THE PRICE OF THE FRONT PORCH: EXPLORING THE RELATIONSHIP BETWEEN
STUDENT FEES AND INTERCOLLEGIATE ATHLETIC TEAM PERFORMANCE

by

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Abstract

College sports are a multi-billion dollar per year industry that influence the financial decisions made by colleges and universities throughout the United States. One such decision is the implementation of fees charged to members of the student body that are allocated to athletics. These fees are introduced by university administrators under the impression that increased spending on athletics will lead to more successful sports programs, garnering prestige for and interest in the university from prospective students and the public. Informed by foundational theories of higher education and current literature examining college athletics, the following study uses regression analysis to investigate the relationship between these student fees and winning percentages for football and men's basketball teams at a sample of National Collegiate Athletics Association Division I institutions. Results indicate little to no relationship between student fees investment and sports performance, although other variables associated with winning reach significance. Discussion of the results as well as implications for university administrators and further research into the topic are provided.

Introduction

During the past two decades, intercollegiate athletics (ICA) has experienced massive growth as both an industry and as a sociocultural presence in American life, with the 2017 National Collegiate Athletic Association (NCAA)¹ Division I Men's Basketball Tournament generating \$1.1 billion in television revenue (Gaines & Yukari, 2017). This growth has been fueled in part by significant increases in capital investment and non-price competition such as facilities improvements and coaches' salaries, especially for football and men's basketball, which are considered the primary revenue sports in ICA (Hoffer, Humphreys, Lacombe, &

¹ The NCAA is the largest and most prominent governing organization for intercollegiate athletics in the United States.

Rusecki, 2015). Colleges and universities participating in National Collegiate Athletic Association (NCAA) Division-I competition frequently maintain departmental operating budgets for athletics in the tens of millions of dollars (USA Today, 2016). Because college sports teams (particularly football and men's basketball) often appear on national television broadcasts and are well merchandised and advertised, they are often the public's first impression of the institution that they represent. Central administrators and enrollment managers are therefore generally receptive to these high levels of institutional spending on ICA because winning sports teams are perceived to have a positive influence on the institution's reputation among key constituent groups- namely prospective students and potential donors (Bass, Schaeperkoetter, & Bunds, 2015).

Although university administrators such as presidents and enrollment managers often value the positive influence that athletics have on institutional reputation, athletic department professionals may pay little or no attention to these administrator's status and enrollment goals for athletics, as they may be primarily focused on revenue generation and sports program success (Putler & Wolfe, 1999). Between 2005-2015, Division I athletic departments increased spending per student athlete by 83% and football spending per football student athlete by 101% (Knight Commission, 2017). These massive increases in spending and the competitive search for new revenue streams such as private giving, television contracts, and mandatory student fees in ICA have caused athletic departments' foci to drift away from the educational enrichment and success of their student athletes (Knight Commission, 2010; Bass, Schaeperkoetter, & Bunds, 2015). This change in athletic department priorities from student athletes' development and well-being to winning and revenue generation comes at a cost to the institution. Universities often fund their sports programs with monies allocated from the general institutional budget, but see no financial

returns from athletics back to the institution (Wolverton, Hallman, Shifflett, & Kambhampati, 2015).

Due to declining state appropriations, students are becoming ever more responsible for supplying institutional revenues in higher education. To this end, a large percentage of ICA cost burdens are often shouldered by tuition revenues and student fees (Wolverton, Hallman, Shifflett, & Kambhampati, 2015; Knight Commission, 2010). This trend makes market competition in college sports problematic. When successful athletics departments, often representing wealthy flagship research universities, increase revenues and subsequently their investments in athletics, smaller programs such as those at regional comprehensive schools struggle to maintain similar levels of spending through institutional subsidies (Cheslock & Knight, 2015). In addition, because this competition is occurring at colleges and universities of all sizes and institutional missions, the problem becomes compounded for these regional comprehensive schools competing alongside flagship universities in Division I that do not or potentially cannot generate the same level of external athletics revenue as their larger and wealthier counterparts. Indeed, revenues received by Division I departments during fiscal year 2015-2016 range from a high of \$194 million at Texas A&M, a flagship university system campus, to a low of about \$2.5 million at small state comprehensive Alabama A&M (USA Today, 2016). This means that in many cases, greater numbers of lower-socioeconomic status (SES) students spend more than wealthy students to fund university sports teams (Wolverton, Hallman, Shifflett, & Kambhampati, 2015).

As student costs in higher education rise dramatically, athletics departments should be held to greater standards of financial accountability. Fees allocated to athletics during the 2013-2014 fiscal year range from a low of \$638 thousand to a high of \$33.6 million, in some cases

comprising a third or more of athletic department revenues (Chronicle of Higher Education & Huffington Post, 2015; Knight Commission, 2017). These figures suggest that athletics fees have significant financial ramifications for both student bodies and administrators, but their effectiveness as a source of ICA spending in improving the athletic department's success is unclear. Determining the presence of a relationship or lack of a relationship between student fees and athletic team performance has the potential to bring about increased transparency from athletic departments and may provide scholars and practitioners alike with new insights to help affect systemic changes that will prevent further cost burdens to student bodies and align athletic goals with academic and institutional goals in higher education. The proposed study will therefore examine the relationship between student fees allocated to athletics and the success of a college or university's athletics teams.

Purpose Statement

The purpose of the present study is to test the relationship between student athletics fees and athletic team performance with a focus on the traditionally revenue-generating sports of football and men's basketball using data assembled from national institutional datasets and reports, controlling for other institutional subsidies and measures of performance. The unit of analysis will be public football-fielding colleges and universities competing in Division I of the National Collegiate Athletics Association. Student athletics fees will be defined as mandatory fees associated with the cost of attendance allocated directly to an institution's athletics department. Team performance will be defined as winning percentage in a given time period. The study will include controls for non-student fee athletics expenditures, prior win percentage, postseason football bowl game or NCAA basketball tournament appearances, schedule favorability, and other relevant institutional characteristics.

Literature Review

This review of relevant literature will discuss current scholarship and research into the financing and institutional benefits of college sports. First, the rapid increase in athletic expenditures over the past three decades by NCAA Division I institutions and its consequences will be addressed, including subsidization of athletics by universities. Of particular relevance to this study is addressing the implementation of student fees as a subsidized source of revenue. Subsequent discussion of finance will focus on models of financial behavior by athletic departments that influence the current ICA organizational system and the relative lack of economic return on investment that most institutions receive from ICA. Athletic program success, however, may or may not be influenced by level of investment.

Next, the review will transition into a discussion of the institutional benefits that athletics have been both empirically demonstrated and perceived to provide. Among these are status and prestige influence, recruitment benefits, and increases in private giving to the university. For these reasons, winning sports teams and their associated insignia are said to contribute to university outreach and branding efforts to a multitude of constituent groups, attracting more academically prepared students and higher levels of giving to the institution.

Economics and Finances of Intercollegiate Athletics

College sports are undergoing significant changes in financial structuring. In 2010, the Knight Commission on Intercollegiate Athletics published “Restoring the Balance: Dollars, Values, and the Future of College Sports.” The report details significant upward trends related to institutional spending on and the subsidization of college sports. Universities in the top decile of NCAA Division I competition reported average athletics expenditures of \$96.7 million and were on track to spend \$254 million by the year 2020 (Knight Commission, 2010). The report

concludes that current spending trends are unsustainable and do not maintain a competitive balance between institutions (Knight Commission, 2010).

ICA Spending, Subsidization, and Student Fees. The claims made in the 2010 Knight Commission report have since been substantiated by numerous authors such as Cheslock & Knight (2015), who developed a three-part conceptual model of ICA finances: (1) a small number of “elite” sporting institutions are increasingly generating higher revenues, widening the gap in revenue streams between institutions. (2), as revenues increase for these elite universities, so do elite their athletics expenditures, leading non-elite universities to increase their expenditures, and (3) as non-elite institutions’ athletics expenditures rise without a similar increase in external revenues, they increasingly turn to institutional subsidies to fund their sports programs. In fact, more than two-thirds of Division I Football Bowl Subdivision² (FBS) universities would not break even without institutional subsidies, which often include student fees allocated to athletics (Matheson, O’Connor, & Herberger, 2012). These student fees have a higher estimated impact to students at non-elite universities because most non-elite universities are smaller and athletic fee costs per student rises as number of students enrolled at an institution falls (Lipford & Slice, 2016).

Further illustrating the financial imbalance between NCAA Division I schools, athletic department expenditures have been determined to fit a strategic “arms race” model wherein higher levels of spending generate prestige and influence the financial decision makers of rival athletic departments, especially those in the same athletic conference (Hoffer, Humphreys, Lacombe, & Ruseski, 2015). Athletic departments’ behaviors have also been demonstrated to fit the revenue theory of costs (Bowen, 1980) by setting all expenditures equal to revenue and

² The Football Bowl Subdivision is one of two football-specific subdivisions within Division I and is considered the zenith of football competition in ICA.

spending all revenues generated (Hoffer, Humphreys, Lacombe, and Ruseski, 2015). These models often govern financial behavior in major college sports and have led to steep economic competition that comes at cost to both institutions and the students they serve, especially at non-elite programs such as those competing in the Football Championship Subdivision³ (FCS) of Division I. Expenditures are set to match all revenues generated, not just external revenues, which means that spending matches both revenue generated by and subsidies allocated to the ICA program. Athletics departments are therefore using student fees for operational and capital expenses, funding what would otherwise be paid for using gate receipts, television contracts, or other sources of external revenue.

Returns on ICA Investment. Despite the recent high increase in college sports spending, a significant body of scholarship detailing returns on this investment indicates that colleges and universities do not always “get what they pay for.” Although the public perception and indeed the perception of institutional decision makers continues to be that athletics are a money-making machine for universities (Bass, Schaeperkoetter, and Bunds, 2015), this perception has been shown to be flawed at best. As Matheson, O’Connor, & Herberger (2012) and Goff (2004) demonstrated, a large majority of Division I athletics departments operate in the red and only see a “profit” when they receive support from the general budget of their institution. In fact, Matheson, O’Connor, & Herberger (2012) continue on to suggest that even “the so-called revenue sports of football and men’s basketball” almost always operate at a deficit (p. 44). This would suggest that significant financial returns on athletics investment are rarely present, except for circa the top twenty earners in Division I.

³ The Football Championship Subdivision is one of two football-specific subdivisions within Division I. Its champion is recognized as the official NCAA football champion, but it is generally considered the less competitive DI subdivision.

Given the lack of guaranteed profitability, athletic departments may be inclined to set expenditures at higher levels if such spending led to increased team performance. However, in one of the first studies conducted on the subject, Litan, Orszag, & Orszag (2003) found no statistical significance between spending and football team winning percentage. Orszag & Israel (2009) later expanded the notion of “on-field” success to include more than simple winning percentage, but found only a small statistical significance between spending and football success, and no significance between spending and men’s basketball success. It has been shown, however, that spending on athletics strongly correlates with “on-field” success and winning among all sports sponsored by an institution, but this correlation only exists for FBS schools, not for the less-competitive FCS schools (Jones, 2013).

These mixed-to-negative results remain consistent when considering some of the largest budget allocations in Division I athletics: coaches’ salaries and capital projects. The salaries of football and men’s basketball head coaches at elite universities often increase 7.5 times as much as spending on student-athletes when revenues are received by the athletic department (Hoffer & Pincin, 2015). Teams with the highest paid coaches, however, are not guaranteed to maintain consistent appearances in top-25 team rankings (Tsitsos & Nixon, 2012). In some cases, however, higher pay for new coaches is positively correlated with winning (Colbert & Eckard, 2015).

Capital projects, such as the construction of new stadiums, are also a significant means of non-price competition (Hoffer, Humphreys, Lacombe, and Ruseski, 2015) among athletics departments. Although these departments and institutional administrators may view new or improved stadiums as sources of revenue generation, they are very rarely sound financial decisions, as stadiums may cost upwards of \$400 million, incur decades of debt service, and be

unlikely to draw in as much revenue to the institution as needed to cover their development costs (Maxcy & Larson, 2015). In summary, the capital and athletic returns on investment in college athletics are often negative, and athletic department and institutional motivations for such investment are often misguided. Colleges and universities are therefore not advised to cite the pursuit of profits as a legitimate reason for heavy investment in ICA.

Institutional Benefits of Intercollegiate Athletics

If financial and athletic successes are not guaranteed by increasing investment in college sports programs, other motivating factors must be behind the spike in spending. A wide body of scholarship details the institutional benefits to be gleaned from successful sports programs. These benefits include both tangible and intangible enhancements to university operation and notoriety, and are cited by both institutional administrators and athletic department personnel as priorities when negotiating fund allocation to athletics (Bass, Schaeperkoetter, & Bunds, 2015). Primarily, successful sports teams may have implications for status hierarchy and stakeholder management.

ICA as Status & Brand Development. Prominently featured in scholarship addressing the institutional benefits of athletics is the “front porch effect,” the notion that due to the popularity and media coverage of ICA in the United States, a university’s athletic teams are often the first opportunity the university has to make an impression on the public, prospective students, and potential donors (Bass, Schaeperkoetter, & Bunds, 2015). The front porch effect has been cited by athletic directors and university presidents alike as a strategic appeal to justify the implementation of significant investments or capital campaigns related to athletics (Bass, Schaeperkoetter, & Bunds, 2015; Chronicle of Higher Education, 2015). Goff (2004) found that during a period of football success in the 1990s, 70% of the newspaper coverage received by

Northwestern University featured its athletic teams, indicating that the front porch effect's validity is not merely anecdotal. Indeed, the front porch effect is a means by which administrators can extend the reputation and prestige of their institutions. As Goff's (2004) report highlights, the effect is strengthened when a university's sports teams- especially the high-visibility sports of football and men's basketball- enjoy high winning percentages, postseason appearances, and increased television exposure.

Lifschitz, Sauder, & Stevens (2014) determined the presence of a link between college football conference affiliation and organizational status. Their study provided insight into the motivating factors behind increasing football expenditures- "if a school's overall reputation is implicated in who it meets on the football field, then supporting intercollegiate play can have important status benefits beyond any direct financial rewards" (Lifschitz, Sauder, & Stevens, 2014, p. 216). The strengthening of an institution's brand through athletics influences powerful constituent groups such as peer institutions and wealthy alumni and has the potential to draw in greater academic recognition, attracting groups such as prospective students to the university. This prestige system extends to formalized structure and measures of organizational status, as football success has been determined to increase an institution's peer assessment score in the *U.S. News & World Report* national university rankings (Mulholland, Tomic, & Sholander, 2014). Further suggesting athletics as an engine of university brand development, university alumni and prospective students are likely to view FBS football membership as prestigious and hold favorable views of moving up to the FBS from lower competitive ranks (Roy, Harmon, & Graeff, 2004; Jones, 2014).

ICA as Stakeholder Management. University administrators often choose to allocate significant institutional resources to athletics based on the perception that winning sports teams

have a positive effect on student recruitment efforts. Toma & Cross (1998) found that the number of applications for undergraduate admission, both in absolute terms and relative to peer institutions, notably increased following a national championship season in football or men's basketball. Similarly, football and men's basketball success throughout the course of a season can increase both the volume and average SAT score of undergraduate applications for admission (Pope & Pope, 2009; Mixon, Treviño, & Minto, 2004). These phenomena are commonly referred to as the "Flutie Factor," a reference to the sharp increase in applications to Boston College in the 1980s attributed to the gridiron heroics of BC quarterback Doug Flutie (Mulholland, Tomic, & Sholander, 2014).

This effect is not limited only to prospective students, as national championship football seasons also influence the general public's opinion of a university's academic quality and perception of its prestige when compared to peer institutions (Goidel & Hamilton, 2006). Athletics successes have also been demonstrated to have a positive influence on potential donors both to athletics and to the institution at large (Walker, 2015). The non-financial benefits to the institution from winning in ICA provide insight into the motivations of administrators and athletic department officials in securing high levels of funding for sports programs. Subsidization of these sports programs can be viewed as an investment in the institution's reputation and the robustness of its enrollment and development initiatives. Indeed, athletic directors often justify the implementation of student fees or the creation of capital campaigns by inducing the front porch effect.

Summary and Gap in the Literature

A great deal of scholarship exists discussing the escalating "arms race" (Tsitsos & Nixon, 2012) in college athletics. One of the principal consequences of this unending arms race is the

establishment of institutional subsidies to athletics that combat poor revenue generation prospects, including student fees allocated to athletic departments. Student fees and subsidization in general are especially prevalent at less competitive ICA programs and affect students at these universities to a greater extent due to cost spreading (Lipford & Slice, 2017). With expenditures by athletic departments matching or exceeding revenues received, the likelihood of true profitability is slim, which indicates that institutional investments in athletics are more likely motivated by potentially-unattainable non-financial benefits to athletics such as increased applications and reputation. These benefits are reaped most consistently by institutions fielding winning sports teams.

Since athletic success does provide measureable benefits to the institution, investments in athletics are made with building this success in mind. However, correlations between spending and winning are not consistent between different investment avenues or between different universities. Despite such findings, current scholarship has yet to address fees as an investment avenue. Thus, there is a need to determine the effectiveness of student fees as a source of athletics revenue for bettering sports performance. This is especially true for non-elite institutions competing outside of the major athletics conferences, where student fees may be higher and may affect a greater number of low-income students. If athletics fees have little influence on team performance, it may be difficult for administrators and athletic department leadership to justify their implementation and maintenance on college campuses.

Theoretical Framework

This discussion of relevant theories to the present study will provide overviews of three important conceptualizations of organizational behavior used to explain institutional decision making in higher education: neo-institutionalism, academic capitalism, and the aspirational

venture theory of costs. Neo-institutionalism highlights the importance of status hierarchies and organizational modeling as influences in shaping the behaviors of institutions. This is important for the study at hand due to the demonstrated influence of college athletics on status in higher education (Lifschitz, Sauder, & Stevens, 2014). Academic capitalism posits that higher education institutions are adapting to the rise of neoliberal state policy by engaging in market behaviors, commodifying the college experience, and monetizing students to become more attractive to prospective investors, whether that be prospective students, alumni donors, and banks that underwrite institutional debt (Slaughter & Rhoades, 2004). Academic capitalism is relevant in studying college sports finance because universities heavily fund athletics programs as a method of marketing their institutions to the public (Bass, Schaeperkoetter, & Bunds, 2015). Most important to the present study is the aspirational venture theory of costs (Rhoades, 2009), which integrates elements of neo-institutionalism and academic capitalism and concludes that colleges and universities set expenditures higher than current revenues generated in an attempt to secure future revenues and hierarchical increases. The aspirational venture theory is the specific lens through which student fees and athletics expenditures more broadly will be viewed throughout the study.

Neo-Institutionalism

Neo-institutionalists argue that organizations make decisions based on a drive to achieve external legitimacy in their fields. The formal organizational structures of these fields may result from the rise of normative institutional rules, which organizations then incorporate into their structures and policies to enhance their position in their fields (Meyer & Rowan, 1977). These rules often lead to increased organizational convergence, as rules that are legitimized by the field have increased survival prospects in society (Meyer & Rowan, 1977). As demonstrated by the

current system of ICA in the United States, universities have a propensity to spend heavily on athletics due to the presence of the previously described “front porch effect.” The term and its mythos were originally induced by athletic directors and university presidents as justification for a set of organizational decisions prioritizing athletics as a recipient of institutional funds. As this prioritization became normalized, the institutional practices benefitting athletics were solidified throughout the higher education system, becoming the standard operating procedure for colleges and universities throughout the system’s status hierarchy.

DiMaggio & Powell (1983) conceptualize the ways in which the prestige-driven system of neo-institutional theory affects institutions of lower status by outlining three mechanisms of convergent organizational behavior, also known as institutional isomorphism. The first, coercive isomorphism, results from external pressure on the organization to conform to standards of behavior established by other high-status organizations within this field. This pressure most often stems from the state or other institutions with regulatory power over the organization, such as in the present case the NCAA (DiMaggio & Powell, 1983). In the case of ICA, sports success can be seen as external pressure because the institutional benefits enjoyed by schools with winning teams creates rivalrous interaction between schools targeting these benefits for themselves. Second, mimetic isomorphism occurs when technology that leads to desirable ends is unclear, and organizations follow the leading models in the field (DiMaggio & Powell, 1983). To this end, the funding structures and spending levels of prestigious athletic departments that enjoy consistent high-level performance may be adopted by institutions seeking to increase their own status in the system of ICA. Finally, normative isomorphism is created when the organizational field become professionalized, creating norms of behavior (DiMaggio & Powell, 1983). Athletic

directors and other-high level administrators may move between institutions, bringing financial knowledge and priorities with them.

Neo-institutional theory is often applied to the status hierarchy of colleges and universities by centering the public perception of institutions as a legitimizing effect. Riesman & Gorey (1958) discussed isomorphic tendencies in higher education as a “snake-like procession,” in which the head was comprised of elite institutions and the body and tail of lesser institutions. As the “head” moves, exhibiting successful organizational behavior, the body and tail attempt to “catch up,” only to discover that once they are able to do so, the head has already moved on again (Riesman & Gorey, 1958). Scholarship has identified college sports as a powerful status symbol affecting not only athletic departments, but also the institution as a whole (Lifschitz, Sauder, & Stevens, 2014; Mulholland, Tomic, & Sholander, 2014). The implementation of student fees can be viewed through this lens- less successful athletic departments attempt to “catch up” to the spending levels of prestigious programs.

Academic Capitalism

Academic capitalism is the set of enterprising organizational behaviors in which colleges and universities engage for the purpose of generating revenue (Slaughter & Leslie, 1997; Slaughter & Rhoades, 2004). As neoliberal public policies and practices become the sociopolitical standard in the United States, institutions of higher education move to the market to generate revenues in the face of declining state appropriations (Slaughter & Leslie, 1997; Slaughter & Rhoades, 2004). Academic capitalism has thus resulted in the commodification of the knowledge production enterprise. Consequences of this commodification have included more aggressive fundraising and expanded auxiliary enterprises (Rhoades, 2009). Athletic departments are among these auxiliaries. Increased funding to athletics is therefore partially responsible for

the increase in per-student costs associated with higher education, as market behaviors lead to increases in tuition and fees (Slaughter & Rhoades, 2004).

Rhoades (2007) notes that increases in revenue generated from tuition and fees are related to organizational decisions that seek to capitalize on previously unexplored student markets. Universities may engage in a variety of capitalistic behaviors to expand their reach and are therefore seeking to use auxiliaries such as athletics as points of entry into these markets and college athletics can be seen as a key part of the college experience being marketed to prospective students. Regional universities with relatively little market exposure may therefore increase their visibility out of state and in wealthier, more urbanized areas via their athletic programs, using the unifying ethos of sport to attract higher socioeconomic status (SES) student populations who pay more in tuition. As ICA becomes an increasingly powerful marketing tool for institutions, student athletics fees provide these institutions with a means to fund their marketing efforts.

Aspirational Venture Theory of Costs

Rhoades (2009) developed the aspirational venture theory of costs to modernize notions of institutional spending behavior first described by Bowen (1980) in the revenue theory of costs. The revenue theory of costs postulates that institutions simply set revenues equal to their expenditures, spending all revenues earned (Bowen, 1980). The aspirational venture theory of costs, however, integrates the status-seeking behavior posited by neo-institutionalism with the market-driven financial behavior outlined by academic capitalism to determine that in the pursuit of prestige, colleges and universities also spend revenues they have neither yet generated nor received (Rhoades, 2009). Institutional ambition leads to high levels of investment in ventures

that are in many cases unlikely to lead to a measurable, significant increase in status or capital wealth (Rhoades, 2009).

The promulgation of student athletics fees in American higher education can be viewed as a tangible example of the aspirational venture theory in practice. Despite empirical evidence that colleges and universities are not guaranteed to benefit financially or athletically from increased investment in athletics (Matheson, O'Connor, & Herberger, 2012; Goff, 2004; Litan, Orszag, & Orszag, 2003, Tsitsos & Nixon, 2012), student fees are introduced in the absence of external revenues received in an attempt to boost sports performance and program visibility. This behavior is both status-seeking and capital-seeking. The aspirational venture theory of costs is therefore an appropriate lens through which to examine athletics fees.

In his discussion of the aspirational venture theory, Rhoades (2009) states that “colleges often make bad investments in ventures driven by (often unfulfilled) ambitions, paying too little attention to costs, proffering too much faith in the hoped-for benefits, and passing along costs to students.” The literature shows that investment in athletics does not often lead to tangible increases in sports performance. Therefore, while sports performance has been shown to increase organizational status through attracting more academically prepared students (Pope & Pope, 2009; Mixon, Treviño, & Minto, 2004) and increasing public support (Goidel & Hamilton, 2006), increased institutional investment is not necessarily an effective channel through which these benefits can be reached. Colleges and universities may be placing too much faith in student athletics fees as a means to fund marketing and prestige-generating efforts, all the while ignoring the associated costs to the students. The aspirational venture theory of costs is therefore a valuable lens through which to examine student fees, as the decision by institutions and athletic departments to implement and subsequently increase these fees is a prime example of this

aspirational behavior. It is especially relevant as it uses the institution as the unit of analysis and places these units in a hierarchical system for examination, which influences the design of the present study.

Research Questions

The review of relevant literature and guiding theoretical principles laid out in the preceding passages have led to the formation of two primary research questions:

- I. What is the relationship between the amounts of athletic expenditures generated by student fees and athletic team performance at NCAA Division I institutions?
- II. Is a higher percentage of athletic expenditures derived from student fees connected to an increase or decrease in athletic team performance?

Research Question I is a modification of similar questions used by scholars in prior studies of investment in ICA, but it disaggregates the investment metric into student fees and expenditures less fees. Student fees are often introduced by smaller, relatively resource-poor institutions in an attempt to mimic the spending behavior of the most successful institutions and obtain similar levels of success on the playing field. Whether this isomorphic behavior pays off or not is yet undetermined. The answer to this question will provide greater insight into the relationship between spending and sports performance.

Research Question II more specifically addresses how student athletics fees are institutionally related to sports performance. The aspirational venture theory of costs suggests that less resourced institutions are more likely to try to leverage athletics success through fees, even if there is little evidence that this prospect will become successful. Thus, these institutions tend to generate a more significant percentage of their ICA expenditures from student fees. By considering the amount of fees relative to other expenditures that a university collects to attempt

to achieve a competitive balance, the answer to this question will provide insight into the potential consequences of student fee collection.

Sampling and Data Collection

In 2015, two prominent media outlets- the Chronicle of Higher Education and the Huffington Post- used public records requests to compile data on athletics revenues and expenditures from 205 public NCAA Division I colleges and universities over the five-year period of academic years (AY) 2010-2014. The institutions in this dataset form the population of schools used in the study. Of the original 205, 108 were selected for the final sample. All data collected on finances, athletic team performance, and institutional characteristics come from the same set of institutions across time.

The number of institutions used in the study was narrowed down from 205 to 108 for the following reasons. First, 38 colleges and universities were immediately dropped from the data because they do not field a football team. As previously discussed, football is generally the sport requiring the greatest level of expenditures, as well as generating the highest levels of revenue and public attention. As such it is critical in this study to focus on schools that have football programs. Another 30 institutions were eliminated because they did not receive revenue from student athletics fees during the period 2010-2014, and again, that is the focus of the study. Three other institutions received revenues from student fees, but the amounts were small enough to be immediately outlying and interpreted as incidental. For example, one university in the sample reported receiving only \$25 in student fee revenue over the five-year period. Moreover, eight institutions were dropped because they were missing at least one year's worth of data, which would create skewed totals and averages in these institutions' observations. A final 18 schools were dropped due to a special case which created a disruption in the normal flow of

revenues and expenses within the athletics department. These cases included transitioning up from Division I-FCS to Division I-FBS and the school's football team beginning or suspending competition during the timeframe, among others.

The present study categorizes the institutions in the sample based on their competitive and administrative levels within Division I. Schools colloquially known as "Power 5" schools ($N=27$) belong to any one of five Football Bowl Subdivision (FBS) conferences that have independent and autonomous voting power within the NCAA- the Atlantic Coast Conference (ACC), the Big Ten Conference, the Big XII Conference, the Pacific-12 Conference (PAC-12), and the Southeastern Conference (SEC). These universities tend to be the largest, most selective institutions in the sample with the highest endowments and are often viewed as the traditional powers of ICA. Consequently, they tend to have the highest athletics budgets and generate the most significant levels of athletics revenue from gate receipts, television contracts, and private donations (Bass, Schaeperkoetter, & Bunds, 2015; USA Today, 2016). The study will refer to these institutions as "high-major" programs. "Group of 5" schools ($N=35$) belong to any of the other five FBS conferences that do not hold autonomy in NCAA voting. These conferences are the American Athletic Conference (AAC), Conference-USA (C-USA), the Mid-American Conference (MAC), the Mountain West Conference (MWC), or the Sun Belt Conference. These institutions compete in the FBS with high-major schools, but often do not have the same large budgets (USA Today, 2016) and will be referred to by the study as "mid-major" programs. The remainder of the sample includes any institutions in the Football Championship Subdivision, generally considered to be the lower of the two competitive levels in Division I football. Universities in the FCS ($N=46$) generally have the lowest budgets and smallest revenue streams

of schools in the sample (USA Today, 2016). These schools will be considered the “low-major” programs.

Sample Characteristics

The 108 institutions used in the present study are widely varied in terms of their locations, sizes, and characteristics. The sample contains public universities from 37 states in eight of nine geographic regions as defined by the Integrated Postsecondary Educational Data System (IPEDS). These universities’ AY2014 full-time enrollments (FTE) range from a minimum of 1,711 to a maximum of 42,490 with a mean of 16,664, highlighting the scope of difference in student body size among NCAA Division I members. Examining the sample also reveals a diversity of charter and mission- the studied institutions range from flagship research-intensive universities to small regional institutions as identified by the Carnegie Foundation’s classifications of higher education institutions. Table I lists the average Carnegie classification number for each sample grouping, with a lower number indicating a heavier research focus and a larger number of doctoral programs offered. This is often colloquially used as a way to judge the prestige or status of an institution, and is often invoked by institutions themselves in marketing efforts.

Table I. Characteristics of Institutions within the Sample

Sample Grouping	Min. FTE	Max. FTE	Avg. FTE	Avg. Locale	Avg. Carnegie
High-Major	16,364	42,490	26,679	3.33	15.15
Mid-Major	8,384	31,932	17,808	3.6	16.34
Low-Major	1,711	31,986	9,914	4.93	17.41

IPEDS also provides information on a university’s “locale,” which identifies the market size within which the institution is predominantly located. Table I provides the average locale for

each sample grouping. A higher number indicates a greater distance from an urban area or population center.

Data Collection

All data regarding student fees and athletics expenditures were collected from the Chronicle/Huffington Post dataset. The data in the set represent fees and expenditures during five-year time period containing AY2010-AY2014. The academic year more closely mirrors the fiscal year than the calendar year, which means that the data define 2010 as summer 2009-summer 2010. All financial data in the set came already adjusted for inflation, but disaggregated by year. The time period total was calculated for three different measures: total expenditures, total student fees, and expenditures less student fees. These figures were then used to calculate average number per year of all three measures, as well as a figure for the percentage of total expenditures accounted for by student fees.

Data on football and men's basketball wins for the 108 institutions in the study were obtained from a variety of sources, including online sports data warehouse sports-reference.com, the archives of sports media outlets ESPN and Fox Sports, and in some cases individual institutional archives. These sources were used to generate total wins and total games played figures for each institution during two separate multi-year periods: AY2015-AY2017 and AY2005-AY2014. Due to the seasonal nature of college sports, this included football seasons notated 2004 through 2016 and men's basketball seasons notated 2004-2005 through 2016-2017. Winning percentage during these timeframes was then calculated for each institution using these figures.

In addition to data on winning, postseason appearances during the period AY2005-AY2014 and head coaching changes during AY2014-AY2017 for both football and men's

basketball were collected using the same data sources. For Football Bowl Subdivision (FBS) schools, football postseason appearances were defined as bids to any one of a varying number of invitational “bowl” games occurring after the conclusion of the regular season and played annually between mid-December and early January, which are NCAA sanctioned but not NCAA organized. For Football Championship Subdivision (FCS) schools, postseason appearances were defined as either an automatic or at-large playoff berth to the NCAA-organized Division I football championship tournament played during the same time period as the FBS bowl games each year. In the case of men’s basketball, a postseason appearance for any school in the study was defined as an appearance in the NCAA-organized Division I men’s basketball championship tournament held annually between mid-March and the first Monday in April each year, colloquially known as “March Madness.” In a few cases where institutions transitioned up to either the FBS or the FCS from the FCS or Division II respectively during AY2005-AY2014, postseason berths in the prior level of competition were also tabulated to indicate total postseason appearances during the ten-year span. The study indicated a head coaching change in the following cases: a first-year head coach began their tenure with the program in AY2015, or a sitting head coach was dismissed from or left the program with a significant percentage of games left to coach during AY2015-AY2017.

Other measures considered as a potential influence on athletic team performance were obtained from IPEDS and from the Jeff Sagarin computer rankings, which are predictive metrics evaluating all NCAA Division I football and men’s basketball teams. IPEDS yielded full-time enrollment figures for each university in the study, as well as important categorical data which indicate the market size and type in which each school is located, the region of the United States in which each is located, and the Carnegie classification for each. The Sagarin ratings were used

to collect strength of schedule ranks for each institution during each year AY2015-AY2017.

Strength of schedule is a way to evaluate the quality and performance of a college sports team's opponents in a given season. These rankings were then averaged across the three seasons played during this time period to fit the study's other cross-sectional data.

Methods

The present study employed two rounds of Ordinary Least Squares (OLS) regression to estimate the relationship between student fees and athletic success. This chapter will discuss the OLS methods used by the study to answer the two aforementioned research questions in their entirety, beginning with how the outcome variables, explanatory variables, and factor variables used in the regression models were constructed. Next, the final models and their specifications will be presented. Finally, the robustness of these models will be assessed via a discussion of the seven Classical Assumptions that must hold for OLS to be the best linear unbiased estimator, including tests that were used to check for violations to these assumptions.

Variable Construction

The primary outcome variable of interest to the study is athletic success, which is measured by the three-year winning percentage collected from the seasons AY2015-AY2017. It is important to consider winning percentage over total or average games won because universities do not necessarily play the same number of games each season. For example, an NCAA basketball team which appears in multiple NCAA or conference tournament games has more opportunities to win games, increasing the total. In addition, FCS football teams often play 10 or 11 games in one season rather than 12, and only a small number advance to the FCS playoffs. This is in contrast to the FBS, where as many as two-thirds of football teams may earn

bowl game bids in one season. Thus, winning percentage is the best metric for success because it accounts for the scope of competition, removing artificial skew in favor of high-major teams.

The primary explanatory variable of interest to the study is student athletics fees. This variable was operationalized in two different ways. For the first round regression models, the total student fees during the five-year period AY2010-AY2014 were divided to calculate the average per-year amount collected by each institution. This number was then divided by 100,000 to allow for easier interpretation of the output. In developing the functional form of the OLS models, using the natural log of average fees was deemed to improve the distribution of the values in the variable. For the second round models, total fees over the five-year period AY2010-AY2014 were divided by the total expenditures for the same period, generating the percentage of total expenditures attributed to student athletics fees.

Control Variables. Athletic success is not determined entirely by either the wealth, size, or competitive affiliations of an institution. A multitude of factors influence winning, making the possibility of omitted variable bias an important consideration when developing the OLS models used for this study. To this end, the study employs numerous control variables to help assure the most unbiased estimation possible of the relationship between student fees and winning. These variables are related to both tangible and intangible influences on team success.

The most important control variables in the study account for athletic expenditures other than student fees. As discussed above, the first round of OLS models used considers the natural log of the average student fees per year. For these models, non-fee athletic spending was calculated by subtracting the sum of student fees from the total athletics expenditures of each institution. The amount remaining represents a wide variety of expenses including but not limited to coaches' salaries, facilities and capital spending, debt service, uniforms and equipment, staff

and administrative spending, and operations expenses. Similar to the fees variable, the final construction of this variable in the model was the natural log of the calculated expenditures less fees value divided by 100,000. As covered in the literature review, non-fee spending categories such as these have previously-demonstrated relationships to sports success (Colbert & Eckard, 2013; Hoffer, Humphreys, Lacombe, & Ruseski, 2015, among others). For the second-round OLS models, fees are input as a percentage of total expenditures, so this control variable was expressed as the natural log of total expenditures to mitigate the effects of higher or lower institutional spending.

Full-time enrollment observations for each institution in the sample were used as an additional control in the study. Although the effects of FTE on sports performance may be more indirect than direct, “big” schools are more likely to have national brands and rankings. Academic capitalism tends to favor large institutions, and this likely holds true for athletics as well. The size of a school may influence a prospective student-athlete to enroll at its campus or lure better coaches to run its programs.

Other controls were introduced to account for athletic-competition specific effects. Prior winning percentage was calculated the same way as the outcome variable, but used ten previous seasons of competition as opposed to the most recent three: AY2005-AY2014. Postseason appearances for this same time period comprised a second sports-specific control. These variables are important because winning and postseason play have the potential to make a university more attractive to talented student-athletes. In addition, postseason competition has the ability to garner greater revenues to an institution via television payouts, in addition to greater visibility. The final athletic effects control variable was the average strength of schedule ranking for each sample school. Individual seasonal rankings were obtained from Jeff Sagarin for

each season of competition during the period AY2015-AY2017 and added together before being divided into three to obtain the mean. A value of 1 indicated the strongest or most difficult strength of schedule, while larger numbers indicated less-stiff competition. Schools with more difficult strengths of schedule are more likely to be high-major schools, but may also have their winning percentages reduced by having to face more difficult opponents in competition.

Factor Variables and Fixed Effects. A dummy variable was added to the model to indicate a change in head coaches at each institution with 1 representing a change and 0 representing no change. Coaching turnover can be indicative of numerous important success-related factors. A head coach may be relieved of their duties because they have not brought the athletic director's expected level of success to their program, leading to a coaching change that may improve the team's winning percentage in the ensuing seasons. Conversely, a coach may be so successful that larger and wealthier institutions hire them away from their current institution. Coaching success can be assessed in multiple ways, such as the coach's ability to recruit talented players or to develop effective practices, strategies, and systems to field a winning team. For newly hired coaches, their ability to manage the roster of players left over after the previous coach's departure in a way that fosters success where previously there was little or none is an important consideration. These factors make coaching an integral component of athletic success, and while it is difficult to measure all of the intangible effects a great coach has on a college sports team, a change in head coaches could bring about important changes in winning and must be accounted for in the study's OLS models.

In addition to the coaching dummy variable, four factor variables were added to control for fixed effects in the study. The first of these four variables indicates the competitive level of the institution within Division I. As defined in the discussion of sample generation, these

competitive levels include high-major, mid-major, and low-major institutions. An institution's competitive affiliation has ramifications for the number of quality opponents that its football and men's basketball teams face each year, as well as its ability to secure at-large postseason bids from selections committees. This can lead to an increased number of games played per season, providing that institution with more opportunities to increase its winning percentage.

The second factor variable introduced is the institution's geographic region within the United States as defined by IPEDS. Eight regions are represented by schools in the sample: New England (CT, ME, MA, NH, RI, VT, code 1), Mid East (DE, DC, MD, NJ, NY, PA, code 2), Great Lakes (IL, IN, MI, OH, WI, code 3), Plains (IA, KS, MN, MO, NE, ND, SD, code 4), Southeast (AL, AR, FL, GA, KY, LA, MS, NC, SC, TN, VA, WV, code 5), Southwest (AZ, NM, OK, TX, code 6), Rocky Mountains (CO, ID, MT, UT, WY, code 7), and Far West (AK, CA, HI, NV, OR, WA, code 8). The region factor variable accounts for subcultural interest in a given sport, such as the Southeast's predilection for football. Top-level football talent may be more likely to enroll at universities in this region based on its increased focus on the sport as compared to other regions. In addition, regional differences may change travel time and logistical complexity to competition venues as well as the ability of coaches to recruit players from markets considered talent pools.

A third factor variable is a control for market size, which is sourced from the IPEDS variable "locale." Locale assigns a number code to each institution based on its location within or relative to a population center. Codes 11, 12, and 13 represent institutions within a city with 11 being a population greater than 250,000 and 13 being a population less than 100,000. Codes 21, 22, and 23 represent institutions located within suburbs or peripheral communities of cities with the same population tags. 31, 32, and 33 are designated town codes- territories inside urban

clusters but located outside of a city or suburb. Schools labeled 31 are “fringe,” located within 10 miles of an urbanized area, and schools labeled 33 are “remote,” at least 35 miles away from an urbanized area. Finally, 41, 42, and 43 are codes for schools in rural locations. 41 indicates a campus in a rural area within five miles of an urbanized area and within 2.5 miles of an urban cluster. 43 indicates a rural campus that is at least 25 miles from an urbanized area and at least 10 miles away from an urban cluster. Market size and scope has the possibility to influence sports performance in a number of ways. First, schools in larger markets tend to attract higher profile recruits and coaches. Second, a larger market means greater revenue streams for capital projects and coaches’ salaries. Third, ease of travel to competition reduces stress on players and staff.

A final control in the study for fixed effects is the Carnegie Classification of each institution in the sample. The Carnegie Foundation classifies colleges and universities based on their size, scope, and mission. The codes in the classification are important because they align with the perceived prestige of an institution, strengthening institutional brand and making enrolling at that institution a more attractive prospect to a wider pool of student-athletes. The ability to use prestige and brand identity in recruiting is an important tool for universities. Sample institutions range from doctoral universities with the highest levels of research activity to regional comprehensive institutions.

Regression Modeling

After all variables were constructed and multiple functional forms were explored, two final OLS models each for football and men’s basketball were generated for the study.

$$1. \quad PCT_i = \beta_0 + \beta_1 \ln AVGF_i + \beta_2 \ln AVGELF_i + \beta_3 PCT10_i + \beta_4 POST10_i + \beta_5 SOS_i + \beta_6 CC_i + \beta_7 FTE_i + \beta_8 COMP_i + \beta_9 REG_i + \beta_{10} MAR_i + \beta_{11} CARN_i + \epsilon_i$$

The dependent variable PCT = winning percentage during AY2015-AY2017. Explanatory variables of interest $\ln AVGF$ = natural log of the average student athletics fees per AY (2010-2014) and $\ln AVGELF$ = natural log of the average expenditures less student fees per AY (2010-2014). The natural log was taken from both variables after they had been divided into hundreds of thousands of dollars. This was determined to be the best functional form for the model as the natural log eliminated skew present in the raw variables.

Athletics control variables include $PCT10$ = winning percentage during AY2005-AY2014, $POST10$ = number of postseason appearances during AY2005-AY2014 (NCAA tournament for men's basketball, bowl game or FCS playoffs for football), SOS = average annual strength of schedule rank during AY2015-AY2017, and CC = dummy variable indicating a coaching change during AY2014-AY2017. Institutional control variables FTE = AY2014 full time enrollment, $COMP$ = factor variable for competition level within Division I (FBS high-major, FBS mid-major, FCS), REG = factor variable for geographic region within the United States, MAR = factor variable for market size, and $CARN$ = factor variable for institution's Carnegie classification. This model is constructed similarly to those in prior research examining the relationship between investments and winning (Jones, 2013; Litan, Orszag, & Orszag, 2003), but disaggregates student fees from other expenditures. The present study uses this model to answer research question I- are higher amounts of student fees related to an increase in winning percentage?

The second model includes the same controls as the first, but alters the primary explanatory variables:

$$2. \quad PCT_i = \beta_0 + \beta_1 FPCT_i + \beta_2 \ln TOTE_i + \beta_3 PCT10_i + \beta_4 POST10_i + \beta_5 SOS_i + \beta_6 CC_i + \beta_7 FTE_i + \beta_8 COMP_i + \beta_9 REG_i + \beta_{10} MAR_i + \beta_{11} CARN_i + \epsilon_i$$

FPCT = the percentage of athletics expenditures attributed to student fees during AY2010-2014 and $\ln TOTE$ = the natural log of total athletics expenditures during AY2010-2014. Model 2 is used to answer research question II- is a higher percentage of expenditures from student fees related to an increase or decrease in winning percentage?

Both regression models were examined in depth to ensure the seven Classical Assumptions of OLS regression held true. Potential specification errors that would cause a violation in Assumption I were considered in developing the models' functional forms discussed above. Each model's error term was determined to contain a zero population mean in keeping with Assumption II. In addition, since the present study uses cross-sectional data, serial correlation is highly unlikely, protecting against violations to Assumption IV. Finally, Assumption VII requires that the error term be normally distributed. Although the error term is a population statistic that cannot be calculated, histograms of the residuals for each model showed mostly normal distributions. Further tests of robustness against Assumption violations that were of particular concern in the study are discussed in depth in the following passages.

For OLS to be the best linear unbiased estimator, explanatory variables should be uncorrelated with the error term. To reiterate, the error term cannot be assessed during the regression process as it is a population statistic. To address potential violation of Assumption III, the study tested multiple functional forms, including numerous control variables. This helps prevent omitted variable bias, which could affect the results and their interpretations.

OLS requires an error term of constant variance, meaning that no heteroskedasticity is present in the model. All four models in the study were subjected to multiple tests for heteroskedasticity, including the White test and the Breusch-Pagan test. Testing failed to produce support for the alternative hypothesis of heteroskedasticity, indicating no violation to Classical

Assumption V. To this end, there was no need to include heteroskedasticity-corrected standard errors in the models' constructions.

It is important that no explanatory variable in the OLS model is a perfect linear function of or heavily correlated with any other explanatory variable. Two methods were employed on the four models used in the study that test for the presence of multicollinearity- an examination of the correlation tables for the explanatory variables (see Table II) and the Variance Inflation Factors (VIF) test.

Table II. Correlation Tables for Explanatory Variables

Football	lnAVGF	lnAVGELF	FPCT	lnTOTE	PCT10	POST10	SOS	CC	FTE
lnAVGF	1.0000								
lnAVGELF	-0.1474	1.0000							
FPCT	-	-	1.0000						
lnTOTE	-	-	-0.4288	1.0000					
PCT10	0.0267	0.3141	-0.1533	0.3353	1.000				
POST10	0.0626	0.6553	-0.3458	0.6740	0.7583	1.0000			
SOS	0.0010	-0.8849	0.5129	-0.8830	-0.2254	-0.6157	1.0000		
CC	0.0106	-0.1580	0.0896	-0.1498	0.0276	-0.0893	0.1421	1.0000	
FTE	0.2680	0.7163	-0.2085	0.8109	0.2033	0.5137	-0.7302	-0.0909	1.0000

Basketball	lnAVGF	lnAVGELF	FPCT	lnTOTE	PCT10	POST10	SOS	CC	FTE
lnAVGF	1.0000								
lnAVGELF	-0.1474	1.0000							
FPCT	-	-	1.0000						
lnTOTE	-	-	-0.4288	1.0000					
PCT10	-0.0935	0.5289	-0.3802	0.5055	1.000				
POST10	-0.1588	0.5562	-0.4072	0.5325	0.8237	1.0000			
SOS	-0.0770	-0.8583	0.4356	-0.8857	-0.4884	-0.5046	1.0000		
CC	-0.1125	-0.0144	-0.1224	-0.0749	-0.0257	-0.0230	0.0572	1.0000	
FTE	0.2680	0.7163	-0.2085	0.8109	0.3734	0.4114	-0.7195	-0.1279	1.0000

High levels of correlation between some explanatory variables were found in all four models, but these correlations were deemed coincidental based on theoretical understandings of higher education and college sports. Most explanatory variables were uncorrelated. VIF tests on all four models revealed slight multicollinearity, but overall presented low with a mean VIF between five and six for all four models. Despite the potential violations of Classical Assumption VI

discovered by the VIF tests, all previously specified variables remained in each model to reduce the significant risk of omitted variable bias caused by changes in specification. This decision was also informed by theory and prior understanding of college athletics. Because the multicollinearity assessed was slight, the statistical significance of each explanatory variable coefficient is unlikely to be affected.

Results

This presentation of the OLS regression results from the study will be divided into three sections. First, descriptive statistics for the sample will be presented. Table III outlines descriptive and summary statistics for the sample, disaggregated by level of competition. Next, the chapter will address research question I by discussing model 1, football (1F) and model 1, men's basketball (1M). In keeping with previous research, the results from these models are mixed, indicating that higher levels of investment are related to an increased winning percentage for men's basketball but not for football. Finally, the chapter will transition to addressing research question II via model 2, football (2F) and model 2, men's basketball (2M).

The study's second round of OLS models finds no statistical support that winning percentage is related to a higher percentage of expenditures from student fees, but does find that total expenditures are related to an increase in men's basketball performance similar to model 1. Regression results for the non-categorical explanatory variables are presented in Table IV. Other significant statistics of note are also addressed throughout the chapter. Coefficient results are presented under the assumption that all else in each equation is held constant. Levels of significance for all models were measured at $\alpha=0.05$.

Descriptive Statistics

High levels of variance exist within and between groups for nearly all explanatory and outcomes variables. Notable figures include a sample mean of almost one-quarter of athletics expenditures derived from student fees. Below, summary statistics are presented for the sample in its entirety. Analysis of descriptive and summary statistics will be presented in the discussion chapter.

Football Performance. The mean football winning percentage during AY2015-AY2017 for all institutions in the sample was 49.45% with a standard deviation of 18.06%, a minimum value of 2.94%, and a maximum value of 88.89%. Football winning percentage during AY2005-AY2014 was roughly the same- 48.59%. The standard deviation for this variable was lower at 14.94%, with a higher minimum of 14.89%, and a similar maximum of 86.15%. The higher minimum and lower standard deviation during AY2005-AY2014 likely result from an equilibrium reached by the inclusion of a greater number of seasons in the variable. Football teams in the sample made a mean of 3.76 trips to postseason bowl or NCAA championship games during AY2005-AY2014, with 81.48% of institutions (88) making at least one trip. 37.04% of institutions (40) played in a postseason game in at least five out of a possible 10 seasons (50%). Average strength of schedule rankings during AY2015-AY2017 ranged from a weakest value of 244.667 to a strongest value of 4. 54.63% of institutions (59) experienced a change in head coaches during AY2014-AY2017.

Men's Basketball Performance. The mean men's basketball winning percentage during AY2015-AY2017 for all institutions in the sample was 52.73% with a standard deviation of 14.24%, a minimum value of 19.10%, and a maximum value of 85.84%. Men's basketball winning percentage during AY2005-AY2014 was roughly the same- 52.09%. The standard deviation for this variable was lower at 12.26%, with a higher minimum of 25.27%, and a similar

maximum of 83.59%. Similar to the figures for football, the higher minimum and lower standard deviation in AY2005-AY2014 likely result from an equilibrium reached by the inclusion of a greater number of seasons. The overall lower figures for men's basketball are likely the result of a greater number of games played each season, bringing the statistics to equilibrium more rapidly over a given time period. Men's basketball teams in the sample made a mean of 2.08 trips to the NCAA tournament during AY2005-AY2014, with 62.96% of institutions (68) making at least one appearance. 15.74% of institutions (17) played in a postseason game in at least five out of a possible 10 seasons (50%). These numbers are lower than football primarily because the NCAA awards 68 bids to the NCAA men's basketball tournament versus a combined 88+ bowl and football championship game bids, meaning that men's basketball teams have fewer opportunities at postseason play. Average strength of schedule rankings during AY2015-AY2017 ranged from a weakest value of 346 to a strongest value of 4.33. The weakest strength of schedule rank is much larger for men's basketball due to a greater number of Division I schools that field a men's basketball team than field a football team. 44.44% of institutions (48) experienced a change in head coaches during AY2014-AY2017.

Table III. Descriptive and Summary Statistics by Sample Group

Sample Grouping	Mean Win %	Std. Dev.	Min. Win %	Max. Win %	Avg.	Avg.	Fees %
	'15-'17	'15-'17	'15-'17	'15-'17	Exp./AY	Fees/AY	Exp.
Football							
High-Major	52.67	16.34	13.89	82.50	772.10	37.93	5.11
Mid-Major	46.64	17.08	22.22	77.50	302.30	73.92	26.91
Low-Major	49.70	19.72	2.94	88.89	144.21	49.37	31.21
Men's Basketball							
High-Major	61.57	12.98	37.63	85.84			
Mid-Major	51.03	12.02	25.26	72.55			
Low-Major	48.84	14.52	19.10	74.26			

Fees and Expenditures. Mean average per-year total expenditures⁴ for all institutions in the sample was \$272.32, with a standard deviation of \$243.41, a minimum value of \$29.64, and a maximum value of \$1423.57. Mean average per-year student fees assessed per institution was \$54.46, with a standard deviation of \$48.68, a minimum value of \$5.93, and a maximum value of \$284.71. The high variance in both of these measures of investment by Division I schools leads to standard deviation values that are relatively close to the mean values themselves. The mean percentage of expenditures derived from student athletics fees was 23.29% with a standard deviation of 20.46%, a minimum value of 0.63%, and a maximum value of 82.62%.

Model 1: Fees, Spending, and Winning Percentage

Model 1F yielded an R^2 of .5892 and a significant overall F -score of 3.36, with an estimated constant value of -36.96. A 2.97% increase in winning percentage for every \$100,000 of student fees assessed was detected, but failed to reach measurable significance. Similarly, while the model detected a 7.00% increase in winning percentage for every \$100,000 of expenses less fees assessed, no statistical significance supported this result. Of all explanatory variables, only winning percentage from the previous ten seasons of competition and the presence of a coaching change yielded significance, although previous winning percentage is only related to a 0.70 increase in the winning percentage during AY2015-AY2017. A coaching change, however, was associated with a -8.25 change in winning percentage during AY2015-AY2017. The coefficient results of fixed effects in 1F were overwhelmingly insignificant other than for the institutions' Carnegie Classifications. Carnegie classification code 22, indicating regional comprehensive institutions, was related to a -37.58 change in winning percentage relative to doctoral, highest-research institutions coded 15.

⁴ Unless otherwise noted, all value calculations for student fees and athletics expenditures are presented in hundreds of thousands of dollars (\$100,000).

Model 1M yielded much more robust overall statistics. The R^2 was .6632 and the overall F was 4.61, with an estimated constant value of -69.99. These R^2 and F -score values are the highest of any of the four models in the study. Unlike 1F, student fees assessed and expenditures less student fees assess both easily rose to statistical significance. For every \$100,000 increase in student fees, winning percentage increased by 6.16%, and for every \$100,000 increase in expenditures less student fees, winning percentage rose by 10.45%. Other explanatory variables in 1M that yielded statistically significant results were coaching change, which was related to a 4.84 drop in winning percentage, and winning percentage from the previous ten seasons, which was related to a 0.71 increase in winning percentage during AY2015-AY2017. An institution's full time enrollment (FTE) indicated an extremely slight negative relationship with winning percentage that just failed to reach statistical significance with a P-value of 0.06. 1M further differed from 1F due to fixed effect results. Schools in the IPEDS-defined Plains and Rocky Mountain regions were the only groups that statistically significantly differed relative to the 1-code New England schools, yielding a 26.35 and an 18.43 increase and in winning percentage, respectively. Suburban schools also demonstrated significant results, with IPEDS market size codes 22 and 23 showing 19.58 and 21.28 increases in winning percentage respectively relative to code 11, which indicates large cities.

Model 2: Percent of Expenses from Fees and Winning Percentage

Model 2F yielded an R^2 of .5809, a significant overall F -score of 3.25, and an estimated constant value of -20.82. These are the lowest R^2 and overall F -score results of any model in the study. A higher percentage of expenditures from fees detected only a minute -0.05% change in winning percentage, and failed to reach significance. The coefficient for total expenditures also failed significance but had a much larger value of 4.85%. The two explanatory variables to reach

statistical significance were again winning percentage from the previous 10 seasons and coaching change, with coefficient values of 0.72 and -8.64, respectively. Like 1F, one fixed effect coefficient in 2F was significant. Carnegie classification code 22, indicating regional comprehensive institutions, was related to a -40.34 change in winning percentage relative to doctoral, highest-research institutions coded 15.

Model 2M generated an R^2 of .6519, an overall F -score of 4.39 and estimated constant value of -90.68. Similar to 2F but unlike 1M, the coefficient for the explanatory variable relating to student fees did not reach statistical significance. The coefficient for total expenditures, however, was statistically significant and very large. Every \$100,000 increase in total expenditures was related to a 13.63% increase in winning percentage. This is the largest coefficient among all explanatory variables relating to investment in athletics from any model in the study. 2M is also the model in the study for which a coaching change failed to reach significance, with an $\alpha=0.055$. Winning percentage from the previous 10 years was highly significant, relating to a 0.72 increase in winning percentage during AY2015-AY2017. As in 1M, Plains schools again demonstrated a significant difference relative to New England schools, with the regression model detecting a 19.98 increase in winning percentage for this group. Unlike 1M, however, Rocky Mountain schools were not found to be significantly different from New England schools. Another similarity to 1M in fixed effect variables relates to suburban institution codes 22 and 23, which demonstrated significant results- 20.14 and 21.21 increases in winning percentage respectively relative to code 11.

Table IV. Regression Coefficients of Non-Categorical Explanatory Variables on Winning
Percentage in OLS Models (108 Obs.)

Variable Description	Model 1F	Model 1M	Model 2F	Model 2M
Natural Log of Avg. Fees/AY (2010-2014)	2.97 (0.312)	6.16 (0.007)		
Natural Log of Avg. Exp-Fees/AY (2010-2014)	7.00 (0.149)	10.45 (0.005)		
Percent of Exp. From Fees AY2010-AY2014			-0.05 (0.655)	0.03 (0.739)
Natural Log of Total Fees AY2010-AY2014			4.85 (0.434)	13.63 (0.006)
Winning Percentage AY2005-AY2014	0.70 (0.001)	0.71 (0.000)	0.72 (0.001)	0.72 (0.000)
Postseason Appearances AY2005-AY2014	-0.05 (0.968)	-0.55 (0.510)	-0.10 (0.936)	-0.83 (0.329)
Avg. Strength of Schedule/AY (2015-2017)	0.05 (0.489)	0.03 (0.288)	0.02 (0.749)	0.01 (0.615)
Coaching change DV AY2014-AY2017	-8.25 (0.011)	-4.84 (0.033)	-8.64 (0.008)	-4.43 (0.055)
Full time enrollment AY2014	-0.00 (0.494)	-0.00 (0.060)	-0.00 (0.717)	-0.00 (0.113)
R^2	.5892	.6632	.5809	.6519
Adjusted R^2	.4139	.5194	.4021	.5033
Overall F -score	3.36	4.61	3.25	4.39

Note: p values in parentheses.

Acknowledgement of Limitations

Although the statistical examination of the research questions led to numerous significant outcomes and important results that will be discussed further in the next chapter, limitations to the study do exist. First, despite a thorough analysis by the author of factors that influence winning in college athletics, omitted variables may still exist and some variables- such as coaching- contain intangible effects that are difficult to measure. Thus, while the study may include a reasonably comprehensive list of control variables and fixed effects, this list is by no means exhaustive. Second, the construction of the OLS regression models and the data included in them do not lend themselves to the implication of causality. As such, the author was

intentional in designing the study as an examination of the relationship between student fees and winning, rather than an attempt to determine whether or not student fees can be included among the list of factors that *cause* sports performance to increase. The ensuing interpretation, discussion and implications of the study's results will therefore consider these limitations when providing policy recommendations and ideas for further research.

Interpretation and Discussion

The interpretation and discussion of relevant results from the study will first examine descriptive and summary statistics of the sample as presented in the results chapter. Second, the analysis will transition to the regression output. Models will be compared with respect to specification and sport. Finally, fixed effect variables of interest will be examined in detail. Previous scholarship, systemic knowledge of college athletics, and theory will guide the discussion throughout.

Discussion of the Descriptive and Summary Statistics

Table V demonstrates the disproportionate levels of athletic spending between high-, mid-, and low-major universities. High-major institutions spend roughly \$47 million per year more on athletics than mid-major institutions, yet they derive an average of only about 5% of their expenditures from student fees versus mid-major institutions' 27%. While low-major institutions' fees make up the highest percentage of expenditures for any group at roughly 31%, they take in a far lower amount of fees per year on average in comparison to mid-major institutions. High-major institutions have the highest average winning percentages for both football and men's basketball by a significant margin. Interestingly, mid-major institutions have a higher average win percentage than low-major institutions for men's basketball, but not for

football as might be expected. These results indicate the presence of hierarchical influence on college athletics investment.

Status Hierarchies, Financial Decision Making, and the “Head of the Snake.” In their foundational work of institutional theory mentioned in the present study’s theoretical framework, Riesman & Gorey (1958) posit that American higher education takes the form of a long snake, in which elite institutions at the top of the status hierarchy make up the head of the snake, less prestigious institutions make up the body, and the lowest make up the tail. The “body” mimics decisions made by the “head” in order to catch up and gain some of the prestige at the top, only to find that the top institutions have already moved on from where they were when the policy decision was implemented. The statistics outlined above can be interpreted as the status “snake” of NCAA Division I athletics.

High-major institutions spend the most and win the most. As discussed in the literature review, winning has been demonstrated to provide tangible benefits to colleges and universities (Toma & Cross, 1998; Walker, 2015, among others). In an effort to “catch up” to these institutions and achieve similarly successful sports performance, mid-major institutions make financial decisions with the intent to generate available expenditures similar to those enjoyed by high-major institutions. Athletics departments in the “body of the snake” as outlined by Riesman & Gorey (1958) find that they are unable to generate gate receipts, television contracts, and private donations at a similar level to those generated by the “head.” As such, these departments appeal to the institution for the implementation of student fees, invoking the language of the “front porch effect” (Bass, Schaeperkoetter, & Bunds, 2015) to drum up support. Despite attempts to increase spending to compete with high-majors, statistics show that mid-majors are still at a clear success deficit. Although low-major schools at the “tail” also collect athletics fees

from students, they are more competitive with each other than with the next step up on the status hierarchy, because low-majors will generally focus on being regionally established rather than on breaking into national prestige along with high-majors. For these institutions, student athletics fees may be implemented to create ICA budgets large enough to build the institution's brand locally or regionally and attract students who view college sports programs favorably during their college searches, regardless of these programs' performance relative to other schools.

The idea that athletics fees may serve multiple purposes in higher education is worth exploring. All universities may implement them as a way to improve sports performance, yet administrators may be focused on different institutional outcomes depending upon the school's status. In examining the statistics presented through the lens of Rhoades' (2009) aspirational venture theory of costs, mid-major schools may be especially guilty of increasing spending and fee collection based on an undelivered promise of sports success that will lead to positive outcomes for the institution. Troublingly, mid- and low-major institutions are oftentimes less resourced and enroll higher numbers of low-income students as compared to high-major institutions and as the summary statistics indicate, this increased cost to students who may not be able to afford it is not producing results on the playing surface. Mid- and low-major institutions winning percentages are nowhere near those of high-major institutions. As the aspirational venture theory postulates, institutional market behaviors to gain greater status and revenue, especially through efforts to recruit new students, often come at a cost to students already enrolled at the institution (Rhoades, 2009). An average of roughly \$7.3 million per year in student fees for mid-majors and an average percent of expenses from fees as high as 31% for low-majors are significant, potentially critical costs for these students to shoulder.

Direct vs. Indirect Competition by Sport. The fact that mid-major institutions have a lower average win percentage in football compared to low-major institutions is perhaps best explained analytically rather than theoretically. Both high-major and mid-major institutions compete directly with one another in the FBS, while low-major institutions only play one or two FBS institutions per year, thus mostly avoiding stronger competition. In men's basketball, where subdivisions within Division I do not exist, low-major schools play against heavier competition much more frequently in non-conference games, leading to the inflated average win percentage of high-major men's basketball teams as compared to football teams within the same group, roughly 61% vs. roughly 52%, respectively. These points suggest the potential importance of scheduling and competition as critical to success rather than investment, despite the insignificance of strength of schedule rankings in the regression analyses. In terms of spending, low-major schools may be locked in a football spending "arms race" (Tsitsos & Nixon, 2012) exclusively against other schools in the same group, rather than with mid- or high- major competition, which enables them to win more football games with a lower level of investment, explaining their higher mean winning percentage as compared to mid-major institutions. This dissolves during men's basketball competition due to the removal of competitive subdivisions.

Discussion of Fixed Effect Outcomes

Both football models in the study showed significant negative results if an institution's Carnegie classification is coded 22. The only institution coded 22 in the study is a small, historically black university (HBCU) located in a small city. Given the miniscule sample size for this specific classification, the significant result generated by the regression models may be circumstantial and likely warrants further examination. To this end, interpretation of this outcome should be taken with a large grain of salt. However, there is a common understanding

among college athletics administrators and media personnel that HBCUs often face an extreme deficit compared to their predominantly white counterparts when looking to fund their athletics programs (Nocera, 2016). To this end, HBCUs often schedule multiple “guarantee games” per season, in which a high-major opponent provides a low-major institution with a financial guarantee- often in excess of \$100,000- to travel to the high-major opponent’s home field for a game where victory is highly unlikely for the low-major school, often artificially decreasing winning percentage for the low-major and increasing it for the high-major. To this end, the result produced by these regressions could have more to do with the sample school’s financial need as an HBCU rather than as a Carnegie-22 school. Further research may be able to examine this in detail by generating a sample with a more robust number of Carnegie-22 schools.

Tabulations of the observations in the variables for region and market size provide insight into the potential reasons for significance and are outlined in Table V below.

Table V. Tabulations of Region and Market Size Fixed Effects (108 Obs.)

		Number of Obs.- Region	Number of Obs.- Market Size
Variable Value: Region (Market Size)			
1	(11)	2	15
2	(12)	6	20
3	(13)	13	34
4	(21)	9	8
5	(22)	45	2
6	(23)	10	4
7	(31)	11	3
8	(32)	12	6
	(33)		11
	(41)		4
	(42)		0
	(43)		1
Total		108	108

The significance of regional and market size effects in the men’s basketball models may also warrant further examination. As the data in Table V above demonstrate, regional and market size

differences are not evenly distributed throughout the sample. Region 4 (Plains) may have shown significance due to the relatively small number of Plains schools relative to the number of schools in other regions. Similarly, market size codes 22 and 23 could be outliers when compared against 11. These significant results should be interpreted cautiously, yet that does not mean they are not without potential analytical value. Regional subcultures were considered in the inclusion of the variables for region and market size, and may be important in considering their interpretation as well. Basketball is very popular in region multiple region 5 states, which include Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, and South Dakota. The history and consistency of basketball success enjoyed by schools in this region may disproportionately attract talented players and skilled coaches as compared to other schools in the same competitive level. In considering market size, the location of a university in a suburban community located just outside a city may win at a higher level due to a lack of market competition from other schools or professional sports teams, drawing community interest to the team. High-level coaches may also perceive a suburban location as a better place to raise their families than a large city or a rural area. If further studies are able to generate a sample with more even distribution of region and market size, these factors may be open to more confident interpretation.

Model 1: Fees and Expenditures Generate Mixed Results

Like much of the established body of scholarship examining spending and sports performance at the college level, the results of models 1F and 1M conflict with the notion that spending more will consistently produce higher levels of athletic success. The insignificance of both student fees and other expenditures on football performance may be explained in part by the enormous costs associated with fielding a football team, especially when compared to men's

basketball. The investment of a set sum of money into a football program with 100-plus student-athletes, a stadium seating between 35,000-100,000 spectators, and significant coaching and management personnel will logically have a smaller impact than the same sum of money will on a men's basketball team with 15-20 student athletes on roster, a venue seating only 5,000-20,000 fans, and a coaching staff of three to five. Football is also especially status-oriented (Lifschitz, Sauder, & Stevens, 2014), meaning that monies are invested against a heavier competitive imbalance than in basketball.

The significance of the results of 1M are as revealing as the insignificant results of 1F and warrant special analytical consideration. Although both the variable for student fees and the variable for expenditures less fees are measured the same way, the difference in their coefficients have implications for how expenditures are distributed within a program. Contained in expenditures less fees are such important subcategories as coaches' salaries, capital projects, and other administrative or direct institutional subsidies. Student athletics fees are often collected by an institution and then transferred to the athletics department, whose administrators may allocate them however the athletics department sees fit, similar to unrestricted private giving. The results of regression 1M indicate that the ways in which student fees are spent on men's basketball programs are potentially less effective than directed spending. In fact, student fees assessed were related to a -4.29% change in winning percentage compared to all other categories of spending. This indicates the need for greater oversight in how student athletics fees are spent, which will be discussed further in the implications chapter.

From a theoretical standpoint, the results of the first round of OLS in the study shows the relatively unfounded nature of the institutional decision to implement student athletics fees. Football, the ICA program that is generally the most popular, most visible, and best recognized

by the general public (Lifschitz, Sauder, & Stevens 2014) is not shown by the study's regression outcomes to be more successful when spending increases. Thus, a football program's ability to win and generate interest in the institution from important constituent groups is here demonstrated to be affected by other intangible factors that could be difficult for an institution to control. Athletics programs at universities are unlikely to turn a profit, and even in the rare case that net revenues exceed expenses for an institution, the monies are virtually never funneled back into the institution writ large (Wolverton, Hallman, Shifflett, & Kambhampati, 2015). If the potential benefits to an institution from athletics rely entirely on its ability to field winning teams, especially a winning football team, the institution may need to consider organizational alternatives to participating in the previously-discussed spending "arms race."

Model 2: Percent of Expenditures from Fees is Unrelated to Winning

Both models 2F and 2M estimate that the winning percentage of a university's sports teams is not related to the percentage of that university's athletics expenditures derived from student fees. The failure of this variable to reach significance indicates that a university's decision to subsidize its athletics programs via the implementation of student fees may do little to alter winning percentage relative to competition, especially when comparing across competitive affiliations. As discussed in the analysis of descriptive statistics above, low-major institutions generate the greatest percentage of athletics expenditures from fees at an average of 31% versus an average of 27% for mid-major institutions and a low average of 5% for high-majors. For the significant subsidization efforts of low- and mid-major institutions, no significant change has occurred in the performance of these institutions' most visible sports teams, raising the important question of cost to students. Are students at these institutions effectively paying for nothing? Although the implementation of athletics fees may be justified by administrators

through the perceived social and community worth of athletics or through their potential institutional benefits, if the additional revenues generated and spent via fee collection do not impact winning, it would appear difficult for the institution to justify the fees, reinforcing the present study's introductory arguments.

One financial coefficient in the second round of OLS models did reach statistical significance. The coefficient for total expenditures was related to a 13.63% increase in men's basketball winning percentage. This reinforces the results of model 1: athletics spending most likely has a higher direct relationship to men's basketball than it does to football. Although fees themselves did not generate significance in 2M, it is interesting that the total expenditures variable had a higher coefficient than that of expenditures less fees variable in model 1M. This could be attributable to differences in model specification, although it could also point to the increase in monies available to spend in various areas of need including salaries and facility improvements that are provided by the allocation of student fees.

Model 2 presents evidence that universities implementing fees in the attempts to "catch up" to the most successful sporting institutions may just be running in place. The perceived return on investment that may have motivated institutions' decisions to collect fees from students in order to subsidize ICA on campus may in fact be more of a zero sum game than the prevailing narrative would suggest. This speaks to the study's informing theory- institutional spending for the purposes of garnering status and revenue are often made without regard to effectiveness or consequence. In conjunction with model 1, a conclusion can therefore be drawn that other means of funding are more likely to be related to winning percentage, especially in the case of men's basketball.

Other Variables: Status and Coaching as Indicators of Performance

The most consistent significant outputs across all four models in both rounds of regression in the study were found in the coefficients for previous winning percentage and coaching change. Winning percentage for the past 10 seasons reached statistical significance in all four models, while a change in the program's head coach during AY2014-AY2017 reached significance in three of four, just barely missing significance in model 2M with an $\alpha=0.055$. These results challenge the popular notion that money is the fastest and most effective way to securing success in college athletics. In reality, indicators of past performance may be more effective in examining future success than finances.

Winning Consistency and the Matthew Effect. The only variable that held statistical significance in all four models was winning percentage during the prior 10 seasons (AY2005-AY2014). The coefficient also remained remarkably similar with results of 1F=0.70, 1M=0.71, 2F=0.72, and 2M=0.72. To this end, it appears likely that most sports programs that have enjoyed past successes will continue to enjoy success, while those that have not been successful are less likely to become successful in the future. If true, this is an example of what sociologist Robert K. Merton (1973) deemed the "Matthew Effect." Status, wealth, and success beget greater status, wealth, and success. Organizations therefore find it more difficult to achieve these the less of them they possesses to begin with. The presence of a Matthew Effect in NCAA Division I competition would create near-insurmountable difficulty for building sustained success at sports programs with little or no prior history of success. While program turnarounds have occurred in the past, they are uncommon and patterns of winning and losing tend to sustain themselves over time.

Coaching Changes and the Presence of Human Influence on Sports Performance. The significance of the coaching change dummy variable in the OLS models is evidence that human

capital and relationships are related to winning in both football, men's basketball, and in all likelihood other college athletics programs. Coaching changes have ramifications for student athletes, administrators, and boosters, who all interact extensively with coaches in the management of their programs. Not only were the variables for coaching change statistically significant in three out of four models, the coefficients were of high value when compared to other outcome variables: 1F=-8.25 percentage point change, 1M=-4.84 percentage point change, and 2F=-8.64 percentage point change. Notably, these results provide evidence that changes in a program's head coach are related to highly negative changes in winning in both football and men's basketball. These results indicate that universities may be better served by retaining coaches rather than increasing subsidies. It is also important to note the stronger relationship between football coaching and winning percentage versus that of men's basketball. This may be due to men's basketball winning percentage being significantly more related to expenditures than football, and it also may be representative of the larger changes in staff that a new head coach may make within a program, affecting a greater number and position diversity of student-athletes.

Summary of the Analysis

Broad differences exist between high-major, mid-major, and low-major institutions with regards to both investment in athletics and in sports performance outcomes. These differences highlight the relatively static nature of status in Division I sports. Given the results of the regression models, there is no evidence that a relationship exists between the amount of student fees allocated and football winning percentage. While there is evidence of a relationship between the amount of student fees and men's basketball winning percentage, it appears to be a weaker relationship than that which exists between other spending categories and winning percentage.

Student fees and spending more generally may therefore be ineffective ways to increase sports performance. Institutions that generate more of their athletics expenditures from student fees do not see any significant change in winning percentage for either football or men's basketball. The influences of coaching and prior winning percentage, however, have a stronger relationship to current program playing surface outcomes.

The aspirational venture theory of costs (Rhoades, 2009) posits that institutions of higher education make decisions with the intent of seeking status and revenue simultaneously, spending both earned and unearned revenues to achieve them. These decisions are based on the anticipation of future institutional benefits such as those provided by athletics that university officials have no way to prove are imminent. By subsidizing athletics via the collection of student fees with little statistical support they are related to future success, universities are placing undue financial burdens on students for what may amount to sunk costs in the future. This analysis of the regression results informs several recommendations for institutions and their administrators that are discussed in the ensuing chapter.

Implications of the Study

The presence of the arms race that has been documented in college athletics (Hoffer, Humphreys, Lacombe, & Ruseski, 2015; Tsitsos & Nixon, 2012) creates organizational difficulties and great costs for colleges and universities participating in Division I competition. Student fees can be interpreted as a side-effect of the ever-increasing financial competition between universities in the NCAA. The results of this study's regression analyses and its subsequent discussion of these fees and the nature of their relationship to winning have contributed to and expanded upon current understandings of investment and athletic success, as well as connected the status system of college sports to broader theoretical understandings of

higher education. To this end, the ensuing chapter will discuss some of the implications of the study, beginning with practical considerations for university decision makers and ending with possibilities for future research on this topic.

Implications for Institutions

Although the present study cannot make claims of causality between student fees and sports performance, the notion drawn from the regressions that fees are unrelated to on-field outcomes warrants examination by both the NCAA and individual institutions. At a time when the NCAA is the subject of intense scholarly and media scrutiny for its rampant financial entanglements (Gaines & Yukari, 2017; Wolverton, Hallman, Shifflett, & Kambhampati, 2015), it should be held responsible for political and organizational entrenchment that allows for the “arms race” to continue its current acceleration. Despite its nonprofit status, the NCAA’s lucrative and business-first model of operation puts pressure on universities. Financial inequity between member institutions in Division I perpetuates inequity of competition, which per the present study is especially evident for men’s basketball, but has been shown to exist for other sports in prior research (Jones, 2013; Cheslock & Knight, 2015) This inequity may put pressure on administrators to subsidize without proof of success, creating cost burdens for students. If the NCAA is to continue as a nonprofit committed to amateurism, it has a responsibility to investigate the financial strains the current ICA system places on institutions and enact structural reforms as necessary. To this end, the data and results of this study could be useful for NCAA research in pursuing the issue of student fees. If further examination also reveals an inconsequential relationship between student subsidization and sports prowess, the organization may consider adding policies which regulate or restrict the implementation of athletics fees.

Colleges and universities also have a responsibility to conduct internal investigations into their own financial policies and decisions with regard to athletics. The average high-major school in the sample collects \$142.18 annually from each student, the average mid-major collects \$415.10, and the average low major collects \$497.99. Division I status is an attractive branding prospect for an institution, but if the institution needs to rely on subsidization this extensive either directly from students in the form of athletics fees or at an opportunity cost to students through budget allocations, it may need to reevaluate the relative worth of remaining a Division I school. The present study illustrates to some degree the futility in small, comparatively resource-poor regional universities attempting to match the funding capability and athletic success of the most powerful and prestigious schools and programs in the system. If an institution cannot find either empirical or statistical justification for subsidization, especially for student fees, students should be able to opt out of those fees, demand that the institution stops charging them, or encourage the institution to reclassify to a lower, less competitive Division. The results of this study could therefore be shared with university administrators and boards of trustees to provide them with insight into the potential consequences of student athletics subsidization. If bad investments are made due to a desire for hoped-for benefits that may or may not come to fruition, these investments could be avoided by an administrative understanding that a relationship between the investments and benefits is unlikely. University decision makers would be better informed when shaping fee policies, requiring advanced reporting and accountability from athletics departments, and potentially preventing cost escalation for students.

Scholarship on the current status of college athletics concurs that ICA has long since lost what made it integral to the academy (Nixon, 2014), but the academy itself does not need to suffer due to the presence of sports programs on college campuses. Thorough analysis of current

financial policies related to ICA by NCAA member institutions has the clear potential to realign institutional goals and refocus investments on the students these institutions serve. On the non-financial side of the ICA wheelhouse, the significance of the coaching change variable in the present study's OLS models may be a suggestion for universities to increase their time and financial investments in coaching staffs, conducting thorough searches and improving the retention of quality coaches, as labor movement in the coaching market seems to have a negative relationship with winning. Although larger budgets allow universities to build better and more up-to-date facilities and create incentives for student-athletes, coaching ability and managerial expertise should be an important consideration for universities attempting to improve their football and men's basketball programs. While market competition often pressures institutions to make changes to their coaching staffs, it would appear that is more potential trouble than it is worth.

Implications for Future Research

As discussed previously, the regression analyses employed in the present study are comprehensive but by no means exhaustive. A myriad of factors can be effectively argued to have an influence on sports performance, some of which may be included in expanded models. First, recruiting class rankings, while often difficult to measure for all Division I institutions, would provide an effective measure of the talent that moves through an ICA program. Second, developing a more quantitatively complex measure of coaching could highlight discrepancies in ability, rather than just differences between management regimes, which is what the dummy variable from the present study was able to quantify. Third, the inconsistency in significance of the factor variables used in this study raises questions about the true nature of region and market effects on athletic performance. A larger and more evenly dispersed sample of schools has the

potential to fully explore these questions. Athletic conference affiliation is another potential fixed effect used to control for performance or it could be substituted for use as a measure of region. Finally, expenditures could be further disaggregated into multiple categories that have already been discussed at length in the study. Do capital investments have more of a relationship to sports success than direct institutional subsidies? Although these variables have been explored independently of one another in existing literature (Colbert & Eckard, 2013; Maxcy & Larson, 2015, among others), a comprehensive breakdown of all categories of ICA spending has yet to be undertaken.

Winning percentage for football and men's basketball is only one way to quantify sports success. The methods from this study could be combined with performance metrics defined in prior scholarship (Jones, 2014) to measure the outcome variable of interest in the present study more holistically. Logistic regression models could be used to measure outcome variables such as a school's postseason appearances or conference championships during a given time period. In addition, some studies have considered the entirety of programs sponsored by an institution's athletics department when measuring sports success (Jones, 2014). It would be worthwhile to determine if student fees influence performance in non-revenue sports, especially women's sports, which tend to enjoy far less visibility and popularity than men's sports (Schmidt, 2016).

In considering student fees as the primary explanatory variable of interest to this research, other model and variable constructions are possible. First, finding data on where the fees are allocated within athletics departments may help researchers develop a clearer picture of how fees affect performance. Additionally, the analysis could take different functional forms. One potential model in this study included time-series data, examining fees and performance year-to-year, rather than school-to-school. Another specification measured winning percentage during

AY2015-AY2017 against the percent increase in student fees during AY2010-AY2014, rather than the average, total, or percent of expenditures. Because student athletics fees are a relatively new development in college athletics and in higher education more generally, their ramifications have yet to be fully and holistically determined. As financial and ICA data from institutions continue to accumulate, the possibility for more robust, comprehensive studies increases.

Conclusion

Despite some evidence of increased sports performance due to investment in athletics, the present study concludes that student fees are relatively unrelated to winning, at least for football and men's basketball. The results and interpretation of the employed OLS regression models support the theoretical argument that institutions often spend unearned revenues in the pursuit of wealth and prestige, without a guarantee of return on this investment. The competitive imbalance in ICA, especially at the highest levels, is likely to foster institutional decision making that requires students to shoulder high costs with little chance of reaping the rewards desired by the institution. Universities are monetizing students to increase athletic performance with no apparent promise of the intended result coming to fruition. Not only does this behavior create opportunity costs for universities, it places more financial pressure on the low-income students who are more likely to enroll at mid- and low-major institutions. Less resourced institutions appear to be the most likely to make these bad investments in keeping with the aspirational venture theory of costs (Rhoades, 2009).

While the current status of ICA holds, universities are at risk to commit funds to sports that would otherwise be used for institutional benefits. Athletics departments and university administrators should be held accountable for athletics subsidization efforts by investigating their effects on performance to the greatest extent possible. This study is therefore an important

jumping-off point for what will hopefully become a thorough and informative body of scholarship dedicated to fostering greater understanding of student athletics fee policies and financial accountability writ large in college sports.

References

- Bass, J. R., Schaeperkoetter, C. C., & Bunds, K. S. (January 01, 2015). The “Front Porch:” Examining the Increasing Interconnection of University and Athletic Department Funding. *Ashe Higher Education Report*, 41, 5, 1-103.
- Bowen, H. R. (1980). *The costs of higher education: How much do colleges and universities spend per student and how much should they spend?* New York: McGraw-Hill.
- DiMaggio, P., & Powell, W. (1983). The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. *American Sociological Review*, 48, 147-160.
- Cheslock, J. J. & Knight, D. B. (2015). Diverging Revenues, Cascading Expenditures, and Ensuing Subsidies: The Unbalanced and Growing Financial Strain of Intercollegiate Athletics on Universities and Their Students. *The Journal of Higher Education* 86(3), 417-447.
- Chronicle of Higher Education & Huffington Post. (2015). *ICA Finance*. [Data File]. Retrieved from http://www.chronicle.com/interactives/ncaa-subsidies-main/#id=table_2014.
- Colbert, G. J., & Eckard, E. W. (August 30, 2013). Do Colleges Get What They Pay For? Evidence on Football Coach Pay and Team Performance. *Journal of Sports Economics*, 16, 4, 335-352.
- Gaines, C., & Yukari, D. (2017, March 17). The NCAA Tournament is an enormous cash cow as revenue keeps skyrocketing. *Business Insider*. Retrieved November 06, 2017.
- Goff, B. L. (2004). Effects of university athletics on the university: A review and extension of

- empirical assessment. In J. Fizez & R. Fort (Eds.), *Economics of college sports* (pp. 65-85). Westport, CT: Praeger.
- Goidel, R., & Hamilton, J. M. (January 01, 2005). Strengthening Higher Education through Gridiron Success? Public Perceptions of the Impact of National Football Championships on Academic Quality. *Conference Papers -- American Association for Public Opinion Research*.
- Hoffer, A., & Pincin, J. A. (February 01, 2016). The Effects of Revenue Changes on NCAA Athletic Departments' Expenditures. *Journal of Sport & Social Issues*, 40(1).
- Hoffer, A., Humphreys, B. R., Lacombe, D. J., & Ruseski, J. E. (August 01, 2015). Trends in NCAA Athletic Spending. *Journal of Sports Economics*, 16, 6, 576-596.
- Jones, W. A. (August 01, 2014). Does becoming a Member of the Football Bowl Subdivision Increase Institutional Attractiveness to Potential Students. *Innovative Higher Education*, 39, 4, 293-306.
- Jones, W. A. (January 01, 2013). Exploring the Relationship between Intercollegiate Athletic Expenditures and Team On-Field Success among NCAA Division I Institutions. *Journal of Sports Economics*, 14, 6, 584-605.
- Knight Commission on Intercollegiate Athletics. (2010). *Restoring the balance: Dollars, values and the future of college sports*. Miami: John S. and James L. Knight Foundation.
- Knight Commission on Intercollegiate Athletics (2017). *Finances of College Sports*. Miami: John S. and James L. Knight Foundation. Accessed November 06, 2017.
- Lifschitz, A., Sauder, M., & Stevens, M. L. (July 01, 2014). Football as a Status System in U.S. Higher Education. *Sociology of Education*, 87, 3, 204-219.

Lipford J.W., & Slice J.K. Cost spreading in college athletic spending in the United States:

Estimates and implications. *Education Economics*. 2017;25(4):379-393.

Litan, R., Orszag, J., & Orszag, P. (2003). *The empirical effects of collegiate athletics: An interim report*. Indianapolis, IN: National Collegiate Athletic Association.

Matheson, V. A., O'Connor, D. J., & Herberger, J. H. (February 01, 2012). The bottom line:

Accounting for revenues and expenditures in intercollegiate athletics. *International Journal of Sport Finance*, 7, 1, 30-45.

Maxcy, J. G., & Larson, D. J. (January 01, 2015). Reversal of fortune or glaring misallocation: Is

a new football stadium worth the cost to a university? *International Journal of Sport Finance*, 10, 1, 62-86.

Merton, R. K. (1973). *The sociology of science: Theoretical and empirical investigations*.

Chicago: University of Chicago Press.

Meyer, J. W. and Rowen, B. (1977). Institutionalized Organizations: Formal Structure as Myth

and Ceremony. *American Journal of Sociology*, 83, 340-63.

Mixon, F. G., Treviño, L. J., & Minto, T. C. (January 01, 2004). Touchdowns and test scores:

exploring the relationship between athletics and academics. *Applied Economics Letters*, 11, 7, 421-424.

Mulholland, S. E., Tomic, A. S., & Sholander, S. N. (December 01, 2014). The faculty Flutie

factor: Does football performance affect a university's US News and World Report peer assessment score? *Economics of Education Review*, 43, 79-90.

Nixon, H. L. (2014). *The athletic trap: How college sports corrupted the academy*. Baltimore:

The Johns Hopkins University Press.

- Nocera, J. (September 18, 2016). Historically Black Schools Pay the Price for a Football Paycheck. *The New York Times*. Retrieved April 15, 2018.
- Orszag, J., & Israel, M. (2009). *The empirical effects of collegiate athletics: An update based on 2004-2007 data*. Indianapolis, IN: National Collegiate Athletic Association.
- Pope, D. G., & Pope, J. C. (January 01, 2009). The Impact of College Sports Success on the Quantity and Quality of Student Applications. *Southern Economic Journal*, 75, 3, 750-780.
- Putler, D. S., & Wolfe, R. A. (December 01, 1999). Perceptions of Intercollegiate Athletic Programs: Priorities and Tradeoffs. *Sociology of Sport Journal*, 16, 4, 301-325.
- Rhoades, G. (2009). Reward Colleges Not for Rankings but for Social Responsibility. *The Chronicle of Higher Education*.
- Rhoades, G. (2007). Distinctive Choices in Intersecting Markets: Seeking Strategic Niches. *Global Perspectives on Higher Education*, 6, 121-143.
- Riesman, D., & Gorey, E. (1958). *Constraint and variety in American education*. Garden City: Doubleday & Company, Inc.
- Roy, D. P., Harmon, S. K., & Graeff, T. R. (January 28, 2004). Alumni Perceptions of a Move to NCAA Division IA Football Membership. *Journal of Marketing for Higher Education*, 13, 179-197.
- Schmidt, H. C. (August 11, 2016). Women's Sports Coverage Remains Highly Marginalized. *Newspaper Research Journal*, 37, 3, 275-298.
- Slaughter, S., & Leslie, L. L. (1997). *Academic capitalism: Politics, policies, and the entrepreneurial university*. Baltimore: Johns Hopkins University Press.

- Slaughter, S., & Rhoades, G. (2004). *Academic capitalism and the new economy: Markets, state, and higher education*. Baltimore: Johns Hopkins University Press.
- Toma, J. D., & Cross, M. E. (December 01, 1998). Intercollegiate Athletics and Student College Choice: Exploring the Impact of Championship Seasons on Undergraduate Applications. *Research in Higher Education : Journal of the Association for Institutional Research*, 39, 6, 633-661.
- Tsitsos, W., & Nixon, H. L. (February 01, 2012). The star wars arms race in college athletics: Coaches' pay and athletic program status. *Journal of Sport and Social Issues*, 36, 1, 68-88.
- USA Today. (2016). *NCAA Finances: 2015-2016 Finances*. Retrieved from <http://sports.usatoday.com/ncaa/finances/>.
- Walker, A. G. (2013). *Division I Intercollegiate Athletics Success and the Financial Impact on Universities*. SAGE Open.
- Wolverton, B., Hallman, B., Shifflett, S., & Kambhampati, S. (2015, November 15). The \$10-Billion Sports Tab: How Colleges are funding the Athletics Arms Race. *Chronicle of Higher Education*. Retrieved November 06, 2017.