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Athletic Success and Academic Selectivity in Postsecondary Institutions: A Longitudinal Analysis

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ABSTRACT

Athletic Success and Academic Selectivity in Postsecondary Institutions: A Longitudinal Analysis

by

Chelsea Evan Temple

While there are many obvious advantages to a college or university in cultivating a strong athletic program, one potentially overlooked benefit may be its effect on the school's ability to be academically selective. If stronger athletic programs lead to more first-year applicants, an athletically successful school may have the opportunity to be more selective in its admissions decisions, without causing a decline in enrollment. To test this theory, we use school-level longitudinal admissions data available from Peterson's Undergraduate Dataset for the years 1998-2013. We match this data with publically available measures of collegiate athletic performance, including school win percentage, indicators for conference and national championships, and the number of consensus All-Americans on the team. We estimate our model using school fixed effects to eliminate unobserved school-level heterogeneity, and we allow for heterogeneity in selectivity effects across different divisions. We find evidence suggesting that schools with more successful football teams experience simultaneous decreases in enrollment of lower-scoring ACT students and increases in enrollment of higher-scoring ACT students. These effects exist primarily for Division I-A and Division II schools.

I. Introduction

There has been minimal research regarding the admissions impacts of successful football programs at postsecondary institutions. From that research, however, there is substantial evidence that successful performance on the football field in NCAA Division I-A positively affects the quantity of prospective students that apply to these schools. Recently, in addition to investigating Division I-A, Priday (2015)—in collaboration with this study—has examined a possible football effect on Division I-AA, II, and III institutions. Consistent with previous research, Priday (2015) finds a significant, positive impact of football performance on applications for Division I-A schools. While his basic model did not find any effect on applications for Division I-AA, II, and III schools, his extended model finds some small positive impacts on applications for mid-sized schools in Divisions II and III.

Priday (2015) also tests for athletic performance impacts on first year enrollment. His results suggest that higher win percentages lead to small increases in first year enrollment for Division II and Division III institutions. Win percentage does not have an enrollment effect for Division I-A or Division I-AA. He does find, however, a positive effect of the quantity of consensus All Americans on first year enrollment for Division I-A schools.

Adding to the existing literature, this paper investigates the possible implications of football programs on school quality. If successful football performance increases the applicant pool at an institution, we argue that schools then have the ability to be more academically selective in their admissions decisions. Empirical evidence of a positive effect on applications combined with Priday's (2015) recent findings regarding impacts on enrollment hint at the validity of this selectivity story. Furthermore, other recent research by Chung (2013), who employs a model that allows for heterogeneity in student preferences (for education versus athletics) and in student ability levels, finds that students with lower SAT scores primarily make up the applicant pool increase.

To further explore the relationship between football success and selectivity, we obtain academic data from Peterson's Undergraduate Licensed Data Set for 1998-2013. We obtain most of our athletic data from the NCAA Record Books and College Football Data Warehouse. We collect an extensive list of measurable athletic success indicators, though the variables with the most impact are national championship winners and win percentage. We use overall win percentage versus within conference win percentage in order to standardize the effect of a successful football season between all schools within a given division. We extend previous research by gathering data for not only Division I-A programs, but also for Divisions I-AA, II, and III. Institutions classified as Division I-A are typically "flagship" schools, such as University of Texas at Austin. Division I-AA schools are similar to Division I-A, though, on average, smaller in both enrollment and clout. Many private institutions and smaller public schools are categorized as Division II, while Division III consists primarily of much smaller private institutions.

To test the academic selectivity story, we employ a fixed effects model. With this model, we exploit variation in athletic success within a school across time, enabling us to explain the variation of incoming test scores within a school. We run our model separately for Division I-A, I-AA, II, and III, as we expect the effect to vary across different divisions. We include as our dependent variables four ACT percentile groups, four SAT verbal percentile groups, and four SAT math percentile groups. ACT scores of incoming freshman are broken down into below 18, 18-23, 24-29, and 30-36. SAT verbal and math scores for entering students are broken down into below 500, 500-599, 600-699, and 700-800.

Our estimates suggest that Division I-A schools are more academically selective as a result of successful football performance, as these schools see an increase in the number of incoming students scoring in higher ranges of the ACT, SAT verbal, and SAT math tests. We find no effects for Division I-AA, and weak effects for Division III. For Division II, we see a story opposite of that of Division I-A: as a result of a successful football season, these schools see a simultaneous increase in students scoring in the lower percentiles and decrease in students scoring in the higher percentiles.

II. Literature Review

McCormick and Tinsley (1987) were the first to link athletic success to the academic quality of incoming freshman, arguing that athletic success acts as advertising for a school, attracting more applicants. They hypothesize that, for a given school that sees success in football, if the average quality of applicants does not change, a school with a fixed enrollment policy has a larger sample of applicants from which to choose, thereby increasing the average quality of students that enroll. On the other hand, if school administrators must maintain admission standards but are able to increase enrollments, then enrollment grows. McCormick and Tinsley (1987) gather data for 63 "big-time football schools" in 1971. As a measure of academic quality, they use incoming freshman SAT score. They also create a dummy variable to indicate if a school has major college athletics; it is equal to unity if the school is a member of the Atlantic

Coast Conference, Southwestern Conference, Southeastern Conference, Big Ten, Big Eight, Pacific Athletic Conference, or a major independent. They first run an ordinary least squares model with SAT scores of entering freshmen regressed on the sports dummy and a set of school-characteristic variables. Results find a positive and significant effect of being a "big-time football school" on SAT score, in support of their hypothesis.

McCormick and Tinsley (1987) expand on this idea using data on within-conference football winning percentages from 1971-1984 for schools in those big-time athletic conferences. They also calculate average SAT scores for incoming freshman classes in 1981 and 1984, computing the change in SAT scores for each school. They regressed this change in SAT scores on change in academic quality variables and within-conference win percentages. This specification yields the same results: the coefficient on the 15-year trend of winning percentages is positive and significant, suggesting that athletic success goes hand in hand with academic success, affecting the enrollment of a school and the school's academic quality.

Murphy and Trandel (1994) augment the study of McCormick and Tinsley (1987) by examining the relationship between athletic success and applicant totals. Like McCormick and Tinsely's (1987) study, Murphy and Trandel (1994) use within-conference football team records as a measure of success on the football field. They investigate 42 universities belonging to the major football conferences from 1978-1987. Unlike McCormick and Tinsley, Murphy and Trandel (1994) utilize panel data, enabling them to control for the unobservable school-quality differences between institutions. They collect professor salary data from *Academe* and other institutional data from

Peterson's Guide to Four-Year Colleges. First, they employ a fixed effect model with within conference win percentage, a vector of school-specific variables, time dummies, and other variables that control for factors related to application totals. A second model adds an additional variable: the fraction of the university's applicants (lagged one year) that are admitted to the school. Results from running the first equation reveal a significant, but moderate, positive effect of within conference win percentage on applicant totals: an increase in winning percentage by .25 yields a 1.37% increase in applications. The coefficient on win percentage does not change significantly with the inclusion of number of admitted applicants. Overall, Murphy and Trandel (1994) conclude that athletic success can increase the number of applicants to a school by acting as form of advertising.

Toma and Cross (1998) compare "peer schools"—those who have won national championships in NCAA Division I-A with those who have not—to see potential changes in the number of applications a school receives. In addition to asking whether winning a national football championship during 1979-1992 affected the number of undergraduate applications received, Toma and Cross (1998) present two more questions: when compared to peer institutions who did not win a championship, do these application effects hold? More specifically, are there similar trends in application numbers for the championship schools and the peer schools? And secondly, is the change in applications temporary or a trend over several years? Toma and Cross (1998) adopt a model that divides college choice into three stages: 1) predisposition: a student decides to continue education; 2) search: a student gathers information on schools; and 3) choice: a student chooses a school. They suggest athletic success (and the ensuing positive attention received by the school) works primarily through the search and choice stages, and acknowledge that there may be slight influences in the predisposition stage. Toma and Cross (1998) define national champions as a first place finish in either the Associated Press poll of sportswriters or the ESPN/USA Today poll of football coaches. During the period of investigation, 13 universities won or shared a national championship title in football. From *Peterson's Guide to Four-Year Colleges and Universities* they collect admissions data for the four years before and after winning the national championship. They consulted with admissions and institutional research staff to come up with four to five peer institutions (competitors), defined as schools with the same types of applicants, and of similar size, academic reputation, and athletic programs; these "matched" institutions are also located in the same geographic region as the championship school.

Their findings reveal that 14 out of 16 schools that won/shared championships in college football saw an increase in the number of applications received for the first incoming freshman class after the championship. Seven schools saw an increase in application totals greater than or equal to 10%, and two saw a greater than or equal to 20% increase. The effects were consistent over the three lag years. While the majority of schools saw increases in application numbers, only some championship schools saw those increases relative to a rise in applications at their peer schools. Toma and Cross (1998) hypothesize that one reason for the disparity is that "not all championship seasons may be created equal" (651). They note that the successes of Miami after 1987 and Georgia Tech after 1990 were "good stories"—Miami won four championships following the mid-1980s by playing the game in a new way, and Georgia Tech returned to glory after forty years of disappointment. And, in fact, the University of Miami and Georgia

Tech exhibited the highest increases in number of applications following their championship seasons. Likewise, argue Toma and Cross (1998), championship schools that did not see an increase in applications due to a “bad story,” such as BYU’s controversial national title in 1984 in which they were undefeated in a weak conference. Toma and Cross (1998) also offer the relative selectivity of the institution as a reason why some schools saw application increases relative to their peers. They find some weak evidence for this, noting that in this particular study they cannot say to what extent selectivity bears influence on the impact of athletic success on college applications. Toma and Cross (1998) conclude that athletic success positively impacts applications received. For future research they question whether the additional applicants are of differing quality and whether these findings apply to NCAA Division II and III schools. They also question if the results are similar for schools that have not won a national championship, but that have still received a lot of positive attention during their athletic seasons.

Pope & Pope (2009) investigate both the “quantity” and “quality” effect of football success on applications for 330 NCAA Division I-A schools from 1983-2002; for each observation they have information regarding school applications, SAT scores, athletic success indicators, and other control variables. The majority of institutional data was purchased from the Thomson Corporation, who publishes the *Peterson’s Guide to Four Year Colleges*. College Board’s Test-Takers Database provided individual-level data for a 25% random sample of all SAT test-takers in the United States with graduation cohorts between 1994-2001. It also provided demographic and background information featured in the Student Descriptive Questionnaire component of the SAT.

To control for the unobserved school-level heterogeneity that may be correlated with indicators of sports success and the number of applications received by a school, Pope and Pope use a fixed-effects model. Dependent variables include log applications, log enrollment, and log real tuition. As athletic success indicators, Pope and Pope (2009) use AP Top 10 and Top 20 rankings and national championship winners (they include a lead, a current year, and three lags for each). The lags for each football success indicator address the varying timelines of application submissions and the duration of the football season. Pope and Pope (2009) run the regression separately for public and private schools to see if there is an isolated effect. A second model investigates the "quality" effect with log number of SAT scores received by a school from a specific population group as the dependent variable. This allows them to compare coefficients on sports variables across groups to see who is more likely to impact from sports success. Once again, the regression is run separately for public and private schools.

Pope and Pope (2009) find that for a given school, ending a football season ranked in the top 20 leads to a 2.5% increase in applications; a top 10 finish yields a 3% increase; and a 7-8% increase follows a national championship. The largest effect on log applications was on the current year football success dummy, and a small effect accompanied the first lag. A variation in the application effect in public versus private schools was not conclusive. Pope and Pope (2009) investigate the potential reactions of schools to increased applications: increasing enrollment or increasing tuition. Following football success, they found a 3.4% increase in enrollment for football teams finishing in the top 20; 4.4% increase with a top 10 finish; and a 10.1% increase for a national champion, with all effects being significant at the 1% level. This finding, argues Pope and Pope (2009), was likely driven by public schools that offer guaranteed admissions to certain students. It could also be due to more admitted students choosing to enroll. There is no effect found on tuition for football success. In addition to the "quantity" effect, Pope and Pope examine the "quality" effect of football success, but do not find anything of significance.

Chung (2013) bases his investigation on the argument that athletic programs serve as the primary form of advertising for an institution. He categorizes the 120 NCAA Division 1 Football Bowl Subdivision schools by automatic qualifying (AQ) conferences or non-automatic qualifying (non-AQ) conferences, the major difference being that schools in AQ conferences are much more likely to attend a bowl game at the end of their season; this is important because participation in bowl games signifies a successful season. Chung (2013) employs three separate models, all of which suggest that athletic performance has a significant positive effect on applications. When controlling for differences in student preference for education quality and differences in student ability, Chung (2013) finds that students with lower SAT scores account for the majority of this increase in applications. Additionally, Chung's (2013) results suggest that schools increase their selectivity following success on the football field.

III. Data

Academic Data

Peterson's Undergraduate Licensed Data Set provides academic data for the years 1998-2013. As stated above, the dataset consists of institutional characteristics, campus features, tuition and other attendance costs, admissions, applicant and enrollee demographics, faculty, athletic programs, major programs, facilities, and graduation requirements. Most applicable to this paper, *Peterson's* supplies ACT and SAT information for each institution. We organize ACT into four percentage groups: below 18, 18-23, 24-29, and 30-36. SAT is split into SAT verbal and SAT math, each with four percentage groups as well: below 500, 500-599, 600-699, and 700-800. Table 2B presents these summary statistics by division. The majority of students in Division I-A schools score between 24 and 29 on the ACT, though Division I-A has the largest percentage of students scoring in the 30-36 range (22.28%). Division III follows a similar distribution of ACT scores. Division I-AA consists of students scoring mostly in the 18-23 and 24-29 ranges. In Division II, almost half of students score in the 18-23 range. The distribution of score groups for SAT verbal and SAT math heed a similar pattern. Division I-A and III institutions have the largest percentage of students scoring in the highest range for SAT verbal and math, while the majority of students in Division II schools score in the low end. Student scores in Division I-AA are somewhat evenly distributed between the three lowest score groups.

Athletic Data

We constructed our athletic dataset from many publically available sources. From College Football Data Warehouse, assisted by *Peterson's*, we obtained division and program information for all NCAA Division I-A, I-AA, II, or III football teams from 1998-2013 (in co-occurrence with the years provided by *Peterson's*). For Division I-A programs, we also recorded conference information, as we believe membership in a particular conference will have more weight for teams (and fans) in that division. In total, we sample 658 institutions: 123 Division I-A schools, 146 Division I-AA schools, 185 Division II schools, and 247 Division III schools. Athletic performance indicators for Divisions I-A and I-AA include national championships, conference championships, Associated Press Top 10 and 20 rankings, number of consensus All Americans and Heisman Trophy Winners, Associated Press player of the year, bowl game appearances, and win percentages. It is important to note that we use overall season win percentages in order to standardize the effect of having a successful football season across all schools within a given division—a unique specification not included in previous research. Many of these variables are highly collinear with overall win percentage so we do not see them exhibit much of an impact. For this reason, several of them are removed from the Division I-A regressions. For Divisions II and III we use overall win percentages, national championships, and conference championships as measures of athletic success. Sports Reference provided consensus All American and Heisman Trophy information, while the Associated Press supplied us with team rankings and player of the year. We obtained bowl game appearance records from TexasFan7. We compiled win percentage, national championship winners, and conference championship winners from the NCAA annual record books.

Table 1 presents the summary statistics of the athletic variables by division for the 2013 athletic season. The average win percentage is around 50% for each division. There is only one national championship winner per year for each division, which is confirmed by the mean value for each division. Likewise, there is only one Heisman Trophy winner awarded to a Division I-A player. The maximum value for Division I-A consensus All-Americans in 2013 is 3 players for one team.

IV. Model

To examine the effect of athletic success on selectivity, we begin with the following simple model, using standardized test scores as the dependent variable:

$$score_{it} = \alpha_0 + A_{it}\lambda + S_{it}\delta + X_t\phi + a_i + \varepsilon_{it},^{1} \quad (1)$$

where A_{it} represents a vector of variables measure collegiate athletic performance and S_{it} represents institution-specific characteristics. We include year-specific dummy variables to control for general time trends in test scores. The school fixed effect a_i accounts for any unobserved school-level heterogeneity. By using a fixed effects model, we exploit variation in athletic success within a school across time; we use this to explain within-school variation in incoming test scores. The school characteristics that do vary over time—and are therefore not accounted for in the school fixed effect—are in S_{it}. These will capture the effect of variables that do change within a school over time, which also impact the average standardized test scores of enrolling students.

The institutional characteristics within S_{it} include the faculty-student ratio, total undergraduate enrollment, the cost of attendance, the number of faculty with advanced degrees, and the institution's expenses per full-time student. Among the many institutional characteristics that we believe are important, but that are captured in the unobserved school effect, are the presence of Greek life, the geographic location, and the status as a private or public institution.

[1] This model is similar in format and identical in notation to the basic fixed effects model from Priday (2015).

V. Results

ACT

Table 3 presents the regression results for ACT percentiles. Each division is broken down by percentile. For Division I-A, we see a statistically significant decrease in the number of students within the 18-23 range associated with an increase in win percentage, winning a national championship, and having a Heisman Trophy winner. Simultaneously, there is a significant and positive increase in the number of students within the 30-36 range from winning a national championship. This shows that Division I-A schools are being more selective with increased athletic performance. Division I-AA does not show any statistically significant effect from improving athletic performance.

Division II experiences an effect similar to Division I-A. However, increasing the overall win percentage increases the number of lower percentile students, while winning a national championship decreases the number of students in this percentile. Associatively, there are increases in higher score percentiles associated with winning a national championship. Though there is an effect contradictory to our theory, we still believe selectivity is still occurring within national championship winning institutions. Division III, like Division I-AA, does not see a change in ACT associated with differing athletic performance.

SAT Verbal

In Table 4, we see the regression results for SAT verbal percentile groups. Division I-A does experience a “football effect” on standardized test scores. There is a significant and negative change in the number of students with scores under 500, while there is a significant and positive change in the number of students with scores in the 700-800 range. Again, there is no effect seen on Division 1-AA.

In Divisions II and III, there is a little evidence of selectivity in SAT verbal scores. Division II saw a significant and negative decrease in the below 500 percentile and Division III saw a significant and positive increase in the 700-800 percentile, both associated with winning a national championship. Though this evidence is weaker than was seen using ACT percentiles, it is still consistent with our hypothesis of the “football effect.”

SAT Math

Table 5 displays the regression results for SAT math percentile groups. The results for Division I-A are consistent with our previous findings; there is a significant and negative change in the number of lower percentile scores and a significant and positive effect on the number of higher percentile scores. However, this selectivity is not observed in Division I-AA schools. Improved athletic performance led to a decrease in both higher and lower percentile SAT math scores.

While there is no statistically significant effect on SAT math percentiles associated with football success for Division III, there is a curious result for Division II. There is a 5.6% decrease in the 600-699 SAT Math group, but there is a 3.12% increase in the below 500 group. This is the opposite of the hypothesized and previously seen “football effect.” Possible explanations of this are discussed in the conclusion.

VI. Conclusion

Division I-A is mostly where the effect of football success on academic selectivity is seen. These schools experience increases in the number of students with higher ACT, SAT Verbal, and SAT Math scores and decreases in lower percentile scores, i.e. they are taking in higher grade students as a result of performing well on the football field. This same effect was not experienced by Division I-AA, and was experienced weakly and inconsistently in Divisions II and III. Division II saw an opposite effect in regards to SAT Math percentile groups, where there was an increase in lower percentile students and a decrease in higher percentile students. Looking at table 2B, we see that Division II schools already are heavily concentrated with lower percentile SAT Math students. From this, we conclude that football success is actually just continuing the trend already existing in this division.

Overall, these results are interesting and consistent with theory. Division I-A schools have larger programs and a stronger "football culture" so it is logical for successful football performance to have a more significant effect. Though the effect does not disappear with other lower divisions (II and III), it certainly is less prominent, meeting our expectations. Applicants to these institutions are not seeking the same football atmosphere as an applicant to a Division I-A school.

Previous literature led us to hypothesize that athletic success does impact academic selectivity in postsecondary institutions. There is a larger football effect on applications for Division I-A schools compared to a minimal effect on first year enrollment in those schools, likely because many large, Division I schools have enrollment caps. A greater number of applicants with no change in enrollment would lead us to believe schools are able to be more academically selective – which is evidenced by our results.

TABLES

Table 1: Athletic Summary Statistics by Division (2013)

	Obs	Mean	Standard Dev	Min	Max
Panel A: Division I-A					
win percentage	125	0.5182	0.2374	0	1
national champ	125	0.0080	0.0894	0	1
consensus All-American	125	0.2000	0.5820	0	3
Heisman	125	0.0080	0.0894	0	1
Panel B: Division I-AA					
win percentage	126	0.4790	0.2207	0	0.933
national champ	131	0.0076	0.0874	0	1
Panel C: Division II					
win percentage	156	0.4996	0.2430	0	0.93
national champ	160	0.0063	0.0791	0	1
Panel D: Division III					
win percentage	234	0.4834	0.2628	0	1
national champ	238	0.0042	0.0648	0	1

Note: The data in this table was collected and analyzed collaboratively with Benjamin Priday (Rhodes College). As such, this table is identical to the academic summary statistics presented in table 1 of Priday (2015).

Table 2A: Academic Summary Statistics by Division (2013)

	Obs	Mean	Standard Dev	Min	Max
Panel A: Division I-A					
applications	123	19630.8	11665.25	2641	72697
total enrollment	122	20978.2	9769.657	3160	59382
freshman enrollment	122	3755.07	1752.003	0	8393
total cost of enrollment (in thousands)	118	23.6218	8.480668	4.71	43.722
student-faculty ratio	122	17.8525	4.758068	5	32
faculty with advanced degrees (in hundreds)	107	11.9596	6.455833	0	34.43
expenses for full-time students (in thousands)	76	12.4395	11.88051	0	73.894
Panel B: Division I-AA					
applications	117	10655	8715.599	1598	36941
total enrollment	121	8390.88	5369.374	1569	25868
freshman enrollment	120	1564.6	847.0673	389	4118
total cost of enrollment (in thousands)	119	23.6235	10.59515	5.8425	45.132
student-faculty ratio	119	15.479	4.331299	5	26
faculty with advanced degrees (in hundreds)	100	5.1005	3.954056	0.89	22.5
expenses for full-time students (in thousands)	85	10.2583	7.882567	2.114	47.865
Panel C: Division II					
applications	152	4083.26	3027.678	316	17880
total enrollment	154	5017.23	4023.153	633	25259
freshman enrollment	149	901.477	640.5161	181	3940
total cost of enrollment (in thousands)	145	16.7219	7.150616	4.587	38.13
student-faculty ratio	149	16.7651	3.335698	10	27
faculty with advanced degrees (in hundreds)	129	1.95372	1.452125	0.2	8.94
expenses for full-time students (in thousands)	104	6.33174	2.350309	0	16
Panel D: Division III					
applications	225	4364.41	3879.583	223	27265
total enrollment	229	2785.49	2372.934	528	14432
freshman enrollment	225	602.804	399.6142	90	2200
total cost of enrollment (in thousands)	220	29.4495	9.919413	7.05	45.358
student-faculty ratio	222	12.8243	3.032366	6	25
faculty with advanced degrees (in hundreds)	194	1.95706	1.888187	0.18	15.28
expenses for full-time students (in thousands)	157	12.0751	8.692022	2.073	64.3

Note: The data in this table was analyzed collaboratively with Benjamin Priday (Rhodes College). As such, this table is identical to the academic summary statistics presented in table 2 of Priday (2015).

Table 2B: ACT and SAT Scores by Division in 2013 (Percentages by Score Group)

Panel A: ACT Scores

	Below 18	18-23	24-29	30-36
Division I-A	4.41	31.29	42.05	22.28
Division I-AA	13.94	37.73	33.24	14.96
Division II	20.82	48.52	25.97	4.12
Division III	7.01	36.53	37.66	18.78

Panel B: SAT Verbal Scores

	Below 500	500-599	600-699	700-800
Division I-A	22.63	36.07	28.41	12.90
Division I-AA	33.31	33.11	21.87	11.46
Division II	55.75	31.05	10.88	2.49
Division III	30.04	33.10	23.70	12.99

Panel C: SAT Math Scores

	Below 500	500-599	600-699	700-800
Division I-A	17.71	31.50	32.53	18.27
Division I-AA	31.63	31.22	24.46	12.82
Division II	50.06	33.27	13.91	2.87
Division III	25.50	33.12	27.62	13.74

Note: Numbers represent the average percentage of students in each score category.

Table 3A: Effect of Athletic Success on ACT Score Percentage Groups (Division I-A)

	Below 18	18-23	24-29	30-36
win percentage	-0.430	-2.075*	1.741	0.395
	(0.565)	(1.134)	(1.076)	(0.772)
national champ	0.307	-4.612*	0.788	3.886**
	(0.381)	(2.473)	(2.180)	(1.689)
Heisman	-0.0678	-3.943*	3.792	1.422
	(0.332)	(2.360)	(2.841)	(1.808)
ln(enrollment)	-2.624	5.781	-4.307	-0.245
	(2.259)	(3.827)	(2.711)	(2.391)
conference change	1.227**	-1.199	0.709	-0.867
	(0.616)	(0.959)	(0.826)	(0.525)
division change	-0.793	3.735*	-1.495	-0.839
	(0.952)	(1.985)	(1.624)	(0.676)
tuition	0.249**	-0.133	-0.932***	0.801***
	(0.104)	(0.239)	(0.220)	(0.190)
student/teacher ratio	0.0516	-0.519**	0.444**	0.115
	(0.0783)	(0.212)	(0.217)	(0.107)
faculty degree	0.0536	-0.197	0.332	0.395**
	(0.105)	(0.274)	(0.357)	(0.186)
student expense	0.00293	-0.374*	0.0834	0.304***
	(0.0446)	(0.210)	(0.241)	(0.100)
Observations	650	652	652	652
R-squared	0.269	0.330	0.254	0.558
Number of schools	86	86	86	86

Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1. All specifications include year and conference dummy variables, as well as school fixed effects.

Table 3B: Effect of Athletic Success on ACT Score Percentage Groups (Division I-AA)

	Below 18	18-23	24-29	30-36
win percentage	-0.951	1.363	-1.002	0.684
	(1.035)	(1.147)	(1.035)	(0.741)
national champ	1.691	-0.412	-3.315	2.032
	(1.300)	(2.001)	(2.660)	(1.413)
ln(enrollment)	5.063	-2.289	-0.0348	-2.474
	(4.075)	(5.755)	(4.211)	(1.565)
division change	7.250	-6.506	-0.609	-0.290
	(7.893)	(5.067)	(3.005)	(0.543)
tuition	0.710***	-0.519***	-0.866***	0.684***
	(0.190)	(0.193)	(0.212)	(0.159)
student/teacher ratio	0.600***	-0.531**	0.0742	-0.122
	(0.192)	(0.211)	(0.222)	(0.0877)
faculty degree	-0.111	-1.953	1.806	0.255
	(0.283)	(1.177)	(1.276)	(0.280)
student expense	-8.07e-06	0.000189***	0.000145**	-0.000305***
	(5.72e-05)	(6.74e-05)	(6.91e-05)	(3.18e-05)
Observations	707	714	715	715
R-squared	0.230	0.170	0.171	0.288
Number of schools	101	101	101	101

Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1. All specifications include year dummy variables, as well as school fixed effects.

Table 3C: Effect of Athletic Success on ACT Score Percentage Groups (Division II)

	Below 18	18-23	24-29	30-36
win percentage	1.590**	-1.407	-0.713	0.686
	(0.785)	(1.069)	(0.855)	(0.599)
national champ	-2.958***	-2.120	3.549*	1.243*
	(0.881)	(2.709)	(1.932)	(0.723)
ln(enrollment)	5.633*	-5.619**	-2.301	1.185
	(2.961)	(2.648)	(1.785)	(0.814)
division change	4.107**	-2.891	-0.677	-0.375
	(1.973)	(2.099)	(1.087)	(0.622)
tuition	0.301	-0.735***	0.226	0.207**
	(0.189)	(0.239)	(0.248)	(0.0861)
student/teacher ratio	-0.219*	0.432***	-0.131	-0.0752*
	(0.124)	(0.118)	(0.109)	(0.0404)
faculty degree	-0.334	0.0494	0.124	-0.120
	(0.593)	(0.738)	(0.660)	(0.224)
student expense	-0.281	-0.115	0.269	0.113
	(0.218)	(0.245)	(0.199)	(0.102)
Observations	951	955	955	954
R-squared	0.121	0.073	0.122	0.121
Number of schools	141	141	141	141

Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1. All specifications include year dummy variables, as well as school fixed effects.

Table 3D: Effect of Athletic Success on ACT Score Percentage Groups (Division III)

	Below 18	18-23	24-29	30-36
win percentage	-0.222	-0.711	0.484	0.574
	(1.155)	(1.304)	(1.090)	(0.653)
national champ	-0.140	0.695	-0.789	0.416
	(0.766)	(0.653)	(1.422)	(0.846)
ln(enrollment)	-3.198*	-1.408	3.811	0.820
	(1.790)	(2.152)	(2.748)	(1.522)
division change	0.976	-0.974	-0.524	0.563
	(1.688)	(2.036)	(1.350)	(0.725)
tuition	0.102	-0.0995	-0.966***	0.967***
	(0.148)	(0.203)	(0.223)	(0.167)
student/teacher ratio	0.0846	-0.229	0.0740	0.0730
	(0.218)	(0.229)	(0.182)	(0.0979)
faculty degree	-0.654	-0.335	0.245	0.726
	(0.508)	(0.482)	(0.614)	(0.545)
student expense	-1.53e-05	-0.000109***	6.70e-05***	7.45e-05***
	(1.49e-05)	(2.21e-05)	(2.26e-05)	(1.40e-05)
Observations	1,376	1,378	1,378	1,376
R-squared	0.022	0.053	0.076	0.323
Number of schools	186	186	186	186

Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1. All specifications include year dummy variables, as well as school fixed effects.

Table 4A: Effect of Athletic Success on SAT Verbal Score Percentage Groups (Division I-A)

	Below 500	500-599	600-699	700-800
win percentage	-1.911*	0.544	0.772	0.416
	(1.020)	(0.812)	(0.930)	(0.516)
national champ	-0.503	-1.073	0.598	0.995**
	(1.454)	(0.838)	(1.546)	(0.432)
Heisman	-2.665	0.852	0.231	1.717***
	(1.689)	(1.108)	(1.996)	(0.374)
ln(enrollment)	-3.431	7.253**	-1.860	-1.267
	(5.814)	(3.288)	(5.032)	(2.927)
conference change	0.393	0.909	-0.911	-0.347
	(1.085)	(0.658)	(0.813)	(0.326)
division change	0.735	-0.00556	0.861	-1.496
	(2.645)	(3.080)	(1.448)	(1.108)
tuition	0.0560	-0.177*	-0.0738	0.200***
	(0.155)	(0.0952)	(0.156)	(0.0644)
student/teacher ratio	-0.359***	0.137	0.168	0.0677
	(0.135)	(0.0955)	(0.127)	(0.0475)
faculty degree	-0.268	-0.0133	0.230	0.0723
	(0.188)	(0.141)	(0.154)	(0.0808)
student expense	-0.277**	0.0264	0.152*	0.0897*
	(0.112)	(0.102)	(0.0903)	(0.0519)
Observations	611	612	612	611
R-squared	0.116	0.170	0.131	0.214
Number of schools	86	86	86	86

Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1. All specifications include year and conference dummy variables, as well as school fixed effects.

Table 4B: Effect of Athletic Success on SAT Verbal Score Percentage Groups (Division I-AA)

	Below 500	500-599	600-699	700-800
win percentage	0.365	0.187	-0.528	-0.0681
	(1.097)	(1.113)	(0.714)	(0.419)
national champ	3.433	-2.901	-0.672	0.0570
	(3.510)	(1.915)	(1.788)	(0.460)
ln(enrollment)	3.594	-2.132	-0.973	-0.801
	(3.208)	(2.964)	(2.154)	(1.505)
division change	0.639	3.417	-3.916*	-0.356
	(1.758)	(2.962)	(2.317)	(0.626)
tuition	0.143	-0.0768	-0.243**	0.181
	(0.149)	(0.183)	(0.108)	(0.121)
student/teacher ratio	-0.258	0.176	0.124	-0.0604
	(0.240)	(0.145)	(0.162)	(0.0612)
faculty degree	-0.617	0.103	0.163	0.343**
	(0.435)	(0.235)	(0.347)	(0.166)
student expense	-7.49e-05	0.000335***	-0.000186***	-8.12e-05***
	(5.69e-05)	(5.30e-05)	(3.30e-05)	(2.65e-05)
Observations	628	631	631	631
R-squared	0.092	0.062	0.118	0.128
Number of schools	95	95	95	95

Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1. All specifications include year dummy variables, as well as school fixed effects.

Table 4C: Effect of Athletic Success on SAT Verbal Score Percentage Groups (Division II)

	Below 500	500-599	600-699	700-800
win percentage	1.716	-1.301	-1.217	0.591
	(1.569)	(1.249)	(0.923)	(0.457)
national champ	-3.215*	2.977	0.439	-0.659
	(1.806)	(2.606)	(1.809)	(1.025)
ln(enrollment)	8.827**	-10.26***	1.160	1.157
	(3.955)	(3.185)	(1.468)	(0.875)
division change	4.550*	-1.527	-2.119**	-0.893
	(2.549)	(2.184)	(0.958)	(0.625)
tuition	0.150	-0.346*	0.179	0.0299
	(0.294)	(0.201)	(0.172)	(0.0540)
student/teacher ratio	-0.183	0.249	-0.0458	-0.0761
	(0.249)	(0.233)	(0.0930)	(0.0576)
faculty degree	-2.078	0.611	2.207*	-0.300
	(1.761)	(1.219)	(1.237)	(0.407)
student expense	-0.0789	-0.161	0.0933	0.129
	(0.224)	(0.206)	(0.134)	(0.129)
Observations	746	755	754	753
R-squared	0.104	0.108	0.090	0.041
Number of schools	121	121	121	121

Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1. All specifications include year dummy variables, as well as school fixed effects.

Table 4D: Effect of Athletic Success on SAT Verbal Score Percentage Groups (Division III)

	Below 500	500-599	600-699	700-800
win percentage	-0.147	-0.904	0.490	0.282
	(0.844)	(0.848)	(0.737)	(0.493)
national champ	0.265	-0.815	-0.711	1.217*
	(2.486)	(1.381)	(1.763)	(0.679)
ln(enrollment)	-9.023***	3.731**	3.989*	1.698
	(2.748)	(1.611)	(2.123)	(1.251)
division change	0.997	-0.412	-0.388	-0.0254
	(1.320)	(0.988)	(0.684)	(0.588)
tuition	-0.612***	0.157	0.273**	0.212**
	(0.201)	(0.127)	(0.133)	(0.101)
student/teacher ratio	-0.0367	0.00365	-0.107	0.130
	(0.216)	(0.156)	(0.168)	(0.118)
faculty degree	0.0665	-0.347	0.0884	0.202
	(0.560)	(0.408)	(0.504)	(0.433)
student expense	-0.0685	-0.0172	0.0191	0.0727
	(0.0512)	(0.0529)	(0.0493)	(0.0524)
Observations	1,405	1,408	1,410	1,410
R-squared	0.157	0.082	0.114	0.081
Number of schools	185	185	185	185

Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1. All specifications include year dummy variables, as well as school fixed effects.

Table 5A: Effect of Athletic Success on SAT Math Score Percentage Groups (Division I-A)

	Below 500	500-599	600-699	700-800
win percentage	-1.702*	-0.402	2.091**	-0.0904
	(0.871)	(0.863)	(0.910)	(0.566)
national champ	-0.273	-1.306	-0.304	1.798***
	(0.933)	(0.822)	(1.282)	(0.440)
Heisman	-0.207	-1.498	1.824	0.0539
	(1.447)	(1.153)	(2.126)	(0.879)
ln(enrollment)	-3.368	0.177	2.013	1.683
	(4.420)	(4.775)	(4.715)	(2.698)
conference change	-1.104	-0.714	0.908	0.688
	(0.853)	(0.625)	(0.706)	(0.576)
division change	1.548	3.703	-3.610**	-1.703**
	(2.096)	(2.431)	(1.438)	(0.685)
tuition	0.177	-0.276*	-0.361*	0.456***
	(0.170)	(0.150)	(0.182)	(0.147)
student/teacher ratio	-0.275**	0.0953	0.0736	0.113
	(0.119)	(0.119)	(0.122)	(0.0986)
faculty degree	-0.173	0.246	0.186	-0.205
	(0.133)	(0.157)	(0.154)	(0.155)
student expense	-0.157	-0.178	0.0353	0.309***
	(0.122)	(0.108)	(0.152)	(0.111)
Observations	618	620	620	620
R-squared	0.180	0.229	0.173	0.349
Number of schools	87	87	87	87

Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1. All specifications include year and conference dummy variables, as well as school fixed effects.

Table 5B: Effect of Athletic Success on SAT Math Score Percentage Groups (Division I-AA)

	Below 500	500-599	600-699	700-800
win percentage	0.456	-0.0844	0.496	-0.793*
	(1.124)	(1.019)	(0.661)	(0.403)
national champ	3.400	-3.068*	-1.430	1.134
	(3.375)	(1.750)	(2.062)	(0.928)
ln(enrollment)	5.433*	-4.503	-1.852	0.987
	(3.031)	(3.228)	(2.120)	(1.495)
division change	1.888	1.786	-3.345	-0.474
	(2.101)	(2.833)	(2.220)	(0.882)
tuition	0.438***	-0.313*	-0.379***	0.261*
	(0.147)	(0.188)	(0.111)	(0.132)
student/teacher ratio	0.0443	-0.231	0.244	-0.0606
	(0.196)	(0.167)	(0.173)	(0.0561)
faculty degree	-0.504	-0.0490	0.492	0.0757
	(0.343)	(0.189)	(0.363)	(0.144)
student expense	-7.75e-05	0.000136**	0.000163***	-0.000232***
	(6.34e-05)	(5.88e-05)	(4.16e-05)	(3.48e-05)
Observations	643	647	647	647
R-squared	0.102	0.081	0.113	0.126
Number of schools	96	96	96	96

Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1. All specifications include year dummy variables, as well as school fixed effects.

Table 5C: Effect of Athletic Success on SAT Math Score Percentage Groups (Division II)

	Below 500	500-599	600-699	700-800
win percentage	-0.761	-0.198	-0.0223	0.627
	(1.393)	(1.086)	(0.893)	(0.471)
national champ	3.120***	0.767	-5.589***	1.759
	(0.937)	(1.562)	(0.554)	(1.825)
ln(enrollment)	3.035	-3.670	1.527	-0.213
	(3.285)	(3.368)	(2.015)	(0.727)
division change	5.301***	-1.563	-2.556***	-1.007*
	(1.910)	(1.598)	(0.959)	(0.576)
tuition	0.490	-0.735***	0.144	0.135
	(0.321)	(0.219)	(0.181)	(0.0961)
student/teacher ratio	0.278	-0.135	-0.149	-0.0203
	(0.195)	(0.225)	(0.182)	(0.0507)
faculty degree	0.619	-1.152	0.887	0.139
	(1.505)	(1.334)	(1.027)	(0.540)
student expense	0.126	-0.326	0.200	0.0340
	(0.285)	(0.222)	(0.152)	(0.0926)
Observations	756	764	764	762
R-squared	0.062	0.106	0.056	0.055
Number of schools	121	121	121	121

Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1. All specifications include year dummy variables, as well as school fixed effects.

Table 5D: Effect of Athletic Success on SAT Math Score Percentage Groups (Division III)

	Below 500	500-599	600-699	700-800
win percentage	-0.741	0.258	0.0579	0.0858
	(1.066)	(0.932)	(0.849)	(0.480)
national champ	2.226	-2.212	-0.139	0.0942
	(2.228)	(2.816)	(3.068)	(1.149)
ln(enrollment)	-11.68***	4.129*	7.383**	-0.161
	(2.506)	(2.377)	(3.013)	(1.092)
division change	1.919**	-0.229	-1.721**	0.281
	(0.900)	(0.993)	(0.769)	(0.509)
tuition	-0.225	0.0773	-0.193	0.355***
	(0.170)	(0.136)	(0.146)	(0.0904)
student/teacher ratio	0.244	0.00293	-0.295*	0.0707
	(0.228)	(0.185)	(0.172)	(0.131)
faculty degree	0.122	0.249	-0.271	-0.0840
	(0.492)	(0.545)	(0.419)	(0.289)
student expense	-0.0590*	-0.0184	0.0127	0.0673***
	(0.0354)	(0.0447)	(0.0661)	(0.0226)
Observations	1,400	1,404	1,403	1,402
R-squared	0.073	0.035	0.037	0.077
Number of schools	185	185	185	185

Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1. All specifications include year dummy variables, as well as school fixed effects.

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