230)
40YardDash(sec)	-0179 (0816)	-1.250 (0397)
Completion%	00583 (0133)	00714 (0196)
PassingYards	-000547 (0162)	000399 (0408)
Passing Yards/Attempt	00888 (0835)	-0359 (0159)
PassingTD	00237 (0479)	000231 (0956)
Interceptions	00530 (0321)	-00168 (0483)
Rushing Yards/Attempt (QB)	-000417 (0951)	0120 (0181)
Power5	0306 (0380)	0887 (0067)

R²	0173	0148
p values in parentheses		
* p < 005 ** p < 001, *** p < 0001		
Table 3 Quarterbacks — Above Expected		
Quarterbacks Difference		
	Earnings(\$)	Snaps
Height(in)	-1522228 (0923)	8972 (0689)
HandSize(in)	-49821064 (0288)	-2101 (0719)
ArmLength(in)	-15574902 (0523)	-2881 (0441)
40YardDash(sec)	-189701.3 (0989)	2084 (0288)
Completion%	573085.1 (0309)	9248 (0226)
PassingYards	-127997 (0813)	-0286 (0669)
Passing Yards/Attempt	-53371267 (0828)	-1536 (0683)
PassingTD	-1011151.4 (0819)	2345 (0687)
Interceptions	11354388 (0876)	4198 (0624)
Rushing Yards/Attempt (QB)	-20071655 (0832)	2337 (0089)
Power5	43383173 (0339)	4507 (0519)
All-American	-35729833 (0522)	-271.4 (0791)

Constant	8208285169	-108863
	(0483)	(0485)
N	47	90
R²	0138	0098

p values in parentheses

* p

Table 5 Running Backs—Above Expected

	Running Backs Difference	
	Earnings	Steps
40 Yard Dash (sec)	-269510005 (0153)	16571 (0084)
3 Core(sec)	22980891 (0586)	-1853 (0654)
Rushing Yards	11139 (0987)	0277 (0408)
Rushing Yards/Attempt	-67731624 (0542)	4012 (0688)
Rushing TD	-6551649 (0912)	-2126 (0377)
Receiving Yards/Catch (RB)	-23861626 (0797)	-1324 (0668)
Receiving TD (RB)	54130775 (0497)	1055 (0088)
Power5	177688170 (0688)	-4919 (0880)
All-American	-392158082 (0306)	5094 (0867)
Constart	1.1040e+09 (0241)	-65003 (0214)
N	12	111
R ²	0872	0068

p values in parentheses

* p < 0.05 ** p < 0.01, *** p < 0.001

Table 6 Wide Receivers

Wide Receivers		
	ln(Earnings)	ln(Snaps)
Height(in)	-0.0872 (0.369)	-0.0368 (0.711)
HandSize(in)	0.392 (0.218)	0.171 (0.587)
ArmLength(in)	0.148 (0.280)	0.034 (0.807)
40YardDash(sec)	0.786 (0.540)	-1.317 (0.474)
Vertical Jump(in)	-0.0559 (0.247)	0.0220 (0.673)
3Core(sec)	-0.00700 (0.980)	0.00841 (0.997)
Receiving Yards/Catch	0.0630 (0.216)	0.0300 (0.700)
Receiving ID	0.0178 (0.521)	0.0999* (0.009)
Power5	-0.423 (0.210)	0.356 (0.280)
All-American	-0.0802 (0.860)	0.481 (0.401)
Constant	1.341 (0.085)	9.660 (0.335)
N	29	172
R ²	0.432	0.087

p values in parentheses

* p < 0.05 ** p < 0.01 *** p < 0.001

Table 7 Wide Receivers — Above Expected

Wide Receivers Difference		
	Earnings	Snaps
Height(in)	-5.7415099	4.197

	(048)	(059)
HandSize(in)	25341877 (028)	-31.61 (090)
ArmLengh(in)	83317476 (0419)	1079 (0459)
40YardDash (sec)	78272869 (0459)	9794 (0544)
Vertical Jump(in)	-1705064 (0629)	1810 (0683)
3Core(sec.)	-21837832 (063)	1450 (0839)
Receiving Yards/Catch	2066310 (0539)	-6258 (0153)
Receiving/TD	1828419 (098)	4459 (0175)
Power5	-10924855 (0672)	251.7 (0418)
All-American	-7512701 (0732)	14314* (0009)
Constart	-2480861085 (060)	-121631 (0163)
Note	d	d

BenchPressReps	-000800 (0633)	00131 (0029)
Power5	-00800 (0539)	00141 (0951)
All-American	0326 (0019)	0569 (0105)
Constant	1375*** (000)	-0850 (0876)
N	83	311
R²	0097	0027

p values in parentheses

* p < 005 ** p < 001, *** p < 0001

Table 9 Offensive Line—Above Expected

Offensive Line Difference		
	Earnings	Sraps
Hight(in)	27113618 (035)	5257 (0572)
ArmLength(in)	14361275 (065)	5035 (0659)
BenchPressReps	1333773 (083)	3382 (0146)
Power5	-63325606	376 63325606

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Table 10 DefensiveFront

	DefensiveFront	
	ln(Earnings)	ln(Snaps)
Hght(in)	-00023 (095)	-00177 (076)
ArmLengh(in)	00813 (029)	0185 (002)
40YadDash (sec)		

40YardDash	-38325867 (023)	-6186 (096)
BenchPressReps	-7715023 (023)	1510 (035)
BroadJump(in)	-699836 (030)	-1691 (029)
3Core(sec)	15355116 (039)	-3986 (027)
Power5	-11368864 (030)	-1541 (099)
All-American	-1688557 (085)	498 (017)
Constart	8599344 (073)	4238 (040)
N	89	378
R²	0057	0018

p values in parentheses
* p < 005 ** p < 001, *** p < 0001

Table 12 Defensive Backs

Defensive Backs Difference		
	Earings	Snaps
Height(in)	400113 (029)	1382 (088)
ArmLength(in)	-7631879 (012)	5593 (066)
40YardDash(sec)	5358791 (090)	12883 (033)
Vertical Jump(in)	-1004537 (059)	-3697 (098)
3Core(sec)	-3468892 (020)	-8091 (016)
Power5	-1523809 (015)	-1856 (040)

All-American	13117861.7 (0249)	1461.5* (0002)
Constant	1854982330 (0552)	-26167 (0764)
N	48	242
R ²	0.123	0.054

p values in parentheses
* p < 0.05 ** p < 0.01, *** p < 0.001

Table 13 Defensive Backs—Above Expected

	Defensive Backs Difference	
	Earnings	Snaps
Height(in)	400111.3 (0296)	1382 (0883)
ArmLength(in)/	-7631879 (0126)	5598 (0667)
40YardDash(sec).	5358091 (0980)	12883 (0330)
Vertical Jump(in)	-1004537 (0597)	-3697 (0988)
3Core(sec)	-31469992 (0200)	-8091 (0165)

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