

Stephen F. Austin State University

SFA ScholarWorks

Electronic Theses and Dissertations

Spring 5-12-2018

A QUANTITATIVE STUDY OF THE RELATIONSHIP BETWEEN ATHLETIC SPENDING AND INSTITUTIONAL ENROLLMENT MEASURES IN FCS ATHLETIC INSTITUTIONS

Rob McDermand
mcdermanrd@sfasu.edu

Robert D. Mcdermand
Stephen F Austin State University, mcdermanrd@sfasu.edu

Follow this and additional works at: <https://scholarworks.sfasu.edu/etds>



Part of the [Educational Administration and Supervision Commons](#), [Educational Leadership Commons](#), and the [Secondary Education Commons](#)

[Tell us](#) how this article helped you.

Repository Citation

McDermand, Rob and Mcdermand, Robert D., "A QUANTITATIVE STUDY OF THE RELATIONSHIP BETWEEN ATHLETIC SPENDING AND INSTITUTIONAL ENROLLMENT MEASURES IN FCS ATHLETIC INSTITUTIONS" (2018). *Electronic Theses and Dissertations*. 147.
<https://scholarworks.sfasu.edu/etds/147>

This Dissertation is brought to you for free and open access by SFA ScholarWorks. It has been accepted for inclusion in Electronic Theses and Dissertations by an authorized administrator of SFA ScholarWorks. For more information, please contact cdsscholarworks@sfasu.edu.

A QUANTITATIVE STUDY OF THE RELATIONSHIP BETWEEN ATHLETIC SPENDING AND INSTITUTIONAL ENROLLMENT MEASURES IN FCS ATHLETIC INSTITUTIONS

Creative Commons License



This work is licensed under a [Creative Commons Attribution-Noncommercial-No Derivative Works 4.0 License](https://creativecommons.org/licenses/by-nc-nd/4.0/).

**A QUANTITATIVE STUDY OF THE RELATIONSHIP BETWEEN ATHLETIC
SPENDING AND INSTITUTIONAL ENROLLMENT MEASURES IN FCS
ATHLETIC INSTITUTIONS**

by

Robert D. McDermid, B.A., M.A., M.P.A., M.B.A.

Presented to the Faculty of the Graduate School of

Stephen F. Austin State University

In Partial Fulfillment

of the Requirements

For the Degree of

Doctor of Education

STEPHEN F. AUSTIN STATE UNIVERSITY
(May 2018)

**A QUANTITATIVE STUDY OF THE RELATIONSHIP BETWEEN ATHLETIC
SPENDING AND INSTITUTIONAL ENROLLMENT MEASURES IN FCS
ATHLETIC INSTITUTIONS**

by

Robert D. McDermand, B.A., M.A., M.P.A., M.B.A.

APPROVED:

Patrick M. Jenlink, Ed.D., Dissertation Chair

Scott Bailey, Ed.D., Committee Member

Stephen Kosovich, Ph.D., Committee Member

Jason Reese, Ph.D., Committee Member

Troy Davis, Ph.D., Interim Chair, Department of
Secondary Education and Educational Leadership

Pauline Sampson, Ph.D.,
Dean of Research and Graduate Studies

ABSTRACT

As university budgets face fiscal challenges, it is important that university leaders make smart fiduciary choices. University leaders are quick to argue that athletics act as a front porch for universities, are a fundamental part of collegiate life, and that increased athletic funding will lead to enrollment increases and higher quality applicant pools. Critics of athletic spending, on the other hand, argue that money spent on college sports could be spent in other areas of the university.

Using a regression analysis similar to previous research, the purpose of this panel data regression analysis was to examine the relationship between intercollegiate athletics and college enrollment at FCS schools during the period between 2003 and 2015. Specifically, the researcher sought to examine whether institutional athletics expenditures had an impact on the total enrollments, number of applications, or quality of applicants at each of the universities within the Southland Conference.

The results of this study showed virtually no relationships between athletic spending and any of the dependent variables under study. Instead, the findings of this research suggested that at the FCS level, institutional spending on athletics did not statistically significantly impact university enrollment, application or student quality measures.

ACKNOWLEDGEMENTS

To my wife, Lawren, and my children, Robert David and Reid Lawrence, you are my loves and I did all of this for you. Thank you for your patience, I know it will all be worth it.

Thank you my chair Dr. Patrick Jenlink. Your encouragement throughout this process has been invaluable and your support has allowed my journey to be among the most valuable of my life.

Thank you to my committee members, Dr. Stephen Kosovich, Dr. Jason Reese and Dr. Scott Bailey, all of whom provided valuable insights that helped make my research richer than it otherwise could have ever been.

“If I have seen further than others, it is by standing on the shoulders of giants.” – Isaac Newton.

DEDICATION

I would like to dedicate this dissertation to my children, Robert and Reid, to whom I have sage advice.

Boys, education isn't about memorizing facts or passing tests. School isn't the only place where facts exist. Teachers aren't the only people who can impart knowledge. Information is everywhere. Learning never ends. Your mind will never stop expanding. Don't stop educating yourself just because you've "graduated" or because you've earned a "degree" or "diploma." Feed your mind, boys.

Boys, if you're not sure what that looks like, hopefully I'll be in the other room reading. Just come and ask.

TABLE OF CONTENTS

	Page
ABSTRACT.....	iii
ACKNOWLEDGEMENTS.....	vi
DEDICATION.....	v
TABLE OF CONTENTS.....	vi
LIST OF TABLES.....	ix
I. INTRODUCTION TO THE STUDY.....	1
Introduction.....	1
Background of the Problem.....	3
Theoretical Foundation.....	6
Statement of the Problem.....	14
Purpose Statement.....	15
Research Questions.....	15
Significance of the Research.....	16
Definition of Terms.....	17
Assumptions.....	21
Limitations/Delimitations.....	22
Organization of the Study.....	22

II.	LITERATURE REVIEW	25
	Introduction.....	25
	Athletics in Higher Education.....	27
	FCS Athletics	29
	Psychological Benefits of Intercollegiate Athletics	31
	Institutional Spending and Athletic Success.....	32
	Athletic Success and Student Test Scores	35
	Athletic Success and Admissions Applications	42
	Athletic Success and Financial Giving	50
	Athletic Success and Other Institutional Outcomes.....	57
	De-Escalation of Commitment in Intercollegiate Athletics.....	60
	Dropping Intercollegiate Football and Institutional Enrollment.....	65
	Fixed Effects Modeling.....	67
	Summary	70
III.	METHODOLOGY	73
	Introduction.....	73
	Purpose.....	74
	Research Questions.....	74
	Research Design.....	74
	Instrumentation	76
	Sample.....	77
	Data Collection	78

	Data Analysis	80
	Summary	82
IV.	FINDINGS	84
	Introduction.....	84
	Descriptive Statistics.....	85
	Summary Statistics.....	97
	Results of Research Questions.....	99
	Research Question 1 – Total Undergraduate Enrollment	99
	Research Question 2 – Undergraduate Applications	101
	Research Question 3 – Applicant Quality.....	107
	Summary	114
V.	SUMMARY, CONCLUSIONS, IMPLICATIONS, AND FUTURE RECOMMENDATIONS	115
	Introduction.....	115
	Summary of the Study	117
	Implications.....	122
	Recommendations for Future Research	124
	Concluding Remarks.....	127
	REFERENCES	130
	VITA	147

LIST OF TABLES

Table	Page
1. Descriptive Statistics - Total Expenses in the Southland Conference (2003-2015).....	86
2. Descriptive Statistics - Total Undergraduate Enrollment in the Southland Conference (2003-2015).....	88
3. Descriptive Statistics - Undergraduate Applications in the Southland Conference (2003-2015).....	90
4. Descriptive Statistics - SAT Critical Reading Scores in the Southland Conference (2003-2015).....	92
5. Descriptive Statistics - SAT Math Scores in the Southland Conference (2003-2015).....	94
6. Descriptive Statistics - ACT Composite Scores in the Southland Conference (2003-2015).....	96
7. Summary Statistics.....	98
8. Fixed Effects Regression for Total Undergraduate Enrollment in the Southland Conference (2003-2015).....	101
9. Fixed Effects Regression for Male Undergraduate Applications in the Southland Conference (2003-2015).....	103
10. Fixed Effects Regression for Female Undergraduate Applications in the Southland Conference (2003-2015).....	104
11. Fixed Effects Regression for Total Undergraduate Applications in the Southland Conference (2003-2015).....	106
12. Fixed Effects Regression for SAT Critical Reading 25th Percentile Scores in the Southland Conference (2003-2015).....	108

13	Fixed Effects Regression for SAT Critical Reading 75th Percentile Scores in the Southland Conference (2003-2015)	109
14	Fixed Effects Regression for SAT Math 25th Percentile Scores in the Southland Conference (2003-2015).....	110
15	Fixed Effects Regression for SAT Math 75th Percentile Scores in the Southland Conference (2003-2015).....	111
16	Fixed Effects Regression for ACT Composite 25th Percentile Scores in the Southland Conference (2003-2015).....	112
17	Fixed Effects Regression for ACT Composite 75th Percentile Scores in the Southland Conference (2003-2015).....	113

CHAPTER I

Introduction to the Study

Introduction

The role that intercollegiate athletics have played in higher education has been dynamic and evolving since the first competitive athletic contests took place between American colleges in the middle of the 19th century. Athletic departments have evolved to be perceived as an essential element of the American collegiate experience, so much so that schools often regard intercollegiate athletics as a necessary expense in order to attract and enroll students. Athletics can be deemed mission-enhancing because participation provides valuable learning opportunities for student athletes and enhances the larger student body by providing a common bond (Toma, 2003).

As college costs have increased substantially in recent years, the debate surrounding the purpose of intercollegiate athletics has become even more pronounced and has become a focal point of public discussion (Desrochers, 2013). Many observers have argued that intercollegiate athletics are an essential component of college life, and act as a marketing tool for the institution, while others have noted that the cost to maintain high-level athletics departments has spiraled out of control.

The offsetting benefits that are thought to justify these costs include large presumed financial returns to the most successful football and basketball programs; the pleasure of competing; positive effects on school spirit; stronger ties to alumni as well as local communities; and increased visibility for the school. (Turner, Meserve & Bowen, 2001, p. 813)

Increasingly, however, “. . . scholars and critics have raised questions about whether these programs are worth what they cost . . .” (Turner, Meserve & Bowen, 2001, p. 813).

Collegiate athletic programs are often regarded as the front porch of the university, a tool that colleges can use to expand their brands and generate interest in their schools from potential students (Bass, Schaeperkoetter & Bunds, 2015; Chudacoff, 2015; Fisher, 2009, Lavigne & Schlabach, 2017). The necessity of maintaining intercollegiate athletics programs has become the crux of ongoing arguments between college administrators, faculty, presidents and boards of trustees, all of whom have differing priorities and perceived goals for their universities. While many presidents firmly support the advertising effects of intercollegiate athletics, others like Duderstadt (2001) argue that “. . . the mad race for fame and profits through intercollegiate athletics is clearly a fool’s quest . . .” (Duderstadt, 2001, p. 146). Nowhere is this debate more obvious than at mid-sized regional colleges and universities that compete at the NCAA Division 1 FCS level, where students contribute large percentages of their tuition and student fee money to pay for intercollegiate athletics programs (Desrochers, 2013; Johnson, 2014).

Background of the Problem

Researchers have identified the shifting market for higher education as causing a growing rift between colleges and their collegiate athletic programs. Specifically, the traditional funding sources for universities, such as state and federal government appropriations, are shrinking at a time when college is increasing in costs (Cheslock & Knight, 2015). Many universities will likely face difficult challenges in the near future as they are reaching their price ceilings with regard to increasing the cost of tuition for their students, and are subsequently running out of ways to increase revenues (Bass, Schaeperkoetter & Bunds, 2015; Cheslock & Knight, 2015). With regards to intercollegiate athletics, there are only a handful of elite level Division I athletics programs producing the bulk of all revenues for all of college athletics, mainly through television revenues, while the vast majority of schools lose large sums of money supporting college sports (Bok, 2009; Desrochers, 2013). Following the economic recession of 2008 “. . . academic resources were strained (and) only the FBS reined in escalating athletic spending per athlete in 2010; nevertheless, athletic subsidies per athlete continued to increase in all subdivisions despite these financial constraints . . . ” (Desrochers, 2013, p. 2). As traditional university revenue sources continue to shift away from higher education, the schools most responsible for the revenue generation are increasingly more likely to find ways to maintain a tight grip on revenues, leaving smaller schools with even fewer financial resources in which to support themselves (Cheslock & Knight, 2015; Labaree, 2017).

As the revenues at the largest schools rises a cascading effect on expenditures takes place where these schools will continue to spend more money on intercollegiate athletics, and the effect will be that smaller schools will look to increase their spending to keep up with big-time programs but will not have the additional revenue sources necessary to balance their budgets (Bass, Schaeperkoetter & Bunds, 2015; Desrochers, 2013; Estler & Nelson, 2005). Without traditional revenue sources available to fill in the growing gap between income and expenditures, smaller schools will seek even more revenue from student fees and other university subsidies (Bass, Schaeperkoetter & Bunds, 2015; Cheslock & Knight, 2015; Desrochers, 2013; Estler & Nelson, 2005). Subsidies and student fees are frequently used by institutions to support numerous activities, which help the universities meet their overall academic and social missions (Denhart & Ridpath, 2011). In many cases,

. . . institutional subsidies implicitly drain resources that could otherwise support the core academic missions of teaching and research. General tuition fees may be raised to cover academic costs that would have been fundable from other revenues were it not for rising athletic costs . . . (Denhart & Ridpath, 2011, p. 1)

The challenge facing university leaders with regards to athletics is whether the increased financial investment in intercollegiate athletics creates the returns on those investments and furthers the overall mission of higher education (Denhart & Ridpath, 2011; Desrochers, 2013). “The difficult question facing colleges and universities . . . ,” Cheslock and Knight argued, “. . . is how much to subsidize each mission-enhancing activity given limited funds . . . ” (Cheslock & Knight, 2015, p. 436). Jones (2014b)

argues that “. . . some college administrators are considering whether the expense of football outweighs the benefits of fielding a team . . .” (Jones, 2014b, p. 108). As the financial climate for higher education shifts dramatically, university leaders must assess whether investment in athletics is a good or better investment than other campus activities or academic initiatives that could better serve the broadest goals of their institutions.

As college costs swelled throughout the late 1990s through 2007, so did the spending on collegiate athletics, where revenues and expenses are tied closely with tuition costs and student fees (Bass, Schaeperkoetter & Bunds, 2015). When the Great Recession began in 2008 and states began cutting appropriations to higher education, the costs of attending college increased even more and the burden to pay for school shifted from the state to the student, but costs to maintain athletic programs did not shrink (Johnson, 2014). Increased spending on college athletics during this period has often led to deficits that have been augmented by university finances (Denhart & Ridpath, 2011; Hearn, 2002). Following the recession and thanks largely to the increased television contracts provided to athletic conferences from ESPN and other cable sports channels, a series of conference realignments took place in 2010 that had a dramatic effect on the landscape of Division 1 athletics programs, as large athletic programs huddled together in the ‘Power 5’ conferences that had financially lucrative media contracts (Hoffer & Pincin, 2016).

Mid-sized and smaller Division 1 programs were left to compete in conferences that could no longer attract as much media attention, and thus lower payouts, but had to

compete athletically against teams from the larger conferences in order to maintain their Division 1 status. Mid-sized athletic conferences took on roles that traditionally were left to larger conferences, and their missions changed dramatically. As Hawkins (2010) noted, “. . . although the original purpose of (the NCAA and Division 1 conferences) existence was legislative, they have evolved to be in the business of marketing goods and services and wealth distribution . . .” (p. 133). The need to keep competing at the highest levels, and the draw to increase spending to do so, created disconnects between the goals of athletic programs and the financial needs of students in higher education throughout the country. Athletic departments believe that funding winning programs should be a priority at universities that want to compete in Division 1 sports, while the increasing costs to maintain winning programs are being absorbed by students who are already paying more for college than at any point in history (Fulks, 2009).

Theoretical Foundation

The challenge for university policy makers is to decide whether the investment in college athletics is worth it to further the mission of the university itself. Debate exists between groups who support the idea that intercollegiate athletics are an essential component of college life, and act as a marketing tool for the institution, while those who oppose athletic spending argue that the cost to maintain high-level athletics departments has spiraled out of control (Turner, Meserve, & Bowen, 2001). With the financial challenges facing many schools throughout the country, there is a serious need to discuss the role that athletics plays in the success or failure of institutions of higher learning.

Two theories were used to frame this study: economic arms race theory and Fort's (2013, 2016) agency theory. The dynamic friction between these two theories provides a theoretical foundation regarding how university administrators allocate money for athletic spending and how intercollegiate athletics are situated in relationship the broader university setting.

As Shulman and Bowen (2001) noted, “. . . it is almost impossible to have an extended conversation with an athletics director of a program operating at any level of play without hearing the metaphor of an arms race invoked . . .” (Shulman & Bowen, 2001, p. 227). From an economic perspective, an arms race is an extension of game theory similar to a prisoner's dilemma that occurs when two or more entities try to gain a competitive advantage over one another through increased spending on tools believed to provide them with a strategic leverage in the race to the goal (Von Neumann & Morgenstern, 1990). Typically each of the entities responds to the move made by their competitor in a sequenced game, with first movers achieving brief advantages over their opponents before equilibrium is re-established when the second entity makes its move. Militaristically this can be seen in the example of the nuclear arms race between the United States and Soviet Union during the Cold War, where each country built larger and more technologically sophisticated missile defense systems in order to render their opponents' obsolete (Nissani, 1992). Recognizing, however, that their own defense systems would quickly become obsolete once their opponents employed the same strategy, each side invested in further missile technology that would result in a (brief) advantage (Nissani, 1992). Since neither nation actually used the weapons on their

opponent, the cumulative effect of the nuclear arms race was a détente with an enormous price tag, the same outcome that could have been achieved at virtually no expense (Nissani, 1992).

Galbraith (1976) described the perpetuation of the nuclear arms race as being fueled by economic, bureaucratic and militaristic dynamics. Those who controlled the arms race had an incentive to keep the arms race going, even after it became clear that the same outcome could be achieved by negotiating an end to nuclear aggression. In laymen's terms, once the arms race became an arms race, it was a perpetual motion machine that could only end with the mutual destruction of the world or the inevitable collapse of one of the competitors (Galbraith, 1976). While each country believed that at each stage of the game they were obtaining an advantage over their opponent, history shows that neither nation achieved that aim through the arms race, and instead the out of control military spending may have, in fact, partially led to the collapse of the Soviet Union.

The nuclear arms race has been used as a metaphor to describe the increased spending on intercollegiate athletics as schools that seek anything other than winning national championships are often perceived as "surrendering" (Shulman & Bowen, 2001, p. 284). Instead of building intercontinental nuclear missiles, schools compete with one another to build bigger stadiums, improve ancillary facilities, increase coaches' salaries, and improve other amenities within their athletics departments (Bowen & Levin, 2003; Clotfelter, 2011; Getz & Seigfried, 2012). As one school improves its facilities, arms race theory suggests that other schools throughout the country do the same to keep pace

with the first mover and not fall victim to the advantage gained by their opponents (Getz & Seigfried, 2012; Hoffer, Humphreys, Lacombe & Ruseski, 2015). However, like the nuclear arms race between the USSR and United States, as each school makes a move to gain an advantage, that advantage is quickly negated by the move made by the next competitor, who builds a bigger stadium or finds a more marquee head football coach (Tsitsos & Nixon, 2012).

Arms race theory posits that while one school maneuvers to win more contests, it comes at a cost to another school, which must now raise its own bar to achieve the success it lost at the expense of another institution's success. This game-like behavior, however, simply provokes the first school to increase its spending to once again achieve success, and cumulatively both schools end up neutral because there will always be a loser (Stafford, 2010). Only through collective action taken at the highest levels of collegiate sport, at the NCAA level, to curb spending, the arms race theorist suggest, can a substantial change take place, as "unilateral disarmament" does not seem to be taking place (Bowen & Levin, 2003, p. 317).

While most frequently associated with the literal accumulation of nuclear weapons during the Cold War, economic arms race theory has been applied in a number of ways to research in intercollegiate athletics. Despite its typical connection to the Cold War experience, the arms race label has been applied to college athletics since before the First World War (Estler & Nelson, 2005). Arms race theory in college sports appears in the literature in an article by Edwards (1986) as it relates to increased spending on recruitment of college athletes following the passing of Proposition 48 and the impact

that rule would have on recruiting black athletes. Edwards argued that in the landscape of building winning athletic programs, “. . . there is today disturbingly consistent evidence that athlete recruitment and development among major collegiate football and basketball institutions (that) has degenerated into a spiraling ‘athletic arms race’ wherein student-athletes are both the most strategic material and chief casualties . . .” (Edwards, 1986, p. 24).

In their empirical study of the effects of college athletics on universities, Orszag and Israel (2009) framed one of their research questions as “. . . Division I-A athletic expenditures exhibit an ‘arms race,’ in which increased operating expenditures by schools in a conference are associated with increases at other schools in the same conference . . .” (Orszag & Israel, 2009, p. 11). The findings of the research question, the researchers noted, was that “. . . the data do provide some support for an arms race between schools in a given conference, or at least correlation between current and lagged athletic spending across schools in the same conference . . .” (Orszag & Israel, 2009, p. 12). Denhart and Ridpath (2011) used the phrase arms race to describe the rapidly increasing student fees being charged by universities to support athletic department subsidies. Clotfelter (2011) argued that the increase in spending on athletic facilities, coaches’ salaries and overall athletic spending “. . . certainly looks like an arms race in spending on athletics . . .” (Clotfelter, 2011, p. 123). Tsitsos and Nixon (2012) examined arms race theory through the lens of head football and men’s basketball coach’s salaries, and argue that the desire for colleges to attract star coaches drives up the value for coaches at a rate far exceeding other aspects of university spending.

In contrast to the arms race theory, Fort (2013, 2016) argued that university administrators are less naïve than arms race logic implies and that they, in fact, influence explicit agency over financial decisions regarding athletics spending. Fort noted that “. . . arms race logic, imposes strained assumptions about the cooperative setting and the naiveté of university administrators, along with a curious distinction of one type of revenue to reach its conclusions . . .” (Fort, 2016, p. 119). Furthermore, the researcher stated that the “arms race explanation completely omits the actual consideration of the university budgeting process . . .” (Fort, 2016, p. 119). The problem of the pervasiveness of the arms race theory, Fort argued, is that it is so extensive that it is casually referred to in academic research as well as public discourse and popular media regardless of its accuracy (Fort, 2016; Weight, Navarro, Huffman & Smith-Ryan, 2014). Fort noted that in recent literature, the term “arms race” has appeared casually in reference to themes in athletics on broad topics that extend beyond financial spending, including broad subjects like the psychological benefits of athletics participation, by organizations like the NCAA, and by advocacy groups such as the Drake Group and the Knight Commission on Intercollegiate Athletics (Drake Group, 2015; Fort, 2016; Knight Commission on Intercollegiate Athletics, 2009; Weight, et al., 2014).

Fort rejects the arms race theory because he believes that it neglects to consider the benefits that athletics bring to the university when challenging the costs; especially because proponents of the arms race explanation typically argue that any investment in college athletics is wasteful spending (Fort, 2013, 2016). Budget allocations to athletics, he argues, are “. . . comparatively small investments in values across the rest of the

campus that both university administrator objectives and cover their costs . . .” (Fort, 2016, p. 120). Furthermore, proponents of arms race spending, Fort argued, “. . . simply label the investment in the athletic department by university administrators as somehow different than ‘generated’ revenues and call it a ‘subsidy’ . . . (and) from this accounting fiction, athletic departments lose money if generated revenues are less than spending . . .” (Fort, 2013, p. 42). Agency theory considers the fact that athletic budgets are not forever expanding but instead are a reaction to the university administration’s willingness to spend on athletics. Rather than see Athletic Directors as naïve participants in an ongoing arms race, Fort argued that “. . . it is more reasonable to expect that ADs would simply scale back operations if they were told that university budget allocations to their department were to be phased out . . .” (Fort, 2013, p. 48).

Instead, agency theory argues that university administrators invest in college athletics because of their belief that the benefits of doing so impact the university at a level justifiable for the investment made to athletics. Fort (2013) connected athletic spending to broader trends in university spending when he states that

. . . university administrators invest significantly in all departments under their control. . . (and) in turn, these administrators expect a return along the dimensions that matter for their pursuits – research, teaching, and service...thus athletic departments are not a ‘drag’ on the university budget...instead they are just another investment center that yields a return that matters to university administrators . . . (Fort, 2013, p. 42)

Overall, agency theory posits that money spent on athletics is, according to university leadership, being put to its most economically advantageous use, for if it was allocated to other university departments the university would be reallocating “. . . their budget inefficiently relative to their end objectives of research, teaching, and service . . .” (Fort, 2013, p.44).

Where the arms race explanation relies on the argument that university administrators and athletic leaders are trapped in the arms race based on a naïve set of assumptions, agency theory argues that university administrators understand the financial relationship between athletics and their institutions (Bowen & Levin, 2003; Fort, 2013). Instead of seeing university administrators and athletic directors as naïve, Fort (2013) argued that those constituents are instead “. . . keenly aware of their environment . . .” and are not looking at athletic spending as a financial sinkhole (Fort, 2013, p. 27). Agency theory, then, focuses on answering the question of whether university administrators get a reasonable return on their financial investment in college sports (Fort, 2013).

The fundamental difference between the two theories, then, is the underlying motivation of university leaders to emphasize the importance of college athletics on their campuses and financially support athletics in order to meet institutional goals. Proponents of the arms race theory of athletic spending believe that institutions are caught in an unwinnable game and university administrators are naively spending finite resources on athletics with no measureable goal in play. Conversely, agency theorists suggest that the relationship between university leadership and athletic spending is more

nuanced and that university administrators invest in athletics because it is the best use of money to achieve desired institutional outcomes.

Statement of the problem

The problem addressed in this study was the absence of an economic model that predicts or demonstrates the relationship between athletic spending and FCS institutional admissions outcomes such as enrollment and student quality as defined by test scores in the period between 2003 and 2015. Without an economic model that explains the relationship between financial investment in athletics and measurable university enrollment and student quality outcomes, university leaders at the FCS level are left to make significant financial investments in athletics with virtually no conclusive proof to demonstrate the efficacy of the costs of college sports at their schools. Previous research has been mixed regarding the benefits for NCAA Division I colleges and universities from the existence of their intercollegiate athletics programs (Jones, 2014; Litan, Orszag & Orszag, 2003; Murphy & Trandel, 1994; Orszag & Israel, 2009; Toma & Cross, 1998).

There have been few studies that have specifically examined the enrollment impact of intercollegiate athletics on mid-major Division I schools, specifically schools placed in conferences outside of the Power 5 Football Bowl Subdivision (Cheslock & Knight, 2012; Cross, 1999; Lee, 2012). As university administrators look to allocate limited financial resources, the impact of the existence of athletics must be explored. Larger athletics departments at the Bowl Championship FBS level are better able than smaller departments at the Football Championship FCS level to offset the costs of athletics with revenues that athletics provides through channels such as ticket sales,

licensing agreements, and conference television contracts, and generally have a smaller proportion of their costs covered with student subsidies (Denhart & Ridpath, 2011).

The role of athletics, therefore, at these smaller schools must be examined separately from the trends occurring at the highest levels of college sports in order to get a true picture of the impact college athletics has on schools that are typically less visible than the largest schools competing in big-time college athletics.

Purpose Statement

The purpose of this panel data regression analysis was to examine the relationship between intercollegiate athletics and college enrollment of schools situated in the Southland Conference, a mid-major NCAA Division I athletic conference, during the period between 2003 and 2015. Specifically, the researcher sought to examine whether institutional athletics expenditures have an impact on the number of applications, enrollments or quality of applicants at each of the universities within the Southland Conference.

Research Questions

The following research questions were addressed:

1. What is the relationship between athletics spending and total undergraduate enrollment at Southland Conference member institutions during the period between 2003 and 2015?
2. What is the relationship between athletics spending and undergraduate applications at Southland Conference member institutions during the period between 2003 and 2015?

3. What is the relationship between athletics spending and applicant quality at Southland Conference member institutions during the period between 2003 and 2015?

Significance of the Research

Given the fiscal climate in higher education, it is important that university leaders make smart fiduciary choices that lead colleges and universities into the future without burying students with unnecessary debt due to their education. University leadership and others who control athletic budgets are often quick to argue that athletics are a fundamental part of collegiate life and must be financially supported at all costs. Others argue that increased athletic funding, beyond the general increases in annual operational costs, will lead to enrollment increases or higher quality applicant pools (Dosh, 2013). Critics of athletic spending point out that money spent on college sports could be better spent in other areas of the university, specifically in academic areas (Desrochers, 2013).

Given the lack of existing research on the empirical effects of institutional athletic expenditures on enrollment outcomes and student quality at the Division I FCS level, the pros and cons of college sports at this level are highly ambiguous. By focusing specifically on admissions and enrollment effects of athletics at the Division I FCS level, this study provides a unique lens for university leaders to begin discussing the relationship between athletic spending and institutional outcomes at this level of college athletics.

Specifically, faculty, administrators, and university leaders at Southland Conference member institutions can use the findings of this study to guide future policies

on athletics spending knowing how athletics affects measurable university outcomes. From a broader perspective, FCS and Division I-AAA schools could use these findings to influence policy decisions on their campuses, but with their unique regional and institutional variables in mind.

Definition of Terms

This study specifically examined the relationship between institutional athletic expenditures and enrollment and student quality as measured by test scores at schools positioned within the Southland Conference, an NCAA Division I FCS intercollegiate athletics conference. For the purposes of this study, the following definitions provide clarity of the conceptual terms examined.

Intercollegiate athletics.

Competitive sports organized between two or more colleges or universities and organized through the National Collegiate Athletic Association (NCAA) or National Association of Intercollegiate Athletics (NAIA) (Brunet, 2010).

National Collegiate Athletic Association (NCAA).

The NCAA is a membership organization consisting of more than 1000 colleges and universities throughout the United States and Canada that sponsor intercollegiate athletics (NCAA, 2016). The NCAA breaks schools down into three classifications, Division I, Division II and Division III. Division I schools generally have the largest student bodies and manage the largest athletics budgets. Division I is broken into three sub-categories: Football Bowl Championship Series (BCS/FBS/DI-A), Football Championship Series (FCS/DI-AA) and non-football schools (DI-AAA). The level of

competition at the Bowl Championship Series level is considered the highest within Division I, with the other two sub-categories being less competitive but still higher than Division II or Division III (NCAA, 2016).

Football Championship Subdivision (FCS).

The characteristics of Division I Football Championship Subdivision (FCS) and Division I non-football playing, formerly Division I-AA, athletics departments are key to understanding the unique challenges these institutions have when competing within NCAA Division I athletics. When compared to Division I Football Bowl Subdivision (FBS) institutions, FCS schools sponsor fewer NCAA championship sports, fourteen as opposed to the FBS requirement of sixteen, including football, with each sport meeting broader NCAA participation requirements in order to count towards sponsorship status (Bass, Schaeperkoetter & Bunds, 2015; NCAA, 2017). FCS schools must schedule at least 50% of their regular season football contests against other Division I opponents, but can maintain a lower football home game attendance requirement to maintain membership (to meet higher FBS requirements a school must average more than 15,000 actual or paid attendees per home contest throughout a regular season) (Bass, Schaeperkoetter & Bunds, 2015; NCAA, 2017).

Scholarship limits at the FCS and non-football Division I level are lower than at the Division I FBS level, with FCS institutions only permitted to issue 63 scholarships in football (FBS schools can award up to 85) and with all schools having the ability to award less total financial aid or athletics grants-in-aid to the total number of athletes in all other sports (Bass, Schaeperkoetter & Bunds, 2015; NCAA, 2017). Overall, the total

budgets for Division I FCS schools in 2015-2016 ranged from \$4.3 million to \$45.2 million, and for Division I non-football playing schools ranged from \$3.9 million to \$35.8 million. In both cases, the averages for the two subdivisions was far below Division I Football Bowl Subdivision institutions, whose budgets in 2015-2016 ranged from \$13.05 million to \$155.3 million (Equity in Athletics Data Analysis Cutting Tool).

In total, just twenty-four Division I athletic departments, all FBS programs, earned positive revenue in 2015-2016, with net losses for all FBS schools averaging more than \$15 million (Equity in Athletics Data Analysis Cutting Tool). No Division I FCS or non-football institute during that period produced a net profit, and all schools in the two subdivisions relied heavily on institutional student fees and subsidies to balance their budgets. On average, FCS institutions received 71% of their revenues from student fees and other institutional financial transfers, while non-football institutions received an average of 77% of their revenues from fees and subsidies. Furthermore, FCS institutions operated at an average net loss of more than \$11 million dollars (with a range from a high of \$35.7 million to a low of \$2.1 million) while non-football schools lost an average of \$10.7 million (with a range of \$31.2 million to a low of \$2.8 million) (Equity in Athletics Data Analysis Cutting Tool).

Southland Conference.

An NCAA FCS athletic conference formed in 1963 and headquartered in Frisco, Texas, whose membership currently consists of 13 member schools geographically located in Texas, Louisiana and Arkansas. Member institutions include Abilene Christian University (FCS), Houston Baptist University (FCS), the University of

Incarnate Word (FCS), the University of New Orleans (Div I-AAA), the University of Central Arkansas (FCS), Lamar University (FCS), McNeese State University (FCS), Nicholls State University (FCS), Northwestern State University (FCS), Sam Houston State University (FCS), Southeastern Louisiana University (FCS), Stephen F. Austin State University (FCS) and Texas A&M University-Corpus Christi (Div I-AAA) (Southland Conference, 2016).

Institutional athletic expenditures.

All direct and indirect revenues and expenses related to intercollegiate athletics programs, as reported annually to the Office of Postsecondary Education of the U.S. Department of Education. Revenue items include all student fees directly allocated to athletics, all direct institutional support, which are financial transfers directly from the general fund to athletics, indirect institutional support, such as the payment of utilities, maintenance, support salaries, etc. by the institution in behalf of athletics, and direct governmental support including the receipt of funds from state and local governmental agencies that are designated for athletics. Additionally, generated revenues are produced by the athletics department and include ticket sales, radio and television receipts, alumni contributions, guarantees, royalties, NCAA distributions, and other revenue sources that are not dependent upon entities outside the athletics department (Fulks, 2009; Orzag & Israel, 2009). Expense items include athletic student aid in the form of student scholarships, living expenses and cost of attendance, coach salaries, benefits and bonuses, support staff and administrator salaries and benefits, game expenses, game guarantees,

operating expenses such as travel, equipment and maintenance, medical expenses and recruiting expenses (Fulks, 2010; Orzag & Israel, 2009).

Undergraduate enrollment.

The sum of students enrolled for credit with each student counted only once during the reporting period, regardless of when the student enrolled in a 4- or 5-year bachelor's degree program, an associate's degree program, or a vocational or technical program below the baccalaureate (National Center for Education Statistics, 2016).

Applicant quality.

Student academic quality as assessed by using average SAT Critical Reading, SAT Math and ACT Composite 25th and 75th percentile scores (Tucker & Amato, 2006; US News & World Reports, 2016).

Assumptions

Throughout this research, the researcher assumed that the data being examined was accurate and had been reported correctly and honestly by each institution in the Southland Conference during the period from 2003 through 2015. The data sources used, such as the Equity in Athletics Data Analysis Cost Cutting Tool, and the Integrated Postsecondary Education Data System are the most common archival data sites for information related to higher education spending and enrollment trends, and are the most commonly used data sets employed throughout the relevant literature. Furthermore, government sites such as the National Center for Education Statistics and the United States Bureau of Economic Analysis are both robust longitudinal data sets that have collected, maintained, and distributed publically available archival data since the 1970s.

Limitations/Delimitations

The sample for this study was limited to schools that had competed athletically in the NCAA Division I Southland Conference between the 2003 and 2015 academic years. During this time period a handful of schools left the conference to join larger athletic conferences during the conference realignment period that began in 2010, and additional schools were added as replacements to maintain enough membership in the conference to continue competing at the Division I level. Due to the size and region of the Southland Conference, the findings of this study cannot be generalized to all institutions throughout the country, especially those at different levels of NCAA membership. Since the data collected for this study took place during two significant transitional periods for higher education and athletics, the Great Recession and conference realignment, the findings may not be indicative of future trends in enrollment at the institutions being studied.

A potential concern was avoided in this study by selecting a date range from 2003 to 2015. In 2016 the SAT test was substantially redesigned and given a new weighting structure, which could substantially shift the findings of this study. To delimit that possibility, the years under study for this research include only those in which the SAT test was administered in a standard manner. A similar concern arose in the Pope and Pope (2009) study, where SAT data was significantly skewed by the major overhaul of the test in 1995, and thus created a challenge for accurate data analysis.

Organization of the Study

This study consists of five chapters, including (1) the introduction, (2) a review of the relevant literature regarding the intersection of intercollegiate athletics and

institutional outcomes, to gain a better understanding of the research questions, (3) an explanation of the research methods employed by this study to answer the research questions, (4) the findings of the data collection and statistical regressions, and (5) the summary, conclusions, implications and recommendations of this research.

Specifically, Chapter I provides the reader with an introduction to intercollegiate athletics and its role within higher education, introduces the problem being studied, provides a background of the problem in the context of this study, defines the purpose of the study, the significance of the study, and describes how the study will be organized.

Chapter II introduces the relevant literature surrounding intercollegiate athletics, higher education, and the relationship between athletic investment and success and institutional outcomes. A variety of literature is examined, including sources that address issues such as the psychological benefits of intercollegiate athletics, the relationship between athletic spending and on-field success, the relationship between athletic achievement and institutional enrollment measures, the de-escalation of commitment in athletics, and the enrollment effects of discontinuing Division I intercollegiate athletics programs. The conclusion of the chapter provides an explanation of fixed effects modeling and its relevance to the literature and application on previous studies.

Chapter III introduces the research methodology used by the researcher when answering the research questions explored in this study. This chapter discusses the fixed effects regression model used to address the research questions and explains the model's instrumentation. The chapter further describes the research design, sampling, data collection and data analysis used for this study.

Chapter IV examines the findings of the data collection and fixed effects regression analyses used by the researcher when exploring the research questions in this study. Descriptive statistics are provided to establish the context of the findings and then the results of ten separate regression analyses are presented with specific attention paid to the statistically significant relationships in the data.

Chapter V provides a summary conclusion for the study and a space where the researcher explores the implications of the research findings. This chapter also discusses recommendations for future research based on unanswered questions in this research and also concludes the research paper entirely.

CHAPTER II

Literature Review

Introduction

The impact of college athletic success in relation to the broader goals of higher education is an issue that has in recent years been explored by scholars from a number of different perspectives through a wide variety of academic disciplines. There have been a number of quantitative and qualitative studies on the effects of intercollegiate athletics on college admissions, student application quality, enrollment and retention, and university prestige (Basten, 2002; Brunet, 2010; Harshaw, 2009; Peterson-Horner & Eckstein, 2015; Pope & Pope, 2009; Toma & Cross, 1998). These studies have come from disciplines as different as economics, psychology, education and public policy with each discipline providing its own theoretical lens to assess the role that intercollegiate athletics has within higher education.

The purpose of this panel data regression analysis was to examine the relationship between intercollegiate athletics and college enrollment of schools situated in the Southland Conference, a mid-major NCAA Division 1 athletic conference, during the period between 2003 and 2015. In the process of addressing this purpose, the following research questions were addressed:

1. What is the relationship between athletics spending and undergraduate applications at Southland Conference member institutions during the period between 2003 and 2015?
2. What is the relationship between athletics spending and total undergraduate enrollment at Southland Conference member institutions during the period between 2003 and 2015?
3. What is the relationship between athletics spending and applicant quality at Southland Conference member institutions during the period between 2003 and 2015?

This literature review explores the existing literature on the relationships between intercollegiate athletic expenditures and institutional athletic and academic outcomes, and exposes the gap where there is an absence of an economic model that predicts or demonstrates the relationship between athletic spending and FCS institutional admissions outcomes in the period between 2003 and 2015. Additionally, this review introduces the topic of Division 1 intercollegiate athletics at the FCS level, examines the qualitative links between collegiate athletics and higher education, the links between athletic spending and athletic success, the relationship between athletic success and institutional enrollment and student quality outcomes, the relationship between athletic success and fundraising and alumni support, and the growing debate over commitment de-escalation in collegiate athletics and the institutional consequences of eliminating big-time Division I athletics.

Athletics in Higher Education

The development of college athletics and athletics' integration into higher education has been documented by a number of researchers, each of whom has added to the conversation of the role that sports play in the university community. From the earliest research on the topic, the question of the purpose of athletics has been asked, especially “. . . whether an institution in the social order whose primary purpose is the development of the intellectual life can at the same time serve as an agency to promote business, industry, journalism, salesmanship and organized athletics on an extensive commercial basis . . .” (Savage, 1929, p. viii). Most scholars agree that athletics occupies a challenging position with higher education and is most often linked to the university through commercialization, spectacle, and an outsized role on campus when compared to the undergraduate educational missions of the schools (Bok, 2003; Estler & Nelson, 2005; Sperber, 2000; Yost, 2010; Zimbalist, 1999).

Smith (1988) argued that college athletics have played a significant role in the collective social imagination of the public American university since the first competitive boat race between Harvard and Yale in 1852. He connected the present to the past through the themes of commercialization and professionalism in college sports, using the sponsorships of the first boat race and the payment of the racers as anchors for the big-time television revenues from modern Division I athletics contests and the recruitment scandals in late-20th century college basketball (Smith, 1988). He argued that college sports has always served a commercial function within higher education, acting as a marketing tool for institutions even during the earliest years of college football, baseball

and, later, basketball (Smith, 1988). Smith's argument is confirmed by Sack and Staurowsky (1998) who stated that

Few campus activities could better meet (commercialized needs) than intercollegiate sport. Nothing could better attract the attention of mass media, and nothing had a greater appeal to the practical minded business leaders who provided financial support and who increasingly came to dominate academe's governing boards. (Sack & Staurowsky, 1998, p. 20)

Sperber (2000) argued that higher education as a social institution in the United States experienced mission drift in the late twentieth century as it shifted its focus from educating young people to providing numerous avenues for entertainment including big time college athletics, a phenomenon he called "beer and circus" (Sperber, 2000, p. xiv). More important than challenging work in the classroom was the university's goal of fielding a winning football or men's basketball team and making countless appearances on national television (Sperber, 2000). The television exposure ". . . of major college football games, with their two-minute promo spots on the academic aspects of the schools, indicates the disparity in emphasis. The subtext for viewers is: at these universities, college sports is far more important than undergraduate education . . ." (Sperber, 2000, p. 235).

Bok (2003) contended that the marketing and advertising of college athletics has served as a model for other areas of the modern university to take note of and replicate, especially as higher education has taken on a more commercialized role in the marketplace and replaced public funding with private dollars. Bok argued that modern

universities have focused many of their resources on developing revenue generating aspects of higher education, such as pursuing scientific grants, attracting corporate research dollars, and investing in high return-on-investment online and distance learning platforms, all of which follow the profit-oriented path started by athletics, and have moved away from more traditional education-focused initiatives on campus (Bok, 2003). He stated that “American universities, despite their lofty ideals, are not above sacrificing academic values – even values as basic as admissions standards and the integrity of their courses – in order to make money . . .” (Bok, 2003, p. 54). The commercial neoliberal model, Bok concluded, has become the dominant model for most institutions of higher education, and is a model built on the lessons learned from college athletics and the role that sports play in marketing the university (Bok, 2003).

FCS Athletics

As the growing competitive and financial disparities in college athletics began to galvanize throughout the 1950s and into the 1970s, the NCAA was forced to address the need to restructure its competitive arrangement due to the difficulty in maintaining competitive balance between large budget and small budget schools (Crowley, 2006; Gurney, Lopiano & Zimbalist, 2017). Beginning in 1973 the NCAA took steps to divide its member institutions into three subdivisions of schools that would be aligned more equitably among membership and would grant each subdivision the ability to set its own membership criteria (Crowley, 2006; Gurney, et al., 2017; NCAA, 2017). Pressing issues such as budgetary requirements, financial aid given to student-athletes, attendance requirements for athletic contests, and other cost measures could, following the

restructuring, be covered by different rules in each division (Crowley, 2006). This three tiered subdivision structure is still roughly the structure that the NCAA follows currently, with Divisions I, II and III. When subdivisions were introduced,

. . . 233 institutions aligned themselves in Division III, 194 chose Division II and 237 elected Division I as their home. Of the latter number, 111 did not sponsor football. Of the 126 that did, most operated major program in the sport. Many, though, did not. This difference proved to be significant . . . (Crowley, 2006, p. 89)

Shortly after its inception, however, Division I was determined by the membership to be too broad and encapsulated institutions that did not sponsor football, and five years after the division was created representatives from the largest revenue football playing institutions chose to further subdivide Division I into categories that would ensure that the highest grossing schools would capitalize most from the revenues they generated amongst themselves, especially among the growing television income (Crowley, 2006, Gurney, e.al., 2017). A 1978 amendment at the NCAA convention was passed by the association's membership to split Division I into additional subcategories, Division I-A (the largest revenue football institutions), who could compete for post-season bowl eligibility, and Division I-AA (all other Division I football playing members), who would compete in a post-season tournament to determine a national champion at that level (Crowley, 2006). In 2006, the Division I subdivisions were renamed, and Division I-A became Football Bowl Subdivision (FBS) and Division I-AA became Football Championship Subdivision (FCS) (Gurney, et al., 2017; NCAA, 2017).

Psychological Benefits of Intercollegiate Athletics

Qualitatively, researchers have explored issues as diverse as the psychological benefits that athletics may have on undergraduate students, the effect that athletics has on the perception of institutional reputation for colleges, the escalation of commitment on athletic spending, and the perception of university presidents on the role of athletics at their institutions (Bouchet, 2011; Briody, 1996; Huffman, 2013). The attitudes and perceptions of college presidents, undergraduate students, faculty, fans, and other stakeholders is that intercollegiate athletics fills an important need in higher education, one that brings together the university community to support shared experiences and act as a marketing tool for the school (Basten, 2002; Briody, 1996; Bouchet, 2011; Brunet, 2010; Estler & Nelson, 2005; Huffman, 2013).

Psychological qualitative studies typically focus on the communal aspects of intercollegiate athletics and the psychic roles that game days have on the undergraduate experience (Frank, 2004; Kelly & Dixon, 2011; Kim, 2010; Lanter & Blackburn, 2015; Warner, Shapiro, Dixon, Ridinger, & Harrison, 2011). Frank (2004) noted that intercollegiate athletics events provide shared spaces where divergent student groups come together for common experiences. Other psychological research linked athletic success to retention by examining the social integration factor that athletics creates within a university (Harshaw, 2009). Lanter and Blackburn (2015) examined the relationship between men's basketball success and student self-esteem and found that students who had a connection to athletics experienced an increase in self-esteem following a period of athletic success. Another common theme of qualitative studies was that intercollegiate

athletics is the front porch of the university and has a dynamic marketing effect that cannot be removed from the typical college experience because institutional reputation is directly related to the perceived prestige of the institution and the athletic success it achieves (Cross, 1999; Lifschitz, Sauder, & Stevens, 2014).

Overall, the findings presented in the qualitative research indicated that there is an emotional and psychological benefit for a university to support a winning athletic program. The challenge with using these qualitative findings to direct institutional spending policy is that the conclusions are based primarily on opinions and perceptions of the importance of athletics rather than data or more scientific methods of study.

Institutional Spending and Athletic Success

The links between institutional spending and athletic success have been explored by a number of researchers with the purpose of finding the relationship between financial investments in sports and the level of sports success schools can expect with increased athletic budgets (Jones, 2013; Lawrence, Li, Regas & Kander, 2012; Litan, Orszag & Orszag, 2003; Orszag & Israel, 2009;). Litan et al. (2003), as part of their broader empirical study of the overall effects of athletic success on institutional outcomes, used a cross sectional time series panel data set and fixed effects model to explore data from 1993 to 2001 and found that there was no statistically significant relationship between financial spending and on-field outcomes at Division I FBS schools (Litan et al., 2003). The authors concluded that their model “. . . suggests no statistical relationship between changes in operating expenditures on football and changes in football winning percentages between 1993 and 2001 . . .” (Litan et al., 2003, p. 4).

Orszag and Israel (2009) performed a similar study to Litan et al. (2003) on big-time FBS schools using data from 2004 to 2007 and found a small, statistically significant, relationship between institutional financial investment in athletics and on-field success, whereby an investment of approximately \$1 million additional dollars into a school's football program was estimated to improve an FBS football team's chances of winning by approximately 1.8 percentage points (Orszag & Israel, 2009). The finding, however, was localized only to additional spending on team expenditures such as recruiting, travel and equipment, and there was no significant relationship between coaching salaries or scholarships and a team's winning percentage (Orszag & Israel, 2009). Furthermore, the authors found that the same effect was not seen when applying the same spending to the other traditional revenue sport, men's basketball (Orszag & Israel, 2009).

Lawrence, Li, Regas and Kander (2012) investigated the predictors of athletic success by exploring National Association of Collegiate Directors of Athletics (NACDA) Directors' Cup standings and the variables that contribute to institutional rankings in that measure. The researchers chose to examine the Cup standings because the NACDA Director's Cup is an overall athletic department competition that judges athletics success in a broader scope than just football and men's basketball on-field success (Lawrence, Li, Regas & Kander, 2012). Using a stepwise regression analysis, the researchers found that there were statistically significant relationships between institutional financial investments in women's sports and non-gender specific areas (such as administrative costs, marketing costs, athletic training equipment, and facility costs) and overall athletic

success as judged by the Director's Cup standings (Lawrence et al., 2012). The findings of this study indicated that overall athletic success, as judged by NACDA Director's Cup standings, were more positively impacted by financial investments in women's sports and administrative costs than in men's sports like football and basketball, which were findings different from similar studies that defined athletic success through FBS football and men's basketball only (Lawrence et al., 2012).

Jones' (2013) fixed effects regression analysis of the relationship between athletic department expenditures and overall athletic department on-field success found that there was a strong correlation between institutional financial investment in athletics and on-field performance among top level Football Bowl Subdivision institutions but not at lower levels of Division I athletics (Jones, 2013). The findings of the study suggested that FBS level athletic programs could expect to see a 1.08 point increase in Director's Cup standings for every additional 1% invested into their athletic programs, but FCS level institutions saw no such increase as a result of additional financial investment (Jones, 2013). The author suggested that the finding of a relationship between spending and winning at the FBS level, but not at all other levels of Division I, might be a result of how spending increases are applied at each level of Division I athletics. Jones suggested that at FBS institutions the spending can be directly applied to areas that have been shown to aid in winning, such as recruiting, whereas at non-FBS schools the spending increases are more likely to be used to fund ". . . areas not directly related to competitive success, such as administrative costs or increasing the number of student athletics participating in intercollegiate athletics . . ." (Jones, 2013, p. 602).

Overall, the relationship between institutional athletic spending and athletic success at the highest level of collegiate sport were inconclusive. Litan et al. (2003) were unable to find a relationship in spending and athletic success using panel data from 1993-2001, while Orszag and Israel (2009) were able to find a small positive effect of increased spending for football programs. Lawrence, et al. (2012) found that only spending on non-revenue and women's sports showed to be significantly correlated with higher rankings in the NACDA Director's Cup standings, while Jones (2013) found that there was a positive relationship between spending and Director's Cup standings, but only for FBS level teams and not at the lower levels of collegiate athletics. Multiple studies of this relationship at the FCS level have not been undertaken, and therefore that relationship is still relatively unknown with the exception of Jones' (2013) findings.

Athletic Success and Student Test Scores

Beyond linking athletic spending and athletic success, a number of studies have sought to find the relationship between on-field athletic success and student academic outcomes. As universities look to attract the highest quality students, athletics is often promoted as a way to increase the quality of students, specifically with regards to incoming freshman standardized test scores (Litan, Orszag & Orszag, 2003; McCormick & Tinsley, 1987; Tucker & Amato, 1993). One of the earliest studies on the impact of athletics success on student applicant quality was McCormick and Tinsley's (1987) ordinary least squares analysis of the relationship between the presence of intercollegiate athletics and student test score quality at the Division I level using data collected between 1971 and 1984. Using participation in major athletics as the unit of measurement, and

controlling for all other institutional factors, the researchers found that schools that competed in high level Division I athletics had an undergraduate student population with higher overall SAT scores than schools that competed at lower levels or did not compete in intercollegiate athletics at all (McCormick & Tinsley, 1987). The researchers also found that there was a marginally significant relationship between an increase in an institution's football winning percentage and overall student SAT scores, which they suggest as evidence that athletic success “. . . is associated with academic quality . . .” and that there “. . . is evidence of a symbiotic relation between athletics and academics on many college campuses . . .” (McCormick & Tinsley, 1987, pp. 1007-1008). The author's suggested that athletic success could have an advertising effect for an institution, thus increasing the number of total applicants, and therefore allowing schools to become more selective in their admissions process (McCormick & Tinsley, 1987).

Litan, Orszag, and Orszag (2003) published an interim report commissioned by the NCAA that examined the relationship between athletic success and a large number of institutional outcomes, including incoming student test scores. The researchers collected data from a number of sources, including the Equity in Athletics Disclosure Act (EADA) database and the Integrated Post-Secondary Education Data System (IPEDS) database, for all Division I-A (FBS) schools for the period of 1993 to 2001 (Litan, Orszag & Orszag, 2003). Using a fixed effects model to control for unobserved institutional variables, the researchers found that there was no statistically significant relationship between a Division I school's spending on football or men's basketball or and freshmen student SAT test scores (Litan et al., 2003). Furthermore, they also found that there was

no statistically significant relationship between changes in a football team's success and average incoming freshmen SAT scores (Litan, et al., 2003).

Frank's (2004) empirical study explored the links between athletic success, student quality, and institutional donations, and specifically tried to make sense of the divergent conclusions apparent in the body of existing research on the subject.

Reviewing earlier literature on the subject, the researcher observes that earlier studies such as those by McCormick and Tinsley (1987), Tucker and Amato (1993), Murphy and Trandel (1994), Mixon (1995) and Toma and Cross (1998), were only able to show small statistically significant changes in SAT scores for incoming freshmen if schools achieved very high measures of athletic success (Frank, 2004). Frank concluded that the increases in applications at Division I schools are generally not worth the increased costs to achieve those increases, and notes that returns on investment for

. . . a big-time athletic program might be a cost-effective means of expanding the applicant pool if a highly visible winning program could be launched at moderate expense. But as we have seen, even the cost of fielding a losing program is extremely high and growing rapidly . . . (Frank, 2004, p. 28)

Of the mixed findings he found in previous studies, Frank noted that the field of college athletics is a zero-sum game, and for every school that ends its season winning a championship or finishing in the top-20 of the post-season rankings, there are schools that do not win or finish outside of the rankings and therefore suffer the corresponding downward movements in institutional attractiveness (Frank, 2004).

Mixon, Trevino, and Minto's (2004) exploration of the relationship between athletics and test scores found that academically selective institutions were able to enhance the quality of their student populations as a result of successful athletic programs. Using data collected for just the 2000-2001 academic year from Division I-A (FBS) institutions, the authors found that football success was significantly positively correlated with an increase in the quality of incoming freshmen classes as measured by median SAT scores (Mixon, Trevino & Minto, 2004). The findings of this study built on the earlier findings of McCormick and Tinsley (1987) and Mixon (1995) but were limited to schools at the highest level of Division I competition.

Tucker (2005) examined data for major football institutions from the largest Division I-A (FBS) conferences between 1990 and 2002 to test whether there was a statistically significant relationship between football or men's basketball on-field/on-court success and improved SAT scores for incoming freshmen. The conferences chosen were the Atlantic Coast Conference (ACC), Big 10, Big 12, Big East, Mountain West, Pacific 10, Conference USA, Southeastern (SEC) and independent Notre Dame (Tucker, 2005). The researcher's findings indicated that for every 10% increase in an FBS football team's winning percentage over a five year period, mean average SAT scores for that institution would increase by 14 points (Tucker, 2005). An additional relationship was found between an institution's appearance in a post-season bowl game or final top-20 ranking during the same five year average would increase median average SAT scores by 12 points (Tucker, 2005). Tucker's research was limited to the highest levels of Division I football participation, and the author noted that there was also a need to

segment out SAT scores for incoming freshmen into 25th and 75th percentiles to better understand the relationship between athletic success and its effects on applicant quality, not just overall institutional mean average SAT score increases (Tucker, 2005).

The relationship between mens basketball success and student test scores was investigated by Tucker and Amato (2006), with the purpose of exploring whether a university's financial investment in men's basketball is correlated with incoming freshmen SAT test scores. Using the same major conference schools examined in Tucker's (2005) earlier research, and defining basketball success as appearances in the NCAA post-season basketball tournament, the researchers found a statistically significant lagged relationship between basketball success and average incoming freshman SAT scores during the period 1993-1997, but failed to find the same relationship during the period of 1998-2002 (Tucker & Amato, 2006). The authors noted that the relationship between basketball success and student quality is short lived and can be seen moving in both directions, as student quality drops when athletic success fades (Tucker & Amato, 2006). Using a fixed effects model to control for conference affiliation, the authors also found that being associated with one of the largest FBS conferences, the Bowl Championship Series (BCS), had a statistically significant positive relationship with student academic measures and incoming freshmen test scores (Tucker & Amato, 2006).

Smith (2008) looked at men's basketball success and its relationship to incoming freshman applications and test scores by analyzing all Division I men's basketball playing schools during the period of 1994 to 2005. With 75th percentile SAT scores as the dependent variable (the highest range of incoming freshmen scores) the researcher

found that general basketball success, such as winning seasons or postseason appearances, and playing the Final Four have no statistically significant correlation with incoming student test scores, but that having a breakout season of unexpected success raises incoming SAT scores by 8.86 points (Smith, 2008). Smith's study included all Division I men's basketball-playing institutions, which covered a broader set of schools than studies focusing specifically on FBS football schools alone.

Smith's (2009) follow up study examined the relationship between participation in Division I football and incoming freshman applications and test scores. Specifically the researcher collected data for the period of 1994 through 2005 for 235 institutions that competed at both the FBS and FCS level of Division I, and explored the effect that athletic success had on the top 75th percentile SAT scores for the incoming freshman class the following year (Smith, 2009). The findings of the study demonstrated that the yearly success of the football team, either the winning percentage or postseason bowl or championship game appearances, had no statistically significant impacts on incoming student SAT scores (Smith, 2009). Instead, Smith found that the historical successes of a football playing school mattered more to increasing SAT scores than does winning. For each year a school has played football, what the researcher labeled 'tradition', the average SAT scores increased by 0.83 points, and for every book written about the football program, or the football culture of the school, the average SAT score was found to rise by 2 points (Smith, 2009). The conclusions of the study point to a tradition of football or a culture of football at a school playing a more important role in increasing the

quality of applicants than in short term investments in winning games or participation in post-season bowls and championships.

Pope and Pope (2009) found that athletic success had a statistically significant impact on SAT-sending rates for potential freshman students, but that students scoring below 900 in the SAT test reacted to sports success at twice the rate of the higher scoring students (Pope & Pope, 2009). Schools that won the NCAA basketball tournament, the researchers found, saw an 18% increase in the number of SAT scores sent by students with less than 900 cumulative on the test, a 12% increase in scores between 900 and 1100, and an 8% increase in high scores above 1100 (Pope & Pope, 2009). The findings of this research suggest that athletic success does not just impact interest from low achieving students as determined by test scores.

Lee's (2012) dissertation explored the relationship between winning athletic programs and student admissions profiles at small and medium sized, private, NCAA Division I institutions in the Metro Atlantic Athletic Conference (MAAC). The researcher found that institutions within the MAAC that witnessed athletic success realized an increase in applications and an overall increase in SAT scores following their championship seasons (Lee, 2012). However, Lee found that when compared to the rest of the MAAC conference, the champion institution often did not witness increases in SAT scores that were significantly greater than the non-champion institutions (Lee, 2012).

Chung (2013) explored the dynamic advertising effects of collegiate athletics on student applicant quality by examining the "stock of goodwill" that athletics could bring

to a university and influence students to apply (Chung, 2013, p. 13). The stock of goodwill and advertising effect, notes Chung, has a diminishing effect, and the further away from the athletic success the lower the goodwill should be observed on applicant quantity and quality (Chung, 2013). Using a fixed effects discrete choice model Chung found that athletic success had a residual long term effect on student applicant quality, but that students with lower SAT scores tended to have a stronger preference for schools with athletic success (Chung, 2013). The findings of this study also showed that the decay rate for athletic success was highest among students with the lowest SAT test scores, indicating that intercollegiate athletic success has a fleeting positive effect on students unconcerned with the academic reputation of an institution (Chung, 2013).

Overall, much like the relationship between athletic spending and athletic success, the literature is not conclusive about the relationship between athletic success and student test score quality. Generally, however, most researchers agreed that there is a small positive relationship between institutional athletic spending and the test scores of freshmen student applicants.

Athletic Success and Admissions Applications

Similarly to student test score quality, researchers have examined the relationship between athletic success and student applications to universities. This relationship is especially important for schools that promote the athletic department as the front porch of the university and expect athletic success to act as a marketing tool for increased awareness of the institution (Bass, Schaeperkoetter, & Bunds, 2015; Chung, 2013).

Murphy and Trandel (1994) examined the relationship between an institution's football record and the size of its applicant pool. Using a fixed-effect model to control for changes of time and other institutional specific factors, the researchers used data for 55 schools within the largest six major college football conferences at the time, the Atlantic Coast Conference (ACC), Big 8, Big 10, Pacific Ten, Southeastern (SEC) and Southwest, over the period of 1978 to 1987, the researchers measured football success as a team's winning percentage within its own conference and total number of applicants to the university (Murphy & Trandel, 1994). The findings of the research indicated that schools with success on the football field (a 0.250 improvement in overall record) saw a statistically significant, moderately positive, effect on total applications to the university (1.3% total increase) (Murphy & Trandel, 1994). The authors concluded that the long term impact of successful football programs was only weakly correlated with sustained application increases (Murphy & Trandel, 1994).

Toma and Cross's (1998) exploratory study analyzed the effect that winning a Division I national championship during the period of 1979 and 1992 in football or men's basketball had on the quantity and quality of undergraduate admissions at the championship institutions. Using only the championship institutions as their sample, the researchers found that of the 16 schools that had won or shared championships at college football's Division I-A (FBS) level, 14 demonstrated an increase in the number of applications received by first time freshmen, some as high as 20% or more (Toma & Cross, 1998). For men's basketball, ten of the thirteen championship institutions during the period of study saw increases in applications following the championship seasons, but

the effect was much lower than for football championships and there was only one school with an increase of more than 10% observed in the study (Toma & Cross, 1998).

Furthermore, the findings of the study indicated that there was a sustained effect of increased applications due to athletic success, and that schools could be more selective due to the increased number of available student applications (Toma & Cross, 1998). In their conclusions, the authors speculated that the school's national championship visibility may lead to students spreading a wider net when searching for colleges to attend, but may not result in a noticeable impact in the choice phase of student school selection (Toma & Cross, 1998).

Goff's (2000) review and extension of empirical assessments of the effects of athletic success and institutional outcomes found that athletic success, particularly a significant improvement in an athletic program, can significantly increase the national exposure, or advertising effect, of a university regardless of the academic reputation of the school (Goff, 2000). Goff examined previous studies by McCormick and Tinsley (1987), Bremmer and Kesslerling (1993), Tucker and Amato (1993) and Mixon (1995), and then assessed the effects of athletic success at Wichita State, the University of Texas at Arlington, and Georgia State University to find that football participation and success has a strong impact on overall applications (Goff, 2000). Furthermore, the author concluded that major achievements in athletics, such as trips to post-season bowl games or participation in the NCAA post-season basketball tournament appear to spark additional interest in institutions by potential students through increased numbers of applications (Goff, 2000). Conversely, Goff found that negative publicity such as

institutional athletics sanctions or other penalties offset any gains made by athletic success, but do not decrease positive gains at a faster rate than those gains are earned through athletic achievements (Goff, 2000).

McEvoy's (2005) study of the relationship between athletic team performance and undergraduate admissions applications at Division I-A (FBS) level institutions between 1994 and 1998 found that there was a significant positive relationship between a school's football winning percentage and the number of total applicants to that school in the identified year and subsequent year (McEvoy, 2005). Following the model employed earlier by McCormick & Tinsley (1987) and Murphy and Trandel (1994), McEvoy defined the independent variable of athletic performance as the change in winning percentage from year to year, and the dependent variable of total applications received by the institution, and the author applied ANOVA tests on the data to generate results (McEvoy, 2005). The positive relationship between athletic team performance and increased applications was observed to exist only with football, and was not seen in other revenue sports like men's basketball, or in high profile women's sports like basketball or volleyball (McEvoy, 2005). McEvoy's research was limited to 62 schools in the six major Division I-A (FBS) conferences during the period studied, and was not undertaken at the Division I-AA (FCS) level (McEvoy, 2005).

Pope and Pope (2009) used a comprehensive dataset of approximately 330 Division I schools from 1983 to 2002 to explore the impact of sports success and its relationship on the number of applications received by institutions. Using panel data and a fixed effects regression model, the researchers found that schools that competed in the

NCAA men's basketball tournament could see an increase in applications of approximately 1% the year following their appearance, with schools making the Final Four seeing a higher increase of 4-5% and championship teams seeing a 7-8% increase (Pope and Pope, 2009). For football, the effects of a top 20 ranking at the end of the season resulted in a 2.3% increase in applications, while a championship season resulted in a 7-8% increase in applications (Pope & Pope, 2009). Both findings experienced a lag effect, with the positive effects dropping off significantly within two years and being virtually non-existent in three years following a championship (Pope & Pope, 2009).

Castle and Kostelnik's (2011) examination of the Division II Pennsylvania State Athletic Conference (PSAC) had mixed results about the relationship between athletic success and admissions outcomes, and found that there was not a significant correlation between an athletic program's winning percentage or overall conference standing and an increase in freshman applications or student quality (Castle & Kostelnik, 2011). Their research also found that there was no positive effect on admissions applications and student quality of successful football and men's basketball programs at the Division II level, which was one of the only positive quantitative correlations found at the Division I FBS level by previous researchers like Mixon, Trevino and Minto (2004) and Pope and Pope (2009) (Castle & Kostelnik, 2011).

In a follow up to their earlier study, Pope and Pope (2014) used a unique dataset culled from the College Board that recorded the colleges and universities that high school students sent their SAT scores to during the period of 1994 and 2001 to determine if athletic success factored into student application decisions. Unlike most of the other

studies that use mean SAT data gathered from EADA institutional reporting, the College Board dataset allowed the researchers to explore individual student level decision making, and provided demographic information for the students sending their test scores to colleges (Pope & Pope, 2014). Athletic success was determined by examining schools that had participated in the Division I men's basketball tournament or whose football team was ranked in the NCAA Division I-A national poll (Pope & Pope, 2014). By substituting the SAT score submission as a proxy for an application, and using a fixed effects model controlling institution-specific unobserved heterogeneity, the researchers found that there was a statistically significant increase in the number of students who sent their SAT scores to schools that had recently performed well in football or men's basketball (Pope & Pope, 2014). For schools that participated in the NCAA men's basketball tournament, the researchers found that there was an increase in sent SAT scores of between 2% and 11% the following year depending on how far the team advanced in the tournament (Pope & Pope, 2014). Top 20 ranked football teams were also determined to be related to an increase in sent SAT scores, with increases of 2% to 12% the following year (Pope & Pope, 2014).

Roufagalas and Byrd (2014) explored the effects that unexpected and expected athletic success had on student applications by segmenting out schools that invest in permanent, sustained athletic success from those that experience one-time, fleeting athletic success. The segmentation, they argued, is a key point of discussion for university leadership as schools that experience unexpected one-time success might consider funding athletics in an attempt to replicate that success in a similar way as

schools that invest in permanent, sustained athletic success (Roufalagas & Byrd, 2014). The findings of the study demonstrated that unexpected athletic success was shown to have a statistically significant negative relationship to freshman applications relative to the expected total number of applications in both the year following the athletic success as well as in the following year, with applications for schools dropping by approximately 4% in the first year and 2% in the following year (Roufalagas & Byrd, 2014). The researchers concluded that it is not advantageous for schools to invest financially in chasing one-time success if they hope to see an increase in their applications (Roufalagas & Byrd, 2014).

In his study of the relationship between winning Football Bowl Subdivision athletic programs, alumni giving, and academic reputation and admissions measures, Anderson (2016) concluded that winning at the highest level of college sports had a positive impact on all of the variables studied. Using a propensity score design to more accurately value expected wins and losses, the conclusions of the study indicated that an improvement of three wins for an FBS football program had an economically significant effect on total applications to an institution (an average increase of 3.6%), admissions acceptance rates (selectivity increased by 1.3%), and an improvement in average SAT scores for incoming freshman (0.2%) (Anderson, 2016). The findings, however, were applicable only to FBS institutions competing at the highest level of intercollegiate athletics, and the researcher noted in his conclusions that it was difficult to know how investing in athletics was related to winning programs because “. . . we do not know the causal relationship between team investments and team wins . . .” (Anderson, 2016, p.

130). Linking his findings to the earlier research of Orszag and Israel (2009), who found that FBS athletic departments invested approximately \$1 million to obtain one additional football win, Anderson states that according to his model each \$1 million investment in athletics would yield just a fraction of the total impact seen from three additional wins, and then concluded that those “. . . effects seem too modest by themselves to justify the additional expenditures . . .” (Anderson, 2016, p. 130).

As can be seen by the studies exploring the links between athletic success and institutional enrollment outcomes, many quantitative studies have examined at individual university case studies, using samples of schools within one athletic conference or examining one division of college sports, like all of Division I football programs, during a narrow time frame, typically less than a decade (Castle & Kostelnik, 2011; Murphy & Trandel, 1994; Perez, 2012; Peterson-Horner & Eckstein, 2015; Toma & Cross, 1998; Tucker & Amato, 2006). Broad meta-analytical studies on the subject of athletic success and academic outcomes typically do not try to apply the same framework onto well-funded athletic schools such as Alabama and small, poorly funded athletic programs typical in the NCAA’s Division III. Only a handful of meta-analytical studies have focused on the link between athletics and university outcomes (Orszag & Israel, 2009; Pope & Pope, 2009; Pope & Pope, 2014). The meta studies concluded that there was only a small benefit to producing a winning athletics program (mostly BCS level Division 1 football) on the number of admissions a school received, the test scores of students that applied, or the overall quality of its admitted students. Even then, the meta-analytical studies generally concluded that athletic spending was not worth the financial

cost to the university in dynamic advertising effect to invest in trying to win bowl games or national basketball championships (Orszag & Israel, 2009; Pope & Pope, 2009; Pope & Pope, 2014).

Athletic Success and Financial Giving

Studies have also investigated the links between athletic success and institutional fundraising and increased donations to the university, which are one of the other significant outcomes that universities in today's marketplace hope to exploit (Chung, 2015; Goff, 2000; Humphreys & Mondello, 2007; Stinson & Howard, 2008; Staurowsky, 2002; Stinson, Marquardt, & Chandley, 2012). Findings in this area were mixed, as researchers have shown that at some schools the success of athletics increases the financial contributions to athletics at the expense of giving to the institution, while at lower levels of college sports the research showed that overall giving to athletics and the university goes up when athletics teams are successful.

Proponents of 'big time' intercollegiate athletics have argued that strong athletic programs increase an institution's brand awareness and, therefore, its ability to attract alumni donations, while opponents of athletic spending have argued that donations to athletics are a drain of resources away from academic programs or that the contributions could be better obtained through an increase in the quality of students and faculty at the institution (Grimes & Chressanthis, 1994, McCormick & Tinsley, 1987; Rhoads & Gerking, 2000; Stinson & Howard, 2004).

One of the earliest studies exploring the relationship between financial contributions and intercollegiate athletics was performed by Coughlin and Erikson

(1984). Using attendance data, post season bowl participation, and winning percentage as independent variables in a cross sectional study taken from the 1980 NCAA Division I football season, the researchers conclude that all three variables are positively correlated with increased monetary contributions to a school's athletic program, but do not look at the spillover effects of contributions or how those contributions impact the general giving of alumni to the rest of the university (Coughlin & Erekson, 1984).

Grimes and Chressanthis' (1994) study examined the relationship between athletic success and alumni contributions to the academic endowment of a representative NCAA Division I institution, Mississippi State University. Using time series data and controlling for alumni population, student enrollment, state appropriations, and per capita income, the results of the study indicated that alumni contributions to the general academic endowment were positively related to the overall winning percentage of the athletic sports programs at the institution, while post season competition was not significant (Grimes & Chressanthis, 1994). Furthermore, the study showed that television appearances were positively correlated to contributions and that institutional sanctions in the form of NCAA penalties result in slight reductions in overall giving to the academic endowment (Grimes & Chressanthis, 1994).

Baade and Sundberg (1996) examined the athletic performance data for 167 college football teams during the period between 1973 and 1990 and found that appearing in a postseason bowl game increased alumni giving between 40% and 54%. Using data from multiple data sources, the researchers constructed a longitudinal panel data set covering the longest period of time studied by researchers in the context of athletic

success and financial giving by donors. While postseason bowl appearances were positively correlated with increases in donations, the researchers also concluded that overall winning records for football and men's basketball do not positively relate to increases in overall giving, but NCAA basketball tournament appearances do (Baade & Sundberg, 1996).

Rhoads and Gerking (2000) studied the role that successful intercollegiate athletic programs had on donor contributions to universities during the period between 1986 and 1996. The researchers used a fixed effects analysis of panel data for 87 institutions and found that athletic success had a positive impact on levels of alumni giving to universities but did not result in a similar effect for other forms of donations to the university (Rhoads & Gerking, 2000). The researchers also found that universities with longer traditions of athletic success experienced a spillover effect of contributions from athletic success into academic contributions from all sources, including alumni and non-alumni, but that this relationship was weaker than the relationships schools found between student and faculty quality and academic contributions (Rhoads & Gerking, 2000). The researchers concluded that their findings supported the idea that

. . . year-to-year athletic success has an influence on voluntary contributions to universities in support of education . . . as might be expected, (the data) indicate that alumni appear to care more about the performance of the football and basketball teams than do other types of donors . . . (Rhoads & Gerking, 2000, p. 254).

In a study of private liberal arts colleges at various levels of college athletics, Turner, Meserve and Bowen (2001) examined how a school's football success impacted the giving behavior of traditional donors as well as former student-athletes of the institution. Using institutional-level micro data from 15 institutions, including five from the Division FBS level (Duke, Notre Dame, Northwestern, Rice, and Vanderbilt), four from the Division I FCS Ivy League (Columbia, University of Pennsylvania, Princeton, and Yale) and the remaining six from liberal arts colleges that compete at the Division III level (Denison, Hamilton, Oberlin, Swarthmore, Wesleyan, and Williams), the researchers examined ten years of donor behaviors during the period between 1988 and 1998 for the cohorts that entered the selected institutions as part of the 1976 cohort (Turner, Meserve, & Bowen, 2001). The results of the fixed effects regression on the panel data set found "no relationship of any kind between won-lost records in football and general giving rates at either the Division IA universities that operate high-profile programs or among the Ivies" (Turner, et. al., 2001, p. 821). The researchers did find, though, that there was a relationship between athletic success and a decrease in general giving to Division I private schools from non-athletes which they ascribed to the assumption (perhaps erroneously) that ". . . winning football teams generate so much revenue that they don't need to make as large a gift as they would have made otherwise . . ." (Turner, et. al., 2001p. 824). The finding that general giving by non-athletes at Division I schools was depressed as football success increased supported the argument that athletic success and donations crowd out general academic financial support for universities.

Stinson and Howard (2004) explored the relationship between donor behavior in relation to academic success and alumni giving for athletics and academic fundraising efforts. Using the University of Oregon as a longitudinal case study during the period between 1994 and 2002, the researchers examined how alumni financial support from donors contributing more than \$1,000 to the university's Annual Giving Program was impacted by the institution's on-field athletic success (Stinson & Howard, 2004). The authors concluded that there was a 'crowding out' effect on institutional academic giving by athletic giving, whereby increases in athletic donations resulted in decreased in academic donations (Stinson & Howard, 2004). Furthermore, the researchers found that donors who traditionally only donated to academic endeavors were not impacted by athletic success, while donors who were classified as athletic donors were heavily influenced by athletic success and donors who split their contributions between the athletic and the academic fundraising efforts of the university showed an increasing preference for athletics contributions as athletic programs at Oregon improved (Stinson & Howard, 2004). The researchers concluded that ". . . the role of athletic success in influencing giving behavior needs to be further clarified, considering the susceptibility of different groups to changing gift patterns based on athletic team success . . ." (Stinson & Howard, 2004, p. 136).

Frank's (2004) empirical study explored the links between athletic success and alumni giving through institutional donations, and reviewed the body of earlier literature on the subject. The researcher found that earlier literature on the subject was inconclusive, as studies of the relationship between athletic success and alumni giving

demonstrated a number of various measured outcomes (Frank, 2004). Frank noted the inconclusiveness within the very early literature by exploring how Siegelman and Carter (1979) could not show a relationship between donations at football success at Division I schools, that Brooker and Klastorin (1981) were unable to find a statistically significant relationship between athletic success and alumni giving at the Division I level, and only once they applied a fixed effects model could Siegelman and Brookheimer (1983) find a statistically significant relationship between Division I football winning percentages and direct donations to an athletics department (Frank, 2004). The author further argued that a number of subsequent studies, such as Grimes and Chressanthins (1994), Baade and Sundberg (1996), Rhoads and Gerking (2000) and Litan et al. (2003) were unable to show a statistically significant positive relationship between athletic success and alumni donations to an institution, and the Turner, Meserve, and Bowen's (2001) findings suggested at a statistically insignificant level that athletic success could even reduce the amount that donors contribute to institutions for general purposes (Frank, 2004). Pointing to the inconclusiveness of the literature, Frank concluded that schools should not assume that financial investments in athletics, with the intended outcome of higher achievement in football and men's basketball, will yield higher alumni giving to the institution, especially for purposes outside of athletics (Frank, 2004).

In a follow up to their 2004 study, Stinson and Howard (2010) explored the specific impact that athletic success had on donors that traditionally split their financial contributions between athletic and academic fundraising efforts. The researchers collected data on contributions from donors making annual gifts of more than \$1,000

from three institutions with varying degrees of athletic success (Stinson & Howard, 2010). The findings of this study showed that split donors donated more money on average than did traditional donors making donations to athletics only, and that in the long-term, split donors are retained by institutions for longer periods of time than are donors who contribute solely to academics (Stinson & Howard, 2010). This research also found that between 5% and 15% of donors who began as athletic donors expanded their giving to the academic side of the university and became split donors (Stinson & Howard, 2010).

To explore the crowding-out effect of athletic giving on academic giving, Koo and Dittmore (2014) examined the athletic and academic giving patterns of 155 Division I, II and III institutions. Using a fixed effects regression design with a panel dataset, the researchers looked at data for a ten year period between 2002 and 2012 for athletic success in football and basketball and that success on the institutional giving levels of donors for both athletic and academic fundraising efforts (Koo & Dittmore, 2014). The researchers found that for

. . . every 1% increase in football winning percentage in the previous year was associated with an increase of approximately \$452,000 in athletic giving. Also, every \$1 increase in the one-year lagged athletic giving was related to the current dollars of athletic giving at the nearly same rate . . . (Koo & Dittmore, 2014, p.11).

The findings of this study supported the assertion that athletics success has a positive spillover effect from athletic giving to academic giving as opposed to a negative

crowding-out effect on academic financial gifts to universities, and align with the earlier studies by Grimes and Chressanthis (1994), Rhoads and Gerking (2000) and Stinson and Howard (2004, 2010) (Koo & Dittmore, 2014).

Athletic Success and Other Institutional Outcomes

Other university outcomes were also explored frequently in the literature. The link between athletic success and university prestige, usually in the form of U.S. News and World Report rankings, was a topic that has generated a lot of recent research (Fisher, 2007; Fisher, 2009; Lifschitz, Sauder & Stevens, 2014; Lovaglia & Lucas, 2005; Mulholland, Tomic & Scholander, 2014). Institutional reputation is an important metric for universities in the marketplace, and the US News and World Report rankings is one of the most widely disseminated rankings of colleges in the United States, specifically among college-bound students and their families.

Lovaglia and Lucas (2005) examined whether or not having a high visibility athletic program could increase the prestige of an institution's academic programs. Using data collected from 479 students about their perceptions of institutional prestige, the researchers found that having a highly visible athletics program made students perceive that the academic contributions of a school's graduates seem more prestigious (Lovaglia & Lucas, 2005). Confirming the findings of Lovaglia and Lucas, Mulholland, Tomic and Scholander, (2014) found that intercollegiate football success increased an institution's peer assessment score as ranked by the US News and World Report College Rankings. The researchers found that a one standard deviation point increase in football polling votes has the same impact on peer assessment scores as did a 20 point increase on SAT

75th percentile scores (Mulholland, Tomic & Scolander, 2014). Also confirming these findings was the work of Lifschitz, Sauder and Stevens (2014) that examined the relationship between athletic conference affiliation and institutional prestige through US News and World Report rankings and found that athletic conference affiliation was related to member institutions' perceived academic status.

Once students were enrolled at institutions, Mixon and Trevino (2005) found that there was a positive and significant relationship between an institution's on-field football success and freshmen retention and graduation rates. Using data from the 2000-2001 academic year for 78 members of Division I FBS football conferences, the researchers performed an Ordinary Least Squares analysis and linear regressions and concluded that the psychic benefits of athletics success helped the university achieve its academic mission by offsetting the challenge and rigor of academic endeavors (Mixon & Trevino, 2005).

Challenging Mixon and Trevino's findings, however, was the research of Lindo, Swensen and Waddell (2012) which argued that both male non-athletes at the University of Oregon were negatively impacted academically by successful athletic programs, and increased alcohol consumption, decreased studying, and achieved lower overall grades when athletic teams were experiencing success, but that these findings were limited to the Fall semester in which the football team competed. The researchers concluded that the negative relationship between athletic success and undergraduate athletic achievement, especially among males, could partially explain the growing gap between male academic achievement and female academic achievement on college campuses (Lindo, Swensen &

Waddell, 2012). Taking Lindo, et al.'s model and applying it to Clemson University, Hernandez-Julian and Rothhoff (2014) found that the opposite effect was seen, and that female undergraduates were more sensitive to athletic success than were male undergraduates. Their findings suggested that, along with Lindo, et al.'s findings, while athletic success at an institution could negatively impact the individual academic performance of undergraduate students, the effects of a winning athletic program could, overall, still benefit the academic reputation of the university (Hernandez-Julian & Rothhoff, 2014).

Chung (2015) investigated the short and long term monetary effects of operating a winning athletics program on institutions within Division I FBS during the period of 2003 to 2013. For the purposes of this study the researcher focused on the revenue generating sports of men's basketball and football to define athletic success because those two sports received the most attention and had the largest chance of generating revenues for schools in the study (Chung, 2015). Without considering school-specific heterogeneity, Chung found that there was a positive correlation between winning FBS football programs in institutional athletics revenue, a finding that was also observed to be statistically significant when applying a dynamic panel data method to the data (Chung, 2015). The findings of this research also showed that larger, more established athletics programs saw a linear relationship between football and basketball wins and an increase in revenue generation while smaller programs only saw a linear relationship between the two when they experienced unexpected championship wins or post-season appearances in football bowl games (Chung, 2015). The relationship between winning and increased

revenue, Chung concluded, is more stable for schools with a history of investment in intercollegiate athletics at the highest level of FBS sport, while those without established histories of high achievement can only expect to see revenue increases by winning at unexpectedly high levels of FBS football and Division I men's basketball (Chung, 2015).

De-Escalation of Commitment in Intercollegiate Athletics

As spending on athletics increases while state funding for higher education declines, many schools find themselves in situations where they must justify their continued financial investment in expensive Division I athletics programs. In the field of management studies, the phenomenon whereby an organization commits financial resources to a course of action that exceeds the boundaries of economic feasibility is known as escalation of commitment, and persistence in such behavior can result in the entrapment of the organization to a failing course of action (Hutchinson & Bouchet, 2014). Escalation of commitment theory has primarily been applied to public policy decisions to understand why organizations or governments financially support failing endeavors despite the observable realities that those endeavors come at a substantial financial cost (Ross, 2003).

Escalation of commitment theory frames organizational decision-making as being counterintuitive to traditional goal achievement within an organization, and notes that “. . . individuals and organizations (are) prone to situations involving continued and increased commitment to a failing project or course of action amidst the presence of negative feedback . . .” that should push them in alternative courses of action (Hutchinson & Bouchet, 1976, p. 348). As an organizational theory, commitment escalation theory

rests heavily on the work of Staw (1976) and Staw and Ross (1987, 1993), who originally applied their work to businesses that failed to change course on failing courses of action, and built on older escalation research that said the only way to shift away from a failing path was to abandon the project entirely. Keil and Montealegre (2000), and later Mahring & Keil (2008), instead created a four phase model of modified alternatives to reduce commitment to a failing course of action, without complete abandonment of the course of action or devastating shift in organizational direction (Montealegre & Keil, 2000; Mahring & Keil, 2008; Hutchinson & Bouchet, 2014). The four phases of the commitment de-escalation model proposed by Montealegre and Keil (2000) included (a) problem recognition, (b) re-examination of prior course of action, (c) searching for alternative courses of action, and (d) implementing an exit strategy (Montealegre & Keil, 2000; Hutchinson & Bouchet, 2014).

Bouchet and Hutchinson (2010) noted that escalation of commitment within athletics happens “. . . despite overwhelming evidence that the course of action is not advantageous to the organization . . .” (Bouchet & Hutchinson, 2010, p. 272). In collegiate athletics, the continued financial investment in Division I athletics coupled with the declining revenue sources for institutional funding and the increased reliance on student fees has created a situation that management theorists describe as permanently failing organizations (Hutchinson & Bouchet, 2014). Furthermore, within Division I, failing institutional strategies frequently manifest themselves in the forms of lack of performance-based competitiveness, complications with conference alignment, mismatched athletics and institutional values, and limited institutional integration of

student-athletes (Hutchinson & Bouchet, 2014). Hutchinson, Rascher and Jennings (2016) noted that the “. . . overwhelming majority of universities acknowledged athletics as a failing course of action due to the financial expense not providing a comparable financial return, economic benefit, or otherwise spillover effect (e.g. increased enrollment) . . .” (Hutchinson, Rascher, & Jennings, 2016, p. 75). A number of studies have explored various aspects of institutional athletic escalation and its impact on institutional outcomes such as enrollment and student quality.

Bouchet and Hutchinson’s (2010) case study on the escalation of commitment at Southern Methodist University examined the university’s rationale for increasing financial investments in its intercollegiate athletics program starting in 2006. The researchers found through stakeholder interviews that the university administration believed that “. . . boosting the institution’s name recognition would help meet their goals of attracting quality students and increasing the endowment . . .” (Bouchet & Hutchinson, 2010, p. 279). The increased visibility was intended to boost the overall institutional enrollment, improvement in student quality, and increase alumni giving through contributions to the university’s endowment (Bouchet & Hutchinson, 2010). Senior level university administrators specifically noted that “. . . it is important for us to keep up the number of applicants to the school. This allows us to be more selective in admitting students. We honestly feel football helps us in achieving the goal (of attracting students) . . .” (Bouchet & Hutchinson, 2010, p. 282). The researchers concluded that Southern Methodist University, by choosing a course of action of increased financial investment in athletics with the goal of improving the school’s brand nationally in order to increase the

size of its applicant pool and enrollment, was pursuing a path that would lead to widespread institutional failure if the intended outcomes were not realized after the investment had been made, or university leaders were unable to engage in an exit strategy if the investment proved to be a failure (Bouchet & Hutchinson, 2010).

Bouchet and Hutchinson (2011) examined Birmingham-Southern University's move from NCAA Division I to Division III in 2006 and the school's challenge of de-escalating from the highest level of intercollegiate competition and into a less expensive subdivision of college sports. Using qualitative interviews the researchers found that the original reasons for the school's move to Division I in 2001 had been pressure from a select group of donors at the school to increase the university's exposure through qualifying for the NCAA men's basketball tournament (Bouchet & Hutchinson, 2011). University leaders acknowledged that the donors were ". . . disingenuous regarding the reasons for undertaking the move (to Division I). The bottom line was we just could not afford to participate at the Division I level. It didn't work . . ." (Bouchet & Hutchinson, 2011, p. 270). Furthermore, school administrators believed that the move to Division I would increase the college's endowment and increase student enrollment, neither of which outcome was seen by the school during their period in Division I (Bouchet & Hutchinson, 2011). In fact, Birmingham-Southern's president noted that the school actually saw an increase in enrollment when it moved from Division I to Division III (Bouchet & Hutchinson, 2011). Ultimately, the university had to frame the de-escalation from Division I to Division III as an economic move for the university instead of an

emotional one to ensure that external stakeholders would understand the school's need to make changes in its athletic department (Bouchet & Hutchinson, 2011).

In a 2014 follow up to their earlier studies of Birmingham Southern and Southern Methodist universities, Hutchinson and Bouchet (2014) applied commitment escalation theory in a collective case study among eight universities (Centenary College, Birmingham-Southern College, Northeastern University, La Salle University, East Tennessee State University, University of the Pacific, Long Beach State University, and Vanderbilt University) that successfully achieved organizational de-escalation within their intercollegiate athletics departments. In each case, the universities under study had successfully re-classified down from Division I, removed their football program, or significantly restructured their athletic department (Hutchinson & Bouchet, 2014). Using a purposive multiple case study design, the researchers interviewed Presidents, Chief Financial Officers, Chief Operating Officers, Provosts, Vice Presidents for Enrollment, Vice Presidents of Administration, Vice Presidents for Finance, Faculty Athletic Representatives, Athletic Directs, Senior Associate Athletic Directors, and Associates Athletic directors at the schools in the study and found that the most prudent path to organizational commitment de-escalation was to present organizational stakeholders with objective data concerning the true costs of intercollegiate athletics and demonstrating a timely exit strategy away from the failing path (Hutchinson & Bouchet, 2014). Furthermore, the findings of this study confirmed that institutional leaders and stakeholders are often caught between the emotional aspects of intercollegiate athletics

and the rational versus irrational decision making processes involved with following a failing path of organizational escalation (Hutchinson & Bouchet, 2014).

Dropping Intercollegiate Football and Institutional Enrollment

Goff (2000) studied the enrollment trends between 1960 and 1993 at two Division I schools, Wichita State University and the University of Texas at Arlington (UTA), that dropped their football programs and one Division I school that added football, Georgia Southern University, to see if a relationship existed between enrollment and the existence of a Division I football program. The University of Texas at Arlington dropped football in 1986 and Wichita State dropped football in 1987, while Georgia Southern added football in 1981. While controlling for general enrollment trends within all of higher education, the researcher found that on average there was an approximately 600-student decline relative to years at Wichita State and UTA when football was not present, and an additional 500-student increase at Georgia Southern with football being added (Goff, 2000). While the conclusions of this study indicated a negative trend upon dropping football, due to the limited number of institutions that have dropped Division I football programs, the findings of Goff's study were limited in the sense that it is based on just two cases.

Toma (2003) examined the role that football played in higher education and suggested that schools that emphasize football at the highest level, schools he refers to as Football U, should see an impact on student admissions, campus culture, and alumni support (Toma, 2003). The inverse, Toma argued, is that for schools that do not compete at the highest levels of football, such as schools outside of the Division I-A FBS

structure, football is “. . . rarely the window to understanding institutional life that football Saturdays are at flagship state or large private universities . . .” (Toma, 2003, p. 23). The removal of football at these lower profile institutions, he argues, would have little impact on those schools’ ability to attract new students (Toma, 2003).

Jones (2014b) used evidence from three universities, East Tennessee State University, Saint Mary’s College of California, and Siena College, to examine freshman application trends at schools that dropped their Division I FCS football programs in the Spring of 2004. Using panel data from the three institutions, with comparable control institutions added to the model, and employing a differences-in-differences model to help create a quasi-experimental design for the small group of institutions, the researcher found mixed results from the three institutions following the discontinuation of football (Jones, 2014b). Applications at East Tennessee State University dropped in the first three years after the elimination of football, but increased during the period of 2008 to 2010, for an overall statistically insignificant increase of 5.8% during the period 2004 to 2010 (Jones, 2014b). In the immediate aftermath of dropping football, St. Mary’s college of California saw an increase in total applications relative to its peer institutions, but then saw a decline between 2006 and 2010, for an overall statistically insignificant decrease of 18.7% in applications during the period 2004 to 2010 (Jones, 2014b). At Siena College, applications rose consistently in the years after football was eliminated at a rate higher than peer institutions all the way through 2010, for a statistically significant increase in applications of 13.2% during the period of 2004 to 2010 relative to peer institutions (Jones, 2014b). In conclusion, Jones noted that “. . . evidence from this study of three

institutions of higher education which dropped intercollegiate football after the 2003-2004 season suggest that not fielding a football program does not correlate with a statistically significant drop in freshmen admissions applications . . .” (Jones, 2014b, p. 108).

Hutchinson, Rascher and Jennings (2016) explored the entire population of universities that had discontinued all levels of Division I football programs during the period from 1981 to 2010 to examine the relationship between discontinuing football and institutional outcomes, specifically addressing the relationship between discontinuing the Division I football program and its effect on SAT scores for incoming freshmen and university enrollment numbers (Hutchinson et al., 2016). The researchers found that there was a statistically insignificant improvement in overall SAT scores and a statistically insignificant enrollment growth for schools in the years following their discontinuation of football (Hutchinson et al., 2016). While not conclusive, the results of the study showed that discontinuing football programs had little statistically significant positive or negative impact on the academic status of the institution (Hutchinson, et al., 2016). These findings, the authors noted, were important because they challenge the widely held belief among university administrators that the elimination of Division I football will have negative consequences for university outcomes such as enrollment and student quality (Hutchinson, et al., 2016).

Fixed Effects Modeling

When studying the relationship between athletic success and athletic spending on institutional outcomes over time, the most appropriate model to apply to cross sectional

time series panel data is a fixed effects regression. Fixed effects models are the most common quantitative methods applied to research in this field, and have been shown to best model the relationships between the predictor variables of athletic success and athletic spending and the dependent variables most commonly studied such as institutional enrollment, student applications, student quality, increased fundraising or alumni support (Chung, 2013; Jones, 2013; Koo & Dittmore, 2014; Litan et al., 2003; Murphy & Trandel, 1994; Pope & Pope, 2009; Pope & Pope, 2014; Siegelman & Brookheimer, 1983; Tucker & Amato, 2006). Without employing a fixed effects model to time series data, some researchers have overemphasized the importance of athletic success on institutional outcomes because of the unobserved institutional-specific characteristics that often influence the outcome of traditional linear or multiple regressions, and only by controlling for institutional characteristics over time can true relationships between athletic success or spending and institutional outcomes be truly measured (Siegelman & Brookheimer, 1983).

Applying fixed effects models to the relationship between athletic spending and success and institutional outcomes such as applications and incoming test scores has the effect of significantly weakening the observed effects of athletic success (Roufaglas & Byrd, 2014). Roufaglas and Byrd (2014) suggested that fixed effects modeling can deal with unobserved school heterogeneity and take into consideration athletic-related variables such as school tradition better than other models such as ordinary least squares, which overestimate the effects of athletic success effects (Roufaglas & Byrd, 2014). The authors noted that

. . . Murphy and Trandel (1994) using 1978-1987 data, show that a 0.250 increase in in-conference winning percentage is expected to increase applications by 1.3% (statistically significant). Litan et al. (2003) find no significant effects of either football spending or football winning percentage upon SAT scores or upon acceptance rates, using 1993-2001 data . . . (Roufagalas & Byrd, 2014 p. 10)

Litan et al.'s (2003) study of the empirical effects of college athletics on the university used a panel data set with year and institutional fixed effects to control for unobserved heterogeneity within each institution and found no statistically significant relationships between football spending and team winning percentages during the period of 1993-2001 among Division I FBS schools. Orszag and Orszag (2005) employed a fixed effects model to a panel data set consisting of all NCAA Division II institutions for the period of 1993-2003. Like the earlier Litan et al. (2003) study, Orszag and Orszag were unable to find any statistically significant relationships between institutional spending on football and winning football programs (Orszag & Orszag, 2005).

In his examination of the relationship between intercollegiate athletic expenditures and on-field athletic success, Jones (2013) used fixed effects modeling to control for athletic department characteristics that did not change over time, such as institution type (public/private), institutional location and institutional selectivity. The researcher also accounted for year fixed effects in the model by controlling for yearly trends which impacted all institutions during the period he studies, such as inflation and national economic conditions (Jones, 2013).

Summary

The challenge for a researcher in this field is negotiating the qualitative and quantitative research, where the qualitative research firmly supports the position that intercollegiate athletics plays an important role in growing and defining a university while the quantitative research does not support a similar conclusion. After reading the literature, there is a general awareness among university leaders that investing in athletics is a risky proposition but one that some are willing to wade into because of the potential advertising effect that a successful program could mean for their institutions. Undergraduate students, university presidents and members of university boards see athletics as an opportunity to attribute psychic benefits to, or hang their hats on, something tangible.

Quantitative studies on the subject of athletics and its value to the university tended to conclude that there is only a small measurable effect of athletic quality or spending and positive university measurable outcomes (Hoffer & Pinchin, 2016; Orszag & Israel, 2009). Any effect that is discovered is not universal, rather highly localized to elite level athletics programs, short in duration, and is typically confined exclusively to very high level athletic success such as BCS bowl participation or winning a national basketball championship (Pope & Pope, 2009, 2014). Furthermore, quantitative studies were mixed in their findings with many studies concluding that there was no noticeable effect of successful athletics on the university at all; while others argued that athletic success came at a price that is far too steep for sound budgetary decision making by university leadership (Anderson, 2016; Orszag & Israel, 2009; Stinson, Marquardt, &

Chandley, 2012). Additional studies even examined whether institutions saw any enrollment impact from adding or completely eliminating athletics (specifically football) from their school (Jones, 2014a; Jones, 2014b; Van Holm & Zook, 2016).

By focusing on one school, a small subset of schools within one conference, or one collegiate division, the results of these quantitative studies can typically be generalized to similar schools, conferences, or to members of similar athletic divisions. By focusing on athletic programs that are aligned into groups, such as conferences or collegiate athletic divisions, the researchers were able to explore trends among institutions with similar goals and aspirations.

The dynamic marketing effect of intercollegiate athletics has been explored by researchers who have argued that there is an increase in university brand awareness thanks to successful intercollegiate athletics, and that this brand awareness translates into increased applications and increased enrollment (Chung, 2013; Smith, 2008). The same research, however, also finds that applicants who are encouraged to apply to schools because of athletic success are much less academically inclined, and that the advertising effect of college athletics does not yield a significantly improved set of applicants in the short or long term (Toma & Cross, 1998; Tucker & Amato, 2006).

The numbers, however, tell a different story. Investing in athletics has not been definitively shown to increase applications or admissions to a university, and no significant improvement in the student body as a whole (Pope & Pope, 2009; Pope & Pope, 2014). Meta-analytical studies on the subject are mixed, and case studies show there is very little positive effect at all, and whatever effect is seen is short lived and

comes at a high cost for the institution (Lee, 2012; Murphy & Trandel, 1994; Perez, 2012; Peterson-Horner & Eckstein, 2015; Toma & Cross, 1998; Tucker & Amato, 2006;). Since each university, athletic conference, and collegiate athletic division is unique in its own ways, the quantitative and qualitative findings from research performed on other institutions can be used as a guide but the unique outcomes of athletic spending at each university must be examined individually to gauge the impact of athletic spending on institutional outcomes

CHAPTER III

Methodology

Introduction

There have been few studies that have specifically examined the enrollment impact of intercollegiate athletics on mid-major Division I schools, specifically schools placed outside of the Power 5 Football Bowl Subdivision, and none since the Great Recession of 2007-2008 and conference realignment that started in 2010. The problem that was addressed in this study was the absence of an economic model that predicts or demonstrates the relationship between athletic spending and FCS institutional admissions outcomes in the period between 2003 and 2015. With increasingly limited funding for higher education, college administrators must seriously examine the true economic impact of intercollegiate athletics and the role college sports plays at their institutions. There are a number of differences between large, well-funded, athletic programs at the highest levels of intercollegiate athletics participation and mid-sized regional universities, and therefore the role of athletics at these smaller schools must be examined separately from the trends occurring at the highest levels of college sports.

Purpose

The purpose of this cross sectional time series panel data fixed effects regression analysis was to examine whether a relationship existed between institutional athletic expenditures and total university applications, enrollments, and student quality at institutions in the NCAA Division I FCS Southland Conference during the period between 2003 and 2015.

Research Questions

The following research questions were addressed:

1. What is the relationship between athletics spending and total undergraduate enrollment at Southland Conference member institutions during the period between 2003 and 2015?
2. What is the relationship between athletics spending and undergraduate applications at Southland Conference member institutions during the period between 2003 and 2015?
3. What is the relationship between athletics spending and applicant quality at Southland Conference member institutions during the period between 2003 and 2015?

Research Design

The design for this study was a cross sectional panel data fixed effects regression analysis with several control variables to investigate the relationship between institutional athletic department expenditures, undergraduate enrollment and student quality at Southland Conference member institutions during the period between 2003 and 2015. A

fixed effects model was applicable to this research because the fixed effects control for year-specific and school-specific unobserved heterogeneity, or where unobserved correlations could exist due to the time series nature of, or in the cross sectional analysis of, the data being studied (Allison, 2009).

Independent variables are those variables that probably cause, influence, or affect outcomes, and are also sometimes referred to as treatment or predictor variables (Creswell, 2003). In this study the independent variable that was examined was total institutional athletic expenditures. The data for this variable were gathered from the Equity in Athletics Data Analysis Cost Cutting Tool for the period being studied for all institutions in the NCAA FCS Southland Conference.

Dependent variables are defined as the effect variables that receive influence from the independent variable and are the observed outcomes or results (Creswell, 2003). The dependent variables examined in this research included total applications received by an institutions, total full-time undergraduate enrollment by Fall headcount, ACT composite 25th percentile, ACT Composite 75th percentile, SAT Critical Reading 25th percentile, SAT Math 25th percentile, SAT Critical reading 75th percentile, and SAT Math 75th percentile. All of the dependent variables were collected using the National Center for Education Statistics Database's Integrated Postsecondary Education Data System (IPEDS) database.

Control variables were introduced into this model to better test for the relative relationship of the dependent and independent variables being studied. Control variables for this study were average nine-month full-time professor salary, total annual cost of

attendance at each institution, number of high school diplomas given out by state, and per capita income by state. Professor salary and cost of attendance data were gathered using the National Center for Education Statistics Database's Integrated Postsecondary Education Data System (IPEDS) database. Data on the number of high school diplomas awarded by state were collected from the National Center of Education Statistics database and were linked by state to the colleges in the study. Data on per capita income by state were collected from the United States Bureau of Economic Analysis and linked by state to the colleges in the study. The control variables included in this study were the same control variables employed by Pope and Pope (2009) in their fixed effects regression analysis that examined the relationship between athletic success and the quantity and quality of student applications, and the data sources are the same as those employed by Litan, Orszag and Orszag (2003), Orszag and Orszag (2005) and Pope and Pope (2009) in their earlier empirical studies on this subject.

Instrumentation

For the purpose of this study, student quality was assessed through mean average SAT standardized test scores for incoming undergraduate students at the Southland Conference member institutions being sampled. The Scholastic Aptitude Test (SAT) is an aptitude test administered to secondary students in years 11 or 12, and is divided into two parts, the SAT Reasoning Test measuring reading, writing and quantitative skills and the SAT Subject Tests measuring knowledge and reasoning ability in various subjects. The SAT is scored on a scale from 200-800 in each of the two reading and writing and math sections and there is an optional essay component scored on a scale of 2-8. The two

part sum score out of a total of 1600 is what universities report to the Department of Education for incoming undergraduate students (National Center for Education Statistics, 2016).

There is validity to using SAT standardized test scores to determine incoming student academic quality because the United States Department of Education endorses the SAT undergraduate level aptitude tests to determine students' capability for postsecondary study (U.S. Department of Education, 2016). Furthermore, for the purpose of this study, all of the Southland Conference member institutions report SAT data to the federal government and use standardized test scores to make admissions decisions about incoming undergraduate students.

Sample

This study employed a sample of 17 institutions that were members of the Division I FCS Southland Conference during the period between 2003 and 2015. The population is a group of individuals, objects, or items from among which samples are taken for measurement (Singh, 2007). This sample represented the entire population of the Southland Conference during the period under study and includes schools that both entered and left the conference during that time. According to Creswell (2003), researcher's access is a key element in research design that must be addressed during the data collection process. Since the researcher had access to extensive datasets provided by the United States Department of Education and Department of Labor Statistics, it was possible to sample the entire population of the conference with relative ease. For the purposes of this study, the time period and set of participants was chosen as it reflects a

typical mid-major NCAA Division I conference during a shifting economic time period. The schools in the study are regional comprehensive universities that were greatly impacted by the great recession of 2007-2008 and many mid-major programs had their funding called into question following the downward trends in state support after the recession.

During the period under study the conference consisted of regional public and private colleges and universities throughout Texas, Louisiana, Oklahoma and Arkansas with enrollments ranging from 2,000 to 13,000 students. The universities examined included Abilene Christian University, Houston Baptist University, Lamar University, McNeese State University, Nicholls State University, Northwestern State University, Oral Roberts University, Sam Houston State University, Southeastern Louisiana University, Stephen F. Austin State University, Texas A&M University at Corpus Christi, University of Central Arkansas, University of New Orleans, University of the Incarnate Word, Texas State University, University of Texas at Arlington, and University of Texas at San Antonio.

Data Collection

Undergraduate enrollment data and SAT test score data were collected from publicly available databases provided by the National Center for Education Statistics Database's Integrated Postsecondary Education Data Center (IPEDS) and college athletics spending information was collected from the Equity in Athletics Data Analysis Cutting Tool through the Office of Postsecondary Education of the United States Department of Education. Data on the number of high school diplomas awarded by state

were collected from the National Center of Education Statistics and data on per capita income by state were collected from the United States Bureau of Economic Analysis and linked by state to the colleges in the study.

The IPEDS database provides basic data on postsecondary educational institutions in the United States for use in determining trends in higher education such as student enrollment, the number of employed faculty and staff, total number of degrees granted, and budget expenditures (National Center for Education Statistics, 2017). IPEDS data were collected by using the Compare Institutions feature on the website and selecting all dependent variables for each of the institutions being studied for the time period of 2003 through 2015. The IPEDS Data Center produced a spreadsheet output for all of the selected variables and years under study.

The Equity in Athletics Data Analysis Cost Cutting Tool was designed by the Office of Postsecondary Education of the United States Department of Education as a resource to provide customized reports for public inquiries regarding equity in athletics data and consists of data collected annually as required by the Equity in Athletics Disclosure Act (EADA) (US Department of Education, 2017). Similarly to the IPEDS Data Center, EADA data were collected by using the Compare Data for Multiple Schools feature on the website and selecting the independent variable for all of the institutions being studied for the period between 2003 and 2015. The EADA Cost Cutting Tool produced a spreadsheet output for all of the selected variables and years under study and this spreadsheet data was merged with the existing output from the IPEDS data for the dependent variables using STATA software.

The National Center of Education Statistics is the federal entity responsible for collecting, analyzing and reporting data and statistics related to education in the United States (National Center for Education Statistics, 2017). NCES data was collected using the Data Tools feature of the website to select all independent variables being studied for the time period of 2003 through 2015. The NCES website produced a spreadsheet output for all of the selected variables and years under study. This data was merged with IPEDS and EADA data using STATA software.

The United States Bureau of Economic Analysis is the principal federal agency responsible for promoting “. . . a better understanding of the U.S. economy by providing the most timely, relevant, and accurate economic accounts data in an objective and cost-effective manner . . .” (United States Department of Commerce, 2017). Per capita income data was collected using the Bureau of Economic Analysis National Data GDP and Personal Income database, and the website produced a spreadsheet output for the selected variable and years under study. State income was merged into the larger dataset by linking state codes with the institutions under study.

Data Analysis

Raw data were downloaded directly from the online historical archives of the National Center of Education Statistics, the IPEDS database, the EADA database, and the United States Bureau of Economic Analysis. The IPEDS, NCES and EADA sources reported their raw data in continuous numerical format and uses unique institutional UNITid identifiers to categorize data by individual college. The United States Bureau of Economic Analysis data were coded by state to merge with the state codes from the

IPEDS and EADA data sets for each institution. All of the data sets were merged using STATA software to match cases, using the UNITid identifiers and state codes, and compile the data to ensure accuracy. Data were cleaned, and missing values were left empty due to their low number and the possibility that inserting mean averages could skew the research findings. Dummy variables were created for state and year, and a one year lead and lag variables were created to test for future and lagged effects of the data. The dataset was then exported in .csv file format for analysis through the STATA and Microsoft Excel software programs.

STATA was also used to create summary statistics of the data, while Microsoft Excel was used to create descriptive statistics. Descriptive statistics for institutional athletic expenditures, undergraduate enrollment, and test scores was presented through mean averages including mean spending for institutions over time, mean total undergraduate enrollment over time, mean test scores for first time incoming freshmen over time and mean total applications over time.

Fixed effects regression modeling was conducted using the STATA data analysis and statistical software to test for relationships among the variables (Allison, 2009). The researcher was specifically interested in the f-statistic and the beta coefficient present in the data analysis outputs. The f-test describes whether the fixed effects model actually explained anything in the data, or whether the model was a good fit for the data. The f-test was a statistical test where the p-value for the test should be significant at a 5% level, or lower than 0.05 in the data output. The beta coefficient of the independent predictor variable and its effect on the dependent variables under study was the primary data point

of interest. The beta coefficient in a fixed effects model tells the researcher the direction and strength of the relationship between the variables and allows the researcher to infer how much of a change in the dependent variable can be expected with a change in the predictor variable. As Bartels (2008) noted, in the case of time-series cross-sectional data the interpretation of the beta coefficients would be “. . . for a given observation, as X varies across time by one unit, Y increases or decreases by β units” (p. 6). The beta coefficient of the predictor variable of institutional spending showed the relationships between the variables of institutional athletic expenditures, undergraduate enrollment, total applications and incoming freshmen test scores.

Summary

By itself, quantitative research does not guarantee validity or reliability of the research, but does allow for a high level of objectivity when discussing the data and findings (Borrego et al., 2009). The panel data fixed effects regression research design, therefore, provided an objective approach to analyzing the data to determine if relationships existed between the research variables. The fixed effects regression research design was also helpful for determining the degree of the relationship between institutional athletic expenditures, student quality, and undergraduate enrollments for the given sample of Southland Conference schools (Cook & Cook, 2008). The data was analyzed using software that is typically used by social science researchers to conduct quantitative research and will help reduce subjectivity. Qualitative research techniques were left out of the research design to reduce the subjectivity of the findings.

As the researcher was aware, the potential limitation of fixed effects regression analysis is omitted variable bias, or a chance that the relationships between athletic spending and the dependent variables under study could be correlated to variables that were not seen by the researcher or controlled for in the regression model. Several control variables as well as year and institutional fixed effects were included in the analysis, but there was always a potential threat that uncontrolled characteristics could be correlated with institutional athletics spending and could therefore lead to omitted variable bias in this analysis. Another potential limitation of fixed effects was that this model could not accurately capture the changes in school quality over time, and some schools within the Southland Conference may have substantially improved their academic reputations during the period of study. As Allison (2005) noted, however, “No matter how many variables you control for, someone can always criticize your study by suggesting that you left out some crucial variable” (p. 1).

CHAPTER IV

Findings

Introduction

The purpose of this analysis was to examine the relationship between the financial investment in intercollegiate athletics and the enrollment, applications and student test scores of schools situated in the Southland Conference, a mid-major NCAA Division I athletic conference, during the period between 2003 and 2015. Specifically, the researcher examined whether institutional athletics expenditures impact the number of applications, enrollments or quality of applicants, as derived from incoming freshmen standardized test scores, at each of the universities within the Southland Conference during the time period under examination. By focusing specifically on enrollment, applications and test scores in relation to athletics the Division I FCS level, the findings below provide context for university leaders at similar institutions, and more specifically those at Southland Conference member institutions, to begin discussing how to frame the role of intercollegiate athletics at their institutions.

Data were collected from the National Center for Education Statistics Database's Integrated Postsecondary Education Data Center (IPEDS), the Equity in Athletics Data Analysis (EADA) Cutting Tool through the Office of Postsecondary Education of the

United States Department of Education, the United States Bureau of Economic Analysis, and the National Center for Education Statistics general database and analyzed using descriptive statistics and fixed effects regressions. This chapter begins with a description of the summary and descriptive statistics for the groups under study followed by descriptions of the fixed effects regressions used to answer each of the three research questions of this study.

The Stata Data Analysis and Statistical Software (STATA) package, version 9.2, was used to run summary statistics and analyze the data in order to answer the three research questions. Additional summary statistics and descriptive statistics were derived using Microsoft Excel.

Descriptive Statistics

Descriptive statistics for total institutional athletic expenditures during the period between 2003 and 2015 can be found in Table 1 below. In 2003 the mean for institutional athletic expenditures for schools in this study was \$4,913,199 and by 2015 that had increased nominally by \$9,750,427 to \$14,663,626, representing a total increase in institutional expenditures of 198.45%. Only three schools, the University of New Orleans, Southeastern Louisiana State University, and Oral Roberts, increased their athletic budgets by less than 100% during this period. The three largest proportional increases in spending, Houston Baptist University, University of the Incarnate Word, and University of Central Arkansas, belonged to schools moving from Division II to Division I membership during this period. The next two highest increases, UTSA and Lamar, each added Division I football during this period.

Table 1

Descriptive Statistics - Total Expenses in the Southland Conference (2003-2015)

Institution Name	Total Expenses			
	2003	2015	\$ Change	% Change
University of Central Arkansas ^a	\$2,720,019	\$11,997,465	\$9,277,446	341.08%
McNeese State University	\$4,775,205	\$11,291,974	\$6,516,769	136.47%
University of New Orleans ^b	\$4,229,707	\$5,137,842	\$908,135	21.47%
Nicholls State University	\$3,473,481	\$9,820,335	\$6,346,854	182.72%
Northwestern State University	\$4,918,760	\$11,557,256	\$6,638,496	134.96%
Southeastern Louisiana University	\$7,023,366	\$13,494,250	\$6,470,884	92.13%
Oral Roberts University ^c	\$7,411,517	\$12,357,824	\$4,946,307	66.74%
Abilene Christian University ^b	\$4,849,383	\$12,894,219	\$8,044,836	165.89%
Texas A&M-Corpus Christi	\$3,560,255	\$10,313,499	\$6,753,244	189.68%
Houston Baptist University ^b	\$2,090,700	\$15,314,235	\$13,223,535	632.49%
University of the Incarnate Word ^b	\$3,510,143	\$17,985,309	\$14,475,166	412.38%
Lamar University	\$4,330,423	\$17,736,191	\$13,405,768	309.57%
Sam Houston State University	\$5,416,735	\$16,024,424	\$10,607,689	195.83%
Stephen F. Austin State University	\$5,899,527	\$15,528,490	\$9,628,963	163.22%
Texas State University ^d	\$8,639,749	\$30,546,211	\$21,906,462	253.55%
University of Texas Arlington ^d	\$4,767,884	\$11,457,556	\$6,689,672	140.31%
University of Texas San Antonio ^d	\$5,907,533	\$25,824,562	\$19,917,029	337.15%
Mean Average for All Schools	\$4,913,199	\$14,663,626	\$9,750,427	198.45%

^aUCA transitioned to Division I and joined the Southland Conference in 2006

^bUNO, ACU, HBU and UIW transitioned to Division I and joined the Southland Conference in 2013

^cOral Roberts University was a Southland Conference member from 2012-2014

^dTexas State, UTA and UTSA moved to FBS conferences in 2012

Table 2 below shows the descriptive statistics for total undergraduate enrollment of each institution in this study during the period between 2003 and 2015. The mean average enrollment change was a net increase of 12.99% overall for all schools in the study. The table shows that during this period eight institutions saw a net decline in total undergraduate enrollment between 2003 and 2015 while nine schools had increases over the same period. Five of the schools that experienced net enrollment losses are located in Louisiana (McNeese, University of New Orleans, Nicholls State, Northwestern State, and Southeastern State), two are located in Texas (Lamar and Abilene Christian) and one is in Oklahoma (Oral Roberts). Of the nine schools with net increases, eight are located in Texas (Texas A&M-Corpus Christi, Houston Baptists University, University of the Incarnate Word, Sam Houston State University, Stephen F. Austin State University, Texas State University, UT-Arlington, and UTSA), and one is located in Arkansas (Central Arkansas). The largest real gains in total undergraduate enrollment were at Texas State (9690), UTSA (4455), Sam Houston State (4378) and UTA (2871), three of which were institutions that moved to FBS athletics in 2012.

Table 2

Descriptive Statistics – Total Undergraduate Enrolments in the Southland Conference (2003-2015)

Institution Name	Total Undergraduate Enrollment			
	2003	2015	# Change	% Change
University of Central Arkansas	8055	8235	180	2.23%
McNeese State University	6023	5775	-248	-4.12%
University of New Orleans	9598	4789	-4809	-50.10%
Nicholls State University	5304	4576	-728	-13.73%
Northwestern State University	6968	5016	-1952	-28.01%
Southeastern Louisiana University	11420	9568	-1852	-16.22%
Oral Roberts University	2947	2510	-437	-14.83%
Abilene Christian University	3877	3567	-310	-8.00%
Texas A&M-Corpus Christi	4820	7286	2466	51.16%
Houston Baptist University	1629	2115	486	29.83%
University of the Incarnate Word	2036	4238	2202	108.15%
Lamar University	6315	6314	-1	-0.02%
Sam Houston State University	9739	14117	4378	44.95%
Stephen F Austin State University	8406	9413	1007	11.98%
Texas State University	17679	27369	9690	54.81%
University of Texas Arlington	13486	16357	2871	21.29%
University of Texas San Antonio	15584	20039	4455	28.59%
Mean Average for All Schools	7875.65	8899.06	1023.41176	12.99%

Table 3 below shows the undergraduate applications for schools in this study during the period between 2003 and in 2015 and also breaks down the numbers into gender groups for male and female undergraduate applications. In all three categories of applications, the mean average for all institutions increased between 2003 and 2015. On average there were 1,292 more male applicants per institution and an additional 2,188 female applicants per institution in 2015 than there were in 2003. The mean average of total applications in 2015 was 3480 greater than in 2003, for an overall increase of 78.71%. Three institutions (the University of Central Arkansas, the University of New Orleans, and Northwestern State University) experienced application declines from 2003 to 2015, while the largest increase was seen at Houston Baptist University where the institution received 13,623 more applications in 2015 than it had in 2003, an increase of 1520.4%.

Table 3

Descriptive Statistics – Undergraduate Applications in the Southland Conference (2003-2015)

Institution Name	Total Undergraduate Applications			
	2003	2015	# Change	% Change
University of Central Arkansas	5655	5063	-592	-10.47%
McNeese State University	2183	3002	819	37.52%
University of New Orleans	5467	3932	-1535	-28.08%
Nicholls State University	N/A	2399	N/A	N/A
Northwestern State University	4389	3231	-1158	-26.38%
Southeastern Louisiana University	3373	3718	345	10.23%
Oral Roberts University	1337	2339	1002	74.94%
Abilene Christian University	4011	10804	6793	169.36%
Texas A&M-Corpus Christi	3114	8909	5795	186.10%
Houston Baptist University	896	14519	13623	1520.42%
University of the Incarnate Word	1422	4050	2628	184.81%
Lamar University	4185	4529	344	8.22%
Sam Houston State University	5182	9242	4060	78.35%
Stephen F Austin State University	5750	11382	5632	97.95%
Texas State University	11483	20711	9228	80.36%
University of Texas Arlington	5103	10777	5674	111.19%
University of Texas San Antonio	7184	15706	8522	118.62%
Mean Average for All Schools	4421	7901	3480	78.71%

Table 4 shows the descriptive statistics for incoming freshmen SAT Critical Reading scores of each institution in this study during the period between 2003 and 2015. On average the Critical Reading scores of schools in this study declined at both the 25th and 75th percentile levels during the period under study. The mean average 25th percentile score for Critical Reading declined by 18.75 points overall, from 461.75 in 2003 to 443 in 2015, and the 75th percentile score by 17 points overall, from 569.58 in 2003 to 552.5 in 2015. For schools with data from both 2003 and 2015, 10 out of 12 schools showed no change or a decline in SAT Critical Reading 25th and 75th percentile scores while just two schools, Lamar and UTSA, showed small increases of 1.19% and 2%, respectively, at the 25th percentile level, and 2.32% and 4.2%, respectively, at the 75th percentile level. This data shows that incoming freshmen SAT Critical Reading scores for schools in this study declined over the period between 2003 and 2015, but more so at the 25th percentile level (the lower quartile) than at the 75th percentile level.

Table 4

Descriptive Statistics – SAT Critical Reading Scores in the Southland Conference (2003-2015)

Institution Name	SAT Critical Reading 25th Percentile Scores			SAT Critical Reading 75th Percentile Scores		
	2003	2015	Change	2003	2015	Change
University of Central Arkansas	N/A	440	N/A	N/A	540	N/A
McNeese State University	N/A	440	N/A	N/A	530	N/A
University of New Orleans	470	460	-2.13%	620	600	-3.23%
Nicholls State University	N/A	440	N/A	N/A	540	N/A
Northwestern State University	N/A	420	N/A	N/A	550	N/A
Southeastern Louisiana University	N/A	N/A	N/A	N/A	N/A	N/A
Oral Roberts University	480	453	-5.63%	600	550	-8.33%
Abilene Christian University	490	470	-4.08%	600	590	-1.67%
Texas A&M-Corpus Christi	430	430	0.00%	518	530	2.32%
Houston Baptist University	480	470	-2.08%	590	580	-1.69%
University of the Incarnate Word	440	430	-2.27%	550	530	-3.64%
Lamar University	420	425	1.19%	530	530	0.00%
Sam Houston State University	450	450	0.00%	560	550	-1.79%
Stephen F Austin State University	470	440	-6.38%	560	550	-1.79%
Texas State University	490	460	-6.12%	580	560	-3.45%
University of Texas Arlington	470	400	-14.9%	580	540	-6.90%
University of Texas San Antonio	451	460	2.00%	547	570	4.20%
Mean Average for All Schools	461.8	443	-4.06%	569.6	552.5	-3.00%

The descriptive statistics for incoming freshmen SAT Math scores for each of the institutions in this study are shown below in Table 5. During the period between 2003 and 2015 the mean average SAT Math scores for all schools increased by 3.9 total points at the 25th percentile level, a 0.85% increase, while declining by 0.625 points at the 75th percentile level, a decrease of 0.11% overall. Six of the schools in the study showed either a decline in SAT Math 25th percentile scores or no change at all, while six schools showed increases, with the University of New Orleans having the largest 25th percentile increase at 35 points (7.95%) and Oral Roberts the largest decrease at 20 points (-4.26%). At the 75th percentile level, seven schools demonstrated an overall decrease in SAT scores and five demonstrated increases. The largest increase for 75th percentile scores was 40 points for the University of New Orleans (6.78%) and the largest decrease was 30 points for Texas State University (-5.08%).

Table 5

Descriptive Statistics - SAT Math Scores in the Southland Conference (2003-2015)

Institution Name	SAT Math 25th Percentile Scores			SAT Math 75th Percentile Scores		
	2003	2015	% Change	2003	2015	% Change
University of Central Arkansas	N/A	450	N/A	N/A	570	N/A
McNeese State University	N/A	470	N/A	N/A	580	N/A
University of New Orleans	440	475	7.95%	590	630	6.78%
Nicholls State University	N/A	470	N/A	N/A	610	N/A
Northwestern State University	N/A	450	N/A	N/A	550	N/A
Southeastern Louisiana University	N/A	N/A	N/A	N/A	N/A	N/A
Oral Roberts University	470	450	-4.26%	590	560	-5.08%
Abilene Christian University	490	480	-2.04%	610	590	-3.28%
Texas A&M-Corpus Christi	410	440	7.32%	527	540	2.47%
Houston Baptist University	470	490	4.26%	600	570	-5.00%
University of the Incarnate Word	420	430	2.38%	550	530	-3.64%
Lamar University	410	440	7.32%	520	540	3.85%
Sam Houston State University	460	440	-4.35%	550	540	-1.82%
Stephen F Austin State University	460	450	-2.17%	560	550	-1.79%
Texas State University	500	470	-6.00%	590	560	-5.08%
University of Texas Arlington	490	490	0.00%	600	610	1.67%
University of Texas San Antonio	457	470	2.84%	553	580	4.88%
Mean Average for All Schools	456.4	460.3	0.85%	570	569.4	-0.11%

Table 6 below shows the descriptive statistics for incoming freshmen ACT Composite scores for schools in this study during the period between 2003 and 2015. Overall the mean average ACT Composite scores during this period increased at both the 25th percentile level and at the 75th percentile level by an average of 1.029412 points, which was an increase of 5.56% at the 25th percentile level and 4.38% at the 75th percentile level. Five schools at each percentile level saw no change in incoming freshmen ACT Composite scores between 2003 and 2015. Only one institution, Oral Roberts University, showed a decrease in scores in 2015 over where those scores had been in 2003, declining at the 25th percentile level from 20 to 19 (-5%) and at the 75th percentile level from 26 to 24 (-7.69%).

Table 6

Descriptive Statistics – ACT Composite Scores in the Southland Conference (2003-2015)

Institution Name	ACT Composite 25th Percentile Score			ACT Composite 75th Percentile Score		
	2003	2015	Change	2003	2015	Change
University of Central Arkansas	20	20	0.00%	26	26	0.00%
McNeese State University	17	20	17.6%	22	24	9.09%
University of New Orleans	18	20	11.1%	23	24	4.35%
Nicholls State University	N/A	20	N/A	N/A	24	N/A
Northwestern State University	17	19	11.8%	22	24	9.09%
Southeastern Louisiana University	18	20	11.1%	22	24	9.09%
Oral Roberts University	20	19	-5.00%	26	24	-7.69%
Abilene Christian University	21	22	4.76%	26	27	3.85%
Texas A&M-Corpus Christi	17	17	0.00%	23	23	0.00%
Houston Baptist University	19	20	5.26%	24	26	8.33%
University of the Incarnate Word	17	18	5.88%	23	23	0.00%
Lamar University	16	18	12.5%	21	24	14.3%
Sam Houston State University	19	19	0.00%	23	24	4.35%
Stephen F Austin State University	19	19	0.00%	24	24	0.00%
Texas State University	21	21	0.00%	25	25	0.00%
University of Texas Arlington	19	20	5.26%	24	26	8.33%
University of Texas San Antonio	18	20	11.1%	22	25	13.6%
Mean Average for All Schools	18.5	19.53	5.56%	23.5	24.53	4.38%

Summary Statistics

The summary statistics in Table 7 below provide an overall picture of the variables used in the study. The mean total athletic department expenditures during this period were \$9,463,292 with a low of \$2,067,699 and a high of \$33,674,947. Schools in the Southland Conference during the period between 2003 and 2015 had, on average, 8,791 students per institution, but varied in enrollment size from the smallest, Houston Baptist with 1,566 students, to the largest, Texas State with an undergraduate enrollment of more than 27,000 students. The mean average for undergraduate applications to each institution during this period was 6,248, but applications also varied significantly, with Houston Baptist having many of the lowest overall application numbers and Texas State having the greatest number. Standardized test scores varied from one institution to another, the mean SAT Critical Reading 25th and 75th percentile scores were 448 and 559, respectively, the mean SAT Math 25th and 75th percentile scores were 461 and 573, respectively, and the mean ACT Composite 25th and 75th percentile scores were 19 and 24, respectively. Within institution variation for test scores, however, was very low. Fixed effects regressions rely on high levels of variation in dependent and independent variables within groups and the low level of variation for test scores made estimating the impact of spending on test scores difficult.

Table 7

Summary Statistics

Variable Name	<i>N</i>	<i>M</i>	<i>SD</i>	Min	Max
Total Number of Undergraduates	208	8,790.62	5,644.42	1,566	27,369
ACT Composite 25th Percentile Scores	203 ^a	19.01	1.44	15	23
ACT Composite 75th Percentile Scores	203 ^a	23.94	1.62	20	28
Total Number of Male Freshmen Applicants	202 ^b	2,552.83	1,657.15	257	8,132
Total Number of Female Freshmen Applicants	202 ^b	3,712.67	2,276.21	578	12,579
Total Number of Freshmen Applicants	203 ^c	6,247.60	3,885.68	835	20,711
SAT Critical Reading 25th Percentile Scores	170 ^d	447.79	24.24	390	500
SAT Critical Reading 75th Percentile Scores	170 ^d	559.24	29.37	500	648
SAT Math 25th Percentile Scores	171 ^e	460.92	27.03	400	510
SAT Math 75th Percentile Scores	171 ^e	573.03	32.75	520	670
Total Athletic Department Spending	208	\$9,463,292 ^f	\$5,408,621	\$2,067,699	\$33,674,947

Table 7

Summary Statistics

Total Cost of Attendance	208	\$21,799.24 ^f	\$7,631.22	\$12,358.38	\$44,740.00
Average Full Time Faculty Salary	208	\$60,896.61 ^f	\$8,130.49	\$45,403.00	\$84,483.00
Number of Freshmen By State	208	66,835.32	33,993.94	14,939	108,337
State Median Income	208	\$49,315.25 ^f	\$4,327.52	\$40,066.00	\$56,473.00

^aACT scores were not reported for Texas A&M University in 2008 or 2009, for Lamar University in 2005, or Nicholls State University in 2003 or 2004.

^bMale and female application data were not reported for Texas A&M University in 2008 or 2009, for Lamar University in 2005, Nicholls State University in 2003 or 2004, or McNeese State University in 2007.

^cTotal number of freshman applicant data were not reported for Texas A&M University in 2008 or 2009, for Lamar University in 2005, or Nicholls State University in 2003 or 2004.

^dSAT Critical Reading scores were not reported for the University of Central Arkansas in 2003 or from 2007-2013, for McNeese State University from 2003-2008, for Nicholls State University from 2003-2009, for Northwestern State University in 2003, for Southeastern Louisiana University from 2003-2015, for Texas A&M University-Corpus Christi from 2008-2009, or for Lamar University in 2005.

^eSAT Math scores were not reported for the University of Central Arkansas in 2003 or from 2008-2013, for McNeese State University from 2003-2008, for Nicholls State University from 2003-2009, for Northwestern State University in 2003, for Southeastern Louisiana University from 2003-2015, for Texas A&M University-Corpus Christi from 2008-2009, or for Lamar University in 2005.

^fDollar denominated variables are calculated in 2015 dollars.

Results of Research Questions

Research Question 1 – Total Undergraduate Enrollment. What is the relationship between athletics spending and total undergraduate enrollment at Southland Conference member institutions during the period between 2003 and 2015?

The first research question is examined using a fixed effects regression of institutional athletic spending in relation to the total undergraduate enrollments for Southland Conference schools during the period between 2003 and 2015. Table 8 below shows the results of the fixed effects regression on the relationship between total undergraduate enrollment and institutional spending.

The fixed effects regression analysis indicated that during the period between 2003 and 2015, Southland Conference institutions did not demonstrate an increase in enrollment following an increase in athletic spending, as demonstrated by the negative coefficient and statistically insignificant finding for the current year and lagged year effects of institutional athletic expenditures. The lagged institutional athletic expenditures coefficient was negative and the current institutional athletic expenditures coefficient was positive, but neither was significant at the 5% level or lower. The future year effect, however, was positive, indicating that there was a relationship between institutional enrollments and future spending on institutional athletic expenditures. The coefficient of 0.0001459 indicates that future spending, or money spent the following year, on intercollegiate athletics is tied to enrollment trends at Southland Conference member institutions, while the lack of lagged findings indicates that the opposite relationship is not observed. From this data it can be observed that increases in

institutional spending on athletics do not drive enrollment increases, but institutional enrollments could drive future athletic spending. As enrollments increase, spending on athletics in future years rises, so institutions with increasing enrollments can invest greater amounts of revenue into intercollegiate athletics after their revenues rise, rather than increase revenues as a result of institutional investment.

Another finding is a positive relationship (at the 1% level) between schools that had moved to the highest levels of college sports, the Football Bowl Subdivision (FBS), and total undergraduate enrollments. Membership in a Football Bowl Subdivision conference was correlated with a 1348.971 coefficient at a 0.001 level of statistical significance.

Table 8

Fixed Effects Regression for Total Undergraduate Enrollment in the Southland Conference (2003-2015)

Variable Name	Total Undergraduate Enrollment		
	Coef.	t	P> t
Institutional Athletic Expenditures - L1	-0.0000866	-1.31	0.192
Institutional Athletic Expenditures	0.0000508	0.53	0.596
Institutional Athletic Expenditures - F1	0.0001459	2.08	0.040*
Number of Freshmen By State	0.076622	5.96	0.000**
Total Cost of Attendance	-0.1213429	-3.74	0.000**
Average Full Time Faculty Salary	-0.0281475	-1.07	0.288
State Median Income	0.0279583	0.99	0.322
FBS Level Football - Dummy	1348.971	3.40	0.001**
Division II Level Athletics - Dummy	227.7838	1.00	0.319
Prob > F	0.0000		
N	172		

* significant at the 5% level

** significant at the 1% level

Research Question 2 – Undergraduate Applications. What is the relationship between athletics spending and undergraduate applications at Southland Conference member institutions during the period between 2003 and 2015?

The second research question was examined using a fixed effects regression of the relationship between institutional athletic spending and undergraduate applications for Southland Conference schools during the period between 2003 and 2015. Tables 9, 10

and 11 show the results of the fixed effects regressions on the relationship between undergraduate admissions and institutional spending on athletics.

Table 9 shows the results of a fixed effects regression that examined the relationship between male undergraduate applications and institutional athletic expenditures in the Southland Conference during the period between 2003 and 2015. The results of the fixed effects regression analysis indicated that during the period between 2003 and 2015, Southland Conference institutions did not experience an increase in male undergraduate applications following an increase in athletic spending. The lagged effects of institutional athletic expenditures are negatively correlated to male undergraduate applications while the current and future effects of spending are weakly positively correlated but not statistically significant. These findings would suggest that there is no relationship between institutional athletic expenditures and male undergraduate applications at Southland Conference institutions during the period between 2003 and 2015.

Table 9 does, however, demonstrate a relationship at the 5% level between three of the control variables included in the regression model, number of freshmen by state, total cost of attendance, and FBS level football, and male undergraduate applications. One of those findings, the relationship between male undergraduate applications and a school's inclusion in FBS level athletics, suggests that there is a positive relationship between an institution's Football Bowl Subdivision participation and application interest from potential male undergraduate students, but not with their FCS level participation in the Southland Conference.

Table 9

Fixed Effects Regression for Male Undergraduate Applications in the Southland Conference (2003-2015)

Variable Name	Male Undergraduate Applications		
	Coef.	t	P> t
Institutional Athletic Expenditures - L1	-0.0000375	-0.86	0.389
Institutional Athletic Expenditures	0.0000331	0.60	0.551
Institutional Athletic Expenditures - F1	0.0000403	1.00	0.318
Number of Freshmen By State	0.0441001	3.52	0.001**
Total Cost of Attendance	0.1292405	3.63	0.000**
Average Full Time Faculty Salary	-0.0317527	-1.90	0.059
State Median Income	0.0154646	0.53	0.598
FBS Level Football - Dummy	995.7375	3.00	0.003*
Division II Level Athletics - Dummy	105.4126	0.40	0.689
Prob > F	0.0000		
N	167		

* significant at the 5% level

** significant at the 1% level

The results of a fixed effects regression in Table 10 show the relationship between female undergraduate applications and institutional athletic expenditures in the Southland Conference during the period between 2003 and 2015. The results of the regression analysis indicate that no relationship exists between institutional athletic expenditures and female undergraduate applications. The lagged, current, and future effects of institutional athletic spending are weakly correlated with female undergraduate applications and all three have p-values close to 1 and are not related even at the highest levels of traditional testing.

Table 10 does indicate that female undergraduate applications are correlated with four control variables included in the fixed effects regression model, including number of freshmen by state, total cost of attendance, average faculty salary, and FBS level football. Similarly to male undergraduate applications, but less statistically significant, is the correlation seen in Table 10 between female undergraduate applications and an institution's inclusion in the Football Bowl Subdivision (FBS) which, like male undergraduate applications, signals that institutions competing at the FBS level typically see an increase in female undergraduate applications while those competing in the FCS level Southland Conference do not see that relationship.

Table 10

Fixed Effects Regression for Female Undergraduate Applications in the Southland Conference (2003-2015)

Variable Name	Female Undergraduate Applications		
	Coef.	t	P> t
Institutional Athletic Expenditures - L1	-0.0000164	-0.22	0.828
Institutional Athletic Expenditures	0.00005	0.47	0.638
Institutional Athletic Expenditures - F1	-3.60E-06	-0.04	0.965
Number of Freshmen By State	0.0787621	4.03	0.000**
Total Cost of Attendance	0.2139345	3.46	0.001**
Average Full Time Faculty Salary	-0.0605411	-2.23	0.027*
State Median Income	0.0050338	0.11	0.909
FBS Level Football - Dummy	972.9845	1.79	0.076
Division II Level Athletics - Dummy	576.6523	1.44	0.153
Prob > F	0.0000		
N	167		

* significant at the 5% level

** significant at the 1% level

The relationship between total undergraduate applications and institutional expenditures in Southland Conference schools between 2003 and 2015 is shown in Table 11. The results of the fixed effects regression demonstrate that there is no relationship between institutional athletic expenditures and total undergraduate applications at Southland Conference schools during the period under study. Although the coefficient on the lagged effects of institutional athletic spending is negative, it is not statistically significant. The present and future effects of institutional spending show a weak positive correlation but are also not statistically significant.

Four of the control variables included in the regression model are related to total undergraduate applications at the 5% level; number of freshmen by state, total cost of attendance, average full time faculty salary, and FBS level football participation. Table 11 shows that total undergraduate applications are correlated positively with an institution's inclusion in the Football Bowl Subdivision of NCAA Division I athletics competition, and this finding is significant at the 5% level.

Table 11

Fixed Effects Regression for Total Undergraduate Applications in the Southland Conference (2003-2015)

Variable Name	Total Undergraduate Applications		
	Coef.	t	P> t
Institutional Athletic Expenditures - L1	-0.0000539	-0.47	0.640
Institutional Athletic Expenditures	0.0000837	0.53	0.599
Institutional Athletic Expenditures - F1	0.0000368	0.31	0.758
Number of Freshmen By State	0.1225782	3.89	0.000**
Total Cost of Attendance	0.3424072	3.58	0.000**
Average Full Time Faculty Salary	-0.0919845	-2.16	0.032*
State Median Income	0.020614	0.29	0.772
FBS Level Football - Dummy	1965.299	2.28	0.024*
Division II Level Athletics - Dummy	686.0582	1.05	0.294
Prob > F	0.0000		
N	168		

* significant at the 5% level

** significant at the 1% level

When examining the findings of the three fixed effects regression analyses in Tables 9, 10 and 11, the results indicate that there is no relationship between institutional athletic expenditures and number of undergraduate applications, either by gender or in total. All three models demonstrated a negative correlation with the lagged effects of spending, but none at a statistically significant level, while present and future effects of spending were mixed and also not statistically significant. Each of the models demonstrated, however, that a relationship existed between a school's level of Division I

participation, as institutions that competed at any point at the FBS level were positively correlated with undergraduate enrollment increases at the 5% level of statistical significance.

Research Question 3 – Applicant Quality. What is the relationship between athletics spending and applicant quality at Southland Conference member institutions during the period between 2003 and 2015?

The third research question was examined using a fixed effects regression of the relationship between institutional athletic spending and student quality, as judged by standardized test scores, for Southland Conference schools during the period between 2003 and 2015. Tables 12 through 17 show the results of the fixed effects regressions on the relationship between student quality, as measured by standardized test scores, and institutional spending on athletics. Four of the tables, tables 12 through 15, show the relationship between SAT scores and institutional athletic spending and two tables, 16 and 17, show the relationship between ACT scores and institutional athletic spending.

Table 12 shows the results of a fixed effects regression analysis testing the relationship between SAT Critical Reading 25th Percentile Scores and institutional athletic expenditures in the Southland Conference during the period between 2003 and 2015. The findings of this regression, as shown in the table, indicate that there is no relationship between the two variables in the current, lagged, or future effects. The regression analysis does show that there is a negative relationship between an institution's participation at the FBS level of football, as there was an observed drop in

SAT Critical Reading scores at the 25th percentile for schools participating in FBS football.

Table 12

Fixed Effects Regression for SAT Critical Reading 25th Percentile Scores in the Southland Conference (2003-2015)

Variable Name	SAT Critical Reading 25th Percentile Scores		
	Coef.	t	P> t
Institutional Athletic Expenditures - L1	1.15E-06	1.26	0.210
Institutional Athletic Expenditures	-5.93E-08	-0.07	0.946
Institutional Athletic Expenditures - F1	-4.94E-07	-0.74	0.460
Number of Freshmen By State	-0.0000491	-0.18	0.858
Total Cost of Attendance	-0.001032	-1.70	0.092
Average Full Time Faculty Salary	0.0003061	1.21	0.228
State Median Income	-0.0008126	-1.29	0.198
FBS Level Football - Dummy	-23.03597	-2.52	0.013*
Division II Level Athletics - Dummy	6.203844	1.27	0.208
Prob > F	0.0300		
N	140		

* significant at the 5% level

** significant at the 1% level

Table 13 shows the results of a fixed effects regression analysis of the relationship between SAT Critical Reading 75th percentile scores and institutional athletic spending in the Southland Conference between 2003 and 2015. The results of this regression indicate that there is no relationship between institutional athletic spending and 75th percentile SAT Critical Reading scores in Southland Conference schools during the period under

study. This regression does show a weak positive correlation between the number of freshmen in a state, and weak negative correlations between total cost of attendance and state median income, and 75th percentile SAT Critical Reading Scores.

Table 13

Fixed Effects Regression for SAT Critical Reading 75th Percentile Scores in the Southland Conference (2003-2015)

Variable Name	SAT Critical Reading 75th Percentile Scores		
	Coef.	t	P> t
Institutional Athletic Expenditures - L1	-3.14E-07	-0.35	0.728
Institutional Athletic Expenditures	-6.40E-07	-0.63	0.530
Institutional Athletic Expenditures - F1	8.17E-07	1.23	0.222
Number of Freshmen By State	0.0011659	3.60	0.000**
Total Cost of Attendance	-0.0018715	-3.34	0.001**
Average Full Time Faculty Salary	0.0004357	1.56	0.122
State Median Income	-0.0028579	-2.81	0.006**
FBS Level Football - Dummy	-4.157767	-0.67	0.503
Division II Level Athletics - Dummy	5.238458	0.86	0.392
Prob > F	0.0000		
N	140		

* significant at the 5% level

** significant at the 1% level

Table 14 shows the results of a fixed effects regression analysis of the relationship between SAT Math 25th percentile scores in the Southland Conference during the period between 2003 and 2015. The regression results show no relationships between institutional athletic expenditures and SAT Math 25th percentile scores. Furthermore, no

relationships between any of the independent predictor variables in the regression model at a 5% level. At a 10% level there is a negative relationship between membership at an FBS level institution and SAT Math scores at the 25th percentile.

Table 14

Fixed Effects Regression for SAT Math 25th Percentile Scores in the Southland Conference (2003-2015)

Variable Name	SAT Math 25th Percentile Scores		
	Coef.	t	P> t
Institutional Athletic Expenditures - L1	4.90E-07	0.46	0.645
Institutional Athletic Expenditures	6.28E-08	0.05	0.964
Institutional Athletic Expenditures - F1	-5.23E-07	-0.56	0.577
Number of Freshmen By State	-0.0001487	-0.37	0.713
Total Cost of Attendance	-0.0006278	-0.89	0.378
Average Full Time Faculty Salary	0.000459	1.42	0.158
State Median Income	0.0013801	1.26	0.212
FBS Level Football - Dummy	-10.5737	-1.88	0.062
Division II Level Athletics - Dummy	4.455332	0.72	0.471
Prob > F	0.0001		
<i>N</i>	141		

* significant at the 5% level

** significant at the 1% level

Table 15 shows the results of a fixed effects regression analysis on the relationship between SAT Math 75th percentile scores in the Southland Conference during the period between 2003 and 2015. The regression results show no relationships

between any of the independent predictor variables and the dependent variable of SAT Math 75th percentile scores. Furthermore the F-statistic for the regression is 0.5751 indicating that the regression model itself was not appropriate for these variables and that the findings are of no use to the researcher. This high F-statistic is likely caused by the low level of within group variation in standardized test scores, specifically at the 75th percentile level. Without a high level of variation in the dependent and independent variables, the fixed effects regression analysis is not effective for examining the relationship between athletic spending and test scores.

Table 15

Fixed Effects Regression for SAGT Math 75th Percentile Scores in the Southland Conference (2003-2015)

Variable Name	SAT Math 75th Percentile Scores		
	Coef.	t	P> t
Institutional Athletic Expenditures - L1	-8.96E-07	-0.60	0.548
Institutional Athletic Expenditures	-1.74E-07	-0.09	0.925
Institutional Athletic Expenditures - F1	1.01E-06	0.86	0.390
Number of Freshmen By State	0.0006571	1.09	0.276
Total Cost of Attendance	-0.0014127	-1.31	0.192
Average Full Time Faculty Salary	0.0001706	0.43	0.669
State Median Income	-0.0003956	-0.22	0.823
FBS Level Football - Dummy	-0.1980849	-0.02	0.980
Division II Level Athletics - Dummy	5.620588	0.48	0.635
Prob > F	0.5751		
N	141		

* significant at the 5% level

** significant at the 1% level

The results of a fixed effects regression analysis of the relationship between ACT Composite 25th percentile scores and institutional athletic expenditures is shown in Table 16. Results of the regression indicate that there is no relationship between ACT 25th percentile scores and institutional athletic spending at Southland Conference institutions during the period between 2003 and 2015. Three independent control variables are, however, correlated to ACT 25th percentile scores: number of freshmen by state, total cost of attendance, and whether the school was Division II or Division I.

Table 16

Fixed Effects Regression for ACT Composite 25th Percentile Scores in the Southland Conference (2003-2015)

Variable Name	ACT Composite 25th Percentile Scores		
	Coef.	t	P> t
Institutional Athletic Expenditures - L1	-1.16E-09	-0.03	0.980
Institutional Athletic Expenditures	-3.94E-08	-0.67	0.504
Institutional Athletic Expenditures - F1	7.95E-08	1.63	0.105
Number of Freshmen By State	-0.0000536	-3.32	0.001**
Total Cost of Attendance	0.0000963	2.07	0.040*
Average Full Time Faculty Salary	0.0000106	0.54	0.592
State Median Income	0.0000288	0.83	0.406
FBS Level Football - Dummy	-0.0476945	-0.14	0.887
Division II Level Athletics - Dummy	0.6245466	2.38	0.019*
Prob > F	0.0000		
N	168		

* significant at the 5% level

** significant at the 1% level

Table 17 shows the results of a fixed effects regression analysis of the relationship between ACT Composite 75th percentile scores and institutional athletic spending in Southland Conference schools during the period between 2003 and 2015. Results of this regression indicate that there were no correlations between any of the independent predictor variables in the model and ACT Composite 75th percentile scores at the 5% level. Two of the independent variables, total cost of attendance and Division II membership, were correlated with ACT Composite 75th percentile scores at the 10% level of significance.

Table 17

Fixed Effects Regression for ACT Composite 75th Percentile Scores in the Southland Conference (2003-2015)

Variable Name	ACT Composite 75th Percentile Scores		
	Coef.	t	P> t
Institutional Athletic Expenditures - L1	4.04e-08	0.79	0.428
Institutional Athletic Expenditures	-7.04e-08	-1.24	0.218
Institutional Athletic Expenditures - F1	5.89e-08	1.34	0.183
Number of Freshmen By State	-.0000233	-1.71	0.089
Total Cost of Attendance	.0000424	0.97	0.332
Average Full Time Faculty Salary	8.61e-06	0.46	0.646
State Median Income	-.000024	-0.59	0.559
FBS Level Football - Dummy	.4216973	1.43	0.155
Division II Level Athletics - Dummy	.4964216	1.91	0.059
Prob > F	0.0000		
N	168		

* significant at the 5% level

** significant at the 1% level

In summary, there was no statistical significance found in any of the relationships between institutional athletic expenditures and incoming student test scores in any of the results from all six fixed effects regressions for either SAT or ACT scores. Low end SAT scores for Critical Reading, the 25th percentile scores, were statistically correlated to an institution's membership at the FBS level of NCAA Division I athletics, while all ACT scores had a statistically significant relationship to a school's Division II or Division I level of participation at least at the 10% level. Overall, the findings from this research question appear to be that there is no relationship between institutional athletic expenditures and incoming freshmen student quality, as assessed by standardized test scores.

Summary

In this chapter, the researcher collected and analyzed panel data to answer each of the three research questions presented in this study. In order to answer the research questions, the researcher compared the independent variable of institutional athletic expenditures to ten separate left side dependent variables and ran fixed effects regression analyses on the data to determine the relationships between the variables. The first set of fixed effects regressions explored the relationship between athletic expenditures and institutional enrollment and determined that a future effect existed between enrollment growth and future institutional spending on athletics. The second set of fixed effects regressions explored the relationship between institutional athletic expenditures and freshmen applications and determined that there was no statistically significant relationship between institutional athletic expenditures and the number of undergraduate

applications, either broken down by gender or in total. Finally, the third set of regression analyses explored the relationship between institutional athletic expenditures and student quality, as measured by standardized test scores. The results of the third set of regression analyses indicated that no statistically significant relationships existed between athletic spending and student quality as measured by either SAT or ACT test scores.

CHAPTER V

Summary, Conclusions, Implications, and Recommendations

Introduction

The purpose of this study was to explore the relationship between intercollegiate athletics and college enrollment measures at schools situated in a mid-major NCAA Division I FCS athletic conference. Specifically, the researcher sought to examine whether institutional athletics expenditures had an impact on the number of applications, enrollments or quality of applicants at each of the universities within the Southland Conference during the period between 2003 and 2015. Three research questions guided this research:

1. What is the relationship between athletics spending and total undergraduate enrollment at Southland Conference member institutions during the period between 2003 and 2015?
2. What is the relationship between athletics spending and undergraduate applications at Southland Conference member institutions during the period between 2003 and 2015?

3. What is the relationship between athletics spending and applicant quality at Southland Conference member institutions during the period between 2003 and 2015?

This chapter presents a summary review of the previous four chapters and discusses the findings from Chapter IV in relationship to the context of the study and the existing literature in the field. Each of the findings from Chapter IV will be examined closely and implications of these findings will be discussed. Following a discussion of the implications of the findings, the limitations of this study will be outlined, and recommendations for future research will be presented. Finally, conclusions will be presented summarizing the entire research study and this field of research.

The results of the statistical tests of the three research questions demonstrated just one correlation between athletic spending and institutional undergraduate enrollment, applications, and student quality measures as determined by standardized test scores. With the exception of a future effect of institutional enrollment on athletic spending, all of the other results showed no statistical relationship between the independent and dependent variables under study. As athletic budgets increase for FCS level athletic departments, it is important that we gather an understanding of the benefits that athletics bring to the university, specifically when the notion that athletics act as a front porch is so pervasive. While the existing research provides a mixed evidence that intercollegiate athletics drives institutional enrollment, application and student quality outcomes, this research suggests that there is little evidence to support the idea that increasing investments in college sports yields better institutional outcomes. A more detailed

examination of the results of Chapter IV will be explored in greater detail in the next section of this chapter.

Summary of the Study

The directional relationship that institutional enrollment has a future effect on athletic spending is an interesting finding in this study, specifically because it challenges the broadly held notion that high profile athletics programs generate interest in universities and therefore act as the front porch for an institution to drive total enrollment, undergraduate applications and student quality. Traditional explanations for investing in athletics hold the position that success in athletics drives enrollment, and therefore increased investments in athletics should yield higher enrollments for the university. The finding in the regression analysis for the first research question demonstrates that there is an effect of institutional enrollment on future athletic department expenditures, which suggests that institutional enrollment drives athletic spending rather than the other way around. While the causation in this relationship is not proven through the fixed effects analysis, the suggestion of causality is stronger for the future effects of enrollment on athletic spending than institutional spending on enrollment.

The future effect of enrollment on athletic spending clearly frames the research finding in support of Fort's (2013, 2016) agency theory. Fort (2013) argued that university administrators invest their finite financial resources into various aspects of college campuses because of their perceived value to the university and based on their perceived return on investment. Furthermore, Fort (2013, 2016) rejects the arms race argument that university administrators are naïve participants who are incapable of

scaling back athletic department finances to fit the needs of the university budget. Agency theory as discussed by Fort suggests that university administrators invest in college athletics because of their belief that the benefits of that investment meet the overall goals of the university at a level justifiable to support the investment itself (Fort, 2013).

Since athletics is just one of the investments made by university leaders across the university, and leadership allocates funds according to their perceived belief in the value of those investments, athletic department spending is not a drain on the institution but instead a calculated investment that yields a desired outcome for university leaders (Fort, 2013). The findings of the first research question in this study suggest that athletic budgets are a reflection of the university's financial position as judged by enrollment and are therefore more likely to be set by active agents working in senior leadership positions rather than driven by opportunistic Athletic Directors at the expense of naïve leadership. It would confirm one of the central tenets of agency theory that university administrators understand the financial relationship between athletics and their institutions and act according to what is best for the institution's overall goals (Fort, 2013).

The findings of the second research question in this study conflict with the assertion that an increase in athletic spending results in an increase in total freshmen applications to the institution, as the fixed effects regressions for male, female and total undergraduate applications were all unrelated to athletic spending. While overall undergraduate application totals increased at most of the schools in the Southland Conference during the period between 2003 and 2015, some by as much as 1,520%, the

results of the fixed effects regression analysis showed no relationship between the spending variable and applications. Castle and Kostelnik's (2011) exploration of Division II athletics found a similar result to this study in that there was no relationship between an athletic department's investments or athletic success and an increase in overall freshmen applications. The findings of the second research question, however, challenge the conclusions of Murphy and Trandel (1994), Toma and Cross (1998), Goff (2000), Pope and Pope (2009, 2014), Roufagalas and Byrd (2014) and Anderson (2016), who all found a correlation between a school's athletic success and an increase in total undergraduate admissions, specifically the success of FBS football and men's basketball. Anderson (2016), however, noted that the gap between athletic spending and athletic success, and therefore the indirect relationship between spending and admissions, is difficult to determine because researchers do not know for certain what the specific relationship between investing in athletics and wins is.

Generally speaking, this research must be contextualized in relation to the findings of athletic spending's relationship to athletic success. The research of Litan, Orszag and Orszag (2003), Orszag and Israel (2009) and Lawrence, Li, Regas, and Kander (2012) found that financial investments in athletics, specifically investments in football, were either unrelated or only very weakly correlated with overall athletic success, and that the most substantial relationships existed between investments in women's sports and non-gender specific areas, but only when related to NACDA Director's Cup Standings. University leaders of FCS level Division I schools should look more closely at the findings of Jones (2013) that suggest no relationship between

spending on athletics and on-field athletic success at the Football Championship Subdivision level. Specifically, Jones noted that spending increases at the FCS level typically fund “areas not directly related to competitive success” and therefore should not be assumed to have the kinds of indirect powers that spending increases at FBS level schools (Jones, 2013, p 602). The logical extension of these findings is that if institutional investments are found to be unrelated to athletic success, and institutional enrollment measures in previous literature are all linked to athletic success, then the reasoning that additional financial investments in athletics will yield institutional outcomes is even more specious.

The findings of the third research question in this study challenge the claim that college athletic success and investments in athletics are related to attracting students with higher standardized test scores, as the results of the third research question found no relationship between institutional investments in athletics and test scores for either the SAT Critical Reading, SAT Math, or ACT Composite scores of incoming freshmen at Southland Conference schools during the period between 2003 and 2015. The results of Table 4 demonstrate that the increases in SAT Critical Reading scores for some Southland Conference schools from 2003 to 2015 were generally small, and overall the mean averages for the conference decreased at both the 25th and 75th percentiles. Similar findings can be seen for SAT Math scores in Table 5, where scores at some institutions increased in small amounts while decreasing in others, and as a conference the mean average for all schools declined at the 75th percentile level. The mean average

ACT Composite scores increased by roughly 1 point at both the 25th and 75 percentile ranges but neither finding was related to an increase in athletic spending.

These findings confirm the research of Litan, Orszag and Orszag (2003), whose fixed effects analysis of data for all Division I FBS schools during the period between 1993 and 2001 showed that there was no relationship between athletic spending and incoming freshmen SAT scores. Additionally, the finding that there was no relationship between athletic spending and SAT scores at the 75th percentile level confirms the research of Smith (2008 & 2009), who found that regular and post-season success in men's basketball or football have no relationship to SAT scores at the 75th percentile level. Furthermore, the findings of this research support Frank's (2004) empirical conclusions that whatever positive relationship might exist at the smallest levels between institutional athletic spending and test score outcomes is not worth the financial investment to sports to achieve such small gains in test scores.

Conversely, the findings of this study's third research question specifically challenge the findings of Mixon, Trevino and Minto (2004), Tucker (2005) and Tucker and Amato (2006). Using data from the 2000-2001 football season, Mixon, Trevino, and Minto (2004) found that there was a relationship between athletic success and median SAT scores, and that highly selective institutions were able to improve the quality of incoming freshmen classes as athletics improved. Tucker (2005) and Tucker and Amato (2006) also found relationships between winning and median SAT scores, but noted that to better understand the relationship between incoming student quality and athletics the SAT score would have to be segmented into 25th and 75th percentiles. In general,

however, the findings of the SAT and ACT research data do not suggest any relationship between athletic spending and improved student applicant quality.

Overall, the findings of the three research questions reject the idea that institutional investments in college athletics positively impact future undergraduate enrollments, freshmen applications, or the quality of incoming students at Division I FCS schools. Instead, these findings indicate that quantitative institutional outcomes such as enrollment and application metrics cannot be attributed to financial investments in athletics, and that institutions should not support additional athletic spending with the belief that they will achieve greater institutional enrollment goals as a result.

Implications

The finding that athletic spending has virtually no relationship to institutional enrollment and application outcomes should challenge university leaders to consider the role that intercollegiate athletics plays within their universities. By rejecting the notion that universities need to support expensive athletic departments in order to maintain large enrollments or achieve enrollment growth, university leaders could instead begin to question the true value that intercollegiate athletics provide to the student body and wider academic community.

These findings open the door for university leaders to begin exploring opportunities for de-escalation of institutional commitment to athletic spending, or perhaps the complete removal of Division I sports from their campuses. The findings of Hutchinson and Bouchet (2010, 2011, 2014) and Hutchinson, Rascher, and Jennings (2016) all support the idea that with the correct information it is possible for institutional

leaders to change the course of spending in the face of increasingly shrinking funding from state and federal governments for higher education. Specifically, if institutional stakeholders see the potentially negative implications of overspending on athletics they can instead work to achieve organizational exit strategies (Bouchet & Hutchinson, 2010). The trap that many universities leaders find themselves in, when committed to plans for increased investment in athletics to support broader institutional goals, can be broken if they understand that the relationships between that spending do not lead to the desired outcomes. Furthermore, faculty and other university stakeholders are better able to frame their side of the funding debate if their understanding of the true relationship between athletic spending and institutional outcomes is more robust and clear.

The possibility of discontinuing Division I athletics, specifically the most expensive sport of football, could also be considered if the costs for supporting athletics grow to be too much for an institution to support. The research of Jones (2014b), Goff (2000) and Hutchinson, Rascher, and Jennings (2016) all found mixed results for schools discontinuing football or intercollegiate athletics, but overall could not conclude that dropping football resulted in significant enrollment declines or increases. The findings of the literature should inform university leaders to consider the possibility that intercollegiate athletics, at least at the Division I level, could be too cost prohibitive to continue, and instead should look at alternative paths to continue participating in competitive college athletics. The extreme possibility of completely eliminating intercollegiate sports should also be considered for institutions with budgets that are

stretched too thin to adequately achieve the broad set of institutional goals that they must meet for their students, faculty, staff, and institutional stakeholders.

Recommendations for Future Research

The purpose of this fixed effects regression study was to explore the relationship between athletic spending and institutional outcomes at Division I FCS institutions, with a specific focus on undergraduate enrollments, freshmen applications, and freshmen SAT and ACT scores. The results of this research should provide insight for researchers interested in studying the impact of athletic spending on university goals and success measures. To make future research into this topic more relevant to a wider audience, a number of factors could be taken into consideration. Future researchers could apply this economic model to another Division I FCS conference or to a broader set of institutions, perhaps to all of Division I FCS, Division II, or Division III. The broader the set of institutions, and the longer and the more robust the data set, the more the findings will accurately reflect trends in college athletic spending.

Future research on athletic spending and institutional outcomes should take advantage of robust time series panel datasets and fixed effects statistical approaches to analyze the data and examine the relationships between the variables being studied. As was seen in the literature review, longitudinal panel data sets provide researchers with the most comprehensive sources for interpreting large amounts of data for many institutions over a long period of time. One of the challenges for future researchers is to avoid looking specifically at short term or localized effects of athletics success to make

sweeping generalizations about the impact of athletic performance or spending on institutional outcomes.

Unlike many studies that explored the relationship between athletic success and institutional outcomes, this study's exploration focused on institutional athletic expenditures because that variable is frequently discussed in relationship to the growing problem of bloated college fees and the student debt crisis. Institutional spending as a variable, however, is challenging in studies like this because of the linear cost increases of higher education in general and competing in Division I athletics in particular. The variable is further complicated by the fact that not all institutions have the same institutional costs associated with athletic spending, and therefore each institution is unique in how they fund athletics and what budget items are included in those costs.

Standardized test scores, specifically ACT Composite scores, are a challenging variable to test against institutional athletic expenditures, especially over a period of time where a high level of linear variance is observed in the athletic spending variable but very little variance occurs in scores within each institution over time at the 25th and 75th percentile levels. Future studies could employ the technique of Pope and Pope (2014) for collecting more specific test score and institution-specific application data from the College Board and its application data set rather than more general percentile data.

Proving causality is also a challenge in research of this type. Many university administrators, using the front porch effect of college athletics as their guide, argue that athletics success causes institutional enrollment growth, application increases, and improvements in student quality. This research suggests that not only is that relationship

virtually unseen in the Southland Conference, but that the opposite might be true and institutional growth actually causes athletic spending increases.

The causal direction of spending and enrollment implies a need for additional research on the relationship between athletic expenses and university tuition costs. An alternative hypothesis for the relationship between university spending on athletics and institutional enrollment measures that could be explored is that athletics costs, specifically athletic scholarship costs, are increasing as a result of increased cost of attendance at colleges and universities, and that intercollegiate athletic expenses are closely tied to cost of attendance in general. This alternative hypothesis would argue that as general tuition and fees increase so do the costs imposed on athletics departments, and therefore athletics expenditures need to be seen as a function of general rises in college costs overall.

Qualitative indirect outcomes of college athletics such as the psychic value of athletics, the ability of athletics to improve student self-esteem and the aspects of athletics that bring together the campus community through group activities, were not included in this study. This is where college athletics plays an important role in the university setting that cannot be recreated in the classroom, “. . . by bonding students to the institution for life and energizing them to wear the colors on game day . . .” (Labaree, 2017, p. 184). Different from the quantitative enrollment and admissions outcomes studied in this research, the emotional and psychological benefits provided by intercollegiate athletics are challenging in and of themselves to study, and therefore are

deserving of their own research in relation to increased financial investments in college sports.

University prestige through intercollegiate athletics, especially the relationship between universities and their peer institutions, is another area that deserves further attention from researchers, especially with relation to rising costs of college athletics (Fisher, 2007; Fisher, 2009; Lovaglia & Lucas, 2005). The relationship between increased athletics spending and institutional prestige could help confirm or challenge the notion that college football plays a central role to membership in a peer set of institutions, and therefore helps form an institution's identity as a 'real university' (Estler & Nelson, 2005). Furthermore, the more abstract notions of how the public perceives an institution through athletics must be investigated, especially the linkage of the public to a magnetic attraction, especially college football (Estler & Nelson, 2005; Toma, 2003). More investigation needs to be undertaken to understand if investing in college athletics really serves a perceptual advantage for an institution, especially in the face of arguments that “. . . athletics, especially football and basketball, reinforce the populist appeal of what might otherwise be a remote and socially exclusive institution . . .” (Labaree, 2017, p. 131).

Concluding Remarks

This research study attempted to find a new way of discussing the relationship between athletic spending and institutional admissions and enrollment measures at FCS institutions in order to fill a gap in the literature that was being overlooked by other studies in this subject. Using a widely accepted statistical model and a research design

employed by earlier researchers, this study focused on a subset of FCS schools in the Southland Conference to highlight the unique issues at a level of Division I athletics that was being overlooked by studies that focused primarily on FBS level football and men's basketball programs in particular and "big time" college athletics in general. This study also attempted to create an economic model that could explain the relationship between athletic spending and institutional outcomes, which should be useful for application with other FCS conference case studies or to explore these same variables in more empirical ways for all of Division I athletics.

While not necessarily relying on new or unique data sources, what makes this research unique is the narrow focus of the Southland Conference as the concentration of the study, and the unique perspective that can be gleaned from examining a small group of similarly sized, geographically similar universities competing at the same level of Division I athletics. This kind of narrow focus reveals patterns that can be best exploited by institutional leaders at the schools under study, but can also inform leadership of similarly sized or geographically proximate schools. Schools within the Southland Conference in particular, and Division I FCS schools in general, can all glean useful information from this study about the role that athletics plays on their campuses, which is very important as the fiscal realities of higher education become more pronounced.

As government funding for higher education declines and student loan debt increases, the debate surrounding the costs of college will continue to fuel conversations at all levels of higher education. The model for funding of higher education and, to a lesser extent intercollegiate athletics is, according to Labaree (2017), now broken.

The cost of pursuing a college education is increasingly being borne by the students themselves, as states are paying a declining share of the costs of higher education. Tuition is rising, and as a result student loans are rising. Public research universities are in a particularly difficult position because their state funding is falling most rapidly. According to one estimate, at the current rate of decline, the average state fiscal support for public higher education will reach zero in 2059. (Labaree, 2017, p. 156)

For institutions that support Division I athletics departments, specifically those operating outside of the Power 5 conferences, the impact of decreased state funding will inevitably be felt much worse than for those with programs that have the capacity to generate larger sums of revenue.

Given how many different conclusions researchers in this field have come to regarding the indirect benefits of college athletics, it should come as no surprise that this field will likely be plagued with debate. Regardless of the empirical proof of its real and perceived value for colleges, intercollegiate athletics will continue to play a highly visible role in higher education, and arguments about its value to the university will continue to flame discussions among scholars and university leaders well into the future.

REFERENCES

- Allison, P. D. (2005). *Fixed effects regression methods for longitudinal data using SAS*. Cary, NC: SAS Institute, Inc.
- Allison, P. D. (2009). *Fixed effects regression models*. Los Angeles, CA: SAGE publications.
- Anderson, M. L. (2016). The benefits of college athletic success: An application of the propensity score design. *Review of Economics and Statistics*, 99(1), 119-134.
- Baade, R. A., & Sundberg, J. O. (1996). Fourth down and gold to go? Assessing the link between athletics and alumni giving. *Social Science Quarterly*, 77(4), 789-803.
- Bartels, B. (2008). *Beyond "fixed versus random effects": A framework for improving substantive and statistical analysis of panel, time-series cross-sectional, and multilevel data*. Manuscript submitted for publication. Retrieved from: https://www.researchgate.net/publication/228631320_Beyond_Fixed_versus_Random_Effects_A_Framework_for_Improving_Substantive_and_Statistical_Analysis_of_Panel_Time-Series_Cross-Sectional_and_Multilevel_Data.
- Bass, J. R., Schaeperkoetter, C. C., & Bunds, K. S. (2015). The "Front Porch": Examining the increasing interconnection of university and athletic department funding. *ASHE Higher Education Report*, 41(5), 1-103.

- Basten, J. H. (2002). *The influence of institutional success in intercollegiate athletics on college choice: An organizational identity theory-based study of students' enrollment decisions* (Doctoral dissertation). Available from ProQuest Dissertations & Theses database. (UMI No. 276276328)
- Bok, D. (2009). *Universities in the marketplace: The commercialization of higher education*. Princeton, NJ: Princeton University Press.
- Borrego, M., Douglas, E. P., & Amelink, C. T. (2009). Quantitative, qualitative, and mixed research methods in engineering education. *Journal of Engineering education*, 98(1), 53-66.
- Bouchet, F. A. (2011). *Intercollegiate athletics and escalation of commitment* (Doctoral dissertation). Available from ProQuest Dissertations & Theses database. (UMI No. 885654619)
- Bouchet, A., & Hutchinson, M. (2010). Organizational escalation to an uncertain course of action: A case study of institutional branding at Southern Methodist University. *Journal of Issues in Intercollegiate Athletics*, 3(1), 272-295.
- Bouchet, A., & Hutchinson, M. (2011). Organizational escalation and retreat in university athletics: Brand insulation in Birmingham-Southern College's transition to Division III athletics. *Journal of Intercollegiate Sport*, 4(2), 261-282.
- Bowen, W. G., & Levin, S. A. (2003). *Reclaiming the game: college sports and educational values*. Princeton, NJ: Princeton University Press.

- Bremmer, D. S., & Kesselring, R. G. (1993). The advertising effect of university athletic success: A reappraisal of the evidence. *The Quarterly Review of Economics and Finance*, 33(4), 409-421.
- Briody, J. P. (1996). *Perceptions of the impact of intercollegiate athletics on academic reputation* (Doctoral dissertation). Available from ProQuest Dissertations & Theses (UMI No. 304303862)
- Brooker, G. W., & Klastorin, T. D. (1981). College Athletics and Alumni Giving. *Social Science Quarterly*, 62(4), 744.
- Brunet, M. J. (2010). *The impact of intercollegiate athletics on undergraduate enrollment at a small, private, southern, faith-based institution* (Doctoral dissertation). Available from ProQuest Dissertations & Theses database. (UMI No. 305253926)
- Castle, J., & Kostelnik, R. (2011). The effects of an institution's athletic success on the future freshmen application pool at NCAA Division II universities. *Journal of Issues in Intercollegiate Athletics*, 4(1), 411-427.
- Cheslock, J. J., & Knight, D. B. (2012). *Following a problematic, yet predictable path: The unsustainable nature of the intercollegiate athletics system*. Miami, FL: Knight Foundation.
- 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.

- Chudacoff, H. P. (2015). *Changing the playbook : how power, profit, and politics transformed college sports*. Champaign, IL: University of Illinois Press.
- Chung, D. J. (2013). The dynamic advertising effect of collegiate athletics. *Marketing Science*, 32(5), 679-698.
- Chung, D. J. (2015). How Much Is a Win Worth? An Application to Intercollegiate Athletics. *Management Science*, 63(2), 548-565.
- Clotfelter, C. T. (2011). *Big-time sports in American universities*. New York, NY: Cambridge University Press.
- Cook, B. G., & Cook, L. (2008). Nonexperimental quantitative research and its role in guiding instruction. *Intervention in School and Clinic*, 44(2), 98-104.
- Creswell, J. W. (2003). *Research design: Qualitative, quantitative, and mixed methods approaches*. London, England: Sage.
- Crowley, J. N. (2006). *In the arena: The NCAA's first century*. Indianapolis, IN: NCAA Publishing.
- Coughlin, C. C., & Erekson, O. H. (1984). An examination of contributions to support intercollegiate athletics. *Southern Economic Journal*, 51(1), 180-195.
- Cross, M. E. (1999). *The run to division I: Intercollegiate athletics and the broader interests of colleges and universities* (Doctoral dissertation). Available from ProQuest Dissertations & Theses database. (UMI No. 304520908)
- Denhart, M., & Ridpath, D. (2011). *Funding the arms race: a case study of student athletic fees*. Washington, DC: Center for College Affordability and Productivity. Retrieved from: <https://files.eric.ed.gov/fulltext/ED536146.pdf>.

- Desrochers, D. (2013). *Academic spending versus athletic spending: Who wins?*
Washington, DC: American Institutes for Research.
- Dosh, K. (2013). *Saturday millionaires*. New York, NY: Turner Publishing Company.
- Drake Group. (2015). *Position statement: Student fee and institutional subsidy allocations to fund intercollegiate athletics*. Retrieved from:
<https://drakegroupblog.files.wordpress.com/2015/04/position-statement-student-fees-final-3-2-15.pdf>.
- Duderstadt, J. J. (2009). *Intercollegiate athletics and the American university: A university president's perspective*. Ann Arbor, MI: University of Michigan Press.
- Edwards, H. (1986). The collegiate athletic arms race: Origins and implications of the "Rule 48" controversy. In Lapchick, R. E. (Ed.). *Fractured focus: sports as a reflection of society*. Lexington, MA: Lexington Books.
- Estler, S. E., & Nelson, L. J. (2005). *Who calls the shots? Sports and university leadership, culture, and decision making*. Hoboken, NJ: Wiley.
- Fisher, B. (2007). *Intercollegiate athletics and college rankings: An analysis of the relationship between athletic success and the U.S. news and world report college rankings* (Doctoral dissertation). Available from ProQuest Dissertations & Theses database. (UMI No. 304712043)
- Fisher, B. (2009). Athletics success and institutional rankings. In D. Toma & D. Kramer (Eds.), *The Uses of Intercollegiate Athletics: Opportunities and Challenges for the University, New Directions for Higher Education*, no.148 (pp. 45-54). San Francisco, CA: Jossey Bass.

- Fort, R. (2013). *15 sports myths and why they're wrong*. Stanford, CA: Stanford University Press.
- Fort, R. (2016). College athletics spending: Principals and agents v. arms race. *Journal of Amateur Sport*, 2(1), 119-140.
- Frank, R. H. (2004). *Challenging the myth: A review of the links among college athletic success, student quality, and donations*. Washington, DC: Knight Foundation Commission on Intercollegiate Athletics.
- Fulks, D. L. (2009). *2004-09 NCAA revenue and expenses of division I intercollegiate athletics programs report*. Indianapolis, IN: National Collegiate Athletic Association
- Galbraith, J. K. (1976). The economics of the arms race – and after. *Bulletin of the Atomic Scientists*, 37(6), 13-16.
- Getz, M., & Siegfried, J. J. (2012). College sports: The mystery of the zero-sum game. *Change: The Magazine of Higher Learning*, 44(1), 52-59.
- Goff, B. (2000). Effects of university athletics on the university: a review and extension of empirical assessment. *Journal of Sport Management*, 14(2), 85-104
- Grimes, P. W., & Chressanthis, G. A. (1994). Alumni contributions to academics: the role of intercollegiate sports and NCAA sanctions. *The American Journal of Economics and Sociology*, 53(1), 27-40.
- Gurney, G., Lopiano, D. A., & Zimbalist, A. (2017). *Unwinding madness: What went wrong with college sports – and how to fix it*. Washington, DC: Brookings Institution Press.

- Harshaw, C. E. (2009). *The role of intercollegiate athletics in the retention of first-time, first-year students at NCAA division III institutions with football* (Doctoral dissertation). Available from ProQuest Dissertations & Theses database. (UMI No. 304965600)
- Hawkins, B. (2010). *The new plantation: black athletes, college sports, and predominantly white NCAA institutions*. London, England: Palgrave Macmillan
- Hearn, T. (2002). *The culture of sport and the future of intercollegiate athletics association of governing boards*. Keynote address at the Association of Governing Boards, Boston, MA.
- Hernández-Julián, R., & Rothhoff, K. W. (2014). The impact of college football on academic achievement. *Economics of Education Review*, 43(1), 141-147.
- Hoffer, A., Humphreys, B. R., Lacombe, D. J., & Ruseski, J. E. (2015). Trends in NCAA athletic spending: arms race or rising tide?. *Journal of Sports Economics*, 16(6), 576-596.
- Hoffer, A., & Pinchin, J. A. (2016). The effects of revenue changes on NCAA athletic departments' expenditures. *Journal of Sport and Social Issues*, 40(1), 82-102
- Huffman, A. C. (2013). *A description and comparison of the perceptions of NCAA division II and division III college presidents regarding the impacts of intercollegiate athletics at their institutions* (Doctoral dissertation). Available from ProQuest Dissertations & Theses database. (UMI No. 1465383877).
- Humphreys, B. R., & Mondello, M. (2007). Intercollegiate athletic success and donations at NCAA division I institutions. *Journal of Sport Management*, 21(2), 265-280

- Hutchinson, M., & Bouchet, A. (2014). Organizational redirection in highly bureaucratic environments: De-escalation of commitment among Division I athletic departments. *Journal of Sport Management*, 28(2), 143-161.
- Hutchinson, M., Rascher, D. A., & Jennings, K. (2016). A Smaller Window to the University: The Impact of Athletic De-Escalation on Status and Reputation. *Journal of Intercollegiate Sport*, 9(1), 73-89.
- Johnson, N. (2014). *College costs, prices and the great recession*. Lumina Issue Papers, April 2014. Retrieved from: <https://files.eric.ed.gov/fulltext/ED555862.pdf>.
- Jones, W. A. (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.
- Jones, W. A. (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. (2014b). Does discontinuing intercollegiate football correlate with institutional attractiveness to potential students? Evidence from three universities. *Journal of Issues in Intercollegiate Athletics*, 7, 92-113.
- Keil, M., & Montealegre, R. (2000). Cutting your losses: Extricating your organization when a big project goes awry. *Sloan management review*, 41(3), 55.
- Kelly, D., & Dixon, M.A. (2011). Becoming a “real university:” the strategic benefits of adding football for NCAA division I institutions. *Journal of Intercollegiate Sport*, 4(2), 283-303

- Kim, W. (2010). *College students' psychic income from intercollegiate football and its impact of college satisfaction* (Doctoral dissertation). Available from ProQuest Dissertations & Theses database. (UMI No. 856603843)
- Knight Commission on Intercollegiate Athletics. (2009). *Quantitative and qualitative research with Football Bowl Subdivision university presidents on the costs and financing of intercollegiate athletics: Report of findings and implications*. October. Retrieved from:
http://www.knightcommissionmedia.org/images/President_Survey_FINAL.pdf.
- Koo, G., & Dittmore, S. W. (2014). Effects of intercollegiate athletics on private giving in higher education. *Journal of Issues in Intercollegiate Athletics*, 7(1), p.1-16.
- Labaree, D. F. (2017). *A perfect mess: The unlikely ascendancy of American higher education*. Chicago, IL: University of Chicago Press.
- Lanter, J. R., & Blackburn, J. Z. (2015). The Influence of Athletic Success on the Self-Esteem of First-Year College Students. *Journal for the Study of Sports and Athletes in Education*, 9(1), 1-11.
- Lavigne, P., & Schlabach, M. (2017). *Violated: exposing rape at Baylor University amid college football's sexual assault crisis*. New York: Center Street.
- Lawrence, H. J., Li, M., Regas, J. S., & Kander, J. (2012). National association of collegiate directors of athletics directors' cup standings: Predictors of success. *Journal of Issues in Intercollegiate Athletics*, 5, 207-224.
- Lee, T. M. (2012). *The impact of winning athletic programs on college admissions applications and profile at small, private, NCAA division I institutions* (Doctoral

- dissertation). Available from ProQuest Dissertations & Theses database. (UMI No. 1029862332)
- Lifschitz, A., Sauder, M., & Stevens, M. L. (2014). Football as a status system in U.S. higher education. *Sociology of Education*, 87(3), 204-219.
- Lindo, J. M., Swensen, I. D., & Waddell, G. R. (2012). Are big-time sports a threat to student achievement?. *American Economic Journal of Applied Economics*, 4(4), 254-274.
- Litan, R. E., Orszag, J. M., & Orszag, P. R. (2003). *The empirical effects of collegiate athletics: An interim report*. Sebago Associates.
- Lovaglia, M. J., & Lucas, J. W. (2005). High-visibility athletic programs and the prestige of public universities. *The Sport Journal*, 8(1), np. Retrieved from: <http://thesportjournal.org/article/high-visibility-athletic-programs-and-the-prestige-of-public-universities/>.
- Mähring, M., & Keil, M. (2008). Information technology project escalation: A process model. *Decision Sciences*, 39(2), 239-272.
- McCormick, R. E., & Tinsley, M. (1987). Athletics versus academics? Evidence from SAT scores. *Journal of Political Economy*, 95(5), 1103-1116.
- McEvoy, C. (2005). The relationship between dramatic changes in team performance and undergraduate admissions applications. *The SMART Journal*, 2(1), 17-24.
- Mixon, F. G. (1995). Athletics versus academics? Rejoining the evidence from SAT scores. *Education Economics*, 3(3), 277-283.

- Mixon, F. G., Treviño, L. J., & Minto, T. C. (2004). Touchdowns and test scores: Exploring the relationship between athletics and academics. *Applied Economics Letters*, *11*(7), 421-424.
- Mixon, F. G., & Trevino, L. J. (2005). From kickoff to commencement: The positive role of intercollegiate athletics in higher education. *Economics of Education Review*, *24*(1), 97-102.
- Mulholland, S. E., Tomic, A. S., & Sholander, S. N. (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*(1), 79-90.
- Murphy, R. G., & Trandel, G. A. (1994). The relation between a university's football record and the size of its applicant pool. *Economics of Education Review*, *13* (3), 265-270.
- National Center for Education Statistics. (2016). *2015-2016 survey materials glossary*. Retrieved from: <https://surveys.nces.ed.gov/ipeds/VisGlossaryAll.aspx>.
- National Center for Education Statistics. (2017). *About IPEDS*. Retrieved from: <https://nces.ed.gov/ipeds/Home/AboutIPEDS>.
- National Center for Education Statistics. (2017). *About us*. Retrieved from: <https://nces.ed.gov/about/>.
- National Collegiate Athletic Association (NCAA). (2016). *About the NCAA*. Retrieved from: <http://www.ncaa.org/about>.
- National Collegiate Athletic Association (NCAA). (2017). *Divisional difference at the history of multidivision classification*. Retrieved from:

<http://www.ncaa.org/about/who-we-are/membership/divisional-differences-and-history-multidivision-classification>.

Nissani, M. (1992). *Lives in the balance: the cold war and American politics, 1945-1991*.

New York, NY: Hollowbrook.

Orszag, J., & Israel, M. (2009). *The empirical effects of collegiate athletics: an update based on 2004-2007 data*. (National Collegiate Athletic Association Report).

Retrieved from:

http://www.soe.vt.edu/highered/files/Perspectives_PolicyNews/04-09/TheEmpiricalEffects.pdf.

Orszag, J. M., & Orszag, P. R. (2005, June). *Empirical effects of Division II*

intercollegiate athletics. (National Collegiate Athletic Association Report).

Retrieved from:

<https://pdfs.semanticscholar.org/d6ae/eb32e37221d62d7acc6ef4429988a6f81ec2.pdf>.

Perez, S. J. (2012). Does intercollegiate athletics draw local students to a university?

Journal of Sports Economics, 13(2), 198-206.

Peterson-Horner, E., & Eckstein, R. (2015). Challenging the “Flutie Factor”:

Intercollegiate sports, undergraduate enrollments, and the neoliberal university.

Humanity & Society, 39(1), 64-85.

Pope, D. G., & Pope, J. C. (2009). The impact of college sports success on the quantity and quality of student applications. *Southern Economic Journal*, 75(3), 750-780.

- Pope, D. G., & Pope, J. C. (2014). Understanding college application decisions: why college sports success matters. *Journal of Sports Economics*, 15(2), 107-131.
- Rhoads, T. A., & Gerking, S. (2000). Educational contributions, academic quality, and athletic success. *Contemporary Economic Policy*, 18(2), 248-258.
- Ross, J. (2003). Avoiding captain ahabs: Lessons from the office of independent counsel. *Administration & Society*, 35, 334-349.
- Ross, J., & Staw, B. M. (1993). Organizational escalation and exit: Lessons from the Shoreham nuclear power plant. *Academy of Management Journal*, 36(4), 701-732.
- Roufagalas, J., & Byrd, J. (2014). *College Football Success, Applications and Enrollments: Permanent Stars vs. Shooting Stars*. Working paper submitted for publication. Retrieved from:
https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2490261.
- Sack, A. L., & Staurowsky, E. J. (1998). *College athletes for hire: The evolution and legacy of the NCAA's amateur myth*. New York, NY: Columbia University Press.
- Savage, H. J. (1929). *American College Athletics*. New York, NY: Carnegie Foundation.
- Shulman, J., & Bowen, W. (2001). *The game of life: College sports and educational values*. Princeton, NJ: Princeton University Press
- Siegelman, L., & Brookheimer, S. (1983). Is it whether you win or lose? Monetary contributions to big-time college athletic programs. *Social Science Quarterly*, 64(2), 347-359.

- Siegelman, L., & Carter, R. (1979). Win one for the giver? Alumni giving and big-time college sports. *Social Science Quarterly*, 60(2), 284-294.
- Singh, K. (2007). *Quantitative social research methods*. London, England: Sage.
- Smith, D. R. (2008). Big-time college basketball and the advertising effect: does success really matter? *Journal of Sports Economics*, 9(4), 387-406.
- Smith, D. R. (2009). College Football and Student Quality: An Advertising Effect or Culture and Tradition? *American Journal of Economics and Sociology*, 68(2), 553-579.
- Southland Conference. (2016). About the southland. Retrieved from:
http://southland.org/sports/2013/10/24/GEN_1024130130.aspx?
- Sperber, M. (2000). *Beer and circus: How big-time college sports has crippled undergraduate education*. New York, NY: Henry Holt and Company.
- Stafford, L. (2010). *College sports 'arms race' not sustainable, say university presidents*. Retrieved from: <http://www.ajc.com/news/sports/college-sports-arms-race-not-sustainable-say-unive/nQbgL/>
- Staurowsky, E. J. (2002). The relationship between athletics and higher education fund raising: The myths far outweigh the facts. In *Title IX athletics: Issues and data for education decision makers* (pp. 48-56). Washington, DC: National Coalition for Women and Girls in Education. Retrieved from:
http://www.ncwge.org/archive/PDF/Title_IX_Coalition_Report_Final.pdf
- Staurowsky, E. J. (2002). *The relationship between athletics and higher education fund raising: The myths far outweigh the facts*. A Report Prepared for the United States

Department of Education Commission on Opportunities in Athletics. Ithaca, NY: Ithaca College.

- Staw, B. M. (1976). Knee-deep in the big muddy: A study of escalating commitment to a chosen course of action. *Organizational behavior and human performance*, 16(1), 27-44.
- Staw, B. M., & Ross, J. (1987). Knowing when to pull the plug. *Harvard Business Review*, 65(2), 68-74.
- Stinson, J. L., & Howard, D. R. (2004). Scoreboards vs. mortarboards: Major donor behavior and intercollegiate athletics. *Sport Marketing Quarterly*, 13(3), 129-140.
- Stinson, J. L., & Howard, D. R. (2008). Winning does matter: patterns in private giving to athletic and academic programs at NCAA division I-AA and I-AAA institutions. *Sport Management Review*, 11(1), 1-20
- Stinson, J. L., & Howard, D. R. (2010). Athletic giving and academic giving: Exploring the value of split donors. *Journal of Sport Management*, 24(6), 744-768.
- Stinson, J. L., Marquardt, A., & Chandley, J. (2012). An empirical examination of university intercollegiate athletic expenditures. *Sport Marketing Quarterly*, 21(2), 104-114.
- Toma, J. D. (2003). *Football U.: Spectator sports in the life of the American university*. Ann Arbor, MI: University of Michigan Press.

- Toma, J. D., & Cross, M. E. (1998). Intercollegiate athletics and student college choice: Exploring the impact of championship seasons on undergraduate applications. *Research in Higher Education, 39*(6), 633-661.
- Tsitsos, W., & Nixon, H. L. (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.
- Tucker, I. B. (2005). Big-time pigskin success: Is there an advertising effect?. *Journal of Sports Economics, 6*(2), 222-229.
- Tucker, I. B., & Amato, T. (2006). A reinvestigation of the relationship between big-time basketball success and average SAT scores. *Journal of Sports Economics, 7*(4), 428-440.
- Turner, S. E., Meserve, L. A., & Bowen, W. G. (2001). Winning and giving: football results and alumni giving at selective private colleges and universities. *Social Science Quarterly, 82*(4), 812-826.
- United States Department of Commerce. (2017). About BLS. Retrieved from: <https://www.bls.gov/bls/infohome.htm>
- United States Department of Education. (2016). *Test scores*. Retrieved from: <https://www.ed.gov/about/offices/list/international/usnei/tests.doc>
- US News & World Report. (2016). *How U.S. news calculated the 2016 best college rankings*. Retrieved from: <http://www.usnews.com/education/best-colleges/articles/how-us-news-calculated-the-rankings?page=3>

- Van Holm, E .J., & Zook, S. (2016). *Returns for touchdown? universities entering college football*. Manuscript submitted for publication. Retrieved from: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2733761.
- Warner, S., Shapiro, S. L., Dixon, M. A., Ridinger, L. L., & Harrison, S. B. (2011). The football factor: shaping community on campus. *Journal of Issues in Intercollegiate Athletics*, 4, 236-256
- Weight, E., Navarro, K., Huffman, L., & Smith-Ryan, A. (2014). Quantifying the psychological benefits of intercollegiate athletics participation. *Journal of Issues in Intercollegiate Athletics*, 2014, 390-409.
- Yost, M. (2009). *Varsity green: A behind the scenes look at culture and corruption in college athletics*. Redwood City, CA: Stanford University Press.
- Zimbalist, A. (2001). *Unpaid professionals: Commercialism and conflict in big-time college sports*. Princeton, NJ: Princeton University Press.

VITA

Robert D. McDermand graduated from Thomas L. Kennedy Secondary School in 2000. He attended the University of Waterloo, in Waterloo, Ontario, Canada, and received his Bachelor of Arts in History Degree in 2004. He continued his historical studies at the University of Waterloo and completed his Master of Arts in History Degree in 2006. He began his professional career in college sports and continued his graduate studies at The Ohio State University in 2007 and completed his Master of Public Administration Degree in 2009. In 2011 he began working in the athletic department at Stephen F. Austin State University where he completed a Master of Business Administration Degree in 2015. He was accepted into the 2015 Doctoral Cohort at Stephen F. Austin State University, where he earned a Doctorate of Education in Educational Leadership in 2018. Currently, he serves as the Associate Athletic Director for Academic and Student Services at Stephen F. Austin State University.

Permanent Address: 2735 Summer Hill Circle, Nacogdoches, Texas 75965

Style manual designation: Publication Manual of the American Psychological Association, Sixth Edition

Typist: Robert D. McDermand