

The effectiveness of college football recruiting ratings in predicting team success: a longitudinal study

Jeffrey A. Mankin
Lipscomb University

Julio A. Rivas
Lipscomb University

Jeffrey J. Jewell
Lipscomb University

ABSTRACT

American college football is a multibillion-dollar industry for the 130 schools that play at the highest level. College football is unique in that it must recruit student athletes, unlike high school or pro football. An entire multimillion-dollar industry has developed to provide recruiting ratings and team-specific information for rabid fans. The question in this study is “Do recruiting rankings matter?” This study uses the 247Sports class ratings and team ratings to predict the future success of teams. The Sagarin final ratings are used as a proxy for team success. The results indicate that knowing recruiting rankings explains up to 36% of the variability of the Sagarin ratings.

Keywords: college football, college athletics, recruiting ratings, NCAA, Sagarin, student athlete

Copyright statement: Authors retain the copyright to the manuscripts published in AABRI journals. Please see the AABRI Copyright Policy at <http://www.aabri.com/copyright.html>

INTRODUCTION

Ed Orgeron recounting the story of when then University of Miami coach Jimmy Johnson wanted to tell Orgeron his secrets to coaching: "I told him I'd get my notebook. He said, 'You should be able to remember this one.' Then he said, 'Get great players.' I said, 'I got it.'" (Henry, 2014)

"Recruiting is the lifeblood of big-time college football" (Brady, Kelly, & Berkowitz, 2015)

American college sport is a multibillion-dollar industry. In the academic year 2017-2018, the 130 universities that played American football at the highest-level generated total athletic revenue of \$10.0 billion, which included \$4.6 billion from football. That is approximately \$79 million per university in total athletic revenues, including \$36 million from football (Office of Postsecondary Education, 2019). Each of these universities runs a multimillion-dollar athletic department with the largest revenue source generated from its football program. Football revenues at the largest football programs account for over 80% of the sport-specific revenue for the athletic department. Football is the driver for most of the revenue of university athletic departments.

One of the unique aspects of college football is how it acquires players. In high school, the players generally play at a school that is close to home. So, a high school football program has a student body from the local community and some of those students play football. Where the student lives generally determines which public school the student will attend, unless the student's family chooses a private school. Generally, high school football programs do not compete against other schools for student athletes.

In the National Football League (NFL), the eligible players are drafted by a team and that team has exclusive rights to the player's services. If a player chooses not to sign a contract with that team, there is a chance the player will not be allowed to play and will not receive a salary unless the team trades the player's rights to another team. The NFL, like other professional leagues, does not want teams to compete for players' services, since that could cause bidding wars between the teams that would drive up the cost of player contracts.

Unlike high schools and the NFL, college football teams compete strongly for their players. Players are not locked in to the closest university or to the team that holds their rights, but are free to choose among many competing universities for their services. A player may have scholarship offers from several teams, with some of the top recruits receiving dozens of offers. The recruiting process is a unique characteristic in college football that is different than other levels of football. The way that universities compete for players is through the recruiting process. This formal recruiting process is regulated by the college sports governing body, the National Collegiate Athletic Association (NCAA).

AMERICAN COLLEGE FOOTBALL: A MULTIBILLION DOLLAR INDUSTRY

American college football is a sport that generates billions of dollars annually. It is also a rapidly growing sport. From 2004 to 2018, total football revenues for the schools playing college football at the highest division, the Football Bowl Subdivision (FBS), grew from \$1.6 billion to \$4.6 billion (Office of Postsecondary Education, 2019). This is an annualized growth rate of 7.8%, which is over double the U.S. growth in nominal GDP of 3.6% (Federal Reserve Bank of St. Louis, 2019).

College football is also one of the highest attended sports in the world. It rivals and exceeds most professional leagues around the world, both in total and average attendance. In comparisons to all international professional leagues, college football total attendance of 37.9 million ranks second behind Major League Baseball's 73.7 million. College football's average attendance of 44,603 is also second in the world trailing only the NFL's 68,776 average. (Gaines, 2015). Table 1 shows the sports leagues with the highest average attendance in the world.

The average college football attendance includes a large variation in attendance. For example, one conference, the Southeastern Conference (SEC), if counted as an independent league, would have the highest average attendance of any league in the world. The SEC's 2014 average attendance of 77,694 (NCAA, 2014) exceeded the NFL's average attendance of 68,776 (Solomon, 2015).

College football attendance accounts for almost all of the largest crowds in American sports. Table 2 shows the fifteen teams in the United States with the highest average attendance in sports for 2015. Only one team from the NFL makes the list. The Dallas Cowboys average attendance of 91,459 places it only ninth on the list. The remaining fourteen teams all play college football.

The National Collegiate Athletic Association (NCAA) is the governing body for American college sports. It sponsors sports at three competition levels: Division I, the largest programs, Division II, and Division III. Division I schools offer the most athletic scholarships across all sports. Division II schools have fewer scholarships and Division III schools do not grant athletic scholarships.

Rank	Sport	League	Season	Average Attendance	Total Attendance
1	American Football	NFL (USA)	2014-15	68,776	17,606,643
2	American Football	NCAA FBS (USA)*	2014	44,603	37,913,238
3	Football	Bundesliga (Germany)	2013-14	43,500	13,311,136
4	Football	Premier League (UK)	2013-14	36,695	13,943,910
5	Aussie Rules	AFL (Australia)	2014	32,346	6,404,569
6	Baseball	MLB (USA)	2014	30,346	73,739,622
7	Cricket	IPL (India)	2014	27,833	1,558,664
8	Football	La Liga (Spain)	2013-14	26,766	10,171,062
9	Baseball	NPB (Japan)	2014	26,458	22,859,351
10	Canadian Football	CFL (Canada)	2014	25,286	2,048,164
11	Football	Serie A (Italy)	2013-14	23,332	8,866,274
12	Basketball	NBA (USA)	2014-15	17,809	21,905,470
13	Hockey	NHL (USA and Canada)	2014-15	17,503	21,528,192

For football, Division I is subdivided into two classifications. The Football Bowl Subdivision (FBS), formerly Division I-A, is composed of 130 universities that sponsor many men's and women's sports, including football. These schools play college football at the highest level and are eligible to participate in bowl games or the four-team College Football Playoff at the

end of the season. The FBS schools each provide a total of 85 full athletic scholarships for football each year with annual signing classes of up to 25 student athletes. Most FBS schools participate as members of conferences, with only six schools playing as football independents.

The Football Championship Subdivision (FCS), formerly Division I-AA, is composed of 122 universities that also sponsor a full slate of men's and women's sports, including football. The main difference for the FCS schools is that they offer only 63 football scholarships annually rather than 85. The FCS schools offer a 16-team championship playoff at the end of the season and do not participate in post-season bowl games.

Table 2
American Sports Teams Ranked by Average Attendance 2015
(Solomon, 2015) *(ESPN, 2016)

Rank	Team	Attendance	League
1	University of Michigan	110,168	Big Ten
2	Ohio State University	107,244	Big Ten
3	Texas A&M University	103,622	SEC
4	University of Alabama	101,112	SEC
5	University of Tennessee	100,584	SEC
6	Penn State University	99,799	Big Ten
7	Louisiana State University	93,441	SEC
8	University of Georgia	92,746	SEC
9	Dallas Cowboys	91,459*	NFL
10	University of Florida	90,065	SEC
11	University of Texas	90,035	Big 12
12	University of Nebraska	89,998	Big Ten
13	Auburn University	87,451	SEC
14	University of Oklahoma	85,357	Big 12
15	Clemson University	81,751	ACC

After substantial conference realignment and consolidation in recent years, there are now ten college football conferences within the FBS. These conferences are informally divided into two groups: the Power Five and the Group of Five (McMurphy, 2014). The Power Five consists of most of the larger traditional college football powers, and collectively has far greater attendance and revenue than the Group of Five. Table 3 shows details about the Power Five and the Group of Five conferences. Both the Power Five and the Group of Five collectively compose the NCAA Football Bowl Subdivision. Financial data is available for all 130 universities except for the military academies: United States Military Academy (Army), United States Naval Academy (Navy), and United States Air Force Academy (Air Force).

Table 3 Power Five and Group of Five Conferences Author Calculations with Data from (Office of Postsecondary Education, 2019)			
	Power Five	Group of Five	FBS Total
Conferences	Atlantic Coast Conference Big 12 Conference Big Ten Conference Pac 12 Conference Southeastern Conference University of Notre Dame Brigham Young University	American Athletic Conference Conference USA Mid-American Conference Mountain West Conference Sunbelt Conference Army Liberty University New Mexico State University University of Massachusetts	
Total Universities	66	64	130
2018 Total Football Revenue	\$3,917 million	\$688 million	\$4,605 million
2018 Average Football Revenue	\$59.3 million	\$11.3 million	\$36.3 million
Football Revenue as a % of Total Sport-Specific Revenue	68.9%	43.2%	63.3%
2018 Total Athletic Revenue	\$7,757 million	\$2,265 million	\$10,022 million
2018 Average Athletic Revenue	\$117.5 million	\$37.1 million	\$78.9 million

FOOTBALL RECRUITING SERVICES: A MULTIMILLION DOLLAR INDUSTRY

The attention paid to college football recruiting has increased dramatically in recent years. “Recruiting gurus” have been around for decades, frequently selling tips and news to interested fans through 1-900 numbers or subscription newsletters. However, the proliferation of the internet helped the recruiting industry blossom starting in the late 1990’s.

The major recruiting services are now large corporate media companies. The four major recruiting services are Rivals, Scout, ESPN and 247Sports. Rivals is owned by Yahoo, while ESPN is a Disney company. 247Sports and Scout are both owned by CBS Sports. Yahoo purchased Rivals for \$100 million in 2007. The terms of the 247Sports and Scout sales to CBS Sports were not disclosed. (Organ, 2015).

Each recruiting service rates high school prospects numerically and then assigns from two to five stars to show the rating of the recruit. The recruiting services do not assign any player a one-star rating, but there are unranked players.

Since these ratings are publicly available (fans can subscribe to each service for more detailed information), a substantial amount of fan interest now surrounds the recruiting process. This process culminates each year on National Signing Day, the first Wednesday in February, when high school and junior college players sign a “national letter of intent” committing them to play football for a particular school.

NCAA regulations restrict each team to 85 scholarship players and no more than 25 new signees in any single year, though there are loopholes which allow schools to sign more than 25

players in some years. The individual player ratings can be aggregated to evaluate the quality of each school’s signing class. Each recruiting service publishes school recruiting rankings following National Signing Day. These rankings are influenced by both the number and quality of recruits signed by the school.

Each year, colleges sign approximately 4,500 prospects. The methodology for ranking recruits varies among the recruiting services, however, most follow the same general guidelines for assigning “stars” to players. Less than 1% of the evaluated prospects are assigned five-star ratings (usually around 30 players a year). The next 300-400 prospects are assigned 4-star ratings. This means the five and four-star recruits, known as the “blue-chip” recruits, collectively total about 10% of the recruiting class. It is assumed that the more blue-chip recruits a school has, the more successful the football program. (Elliott, 2014b)

To illustrate how recruiting class numbers work, Elliott broke down the 2010 class using the Rivals rankings. He also tracked the 2010 recruiting class to the 2014 NFL draft and calculated the distribution of the players based on their Rivals recruiting rating. Table 4 is based on this analysis from Elliott.

	2010 Total Recruits		2014 NFL 1st Round		2014 NFL All Rounds	
5 Stars	27	0.6%	4	12.5%	16	6.3%
4 Stars	395	8.8%	13	40.6%	77	30.1%
3 Stars	1,644	36.5%	12	37.5%	92	35.9%
2 Stars and Unrated	2,434	54.1%	3	9.4%	71	27.7%
Total	4,500	100.0%	32	100.0%	256	100.0%

The system for evaluating recruits is proprietary for each of the four recruiting services. The rankings typically include a numerical value and a star rating. Despite the potential differences among the systems, they all have the same goal: to predict future “on the field” success for players. The 247Sports player ratings are explained below. Ratings from the other services could be interpreted in a similar manner.

110 - 101 = Franchise Player. One of the best players to come along in years, if not decades. Odds of having a player in this category every year is slim. This prospect has "can't miss" talent.

100 - 98 = Five-star prospect. One of the top 30 players in the nation. This player has excellent potential and should emerge as one of the best in the country before the end of his career. There will be 32 prospects ranked in this range in every football class to mirror the first round of the NFL Draft.

97 - 90 = Four-star prospect. One of the top 300 players in the nation. This prospect will be an impact-player for his college team. He is an All-American candidate who is projected to play professionally.

89 - 80 = Three-star prospect. One of the top 10% players in the nation. This player will develop into a reliable starter for his college team and is among the best players in his region of the country. Many three-stars have significant pro potential.

79 - below = Two-star prospect. This player makes up the bulk of Division I rosters. He may have little pro-potential, but is likely to become a role player for his respective school. (247Sports, 2012)

DO RECRUITING RANKINGS MATTER?

Because of the growth of college football and the rise of the multimillion dollar recruiting media, the question continues to be asked, “Do recruiting rankings matter?” There are two opposing arguments on this question. There are the people that Miller (2011) termed “star-gazers” who believe that the rankings are predictive and teams with better recruits perform better than teams with lesser recruits. This argument’s mantra would be, “It’s not always about the x’s and o’s, but it’s about the Jimmy’s and Joes” (Miller, 2014). These proponents tend to give examples that show overall results using many years of data, while conceding that outliers can and do occur.

Some of the best examples for the benefits of recruiting rankings are given by sports writers analyzing years of data. Clay Travis shows that during 1996-2014, every national championship team, except for Oklahoma in 2000, had at least two top 10 recruiting classes in the four years before the title. So, he concludes that, “football success has followed recruiting success (Travis, 2015).” Bud Elliott evaluates teams based on the blue-chip ratio: the number of five-star and four-star players divided by total players. His analysis concludes that every national championship team from 2005-2013 had a blue-chip ratio above 50%. That is, over half of the roster is composed of blue-chip recruits (Elliott, 2014a). (This is also true for the 2014, 2015, and 2016 national championship teams.)

Matt Hinton uses the analogy that recruiting rankings are like health insurance since both are making predictions on a large scale. Individuals are hard to predict, however “when you’re dealing with large groups of individuals, say, 1,000 smokers vs. 600 vegetarians, then the results become very, very predictable (Hinton, 2014).”

Hinton’s analysis classified a sample of 75 of the larger football programs (essentially the Power Five plus some other notable teams) into one-star to five-star classifications based on the teams’ accumulated recruiting rankings for 2010-2013. Table 5 is his analysis of the winning percentages of each the five groups of teams.

The opposing argument is that the ratings are not reliable and should be dismissed. The proponents of this side point to specific outliers as evidence that the recruiting rankings do not matter. The outlier examples are teams with lesser recruiting rankings that win big or a star college player who was lightly regarded as a high school player. Some also argue that the recruiting rankings are either worthless at best or a scam at worst and point to the phenomenon known as the “Bama bump.” (Connelly, 2015) The “Bama bump” is said to occur when a player that commits to Alabama is then upgraded in the recruiting services. This is seen as evidence of the recruiting services pandering to large and rabid fan bases for subscription revenues.

Some outliers that Hinton identified during 2010-2013 are Kansas State, South Carolina, and Boise State (Hinton, 2014). These teams performed better than the recruiting ratings would suggest. However, the coaches of all these teams were excellent. Kansas State was coached by Bill Snyder, who is a member of the College Football Hall of Fame. As Miller pronounces, “Bill Snyder can coach. Like a boss (Miller, 2011).” South Carolina was coached by Steve Spurrier, who is one of the all-time great coaches. Boise State is the poster child for the “recruiting does not matter” proponents because of low recruiting ranking and consistent wins, including two Fiesta Bowl wins. However, based on Hinton’s analysis, most of the wins came against lower ranking teams. Also,

Boise State's coach Chris Petersen was hired by Washington at the end of the 2013 season (Hinton, 2014).

	vs. 5-Star	vs. 4-Star	vs. 3-Star	vs. 2-Star	vs. 1-Star	Overall
5-Star	0.500	0.662	0.695	0.870	0.796	0.679
4-Star	0.338	0.500	0.625	0.754	0.754	0.557
3-Star	0.305	0.373	0.500	0.694	0.558	0.495
2-Star	0.132	0.256	0.308	0.500	0.575	0.367
1-Star	0.205	0.246	0.438	0.425	0.500	0.394

Both sides of the argument have interesting anecdotal evidence. However, answering the question accurately requires serious data analysis. This paper will analyze the correlation between recruiting rankings and team success with a large dataset for all schools in the FBS. This study examines the question, "How effective are recruiting ratings in predicting future team success?"

LITERATURE REVIEW

Research into the effectiveness of recruiting ratings is a relatively recent development. Langelett (2003) first examined the relationship between recruiting ratings and team performance. Langelett used the top 10 recruiting classes as the variable for recruiting quality, and the top 25 rankings from the Associated Press and USA Today polls as the proxy for team performance. He found significant results that suggested higher recruiting rankings positively affected team performance. He also found evidence that team performance positively affected team recruiting. Thus, he found a bidirectional relationship, where winning teams recruited at a higher level and had subsequent better teams.

The Langelett paper was the first to begin to quantify the relationship between recruiting ratings and team performance. The data series ran for 6 years, from 1996 to 2001, and only included teams from the top 25 in the final rankings. So, the study contained a limited sample size.

Herda et al., followed the Langelett paper by expanding their data set to 100 schools. They used both Rivals and Scout 2002 recruiting class ratings to predict the 2002-2006 football seasons. The dependent variable was the Sagarin ratings for the five years of football results instead of the AP or *USA Today* polls. The strength of their paper was the use of both Rivals and Scout ratings and the use of Sagarin for results. Their study used the Rivals total points, Rivals average stars, Scout total points, and Scout average stars to predict football success. Average stars is a measure of quality and total points are a measure of quality and quantity of the recruiting class. Performance was measured by both the Sagarin final ratings and the number of wins for each team. They found that the recruiting class ratings explained 11-45% of the variance in the Sagarin rankings and 3-23% of the variance in wins (Herda et al., 2009).

The Herda study was the first to compute R and R^2 values for the relationships between nearly every FBS school's recruiting rankings and football season results. However, the recruiting ranking only included a single recruiting class from 2002. This single class was then tracked from 2002-2006 or for five seasons. A college football team is composed of 4 or 5 years of recruiting classes not just a single class.

Caro (2012) demonstrated the relationship between recruiting and football performance by using Rivals average star team ratings for 2004-2009 and conference winning percentage for 2005-2010. He used the 65 teams from the BCS conferences (predecessor to the Power Five) and only the conference winning percentage, thus excluding nonconference games. He found significant results for three conferences: the SEC, the Big 12 and the Big Ten. In the study, average star rating explained 63%-80% of the variation in conference winning percentage. The coefficient of determination (R^2) for the SEC was 0.80, the Big 12 was 0.78, and the Big Ten was 0.63.

Bergman and Logan (2014) analyzed the relationship between recruit quality and team performance with school fixed effects. They theorized that teams with winning traditions recruit better and therefore the relationship between recruiting and winning may be overstated. Their study used Rivals star ratings from 2002-2012 and their effect on wins, conference wins, and bowl wins. After controlling for between school effects, the effect of recruiting on wins was statistically and economically significant. They observe that teams with highly rated recruits are more likely to have more wins and to appear in bigger bowl games.

A recent study by Dronyk-Trosper and Stitzel built on the Bergman and Logan study to examine whether recruiting has heterogeneous effects across schools. They did find team specific effects on recruiting, so recruiting does not affect each team identically. This study used the Rivals recruiting data and used winning percentage as the proxy for team success. Their study included the years 2001-2013 (Dronyk-Trosper & Stitzel, 2015).

Our paper differentiates itself from the rest of the literature in several meaningful ways. First, we have a larger dataset than any of the other papers – including fifteen years of data for every FBS school. Second, we use the 247 Composite Class Ratings to measure the quality of recruiting classes. The 247 Composite Class Ratings combine data from all four recruiting services into an overall score, thus reducing the potential randomness of focusing on ratings from a single recruiting service. Third, we use the new 247 Composite Team Ratings which no other paper has used. Fourth, like the Herda study, we measure team performance with the Sagarin rankings, which are superior to other performance measures for several reasons.

METHODS

One of the disadvantages of several of the prior studies is the use of wins or winning percentage as the variable for football success. Using wins has a seductive appeal because it is easy to collect, verify, and understand. However, not all wins are equal. A win over a top 25 opponent is obviously more valuable than a win over a lesser ranked team. The problem inherent in using wins or winning percentage is that strength of schedule is ignored and any win is good and any loss is bad.

The Sagarin ratings have been included in *USA Today* since 1985 and were included in the official BCS formula from 1998-2013. Unlike the AP top 25 poll, Sagarin rates all 130 schools using an unbiased algorithm based on several factors – including strength of schedule. Thus, the Sagarin ratings are a much better proxy for the quality of team performance than wins or winning percentage.

We used the 247Sports composite database to measure recruiting ratings. 247Sports composite is “a proprietary algorithm that compiles prospect “rankings” and “ratings” listed in the public domain by the major media recruiting services. It converts average industry ranks and ratings into a linear composite index capping at 1.0000, which indicates a consensus No. 1 prospect across all services.” (2012) This is, in our opinion, the most comprehensive recruiting measure.

We compiled 247 Composite Rankings for the 2002–2018 recruiting classes and the Sagarin team rankings for 2005–2018. So, seventeen years of recruiting data is used to predict fourteen years of team performance. A team is composed of four to five years of recruiting classes.

In order to include an observation in the analysis, every team needs to have a valid number for dependent and independent variables. In case a number was missing, the observation was dropped from the analysis. This problem was more persistent among schools that are part of the Group of Five conferences.

RESULTS

The first regression relates the final Sagarin rating with 247Sports class rating. The model we used is as follows:

$$Sagarin_t = \alpha + \beta_t Class_t + \beta_{t-1} Class_{t-1} + \beta_{t-2} Class_{t-2} + \beta_{t-3} Class_{t-3}$$

Sagarin final ratings (Sagarin) at time t is the dependent variable, and the 247Sports class ratings (Class) for years t , $t-1$, $t-2$, $t-3$, and $t-4$ are the independent variables. Class t is the freshman class, $t-1$ is the sophomore class, $t-2$ the junior class, and $t-3$ is the senior class. For example, a 2018 football team is composed of four recruiting classes from 2018, 2017, 2016, and 2015. The purpose of this regression is to demonstrate that recruiting, as measured by the four Class ratings has a direct influence on the Sagarin rating in the current year.

Table 6 analyzes the complete sample, from football seasons 2005-2018 using the Sagarin ratings. To calculate the regressions, we used 247Sports recruiting class ratings from 2002-2018. In these regressions, we would like to see a strong R^2 , implying that the model is a good fit for the dependent variable. We should also see significant coefficients. The higher the magnitude of the coefficients, the stronger the influence of that class in the final ranking. Coefficients should be positive since the higher total points for the Class rating would produce a higher Sagarin rating. The highest 247Sports Class rating is around 300 and the highest Sagarin rating is around 100. See Table 6 for the ordinary least squares regression results. Table 7 shows the data using fixed effects regression. Table 8 shows the correlation matrix for 247Sports Class rating versus Sagarin rating.

Table 6 shows a strong R^2 of 0.33 and all the coefficients are significant at the 0.05 level except for $t-3$ which is not significant. The intercept, t , the freshman class, and $t-2$, the junior class are all significant at the 0.01 level. The $t-1$ is the sophomore classes and is significant at the 0.05 level. The senior class, $t-3$, is not significant.

The insignificance of the senior class is likely explained, at least in part, by early entry into the NFL draft. NFL draft rules allow players to declare for the draft, thus forgoing any remaining college eligibility, as long as they are at least three years removed from high school graduation. Players choosing to declare for the draft early are generally those who have been very successful in college and expect to be drafted. The vast majority of those declaring early are juniors choosing to forego their senior year of eligibility. In 2019, for example, 135 players were granted early entry into the draft. Of those, six were sophomores who were three years removed from high school, 97 were juniors, and the remainder were early graduates who had college eligibility remaining (NFL, 2019). So, early entry into the draft systematically removes many high-impact seniors from the college football game. The issue of whether or not this factor explains the insignificance of the senior class in our regression results may merit further exploration in the literature.

The R^2 of 0.33 for the whole sample is revealing. About a third of college team’s success is explained by their recruiting class ratings from prior years.

Table 6 247Sports Composite Class Rating Independent Variable vs. Sagarin Rating Dependent Variable For All Recruiting Classes from 2005-2018 n = 1644 Pooled Ordinary Least Squares Regression		
	Coefficient	P-value
R^2	0.3269	
Intercept	48.6955	***
t (Freshmen)	0.05957	***
t-1 (Sophomore)	0.0245	**
t-2 (Junior)	0.03899	***
t-3 (Senior)	0.0079	Not significant
P-Values: *** < .01 ** < .05 * < .10		

Table 7 uses fixed effects regression and shows an R^2 of 0.13 and only the coefficients for the intercept, $t-2$, and $t-3$ are significant at the 0.10 level. Fixed effects regression removes individual school bias for successful programs that may be included in recruiting rankings and season results. This fixed effect model accounts for the observation that teams that win, tend to recruit well and teams that recruit well, tend to win. These results imply that the junior class is the most important class for all schools. Elite programs recruit well and win many games. The fixed effects model removes individual school bias by focusing the influence of the independent variables rather than the magnitude.

The most surprising result is the negative coefficient for $t-3$, the senior class. Again, this is likely explained, at least in part, by early entry into the NFL draft. Anecdotal evidence suggests that the better the recruiting class was three years ago ($t-3$), the more likely the top players could leave early for professional football. For example, the University of Alabama, which had the top rated recruiting class in 2015, had seven players declare early for the 2019 NFL draft (NFL, 2019).

Table 7 247Sports Composite Class Rating Independent Variable vs. Sagarin Rating Dependent Variable For All Recruiting Classes from 2005-2018 n = 1644 Fixed Effects Regression		
	Coefficient	P-value
R^2	0.1269	
Intercept	68.2811	***
t (Freshmen)	0.01357	Not significant
t-1 (Sophomore)	-0.00826	Not significant
t-2 (Junior)	0.01834	**
t-3 (Senior)	-0.01572	*
P-Values: *** < .01 ** < .05 * < .10		

Table 8
247Sports Composite Class Rating Independent Variable vs. Sagarin Rating Dependent Variable
For All Recruiting Classes from 2005-2018
n = 1644
Correlation Matrix

	Sagarin	t	t-1	t-2	t-3
Sagarin	1.0000				
t	0.5529	1.0000			
t-1	0.5338	0.8641	1.0000		
t-2	0.5394	0.8467	0.8589	1.000	
t-3	0.5117	0.8324	0.8364	0.8518	1.0000

Table 8 shows the correlation matrix. There is an approximate 0.53 (0.51-0.55) correlation between each individual 247Sports Class ratings and the Sagarin ratings. This shows that although class ratings are important, they are not the only relevant factor driving team success, measured by Sagarin ratings. The correlation among classes is high due to the fact that recruiting is a multi-year process. A star player may be recruited as a freshman or a sophomore in high school before he eventually signs as a senior. Also, coaching staffs are largely consistent for several years at a particular school. So, a coaching staff is always working on two or three recruiting classes at a given time.

Table 9
247 Sports 2016 Class Ratings
(247Sports, 2017b)

RANK	SCHOOL	RECRUITS	5-STAR	4-STAR	3-STAR	AVG	TOTAL POINTS (Class)
1	Alabama	25	3	14	8	92.54	302.04
2	LSU	27	2	16	9	91.35	295.03
3	Florida State	25	1	17	7	91.71	294.83
4	Ohio State	25	5	17	7	91.56	289.12
5	Mississippi	26	3	12	11	90.42	281.69
6	Georgia	23	3	11	9	90.77	281.31
7	Texas	29	0	16	13	90.07	280.66
8	Michigan	28	1	13	14	89.86	280.38
9	Auburn	24	1	12	11	90.65	275.14
10	USC	21	2	12	7	91.00	273.71
11	Clemson	21	1	11	8	90.30	271.16
12	Florida	25	0	9	16	88.72	260.96
13	UCLA	28	1	9	17	88.34	259.06
14	Tennessee	23	0	10	13	89.12	253.94
15	Notre Dame	23	0	10	13	89.00	249.43

Table 9 shows an example of the independent variable Class. The independent variable includes approximately 115 schools for fourteen years, resulting in n = 1644. The independent variable is the 247Sports total points for each recruiting class (Class). This table shows only the

top 15 schools in 2016. All the schools for all 14 years were included in the data analysis. The independent variable Class would include four years, t , $t-1$, $t-2$, and $t-3$. The highest rated school in 2016 was Alabama, which signed 25 recruits, including three 5-star players, fourteen 4-stars, and eight 3-stars according to the 247Sports ratings. The 92.54 average is the average rating for each player based on the 247Sports rating system as previously shown.

Table 10 shows an example of the dependent variable Sagarin. The dependent variable is the Sagarin final rating for a year. This table shows the top 20 schools for 2016. The data analysis included all schools for all twelve years. The Sagarin rating is a proprietary rating that ranks the teams numerically in descending order of quality. Clemson was the highest rated team by Sagarin for 2016 with a rating of 105.35. Wins and losses are included to provide context. Sagarin includes a metric for strength of schedule. So, Clemson’s schedule was the 3rd most difficult in the year according to Sagarin.

Table 10
SAGARIN 2016 FINAL RATINGS
(Sagarin, 2017)

RANK	SCHOOL	SAGARIN RATING	WINS	LOSSES	SCHEDULE RANK
1	Clemson	105.35	14	1	3
2	Alabama	105.33	14	1	1
3	Michigan	94.05	10	3	49
4	Washington	93.28	12	2	53
5	Ohio State	93.27	11	2	6
6	Oklahoma	93.21	11	2	14
7	LSU	91.99	8	4	5
8	Florida State	91.56	10	3	2
9	Wisconsin	90.59	11	3	13
10	USC	89.92	10	3	17
11	Oklahoma State	89.71	10	3	52
12	Miami	88.28	9	4	26
13	Penn State	87.77	11	3	34
14	Florida	87.04	9	4	25
15	Virginia Tech	85.25	10	4	35
16	Kansas State	84.75	9	4	39
17	Auburn	83.40	8	5	7
18	Stanford	83.24	10	3	23
19	Western Kentucky	83.07	11	3	111
20	Tennessee	82.68	9	4	31

The second regression relates the final Sagarin rating with 247Sports composite team ratings. The model we used is as follows:

$$Sagarin_t = \alpha + \beta_t Team_t$$

Sagarin final ratings (Sagarin) at time t is the dependent variable, and the 247Sports composite team ratings (Team) for year t is the independent variable. The 247Sports team ratings is a new rating, started in 2015, that aggregates the recruiting ratings for all players currently on a team’s roster.

The first regression used a naïve measure for the independent variables. The Class variables include all players signed in a recruiting class. It is naïve in that it assumes that no player leaves the team for any reason through the senior year. Thus, a player that quits, transfers, or leaves early to the NFL is still included for all four years. The Team variable corrects this issue by only including recruiting ratings for players still on the team roster.

Table 11 shows the regression results for 2015-2018. It includes ordinary least squares (OLS) regressions for each year, pooled OLS for all four years, and fixed effects regression for all four years. The R^2 is above 0.30 for three of the four years 2015-2018. The lone exception was 2016 when R^2 was 0.11. The intercepts and coefficients are all significant at the 0.05 level. These results imply that the recruiting rankings account for almost one-third of the success of the team in a given year.

Table 11 also shows the OLS and fixed effects regression for the four-year period for the seasons 2015-2018. These show that 247Sports Team rating has a consistent influence on Sagarin rating. This is demonstrated as individual years results and the overall period results are consistent. For the four-year period, recruiting Team ratings accounted for about one-fourth of the success of the teams.

	R^2		
2015	R^2	0.3064	
	Intercept	44.3689	***
	Coefficient	0.04412	***
2016	R^2	0.1091	
	Intercept	43.4546	***
	Coefficient	0.03319	***
2017	R^2	0.3598	
	Intercept	44.40066	***
	Coefficient	0.04521	***
2018	R^2	0.3672	
	Intercept	44.7623	***
	Coefficient	0.0439	***
2015-2018 Pooled OLS	R^2	0.2465	
	Intercept	44.1836	***
	Coefficient	0.04176	***
2015-2018 Fixed Effects	R^2	0.2465	
	Intercept	42.1355	***
	Coefficient	0.0455	**
P-Values: *** < .01 ** < .05 * < .10			

Table 12
247 Sports 2016 Team Ratings
(247Sports, 2017a)

RANK	SCHOOL	RECRUITS	5-STAR	4-STAR	3-STAR	AVERAGE	TOTAL POINTS
1	Alabama	82	17	44	20	92.72	982.66
2	USC	81	10	41	25	91.07	936.86
3	LSU	83	6	48	24	90.5	917.72
4	Florida State	82	7	40	32	90.33	906.64
5	Ohio State	80	3	50	24	90.87	902.46
6	Georgia	85	8	34	38	89.03	872.00
7	Auburn	80	6	38	31	89.33	865.36
8	Michigan	85	1	42	32	88.37	852.78
9	Clemson	79	4	35	35	88.91	846.00
10	Notre Dame	79	0	50	26	89.81	842.35
11	Texas	81	1	39	39	89.39	838.97
12	UCLA	77	5	31	39	89.13	819.16
13	Texas A&M	85	5	32	36	86.57	814.63
14	Tennessee	83	1	35	37	87.38	813.92
15	Ole Miss	85	4	25	46	87.53	808.15

Table 12 shows the independent variable Team which is the total points for the 247Sports team rating. The highest rated team for 2016 was Alabama with 82 total players and total points of 982.66. Recall that the 2016 Class rating for Alabama was 25 players for total points for 302.04. Alabama signed 101 players from 2013-2016 that are included in the Class ratings. The 2016 Team rating had only 82 players, so Alabama lost a net of 19 players from its recruiting classes. This is the reason that the Team variable is a better independent variable than the individual Class variables.

DISCUSSION

The data analysis shows that recruiting ranking data plays a very important role in explaining the success of college football teams. The 247Sports ratings are good predictors of the final Sagarin ratings. The results indicated that for the overall sample between 0.10 and 0.36 of the total variation in the Sagarin ratings was explained by the recruiting rankings. This indicates that the effort and expense of football recruiting is important to the health of the football program both in terms of wins and finances.

The question that this study asked is: do recruiting rankings matter? The answer is yes, they do appear to be important to a team’s success and therefore they matter. Remember that these ratings happen when the player is 17 or 18 years old in high school. These are assumed to be meaningful as a player progresses to his college years when he is 18-23 years old. The results support the conclusion that recruiting ratings explain about one-third of the variability in the Sagarin final ratings.

CONCLUSION

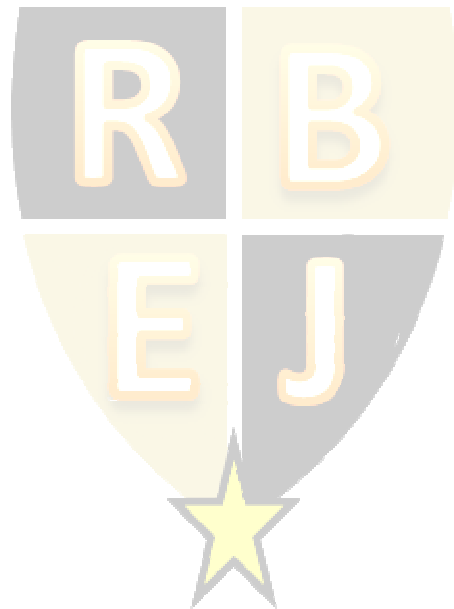
American college football is a multibillion dollar business for 130 universities. If the team is good, then it produces more wins, more tickets sold, and more revenues for the school. The recruiting industry is based on the premise that rating high school recruits is meaningful and that higher rated classes and teams will provide more wins and more success. This study used the 247Sports composite class ratings and team ratings to measure if higher recruiting ratings translate to greater team success. The team success was measured by the Sagarin final ratings for each year. The study used seventeen years of recruiting to predict fourteen years of team success. The recruiting ratings explained up to 0.36 of the variability in the Sagarin final ratings.

REFERENCES

- 247Sports. (2012, July 20). 247Sports Rating Explanation. Retrieved from <http://247sports.com/Article/247Rating-Explanation-81574>
- 247Sports. (2017a, June 21). 2016 College Football Team Talent Composite. Retrieved from <https://247sports.com/Season/2016-Football/CollegeTeamTalentComposite>
- 247Sports. (2017b, July 27). 2016 Football Recruiting Composite Team Rankings. Retrieved from <https://247sports.com/Season/2016-Football/CompositeTeamRankings>
- Bergman, S. A., & Logan, T. D. (2014). The Effect of Recruit Quality on College Football Team Performance. *Journal of Sports Economics*. doi:10.1177/1527002514538266
- Brady, E., Kelly, J., & Berkowitz, S. (2015, February 4). Schools in power conferences spending more on recruiting. *USA Today*. Retrieved from <http://www.usatoday.com/story/sports/ncaaf/recruiting/2015/02/03/college-football-recruiting-signing-day-sec-power-conferences/22813887/>
- Caro, C. A. (2012). College Football Success: The Relationship Between Recruiting and Winning. *International Journal of Sports Science and Coaching*, 7(1), 139-152. doi:10.1260/1747-9541.7.1.139
- Connelly, B. (2015, February 3). Does Alabama interest boost a recruit's rating? Of course ... and with good reason. *SBNation.com*. Retrieved from <http://www.sbnation.com/college-football-recruiting/2015/2/3/7972129/alabama-recruiting-bama-bump-ratings-rankings>
- Dronyk-Trosper, T., & Stitzel, L. (2015). Lock-In and Team Effects: Recruiting and Success in College Football Athletics. *Journal of Sports Economics*. doi:10.1177/1527002515577885
- Elliott, B. (2014a, February 18). Blue-chip ratio: Which college football teams have championship-grade recruiting? Retrieved from <http://www.sbnation.com/college-football-recruiting/2014/2/18/5312840/college-football-recruiting-teams-championships>
- Elliott, B. (2014b, May 12). How sleeper recruits still make the NFL, despite blue-chip dominance. Retrieved from <http://www.sbnation.com/college-football-recruiting/2014/5/12/5696710/nfl-draft-recruits-five-stars-two-stars>
- ESPN. (2016). NFL Attendance 2015. Retrieved from http://www.espn.com/nfl/attendance/_/year/2015
- Federal Reserve Bank of St. Louis. (2019). Gross Domestic Product. Retrieved from <https://research.stlouisfed.org/fred2/series/GDP>
- Gaines, C. (2015, May 22). The NFL and Major League Baseball are the most attended sports leagues in the world. *Business Insider*. Retrieved from <http://www.businessinsider.com/attendance-sports-leagues-world-2015-5>

- Henry, C. (2014, October 15). State of the Hogs: Ed Orgeron. *Hawgs Illustrated*. Retrieved from <http://arkansas.scout.com/story/1464101-state-of-the-hogs-ed-orgeron>
- Herda, T. J., Ryan, E. D., DeFreitas, J. M., Costa, P. B., Walter, A. A., Hoge, K. M., . . . Cramer, J. T. (2009). Can Recruiting Rankings Predict the Success of NCAA Division I Football Teams? An Examination of the Relationships among Rivals and Scouts Recruiting Rankings and Jeff Sagarin End-of-Season Ratings in Collegiate Football. *Journal of Quantitative Analysis in Sports*, 5(4), 1-13. doi:10.2202/1559-0410.1200
- Hinton, M. (2014, February 5). Recruiting Matters: Be they ever so humble, the rankings (still) get it right. Retrieved from <http://www.footballstudyhall.com/2014/2/5/5382140/recruiting-matters-why-the-sites-get-the-rankings-right?>
- Langelett, G. (2003). The relationship between recruiting and team performance in Division 1A college football. *Journal of Sports Economics*, 4(3), 240-245. doi:10.1177/1527002503253478
- McMurphy, B. (2014, August 7). Power Five Coaches Polled on Games. *ESPN.com*. Retrieved from http://www.espn.com/college-football/story/_/id/11320309/majority-power-five-coaches-want-power-five-only-schedules
- Miller, D. S. (2011, December 24). Yes, Virginia. Recruiting Stars do matter, sort of... Retrieved from <https://sites.google.com/a/email.arizona.edu/d-shane-miller/blog/12-24-11---yes-virginia-recruiting-stars-do-matter-sort-of>
- Miller, D. S. (2014, December 14). Yes, Virginia. Recruiting stars do matter... 2014 edition. Retrieved from <https://dshanemiller.wordpress.com/2014/12/14/yes-virginia-recruiting-stars-do-matter-2014-edition/>
- National Collegiate Athletic Association (NCAA). (2014). *2014 National College Football Attendance*. Retrieved from http://fs.ncaa.org/Docs/stats/football_records/Attendance/2014.pdf
- National Football League (NFL). (2019). *List of Underclassmen granted eligibility for the 2019 NFL draft*. Retrieved from <http://www.nfl.com/news/story/0ap3000001011444/article/list-of-underclassmen-granted-eligibility-for-2019-nfl-draft>
- Office of Postsecondary Education. (2019). *The Equity in Athletics Data Analysis Cutting Tool*. Retrieved from: <https://ope.ed.gov/athletics/#/>
- Organ, M. (2015, December 16). CBS acquires 247Sports, Shannon Terry's Nashville-based site. *Tennessean*. Retrieved from <http://www.tennessean.com/story/sports/2015/12/16/shannon-terry-sales-247sports/77429818/>
- Sagarin, J. (2017, January 9). 2016 NCAA Football Jeff Sagarin Ratings. *USA Today*. Retrieved from <https://www.usatoday.com/sports/ncaaf/sagarin/2016/team/>
- Solomon, J. (2015, December 18). College football attendance drops for fifth straight year, but at slower rate. Retrieved from <http://www.cbssports.com/collegefootball/writer/jon-solomon/25418087/college-football-attendance-drops-for-fifth-straight-year-but-at-slower-rate>
- Sporting Intelligence. (2015). *Best attended domestic sports leagues in the world*. Retrieved from <http://www.sportingintelligence.com/finance-biz/business-intelligence/global-attendances/>

Travis, C. (2015, February 5). Top Ten Signing Classes Are Necessary For National Titles. *Outkick the Coverage*. Retrieved from <https://www.outkickthecoverage.com/top-ten-signing-classes-are-necessary-for-national-titles-020515/>



APPENDIX

Appendix A Power Five Conferences and Schools		
Atlantic Coast Conference (ACC)	Big 12 Conference	Big Ten Conference
Boston College Clemson University Duke University Florida State University Georgia Institute of Technology North Carolina State University Syracuse University University of Louisville University of Miami University of North Carolina University of Pittsburgh University of Virginia Virginia Tech University Wake Forest University	Baylor University Iowa State University Kansas State University Oklahoma State University Texas Christian University Texas Tech University University of Texas University of Kansas University of Oklahoma West Virginia University	Indiana University Michigan State University Northwestern University Ohio State University Pennsylvania State University Purdue University Rutgers University University of Illinois University of Iowa University of Maryland University of Michigan University of Minnesota University of Nebraska University of Wisconsin
Pac 12 Conference	Southeastern Conference (SEC)	Independents
Arizona State University Oregon State University Stanford University University of Arizona University of California University of California-Los Angeles University of Colorado University of Oregon University of Southern California University of Utah University of Washington Washington State University	Auburn University Louisiana State University Mississippi State University Texas A&M University University of Alabama University of Arkansas University of Florida University of Georgia University of Kentucky University of Mississippi University of Missouri University of South Carolina University of Tennessee Vanderbilt University	University of Notre Dame Brigham Young University
Appendix B Group of Five Conferences and Schools		
American Athletic Conference (AAC)	Conference USA (CUSA)	Mid-American Conference (MAC)
East Carolina University Naval Academy (Navy) Southern Methodist University Temple University Tulane University of Louisiana University of Central Florida University of Cincinnati University of Connecticut University of Houston University of Memphis University of South Florida University of Tulsa	Florida Atlantic University Florida International University Louisiana Tech University Marshall University Middle Tennessee State University Old Dominion University Rice University University of Alabama at Birmingham University of North Carolina at Charlotte University of North Texas University of Southern Mississippi University of Texas at El Paso University of Texas at San Antonio Western Kentucky University	Ball State University Bowling Green State University Central Michigan University Eastern Michigan University Kent State University at Kent Miami University-Oxford Northern Illinois University Ohio University University at Buffalo University of Akron Main Campus University of Toledo Western Michigan University
Mountain West Conference (MWC)	Sunbelt Conference	Independents
Air Force Academy Boise State University California State University-Fresno Colorado State University San Diego State University San Jose State University University of Hawaii University of Nevada-Las Vegas University of Nevada-Reno University of New Mexico University of Wyoming Utah State University	Appalachian State University Arkansas State University Coastal Carolina University Georgia Southern University Georgia State University Texas State University Troy University University of Louisiana at Lafayette University of Louisiana at Monroe University of South Alabama	Liberty University New Mexico State University United States Military Academy (Army) University of Massachusetts