

**Cartel Monitoring and NCAA Football**

by

Matthew Philip Makofske

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Approved by

John D. Jackson, Chair, Professor of Economics  
Thomas R. Beard, Professor of Economics  
Richard Beil, Associate Professor of Economics

## Abstract

In the last twenty-five years, economists have developed and tested the hypothesis that the member institutions of the National Collegiate Athletic Association behave as a cartel and contrive market power in the sports of football and men's basketball. Study then shifted to the self-regulation and maintenance of said cartel. This thesis reviews the aforementioned literature on the subject, and then offers new data for testing the monitoring process of the college football cartel.

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## List of Abbreviations

BCS	Bowl Championship Series
EADA	Equity in Athletics Disclosure Act
NCAA	National Collegiate Athletic Association
USD	United States Dollar

## **CHAPTER 1: Introduction**

In 1869, Princeton University and Rutgers, the State University of New Jersey, played the first intercollegiate football game. From these humble beginnings the game of football at the college level has spread throughout the country, and developed into a multi-billion dollar a year industry. The game has never been more popular, more lucrative, or more widely broadcast, than it is today. While the rules and nature of the game are relatively unchanged, the business of collegiate football has undergone an incredible transformation. The National Collegiate Athletic Association (NCAA) and its member institutions, through all major forms of media; reach an incredibly vast and significant network of customers. Substantial revenue is being generated by the sport, but those in control attempt to sell a different image to their consumers. They sell an antiquated notion of a humble game, played by amateur (student) athletes; who should not receive a share of the game's revenue, but rather be content to play it for nothing more than tuition and perhaps the glory of wearing their University's uniform. The member institutions of the NCAA have organized themselves and operate in a way that many economists believe constitutes a cartel. After all, if one were to describe an industry in which firms had agreed to pay labor well below their marginal revenue product, it would seem that such an industry was illegal under anti-trust legislation, and could no longer exist in the United States. Yet in major collegiate football, such practices have been going on for decades.

One of the key characteristics of any cartel agreement is the incentive for individual members to cheat on the agreement. Thus a method of enforcing the agreement is necessary to the survival of a cartel. Punishment of cheaters is essential to upholding any cartel agreement. However since the NCAA to this point has not been prosecuted for antitrust law violations and such prosecution does not appear to be imminent; they are able to openly punish those who

violate the terms of the cartel agreement. They do not have to engage in price wars or any other such secretive methods to penalize offenders, in the way that a secret cartel might have to act. The NCAA offers great opportunities to learn about the inner workings of cartels because they operate so openly, and that is what motivates this thesis. They have published the terms of their cartel agreement. They publish the terms of their punishment of agreement violators. With the passage of the Equity in Athletics Disclosure Acts (EADA) in 1994, member institutions are now required to report financial information which provides greater insight to the cost and demand structure facing individual football programs. One of the difficulties of studying cartel behavior is that often the only cartels that we are aware of are ones that have failed. Understanding the inner workings of the perfect cartel is in a sense akin to understanding the perfect murder. The perfect cartel does not appear to be a cartel at all. And yet it seems we have found a cartel that goes about its business quite openly, and without fear of being broken up. We have found a cartel that generates substantial revenue every year, but denies labor a fair wage and unionization rights all in the name of academic integrity. Still we are not looking at an industry that is a textbook case of a cartel. In simple cases we view a cartel as a group of firms with similar or identical outputs who collectively work together to create monopoly power in a market and extract monopoly rents. The same situation holds in the case of major college football; however as we look further into this market we see many elements that make it much more complex than the traditional model of a cartel. That being the case, more careful analysis is needed to understand this industry.

This thesis will examine the notion of a college football cartel. The goal is to better understand this very unique and complex industry. The application of economic theory has helped to better understand the industry of major college football. In turn the study of the NCAA

and college football as a special case of a cartel, can add to economic theory. In particular, it will provide an opportunity to examine the dynamic interaction of cartel members with each other and with cartel enforcers and regulators. Further it provides an opportunity to examine unique methods through which firms contrive, disguise, and maintain monopoly power. This thesis will review earlier work by economists and evidence they've provided of a cartel existing within collegiate football. It will examine previous claims that the NCAA through its Committee on Infractions serves to enforce the cartel agreement, as well as the methods that the committee is believed to employ in its regulation and enforcement of said agreement. It will then establish the scope and motivation of its contribution to the subject. The goal of this thesis is to answer the following questions: First, how does the NCAA detect cheating on the cartel agreement? Second, how can the behavior of individual institutions within this cartel be modeled? Finally, how do the NCAA and the member institutions interact, as well as react to each other's actions? This thesis will establish a theoretical model of the elements contained in these questions. Once the theoretical model has been established, methods of estimating and testing said model will be discussed. The data used to estimate theoretical variables; how it was collected, what this data represents, its application to the estimated model will be covered. This will be followed by a discussion of the statistical regression methods employed in the estimation of the model. Given sufficient explanation of the regressions to be run, expectations and predictions for these regressions will be posited. This will be followed by the regression results, and moreover an examination of what the results are, and what they mean statistically. This will lead into a discussion of what the results mean to the theoretical model. There will be an examination of what implications these results might have on this subject, and what they might tell us about the behavior of the NCAA as well as the member institutions. Any shortcomings of the estimation

methods, and possible means for correcting them, will be addressed. This will be followed by the conclusions section. In that section the implications of the results will be discussed. There will be a review of the theory that this work was based on, and analysis of how the regression results fit into the theoretical framework. Any new theoretical implications that are forthcoming from my results will be discussed, followed by considerations for further work on the subject.

## **CHAPTER 2: Literature Review**

Many economists believe the NCAA and the member institutions in the sport of college football behave in a way that is consistent with a cartel. The theory of a college football cartel has been developed primarily in the last twenty years. Even in that time period the sport has undergone great transformations and shifts. In 1992 the Bowl Coalition was formed by the: Southeastern Conference, Southwest Conference, Big 8, Atlantic Coast Conference, and Big East, and leading independent Notre Dame. This was at a time of considerable change in the game. The Southeastern Conference had just expanded to add the University of South Carolina (formerly of the ACC), and the University of Arkansas (formerly of the Southwest Conference). That year the SEC formed two divisions and became the first college football conference to play a postseason conference championship game. The next year some of the remaining members of the Southwest Conference and Big 8 followed suit, and formed the Big 12. They played a postseason championship game beginning in 1993. This new Bowl Coalition was later restructured as the Bowl Alliance in 1995. The formation of this coalition was significant because it implicitly acknowledges that the post season bowl games and the revenue they generate are the life-blood of college football. This Alliance was an effort by the power conferences to insure their conference champions and runner-ups got bowl bids. It also allowed the top bowl games and television the flexibility to coordinate the game matchups for optimal television ratings.

College football is a very unique business. There is a governing body, but no commissioner of the sport. There are multiple conferences made up of autonomous institutions, and these conference alliances seem to go through periods of both stability and instability. When the 2011 college football season kicks off, the Pacific 10, the Big 10, Big 12, and Big East

conferences will welcome new members, and many believe this may be the beginning of another major shift in the conference alliances of the game similar to what occurred in the early 1990s. The last twenty years have seen a major proliferation of postseason bowl games, and a progression from the Bowl Coalition to the current Bowl Championship Series. The important thing to note from all of this is that the game of college football has grown drastically, and is financially doing better than ever. The number of postseason bowl games has nearly doubled from 1992-2010. Following the 2010 college football season, 70 different universities participated in the 35 postseason bowl games. Compare that to the 1992 season, which was followed by just 18 bowl games. Considering that the overall organization of the sport is dependent on the dynamic interaction of so many moving parts, the analysis of college football as a cartel seems promising. After all, the powers that be are constantly interacting, and recently they have done so in ways that have been very profitable.

Attempting to understand all the moving parts of the industry at once would be quite difficult. For instance a single institution faces decisions regarding interactions between itself and other schools in its conference, other schools outside its conference, the conference itself, as well as the NCAA. The conferences face decisions involving interactions with their member schools, other conferences, as well as the NCAA; and this doesn't take into account the very important relationship between all these entities and the television networks to which they package and sell the broadcast rights to their product. Consequently, most work by economists to this point has focused primarily on the relationship between the NCAA, particularly their regulatory branch; and the member institutions of the NCAA.<sup>1</sup> This Chapter will review the

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<sup>1</sup> Fleischer et al. (1988); Fleischer, Goff, and Tollison (1992); Eckard (1998); Depken and Wilson (2006); Humphreys and Ruseski (2009)

major work that has been published in this area, and consider the theory that they have promulgated.

The idea of a cartel in college football is somewhat different from the standard example of a cartel, in which members limit supply of a product to agreed upon levels in order to collectively behave as a monopoly. There are no tangible units of output in this industry which can be restricted by the cartel. The product in the college football cartel is entertainment from the game itself. However, the cartel can still find ways to manipulate the output, even when the output is a game. The NCAA has extensive bylaws regulating student-athletes and their member institutions. Student-athletes who violate these bylaws may be declared ineligible for participation in their sport by the NCAA. The NCAA bylaws also govern what member institutions may and may not do in conducting their athletic programs and recruiting athletes to their universities. Given this governance, it is clear that the input market in college football is highly regulated and restricted. This allows the member firms to decrease their costs dramatically. Universities do not have to hire athletes through a competitive labor market, and as result are able to substantially underpay their labor. Brown (1993) estimated that the marginal revenue product of a star college football player was upwards of \$500,000 a year. Consider then the revenue that a top player generates for a University over a three or four year career at the collegiate level, and keep in mind that this estimate is from 1993. The revenue generated by the game has grown considerably over the last 25 years. In 1988 the Fiesta Bowl, a top tier bowl game, had a per-team payout just shy of 3 million dollars. The 2011 Fiesta Bowl had a per-team payout of 18 million dollars, which is 9,445,313.98 when adjusted to 1988 USD; so the deflated payout has more than tripled over that span.

The theory on the college football cartel revolves almost entirely around the input market; however the empirical tests of the theory have focused on the output market. Economists have looked at distribution of wins in college football, both among conferences and across them; for evidence of cartel behavior. The cartel agreement hinges on the members of the cartel not offering athletes compensation other than the agreed upon standard scholarship and assistance. The members of the cartel avoid getting in bidding wars with each other over top recruits, and are able to greatly underpay their players. This thesis contends the member institutions of the NCAA collude for the purpose of behaving as a single buyer in the labor market and extracting a monopsony input price on labor.

The member institutions of the NCAA vary greatly when it comes to funding their athletic programs, as well as their ability to raise money through boosters and corporate sponsorships. Previous work on this subject has assumed that if bidding for recruits were to take place, the wealthiest programs would receive the best players, and competitive balance should decline. The literature on the college football cartel currently consists of a few key studies. The first of these studies were Fleischer et al. (1988) and Fleischer, Goff, and Tollison (1992). These two studies looked at 85 major college football programs over a span of thirty years, from 1953-1983. Fleischer et al. (1988) claimed that winning percentage was viewed by the NCAA as a proxy for cheating, as catching a program in the act, or even finding hard evidence of cheating on the cartel agreement is very difficult. They sought to understand the process by which the NCAA monitors and regulates the cartel agreement, and found empirical evidence that programs with more volatile winning percentages were more likely to be penalized by the NCAA. Essentially the NCAA's system of detection was based on investigating results that seemed out of the ordinary. A program which was consistent winner was less likely to be penalized by the

NCAA than a program whose on-the-field performance suddenly improved. Thus if most programs violate the cartel agreement to some degree, then the NCAA's policy over that thirty-year span had a redistributive effect in favor of the established and consistently successful programs. Eckard (1998) found that in 5 out of 7 conferences, the NCAA enforcement of the cartel agreement improved competitive balance and distribution of wins. Similarly, Depken and Wilson (2006) found that conferences with greater enforcement of the agreement, exhibited greater competitive balance. This suggests that in recent years, regulation from the NCAA promotes competitive balance in the sport. In other words, the portrayal of the NCAA as the monitor and enforcer of the cartel agreement seems appropriate. The NCAA has also in the last 25 years imposed scholarship limits on member programs, and allowed the proliferation of post-season bowl games, both of which promote greater parity and competitive balance across the sport. While the role the NCAA's regulatory activities play are clear, their methods in detecting cheating are still somewhat enigmatic. According to Humphreys and Ruseski (2009) the costs of monitoring the behaviors of all member institutions in the input market would be prohibitively high. Thousands of high school athletes are recruited every year, and member institutions have well organized and well financed booster clubs, who promote the interest of their institution's program. That being the case, the NCAA Committee on Infractions has decided that monitoring programs in the input market and attempting to catch them in the act of cheating is too expensive. Instead, the Committee on Infractions, in the absence of institutions reporting one another to the NCAA directly, views other characteristics of member institutions and investigates the programs it considers most likely to have cheated on the agreement. This type practice within a cartel is not unusual. Stigler (1964) wrote that when the costs of monitoring the agreement are too high, cartels often turn to probabilistic methods to detect cheating. This thesis

builds on the theory that the NCAA relies on a probabilistic method of detecting cheating. They can only investigate a small number of institutions at a given time. In order to spend their time and resources effectively, the NCAA must attempt to investigate the programs that are most likely to have committed major violations of the cartel agreement at the moment.<sup>2</sup> The question that economists have attempted, and still attempt to answer is: what makes a program a likely suspect?

As previously mentioned, the groundbreaking work on this subject, Fleischer et al. (1988) and Fleischer, Goff, and Tollison (1992) focused on variance in winning percentage. They found that the coefficient of variation on winning percentage was significantly correlated with a program being placed on probation. The idea being that a program with a more volatile winning percentage is more likely to have violated the cartel agreement. Humphreys and Ruseski (2009) test for correlation between NCAA probation and winning percentage of 104 programs from 1978-1990. They do not find a statistically significant correlation. With winning percentage they implement lags of 1, 2, and 3 years et cetera, recognizing that a coefficient on winning percentage during the same year as probation doesn't explain much. Probation once implemented should have significant negative effects on a program's winning percentage if not immediately, then soon after. More importantly, does a program's winning percentage prior to probation explain their detection as cheaters? Humphreys and Ruseski (2009) find that the first and second lags on winning percentage were statistically significant, but all lags beyond that were not.

Humphreys and Ruseski (2009) look further at other factors that might affect this monitoring process. The rules established by the NCAA create a great amount of rent seeking in college football. Schools are not allowed to negotiate contracts with players or offer them

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<sup>2</sup> Humphreys and Ruseski (2009)

anything other than the standard deal allowed by all member institutions; a full academic scholarship and a small stipend. As a result many institutions with well financed football programs and booster clubs will spend large amounts of money on rents intended to attract top recruits to their program.

An interesting characteristic of college football is that demand is often highly regional. Although two institutions in say Michigan and Florida are both members of the NCAA, the demand for their individual products may be very different. The profitability of an institution's football program depends very much on the size and demand of their particular fan base and not the total fan base of the sport itself. This is important because each member of the cartel agreement faces a different decision when it comes to cheating. A program which has a higher demand for their product, will likely receive a greater payoff if they cheat on the agreement. Humphreys and Ruseski (2009) developed a model which took several factors of rent seeking into effect. They looked at the stadium capacity and total expenditures on athletics to measure how committed a given school was to their football program. Athletic departments may wish to invest heavily in efforts to bring to players to their programs. NCAA rules prohibit enticing recruits with money or extra benefits directly. However, the quality of a football program's facilities likely factors in the decision an athlete makes when selecting which institution to attend. Humphreys and Ruseski introduced the idea of looking at the amount a program invests in rent seeking, and whether or not it factors into the NCAA's monitoring process.

While there is a growing literature on this topic, it is certainly not extensive at this point. This thesis seeks to add to this growing literature and also look at different aspects of this relatively novel theory. Most empirical research on the topic to this point, has used data that

only runs into the early 1990s.<sup>3</sup> However, the period of the early 1990s to present which has seen the game undergo major transformations. In the last two decades the college football cartel has greatly expanded and refined its business, and has it working as efficiently as ever. With these changes to the sport it is likely that the NCAA and the member institutions have modified their interactive behavior as well. It follows then that recent data will provide the best opportunity to understand how the college football cartel works at the moment. The following chapters will establish the decisions that face the NCAA, and the members of this cartel. It will present the theoretical constructs which it is working within, and describe the models it will use to test this theory. It will also review the data it uses to estimate these models. Finally, it will examine the empirical results of this thesis. It will address their implications on the theory of the college football cartel, and analyze what conclusions are forthcoming.

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<sup>3</sup> Fleischer et al. (1988); Fleischer, Goff, and Tollison (1992); Eckard (1998); Depken and Wilson (2006); Humphreys and Ruseski (2009)

### CHAPTER 3: Theoretical Model

This thesis looks at the industry of college football from the perspective that previous literature has established. This thesis assumes that the member programs of the NCAA have organized themselves in a way that constitutes a cartel. It seeks to better understand both the method of detection that the NCAA employs, as well as the behavior of member institutions within the program. This thesis will employ more recent data as well as some that is newly available. Central to this theory are two unobservable probabilities that are very closely related. From the side the NCAA monitoring the cartel agreement, there is the probability  $\delta$  that a given institution has cheated on the cartel. From the side of an individual member of the cartel, there is the probability  $\rho$  that they will be placed under probation by the NCAA. Perception and estimation of these probabilities will dictate how these two sides behave and interact. This section will break down the ongoing interaction of these two sides, and the effect that  $\delta$  and  $\rho$  have on this interaction.

As previously discussed the greatest difficulty in the maintenance of a cartel, is the incentive for members to cheat on the cartel agreement. However, the classic prisoner's dilemma exists. If multiple members of the cartel cheat on the agreement it makes it more difficult, or in extreme cases impossible; for the cartel as a whole to extract monopoly rents. In this case, cheating on the NCAA cartel agreement should improve the quality of players that a program is able to recruit. Better players should translate into better on-the-field performance for this program. With better performance on-the-field comes better attendance and ticket sales to games, greater sales of team merchandise, and an invitation to a more prestigious postseason bowl game which will pay out more money to the program. Those are merely the immediate pay offs to cheating on the college football cartel agreement. Additionally, consistent success on-

the-field leads to greater prestige for a football program as well as the conference to which it belongs. This will result in more lucrative television deals when such contracts are negotiated. Hence it can be seen that, as is the case with most cartels, substantial benefit can be gained from violation of the agreement. Yet if all institutions cheat on the cartel agreement, and attempt to purchase recruits they will be forced to bid against each other, and their costs will greatly increase and the cartel will likely fail. This section will look at this cartel from two sides; that of the NCAA's regulatory body, and that of a given member institution. It will lay out my assumptions of the decisions facing these two sides, and their resulting behavior. This will establish the constructs of the empirical work and analysis in this thesis.

#### **A. Model of Institutional Behavior**

The estimated models in this thesis are based on the NCAA's actions in placing the football programs of member institutions on probation. In order to develop accurate hypotheses regarding regulation of institutions that cheat, it's important to first consider what leads an institution to cheat on the agreement in the first place. Consider the choices that face a member institution, and their optimal behavior. It should be noted that as of 2010, there are 110 members of the NCAA's Football Bowl Subdivision. This is the highest classification that exists in intercollegiate football and members of this classification are the only institutions that may participate in postseason bowl games. However the most powerful and profitable conferences of the Football Bowl Subdivision have a contractual agreement with the most lucrative bowl games, known as the Bowl Championship Series (BCS). This agreement guarantees invitations to the Champions of the member conferences. The agreement extends to the members of the Atlantic Coast, Big East, Big Ten, Big Twelve, Pacific Twelve (formerly Pacific Ten), and Southeastern Conferences, as well as the University of Notre Dame whose football program is independent of

these conferences. One could easily write a great deal on the BCS and whether it alone violates United States Antitrust laws, as many economists believe it does. However, that is not the purpose of this thesis. This thesis mentions the BCS because the programs which fall under this agreement face similar incentives when it comes to violating the NCAA's bylaws, and these programs are an important group to consider when analyzing the college football cartel. So for the purposes of this thesis, all further discussion of a member program will be in reference to one of the 65 which fall under the current BCS contract. Now consider an individual member institution. Assume that they seek to maximize expected profits. An institution's revenue is a function of many variables; however a critical factor is on-the-field performance. In general, with higher performance on the field come invitations to more lucrative bowl games, as well as higher demand for tickets to their games and team merchandise. There are many ways a program seeks to improve performance on-the-field but for the sake of developing a simple model suppose there are two types of action that will improve performance, and subsequently increase revenue; activities which are permissible within the rules of the NCAA,  $a$ , and activities which violate the rules of the NCAA,  $b$ . Assume that each individual institution must choose optimal levels of  $a$  and  $b$  to maximize their expected profits  $E(\Pi)$ . Let the revenue from football for this institution be represented by the function,  $R$ , and let it be a function of  $a$  and  $b$ . Let costs for this institution from football be represented by the function,  $C$ , and let it be a function of  $a$  and  $b$ . Suppose that  $R$ , is non-decreasing in  $a$  and  $b$ . Suppose that cost  $C$  is increasing in  $a$  and  $b$ . Finally we have to consider the probability  $\rho$  that this institution gets caught violating the cartel agreement, and is placed on probation by the NCAA. Suppose that  $\rho$  from the perspective of the firm is solely a function of  $b$ , and that it is non-decreasing in  $b$ . If caught in violation the rules this institution will face probation, which could include scholarship reductions, bans from

postseason play, and even in extreme cases of repeat violation, being banned from football participation for a period of time. The cost of this probation I will represent with a single fine  $F$ . I believe that  $F$  is a function of  $b$ , and that it is increasing in  $b$ . Precedent suggests that programs who have committed what the NCAA feels to be more severe forms of cheating (higher levels of  $b$ ) receive higher penalties in probation. So in the event of not being caught by the NCAA the institution receives a certain level of profit. In the event it is caught it receives that same of profit minus a fine. Therefore I propose the following model of behavior for a member institution of the cartel:

Maximize, choosing  $a$ , and  $b$

$$(1) E[\Pi(a, b)] = R(a, b) - C(a, b) - (\rho(b))F(b)$$

First-order conditions for optimization imply:

$$(2) R_a^4 = C_a$$

$$(3) \rho_b = (R_b - C_b)/(F_b)$$

## **B. The NCAA as Cartel Monitor**

Previous sections have established the need for the NCAA to monitor compliance of cartel members, as well as punish violators. It is for the good of the cartel as a whole that individual institutions be deterred from cheating on the agreement, so that all members will be able to attain players at non-competitive wages. The problem facing the NCAA is how to detect when cheating on the cartel agreement has occurred. They do not have the resources to monitor all programs in the input market, and insure that recruiting practices follow the rules. Nor can they make sure that players once at an institution are not compensated beyond the agreed upon level. Instead the NCAA must view programs in the output market and determine if a program is likely to have cheated on the cartel agreement. This section will discuss the NCAA's perceived

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<sup>4</sup>  $R_a$  denotes the first partial derivative of  $R$  with respect to  $a$

probability  $\delta$  that a program has violated the cartel agreement, why it is important to the NCAA, as well as what affects it.

Along with facing prohibitive costs in actively monitoring the actions of member programs in the input market of college football, the NCAA faces costs in retroactively investigating an individual member's actions. There are limits to what can be empirically evaluated in terms of the NCAA's investigation process. It is unknown to what degree the NCAA relies on tips from program's or the public when it comes to detecting cheaters. This thesis assumes that the NCAA receives more tips than it could ever hope to investigate, and that at least some tips are not credible. Thus the measurement of  $\delta$  is crucial to the NCAA behaving optimally as cartel monitor. Given the cost of investigating an institution, as well as the limited number of investigations which they can concurrently engage in; it is important that any institution they target for investigation have a high likelihood of cheating. The NCAA does not have sub poena power, so investigations regularly take several years to be completed. It would be incredibly costly to investigate an individual program only to find that either they did not violate the cartel agreement, or there is not enough evidence to justify probation. Therefore it is optimal for the NCAA to investigate the programs which they are most certain have committed major violations of the agreement. The question then becomes, what makes a program a likely offender? As previously mentioned, Fleischer et al (1988) believed that winning percentage as well as variation in winning percentage were a key factor. Humphreys and Ruseski (2009) looked at the practice of rent seeking in college football. Institutions are seeking top recruits to help them win football games, and by the NCAA rules they are not allowed to buy the services of these players. Universities therefore spend money on things such as stadiums, training facilities, and coaches in hopes of luring top recruits to their program. A program that engages

in a high degree of rent seeking likely signals two things to the NCAA. The first is that they are willing to incur high costs on legal methods of improving their program. The NCAA might then assume that this institution would also be willing to incur high costs in illegal practices as well. The second thing that is signaled by a high degree of rent seeking is that a program reveals the demand for its product is relatively high. After all, a profit-maximizing institution would not incur high costs on rent seeking in the input market unless they were receiving, or conceivably could receive, an even higher amount of revenue in the output market. It follows then that an institution which engages in a high degree of rent seeking, faces high demand for their product. An institution facing high demand for their product will also receive a higher payout on cheating, and will be more likely to do so.

The product that an institution puts on the field provides another opportunity to evaluate whether they are a likely offender. As discussed in Chapter 2, a sudden improvement in a football program's winning percentage might indicate that the institution violated the cartel agreement to attain this new success. At the very least, an institution's objective in cheating on the cartel agreement is to improve the product that they put on the field. Winning percentage is a very basic way to measure the quality of the product. Another measure of the quality of a football program's product is their revenue.

The NCAA's perception of the likelihood that a program has cheated,  $\delta$ , is a function of variables which fall into two categories: input market variables, or output market variable. The seating capacity of a football program's stadium, and the salary of the head coach, are variables related to gaining a comparative advantage in the input market. The winning percentage, and revenue of a football program are variables that measure the quality of the product in the output market. Suppose the following model:

$$(4) \delta = f(\textit{stadium capacity}, \textit{head coach salary}, \textit{winning percentage}, \textit{revenue})$$

Suppose that these are the four key variables that NCAA uses to monitor the cartel agreement.

Suppose also that the following relationships exist:

$$(5) d(\delta)/d(\textit{stadium capacity})^5 > 0$$

$$(6) d(\delta)/d(\textit{head coach salary}) > 0$$

$$(7) d(\delta)/d(\textit{winning percentage}) > 0$$

$$(8) d(\delta)/d(\textit{revenue}) > 0$$

This assumes that an increase in one of these values for an institution increases the NCAA's perception of the probability that the institution has violated the cartel agreement.

While the beliefs of the NCAA regarding programs are not observable, their actions in placing programs on probation can be observed. The programs for which  $\delta$  is the highest will be the programs which the NCAA will investigate and then possibly place on probation. Therefore, the factors that impact  $\delta$ , should also impact  $\rho$  in the same way. Suppose the following model:

$$(9) \rho = f(\textit{stadium capacity}, \textit{head coach salary}, \textit{winning percentage}, \textit{revenue})$$

Suppose also that the following relationships exist:

$$(10) d(\rho)/d(\textit{stadium capacity}) > 0$$

$$(11) d(\rho)/d(\textit{head coach salary}) > 0$$

$$(12) d(\rho)/d(\textit{winning percentage}) > 0$$

$$(13) d(\rho)/d(\textit{revenue}) > 0$$

This model will be the focus of the empirical work of this thesis. As probationary periods for institutions can be observed, it will be possible to study the statistical relationships that exist between the probability that an institution is placed on probation by the NCAA, and the aforementioned variables of interest.

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<sup>5</sup>  $d(\rho)/d(\textit{stadium capacity})$  denotes the partial derivative of  $\rho$  with respect to *stadium capacity*.

## **Chapter 4: Empirical Considerations – Variables, Data, Model**

This section will cover the data used for the empirical work of this thesis. It will cover how the data was collected, what it measures, and the statistical regression methods employed for this thesis.

### **A. Variables**

An institution's football stadium is one of the rents a program can use to attract top recruits. The seating capacity, STADIUM, of an institution's football stadium in a given year is used in this study. Stadium capacity measures the amount of rent seeking an institution engages in, with the hopes of attracting better athletes to their football program. Again, an institution which spends more money on the permitted rents in hopes of improving their product should be more likely to break the rules in attempts to do the same. In theory the larger an institution's football stadium is, the more money they have invested in that particular rent to add prestige to their program and attract top recruits. There are rare exceptions to this, as recently a small number of stadiums have undergone renovations to upgrade the quality of their stadium, which actually reduced seating capacity. However, these decreases were generally very small and insignificant. A positive coefficient is expected on STADIUM. A program which is willing to spend more on their rents to attract athletes should also be more likely to cheat on the cartel agreement to land star-quality recruits.

The most basic measure of a football program's success is its performance on the field. In this study, each program's winning percentage, WINPCT, is used for every individual year in the study. This variable is obtained by taking the number of games a program won in a given year and dividing it by the number of games it played in that year. Note that overtime was implemented in college football beginning with the 1996 season, and there have been no tie

games since. Therefore, two programs with the same WINPCT have an equal ratio of wins to losses in that year, and no consideration need be given whether games not won were losses or ties. They were all losses. WINPCT has been the most common variable used in previous papers investigating the NCAA cartel agreement. As mentioned previously, Eckard (1998) found a positive relationship between the NCAA enforcement of the cartel and competitive balance in five out of seven conferences in Division I (now Football Bowl Subdivision) college football. Similarly, Depken and Wilson (2006) found that competitive balance was greater in conferences with a greater level of enforcement. This thesis uses WINPCT to measure the likelihood that a program has or will violate the agreement, and thus better understand the monitoring process. A positive coefficient is expected on WINPCT. Cheating on the cartel agreement should make a football program more successful. Therefore programs with a low WINPCT should be unlikely suspects for NCAA investigation because it is unlikely that they have cheated. This is not to say that there are not programs that cheat ineffectively. However, it is unlikely that they will be a target for NCAA investigation. If the NCAA must rely on probabilistic methods to detect likely cheaters, a program with a history of losing seasons will not appear to be a likely cheater. This thesis suggests that the NCAA will go after the programs it most suspects. So even if a losing program exhibits other signs of likely cheating (i.e. large stadium, high coaching salary, etc.), they will be less suspicious than a program that exhibits these same signs and has a winning record. A positive increase in WINPCT should make a football program a more likely suspect for investigation, and consequently probation. According to Humphreys and Ruseski (2009) a team that perennially has a WINPCT around .500, and then suddenly improves and has several seasons with a higher WINPCT is a likely suspect of cheating on the agreement. A positive sign can be expected on this variable.

## **B. Data**

In 1994, the United States Congress passed the EADA, which went into effect in 1996. This act requires collegiate institutions with athletic departments to annually report financial information regarding their athletic programs. Among the information reported is the annual revenue of the football program, REVENUE. This data can be found through the United States Department of Education website for the Office of Postsecondary Education. Data is available for the years of 2003 through to 2008, and is included each of those years, for every institution in this study. REVENUE brought in by a program is a way of gauging the potential payoff for a program that cheats on the cartel agreement. The higher the demand for a football program's product, the higher their revenue will be. Subsequently there will be greater incentive for such a football program to cheat on the NCAA cartel agreement, and a higher likelihood that they do or will cheat. A positive coefficient is expected on REVENUE.

Included in the EADA, is the requirement that institutions annually report their average head coach's salary for men's and women's sports. The average head coach's salary for men's sports, HDSAL, is included in this study for every year from 2003 through to 2008 for each institution. Head coaches in college football programs are another rent, which institutions use to attract recruits. The purpose of HDSAL is to attempt to measure how much each university spends on this rent. This variable does have some drawbacks. For one, it is not the annual head football coach's salary, but rather an average of the salaries of all head coaches of men's athletic programs. It has been established however that football and men's basketball are the only major revenue sports that exist in collegiate athletics. This being the case, economic theory would suggest that little variance exists in the head coach salaries in non-revenue sports across programs. After all, the marginal revenue product should be a large component of a head

coach's wage. Therefore any observed variance across institutions should be the result of differences in the head coach salary for their football or men's basketball programs. Now the matter becomes how to tell if a school having a higher HDSAL value is the result of a higher head football coach salary or not. What if the head basketball coach is highly paid and the head football coach is not? This thesis assumes that these matters will not pose a significant problem for the purposes of this thesis, as the schools included all appear to have invested in both their football and men's basketball programs to a similar degree. Also a program that pays their head basketball coach highly, but has not invested in their football program highly; will not likely have their football program put on probation. That being the case, HDSAL should serve its aforementioned purpose. The sign on the coefficient of HDSAL is one of the key matters that this thesis seeks to find, as it may illuminate a great deal about the role head coaches serve at major institutions. A significant positive coefficient would indicate that programs which spend more on head coaches are more likely to find themselves under probation from the NCAA. This would make sense in the same way that a positive coefficient is expected on STADIUM, as the head coach is one of the major rents which institutions invest in to attract top recruits. Also a program which pays a head coach more likely has a higher demand for their product, and greater incentive to cheat. All of this promotes an expectation of a positive coefficient on HDSAL.

The dependent variable in this thesis, *PROBATDU*, is a binary "dummy" variable. For each of the 65 institutions the variable will take on the value of "1" for a year when the institution's football program was under NCAA probation, and a "0" for year's when the football program was not. The variable covers a 13-year span from 1996-2008. Using this binary variable as the dependent variable in a probit regression will produce coefficients on the

explanatory variables that will exhibit the direction of their relationship with the probability of being placed on probation  $\rho$ .

**Table 1: Descriptive Statistics**

<b>Variable</b>	<b>Mean</b>	<b>Std. Deviation</b>	<b>Minimum</b>	<b>Maximum</b>
STADIUM	65239.1014	18970.7992	16200.0000	107282.000
HDSAL	375409.694	201635.526	75950.0000	1273991.00
WINPCT	.556079347	.216155525	0	1
REVENUE	25971512.7	15102023.9	4739787.00	87583986.0

### **C. Model**

Three different theoretical models were presented in Chapter 3 to posit explanations for: the behavior of member institutions of the NCAA, analysis of institutional behavior by the NCAA as cartel monitor, and the factors that influence the probability that a member institution’s football program will be placed under probation by the NCAA. It is the third model presented, concerning the probability that a program will be placed under probation; that will be central to the empirical study of this thesis. Recall, that of the four variables considered in this thesis, stadium capacity and head coach salary are regarded as variables related to gaining an advantage in the input market; while winning percentage and revenue are variables related to product success in the output market. This may seem to be a trivial distinction, but in fact the college football cartel does have two sides to it. There is the very common monopolistic hold on the sport. All major college football is played under the regulation and distribution of the member institutions through the NCAA. In the input market, the member institutions of the NCAA have a more unconventional collusive agreement. The very common example of a cartel

is a group of firms which collude with one another, typically to restrict quantity supplied and thus gain the monopoly power of price searching in the output market. However, the member institutions of the NCAA, through their rules requiring amateurism; have a collusive agreement that allows them to behave as a monopsony or single buyer in the labor market. Seeing as the collusive agreement concerns the input market, the distinction between the input market and output market variables is worth making. Do they all effect the probability of being place under probation, or does this NCAA give greater consideration to variables from a particular market? The statistical regression employed by this thesis will evaluate the effect of these four variables on the probability of being put on probation.

This thesis will employ two probit regressions. The dependent variable PROBATDU, as previously mentioned is a binary “dummy” variable that equals “1” for a year when an institutions football program was on probation, and “0” otherwise. Therefore the probability that (PROBATDU=1) for a given program can be viewed as the probability of being put on probation for that program during the sample period. The probit regression is a specific type of binary response model, which uses maximum likelihood method to estimate the following conditional probability:

$$(14) \Pr(\text{PROBATDU} = 1 \mid \text{STADIUM}, \text{HDSAL}, \text{WINPCT}, \text{REVENUE})$$

This is the probability that (PROBATDU = 1) across all programs in the sample given the corresponding values of stadium capacity, head coach salary, winning percentage, and revenue. The NCAA makes essentially a binary response to all member institutions at all times; they are either on probation or they are not. This regression examines whether or not this response is random, or whether it is influenced by observable characteristics of the institutions as this thesis suggests. Maximum likelihood estimation requires an assumption of the population probability

distribution to create a likelihood function. The parameter of interest is then chosen so as to maximize said likelihood function. In this case the coefficients on the dependent variables are the parameters of interest. The probit model imposes the population assumption of a standard normal distribution, with a mean of 0 and a variance of 1. The sign of these coefficients represent the direction of the relationship between the explanatory variable and the probability that (PROBATDU = 1). The change in the dependent variable given a change an explanatory variable is equal to the coefficient on the given variable multiplied by the standard normal probability density function evaluated at the sample mean. The standard normal population density function is always greater than 0, therefore the sign of a given coefficient and the direction of the relationship between the given explanatory variable and the dependent variable; will always be the same.

A second probit regression will be run with the same explanatory variable, but in addition athletic conference “dummy” variables will be included to help evaluate if there exist any cross sectional effects on PROBATDU. ACC will take on a value of 1 for programs who belong to the Atlantic Coast Conference and a value of 0 otherwise. BIG10 will take on a value of 1 for programs who belong to the Big Ten Conference and a value of 0 otherwise. BIG12 will take on a value of 1 for programs who belong to the Big Twelve Conference and a value of 0 otherwise. PAC10 will take on a value of 1 for programs who belong to the Pacific Ten Conference and a value of 0 otherwise. SEC will take on a value of 1 for programs who belong to the Southeastern Conference and a value of 0 otherwise. No dummy variable will be included to account for the Big East Conference. A dummy variable cannot be included for all cross-sections, as it will render the matrix of the dependent observation non-invertible and regression will not be possible.

Based on the theoretical model established in the previous chapter of this thesis, a positive relationship is expected between all explanatory variables (STADIUM, HDSAL, WINPCT, REVENUE) and the probability of being placed on probation. Significant positive relationships would support the claim that the NCAA's monitoring and investigative process is selective and based on actions or characteristics that themselves do not violate the rules.

## **Chapter 5: Results and Interpretation**

This chapter will cover the empirical results of this thesis. It will review the expectations put forward in the preceding chapter, and the degree to which the results support the theoretical assumptions of this thesis. Recall, that this thesis employs a probit regression. The dependent variable, PROBATDU, is a binary “dummy” variable taking a value of 1 during a year when an institution’s football program is on probation and 0 otherwise. Recall that this thesis includes four explanatory variables which might factor into the NCAA’s evaluation of programs likely to have violated the cartel agreement. Stadium capacity and head coach salary are two variables which measure the behaviors of programs in the input market. The winning percentage and revenue of a football program measure the success of the program’s product in the output market. This thesis expects a positive sign on the coefficients for all the dependent variables. The statistical significance of these signs should provide insight to whether the NCAA focuses on behaviors in the input market, results in the output market, both, or neither. REGRESSION I will be a probit regression of STADIUM, HDSAL, WINPCT, REVENUE, and a constant value of one on PROBATDU. REGRESSION II will be a probit regression of STADIUM, HDSAL, WINPCT, REVENUE, ACC, BIG10, BIG12, PAC10, SEC, and a constant value of one on PROBATDU.

**Table 2: REGRESSION I<sup>6</sup>**

<b>Variable</b>	<b>Coefficient</b>	<b>Standard Error</b>	<b>t-ratio</b>
Constant**	-2.13190522	.26927536	-7.917
STADIUM**	.933644D-05	.391311D-05	2.386
HDSAL*	.684658D-06	.390392D-06	1.754
WINPCT	.15448977	.31324487	.493
REVENUE	-.444486D-08	.586974D-08	-.757

\*Indicates coefficient is significant at the 90% confidence level

\*\* Indicates coefficient is significant at the 95% confidence level

As expected, the coefficient on STADIUM is positive. The t-ratio of 2.386 indicates strong statistical significance on this coefficient. This result suggests that there is a significant relationship between the size of an institution's stadium and their probability of being placed on probation by the NCAA. This result is consistent with the expectations put forward in this thesis. The coefficient on HDSAL is positive and statistically significant. This also supports the expectations put forward in the previous chapter. The output market variables WINPCT and REVENUE do not have statistically significant coefficients. Therefore, this sample provides no evidence that an institution's winning percentage or revenue have any effect on the probability that their football program will be placed on probation. It does however provide strong evidence that rent seeking makes a program a more likely target for NCAA probation. It is not surprising to find evidence that the NCAA monitors input market behaviors more than the success of a product in the output market. The objective of violating the cartel agreement is to attain success in the output market. However, violation of the cartel agreement does not necessarily lead to success on the field. These results support the aforementioned assumptions.

<sup>6</sup> Output can be found in Appendix 1

**Table 3: REGRESSION II<sup>7</sup>**

<b>Variable</b>	<b>Coefficient</b>	<b>Standard Error</b>	<b>t-ratio</b>
Constant**	-2.30989209	.32838438	-7.034
STADIUM	.505057D-05	.435091D-05	1.161
HDSAL	.468886D-06	.411291D-06	1.140
WINPCT	.32003282	.32623570	.981
REVENUE	-.357234D-08	.610316D-08	-.585
ACC	-.15973751	.31070105	-.514
BIG10	.37477810	.28312752	1.324
BIG12**	.63404433	.26002021	2.438
PAC10	.36050940	.27991318	1.288
SEC**	.69056595	.26598436	2.596

\*Indicates coefficient is significant at the 90% confidence level

\*\* Indicates coefficient is significant at the 95% confidence level

The coefficients on STADIUM and HDSAL remain positive with the dummy variables included to control for cross-sectional effects. Significance has been lost as seen by the smaller t-ratios; however this significance is picked up by the cross-sectional dummies. The coefficient on BIG12 is positive and strongly significant. This indicates that within the sample period, membership in the Big 12 Conference increased the probability of being place on probation. The coefficient on SEC is also positive and strongly significant. This again indicates within the sample period, membership in the Southeastern Conference increased the probability of being on probation. The initial probit regression showed that both larger stadium capacity and higher head coach salary increase the probability of being place on probation. Recall from Chapter 4,

<sup>7</sup> Output can be found in Appendix 2

the mean stadium capacity in this sample is 65,239.1014. The average stadium capacity for the Big 12 in this sample is just below that at 63,601.92. The average stadium capacity for the Southeastern Conference in this sample is well above the overall mean at 74,909.58. Similarly, recall that the mean head coach salary for this sample is 375,409.694. The average head coach salary for the Big 12 in this sample is 475,087.48. The average head coach salary for the Southeastern Conference in this sample is 460,979.775. The Big 12 is above the mean in head coach salary. The Southeastern Conference is above the mean in both stadium capacity and head coach salary. Given that the initial regression showed that increases in stadium capacity and head coach salary significantly increase the probability that a program will be placed on probation; the significant positive coefficients on BIG12 and SEC are consistent with the results of the initial regression.

Previously this thesis claimed that the NCAA relies on probabilistic methods to detect cheating on the cartel agreement; a characteristic sometimes seen in cartels (Stigler 1964). The claim is that rather than monitor the actions of football programs in the recruiting process, the NCAA investigates probable violators ex-post based in part on observable characteristics that do not violate the rules. The empirical results of this thesis support such claims. Indeed there is evidence that certain characteristics do make a member institution a likely suspect for the NCAA, and that the Committee on Infractions does employ probabilistic methods in detecting cheaters. This thesis provides evidence that the input market behaviors of an institution's football program increase the likelihood that they will be placed on probation. REGRESSION I shows that the probability of being placed on probation, in recent history; is significantly and positively correlated with the stadium capacity and head coach salary of an institution. A football program's winning percentage and revenue prove to be unhelpful in understanding the

probability that they will be placed on probation. The loss of significance on the stadium capacity and head coach salary variables in REGRESSION II is due merely to the inclusion of cross-sectional dummy variables. The significant positive coefficients on the dummy variables for the Big 12 and the Southeastern Conference reflect the results of REGRESSION I as the observations on both conferences were above the average for head coaching salary, and the observations on the Southeastern Conference were above the average for stadium capacity.

The statistical regressions employed in this chapter confirm many of the underlying assumptions put forward in this thesis. These results show that certain characteristics of an institution as well as behaviors allowed within the cartel agreement; increase the probability that an institution will be placed on probation. The NCAA's monitoring process of the cartel agreement does involve probabilistic methods that depend on observable characteristics. There is evidence that the probability that a program will be put on probation is increased by increases in stadium capacity and head coach salary. There is no evidence that winning percentage or revenue affect this probability in any significant way.

## Chapter 6: Conclusions

This thesis set out to look further at the cartel behavior present in major intercollegiate football. It was motivated by primarily the following questions: How does the NCAA detect cheating on the cartel agreement? Furthermore, how do the NCAA and the member institutions interact, as well as react to each other's actions? This thesis reviewed the existing literature on the subject and the theory that had been developed. It then established a theoretical basis for its own empirical work.

How does the NCAA detect cheating on the cartel agreement? This thesis suggests that the NCAA relied in part on probabilistic methods to detect cheating on the cartel agreement. The empirical results confirm that NCAA investigation is selective, and targeted at programs with characteristics which make them likely to cheat. This thesis provided evidence that larger stadium capacity and higher head coaching salary are among the characteristics that the NCAA targets. Winning percentage and revenue can certainly be effected by a program's violation of the cartel agreement, and increasing both is the objective of cheating the agreement. Still, violation of the cartel agreement does not ensure these increases, especially if several other programs in the region violate the agreement as well. Winning percentage and revenue show a great deal of variation from year-to-year. Aside from a few rare cases, using winning percentage and revenue to determine the probability that an institution cheats, as previous work has suggested; is likely more than these works assume. In contrast, spending money to improve features that might attract recruits reveals commitment and investment to landing the best athletes. How can the behavior of individual institutions within this cartel be modeled? Institutions with higher levels of commitment and greater levels of investment, should be more likely to have violated the rules, if for no other reason than to protect or recover said investment.

This thesis provides strong evidence that the NCAA believes this to be true, through the significant positive relationship between an institution's stadium capacity and head coach salary and the probability that those institutions' football programs will be placed on probation. While in theory all dependent variables should increase the probability of being placed on probation, this thesis shows that the input market variables have more practical value to the NCAA in determining which institutions are likely violators. Contrary to previous work which focused more on output market indicators, this thesis establishes that from 1996-2008 the probability of an institution being placed on probation was significantly impacted by input market indicators. This thesis applied the college football cartel theory developed in the prior work of: Fleischer et al. (1988), Fleischer, Goff, and Tollison (1992), Brown (1993), Eckard (1998), Depken and Wilson (2006), and Humphreys and Ruseski (2009); and utilized newly available data to investigate a more recent and currently relevant time period in intercollegiate football. Further research should recognize the expanding nature of college football at present, and focus on more recent history within the game. Given the considerable change to the landscape of the industry in the early 1990's, it should not be assumed that the behavior of the NCAA as cartel monitor has been the same over the past decade and a half; as it was in the 1950's through to the 1980's. So long as the basic structure of the industry is the same, with non-competitive labor markets maintained by a governing body; there will be much that can be learned about the inner-workings of cartels, from big time college football.

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## Appendix 1

### Regression I Output

```
--> RESET
--> READ;FILE="C:\Users\Matthew\Desktop\tc.xls"$
--> PROBIT;Lhs=PROBATDU;Rhs=ONE,STADIUM,HDSAL,WINPCT,REVENUE$
Normal exit from iterations. Exit status=0.
```

```
+-----+
| Binomial Probit Model |
| Maximum Likelihood Estimates |
| Model estimated: Nov 23, 2011 at 10:26:06AM. |
| Dependent variable PROBATDU |
| Weighting variable None |
| Number of observations 858 |
| Iterations completed 11 |
| Log likelihood function -252.7803 |
| Restricted log likelihood -259.0681 |
| Chi squared 12.57555 |
| Degrees of freedom 4 |
| Prob[ChiSqD > value] = .1354716E-01 |
| Hosmer-Lemeshow chi-squared = 13.93367 |
| P-value= .08351 with deg.fr. = 8 |
+-----+
```

```
+-----+-----+-----+-----+-----+-----+
|Variable | Coefficient | Standard Error |b/St.Er.|P[|Z|>z] | Mean of X|
+-----+-----+-----+-----+-----+-----+
Index function for probability
Constant -2.13190522 .26927536 -7.917 .0000
STADIUM .933644D-05 .391311D-05 2.386 .0170 65239.1014
HDSAL .684658D-06 .390392D-06 1.754 .0795 169657.156
WINPCT .15448977 .31324487 .493 .6219 -.60890443
REVENUE -.444486D-08 .586974D-08 -.757 .4489 .118047D+08
```

## Appendix 2

### Regression II

```
--> RESET
--> PROBIT;Lhs=PROBATDU;Rhs=ONE,STADIUM,HDSAL,WINPCT,REVENUE,ACC,BIG10,BIG12
,PAC10,SEC$
```

Normal exit from iterations. Exit status=0.

```
+-----+
| Binomial Probit Model |
| Maximum Likelihood Estimates |
| Model estimated: Nov 23, 2011 at 11:16:16AM. |
| Dependent variable PROBATDU |
| Weighting variable None |
| Number of observations 858 |
| Iterations completed 11 |
| Log likelihood function -243.1314 |
| Restricted log likelihood -259.0681 |
| Chi squared 31.87346 |
| Degrees of freedom 9 |
| Prob[ChiSqd > value] = .2094089E-03 |
| Hosmer-Lemeshow chi-squared = 25.08838 |
| P-value= .00150 with deg.fr. = 8 |
+-----+
```

```
+-----+-----+-----+-----+-----+-----+
|Variable | Coefficient | Standard Error |b/St.Er.|P[|Z|>z] | Mean of X|
+-----+-----+-----+-----+-----+-----+
Index function for probability
Constant -2.30989209 .32838438 -7.034 .0000
STADIUM .505057D-05 .435091D-05 1.161 .2457 65239.1014
HDSAL .468886D-06 .411291D-06 1.140 .2543 169657.156
WINPCT .32003282 .32623570 .981 .3266 -.60890443
REVENUE -.357234D-08 .610316D-08 -.585 .5583 .118047D+08
ACC -.15973751 .31070105 -.514 .6072 .18181818
BIG10 .37477810 .28312752 1.324 .1856 .16666667
BIG12 .63404433 .26002021 2.438 .0148 .18181818
PAC10 .36050940 .27991318 1.288 .1978 .15151515
SEC .69056595 .26598436 2.596 .0094 .18181818
```