The Impact of Athletic Performance on Tuition Rates

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Abstract

This paper explores the impact of intercollegiate athletic performance on tuition rates. A number of recent studies have examined the advertising effect generated by participation in intercollegiate sports. These studies have attempted to ascertain whether athletic performance improves student quality, graduation rates, and state appropriations. Only one previous paper examines the impact of intercollegiate athletics on tuition, and it found a positive impact on out-of-state tuition rates from participation in the NCAA men’s basketball tournament. In this paper, we find that athletic performance as measured by win-loss records in football and basketball impacts both in-state and out-of-state tuition rates, though it appears that the effects are largely confined to members of the six major power conferences.

Keywords: athletic performance, tuition rates

Introduction

Over the past two decades, a number of papers have investigated the impact of success in intercollegiate athletics on various aspects of university life, including alumni giving (Rhoads & Gerking, 2000; Goff, 2000; Baade & Sundberg, 1996; Humphreys & Mondello, 2007), state appropriations to universities (Coughlin & Erekson, 1986; Humphreys, 2006), student quality (McCormick & Tinsley, 1987; Tucker, 1992; Mixon, Trevino, & Minto, 2004; Tucker, 2005; Smith, 2008), and graduation rates (Rishe, 2000; Tucker, 1992; Bremmer & Kesselrig, 1993). In each of these instances, universities are viewed as having raised their public profiles as a consequence of their athletic successes and, as a result, have attempted to capitalize on those successes by securing larger contributions from alumni or greater appropriations from state legislators or by increasing the size and quality of their student bodies. These studies thus emphasize that intercollegiate athletics create an “advertising effect” that provides a means by which universities might generate increases in revenues and improve the quality of the institutions (McCormick & Tinsley, 1987). In simple terms, we can view intercollegiate athletics as a means by which universities attempt to shift the demand curve for their services to the right. If universities succeed on the field or on the court,
this success may present them with an opportunity to increase enrollment or raise student quality or raise tuition.

Of course, university presidents will not, in all likelihood, directly address the increases in tuition and attribute them to this source. More commonly, university administrators will cloak tuition increases in terms of a need to cover increasing costs or some other more “legitimate” sounding rationale. This is much the same argument given by owners of professional sports teams in justification for rising ticket prices; “players’ salaries have risen so we are increasing prices to cover those costs.” But the direction of causation is reversed. Teams are willing to pay more for players because fans are willing to pay more to attend games. Similarly, we argue that universities spend more on athletics because they can raise tuition. This is due to the fact that students are willing to pay more to attend a school with a more prestigious reputation stemming, in part, from their success in athletics. The rise in tuition is then attributed to rising costs or an expansion of other university programs.

The aforementioned empirical studies have largely served to assess the extent to which these marketing efforts have been successful. The results of these studies have been something of a mixed bag, as some studies have reported that athletic success is a statistically significant determinant of student quality or alumni giving and others find no significant effects. Some have even found negative impacts (Tucker, 1992). Although a number of studies have investigated the effects of intercollegiate sports on student quality and enrollment, to our knowledge, only one has investigated the impact of athletic success on tuition (Mixon & Ressler, 1995). We find this surprising because, as Ronald Ehrenberg points out, although university administrators may not be in the business of maximizing profits, they are interested in maximizing the value of their institutions. This drives them to make improvements in virtually all aspects of their operations. This, he argues, compels them to “act like cookie monsters searching for cookies. They seek out all the resources they can get their hands on and devour them” (Ehrenberg, 2000, p. 11). Thus, improvements in student quality or larger enrollments are only a part of the improvements that universities are seeking. Moreover, one plausible explanation for the relatively weak impact of athletic success on student quality or enrollment found in the empirical studies mentioned above might be that universities have largely used the shift in demand to raise tuition to help fund improvements in other areas of university operations that also contribute to value maximization. This might be the case where universities face enrollment constraints or where increasing enrollment and improving student quality result in significant increases in marginal costs.

The only previously published paper on the impact of athletic success on tuition is a 1995 paper by Frank Mixon and Rand Ressler. That paper focuses on the effect of athletic success, as measured by the number of appearances in the NCAA basketball tournament, on out-of-state enrollment. They found that athletic success allows a university to attract additional out-of-state students who are willing to pay higher rates of tuition than in-state students, thus creating the possibility of a net increase in tuition revenues. In contrast, the study presented here examines the impact of athletic success, as measured by win-loss records in both football and basketball, upon both in-state and out-of-state tuition rates. And although the study undertaken by Mixon and Ressler covers the period from 1993-97, our sample covers a considerably longer time
period, characterized by significant changes in the level of television exposure for intercollegiate athletics.

The Mixon and Ressler paper focuses solely on the impacts on out-of-state tuition because, as they rightly point out, state universities are constrained in their ability to raise tuition because of an obligation to keep tuition affordable for the state’s residents although they have no such responsibility to out-of-state students (1995, p. 384). Thus, they do not attempt to test whether in-state rates are affected by athletic performance. Although we share the view that the impact of athletic success is likely to be larger in the case of out-of-state students, we hypothesize that it has a significant impact on in-state tuition rates as well, given that athletic success changes the consumption characteristics associated with the college experience for both groups of students. In addition, the fact that state legislators are willing to give larger appropriations to schools with successful athletic programs (Humphreys, 2007) opens up the possibility that those same state legislators might also permit the schools to charge higher tuition rates. Alternatively, we might find that there is little impact on in-state tuition rates because athletic success enables schools to attain higher levels of state appropriations, which substitute for tuition revenues.

In this paper, we find that although out-of-state tuition rates appear to be more affected by athletic success than in-state tuition rates, we also find a significant impact on in-state rates. In addition, we present evidence that conference affiliation is a key determinant of the impact of athletic performance on tuition rates.

**Empirical Analysis**

**Empirical Model and Data**

The basic econometric model that we estimate in our analysis is shown as:

\[ y_{ist} = \mu_t + \beta X_{it} + \gamma E_{st} + \nu_{ist} \]

where \( y_{ist} \) is a measure of tuition and fees per student, \( X_{it} \) is a vector of university-specific explanatory variables, \( E_{st} \) is a vector of state-specific control variables, and \( i = \) university, \( s = \) state, and \( t = \) time. The sample we constructed is an unbalanced panel comprised of 181 schools spanning 23 years.

The data we use are taken from three primary sources. The first source is the U.S. Department of Education’s National Center for Education Statistics Integrated Postsecondary Education Data, which reports institution-specific data for public colleges and universities each year.\(^1\) Unfortunately, the IPED data does not include data from private institutions. Furthermore, we were concerned that data gathered from private institutions might not be comparable to the data collected in the IPED data set. As a consequence, we do not include private institutions in this study. We selected data for the years 1987 through 2007, mainly because of data availability but also because we believe this time period represents a stable economic, political, and sports environment for colleges and universities, as well as a period marked by significant growth in intercollegiate athletics.

The second source is the College Football Data Warehouse, which reports the win-loss record for each football team per season.\(^2\) These data are sometimes incomplete for multiple reasons, and therefore, we used secondary sources to determine team perform-
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ance in a given season. For example, some teams changed their divisional status, moving from Division I-AA football to Division I-A football, while some other schools changed their name. In a few instances, we emailed the school’s athletic director requesting missing information or to clarify reported information that seemed suspect.

The third source is Ken Massey’s Massey Ratings, which reports win-loss records for each basketball team per season. These data are also incomplete for multiple reasons, and we relied upon email correspondence with various athletic directors to obtain any missing information. The Data Appendix summarizes the data sources we used for all variables as well as describes the content or construction of each variable used in the empirical analysis in detail.

The primary question we examine is whether a school’s success on the gridiron or on the basketball court has any impact on the tuition and fees charged each year? The obvious choice for a dependent variable in our analysis is tuition rates and fees charged. These data are reported on a per student basis and, for each institution in our sample, for a particular academic year. These data, however, do not include any financial aid (e.g., grants, scholarships) a student might receive and, thus, would be considered the “sticker price” advertised by the university.

As we are well aware, admissions officers frequently employ price discrimination in an effort to attract selected students that they would like to have but who might not be able to pay full sticker price. Students may be offered scholarships or more financial aid to entice them to enroll. Unfortunately, we do not have data on the prices paid by individual students and, thus, must rely on the sticker prices to judge the impact on tuition rates. Here, we can make an analogy to automobile dealerships that also practice a considerable amount of price discrimination. In the market for new cars, we typically observe that an increase in demand for a particular model of car is reflected in an increase in its sticker price, although there may also be some discounting from the sticker price in individual transactions and the level of discount will be reduced for models in greater demand. Some buyers will be willing to pay the full sticker price of the car, and so, raising the sticker price will permit the seller to capture the consumer surplus of those buyers with higher reservation prices while still allowing for price discrimination. The rise in the sticker price is an indication of rising prices for that model, even though we do not observe the actual sale price in all cases. In similar fashion, we hypothesize that universities raise sticker prices in response to rising demand while also offering price discounts to selected students.

In addition, we deflated the dollar values using the Higher Education Price Index (Commonfund Institute) to eliminate any impact from inflation because we are using data that span a 20-year time period. Thus, the measure we have constructed shows the real (i.e., inflation-adjusted) tuition and fees charged by a particular university. In the next section, we describe the different explanatory variables that form the basis for our study.

The explanatory variables fall into three specific groups. The first group includes several measures that control for differences in the institution’s athletic programs and their respective football and basketball team performances. Because we are mainly interested in determining whether the football teams’ performances influence the level of tuition and fees charged, the obvious choice is to use the number of wins (FB Wins). Our hypothesis is that more wins means greater demand for entry into that school,
which presents the university with an opportunity to raise the price. Similarly, the obvious choice to control for the potential impact that basketball success may have on demand is the number of basketball wins per season (BB Wins). We also included two measures to capture the potential impact that postseason appearances may have on tuition rates. The first is whether the football team played in one of the major bowl games in the previous year (Bowl), and the second is whether the basketball team played in the final four of the NCAA tournament in the previous year (Final4).5

The second group includes institution-specific variables that we believe are important to control for in the regression analysis. The first is the Carnegie Classification (Carnegie) for each school included in our sample. This variable is chosen because we recognize that considerable institutional heterogeneity is present in our sample of institutions. Perceptions about academic quality are obvious factors that influence enrollment decisions and willingness to pay tuition. Previous studies of the determinants of athletic success on enrollment and student quality have employed a variety of variables designed to measure institutional diversity. These include whether the university has a medical or law school, the percentage of graduate students relative to the total student population, the average SAT scores for incoming freshman, and measures of funded research (Quigley & Rubenfeld, 1993; Lowry, 2001; Humphreys, 2006). Although each of these measures gives us some information regarding a university’s quality and mission, we feel that a university’s Carnegie Classification provides an appropriate means of measuring institutional diversity and quality. As noted by the Carnegie Foundation for the Advancement of Teaching, “[i]t has been widely used in the study of higher education, both as a way to represent and control for institutional differences, and also in the design of research studies to ensure adequate representation of sampled institutions, students, and faculty” (http://www.carnegie foundation.org/classification/). The virtue of the Carnegie Classification scheme is that it takes many of the relevant measures of institutional diversity into account, including those mentioned above. Thus, the Carnegie Classification “enables researchers to identify groups of roughly comparable institutions” (ibid). The Carnegie Classification system is based on consideration of a variety of criteria, including the breadth of undergraduate and graduate programs, the institutions enrollment profile, and the size and setting of the institution. Although the Carnegie Foundation attempts to make it clear that their classification scheme is not supposed to be a measure of quality, even they admit that it has become popularly recognized as one.6

The construction of the Carnegie dummy variable presented some difficult challenges because the classification system changed during the sample period. Notwithstanding these changes, the classification system did maintain some broad categories that allowed us to assign, in a consistent manner, a value for each school in any given year that we believe reflects the relative and important academic quality differences across all schools included in our sample. Because our sample begins in 1986, we started with the classification system in place in 1976. In that year, the Carnegie Foundation assigned each school to one of the following categories: Research Universities I; Research Universities II; Doctoral Universities I; Doctoral Universities II; Master’s (Comprehensive) Colleges and Universities I; and Masters (Comprehensive) Colleges and Universities II. However, the classification system was changed in 1987, 1994, and then again in 2000, but the system maintained the primary distinction between research and teaching intensive universities. Although this distinc-
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tion is somewhat broad and general, we believe it reflects important quality and cost
differences across universities that should be controlled for in the regression analysis.
Thus, we constructed the Carnegie dummy variable as follows: if a school was classified
as a research or doctoral university (I or II) in a given year, then we assigned this
variable a value of 1, otherwise it was assigned a value of 0. The other classification cat-
gories that covered the schools included in our sample were mainly the Master’s
(Comprehensive) Colleges and Universities (I and II). In addition, we matched the
1987 Carnegie Classifications with fiscal year data 1986-87 and forward; the 1994
Carnegie Classifications with fiscal year data 1993-94 and forward; and the 2000
Carnegie Classifications with fiscal year data 1999-00 and forward. Thus, we have con-
structed a consistent dummy variable that differentiates a research-intensive university
from a teaching-intensive university and, perhaps more importantly, allows for the
transition from teaching-intensive to research-intensive that some schools have made
over the sample period.

We also recognize that all football programs are not created equal and do not equally
draw the attention of potential students. Furthermore, we believe that football pro-
grams that compete in specific conferences like the Big 10 and SEC, for example,
appeal to potential students because of the many rivalries within the respective confer-
ences and the fact that these programs generally play on television, go to bowl games,
and have a large fan base to identify with after graduation. We created the conference
affiliation dummy variables with the idea that we wanted to test whether membership
in any one of the six BCS—what many call the power—conferences captures the
impact of athletic success—either on the gridiron or on the basketball court—on the
tuition and fees paid by students attending those institutions. Because several of the
six conferences have changed over time in terms of conference membership, we have
made the following decisions regarding the construction of the conference dummy
variables. First, the former Big 8 conference has evolved into the Big 12 conference and
because this change only involved adding four new schools, we have treated the Big 8
and the Big 12 as the same conference throughout the sample period (Big12) for the
purpose of assigning conference membership. Second, the Big 10, the ACC, and the
SEC have all added new members over the sample period but have retained their con-
ference names. Third, the Big East, like the Big 12, evolved by adding new members
over the sample period, and thus, we treated it accordingly. In fact, the change involved
adding schools with strong football programs to balance the already strong basketball
programs in the conference. The PAC 10 was the only conference that did not change
during the sample period in terms of membership. The only conference that once
existed and could arguably be compared to these six BCS conferences is the former
Southwest conference. Several of the former members of this conference moved to the
Big 12, and the rest moved to other conferences.

We did not include a dummy variable for the Southwest conference for two reasons.
First, although the results would be interesting, we question whether the results would
be relevant to the situation that exists today with the ever increasing popularity and
presence of the six BCS conferences in football and basketball competition. Second,
the Southwest conference folded, while the other six conferences have flourished. We
believe this indicates how weak this conference really was when compared to the six
that we believe have special qualities in terms of their membership.
Thus, we include a conference dummy variable (ACC, Big10, Big12, Big East, Pac10, and SEC) to separate these football programs from all other programs. Because these conferences are home to only Division I programs, we did not include a separate variable to control for the difference between Division I programs and all other programs (e.g., Division I-AA and Division II).  

The third group includes two state-level measures that we believe impact the level of tuition and fees a school might charge. First, we believe that the level of tuition and fees charged is a function of per-capita income, which provides us with the best measure of a state’s citizens’ ability to pay college tuition and fees. We therefore hypothesize that higher per-capita income is likely to be associated with higher tuition and fees. Nonetheless, we are aware that higher per-capita income may also imply that state appropriations to universities may be greater, thus reducing the pressure to raise tuition. Second, we have included state-specific dummy variables to control for any state-specific effects that might have some impact on tuition and fees charged by universities within that state. This variable might reflect, for example, demographic changes that would obviously impact demand and, hence, tuition and fees.

Finally, it is important to discuss two features of our sample. First, it is not a balanced panel because some of the schools that reported data in 1986 (the first cross-sectional year) did not report data in subsequent years and there is no apparent pattern for when and which schools did not report tuition and fees data. Second, the tuition and fees data are reported on an academic year basis that spans part of two calendar years. So, for example, if the academic year is 1989-1990, we designated this data as 1989 and similarly for all other academic-year data. Third, we matched the data for FB Wins and BB Wins to the tuition and fees data in the following manner: for example, if the tuition and fees data is for academic year 1989-1990 (or what we designated as 1989 data), we matched these data with the 1988 football season data and the 1988-89 basketball season data. In essence, we use the data from the previous football and basketball seasons and matched it with the tuition and fees data in the current academic year. We matched any of the remaining data to the tuition and fees data in a similar manner.

Regression Results
Table 1 shows the summary statistics for the variables used in the empirical analysis. Table 2 presents the regression results for the model using both in-state and out-of-state tuition and fees per student as the dependent variables. We used three basic approaches to estimate econometric model shown above: fixed-effects estimation with robust standard errors; fixed effects, two-stage least squares estimation with robust standard errors; and seemingly unrelated estimation. The next section discusses the results for each estimation procedure.

Consider first the results for the two empirical models shown in columns (1) and (2). In column (1) we present the results for the fixed-effects estimation of a reduced form, in-state tuition regression model. Although, overall, the results are disappointing, we see that some of explanatory variables have their expected sign and are statistically significant at conventional levels. Indeed, because the PAC10 conference dummy variable is time invariant we are unable to estimate a parameter value for this variable. By contrast, the results shown in column (2) for the reduced form, out-of-state tuition model display the same pattern, except the football wins variable (FB...
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Table 1: Summary Statistics

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Maximum</th>
<th>Minimum</th>
</tr>
</thead>
<tbody>
<tr>
<td>In-State Tuition &amp; Fees per Student</td>
<td>$4,189.47</td>
<td>$1,816.32</td>
<td>$22,977.00</td>
<td>$799.00</td>
</tr>
<tr>
<td>Out-of-State Tuition &amp; Fees per Student</td>
<td>$11,584.56</td>
<td>$4,145.46</td>
<td>$32,680</td>
<td>$2,541</td>
</tr>
<tr>
<td>FB Wins</td>
<td>5.86</td>
<td>2.86</td>
<td>15</td>
<td>0</td>
</tr>
<tr>
<td>BB Wins</td>
<td>15.39</td>
<td>6.50</td>
<td>37</td>
<td>0</td>
</tr>
<tr>
<td>Bowl</td>
<td>0.05</td>
<td>0.27</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Final4</td>
<td>0.02</td>
<td>0.15</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>DIA</td>
<td>0.58</td>
<td>0.49</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Carnegie</td>
<td>0.65</td>
<td>0.48</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Income</td>
<td>$28,106.34</td>
<td>$4,713.09</td>
<td>$48,127</td>
<td>$16,563</td>
</tr>
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<td>ACC</td>
<td>0.05</td>
<td>0.22</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Big10</td>
<td>0.06</td>
<td>0.23</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Big12</td>
<td>0.06</td>
<td>0.23</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>BigEast</td>
<td>0.03</td>
<td>0.17</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Pac10</td>
<td>0.05</td>
<td>0.23</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>SEC</td>
<td>0.06</td>
<td>0.24</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

Notes: We have converted In-State Tuition & Fees per Student, Out-of-State Tuition & Fees per Student, and Per Capita Income to constant 2007 dollars using the Higher Education Price Index published by the Commonfund Institute.

Wins) has a positive sign and is statistically significant. The parameter estimate indicates that each additional football win raises tuition and fees per student by approximately $31 in current dollars. In addition, we see that four of the five conference variables in column (2) and two of five in column (1) have positive signs and are statistically significant at conventional levels. The positive impact on both in-state and out-of-state tuition and fees is consistent with a recent student survey published in the March 5, 2007, issue of Sports Illustrated in which 36% of the students surveyed responded that the college’s athletic reputation was a significant factor in their decision to go to that particular college.8

As an alternative to the reduced-form tuition models, we estimated a simple structural model (i.e., the inverse demand curve) with in-state tuition as the dependent variable and total student enrollment (Enroll) as one of the explanatory variables. We are unable to estimate this model for in-state and out-of-state tuition because we did not have the enrollment data broken down in terms of in-state and out-of-state students for our sample universities over the 23-year time period. Nonetheless, we believe that this regression model provides some insight to the extent that the universities in our sample draw largely from in-state student populations. Because Enroll is endogenous, we used the Carnegie Classification variable (Carnegie) and the university’s athletic program’s divisional status along with the other explanatory variables included in
Table 2: Tuition & Fees Regression Results

<table>
<thead>
<tr>
<th>Variables</th>
<th>2SLS In-State (1)</th>
<th>SUR Out-of-State (2)</th>
<th>In-State (3)</th>
<th>Out-of-State (4)</th>
<th>In-State (5)</th>
<th>Out-of-State (6)</th>
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<tbody>
<tr>
<td>ACC</td>
<td>-591.797**</td>
<td>695.146***</td>
<td>-238.132</td>
<td></td>
<td>306.668***</td>
<td>2249.872***</td>
</tr>
<tr>
<td></td>
<td>(-2.84)</td>
<td>(4.55)</td>
<td>(-1.75)</td>
<td></td>
<td>(3.47)</td>
<td>(11.17)</td>
</tr>
<tr>
<td>Big10</td>
<td>931.455***</td>
<td>682.665***</td>
<td>1100.119***</td>
<td></td>
<td>644.679***</td>
<td>4067.209***</td>
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<tr>
<td></td>
<td>(15.79)</td>
<td>(5.79)</td>
<td>(3.99)</td>
<td></td>
<td>(7.79)</td>
<td>(21.54)</td>
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<tr>
<td>Big12</td>
<td>1243.920***</td>
<td>1030.932*</td>
<td>1313.526***</td>
<td></td>
<td>705.027***</td>
<td>2956.699***</td>
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<tr>
<td></td>
<td>(6.70)</td>
<td>(2.40)</td>
<td>(10.24)</td>
<td></td>
<td>(6.98)</td>
<td>(12.84)</td>
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<tr>
<td>BigEast</td>
<td>117.286</td>
<td>310.380</td>
<td>115.201</td>
<td></td>
<td>174.126</td>
<td>601.066*</td>
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<tr>
<td></td>
<td>(0.46)</td>
<td>(0.93)</td>
<td>(1.08)</td>
<td></td>
<td>(1.42)</td>
<td>(2.14)</td>
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<tr>
<td>PAC10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1067.878***</td>
<td>2347.832***</td>
</tr>
<tr>
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<td></td>
<td></td>
<td>(10.73)</td>
<td>(10.34)</td>
</tr>
<tr>
<td>SEC</td>
<td>148.318</td>
<td>347.367*</td>
<td>109.604</td>
<td></td>
<td>88.477</td>
<td>833.402***</td>
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<td></td>
<td>(0.74)</td>
<td>(2.34)</td>
<td>(0.91)</td>
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<td>(1.25)</td>
<td>(5.15)</td>
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<td>RD</td>
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<td>522.387***</td>
<td>1567.016***</td>
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<tr>
<td></td>
<td>(-0.68)</td>
<td>(-0.21)</td>
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<td></td>
<td>(12.61)</td>
<td>(16.58)</td>
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<tr>
<td>FBWins</td>
<td>19.629</td>
<td>31.142*</td>
<td>19.543**</td>
<td></td>
<td>28.501***</td>
<td>54.001***</td>
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<tr>
<td></td>
<td>(1.96)</td>
<td>(2.16)</td>
<td>(3.19)</td>
<td></td>
<td>(5.20)</td>
<td>(4.32)</td>
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Table 2: Tuition & Fees Regression Results, continued

<table>
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<tr>
<th>Fixed Effects</th>
<th>2SLS In-State (1)</th>
<th>2SLS Out-of-State (2)</th>
<th>SUR In-State (3)</th>
<th>SUR Out-of-State (4)</th>
<th>In-State (5)</th>
<th>Out-of-State (6)</th>
</tr>
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<td>Variables</td>
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<td></td>
<td></td>
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<td></td>
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<td>BBWins</td>
<td>-0.270</td>
<td>4.432</td>
<td>-0.628</td>
<td></td>
<td>6.677**</td>
<td>15.859**</td>
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<tr>
<td></td>
<td>(-0.08)</td>
<td>(0.56)</td>
<td>(-0.33)</td>
<td></td>
<td>(2.67)</td>
<td>(2.78)</td>
</tr>
<tr>
<td>Bowl</td>
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<td>-113.857</td>
<td>-7.797</td>
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<td>-164.965*</td>
<td>-171.740</td>
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<td></td>
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<td>(-2.07)</td>
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<td>Final4</td>
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<td>100.860</td>
<td>54.113</td>
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<td>176.336</td>
<td>358.574</td>
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<td></td>
<td>(0.97)</td>
<td>(0.64)</td>
<td>(0.87)</td>
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<td>(1.79)</td>
<td>(1.60)</td>
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* p < 0.05, ** p < 0.01, *** p < 0.001

Notes: We have converted In-State Tuition & Fees per Student, Out-of-State Tuition & Fees per Student, and Per Capita Income to constant 2007 dollars using the Higher Education Price Index published by the Commonfund Institute.
the demand function as instrumental variables in the first-stage estimation. The results are shown in column (3) of Table 2. First, the parameter estimate for student enrollment (Enroll) is negative and statistically significant, which confirms the Law of Demand. The price elasticity, when evaluated at the means, is a plausible 2.43. Second, the football wins variable has a positive sign and is significant at the 1% level. In this case, however, the estimate suggests that each additional win increases tuition per student by approximately $19.54, which is similar to the magnitude shown in column (1), although the magnitude reported in column (1) is marginally insignificant. More importantly, if we consider the results for FB Wins reported in columns (2) and (3) together, we can conclude that athletic success, at least on the gridiron, has some impact on tuition rates for both in-state and out-of-state students.

The final approach that we consider is to estimate the reduced form, in-state and out-of-state tuition models using Stata’s Seemingly Unrelated Regression estimation procedure for panel data. The idea here is that common shocks to the unobserved university-specific effects will impact both price equations. The results for this approach are shown in columns (5) and (6). Overall, the results for both models confirm our hypotheses, as many of the parameter estimates have the expected sign and are significant at conventional levels. Consider first the two variables that we use to measure athletic success (FB Wins and BB Wins). We see that an additional football win has a positive impact on in-state and out-of-state tuition rates and that the impact is almost twice as great on out-of-state rates as it is on in-state rates. Moreover, we now see that an additional basketball win has some impact on both tuition rates, which is not very surprising because many schools in our sample also have successful and popular basketball programs. The impact of basketball wins is also greater on out-of-state tuition rates than on in-state tuition rates. These results suggest that the apparent increase in demand arising from a school’s athletic success has induced many schools to respond by raising tuition rates more for out-of-state students. This response seems plausible because raising tuition rates for in-state students is likely to be met with opposition from in-state parents and legislators who decide the appropriations for the universities.

The parameter estimates for all the conference affiliation dummy variables, except the Big East and SEC variables, are all positive and significant at conventional levels. The important question is: What is conference affiliation measuring? We believe the conference affiliation variables (at least the ones that are significant) reflect the impact that athletic programs have on tuition and fees that do not necessarily reflect the academic quality of the institution. Further, we believe that conference affiliation will likely generate higher benefits as well as higher costs for the schools and their athletic teams that will then lead the schools to charge higher tuition and fees. For instance, the potential benefits might include more competitive football and basketball games, greater television coverage, and a greater chance to participate in a bowl game or the NCAA basketball tournament. At the same time, the greater costs might include the pressure to spend more to maintain a competitive athletic program and the costs associated with maintaining a full complement of other men’s and women’s teams in sports other than football and basketball.

If the conference variables were picking up both athletic and academic quality, we would expect to see an insignificant effect for the Carnegie variable, which reflects only academic quality. In fact, the Carnegie measure is highly significant, and the coefficient
in the out-of-state tuition model is three times the size of the coefficient in the in-state tuition model. Although we believe that this effect largely arises because research-intensive institutions offer more costly undergraduate and graduate programs, the effect could also arise from the demand side as students seek admission in these high-quality universities and, hence, are willing to pay a tuition premium for that privilege. In either case, the positive and significant coefficient suggests that the type of university matters in terms of tuition and fees charged.

How much does conference affiliation matter in terms of tuition and fees charged? If we only consider the results reported in columns (5) and (6), we see that ACC schools, for example, are able to charge a modest $307 premium, as compared to schools that are not members of this conference, but that PAC10 schools are able to charge a premium of $1,067. The same basic pattern holds for the out-of-state regression results, except the SEC variable is now significant. Big10 schools, for example, are able to charge their out-of-state students a hefty $4,067 premium, which is not surprising because several of the conference schools (e.g., Michigan, Penn State, Wisconsin, and Indiana) draw students from across the country.

Finally, two of the variables have unexpected signs and merit some discussion. First, the bowl appearance measure (Bowl) has a statistically significant and negative impact on tuition, whereas the Final 4 measure (Final4) has a positive effect but is insignificant. The fact that many of these schools generally appear in bowl games, participate in the NCAA tournament, and belong to conferences with revenue sharing may make it difficult to sort the potential independent effects from these events.

Second, the income measure is insignificant at conventional levels, which is surprising because the view held by many is that education is a normal good. By contrast, the coefficient is negative and statistically significant for the models shown in columns (1) and (3). One possible explanation is that citizens in those high-income states are opting for private education, which would reduce the demand facing the schools in our sample. We have no way of testing this hypothesis because our sample only includes public institutions. The primary reason that we omitted the income measure in the out-of-state regression model is because demand by out-of-state students is probably spread across the other 49 states and, thus, makes it impossible to construct a single income variable to reflect this fact.

Summary and Conclusions
This paper has attempted to determine whether athletic success, as measured by annual win-loss records, influences the tuition rates that universities charge both in-state and out-of-state students. Our analysis largely confirms that success in both football and basketball has positive impacts on tuition rates. Our analysis confirms the findings of Mixon and Ressler that out-of-state tuition rates are impacted to a greater extent than are in-state tuition rates, but we also find some positive impact on in-state rates. However, these general findings must be tempered by the recognition that the tuition enhancing effects of athletic success are not equally distributed. Our findings indicate that the primary beneficiaries of athletic success are largely confined to those Division I schools that are members of the so-called “power conferences.” This finding should make university officials, who might otherwise be inclined to invest in the university’s athletic programs in hopes of being able to raise tuition, proceed more cautiously, as it
appears that winning is not enough. Perhaps this also helps to explain the considerable amount of conference realignment we have seen in collegiate sports in the past decade as schools have sought to join conferences that they perceive as being more prestigious.

References
The Impact of Athletic Performance on Tuition Rates


Endnotes
1 See http://nces.ed.gov/ipeds/AboutIPEDS.asp#top for a detailed description of this data source.
2 See http://cfbdatawarehouse.com for more details.
4 See http://www.masseyratings.com for more details.
5 The Rose, Orange, Sugar, and Fiesta Bowls are used throughout the entire sample period. The Cotton Bowl is included up until 1994 following the departure of Texas, Texas A&M, Texas Tech, and Baylor from the Southwest Conference for the Big 12 in 1993.
6 The Carnegie Foundation, in addressing why they had made changes to the classification scheme, argues that, “Another motivation for the changes has to do with the persistent confusion of classification and ranking. For years, both the Carnegie Foundation and others in the higher education community have been concerned about the extent to which it is interpreted as an assessment of quality, thus establishing aspirational targets. This phenomenon has been most pronounced among doctoral-granting institutions, where it is not uncommon to find explicit strategic ambitions to ‘move up’ the perceived hierarchy. By introducing a new set of classifications we hope … to deemphasize the improper use of the classifications as an informal quality measure.” (www.carnegiefoundation.org/classification/).
7 Our sample is composed of 97 Division I-A schools, 61 Division I-AA schools, and 24 Division II schools.
8 See “The Program,” p. 56 for more details. The survey question was: “Was your college’s athletic reputation a factor in your decision to go there?” Thirty-six percent of the students responded that it was a significant factor, and this was the number one response.
9 We thank an anonymous referee for suggesting this approach to us.
10 See, for example Economics, 2nd Edition, p. 114 by Timothy Tregarthen and Abby Rittenberg for a survey of economists’ findings on the income elasticity of demand for education.

Acknowledgments
We would like to thank Debasri Mukherjee and two anonymous referees for their excellent advice and suggestions. We alone are responsible for any errors.
Alexander, Kern

Data Appendix

1. **Tuition & Fees**: tuition and fees (including student activity fees) collected from students for educational purposes and do not include any charges for room and board. In addition, these data are reported for both in-state and out-of-state students and on an academic year basis. Source: U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data (http://nces.ed.gov/ipeds/).

2. **FB Wins**: the number of wins per season. These data include any bowl game appearances, conference championships, or playoff games. Sources: College Football Data Warehouse (http://cfbdatawarehouse.com) and the ESPN College Football Encyclopedia: The Complete History of the Game (2005). We also contacted several athletic directors to obtain missing data.

3. **BB Wins**: the number of wins per season. These data include any post-season tournament play. Source: Massey Ratings: College Basketball (http://www.masseyratings.com). We also contacted several athletic directors to confirm any unusual win-loss records or to obtain missing data.

4. **D1A**: a dummy variable equal to 1 if the football program is in Division IA and 0 otherwise. Sources: College Football Data Warehouse (http://cfbdatawarehouse.com) and the ESPN College Football Encyclopedia: The Complete History of the Game (2005). We also contacted several athletic directors to confirm any divisional change or status.

5. **Conference Affiliation (ACC, Big10, Big12, BigEast, CUSA, Pac10, and SEC)**: a dummy variable equal to 1 if the university was a member of a particular conference and 0 otherwise. Sources: College Football Data Warehouse (http://cfbdatawarehouse.com) and the ESPN College Football Encyclopedia: The Complete History of the Game (2005).

