

# **An Empirical Analysis on the Effects of FBS College Football Success on Undergraduate Enrollment from 2000 to 2014**

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## **Abstract:**

This paper investigates the theoretical connection between FBS College Football success and the undergraduate enrollment of schools in the Northeastern United States. With multiple texts qualitatively discussing the positive effects a winning football culture has on the amount of applicants an institution receives, this study attempts, using panel data, to discover quantitative connections in this field. Utilizing data from over 19 FBS colleges and universities from 2000 to 2014, this study finds that there is a significant, positive connection between undergraduate application rates and football wins, as well as championships. This study lays the foundation for future studies into the connections between sports and admissions.

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## 1.0 INTRODUCTION

Each year, historic amounts of capital are injected into collegiate football programs, from infrastructure to merchandising to coaching. In fact, the University of Tennessee's recruiting costs in 2014 reached over \$1,292,000 and Ohio State University pays Head Coach Urban Meyer four million dollars a year plus bonuses, two quick examples on the large business size of college football (Des Moines Register). Assuming these non-profit universities engage in Division 1 sports to build community, develop competition, and garner recognition (although the pure fact that coaches continue to be paid millions of dollars compared to non-paid student athletes suggest a more for-profit-based model), colleges and universities engaging in college football seek to increase the benefits of attending their schools. Students, as the theory goes, enjoy attending a school with a successful sports environment (Pappano, *New York Times*), ergo many universities invest in college athletics to increase undergraduate enrollment. With the large amount of capital invested in college football, far more than any other collegiate sport, and the importance of undergraduate enrollment in a school's continued success (Perna et. Al, 2008), I am intrigued to discover if collegiate football success has a significant effect on the growth of undergraduate enrollment the following year.

As discussed earlier, the large amount of money is expended on college football to build the prestige of the institution. In "How Big Time Sports Ate College Life" in the *New York Times*, Pannano states that Urban Meyer coaches football "for \$4 million a year plus bonuses (playing in the BCS National Championship game nets him an extra \$250,000; a graduation rate over 80 percent would be worth \$150,000." Meanwhile, the Physics department does not have money to cover their conferences. The reason for this,

explained by Gordon Aubrecht, an Ohio State physics professor, is people don't say 'Oh yeah, Ohio State, that wonderful physicals department.' "It's football." The amount of money funneled into sports is often rationalized due to the gross profits the schools pull in from tickets, concessions, and advertisements. However, if this study can illustrate a positive impact in football wins on undergraduate enrollment, there may be an ethical, not capitalistic, reason to promote sports in such a monetary way.

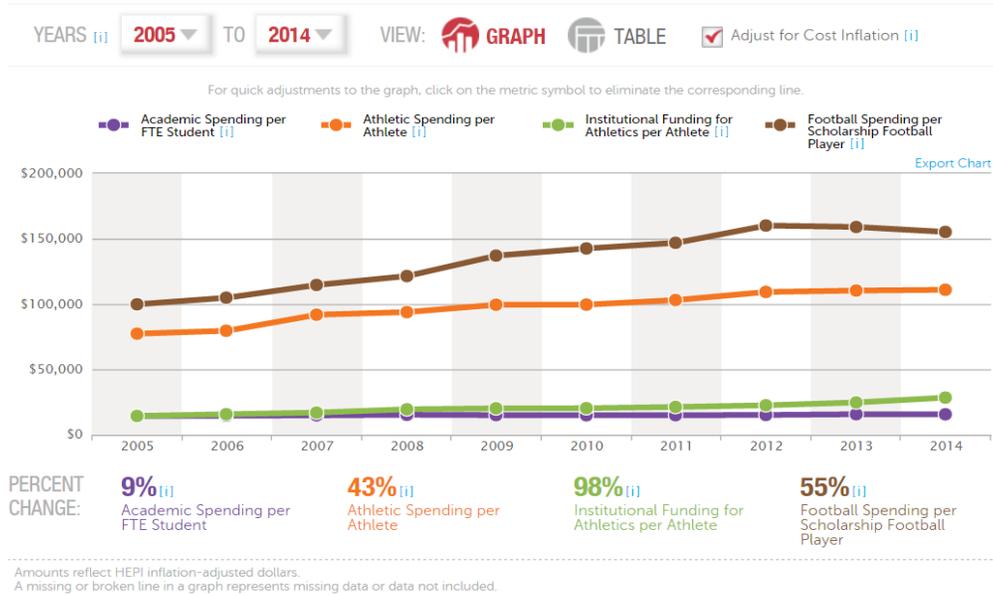
This paper was guided by three research objectives that differ from other studies: First, this paper forges new ground on the connection between undergraduate admission rates and collegiate football success, as no studies have actually looked into this topic. Additionally, it examines the difference in importance of wins and championships in college football, as this difference has only been examined in the national football league. Finally, it focuses in on the Northeastern United States, examining the importance of football in this region of the nation.

The rest of the paper is organized as follows: Section 2 gives a brief literature review. Section 3 outlines the empirical model. Data and estimation methodology are discussed in section 4. Finally, section 5 presents and discusses the empirical results. This is followed by a conclusion in section 6.

## **2.0 TREND**

Figure 1 shows the ever increasing rise in spending in college, specifically in athletics and football. It compares academic spending per student and athletic spending per athlete, showing that schools will place a high emphasis on student-athletes. They far outspend their academic counterparts, illustrating the ever-increasing emphasis of spending on athletics at the university level.

**Figure 1: Spending Trends in Higher Education**



Source: Knight Commission Spending Database

Figure 2 shows the ever increasing rise in in application growth in higher education. Overall, schools are experiencing an uptick in application rates, indicating more and more students are applying to schools overall. It will be important to keep this in mind when examining the relationship to college football success, as a team’s rise in football could be clouded by this general rise in rates. (See next page for chart)

**Figure 2: Application Growth Rates in Higher Education**



Source: U.S. Department of Education

### **3.0 LITERATURE REVIEW**

There is not a large direct literature review on this subject; however, there is a plethora of related studies that are useful in constructing a larger narrative around this work. For instance, the success of a sports team has a highly positive impact in attracting potential free agents (Berri, 1994). This originally led me to consider prospective university applicants as free agents to a school. The United States of America Department of Education's 2008 study on which influencers affect a student's choice in university attendance would show the relative importance of sports atmospheres for high school students seeking higher education.

Overall, there is a history of colleges and universities focusing on athletics to bolster their image and attract candidates. Northeastern universities often flooded their basketball programs with funds to increase success and, ergo, applicant rates (Elster, 1995).

This study however featured little quantitative data. Furthermore, in 2010 Mark Groza highlighted the importance locally of winning football games in connection to college football attendance, indicating the value of winning in getting people *at* a school. In fact, winning and championships are the most important factors in college football attendance (Kroenig, 2011). If they positively affect attendance, might they not positively affect enrollment numbers? Ultimately, Pena in 2008 discusses the multiple types of athletic initiatives college put in place financially to benefit athletic programs in hopes to strengthen their draw, indicating a direct study on this success must take place.

#### 4.0 DATA AND EMPIRICAL METHODOLOGY

##### 4.1 Data

The study uses panel data obtained annually from 2000 to 2014. Data were obtained from the United States Department of Education and the Federal Reserve Economic Database (FRED), both of which are public databases featuring a plethora of important statistics. Summary statistics for the data are provided in Table 1.

**Table 1 Summary Statistics**

Summary Table All Variables				
Variable	$\bar{x}$	Minimum	Maximum	Observations
Year	2007.049	2000	2014	283
Wins	6.339	0	13	283
Champion	0.226	0	1	283
Applicant	12.696	0.4	25	283
Tuition	4.283	0.1	9	283
Type	0.159	0	1	283
Interest	2.916	1.16	6.8	283
Inflation	2.389	0.03	4.28	283
RealWage	3.555	-5.5	9.8	283

**Table 2 Correlation Matrix**

3.4 Correlation Table Final Variables							
	wins	champion	tuition	type	interest	inflation	realwage
wins	1.0000						
champion	0.4380	1.0000					
tuition	-0.0894	0.0027	1.0000				
type	-0.1452	-0.0272	0.0824	1.0000			
interest	-0.0021	-0.0511	0.0312	0.0059	1.0000		
inflation	-0.0257	-0.0125	-0.0042	0.0001	0.3715	1.0000	
realwage	-0.0389	-0.0695	0.0921	0.0045	0.4761	0.4900	1.000

#### 4.2 Empirical Model

The model could be written as follow:

$$\begin{aligned}
 Applicant_{it} = & \beta_0 + \beta_1 Wins_{it} + \beta_2 Champion_{it} + \beta_3 Tuition_{it} + \beta_4 Type_{it} + \beta_5 Interest_{it} + \\
 & \beta_6 Inflation_{it} + \beta_7 Realwage_{it} + u_{it}
 \end{aligned}
 \tag{1}$$

$Applicant_{it}$  is the percent change of applicants from one year to the next, or the applicant growth rate, representing the growth in interest of the college in question. When attempting to select a dependent variable to measure the effects of the independents, it was important to understand relativity; gross numbers would not work her. An increase in 100 applicants can mean a variety of things depending on if the school featured 3,000 undergraduates or 30,000 undergraduates. Additionally, this rate is lagged three years, as it takes an amount of time for the potential effects of college football success to take hold of an incoming class of college graduates. After reading into the literature, the consensus seems to be between 2 and 5 years for the effects to potentially take hold. Through this lagged growth rate variable, a better view of outcomes can be seen.

Independent variables consist of seven variables obtained from various sources. Appendix A and B provide data source, acronyms, descriptions, expected signs, and justifications for using the variables. First, *Wins<sub>it</sub>* (number of wins at school *i* at year *t*) represents one version of measuring college football success at a school. Secondly, *Champion<sub>it</sub>* is an additional proxy for success, as it represents a binary variable of whether or not a school won a championship that year. Third, *Tuition<sub>it</sub>* represents tuition growth rate at the school, lagged three years to account for time again; this data was compiled from the Department of Education. *Type<sub>it</sub>* is a binary variable detailing whether a school is public (0) or private (1). *Interest<sub>it</sub>* is the prevailing interest rate on college loans lagged three years, compiled from FRED. *Inflation<sub>it</sub>* is the prevailing inflation rate lagged three years, measuring the change in CPI from FRED. *Realwage<sub>it</sub>* is the real wage growth rate lagged three years, compiled from FRED

## 5.0 EMPIRICAL RESULTS

The empirical estimation results are presented in Tables 3 and 4. Both the fixed effects and random effects models are listed below and indicate similar findings. All variables in both models exhibit the same signs, while their coefficients only differ. Additionally, the *Type<sub>it</sub>* variable is omitted in the fixed effects model. We can examine the results of the two models in general, as their signs are what are truly important here. Both *Wins<sub>it</sub>* and *Champion<sub>it</sub>* variables are positively correlated with the dependent variable and are statistically significant at 99% confidence. From this, we can infer that a successful college football program will increase the attraction to the school and therefore the number of applicants. The standard errors also are small enough that the signs do not

change, giving us confidence in these conclusions. No other variables in either model are significant, with many of them featuring standard errors that fluctuate their signs. We cannot draw conclusions from these variables. Overall, we are confident with this model at the 1% confidence level, according to the Prob>F or Prob>chi2 indicators. Finally, this model explains approximately 60.7% of the variance in the dependent variable, which is suitable for these conclusions.

**Table 3: Regression results for the Random Effects Panel**

Variable	wins	champion	tuition	type	interest	inflation	realwage
Regression	1.479*** (0.115)	6.738*** (0.785)	0.006 (0.104)	-1.176 (0.815)	0.043 (0.219)	-0.071 (0.312)	-0.0273 (0.106)

Observations	R <sup>2</sup>	Prob>chi2
283	0.6177	0.000

Note: \*\*\*, \*\*, and \* denotes significance at the 1%, 5%, and 10% respectively. Standard errors in parentheses

**Table 4: Regression results for the Fixed Effects Panel**

Variable	wins	champion	tuition	type	interest	inflation	realwage
Regression	1.375*** (0.132)	7.080*** (0.816)	0.014 (0.107)	Omitted	0.059 (0.211)	-0.089 (0.311)	-0.026 (0.106)

Observations	R <sup>2</sup>	Prob>F
283	0.6076	0.000

## 5.0 CONCLUSION

In summary, this study illustrates a positive correlation between college football success and undergraduate enrollment rates. A school who performs well in the college football season, whether it's a win total or a championship, will experience a positive growth in their applicant rate three years later. Schools in the Northeast can focus on this study as a reason to continue flowing money and other resources into their football programs as a means to increase their admission applicant rates. This study quantifies many of the anecdotal evidence presented by others in the literature review of this study. However, there are a few limitations to these results. First, I would like to include additional variables in the study, as it was difficult to quantify many of the attributes that affect the college admission process. I would like to read additional studies to gather these variables. Furthermore, more analysis can be done in the actual payoff of college football for the admission departments of undergraduate programs. This study simply examines the correlation between football and admission, but it does not examine if these positive influences outweigh the monetary costs of doing football business. I would like in the future to take the findings of this study and further them in these ways. Overall, discovering a significant, positive relationship between the dependent and independent variables is a worthwhile result that I can improve upon in the future.

## Appendix A: Variable Description and Data Source

Acronym	Description	Data source
Applicant	Applicant growth rate lagged three years	US Department of Education
Wins	Number of wins in FBS seasons, including championships	NCAA FBS Database
Champion	Binary variable on whether the school won a championship (1) or did not (0) that year	NCAA FBS Database
Tuition	Tuition growth rate lagged three years	US Department of Education
Type	Binary variable on whether a school is private (1) or public	US Department of Education
Interest	Prevailing student loan interest rate lagged three years	FRED
Inflation	Prevailing inflation rate lagged three years	FRED
Realwage	Real wage growth rate lagged three years.	FRED

### Appendix B- Variables and Expected Signs

Acronym	Variable Description	What it captures	Expected sign
Applicant	Applicant Growth Rate lagged three years	The increase in applicants from year to year	N/A
Wins	# of College Football Wins, including championships	College football success	+
Champion	Binary variable of championship (1) or no (0)	College football success	+
Tuition	Tuition growth rate lagged three years	Change in school costs	+/-
Type	Binary variable of public (0) or private (1) school	Culture of school	-
Interest	Prevailing student loan interest rate lagged three years	Cost of loans to attend school	-

Inflation	Prevailing inflation rate lagged three years	Cost of attending school	+/-
Realwage	Real wage growth rate of college educated graduates lagged three years	Cost benefit of attending undergraduate school	+

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