

# Agency Behavior in a Nonprofit Setting: Effects of the 1984 Supreme Court Decision on College Football Television Broadcasts

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## Abstract

The National Collegiate Athletic Association (NCAA) is the organization that administers and governs athletics at colleges and universities in the United States. Economists commonly view the NCAA as a cartel. We model the cartel relationship between the member institutions and the NCAA central organization in a principal-agent setting. Our model predicts imperfect agency behavior on the part of the NCAA with corresponding overregulation relative to the level preferred by the member institutions. We empirically test the model by examining the impact of the 1984 Supreme Court decision that reassigned the television broadcast rights for intercollegiate football from the NCAA to the individual member institutions. Our empirical estimates of telecasts, attendance, and competitive balance support the prediction of imperfect agency behavior by the NCAA.

## 1 Introduction

The National Collegiate Athletic Association (NCAA) is a nonprofit organization often viewed by economists as a cartel [see, for example, Koch (1983; 1986); Pacey (1985); Lawrence (1987); Fleisher et al (1992); and Mackey (1995).] The cartel view of the NCAA posits a group of competing institutions of higher education held together through rules and regulations administered by the NCAA central organization. The NCAA central organization facilitates cartel behavior.

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Using the cartel model to explain the behavior of the NCAA actually requires that two key assumptions hold

1. The NCAA has profit maximization as its organizational objective
2. The NCAA central organization must act as a perfect agent on behalf of the member institutions.

The first assumption generates the prediction that the NCAA restricts output, and that in the absence of the NCAA structure the intercollegiate athletic industry would operate more competitively and efficiently, producing a greater level of output (games) at a lower price in each sport<sup>1</sup>. The second assumption must hold for the NCAA central organization to act as a facilitator for the interests of the member institutions. In this paper, we explore the implications of relaxation of these two assumptions from a theoretical and empirical perspective.

Carroll and Humphreys (2000), and others, find the behavior of the NCAA consistent with prestige maximization, not profit maximization, suggesting that the first assumption may not hold. Both Zimbalist (1999) and Koch (1983, 1986) posit that the NCAA central organization operates out of self interest, and not as a perfect agent for its member institutions, suggesting that the second assumption does not hold. Neither explicitly considers the nonprofit nature of the NCAA central organization or of the member institutions. If the NCAA central organization has objectives of its own that differ from those of the university members, does the pursuance of these alternative objectives affect NCAA policies and regulations? If such behavior exists, does it mitigate or exacerbate any cartel effects?

We examine these issues first by modeling the relationship between member institutions and the NCAA central organization as a principal-agent relationship in the context of nonprofit objectives. This approach allows us to examine the extent to which the principal-agent approach may or may not be consistent with the cartel model of the NCAA. The NCAA operates essentially as a monopoly in its role as regulatory organization with respect to intercollegiate sports<sup>2</sup>. Nevertheless, its role as agent is clearly important, as is the nonprofit setting in which it operates. Whether or how these factors affect its behavior as monopoly regulator is not clear *a priori*.

Second, we empirically test this model using a suit brought against the NCAA by two members of the cartel - the Universities of Oklahoma and Georgia - in the early 1980s contested the NCAA's regulations of college football telecasts. The 1984 Supreme Court decision in this case [*National Collegiate Athletic Association v. U.S. v. Board of Regents* 468 US 85, 120 (1984)] presents a unique opportunity to empirically analyze the agency behavior of the NCAA's central organization. This decision effectively altered the rights structure in negotiating football television contracts by

reducing those rights for the NCAA central organization and increasing the rights of the member colleges. If the NCAA had acted as a perfect agent then its regulation of football telecasts and contracts would have maximized the objectives of the member-team principals. If, on the other hand, the NCAA had acted as an imperfect agent, then its regulations would have promoted its own objectives rather than those of the member teams, and the teams would be better off as a result of the Supreme Court decision. We recognize that there exists diversity across the member team principals in the NCAA. We explore some of the implications of this for NCAA-agency behavior in our empirical analysis.

Our findings indicate that although the Supreme Court decision increased total number of televised football games, it had essentially no impact on either live game attendance or competitive balance. The estimated impact of the decision on attendance is negative but not statistically significant over all Division I teams as well as for “power” teams and “nonpower” teams examined separately. We define “power” teams as those that appeared on national television four or more times from 1978-1983. The estimated impact of the decision on competitive balance is mixed, although overall there was essentially no significant change following the decision. We employ various measures of competitive balance and apply these both within conferences and across all Division I teams. An additional finding specifically relates to the diversity of member teams: that the characteristics of the teams more likely to appear on TV following the Supreme Court decision differed from those characteristics that applied under the NCAA regulatory regime. Our findings on team characteristics as well as on attendance and overall competitive balance support the prediction of imperfect and, possibly, targeted, agency behavior by the NCAA. The increase in total games telecast in the post decision period is consistent with the cartel model. Our findings related to team characteristics and telecast packaging is consistent with revenue maximizing, which is not consistent with the profit maximizing assumption of the cartel model, but is consistent with the market power requirement of that model.

## **2 A principal-agent model of the NCAA**

As nonprofit organizations, the NCAA central organization and individual member institutions are subject to a nondistribution constraint that legally prohibits the distribution of any earned residual to any group or individual associated with the organizations. For this reasons, nonprofits are subject to significant separation ownership and control; there is no legal owner as residual claimant. Accordingly, residual earnings, or profit, may matter to nonprofit decision makers, they may not be the primary objective of a nonprofit organization, unlike a for-profit firm.

Nonprofit organizations are frequently modeled as revenue maximizers (see, for example, James

and Rose-Ackerman, 1988). Revenue maximization models predict that output will be higher than the profit maximizing level, assuming that nonprofit and for-profit firms produce identical outputs. More general models of nonprofit behavior assume utility maximization by the relevant nonprofit decision maker. Utility maximization models include revenue, income, authority, and prestige as arguments in the decision maker's utility function.

We adopt the utility maximization approach when modeling the behavior of the NCAA central organization. Koch (1986) posited its own power, size and permanence as the primary concerns of the NCAA central organization.

The NCAA also operates as a regulatory organization with respect to intercollegiate athletics, interacting with the member institutions in the same way that a union acts on behalf of its members. To capture the interaction between the NCAA central organization and the NCAA member institutions, we model the member institutions as principals in a principal-agent context: NCAA member institutions authorize the NCAA central organization as their collective agent to develop and enforce regulations governing athletic contests and to engage in negotiations that will make each member institution better off than if each acted independently. As in any principal-agent relationship, each principal – or member institution – has its own objectives. The degree to which member institutions achieve their objectives depends on the degree to which the agent's objectives – as captured by the utility function of the NCAA central organization – diverge from the objectives of the member institutions.

### **A representative member institution - a principal**

An NCAA member institution obtains benefits from the way in which a quantity  $x$  of NCAA regulation improves its revenues ( $TR$ ) and reputation ( $REP$ ). A member college also incurs costs associated with NCAA regulations. These costs are the opportunity cost,  $c$ , associated with the payment to the NCAA, which is the member college's share of revenues contributed to the NCAA,  $s(TR)$ , and the constraints that each institution faces as a result of the regulations.

Let the benefits,  $b$ , to a member college principal from any level  $x$  of the relevant NCAA regulation be defined so that  $TR(x) = b_1(x)$  and  $REP(x) = b_2(x)$ . Similarly, the opportunity cost to the member college principal of any level of the relevant NCAA regulation be defined as  $c(x)$ . The member college principal's utility function associated with an NCAA regulation may therefore be stated as

$$U_P = TR(x) + REP(x) - c(x) - s[TR(x)],$$

so that

$$U_P = b_1(x) + b_2(x) - c(x) - s[b_1(x)]. \quad (1)$$

### The NCAA central organization - the agent

Our behavioral model of the NCAA central organization proposes that it obtains benefits from two sources: income or revenues of the organization and the prestige and authority of the NCAA in the field of intercollegiate athletics.<sup>3</sup> Higher income to the NCAA central organization provides greater discretionary ability for NCAA managers, particularly given that its nonprofit status precludes monitoring of managers in the form and to the degree that would occur through the evaluation of profitability in capital markets. Because profit is not explicitly measured or accounted for, costs and expenditures may increase with managerial discretion as revenues increase. The NCAA's role as regulator and monitor of intercollegiate programs is important to the coordination and effective operation of the athletic programs. The NCAA central organization is dependent upon these programs for its own revenues. We incorporate this into our behavioral model as the NCAA's share of revenue,  $s$ , it receives from any member school,  $s(TR)$ .

Prestige and authority reflect the NCAA central organization's power and ability to exert control over the individual athletic programs. As stated earlier, the NCAA's regulation of these programs is important to their effective operation. The NCAA as producer of these regulations also places the organization's management in a clear position of authority and generates a high profile and significant prestige in the sports community and beyond. Our model incorporates the relationship of NCAA's prestige and authority to the NCAA's role as regulator through the inclusion of the variable ( $AUTH$ ).

The NCAA's decision on the form and implementation of any particular regulation  $x$  is made with these potential benefits in mind. Therefore, from the NCAA's decision vantage point, income and authority each depend on  $x$ .

Let the benefits,  $b$ , to the NCAA from any level  $x$  of the relevant NCAA regulation be defined so that  $s[TR(x)] = s[b_1(x)]$  and  $AUTH(x) = b_3(x)$ . The NCAA agent's utility function associated with an NCAA regulation may therefore be stated as

$$U_A = s[TR(x)] + AUTH(x),$$

so that

$$U_A = s[b_1(x)] + b_3(x). \quad (2)$$

## Welfare maximization with perfect and imperfect agency behavior

Maximizing social welfare in this framework maximizes the joint welfare of the principal and agent. We show first the outcome with perfect agent behavior as a benchmark for efficiency in the level of regulations.

### Perfect agent behavior

With perfect agency,  $b_3(x) = 0$ , so that the agent seeks to maximize the utility of the principal plus its own income. The relevant social utility function is therefore

$$U_A = U_P + s[TR(x)] = U_P + s[b_1(x)]. \quad (3)$$

The optimization problem may be stated as

$$\max U_P + s[b_1(x)],$$

or

$$\max b_1(x) + b_2(x) - c(x) - s[b_1(x)] + s[b_1(x)].$$

Let  $b_1(x) + b_2(x) = B(x)$ . The revenue payment from the school to the agent nets out, so that the optimization problem with perfect agency behavior becomes

$$\max [b_1(x) + b_2(x) - c(x)] = \max [B(x) - c(x)]. \quad (4)$$

The first order condition for a maximum is

$$b'_1(x) + b'_2(x) - c'(x) = 0,$$

which may be stated as

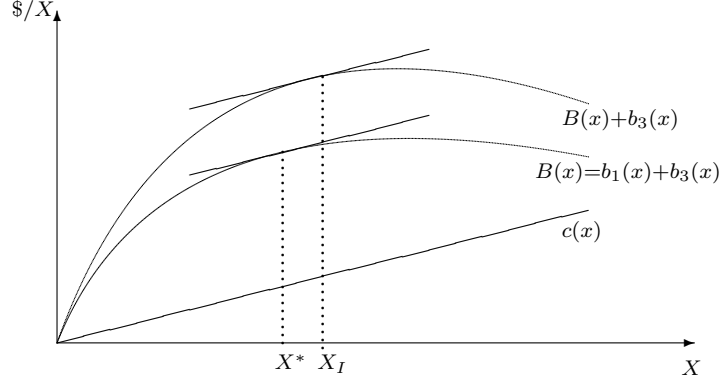
$$b'_1(x) + b'_2(x) = c'(x),$$

or

$$B'(x) = c'(x). \quad (5)$$

The optimal level of regulation,  $x^*$ , is shown in Figure 1.

Figure 1: Imperfect Agency Behavior



### Imperfect agent behavior

With imperfect agency, the agent seeks to maximize its own utility, which, while related to as the objective of the principal (through the revenue effect) is distinct from the utility of the principal. The relevant social utility function therefore becomes the combined utility functions of the member principal and the NCAA agent:

$$U_P + U_A = b_1(x) + b_2(x) - c(x) - s[b_1(x)] + b_3(x) + s[b_1(x)]. \quad (6)$$

The imperfect agency optimization problem may be stated as

$$\max b_1(x) + b_2(x) - c(x) - s[b_1(x)] + b_3(x) + s[b_1(x)],$$

or

$$\max B(x) - c(x) - s[b_1(x)] + b_3(x) + s[b_1(x)], \quad (7)$$

where  $B(x) = b_1(x) + b_2(x)$  as before. The revenue payment from the school to the agent again nets out, so that the optimization problem with perfect agency behavior becomes

$$\max [B(x) + b_3(x) - c(x)].$$

The first order condition for a maximum is

$$B'(x) + b_3'(x) = c'(x). \quad (8)$$

The level of regulation with imperfect NCAA agency behavior is shown in Figure 1 as  $x_I > x^*$ .

## **Implications of imperfect agent behavior**

The effect of imperfect NCAA agency behavior is over-regulation of member institutions: the level of regulation designed and implemented by the NCAA is greater than that which is optimal for the member institution principals even given the requisite revenue sharing with the NCAA. Over-regulation implies larger than optimal constraints on the choice sets of member institutions. As an example of over-regulation due to imperfect agency behavior, consider the NCAA regulations placed on football telecasts prior to 1984. The NCAA's regulation of football telecasts had two primary elements:

1. Restricting total output by limiting the total number of games broadcast in any football season, and
2. Constraining the composition of of output by limiting the number of television appearance that any particular team could make in a single football season.

The first element of the NCAA's football telecast regulation, the restriction of output, is consistent with cartel behavior on the part of the NCAA. However, the second element of the NCAA's football telecast regulation cannot be explained by cartel behavior alone, as it applies to the composition of college football telecasts and not to the number of telecasts. We attribute this second element of the regulation to over-regulation due to imperfect agency behavior on the part of the NCAA central organization.

Empirical evidence on the consequences of the 1984 Supreme Court decision for intercollegiate football contains both evidence consistent with the cartel model and evidence that cannot be fully explained by the cartel model alone. Pacey (1985) examined legal briefs and Greenspan (1988) analyzed aggregated revenue and attendance data from college football to explore the consequences of the 1984 Supreme Court decision. Both found that this decision resulted in a larger number of televised games and increased benefits to consumers of football games, consistent with the predictions of the cartel model. However, these papers report other effects of this Supreme Court Decision that cannot be explained solely by the cartel model. These papers suggest that the response to the decision resulted in decreased football related revenues to many NCAA member teams, advertisers, television networks and television syndicators, and redistributed resources among the NCAA member teams.

According to the cartel model, member institutions participate in the NCAA in order to obtain a share of the cartel rents generated by the NCAA. Our model predicts that imperfect agency behavior on the part of the NCAA central organization alters the cartel outcome in two ways. First, imperfect agency reduces the cartel rents below the level predicted by the cartel model because



the NCAA over-restricted the total number of college football telecasts. Second, imperfect agency behavior altered the distribution of cartel rents across the member institutions by constraining the composition of output. Imperfect agency led to over-regulation of intercollegiate football telecasts by the NCAA central organization. This over-regulation reduced the amount of cartel rents that could be distributed to the member institutions and redistributed these rents from member institutions to the NCAA central organization.

The effects of imperfect agency behavior on factors related to telecasts – live game attendance, indirect benefits in terms of recruiting, competitive balance, and other factors that may affect reputation are also unclear. First, consider live game attendance. If televised games and live games are substitutes, then the increase in television broadcasts following the 1984 decision would reduce live game attendance; but if, televised games and live game attendance are complements, then the 1984 decision would promote live game attendance. Decreased attendance following the decision would be evidence that the NCAA telecast regulations reflected perfect agency behavior by promoting interests of the member institution principals. Increased attendance, or attendance unaffected by the decision, indicating no relationship between telecasts and attendance, would provide support for the hypothesis that the NCAA’s television regulations reflected imperfect agency behavior by not promoting the interests of the member principals.

The existing evidence on the effect of the 1984 Supreme Court decision on attendance is mixed. Lawrence (1987) and Fizek and Bennett (1989) conclude that NCAA telecast regulations protected live game attendance. Kaempfer and Pacey (1986) found that NCAA telecast regulation reduced live game attendance. These two studies covered different sample periods and used different empirical approaches. However, the contradictory results suggest that something more than the reduction of cartel power took place as a result of the 1984 Supreme Court Decision.

Second consider the effect of over regulation on competitive balance within college football. The equalization of competition among member institutions was a primary line of defense by the NCAA in the 1984 Supreme Court case. The motivation for this defense was that equalization of competition results in more interesting athletic events, thus stimulating fan interest and making the member teams better off. Like attendance, the evidence on the effect of the 1984 decision on competitive balance is mixed. Koch (1986) stated that the decision “accentuated the existing inequality among the various” colleges (p. 329). Greenspan (1988), however, stated that the increase in the number of televised games for a larger number of teams following the removal of NCAA constraints could have an equalizing effect on the relative competitiveness of teams. This would occur because increased television exposure for more teams would generate a corresponding increased interest of potential recruits so that better players may be more evenly spread across all member colleges. If Koch’s view is correct, then the NCAA telecast regulations would have reflected

perfect agency behavior by promoting the interest of the member team principals. Competitive balance would be reduced following the 1984 decision. If Greenspan's view is correct, then the effect of the NCAA telecast regulations would have reflected imperfect agency behavior by the NCAA, and competitive balance would be improved following the 1984 decision.

### 3 Empirical Analysis

Our model suggests that imperfect agency behavior by the NCAA led to over-regulation of intercollegiate football broadcasts prior to 1984. Because the model does not provide guidance on the exact form of this over-regulation, and because much of the existing empirical evidence about the effect of the decision is mixed, our empirical investigation focuses on a number of potential areas that might have been affected by over-regulation. We first examine the changes in the number and composition of intercollegiate football telecasts before and after the 1984 Supreme Court decision. No research has examined the direct effect of the 1984 decision on the composition of college football telecasts. Because this decision focused directly on telecasts, an examination of the changes in telecasts after the decision may provide important insights into the nature of the pre-decision over-regulation.

Changes in the number and composition of intercollegiate football telecasts could also affect competitive balance and live-game attendance at football games. The NCAA claimed that their regulation of football telecasts were necessary to maintain both the level of competitive balance and high attendance at games in their defence. Finally, both television broadcasts and live game attendance are important sources of revenues for universities' athletic departments; changes in revenues might also provide insight into the NCAA's over-regulation of intercollegiate football telecasts. In this section, we empirically examine changes in each of these areas after the 1984 Supreme Court decision.

#### Data

Our data come from the college football seasons from 1977 through 1991. We focus only on Division I-A football, the NCAA classification composed of the largest intercollegiate football programs in the country. The full sample consists of 137 institutions that played Division I college football in 1978. The full sample contains some teams, like the Ivy League schools, that are now in Division I-AA but were Division I before this division was split into I-A and I-AA in 1980.

The vast majority of televised college football games were played between Division I schools during this period. The sample period includes seven seasons before the 1984 Supreme Court decision and seven years following the decision. There were 8467 games played between Division

I teams during this period; 4094 were played from 1977 to 1983 and 3840 were played from 1985 to 1991. We use this period because it contains an equal number of seasons, and a relatively equal number of games, before and after the decision. Also, this period features relatively stable conference composition in Division I. There were a number of important changes to the conference structure in Division I in the period following the 1991 season, including the establishment of two new major football conferences, the Big East and the Big XII, expansions of the Southeast and Big 10 conferences, and the demise of the Southwest Conference. We end the sample in 1991 to avoid confusing the effects of the Supreme Court decision with the effects of these changes in conference alignment within Division I.

The primary source of data on individual college football games is the comprehensive web site developed by James Howell for the Usenet newsgroup *rec.sport.football.college*.<sup>4</sup> This web site contains an archive of the participating teams, date, location and final score of nearly every major college football game ever played from the late 19th century on. Data on television broadcasts of college football games were taken from various issues of the Report of the NCAA Football Telecast Committee for the period 1978-1983 and from individual issues of USA Today for the period 1984-1991.

The data on individual games were supplemented with season-specific data on conference affiliation, total home attendance, number of home games, coaching changes, conference standings, post-season bowl appearances and final rankings in polls. These data were primarily taken from various issues of NCAA Football, an annual publication of the National Collegiate Athletic Association. Final Poll rankings were obtained from various issues of the New York Times and USA Today.

Finally, institution-specific enrollment data were obtained from the Integrated Postsecondary Educational Data (IPEDS) system, collected and published by the U.S. Department of Education's National Center on Educational Statistics. The IPEDS Fall Enrollment survey contains detailed information on enrollment at all U.S. institutions of higher education as of October of each academic year, the approximate midpoint of the college football season.

## **Telecasts**

The 1984 Supreme Court decision radically changed the property rights to college football telecasts. In the period 1977-1983, the NCAA determined how many football games would be broadcast, which games were broadcast and which networks would be permitted to broadcast college football games. In the post-decision period, schools and conferences were free to negotiate with networks, and any network could televise college football games. Given the striking differences between the pre- and post-decision environment, we first examined some basic sample statistics from our data

to illustrate how college football telecasts were affected by the decision.

We restrict our analysis to regular season television appearances on national television networks or national cable stations like ESPN and TBS. Before 1984 there were a number of additional types of over the air broadcasts and closed circuit telecasts of college football games limited to local markets, but these appearances did not produce any appreciable revenues or exposure beyond local areas. Broadcasts on networks or cable stations can be divided into two types: regional broadcasts and national broadcasts. National broadcasts were carried by all local network affiliates in the country. Regional broadcasts were carried by some subset of the local network affiliates. All games broadcast on cable stations are defined as national broadcasts.

Figure 2 shows the number of television appearances by schools in our sample over the period 1978-1990. The jump in the total number of games broadcast in response to the Supreme Court decision is clear from the figure. During the period of NCAA control of football broadcasts there were more regional broadcasts than national broadcasts but during the post-1984 period the number of national broadcasts increased relative to the number of regional broadcasts. The NCAA generally negotiated two-year contracts with broadcasters. The contract periods in the sample were 1978-1979, 1980-1981 and 1982-1983. From this figure, the NCAA was increasing the number of telecasts even before the 1984 decision, perhaps in response to the Board of Regents case which was filed on September 8, 1981. However, the almost threefold increase in the total number of telecasts after deregulation is striking. This increase in the number of telecasts has been interpreted as a direct result of the loss of cartel power by the NCAA following the 1984 Supreme Court decision.

Figure 2 also shows a change in the composition of telecasts after the decision, but a closer look at the distribution of college football telecasts before and after 1984 provides additional insight into the nature of the changes brought on by the Supreme Court decision. There are two ways to look at the distribution of football telecasts in the sample: by team-seasons and by teams. Table 1 shows the distribution of telecasts by team-season in the sample. The sample contains 137 teams and 13 seasons for a total of 1,781 team-seasons in the sample. Note that the columns of Table 1 sum to 100%.

From the rightmost two columns on Table 1, most teams in the sample (49%) had no TV appearances in an average season prior to the 1984 season. Of the other half of the teams that appeared on television in a given season, most (24%) appeared once, fewer (17%) appeared twice, and a small number of teams (10%) made three or more appearances. Following the Supreme Court decision, the total number of telecasts increased dramatically. Some of these additional telecasts were spread around college football, reducing the number of teams who did not appear on television in a given season to 40%. However, a large number of these additional telecasts were distributed among a small number of teams who appeared on TV many times each season. So

Figure 2: TV Appearances By Year

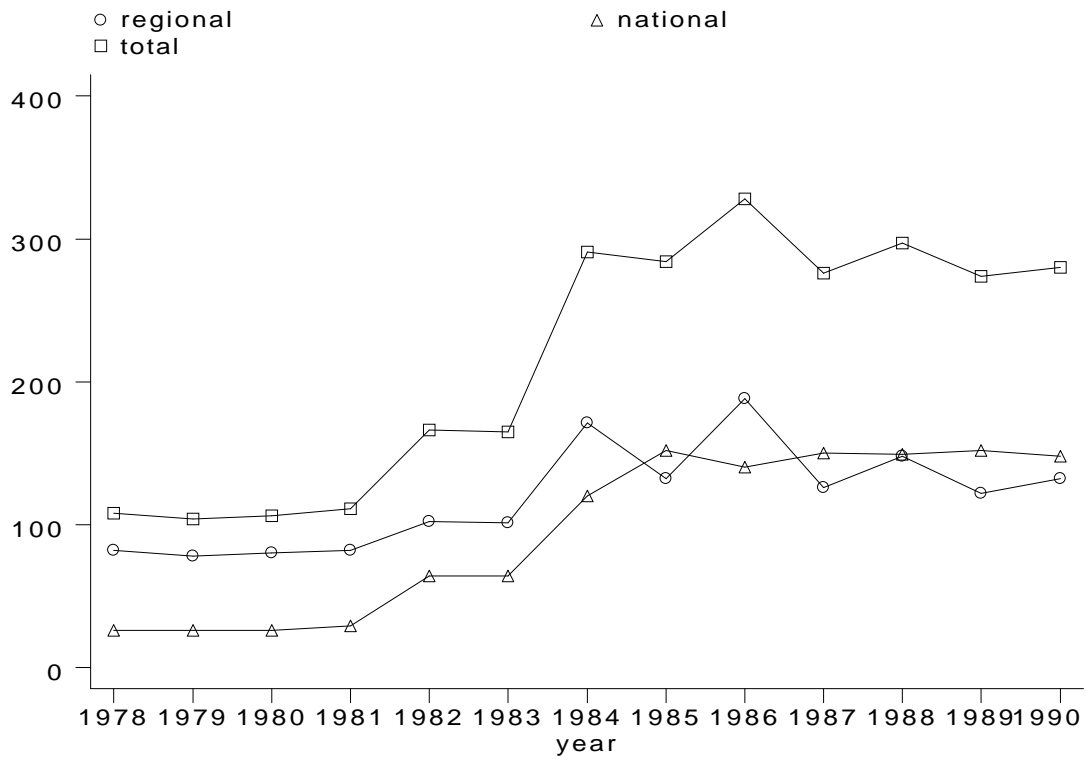


Table 1: Distribution of TV Appearances by Team-Season

Appearances per season by a team	<u>National TV</u>		<u>Regional TV</u>		<u>Total Appearances</u>	
	'78-'83	'84-'90	'78-'83	'84-'90	'78-'83	'84-'90
	0	78%	58%	54%	56%	49%
1	16%	16%	31%	15%	24%	15%
2	5%	9%	14%	12%	17%	9%
3	1%	7%	1%	8%	7%	9%
4	0%	4%	0%	6%	2%	8%
5	0%	3%	0%	2%	1%	7%
6+	0%	3%	0%	1%	0%	12%

telecast deregulation provided TV exposure to more member institutions but also greatly increased the number of appearances that a relatively small number of institutions made in a given season.

The team-season distribution of both regional and national broadcasts show a similar patterns. The probability that a team made no national TV appearances in a given season declined from 78% to 56%, indicating that more teams appeared on national broadcasts. However, the tail of the distribution also increased dramatically, as only 1% of the average pre-1984 team-seasons included three national TV appearances but 16% of the average post-decision team-seasons included three or more national TV appearances. The probability that a team made no regional TV appearances was unchanged after the decision, but the tail of this distribution also got larger.

Another way to characterize the distribution of television broadcasts is to look at the number of total TV appearances made by each member institution over time. Table 2 shows the distribution of total TV appearances for the 137 schools for the two periods before and after the Supreme Court decision. Again, looking at the data this way shows that the probability that an institution did not appear on TV at all declined from 60% in the pre-decision period to 52% in the post-decision period. But the post-decision period also saw a large increase in the number of total TV appearances by a small group of member institutions. No member institutions made more than 21 TV appearances in the pre-decision period, but 16% of the member institutions made more than 21 TV appearances in the post-decision period.

Based on the distribution of telecasts shown on the tables above, the increase in the number of telecasts after 1984 were not spread evenly across the NCAA member institutions. Deregulation of college football telecasts also changed the characteristics of the games that were televised. In order

Table 2: Distribution of Total TV Appearances By School

Total TV Appearances	% of Teams in Sample	
	1978-1983	1984-1990
0	60%	52%
1	7%	8%
2-5	14%	9%
6-10	11%	5%
11-20	9%	9%
21+	0%	16%

to further explore the impact of deregulation on TV appearances, we analyzed the factors that explain which games appeared on television before and after deregulation. To do this, we created a binary variable,  $TV A_{i,t}$ , which takes the value of 1 if school  $i$  appeared on television in year  $t$ . We then estimated the parameters of the following Logit model

$$TV A_{i,t} = \gamma_i + \alpha_1 W_{i,t-1} + \alpha_2 RANK20_{i,t-1} + \alpha_3 TV_{i,t-1} + \alpha_4 BOWL_{i,t-1} + \alpha_5 ENR_{i,t} + \alpha_6 EXP_{i,t-1} + e_{i,t} \quad (9)$$

using the sample data described above.  $W$  is the number of wins by team  $i$  in the previous season,  $RANK20$  is an indicator variable that is equal to 1 if team  $i$  was ranked in the UPI or AP Top 20 in the previous season,  $TV$  is an indicator variable that is equal to 1 if team  $i$  appeared on TV in the previous season,  $ENR$  is total headcount enrollment in thousands at school  $i$ ,  $BOWL$  is an indicator variable that is equal to 1 if team  $i$  played in a bowl game in the previous season,  $EXP$  is the number of years of head coaching experience of the football coach at school  $i$ , and  $e$  is an error term that is assumed to be normally distributed with zero mean and constant variance. Notice that this specification includes a school-specific effect on the probability of appearing on TV,  $g_i$ . This school-specific effect captures unmeasured factors like reputation and prestige on the probability of a school's football team appearing on television.

Table 3 shows the results of estimating Equation 9 for several different subsamples and types of telecasts. The estimated school-specific effects are not reported but are available from the authors on request. These results show a clear difference in the characteristics of games that were televised before and after 1984. Before 1984, television appearances in the previous season and bowl appearances in the previous season were the most important factors affecting a television

appearance in the current season. Success in the previous season, as measured by the number of regular season wins, had no effect on television appearances in the pre-1984 period. Appearing on television in the previous season reduced the probability of appearing on television in the following year, holding the school-specific effect constant. This reflects the NCAA policy of distributing television appearances widely across teams. Note that the results on Table 3 are robust to the exclusion of the lagged dependent variable.

Table 3: Fixed-Effects Logit Regressions

	Total Appearances		National Broadcasts		Regional Broadcasts	
	Pre '84	Post '84	Pre '84	Post '84	Pre '84	Post '84
Wins Last Season	-.015 (.069)	.141* (.071)	.096 (.091)	.183* (.068)	-.018 (.069)	.058 (.066)
Top 20 Ranking Last Season	-.151 (.567)	-.802 (.656)	-.173 (.505)	.584 (.456)	-.302 (.535)	-.684 (.458)
TV Appearance Last Season	-.800* (.235)	-.518* (.261)	-.218 (.314)	-.120 (.280)	-.810* (.254)	-.680* (.289)
Bowl Last Season	1.36* (.445)	.004 (.454)	.472 (.446)	.115 (.372)	1.44* (.427)	.339 (.419)
Enrollment (000s)	.002 (.129)	-.126 (.107)	.307* (.159)	.121 (.105)	.035 (.123)	-.063 (.092)
Head Coachs Experience	.023 (.032)	.015 (.030)	.090* (.050)	.001 (.095)	.025 (.028)	.007 (.025)
N (Teams)	448(90)	387(65)	335(67)	471(79)	483(97)	455(76)

Standard Errors in Parentheses

\*: Significant at 10% level

In the later period the primary determinant of a television appearance is success in the previous year. Prior television appearances still reduce the probability of appearing on television in the current season, but the marginal effect fell from -6% to -3.8%. The difference may be due to network's preferences for games between successful teams in order to maximize the size of the viewing audience.

There is also a difference in the determinants of regional telecasts and national telecasts. In the pre-1984 period, national telecasts tended to involve colleges that are large in terms of enrollment, and teams led by experienced coaches, a proxy for the reputation and stability of the football program. The NCAA appears to have rewarded large and stable football programs with national television appearances. In the later period, size and the experience of the head coach do not predict national television appearances; only success in the previous season is a good predictor of television



appearances in the current season. For regional broadcasts, there is little difference in the two periods, perhaps because many of the post-1984 regional broadcasts are syndicated broadcasts of conference games that are not part of major network programming. The Atlantic Coast Conference may be able to force a syndicated carrier to televise games between some of the weaker teams in the league and a nationally recognized team like Florida State as part of the season package of games.

These estimated effects support the hypothesis of imperfect agency behavior on the part of the NCAA. First, evidence shows that the total number of games telecast nationally increased following the Supreme Court decision. This evidence is consistent with our model's prediction of a higher level of regulation than is in the interest of member team principals. This would have the effect of restricting output below the level that maximizes net benefits to the principals.

Second, the difference in characteristics of the teams most likely to appear on television before and after the decision provide additional evidence of NCAA imperfect agency behavior. During the period of NCAA regulation, the teams most likely to be included in the NCAA package offered to the networks were those at larger schools and whose head coach had greater experience in that position. Such teams were more likely to be well known and command higher TV audiences and higher value as part of the package. In addition, teams which had appeared in previous seasons were less likely to be included in the NCAA package. This created scarcity and increased the value of these individual teams. Preceding season success had no statistical effect on the NCAA's choice in the period of regulation prior to the Supreme Court decision.

Together, the significant determinants suggest that the NCAA's packaging strategy was one that maximized revenue from the package. Because the price paid to each team for a telecast was the same for each school, regardless of size, maximizing total package revenue maximizes revenue for the NCAA, not for the individual teams. This outcome promotes NCAA central organization interests by directly increasing revenues available to its management and also by expanding its role of authority over member teams.

In contrast, following the 1984 decision, the primary indicator of individual team appearances in any season was its (successful) record in the preceding season. This indicator would promote audience size and TV ratings, increasing market value of the individual team to the broadcaster. The post-decision characteristic of teams likely to be telecast thus indicates revenue maximization for individual teams rather than for the NCAA. These differences in characteristics of telecast teams before and after the decision suggest that NCAA's regulations were designed to promote its own interests at the expense of the interests of the member team principals.

## **Competitive Balance**

Did the 1984 Supreme Court decision affect competitive balance in college football? The issue is important because competitive balance affects fan interest and thus demand for tickets and telecasts which in turn affects revenue earned by the schools and the NCAA. Although this question has been addressed by several previous studies, no clear consensus on the direction or significance of this effect has emerged in the literature. The disagreements in the literature focus on three distinct areas:

1. the direction of the impact of telecast deregulation on competitive balance;
2. the appropriate measure of competitive balance; and
3. the particular games that might have been affected by deregulation.

We address each area in turn.

### **Direction of the impact of telecast deregulation on competitive balance**

The direction of the impact of telecast deregulation on competitive balance depends in part on the level of competitive balance during the period of NCAA regulation of football telecasts before the 1984 decision. NCAA had argued that one purpose of the regulations was to promote equalization of competition across teams. Koch's (1986) view would support this position and would predict that the period of NCAA regulation should be one of relatively greater competitive balance than would exist with deregulation following the decision.

The other view, as presented by Pacey (1985) and Greenspan (1988), believes that the NCAA's regulation of college football telecasts reduced competitive balance. The Supreme Court decision suggests that a majority of the Court held this position. Our behavioral model supports this view. Imperfect agency behavior would generate regulations to promote the NCAA's own interests rather than the interests of the member team principals. In this situation our model predicts either increased competitive balance or no change in competitive balance in the period following the decision.

### **Measuring competitive balance**

The second disputed issue centers on the appropriate measure of competitive balance. One common measure of competitive balance, developed by Noll (1988) and Scully (1989) is the variability of the distribution of the winning percentages, defined as the number of wins divided by the total number of games played by a team over some period of time, of some group of sports teams over some

period of time. Other commonly used measures of competitive balance include average winning percentages, Gini coefficients calculated from winning percentages, and excess tail frequencies of the winning percentage distribution. See Fort and Quirk (1995) Schmidt and Berri (2001), and Humphreys (2002) for a full discussion of measurement issues related to competitive balance.

Bennett and Fizel (1995), Eckard (1998) and Humphreys (2002) have all pointed out a potential problem with many commonly used measures of competitive balance: they do not reflect year-to-year changes in relative standings of teams. Both Bennett and Fizel (1995) and Eckard (1998) use only conference winning percentages to measure competitive balance. Bennett and Fizel use the ratio of the actual standard deviation of winning percentage to the idealized standard deviation for each conference, as well as summary statistics for the top and bottom two teams in each conference in each year to capture the effects of turnover in relative standings. They conclude that there was an increase in competitive balance in conferences after 1984. Eckard proposed decomposing the variance of conference winning percentages into a time component and a cumulative component. He also calculated Hirfindahl-Hirschman Indexes (HHIs) of bowl game appearances, top 20 poll finishes, and conference championships. Eckard also concluded that competitive balance increased after 1984 within Division I-A conferences.

### **Within-conference and division-wide competitive balance**

The third contested issue centers on the possibility of a differential impact of telecast deregulation on games played within a conferences and those played outside conferences. Colleges belonging to a football conference must play a predetermined number of games against other conference members in an alternating, or “home-and-home,” arrangement each year. These conference games typically make up a majority of the 11 football games that NCAA regulations allow each team to play in a season and the team’s records in these games determine the conference champion. Teams also play a smaller number of non-conference games each year. These games are arranged by contracts between individual teams and may be scheduled years in advance. In general, the opponents and location of conference games are outside the control of an individual institution while the opponents and location of non-conference games are under the control of the institutions.

Carroll (1991) found evidence that competitive balance increased after telecast deregulation in that the overall winning percentage of teams ranked in the top 20 in post-season football polls had lower mean overall winning percentages after 1984 and unranked football teams had higher mean overall winning percentages. Eckard (1998) and Bennett and Fizel (1995) argue that conference winning percentages better reflect the effect of telecast deregulation on competitive balance than non-conference or overall winning percentages. They posit that television networks affected the

non-conference schedules of some teams in the post-regulation period by requesting more games between high-profile “football powers” in order to increase the potential television market for games.

Measuring competitive balance using only conference games is problematic for several reasons. First, conference affiliation played no role in the Board of Regents case decision. The Supreme Court ruling applied to all college football games, not just conference games, and the conference affiliation of teams was never mentioned as an important issue. Why then should the impact of this decision be judged only by its impact on conference games? Further, if non-conference schedules changed in response to the decision, then those changes are, by definition, part of the impact of the decision. Any analysis that ignores these games misses some part of the impact of the decision.

Second, over the period 1977-1991, between 20% and 25% of all Division I-A football teams did not belong to a football conference in any given season. Focusing on only conference games ignores over 20% of the Division I-A college football games played during this period, a sizable portion of the sample.

The quantitative analysis of competitive balance literature has focused exclusively on end-of-season winning percentages or winning percentages over longer periods of time. However, the outcome of individual games can also reveal important information about how competitive any game was, and thus shed light on the level of competitive balance. At the level of an individual game, the final margin of victory, the difference between the number of points scored by the winning team and the number of points scored by the losing team, is one possible measure of the competitiveness of a game. The smaller the final margin of victory, the more competitive the contest, other things equal.

One way to test for an impact of telecast deregulation on competitive balance in Division I-A college football is to examine the distribution of the final margin of victory in games before and after the 1984 Supreme Court decision. If this decision had no impact on the competitiveness of individual games, then the average margin of victory in games in the period before the decision should be the same as the average margin of victory in games in the period following the decision. If the NCAA’s defense of its telecast regulations was well founded, then the average margin of victory should increase following the decision. Formally, we test the null hypothesis

$$H_o : AMV_{77-83} = AMV_{95-91}$$

against the alternative

$$H_a : AMV_{77-83} < AMV_{95-91}$$

where AMV is the average margin of victory in all Division I-A college football games.

Table 4: t-Tests on Average Margin of Victory

Null Hypothesis: Average Margin of Victory '77-'83 = Average Margin of Victory '85-'91			
Type of Game	P-value	$N_{'77-'83}$	$N_{'85-'90}$
All Games	.017	4094	3841
All Non-conference Games	.005	1440	1296
All Conference Games	.906	1976	1945

Table 4 shows the results of the hypothesis tests. The “All Games” category includes games between Division I-A and I-AA teams, but the other two categories include only games between teams that were in Division I-A each season in the sample period. Clearly, the margin of victory in college football games was larger after the 1984 Supreme Court decision. The average margin of victory was about 0.63 points larger in the post-1984 period. To the extent that closer games are more competitive, the results on Table 4 suggest that the decision reduced competitive balance in college football. The results from two-tailed hypothesis tests ( $H_a : AMV_{'77-'83} \neq AMV_{'85-'91}$ ) were similar.

However, the second two rows of Table 4 show that, as Eckard (1998) and Bennett and Fizek (1995) suggested, the impact of the decision was different for conference games and non-conference games, although not in the direction they predicted. There was no difference in average margin of victory in conference games, but non-conference games were less competitive on average in the period following the 1984 decision. It is difficult to rationalize this difference as due to the influence of television networks on non-conference schedules, because more competitive games should draw larger television audiences, other things equal, implying that television networks would prefer to televise more competitive games. One possible exception to this is the effect of the reputation of “big name” or well known teams on TV audience size regardless of the expected competitiveness of games.

The increase in average margin of victory overall suggests that there was some basis for the NCAA’s defense of its telecast regulations. As one indicator of competitive balance, this result does not support the prediction of imperfect agency behavior.

Competitive balance can also be analyzed using overall winning percentages for teams over a number of seasons. The most commonly used test of competitive balance using data by team and season was first proposed by Noll (1988) and applied to the case of Major League Baseball by Scully (1989). This measure of competitive balance is the standard deviation of the won-loss percentage of the teams in a sports league or conference over some number of seasons. Define  $WPCT_{it}$  as the

winning percentage of team  $i$  in season  $t$ .  $WPCT_{it}$  is the number of wins for team  $i$  in season  $t$  divided by the number of games played in season  $t$  by team  $i$ . This measure of competitive balance for a league or conference composed of  $i = 1, 2, \dots, N$  teams over  $t = 1, 2, \dots, T$  seasons is

$$NS = \sqrt{\frac{\sum_N \sum_T (WPCT_{it} - 0.500)^2}{NT}}. \quad (10)$$

This measure of competitive balance also has an ideal value that depends on the number of games played by teams in a sports league. The idealized value of this measure of competitive balance,  $NS_I$ , is the standard deviation of winning percentages if all teams were of equal playing strength. The larger the difference between  $NS$  and  $NS_I$ , the less the degree of competitive balance over the period.  $NS_I$  is 0.15 for teams with 11 game schedules, which is the approximate average number of games played by Division I-A college football teams over the sample period.

There are 1,580 team-seasons in our sample of Division I-A college football teams over the period 1977-1991. 1,213 of these team-seasons consist of teams in conferences and 367 consist independent teams. The overall competitive balance statistic for the sample is 0.23, well above the ideal value of 0.15. Table 5 shows the competitive balance statistics for the entire sample as well as for the eight Division I-A football conferences that existed throughout the entire sample period, broken down into the pre- and post-Supreme Court decision periods. The equality of the standard deviation of winning percentages across these two periods can be tested using a variance ratio test which has an F-distribution. The P-value column on Table 5 is on the hypothesis test

$$H_o : \quad NS_{77-83} = NS_{85-91}$$

$$H_a : \quad NS_{77-83} \neq NS_{85-91}$$

based on a standard variance ratio test.

The results on Table 5 show no difference in competitive balance, as measured by the standard deviation of the winning percentage, before and after the 1984 decision, as the P-values suggest that the null hypothesis is accepted in all cases. The results of one-tailed tests ( $H_a : NS_{77-83} > NS_{85-91}$  or  $H_a : NS_{77-83} < NS_{85-91}$ ) are identical. The results are the same using either conference winning percentages or overall winning percentages. Note that the standard deviations for conference winning percentages cannot generally be compared across conferences because  $NS_I$  depends on the number of conference games and each conference does not play the same number of games.

Recall that  $NS$  does not reflect changes in relative standings over time. This means that  $NS$  for a conference where the same team finished first in each year and  $NS$  for a conference where

Table 5: Standard Deviations of Winning Percentage

$$H_o : NS_{77-83} = NS_{85-91}$$

Group	Total Winning Percentage			Conference Winning Percentage		
	$NS_{77-83}$	$NS_{85-91}$	P-Value	$NS_{77-83}$	$NS_{85-91}$	P-Value
All D I-A Teams	.237	.238	.86	-	-	-
D I-A Conf.Teams	.235	.243	.47	.275	.277	.80
ACC	.217	.247	.35	.269	.308	.33
Big 10	.232	.251	.52	.271	.281	.76
Big 8	.289	.224	.22	.314	.218	.41
MAC	.228	.240	.67	.245	.259	.65
Pacific 10	.207	.235	.28	.228	.235	.80
Southeastern	.225	.244	.28	.292	.313	.55
Southwest	.233	.269	.48	.293	.278	.70
WAC	.236	.243	.83	.273	.262	.75

a different team finished first in each year could be identical. If the 1984 Supreme Court decision affected only the relative standings in each year, then this metric might not reflect this type of change.

Humphreys (2002) proposed an alternative measure of competitive balance, the Competitive Balance Ratio (*CBR*) that can detect changes in relative standings. The *CBR* scales the standard deviation of the winning percentage, which is essentially a measure of within-league variation in winning percentage, by a team-specific measure of variation in winning percentage. The *CBR* expresses team-specific variation as a fraction of league-specific variation in winning percentage, so this statistic varies between zero and one.

Table 6 shows Competitive Balance Ratios for all Division I teams and the eight Division I-A football conferences in the sample. This table also shows the P-value on a hypothesis test with a null hypothesis that the team-specific variation in winning percentage, the numerator of the *CBR*, is the same in the seven year periods before and after the Supreme Court decision. From Table 6, the denominators of the *CBRs* for each conference are the same.

The results on Table 6 suggest that competitive balance was essentially unchanged across Division I, as shown in line 1. Competitive balance changed within some conferences after 1984 but

Table 6: Competitive Balance Ratios

Group	$CBR_{77-83}$	$CBR_{85-91}$	P-Value
All D-I Teams	.72	.73	.86
Conference			
ACC	.59	.79	.16
Big 10	.63	.59	.35
Big 8	.51	.49	.34
MAC	.73	.83	.16
Pacific 10	.50	.77	.00
Southeastern	.74	.69	.10
Southwest	.62	.67	.17
WAC	.60	.67	.14

the direction of the change differs across conferences. A rise (fall) in the CBR indicates more (less) turnover in relative standings, and thus more (less) competitive balance within a conference. The CBR rose in five conferences and fell in three conferences. One rise (Pacific 10) and one fall (Southeastern) is significant at the 10% level, although the remaining three increases in the CBR (ACC, MAC, Southwest, and WAC) are nearly significant. Thus the changes in the Competitive Balance Ratios in Table 6 suggest that competitive balance in the Southeastern conference was reduced after 1984 and competitive balance increased in the Pacific 10, ACC, MAC, Southwest and WAC. The differential impact on competitive balance may be due to differences in revenue sharing procedures across conferences. These differences have been documented and analyzed by Brown (1994).

Overall, the evidence on the impact of the Supreme Court decision on competitive balance in college football is mixed. Based on evidence from the outcome of individual games, the decision appears to have reduced competitive balance, as the average margin of victory in some games increased significantly in the period after the decision. This result supports the NCAA position of defense in the case and does not support imperfect agent behavior. Based on evidence from final winning percentages, competitive balance improved within some conferences and worsened in others, although there is no evidence that the overall level of competitive balance changed across all teams in Division I-A. The overall outcome based on winning percentage provides some support for the prediction of imperfect agent behavior.



## Attendance

The relationship between telecasts and attendance was debated extensively in the NCAA v. Board of Regents of University of Oklahoma case. The NCAA argued that its regulation of football telecasts was needed to protect the existing market for attendance at football games. The courts rejected this idea, finding no evidence to support it. Understanding the impact of the Supreme Court decision on attendance at football games is important in any analysis of the impact of the decision.

Two previous studies examined the relationship between attendance and television broadcasts of college football before and after 1984. Kaempfer and Pacey (1986) found that telecasts and attendance at games were complements, implying that attendance should increase as a result of the increase in own-game telecasts. Fizel and Bennett (1989) found that although own-game broadcasts and attendance were complements, the overall increase in football telecasts after 1984 led to a decline in attendance after controlling for increases in own-game telecasts.

The basic approach in the literature has been to estimate an aggregate demand function for attendance at college football games. As Kaempfer and Pacey (1986) point out, these aggregate demand functions are additive functions of individual's demand functions for a given market, and thus can be derived from the basic constrained utility maximization problem from consumer theory. As with any empirically viable demand function, the explanatory variables capture the effect of prices, the number of potential consumers, factors that affect the utility associated with attending games, and substitute and complementary activities. The general form of the demand function we use is

$$ATT_{i,t} = \alpha Z_i + \beta X_{it} + \phi C_t + u_{it} \quad (11)$$

where  $ATT_{i,t}$  is total attendance at college football games at institution  $i$  in season  $t$ ,  $Z_i$  is a vector of variables reflecting those factors that affect demand for tickets to college football games at institution  $i$  that do not change over the sample period,  $X$  is a vector of variables reflecting factors that affect demand for tickets to college football games at institution  $i$  that also vary over the  $t$  seasons in the sample,  $C_t$  is a vector of factors that affect demand for tickets to college football games in general and  $\alpha$ ,  $\beta$ , and  $\phi$  are vectors of unknown parameters to be estimated.  $u_{it}$  is an independent and identically distributed random error term with mean zero and constant variance that is assumed to be uncorrelated with the other right hand side variables and captures the effects of other omitted factors on demand for college football attendance. Table 7 describes the variables included in the demand function.

Note that we do not include a ticket price variable in the demand function. Our reasons for this

omission are discussed below. Instead, we use implicit variables to capture the effect of ticket prices on demand. These implicit variables are an institution-specific intercept and an institution-specific time trend. We also include the Entertainment component of the Consumer Price Index relative to the total CPI in the empirical demand function. This variable should capture general changes in the price of leisure activities over the sample.

Table 7: Variables in Demand Function

Variable	Description	Mean	Standard Deviation
$W_{i,t-1}$	Total wins by team $i$ in season $t - 1$	5.5	2.6
$ENR_{i,t}$	Headcount enrollment at institution $i$ in year $t$	19.4	11.2
$CAP_{i,t}$	Stadium capacity at institution $i$ in fall of year $t$	44359	22318
$HG_{i,t}$	Number of home games played by team $i$ in season $t$	5.6	0.95
$NTV_{i,t}$	National TV appearances by team $i$ in season $t$	.70	1.3
$RTV_{i,t}$	Regional TV appearances by team $i$ in season $t$	.87	1.2
$P_t$	Entertainment component of CPI relative to total CPI	101.8	6.7

There are three problems with including an own-price variable in the demand function. First, no comprehensive source of ticket prices by team for our sample period exists. Kaempfer and Pacey (1986) collected average price data for a football ticket for 72 Division I-A and I-AA teams over the period 1978-1981; Fizel and Bennett (1989) collected average price data for a football ticket for 93 Division I-A teams for 1980-1985; Carroll (1991) collected average price data for a football ticket for 30 Division I-A teams for 1979-1990. However, these studies did not include the same subset of teams.

Second, a single average ticket price to a college football game for a given school may be difficult to measure correctly, and may not reflect the actual cost of attending a game. Athletic departments have some market power and price discriminate. They charge different prices to many different groups of consumers. Students typically pay an athletic fee that covers admission to football and basketball games whether or not the student attends. Prime seats, and in some cases nearly all seats in a stadium, can often only be purchased after a large donation to the athletic department or an associated athletic booster's club, and most of these can only be purchased as part of a season ticket package. Local businesses who donate to the athletic department may be given tickets to distribute to customers. The visiting team is typically provided with several thousand tickets to each game to sell. And seats in the end zone or far reaches of the stadium often have a different price than seats in other locations. All these factors make the construction of an appropriate "average" ticket price a difficult proposition.

Finally, there appears to be a relationship between the ticket price variable and stadium capacity in the existing literature. Both Kaempfer and Pacey (1986) and Fizel and Bennett (1989) have to interact their price variables with a percent of capacity variable to get the point estimate of the coefficient on price to have the predicted sign. These transformations suggest that the price variable may not be measured well.

The empirical demand function also includes conference dummy variables and an overall time trend common to all schools in the sample. The results of estimating Equation 11 are shown on Table 8. The parameters on the conference dummies, school dummies, and school-specific time trends are not shown. Almost all were statistically significant.

Table 8: OLS Estimates of Attendance Demand Function

$$ATT_{i,t} = \alpha Z_i + \beta X_{it} + \phi C_t + u_{it}$$

Variable	Overall	Power	Non-Power
$HG_{i,t}$	29969*	51195*	24680*
	(1166)	(2918)	(1220)
$P_t$	-.797*	-1.005	-.861*
	(0.259)	(0.684)	(0.267)
$W_{i,t-1}$	2106*	3120*	1742*
	(396)	(1162)	(405)
$ENR_{i,t}$	2662*	295	3195*
	(913)	(2513)	(935)
Post-1984	-3076	-208	-3476
	(2850)	(7695)	(2935)
$CAP_{i,t}$	.714*	2.39*	.710*
	(0.188)	(0.905)	(0.181)
Trend	9832*	2869	9986*
	(2673)	(3557)	(2508)
$NTV_{i,t}$	3746*	1018	5504*
	(969)	(1687)	(1206)
$RTV_{i,t}$	1741**	1540	2113**
	(835)	(1839)	(911)
$N$	1622	288	1334
$R^2$	0.61	0.42	0.42

Standard Errors in Parentheses

\*: Significant at 1% level

\*\* : Significant at 5% level

The results on Table 8 are in general correctly signed and plausible. The first column is for the entire sample. Home games, wins in the previous season, and headcount enrollment all raise attendance. Television appearances also raise attendance at games, suggesting that telecasts and attendance are complements, and not substitutes as the NCAA argued. This implies that the NCAA's regulation of telecasts was reducing attendance at games and also revenues earned by college football programs. The parameter on the price of entertainment variable is negative and significant, suggesting that as the price of entertainment rose relative to the CPI, consumers purchased less entertainment, including tickets to college football games. The parameter on the post-1984 dummy variable is negative but it is not statistically significant. The overall increase in the number of college football broadcasts in the post-decision period did not appear to affect attendance.

Many previous studies have split the sample of institutions when analyzing the impact of the 1984 Supreme Court decision on attendance, because the decision may have had a differential impact on schools. The two rightmost rows on Table 8 split the sample into "Power" schools and "Non-Power" schools. Past studies have split the sample by arbitrary groups of conferences and non-conference schools. We split the sample by the number of national telecasts in the pre-1984 period. Our group of power teams were the roughly 20 teams that appeared on national television four or more times from 1978-1983. However, splitting the sample by conference groups, or including teams with three or more national television appearances, had no impact on the results.

There are significant differences in the estimates from the two subsamples, but the important point is that the post-1984 dummy variable is not significant for either. The p-value on this parameter for the "Non-Power" schools is about .2, so there is some weak evidence that attendance was lower at these schools after 1984. The key differences are that the relative price of leisure, television appearances, and headcount enrollment have no effect on attendance at the "Power" schools. These colleges, listed in the appendix, have national reputations and draw customers to their games from outside their students and alumni, to the extent that the enrollment variable also reflects relative differences in the number of alumni. The increase in attendance from each home game is also much larger for these teams, as is the effect of stadium size.

## Revenues

The behavioral model developed above posits revenues as an important argument in the utility functions of both member institutions and the NCAA central organization. An examination of changes in revenues earned by Division I football programs before and after the 1984 Supreme Court decision can also shed some light on the nature of this regulatory change. Unfortunately, very little school-specific data on revenues by athletic program exist for the period 1978-1990,

precluding an econometric analysis of changes in revenues like the proceeding analysis of changes in telecasts, attendance and winning percentages. Some aggregated data on revenues generated by specific athletic programs are available for the sample period. The most prominent source of data on intercollegiate athletic revenues for the 1970s and 1980s is the report by Raiborn (1990), who surveyed the financial condition of athletic programs at a large number of colleges and universities. This study does not report school-specific data, but contains some data on revenues aggregated to the division level from the 1980s. Unfortunately, the aggregation scheme used in the 1970s does not correspond to that used in the 1980s and beyond, making a comparison of revenue data across these decades difficult.

If the 1984 Supreme Court decision on telecast deregulation reduced revenues earned by Division I schools, then the cartel model would be supported as theory clearly predicts lower revenues after the breakup of a cartel. However, little change or an increase in revenues in the period after 1984 would indicate that some other model of economic behavior might apply to the relationship between the NCAA and its member institutions.

Table 9: Revenues of Division I Football Programs

	1981	1985	1989
Average Football Revenues	\$ 3,169,000	\$ 3,735,000	\$ 3,776,000
% Change from previous period		18%	1%
Largest Reported Value	\$ 7,875,000	\$ 10,700,000	\$ 14,931,000
% Change from previous period		36%	21 %

Revenues in real 1985 dollars.

Table 9 summarizes the data on revenues earned by Division I football programs in Raiborn (1990). The nominal revenue data reported in this survey were converted to 1985 dollars using the Consumer Price Index. From Table 9, average revenues rose considerably from 1981 to 1985 in inflated adjusted terms but the increase from 1985 to 1989 was not so large. The largest reported revenue in Raiborn's sample also shows a similar pattern. Because the deregulation occurred between 1981 and 1985, the observed changes in revenue from 1981 to 1985 can only be partially attributed to the regulatory change. We do not have adequate revenue data to investigate a cleaner split in the change in revenues before and after the Supreme Court decision. The post-regulatory increase in aggregate revenues suggests, however, that overall, member colleges and universities were better off following the decision. This could be interpreted as an indication of imperfect agency behavior by the NCAA central organization prior to the decision.

## 4 Conclusions

The principal-agent model of the relationship between member teams and the NCAA central organization provides an alternative and complement to the cartel model as a rationale for the regulatory activities of the NCAA. In general, our model and empirical results are not inconsistent with the cartel model of the NCAA. Imperfect agency behavior could serve to exacerbate the impact of an effective cartel. As an imperfect agent, the NCAA central organization would result in over-regulation relative to a cartel outcome that would be optimal for the team principals. The implication of this model is that the NCAA was able to divert benefits from the member team principals to the NCAA central organization to promote its own interests, such as power and authority.

Our empirical analysis of the 1984 Supreme Court decision that deregulated intercollegiate football telecasts by reassigning property rights to this activity from the NCAA to the individual teams generally supports the prediction of imperfect agency behavior by the NCAA. The position of the NCAA in that suit was that its regulation of football telecasts was in the interest of the member teams by protecting live game attendance and competitive balance through limiting the total number of games that could be telecast and the number of appearances of any particular team.

Despite data limitations that require the use of aggregated attendance figures, our analysis of attendance before and after the Supreme Court decision indicates no significant effect of NCAA telecast regulations on live game attendance. Attendance did not decline following the removal of these regulations, supporting the prediction of imperfect agency behavior by the NCAA from our model. Our findings on competitive balance before and after the supreme court decision depend on the metric employed. The increase in average margin of victory in the post-decision period indicates a decrease in competitive balance and does not support imperfect agency behavior by the NCAA. But changes in winning percentage, and in measures of competitive balance related to winning percentage, shows no change in competitive balance and supports the prediction of imperfect agency behavior.

The analysis of television appearances by member institutions also provides support for the prediction of imperfect agency behavior. The total number of television appearances made by member institutions increased after the Supreme Court decision, indicating that the decision reduced the cartel power of the NCAA. However, the characteristics of the individual teams whose games were likely to be televised, and the distribution of the telecasts across member institutions, also changed after 1984. Both of these changes support the prediction of imperfect agency behavior. Indeed, the characteristics of teams appearing on television under NCAA regulation indicates a system of packaging broadcasts that was revenue enhancing for the NCAA central organization. Overall, our

empirical findings support the idea that the NCAA's regulation of football telecasts reflect both cartel behavior and imperfect agency behavior by the NCAA central organization.

## Appendix: “Power” Schools

Alabama

Arkansas

Army

Florida

Florida St.

Georgia

Georgia Tech

Miami

Michigan

Navy

Nebraska

Notre Dame

Ohio St.

Oklahoma

Penn St.

Pittsburgh

San Diego St.

Southern California

Stanford

Texas

Texas A&M

Tulane

UCLA

Washington



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## Notes

<sup>1</sup>We understand that the inherent nature of an athletic event as a joint product of competitors requires some minimal structure to ensure a viable product, such as ensuring availability of competitors for any one team. By “NCAA structure” here we mean rules and regulations beyond this minimally required level.

<sup>2</sup>The National Association of Intercollegiate Athletics (NAIA) performs functions similar to those of the NCAA. However, the NAIA primarily deals with small schools which are not involved in major intercollegiate athletic events such as those in NCAA affiliated schools.

<sup>3</sup>We understand that, as with any organization, the NCAA central organization is a collection of individuals whose role is to design, implement, and enforce the regulations as put forth by the organization as a whole. The behavior which we attribute here to the central organization reflects the likely administrative behavior of the individual(s) who are in authority at the NCAA and who are responsible for the decision to go forward with any particular regulatory design or implementation and enforcement procedure.

<sup>4</sup><http://www.cae.wisc.edu/~dwilson//rsfc/history/howell/>