The Impact of Winning an NCAA Basketball Championship on Applications, Enrollment and Academic Quality

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Abstract: Collegiate sports programs are often characterized as the front porch of a university, serving to publicize the institution and draw students to the door. We analyze how winning a national championship in men's basketball effects both the quantity and academic quality of student. Our findings suggest that winning a national championship has no effect on applications or admissions rate, but increases the enrollment yield of both male and female students. We also find that there is a slight increase in the quality of students who enroll as measured by academic test scores and high school rank. Our results demonstrate that winning a men's basketball national championship may serve as signal to prospective students regarding the overall quality of the university.

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Introduction

University athletic programs are uniquely situated to serve as a visible and accessible liaison between a school and the general public. Members of the public and potential students could view a school's athletic successes as a signal regarding the overall quality of the university. This association between sports and education helps to explain why institutions of higher learning invest significant monetary resources in athletics as opposed to more traditionally academic endeavors. Additionally, Jacob, McCall and Stange (2018) found that students place a high value on consumption amenities, such as sports, student activities, and dormitories. In their view, universities serve as country clubs that not only provide academics, but also use consumption amenities to entice students at attend the university.

This study examines the impact of winning a men's basketball national championship in the NCAA division one's March Madness tournament on a university's student academic profile. Our findings indicate that there is a slight positive effect on the student profile in terms of student quality, and a positive impact of academic yield for both men and women, with a stronger effect for male students.

Related Literature

The impact of an athletics program at a university has a long history in economics. Baade and Sundberg (1996) found that a postseason bowl game appearance by a university's football team increased alumni giving. Humphreys (2006) discovered that when a university fields a "big-time" college football program, state appropriations increase. Additionally, Fisher (2009) and Mulholland, Tomic and Scholander (2014) found NCAA football success increased peer assessment scores as ranked by US News and World Report College Rankings. Focusing on students currently attending a university, Mixon and Trevino (2002) observed that a positive and

significant relationship between a universities' winning percentage in football and overall graduation rates. Alternatively, Lindo, Swensen and Waddell (2012) and Hernandez-Julian and Rotthoff (2014) both found that athletic success in football lowers students' academic performance during a successful season. Also White, Cowan and Wooten (2017) analyzed student's alcohol consumption and found that when their university team participates in the NCAA postseason basketball tournament drinking increased. Suggesting that university athletics can have both a positive and negative effect on the university.

There has also been a significant amount of research focusing on the influence of athletic success on future student enrollment and academic quality. Murphy and Trandel (1994) observed that an improvement in a school's winning percentage in football increased the number of applicants to that school. While Chressanthis and Grimes (1993) discerned that enrollment rises and fall with the success of the football program. Toma and Cross (1998) analyzed the effects of winning a NCAA National Championship in football or men's basketball on the number of applications submitted to a school and found a significant positive increase in applications after the championship. Their study was the first to claim that college athletics are a "front-door" to a university because sports are the only aspect of an institution that reach outside the academic world. Pope and Pope (2009) measured athletic success in terms of playoff berths and found that a school's success in football or men's basketball is often accompanied by an increase of 2% to 8% in applications received. While Jones (2009) study observed that simply appearing in a Bowl Game caused an increase in applications received and admission yield. Interestingly, this increase was only found for male students while the admission yield for both male and female students were positively correlated with the Nielsen Rating of the Bowl Game.

Mixon, Trevino and Minto (2004) also found a positive and significant relationship between football win percentage and applications received, supporting the idea that collegiate football impacts the institution's admissions process. While McEvoy (2005) found a positive relationship between the number of applicants at a university with a winning football team, but he found no such significance with men's or women's basketball success. Smith (2009) observed that prolonged success in athletics is much more beneficial for a university than a single upset win or acute advertising effects from playoff berths or bowl games. His contention is that continued athletic success leads to a more solid sports culture, and therefore a higher perceived quality of the institution.

Caudill, Hourican, and Mixon (2018) detected that when a university eliminates a football team, their applicant pool shrinks and their ACT scores fall. McCormick and Tinsley (1987) found that a winning football season increased in the incoming year's freshman SAT scores. While Segura and Willner (2018) focused on football Bowl Game invitations and discovered that Bowl Game invitations served to increase the median SAT scores at the participating universities. Smith (2008) discerned that division one basketball success does not influence the proportion of students from the top ten percent of their class or the proportion of National Merit Scholars attending the university. In addition Tucker and Amato (2006) found there is no consistent evidence to suggest a highly successful basketball team influences average SAT scores. Pope and Pope (2014) further studying SAT scores, determined that when a university has a stellar year in either football or basketball, the total number of test scores sent to that university increased by ten percent. They further determined that Black students, males and students who played sports in high school are more influenced by athletic success. Lastly, Chung (2013) focused on SAT score distributions and found that lower than average SAT scoring

students have a higher preference for athletic success than do high achieving SAT students. Overall the literature suggest that a football program has more of an influence then a basketball program and athletic success has less influence on the highest academic achieving students than other students.

Methods and Results

To test the impact of winning a men's basketball national championship on a university, we use data from 119 Division I (FBS, formally D-1A) men's basketball programs from 2000 to 2013 for a fourteen year panel.[2] This sample represents all schools from the Atlantic Coast Conference (ACC), the Big 12 Conference, the Big 10 Conference, Conference U.S.A., the Mid-American Conference (MAC) , the Mountain West Conference, The PAC 12, the Southeastern Conference (SEC) , the Sun Belt Conference, the Western Athletic Conference and the Ivy League Conference. These schools represent the universities with the highest athletic budgets as well as the majority of bids to the NCAA postseason tournaments each year. In Table 1 we list the national champions by each year. During the time of our study, Connecticut, Duke, Florida and North Carolina each won two championships.

To control for yearly team quality, we include the win percentage, along with the championship dummy variable as our independent variables. For our dependent variables we use data from the NCAA and the Peterson Undergraduate Data Set, which provides our measure of both male and female freshman applications, admissions rate, and enrollment rate. We report the means and standard deviation of both the dependent and independent variables in Table 2. The average basketball win percentage at the schools studied was .562. This figure is higher than .500

[2] Although there are more than 300 schools that can qualify for the men's basketball tournament, these schools represent the schools with the largest athletic budgets and most of the tournament bids. FBS (formally D1-A) are included in this dataset, whereas FCS (formally D1-AA, smaller football schools) and NFS (formerly D1-AAA, non-football schools) are not included in this data.

because we focus only on the top conferences in the NCAA who often play schools in smaller conferences not included in the dataset. The average number of student applications at these schools were 6,360 men and 7,086 women. To account for differences in size between the universities in our analysis, we log the number of applications. Due to the fact that admissions are contingent upon applications, we also analyze the admission rates. The admissions rate for the schools included in our dataset is 64% for males and 66% for females on average. Lastly, we analyze the enrollment rate, or academic yield, which is the percentage of students who are admitted that choose to enroll. The average enrollment rate in our dataset is 44% for males and 42% for females.

We further examine student quality at these universities as measured by the percentage of the incoming freshman class that were in the top ten percent of their high school class, as well as ACT and SAT academic achievement test scores. In Table 3, we report the dependent variables for various student quality measures. For both mathematical and verbal SAT scores, our quality measures are the percentage of students who enroll from each one hundred point range. On the Math portion of the SAT, our data shows that on average thirteen percent of a university's students score above the 92nd percentile, or a score of between 700 to 800. Twenty-eight percent of those students score in the 600 to 700 range, or the 75th to 91st percentile. Another twenty-eight percent score between 500 and 600, in the 41st to 74th percentile. About fourteen percent of students score in the 400 to 500 range, or the 1 to 40th percentile range. Overall, eighty-six percent of students in our dataset reported a score on the math section of the SAT.

For SAT Verbal scores, our data shows that about ten percent of a university's students score above the 94th percentile, or a score of between 700 and 800. Twenty-five percent of students score in the 600 to 700 range, the 73rd to 93rd percentile. Thirty-one percent score

between 500 and 600, or in the 39th to 72th percentile, while about sixteen percent score in the 400 to 500 range, in the 1 to 38th percentile range. Overall, eighty0five percent of students in our dataset reported an SAT Verbal Score.

When examining ACT scores, thirteen percent of students report scores from the 93rd and above category, or a score of 30 to 36 on the ACT. Thirty-five percent of students report scores from the 73rd to 92nd category, a score of 24 to 29, while thirty-two percent report scores of 18 to 23, in the 72nd to 37th percentile of test takers. Lastly six percent of students report an ACT test score of 12 to 17 or in the 11th to 37th percentile. Overall, eighty-six percent of students reported an ACT score. We also measure student academic quality by examining an incoming student's high school class rank. Our data shows that about thirty-four percent of enrollees in our dataset came from the top-ten percent of their high school class. Additionally, twenty-four percent of the enrolled students came from between the top twenty-five and top-ten of their high school class.

To analyze the influence of winning a men's basketball national championship on a university's admissions profile, we use the fixed effect regression technique. This technique controls for differences between universities and differences over time. Using this method, we analyze how winning a men's basketball championship influences both male and female applications, admission rates, and enrollment rates, as well as the quality of students enrolled at these schools. The university fixed effect controls for all university characteristics that are time invariant including whether the school is religious, private or public. Given the small number of championships, we are unable to split our sample into private and public schools. The year fixed effects control for changing demographics of students and macro-economic conditions that change over time. In addition to the fixed effect regression technique, we also cluster the

standard errors by university. The strength of this technique is it can capture the transitory effect of winning the championship where the permanent is captured in the fixed effect. The model we estimate is:

$$Yit = \beta_0 + B_1 * Championship + B_2 * Lag\ Championship + B_3 * Lag2\ Championship + Bi * University + Bt * Year + \varepsilon_i$$

We report our results of winning a men's basketball national championship on a university's academic profile in Tables 3 through 7. In Table 3, we report the effect of winning a national championship on male applications, acceptance rates, and enrollment rate. We find that winning a championship has no effect on either the number of male applications or the admissions rate at a university, but does increase the enrollment rate by two percentage points one year after winning the championship. This would equate to a four and half percentage increase in the enrollment rate at the school. We also find that winning a national championship increases the enrollment rate one percentage point two years after winning the championship, or a three percent increase in the enrollment rate.

In Table 4, we report the influence of winning a national championship on female applications, admissions rate and enrollment rate. We find that winning the championship has no effect on female applications or the admissions rate, but does increase the enrollment rate by one percentage point two years after winning the championship. This would equate to a three percent increase in the enrollment rate at a school. We also find weak evidence that winning a championship increases the enrollment rate for females one year after the victory by using a one tailed test with the null hypothesis that winning a championship increases the enrollment rate. Our results suggest that winning a national championship has a larger effect on a male's decision to attend the university than a female's decision.

In Tables 5 and 6, we report the results of how winning an NCAA national championship in men's basketball can affect the quality of freshman students enrolled at a university by focusing on verbal and mathematical SAT Scores. We find that winning a national championship has no effect on the percentage of highest achieving students who enroll at a university who earned either over 700 on their verbal or mathematical SAT test. However, we do find that winning a championship increases the percentage of students who earned between a 600 and 700 on the SAT by two and a half percentage points both one and two years after winning the national championship. We further find weak evidence that winning a championship increases the enrollment of students one year after the victory by using a one tailed test with the null hypothesis that winning a championship increases the enrollment rate for students who earn between 600 and 700 on their verbal SAT test. In the Mathematical SAT category, we also find weak statistical evidence that students in the 600 to 700 range increase their enrollment at a school by two percentage points both the year of the championship and the year after the championship in a one tail test. We find no other changes in enrollment for students who earned in the lower test scoring categories of either 500 to 600 or 400 to 500 for either the verbal or mathematical SAT categories. Our results show some evidence that winning a national championship in basketball increases the number of students enrolling at a university who score between the 75^{th} to 90^{th} percentiles on the SAT exam.

In Table 7, we report the results for students who enroll at a national championship school after taking the ACT exam. We find that winning a championship has no effect on enrollment among of top achieving students who earned between a 36 and 24 on the ACT exam; however, it does lower the attendance of students who earned between 18 and 23 (or in the 38^{th} to 72^{nd} percentile of students) by three percentage points the year of the championship. Lastly,

we find that winning a national championship in men's basketball increases enrollment of students who are in the top ten percent of their high school class by 8 percentage points the year after the championship. Overall, our results demonstrate that winning a national championship in a men's basketball increases both the enrollment rate male and female students, and slightly increases the academic quality of students attending the university as well.

Discussion and Conclusion

We find that winning an NCAA national championship in men's basketball has no effect on the number of male or female applications received by the victorious university. Winning the championship, however, does increase the male academic yield at a school by one to two percentage points the year of the championship, and the two years following the championship. Correspondingly, we also find that the female academic yield at a school increases by one percentage point two years after winning the national championship. Given the overall average academic yield at a university is forty-four percent for males and forty-two percent for females, both of these increases would be considered small in magnitude. Therefore, out study indicates that winning a championship in men's basketball does not lead substantially more students to enroll at the victorious university.

We further find that winning a national championship in division one men's basketball slightly increases the academic quality of incoming students at a school as measured by test scores and high school rank. Our results indicate that winning the championship does not increase the enrollment numbers for the very top achieving students who earn above a 700, or scored in the 94^{th} percentile or above, on their verbal or mathematical SATs. Alternatively, we do find that there is a two percentage point increase in the enrollment of the students who earn between 600 and 700, or in the 73^{rd} to 93^{rd} percentile, of test takers. Given that the average

number of students who attend the university from this category is on average is 25%, our findings indicate that winning a national championship increases these top achieving students' decision to enroll at a school by ten percent.

When focusing on ACT scores, we find there is no statistically significant effects on the number of top achieving students who choose to attend the university after the championship. We do, however, find that students who earn between 18 and 23, or in the 38th to 72nd percentile, decrease their enrollment at a school by three percentage points. Given that on average 31% of enrolling students at a school are from this category, this would mean that ten percent less middle-tier students would choose to attend the victorious university. Lastly, we find that there is an eight percentage point increase in the number of students who choose to attend the school from the top ten percent of their high school class. Given that 34% of enrollees are from the top ten percent of their class, this indicates that there is a 23% increase of these students the year the university wins the national championship. These relatively modest increases detected by our analysis might be due to the fact that all the schools who won the NCAA national championship during our time period are known to be the top basketball programs in the nation so much of the effect of basketball success is captured in the university fixed effect.

Overall, we find that there is some increase in the academic yield or the enrollment rate after winning a championship. There is also a slight increase in student academic quality, with higher achieving students opting to attend the victorious institution. However, our results indicate that winning an NCAA men's basketball national championship does not serve to increase the number of applications or admissions rate to a school. These relatively minor increases in student quality and enrollment outlined in this study seem to contradict the idea that a successful men's basketball program as measured by a national championship could be used as

a marketing tool by a university to enhance its academic profile. Instead, winning a basketball championship appears to have a negligible impact on a student's decision to attend a university and fails to dramatically enhance the university's academic profile.

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Table 1: List of NCAA Men's Basketball Champions

Year of Championship	University
2000	Michigan State
2001	Duke
2002	Maryland
2003	Syracuse
2004	Connecticut
2005	North Carolina
2006	Florida
2007	Florida
2008	Kansas
2009	North Carolina
2010	Duke
2011	Connecticut
2012	Kentucky
2013	Louisville

Table 2A: Means

Independent Variables	**Mean (Standard deviation)**
Basketball Win Percentage	.562 (.168)
Dependent Variables	**Means (Standard deviation)**
Male Application	6360 (4328)
Female Application	7086 (4890)
Male Admissions Rate	.644 (.209)
Female Admissions Rate	.662 (.219)
Male Enrollment Rate	.443 (.145)
Female Enrollment Rate	.424 (.147)
Top 10% High School	34% (25)
Top 10% to 25% High School	24% (16)

Colleges = 119 years=13

Table 2B: Student Quality Measures: Test Scores

Variables	Percent of Freshman Class (Standard deviation)	Percentile
SAT Math Score (700-800)	13.3% (16.7)	92nd' and above
SAT Math Score (600-700)	28.2% (16.4)	75th to 91st
SAT Math Score (500-600)	28.5% (16.7)	41st to 75th
SAT Math Score (400-500)	13.6% (12.9)	1st to 40th
Total SAT Math	85.8% (34.9)	1st to 100th
SAT Verbal Score (700-800)	9.8% (13.1)	94th and above
SAT Verbal Score (600-700)	25.1% (15.9)	73rd to 93rd
SAT Verbal Score (500-600)	31.2% (16.8)	39th to 72nd
SAT Verbal Score (400-500)	16.0% (13.7)	1st to 38th
Total SAT Verbal	85.0% (35.7)	1st to 100th
ACT Score (30-36)	13.5% (17.5)	93rd and above
ACT Score (24-29)	34.7% (18.7)	73rd to 92st
ACT Score (18-23)	32.5% (21.4)	38th to 72th
ACT Score (12-17)	5.7% (8.1)	11th to 37th
Total ACT	86.4% (34.3)	1st to 100th

Table 3: Influence of Tournament Basketball Championships on Males

	Log Male Applications	Male Admissions Rate	Male Enrollment Rate
Basketball Win Percentage	.018 (.050)	-.008 (.019)	.003 (.018)
Championship	-.007 (.018)	.026 (.019)	.020* (.012)
Lag Championship	.006 (.029)	-.006 (.023)	.013** (.006)
Lag 2 Championship	.028 (.036)	-.019 (.026)	.011* (.007)
Constant	8.406** (.052)	.673** (.015)	.446** (.016)
School fixed effects	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes
R-squared Within Between Overall	 .63 .00 .06	 .16 .04 .02	 .10 .01 .03

Schools=119 Years=13 Clustered Standard errors in parentheses.
*significant at 90% level **significant at 95% level

Table 4: Influence of Tournament Basketball Championships on Females

	Log Female Applications	Female Admissions Rate	Female Enrollment Rate
Basketball Win Percentage	.018 (.050)	-.017 (.019)	.004 (.018)
Championship	-.007 (.018)	.025 (.020)	.007 (.010)
Lag Championship	.006 (.029)	-.001 (.022)	.011[a] (.008)
Lag 2 Championship	.028 (.036)	-.014 (.026)	.012* (.007)
Constant	8.52** (.035)	.701** (.014)	.430** (.015)
School fixed effects	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes
R-squared			
Within	.62	.17	.10
Between	.01	.05	.00
Overall	.06	.01	.03

Schools=122 Years=13 Clustered Standard errors in parentheses.
*significant at 90% level **significant at 95% level
[a]significant at 90% level one tail test

Table 5: Verbal SAT Scores

Variable	Verbal SAT Over 700	Verbal SAT 600-700	Verbal SAT 500-600	Verbal SAT 400-500
Basketball Win Percentage	.069 (.738)	-.407 (1.717)	-1.025 (2.255)	-.577 (1.755)
Champion	-.237 (.487)	1.313[a] (1.03)	.3403 (1.745)	.047 (.449)
Lag1: Champion	.020 (.715)	2.328* (1.456)	.110 (1.234)	-.340 (.672)
Lag2: Champion	-.144 (.615)	2.737** (1.060)	-.380 (1.478)	-.702 (.746)
Constant	8.250** (.514)	23.791** (1.082)	31.189** (1.572)	16.160** (1.262)
University Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
R-squared Within Between Overall	 .07 .01 .01	 .03 .03 .01	 .01 .00 .00	 .03 .04 .01

Schools=122 Years=13 Clustered Standard errors in parentheses.
*significant at 90% level **significant at 95% level
[a]significant at 90% level one tail test

Table 6: Math SAT Scores

Variable	Math SAT Over 700	Math SAT 600-700	Math SAT 500-600	Math SAT 400-500
Basketball Win Percentage	-.948 (1.012)	-.899 (1.852)	-1.863 (2.127)	-.640 (1.521)
Champion	-.115 (.654)	2.070[a] (1.398)	.474 (1.553)	-.006 (.319)
Lag1: Champion	.284 (.541)	2.065[a] (1.603)	.001 (.747)	.026 (.247)
Lag2: Champion	.573 (.562)	.846 (1.156)	-.104 (1.183)	.081 (.432)
Constant	11.632** (.647)	26.857** (1.172)	29.009** (1.458)	14.067** (1.233)
University Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
R-squared Within Between Overall	 .09 .01 .01	 .06 .01 .01	 .01 .01 .01	 .01 .02 .00

Schools=122 Years=13 Clustered Standard errors in parentheses.
*significant at 90% level **significant at 95% level
[a]significant at 90% level one tail test

Table 7: ACT Scores and High School Rank

Variable	ACT Score (30-36)	ACT Score (24-29)	ACT Score (18-23)	ACT Score (12-17)	High School Top 10%
Basketball Win Percentage	-2.857 (2.456)	.634 (2.512)	-3.276* (1.922)	-.826 (.753)	-.839 (1.886)
Champion	1.068 (1.280)	-3.191 (3.329)	-3.053** (1.534)	-.404 (.330)	8.107* (3.272)
Lag1: Champion	1.266 (1.647)	2.220 (3.212)	1.213 (1.921)	.039 (.364)	-1.694 (3.272
Lag2: Champion	1.138 (1.312)	-1.081 (2.492)	.957 (1.713)	.243 (.324)	-10.080 (11.422)
Constant	12.299** (1.311)	31.359** (1.528)	35.976** (1.127	7.00** (.413)	31.784** (1.284)
University Fixed Effects	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
R-squared Within Between Overall	 .143 .025 .027	 .068 .035 .020	 .047 .013 .009	 .073 .038 .016	 .072 .081 .004

Schools=122 Years=13 Clustered Standard errors in parentheses.
*significant at 90% level **significant at 95% level