Athletic Success and Student Enrollment at an NCAA Division II University

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This case study examines the relationship between winning at football and student enrollment at a representative NCAA Division II institution, Pittsburg State University in southeast Kansas. Using time series data for a 33-year period, we model the impact of football winning percentage and winning margin on various measures of undergraduate enrollment, including new first-year students, returning students, and transfer students. Results indicate that football success is positively correlated with the university's overall undergraduate enrollment, ceteris paribus, primarily through positive impacts on the number of retained students and the number of new transfers. Additionally, winning national championships was found to have a significant effect on the number of new freshmen or first-year students overall. Thus, similar to larger institutions, Division II schools may reap positive academic benefits from supporting successful athletic teams.

Keywords: intercollegiate sports, NCAA Division II, enrollments, retention

INTRODUCTION

A substantial body of empirical work indicates that a university's athletic achievements can generate positive spillover effects for various measures of academic outcomes including student recruitment and enrollment. However, this literature is almost exclusively based on data from large relatively well-resourced National Collegiate Athletic Association (NCAA) Division I institutions with widespread fanbases commanding extensive regional and national media attention. It is less understood whether investments in intercollegiate athletics lead to similar academic benefits for smaller schools which do not receive the same media exposure as Division I universities. We explore this issue by examining the relationship between success on the football field and undergraduate student enrollment at a representative Division II institution, Pittsburg State University in southeast Kansas. Our case study employs 33 years of time series data spanning various cycles of winning, including national championships, and losing. The empirical results suggest that football success is positively correlated with undergraduate enrollment, but is not necessarily a strong recruitment tool for new incoming students.

In the following section we place this study within the setting of the existing research literature, provide a brief overview of the relevant characteristics of the NCAA Division II landscape, and a description of Pittsburg State University to set the institutional context of our study. Next, we describe

our enrollment model and the data used to estimate it. The results are then presented and discussed with respect to what they imply for Division II football schools. We conclude with suggestions for future research and study.

THE INSTITUTIONAL CONTEXT

Research Setting

One of the distinguishing elements of higher education in the United States is the importance of intercollegiate athletics on many campuses. For more than a century, sporting contests have been an integral part of college life for students at both large and small schools. For the largest universities which are members of the NCAA's Division I, athletics is a big business that generates millions of dollars and attracts significant national media attention for the institution. In total, more than US$8.3 billion (Knight Commission, 2019) in revenue is collectively generated by the 130 university athletic programs that play in Division I's Football Bowl Subdivision (FBS). However, for many of these schools individually, intercollegiate athletics is a financial drain as the annual median revenue, net of expenses, for a typical FBS university is historically negative and in the seven-figure range (Fulks, 2017). The significant size of intercollegiate athletic expenditures has drawn extensive attention from economists trying to understand why universities spend millions of dollars each year on a business enterprise which is not central to their core academic missions.

There are many and varied answers given by university administrators and boards of directors for their substantial financial investments in athletics; however, most center around the advertising effects and the sense of community for students and alumni that competitive sports generate. The public attention and media exposure from sports undoubtedly markets a university to a broad general audience and, therefore, potentially influences student applications and enrollments in a positive way.[1] Likewise, by bringing current students, alumni, and friends of the institution together as sports fans rooting for a common goal, athletic events bond these groups together and to their university which may impact student retention and generate additional gifts and donations to the school. Numerous researchers have examined the potential economic benefits from intercollegiate athletics and many find positive impacts on applications, admissions, and enrollment (for example, Chressanthis & Grimes, 1993; McEvoy, 2005; Mixon, Trevubio & Minto, 2004; Murphy & Trandel, 1994; Perez, 2012; Pope & Pope, 2009; Toma & Cross, 1998; Tucker, 2005; and Tucker & Amato, 1993). Furthermore, many have also reported positive relationships between sports success and donations received (for example, Brooker & Kastorin, 1981; Grimes & Chressanthis, 1994; Humphreys & Mondello, 2007; Rhoads and Gerking, 2000; and Tucker, 2004). Recently, a comprehensive study utilizing a propensity score design found causal effects of winning on increased donations, student applications, incoming SAT scores, in-state enrollments, and a university's academic reputation (Anderson, 2017). However, other previous studies report more mixed effects of sports success on the academic enterprise (Sigelman & Carter, 1979; McCormick & Tinsley, 1987; Bremmer & Kesselring, 1993; Baade & Sudberg, 1996; Turner, Meserve & Bowen, 2001; Smith, 2008; Fisher, 2009; Livingston, 2009; Meer & Rosen, 2009; Peterson-Horner & Eckstein, 2015; and Smith, 2018). Thus, although the relationship between athletics and institutions of higher learning is complex, the research literature, while not conclusive, indicates that it is possible for successful intercollegiate athletics programs to generate positive spillover academic benefits to a university. The extent to which these expected effects vary by institutional size is an open empirical question.

To date, the research exploring the linkages between a university's athletics success and academic outcomes has almost exclusively focused on schools which belong to the NCAA's Division I, and in particular, the FBS. These are the schools that are regularly characterized as having "big-time" sports programs. They are the nation's largest public and private schools in terms of spending on intercollegiate athletics and are often their state's and region's largest institutions in terms of student enrollment. A vast majority of the schools in Division I FBS belong to athletic conferences which cartelizes the broadcasting market and media exposure for their athletic contests. While a significant gulf exists between the financial resources of the "Power Five" and "Group of Five" Division I FBS conference schools,[2] the gap between

the average Division I FBS school and the average Division II school is enormous. The median total revenue for Division I FBS schools was US$63.65 million versus US$6.52 million for Division II schools with football programs in 2015, the last year with comparable data available (Fulks, 2016, 2017) – almost one full order of magnitude difference. It is reasonable to question whether the academic spillover benefits of intercollegiate athletics that are often found for Division I schools also exist for smaller schools with fewer resources playing in Division II. This question is vitally important in today's environment where many smaller schools are facing significant declines in enrollment and where intercollegiate sports, particularly football, is viewed as a recruitment and retention tool by some institutions and as an unnecessary expense by others (Pennington, 2019). The purpose of the case study presented here is to examine the relationship between football success and student enrollment at a representative Division II school.

NCAA Division II Setting

The roots of Division II athletic competition were planted in 1973 when NCAA member institutions voted to move from two classifications, University versus College, to three, Division I, Division II, and Division III. The three-tier model was designed to allow schools more choice in determining their level of financial investment in athletics. The primary distinguishing characteristic between the three divisions is the level of financial aid offered to student-athletes. At the extremes, Division I schools may offer fully funded athletics-based scholarships while Division III schools offer no scholarships at all for athletics. Division II is set squarely between these two extremes and follow a "partial-scholarship" model for student-athletes. Division II schools provide athletic-based scholarships that do not cover the entire cost of college.[3] Schools in Division II follow their self-imposed rules governing the determination of the level of support which may be provided to student-athletes in each sport.

Currently, Division II is comprised of 308 member schools which are organized into 24 regional conferences. These schools, almost equally split between public and private institutions, are relatively small with almost 90 percent enrolling less than 7,500 students. On average, each Division II school offers about nine sports for women and about seven sports for men. As noted earlier, the overall medium institutional budget for operating these programs is approximately US$6.52 million per year.[4] Nationwide, more than 110,000 student-athletes compete annually in Division II (NCAA, 2019a).[5] Schools with football programs average 463 student-athletes each year (NCAA, 2019b) and offer athletic scholarships that, on average, cover approximately one-quarter of the base tuition and fees (Fulks, 2016).

Intercollegiate sports programs operate at a loss for virtually all Division II schools. In fact, between 2010 and 2015, only two instances were reported where generated revenues exceeded generated expenses for a football-playing Division II school (Fulks, 2016). Thus, all Division II programs rely heavily on financial support from their institution and from outside sources. As in Division I, there are significant differences across Division II schools in the amount of resources devoted to athletic programs. In 2015, Division II football-playing schools in the lowest quartile reported a median of US$3.70 million in total operating expenses across all sports compared to a median of US$10.23 million for schools in the top quartile. And in the same year, these schools reported an overall median operating deficit of US$5.37 million (Fulks, 2016). Intercollegiate sports programs represent a significant financial investment for the average Division II university.

Since 2005, Division II schools have participated in a public campaign to define their mission as "Life in the Balance" for student-athletes (NCAA, 2019c). The partial scholarship model is portrayed to provide opportunities for student-athletes to compete, not only in sports, but also in the classroom. Using the tag line "Make it Yours," member schools endorse Division II as providing access to scholarships while also promoting academic experiences that are more personal and inclusive than those found in Division I and where graduation and career preparation are priorities. Collectively, Division II schools have developed and endorsed an extensive strategic plan to promote their brand and to clearly distinguish themselves from Divisions I and III (NCAA, 2019d).

Institutional Setting

Our study utilizes data from Pittsburg State University (Pitt State) located in extreme southeast Kansas. Pitt State currently enrolls about 6,500 students and has been a member of Division II since 1989.[6] The university shares a number of both academic and athletic characteristics with the typical Division II institution. Pitt State is one of six public universities governed by the Kansas Board of Regents (KBOR) and is classified as a comprehensive Master's-level university. Located on a 223-acre campus in the city of Pittsburg, a community of approximately 20,000 residents, Pitt State is the largest public regional institution in its service area which includes not only southeast Kansas, but also southwest Missouri, northeast Oklahoma, and northwest Arkansas. This area is primarily rural and characterized by small towns and medium-sized cities approximately 100 miles south of the Kansas City metropolitan area. The university offers more than 150 undergraduate degree programs and approximately 50 graduate programs.[7]

Currently, the Pitt State student-to-faculty ratio stands at 19 to 1 and the average ACT score for entering first-year students is 22. The student body is almost equally split between male and female students. Closely reflecting the demographic composition of the surrounding region, about 78 percent of Pitt State students identify as White, with Black and Hispanic students comprising only about four percent each of the overall student population. Approximately two-thirds of the student body live in the university's on-campus residence halls or in off-campus apartments in nearby neighborhoods.

Pitt State has a long history of intercollegiate athletic competition and fielded its first football team in the fall of 1908.[8] It is the only university in the nation whose athletics teams are known as the Gorillas – a name first used in the early 1920s and derived from the region's historical coal mining heritage. ("Gorillas" was a contemporary slang term in the early 20th century to refer to roughnecks who worked in the coal mines.) Today, the university sponsors six sports for men (including football) and the same number for women. All teams compete in the Mid-America Intercollegiate Athletics Association (MIAA) which is comprised of 14 Division II member institutions spread across Kansas, Missouri, Nebraska, and Oklahoma. (MIAA, 2019).

Approximately 250 men and 100 women compete annually in intercollegiate athletics for Pitt State. This compares to the median of 278 men and 169 women reported for all Division II schools with football programs (Fulks, 2016). Pitt State's overall operating expenses for all sports in 2016 was US$7.94 million, approximately one-and-a-half million dollars more than the Division II median. Pitt State also spends more than median on football. In fiscal year 2016, operating expenses for the Pitt State football program totaled US$1.81 million compared to the Division II median of US$1.31 million. However, this was less than one half of the highest expenditure for football made by a Division II institution that year – US$3.96 million (Fulks, 2016).

Of the nearly 350 Pitt State student-athletes (both men and women), 281 received financial aid totaling US$1.83 million in 2016.9. While this overall level of expenditure places the institution in the third quartile of student aid provided by Division II football-playing schools, the less than median number of student-athletes at Pitt State moves the university to the median on a per-student basis. Thus, Pitt State appears to follow a strategy to offer fewer sports than the median football-playing school in Division II, but to offer strongly competitive financial aid packages to student-athletes for those sports that the university supports. This model is followed by many Division II schools which successfully specialize in the sports of their choice (Hardwick-Day, 2018).[10] Overall, Pitt State is highly representative of the typical Division II public university with a successful football program. Furthermore, as with many smaller regional universities in the Midwest, Pitt State has experienced declining undergraduate enrollment over the past five years and the role that intercollegiate sports, particularly football, may play in developing successful student recruitment and retention strategies is an important element to understand.

A MODEL OF ENROLLMENT

The Data

To address the effect of football success on student enrollment at a Division II university we analyzed data drawn from institutional and public sources over a 33-year span, 1986 through 2018. This period is long enough to capture significant short-run variations in both undergraduate student enrollment[11] and athletic success on the football field at Pitt State. The time span was chosen to be inclusive of Pitt State's membership in NCAA Division II. Figures 1 and 2 show how undergraduate enrollment varied over the sample period. As seen in Figure 1, the number of Pitt State undergraduates followed a general upward trend for most of the period, rising by about 2,000 students from a base of approximately 4,200, between 1986 and 2013. For the last five years of the sample period, enrollment trended downward which is consistent with the experience of many Midwest regional comprehensive universities in recent years (Fain, 2018). Figure 1 also shows that this pattern in overall enrollment is closely mirrored by the enrollment of students who are retained each year and return to the university to continue their studies. Figure 2 reflects the enrollment of annual new entrants to the university broken out by three key cohorts: zero-hour students, freshmen students, and transfer students.[12] As seen in Figure 2, over the long-run Pitt State has come to rely more heavily on new zero-hour and freshmen students to grow and maintain enrollment relative to transfer students. The recent decline in overall enrollment appears to be primarily driven by the loss of students represented by the new freshmen cohort. Figure 2 clearly shows that the rate of decline in new freshmen significantly exceed the relatively smaller losses in both zero-hour or transfer students over the last five years of the sample.

FIGURE 1
PITTSBURG STATE UNIVERSITY ENROLLMENT: 1986-2018

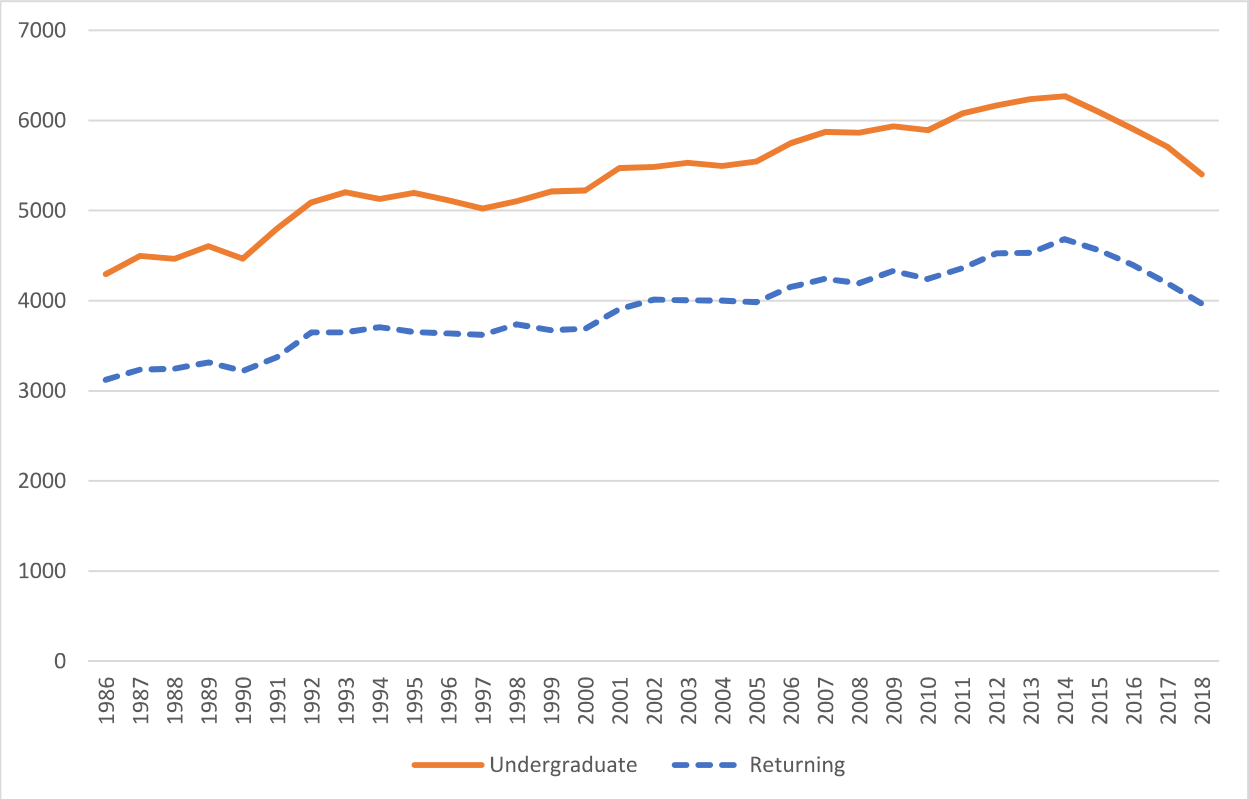


FIGURE 2
UNDERGRADUATE NEW ENROLLMENT COHORTS: 1986-2018

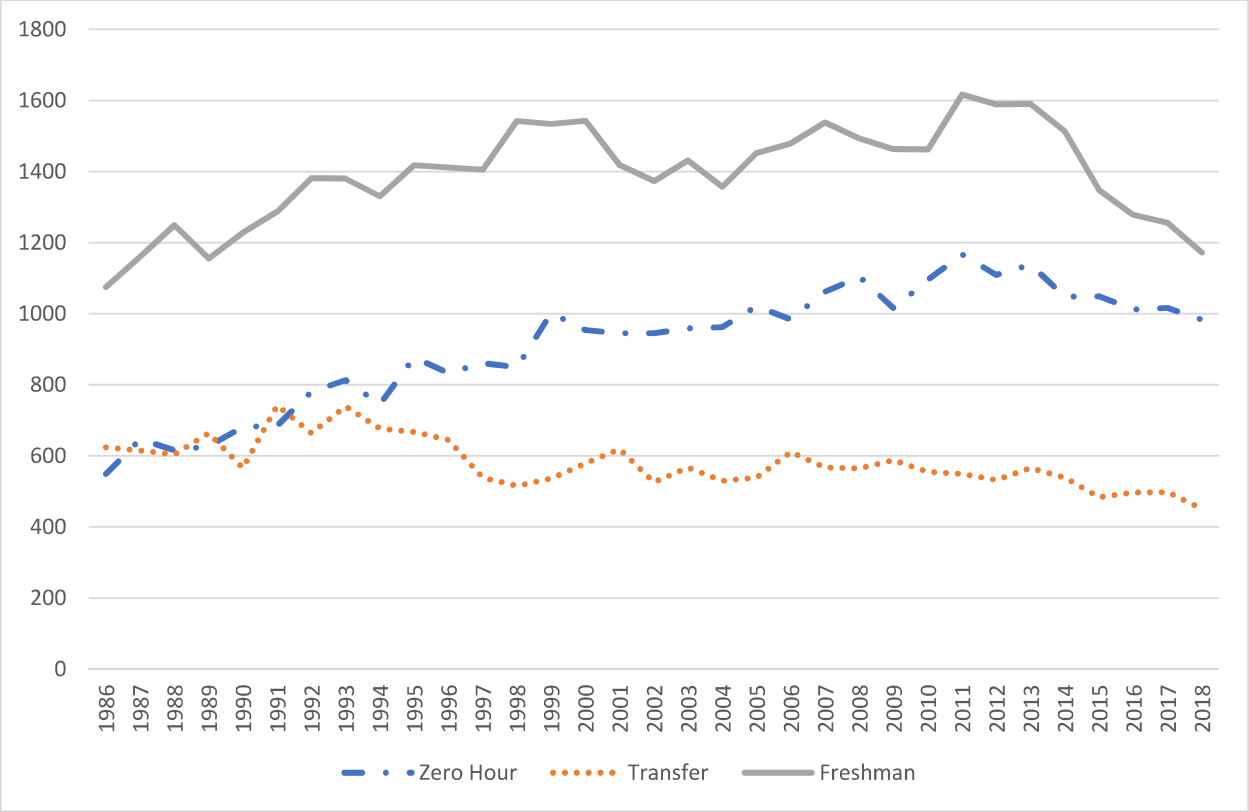
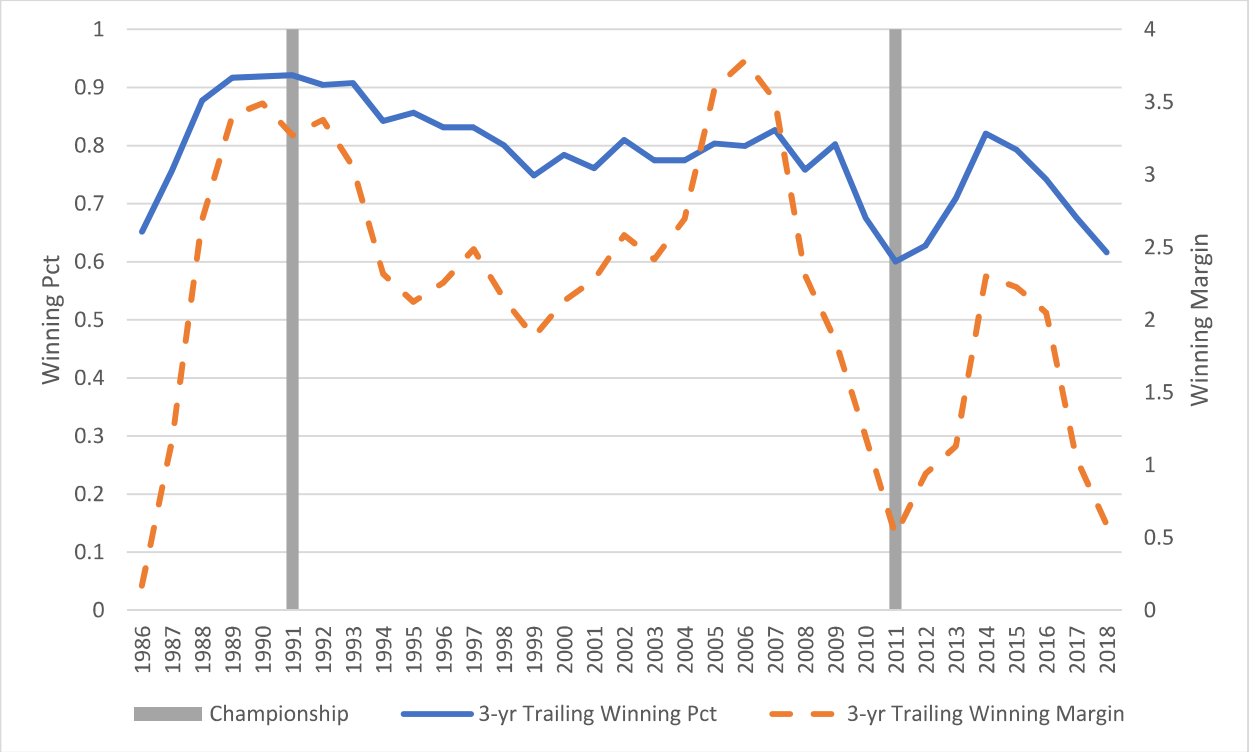


Figure 3 illustrates two measures of Pitt State football success for each year in the sample period: the winning percentage over the previous 3-season period and the winning points margin for the previous 3-season period (scaled by 100). Figure 3 also reflects the two years in which Pitt State won the Division II National Football Championship – 1991 and 2011.[13] These measures, which are used in the enrollment model presented below, were chosen to reflect the recent successes and failures on the football field which we hypothesize to influence the decisions of potential and current students to attend the university. The 3-season winning percentage is a general measure of overall recent success while the 3-season points margin reflects the degree to which the Pitt State football dominated opponents on the field of play. It is assumed that college football fans have preferences for teams with strong offenses that score significantly more points than their competition.

As seen in Figure 3, the Pitt State football team maintained a strong long-run winning record over the sample period with the 3-season winning percentage never falling below 60 percent.[14] Interestingly, the team's second national championship during the sample period coincided with this low mark of recent winning history, as well as the low mark in 3-season winning margins, in 2011. This contrasts with the earlier championship in 1991 which had followed four years of rising winning percentages and a growth in winning margins. The statistically unexpected championship in 2011 reflects the uncertainty of athletic team competition and the need to use more than one measure of success to capture its impact on a university's constituents. Furthermore, it is important to note that both the 3-season winning percentage and 3-season winning margin has trended downward since 2014 which coincides with recent decline in Pitt State enrollments seen in Figures 1 and 2. To examine the relationship between football success and student enrollment we used these data to estimate an empirical model that controls for the factors generally assumed to determine the student enrollment decision.

FIGURE 3
PITT STATE FOOTBALL PERFORMANCE MEASURES



The Empirical Model

Very little empirical work has been conducted to date by social scientists on the economics of Division II athletics.[15] However, DeSchriver and Jensen (2002) found that spectator attendance at Division II football games is positively correlated with a team's winning percentage and a school's marketing efforts and while Tomasini (2005) and Feezell (2009) acknowledge the financial and academic benefits that schools seek to achieve by moving from Division II to Division I, they do not measure or estimate the factors affected by schools maintaining Division II status. The only work to address the enrollment effect of athletic success in Division II was conducted by Castle and Kostelnik (2011) using data from the Pennsylvania State Athletic Conference. For a ten-year period, they found that winning records, aggregated across all sport programs, was correlated with increases in both the quantity and quality of first-time enrolled freshmen at the conference's fourteen member institutions. However, Castle and Kostelnik's research methodology was limited to a correlation analysis that did not control for the myriad of variables that influence students' enrollment choices and the factors that affect an institution's market position. Therefore, we approach the problem using the methodology traditionally used to estimate the tuition elasticity of enrollment for colleges and universities.

The factors that determine a university's level of student demand and are many and varied – tuition and fees, the availability of scholarships, current job market opportunities, family financial support, etc. In addition, an institution's annual enrollment is impacted by environmental variables such as changes in the demographics of the regional population, competition from other universities, economic conditions, and other factors. To control for these factors, a rich and vast empirical literature using regression-based methodologies has evolved to estimate the price elasticity of university enrollment in the aggregate and for individual institutions (see, Ahlburg, McPherson and Shapiro (1994) and Wetzel, O'Toole, and Peterson (1998) for reviews of specific modeling approaches and Craft, Baker, Myers, and Harraf (2012) for an example of the regression methodology applied to a specific institution). Previous studies have

incorporated variables to control for athletic success into this methodology for Division I institutions (see for example, Chressanthis and Grimes, (1993)) but none have utilized it for a Division II school. Therefore, we estimated a model taking the following functional form:[16]

$$\text{Enrollment}_i = f(\text{Football Success, Student Choice, Institution's Market Environment}) \quad (1)$$

where *i* represents the five student enrollment cohorts of interest: Zero-Hour, Freshmen, Transfer, Retained Returning, and overall Undergraduate. Football Success enters the model using the three measures described and discussed above: the 3-season *Winning Percentage*, the 3-season *Winning Margin*, and a lagged categorical variable for *Championship Seasons*.

The Student Choice variables include the direct price of enrollment, *Pitt State Tuition & Fees*, as well as the *Relative Price* of enrollment[17] and the availability of *Scholarships Distributed* by the institution. The variables used to control for the Institution's Environment include *National Tuition & Fees*, *Kansas Household Income*, the *Kansas Unemployment* rate and the number of *Kansas High School Graduates*. The exact specification and the descriptive statistics for each of these variables over the sample period, 1986-2018, are reported in Table 1. In addition to these variables, our estimation included a *Time Trend* counting variable and a constant term to control for annual fixed effects and for factors affecting enrollment over time but not included in the model.[18]

THE RESULTS

Employing ordinary least squares19, the model was estimated twice for each enrollment cohort; once including Winning Percentage and alternatively including Winning Margin as the primary measure of football success. Both specifications included the Championship Seasons categorical variable. The model was estimated after expressing both the dependent and independent variables as natural logarithms. The log-log framework allows the estimated regression coefficients to be interpreted as elasticity coefficients (see Kennedy (2009) and Gujarati and Porter (2010) for detailed discussions of log-log models and elasticity coefficients). The results are presented in Table 2. For all enrollment cohorts the model preforms well with statistically significant F-Statistics and relatively high R^2 "goodness of fit" values for both specifications. In fact, for three of the five cohorts, the R^2 values indicate that the model explains more than 90 percent of the variation in enrollment over the sample's time span. It is interesting to note that the model performs least well for the Transfers cohort, suggesting that are factors outside the model that may be important to the enrollment decision of transfer students.

Before examining the findings for the Football Success variables, there are several results of note for the control variables. First, with respect to the Student Choice variables, the *Pitt State Tuition & Fees* coefficients are always negative as expected and often statistically significant. The relative sizes of these coefficients indicate that Zero-Hour and Freshmen students are more sensitive to changes in the price of enrollment than the other cohorts. For every one percent increase in tuition and fees at Pitt State, enrollment for these cohorts falls by about 1.29 to about 1.36 percent. For Undergraduates overall, the decrease is only about 0.45 percent for every one percent increase in price. The coefficients of *Pitt State Tuition & Fees* for Transfers and Retained Returning students are mostly insignificant, suggesting that these cohorts are not sensitive to changes in price. The *Relative Price* coefficient is only significant in the Freshmen cohort estimations where it enters the model with a positive sign. This indicates that when the price of Pitt State's tuition is greater than that of its closest regional competitor, Freshmen students may be attracted to Pitt State. However, this effect, perhaps reflecting perceptions in relative quality or differences in program portfolios, is relatively small. The effect of *Scholarships Distributed* on overall undergraduate enrollment statistically significant, and the effect is particularly strong among Retained Returning students. Unlike private institutions that rely on scholarship packages to attract incoming students, scholarships are an important tool used to retain existing students at public regional institutions such as Pitt State.

TABLE 1
VARIABLE DEFINITION AND SUMMARY STATISTICS FOR SAMPLE PERIOD

Variable	Definition	Mean
Dependent		
Zero-Hour	Total headcount for all new students with no previously earned credit hours in the fall semester.	913.1212 (167.7185)
Freshmen	Total headcount for all students with less than 30 hours of previously earned credit hours in the fall semester.	1,391.7270 (139.3228)
Transfers	Total headcount for all new students transferring previously earned credit hours from another institution in the fall semester.	580.6061 (69.3537)
Retained Returning	Total headcount for retained returning students in the fall semester, defined as total undergraduate students less zero-hour students and transfer students.	3,903.2730 (434.7727)
Undergraduate	Total headcount for all undergraduate students in the fall semester.	5,397.0000 (555.4105)
Independent		
Winning Percentage	The winning percentage of the Pitt State football team over the previous three seasons.	0.7855 (0.0882)
Winning Margin	Total points scored minus total points conceded by the Pitt State football team over the previous three seasons, scaled by 100.	2.2118 (0.9567)
Championship Seasons	Categorical variable equal to 1 for NCAA Division II Football Championship during previous year; equal to 0 otherwise	0.0606 (0.2423)
Pitt State Tuition & Fees	Pitt State's tuition and fees expressed in 2017 constant dollars	4,196.80 (1596.42)
Relative Price	Categorical variable equal to 1 when Pitt State Tuition & Fees is *greater than or equal to* MSSU Tuition & Fees (2007-2018); equal to 0 otherwise (1986-2006)	0.3636 (0.4885)
Scholarships Distributed	Total scholarships distributed from the Pitt State Foundation, State of Kansas, and Outside Donors, expressed in 2017 constant dollars	2,229,293.60 (950,786.51)
National Tuition & Fees	Median cost of tuition and fees for all 4-year public institutions of higher learning in the United States	5,748.91 (2012.21)
KS Household Income	Median household income in Kansas expressed in 2017 constant dollars	54,121.98 (3,458.04)
KS Unemployment	Kansas state-wide annual unemployment rate	4.6772 (0.9308)
KS High School Grads	Total number of students graduating from Kansas high schools	28,631.0000 (2,619.7680)

TABLE 2
FACTORS INFLUENCING PITTSBURG STATE UNIVERSITY BY STUDENT COHORT: 1956-2018

Variable	Zero-Hour		Freshmen		Transfers		Retained Returning		Undergraduate	
Winning Percentage	-0.042 (0.731)		-0.019 (0.898)		0.479* (0.053)		0.227*** (0.006)		0.141** (0.038)	
Winning Margin		0.001 (0.947)		-0.002 (0.848)		0.047** (0.016)		0.017** (0.020)		0.010* (0.082)
Championship Seasons	0.078*** (0.010)	0.079*** (0.009)	0.055* (0.091)	0.055* (0.089)	0.027 (0.552)	0.018 (0.677)	0.025 (0.154)	0.022 (0.226)	0.034** (0.021)	0.031** (0.037)
Pitt State Tuition & Fees	-1.353*** (0.000)	-1.349*** (0.000)	-1.290*** (0.000)	-1.289*** (0.000)	-0.199 (0.515)	-0.214 (0.460)	-0.227* (0.061)	-0.208 (0.100)	-0.459*** (0.000)	-0.465*** (0.000)
Relative Price	0.064 (0.103)	0.065 (0.106)	0.092** (0.042)	0.091* (0.052)	0.015 (0.803)	0.048 (0.437)	0.017 (0.460)	0.028 (0.265)	0.021 (0.271)	0.028 (0.179)
Scholarships Distributed	0.080 (0.330)	0.089 (0.284)	0.060 (0.599)	0.060 (0.594)	0.126 (0.321)	0.131 (0.275)	0.104** (0.044)	0.103* (0.061)	0.171*** (0.002)	0.168*** (0.003)
National Tuition & Fees	1.959*** (0.000)	1.931*** (0.000)	2.173*** (0.000)	2.192*** (0.000)	-0.530 (0.300)	-0.886* (0.092)	0.642*** (0.002)	0.538** (0.018)	0.796*** (0.000)	0.746*** (0.000)
KS Household Income	0.769** (0.021)	0.767** (0.023)	0.656** (0.046)	0.671* (0.052)	-0.732* (0.100)	-0.965** (0.031)	0.304 (0.123)	0.266 (0.198)	0.268* (0.066)	0.222 (0.152)
Kansas Unemployment	0.112* (0.087)	0.116* (0.080)	0.066 (0.305)	0.066 (0.299)	0.110 (0.244)	0.104 (0.245)	0.121*** (0.005)	0.121*** (0.007)	0.098*** (0.002)	0.093*** (0.004)
Kansas HS Grads	-0.149 (0.732)	-0.162 (0.718)	-0.181 (0.695)	-0.185 (0.684)	-0.681 (0.161)	-0.859* (0.069)	-0.372 (0.169)	-0.508* (0.087)	-0.601*** (0.007)	-0.639*** (0.005)
Time Trend	-0.011 (0.416)	-0.010 (0.473)	-0.034** (0.028)	-0.035** (0.032)	0.024 (0.265)	0.037* (0.092)	-0.006 (0.432)	-0.003 (0.744)	-0.005 (0.435)	-0.003 (0.658)
Constant	-6.863 (0.173)	-6.677 (0.215)	-6.475 (0.262)	-6.784 (0.252)	24.741*** (0.006)	32.252*** (0.001)	3.341 (0.273)	5.993* (0.088)	6.126** (0.023)	7.606*** (0.009)
F-Statistic	66.324	65.963	11.978	11.991	6.798	7.733	56.461	50.537	72.385	68.171
Adjusted R^2	0.953	0.953	0.774	0.775	0.652	0.685	0.945	0.939	0.957	0.955

Notes: ( ) – p value; *p <.1, *p .05, ***p < .01; N = 33

Second, the results for the Institution's Market Environment variables reveal that all cohorts except transfer students are highly sensitive to changes in *National Tuition & Fees*. The price of attending Pitt State is historically below the national median, and as the national median rises, students are attracted by Pitt State's affordability. The relationship is elastic with Pitt State's Zero-Hour and Freshmen enrollment rising between about 1.90 percent and about 2.20 percent for every one percent increase in the median *National Tuition & Fees*. Pitt State's undergraduate enrollment is also counter-cyclical as revealed in the positive and often significant *Kansas Unemployment* coefficients. Although the relationship is inelastic, higher levels of regional unemployment reduce the opportunity cost of a college education and enrollment rises. Interestingly, our model produces opposite signs of *Kansas Household Income* for different cohorts. While Zero-Hour and Freshmen are more likely to attend Pitt State as incomes rise, Transfers have a lower chance of coming to Pitt State. The results seem to suggest that as incomes rise, the affordability of Pitt State may be less important to transfer students who may seek out more prestigious institutions to complete their studies.

Turning to the Football Success variables, Table 2 reveals several interesting results. First, neither *Winning Percentage* nor *Winning Points Margin* are found to be statistically significant for either the Zero-Hour or the Freshmen enrollment cohorts. Apparently, simply winning on the football field is not a strong determinant of enrollment for *new* college entrants at a Division II regional university like Pitt State. However, a Division II national *Championship Season* does lead to higher enrollment among Zero-Hour and Freshmen cohorts in the following academic year. It suggests that national championships, instead of simply winning games, are powerful enough to draw more recruits from high school graduates making college choices. On the other hand, both Transfers and Retained Returning student enrollments are positively and significantly affected by winning football games. For both of these enrollment cohorts, both *Winning Percentage* and *Winning Margin* are found to have a positive, though inelastic, statistically significant coefficient. This suggests that football success psychologically connects returning students and transfer students with the university, and hence, they are more likely to enroll. These positive effects of Football Success on the enrollment of different cohorts are strong enough to be captured by the overall Undergraduate enrollment equations. All three measures of Football Success are found to positively impact the overall level of Undergraduate enrollment for Pitt State. For every one percentage increase in the football team's *Winning Percentage*, overall Undergraduate enrollment is estimated to increase by 0.141 percent, holding all else constant. Given that the football team played 12.2 games per year on average during the sample period, winning an extra game each season over three years could lead to an increase in overall Undergraduate enrollment by about 1.16 percent in the following academic year. Interestingly, a national football championship only contributes 0.034 percent to overall undergraduate enrollment growth, *ceteris paribus*.

CONCLUSIONS

Our results indicate that the positive enrollment benefits of an intercollegiate football program often found for NCAA Division I universities are also possible at a Division II institution with a successful football team. However, while the enrollment benefits for large Division I universities may be broadly-based due to the strong advertising effects of extensive media exposure, the enrollment benefits for smaller Division II schools may be more narrowly focused. Our findings show that the positive impact on undergraduate enrollment of success on the football field comes primarily through the effects on transfer student enrollment and the retention of current students. However, football success on a significant scale, such as winning a national championship, may lead to higher enrollment among new entrants such as freshmen and zero-hour students. Thus, it appears that a successful Division II football program contributes to strong enrollment through two channels: winning national championships grabs the attention of new potential students who do not have a pre-existing affinity for the institution; and, dominating games by large points margins builds strong ties with students who already have a connection with the university. (Current students clearly have an existing connection with the university and, as is the case at many regional universities, most of Pitt State's transfer enrollments come from local community

colleges with formal ties, including 2+2 degree programs, with the university.) Central university administrators, admissions officers, and athletic program directors should be cognizant of how intercollegiate athletic programs impact overall enrollment patterns across the various cohorts of students examined here.

While Pitt State shares many characteristics with the median NCAA Division II institution, additional research is needed to determine if the results presented here are generalizable. In particular, our case study is based on the experiences of a regional public institution and how the results translate for the many private Division II schools, with more selective admissions criteria and a greater reliance on scholarships to drive enrollment, is unknown. Future work is needed to examine the issues explored here using cross-sections of representative Division II institutions with varying characteristics.

Furthermore, additional research is needed to expand the analysis of Division II athletics on other academic aspects of universities, in particular, alumni donations and charitable contributions. While we know a lot about the effects of intercollegiate athletics at large Division I schools, much is left to be learned about the differences that exist for smaller Division II schools.

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ENDNOTES

1. The advertising effect of sports may allow an institution to not only grow enrollments, but also to increase the *quality* of their student body if the increases in applications allow for greater selectivity in admissions. See for example, Smith (2009), Pope & Pope (2009), Mixon, Trevubio & Minto (2004), and Tucker & Amato (1993) for analyses of this relationship.
2. Universities in the "Power Five" conferences (ACC, Big 12, Big Ten, Pac-12, and SEC) have additional autonomy within the Division I FBS over various rules concerning scholarships, stipends, and student eligibility. Division I schools outside the "Power Five" may elect to adopt these rules so as to avoid a recruitment disadvantage, but are not obligated to do so.
3. However, just as any other student, both Division II and Division III student-athletes may receive scholarships based on academic merit, financial need, or for other non-athletic reasons.
4. Interestingly, the *net* operating costs of athletics in Division II are less than those in Division III (for schools of similar size) due to the additional revenues generated by ticket sales and media rights in Division II (Hardwick-Day, 2008).
5. Division II also includes one school in Canada (Vancouver's Simon Fraser University) and is the only NCAA division with schools in Alaska and Puerto Rico.
6. Prior to 1989, Pitt State competed in the National Association of Intercollegiate Athletics (NAIA).
7. For more detailed information about the university, visit the Pitt State homepage at: https://pittstate.edu/ For a brief profile of the university's enrollment policies, refer to Grimes & Lin (2020).
8. At that time the institution was known as the Auxiliary Manual Training Normal School, later becoming Kansas State Teachers College of Pittsburg in the 1920s, Kansas State College of Pittsburg in the late 1950s, and finally Pittsburg State University in 1977. For a profile of Pitt State football during its early Division II era, see Shipnuck (2005).
9. Student aid includes athletic scholarships, tuition discounts and waivers, and summer school support for all current student-athletes and those who have exhausted their eligibility to play.

10. Interestingly, the Hardwick-Day report ignores the potential tradeoff between athletic success and enrollment revenues by noting, "Institutions that emphasize fewer and larger scholarships would be likely to increase net tuition revenue by reducing the average amounts of athletic scholarships and offer them to more students." (p. 3).
11. We limited the analysis presented here to undergraduate student enrollments. It is assumed that the driving causal factors for graduate programs is significantly different than for undergraduate programs. Specification tests (available upon request) and previous analysis of graduate enrollments at Pitt State confirm this (Grimes & Lin, 2020).
12. Zero-hour students are recent high school graduates who have not previously earned college credit at any college or university. Freshmen students include all zero-hour students plus those that have earned less than 30 hours of college credit at Pitt State or elsewhere. Transfer students are new entrants that have earned 30 or more hours of credit at another institution. Most transfer students at Pitt State originate from one of the state's community colleges.
13. Prior to joining NCAA Division II, Pitt State won the NAIA National Football Championship twice, in 1957 and 1961.
14. The only non-winning seasons during the sample period occurred in 2009 and 2010 when the team posted 5-6 and 6-6 records.
15. From a sociological perspective, Feezell (2013) examined faculty attitudes toward student athletics at Division II schools while Huml, Hambrick, and Hums (2016) explored coaches' perceptions of student-athlete commitment to sport and academics.
16. Our model implicitly assumes the market for collegiate sports is differentiated and that Division II games are not perfect substitutes for Division I games. Therefore, regional Division I outcomes do not enter our model's specification.
17. This variable captures the cost of attending Pitt State relative to the cost of attending its closest regional public competitor, Missouri Southern State University (MSSU). MSSU is located less than 30 miles away in the Joplin, MO, metropolitan area and enrolls a student demographic similar to Pitt State. Both Pitt State and MSSU are members of the MIAA.
18. Results are robust to different model/variable specifications and are available upon request.
19. Dickey-Fuller tests for unit roots were conducted for all five dependent variables. The null hypothesis that a unit root is present in the time series was rejected at the 5% level in each case. Thus, ordinary least squares estimation of the model is appropriate for these data (Greene, 2000, pp. 782-785). The Dickey-Fuller test results are available upon request of the authors.

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