Corruption on the Court: The Causes and Social Consequences of Point-Shaving in NCAA Basketball

YANG-MING CHANG, SHANE SANDERS*

Kansas State University; Nicholls State University

This paper is concerned with the economic incentives of crime among agents within a private organization. Specifically, we present a contest model of a college basketball game to identify the winners, losers, and social welfare consequences of point-shaving corruption in men's NCAA basketball as an example of participation in illicit activities. It is shown that, under reasonable conditions, such activities lower the level of social welfare derived from college basketball play by reducing aggregate efforts in a game and distorting relative efforts across teams. We then examine the economic incentives of a player to point-shave and discuss player-types that are at a relatively high risk of engaging in point-shaving corruption. Private and public mechanisms to minimize corruption are compared in terms of efficiency, and a differential "honesty premium" is derived and discussed as an efficient way for the NCAA to decrease the incidence of player corruption.

1. INTRODUCTION

This paper is concerned with the economic incentives of crime among agents within a private organization. With high-profile cases such as Enron and WorldCom in recent years, corruption among private sector employees has gained much media attention as a potentially high-stakes crime whose victim is often the "outside" investor. In the present study, we address the causes and social welfare effects of point-shaving corruption in NCAA basketball as an example of corruption among agents within a private organization. Further, we

---

* We would like to thank an anonymous referee, Bhavneet Walia, Charles Hegji, and Evan Moore for comments and suggestions. All errors are our own. Yang-Ming Chang: Department of Economics, Kansas State University, 327 Waters Hall, Manhattan, KS 66506-4001, ymchang@ksu.edu, (785) 532-4573. Shane Sanders: Assistant Professor, Department of Finance and Economics, Nicholls State University, P.O. Box 2045, Thibodaux, LA 70310, shane.sanders@nicholls.edu, (985) 448-4242.

compare the efficiency of private and public mechanisms to minimize such corruption. Point-shaving is a subtle form of match-fixing that occurs regularly in major men's NCAA sporting events. A point-shaving scheme typically involves a sports gambler and one or more players of the favored team for a given corrupted match.[1] In exchange for a bribe, a corrupted player agrees to adjust his match effort such that his team is unlikely to "cover the point spread" or win by at least the publicly expected margin. The gambler then wagers against such an eventuality with the advantage of (orchestrated) inside information. Point-shaving is a subtle form of corruption in the sense that it does not typically alter the outcome of a match but merely "shaves" a small number of points from the favored team's (true) expected margin of victory.

In a point-shaving scheme, a gambler generally induces a player's cooperation by offering him an outcome contingent bribe (Wolfers, 2006).[2] Should the player's team win by less than the spread, he will receive an agreed upon amount of money. However, the player will receive no money in the event that his team covers the spread. There have been many cases of point-shaving in NCAA Division I Men's Basketball. City College of New York (1951), Boston College (1978-1979), Tulane (1985), Arizona State (1994), and Northwestern (1995) are all notable examples in which players were implicated, if not convicted, on charges such as sports bribery and racketeering. However, illegality does not necessarily imply economic inefficiency. Leff (1964) and Huntington (1968) suggest that corruption might *improve* economic welfare by (i) allowing entrepreneurs to avoid excessive bureaucratic red tape and (ii) causing government officials to work harder in order to maintain their job. However, subsequent studies on the subject, such as Shleifer and Vishny (1993), generally find that corruption is costly to economic welfare. Mauro (1995) concludes that corruption lowers economic growth by lowering the level of investment in a country.

In this study, we first construct a contest model of a college basketball game to identify the winners, losers, and overall social welfare consequences of point-shaving activities in men's college basketball. The model shows that point-shaving activities by members of the favored team both decrease aggregate effort and distort relative effort across teams. As in Amegashie and Kutsoati's (2005) analysis of boxing matches, a decrease in aggregate effort in a

[1] Wolfers (2006) states that point-shaving usually occurs between gamblers and members of the *favored* team because players generally compete with a great deal of intensity. Thus, it is much easier to adjust efforts downward.

[2] Gamblers can contract with coaches to point-shave as well. However, gambler-player point-shaving is by far the most documented form. As the present value of a coach's expected lifetime basketball salary is much higher than that of the *typical* college player, it may not often be optimal for a coach to risk job dismissal by point-shaving.

current college basketball game is expected to shift inward the demand curve for subsequent NCAA Men's Basketball matches. Further, we argue that distortions of relative effort across teams away from the expectation of fans will have a similar effect. Thus, it is shown that, under reasonable conditions, point-shaving lowers the level of social welfare generated by college basketball. This is a notable result, as there are no prior explorations concerning the welfare consequences of corruption in sport.

In a novel study, Wolfers (2006) provides empirical evidence for the presence and extent of point-shaving in NCAA Division I Men's Basketball. By treating the spread margin as a forecast and studying forecasting errors over a large sample of games, the author finds that "'too few' strong favorites beat the spread." In other words, the distribution of game outcomes dips below the expected normal distribution at margins slightly above the spread. Based on this distributional departure, the author estimates that six percent of matches featuring a strongly favored team (i.e., one favored to win by at least twelve points) are corrupted by the presence of point-shaving activities. There are more direct routes to ascertain the presence, if not the extent, of point-shaving in college basketball. As alluded to previously, an examination of college basketball's history will reveal several point-shaving apprehensions since 1951. Table 1 presents a list of well-documented college basketball point-shaving scandals.

As many cases of point-shaving are presumably never apprehended, an examination of Table 1 gives us only a lower bound as to the *extent* of point-shaving activity in college basketball. In 2003, the NCAA conducted a survey of sports wagering behavior that included 20,739 randomly-sampled member student athletes. Of all Division I men's basketball players polled, 0.5 percent reported playing poorly in exchange for a monetary bribe, 1.0 percent reported playing poorly in exchange for gambling debt forgiveness, and 4.4 percent claimed direct knowledge of point-shaving activities.[3] The NCAA responded to the 2003 survey in the following position statement:

[3] It is important to note that, even in an anonymous survey, student athletes involved in point-shaving have an incentive to underreport these offenses. Such players might expect accurate responses to lead to stricter player monitoring in future seasons.

http://www.bepress.com/rle/vol5/iss1/art12
DOI: 10.2202/1555-5879.1244

Table 1: Documented College Basketball Point-Shaving Scandals

Year exposed	*Team(s) implicated*	*Individual(s) implicated*	*Description and aftermath*
1951	*City College of NY Long Island Univ. New York Univ. Manhattan Coll. Bradley Univ. Univ. of Kentucky Univ. of Toledo*	*32 players 6 "fixers" 3 gamblers*	*Evidence of point-shaving in at least 86 college basketball games from 1947 to 1950. Several convictions on charges related to conspiracy to commit sports bribery.*
1961	*22 teams*	*37 players*	*Evidence of point-shaving plots in at least 43 games between 1957 and 1961. Three gamblers convicted on charges related to conspiracy to commit sports bribery.*
1979	*Boston College*	*3 players*	*Evidence of point-shaving plots in at least nine games in this mob-related scandal. One player convicted on charges related to conspiracy to commit sports bribery and interstate gambling.*
1985	*Tulane University*	*5 players*	*Evidence of point-shaving plots in at least three games. Players were bribed with cash and cocaine. Three of the five players charged with offenses related to conspiracy to commit sports bribery, while the other two testified against them in exchange for immunity. No players served jail time. However, the university suspended its basketball program until 1989.*
1997	*Arizona State University*	*2 players; At least one gambler*	*Evidence of point-shaving plots in at least four Arizona State basketball games in 1994. Fifteen of 22 campus fraternities participated in the illegal gambling ring. Both players pled guilty to charges of conspiracy to commit sports bribery*
1998	*Northwestern University*	*2 players; 2 gamblers*	*Evidence of successful point-shaving plots in at least two games in 1995. Players convicted on charges of conspiracy to commit sports bribery.*

Sources: NCAA (2008); Heston and Bernhardt (2006); Merron (2007); Goldstein (2003)

> "Sports wagering has become a serious problem that threatens the well-being of the student-athlete and the integrity of college sports…Student-athletes are viewed by organized crime and organized gambling as easy marks. When student-athletes become indebted to bookies and can't pay off their debts, alternative methods of payment are introduced that threaten the well-being of the student-athlete or undermine an athletic contest- such as point-shaving."

Thus, the NCAA views point-shaving as both a detriment and threat to the integrity, and thus popularity, of collegiate athletics.

Wolfers provides a general explanation for the presence of point-shaving in college basketball: "The key incentive driving point-shaving is that bet pay-offs are discontinuous at a point – the spread – that is (or should be) essentially irrelevant to the players." That is to say, a player is essentially indifferent between his team winning by seven points or by eight points. A spread bettor, on the other hand, might care immensely about such a distinction. Thus, it is asymmetric incentives between gamblers and players that create mutually gainful opportunities for corruption in college basketball. However, if all matches featuring a strongly favored team present an opportunity for mutually gainful contracting between players and gamblers, why is corruption of such matches not found to be more pervasive? To answer this question, one must note that the player's decision to accept a bribe is far from costless in expectation. In our analysis, we consider a risk-neutral, expected payoff maximizing collegiate basketball player (see Section 3). Much like Becker and Stigler's (1974) potentially malfeasant cop, each (amoral) player compares the present value of honest work to that of corruption at the beginning of each "decision period" in his collegiate playing career. Thus, we are able to adapt Becker and Stigler's analysis to the unique expected payoff structure of an apprenticing workforce that is highly heterogeneous and find conditions under which an individual from this workforce will engage in corruption.

Wolfers explains that a shortfall of the economic approach to studying corruption is its inability to identify specific violators. While certainly true, our theoretical analysis is able to identify player "types" within men's NCAA basketball that are more corruptible (i.e., more likely to engage in point-shaving activities). Further, given that point-shaving creates considerable social costs and little in the way of social benefit, we derive a player payment mechanism that would, in the presence of complete player information, eliminate player incentives to point-shave. Previous authors have attributed amateur pay levels as a major cause of point-shaving in college basketball. Dick DeVenzio, a former point-guard at Duke University, writes, "Poor kids, stolen from and

DOI: 10.2202/1555-5879.1244

cheated by those who purport to be their educators, are especially prime candidates for point-shaving…certainly it is true that having some money and being grateful for it and for personal good fortune would eliminate a great deal of potential temptation" (1985:189). Further, Wendel (2005) argues that paying the players at a level closer to their marginal revenue product would "make them less prone to take money (from other sources)." While our model takes the present value of collegiate player "pay" (i.e., tuition, room, board, benefits from notoriety, opportunity to play college-style basketball, and other benefits of team membership) as exogenous, we do consider a payment mechanism that provides strong incentives for honest collegiate play. The resulting policy suggestion adapts Becker and Stigler's findings to the unique case of the apprenticing basketball player and lends support to a private mechanism by which to minimize point-shaving corruption.

The remainder of the paper is organized as follows. In Section 2, we present a contest model of a sports game to identify the winners, losers, and overall social welfare consequences of point-shaving activities in men's college basketball. In Section 3, we analyze the conditions under which a player chooses to point-shave and discuss possible player-types that are more likely to violate the NCAA rules. We then present an alternative player payment mechanism that would introduce strong honesty incentives to the college basketball player. Implications of this policy are discussed. Section 4 concludes.

2. POINT-SHAVING: WINNERS, LOSERS, AND NET EFFECT ON SOCIAL WELFARE

2.1. A MERITORIOUS CONTEST – THE BENCHMARK CASE

To understand the welfare consequences of point-shaving, we consider a meritorious (i.e., uncorrupted) basketball game. As in Szymanski (2003, 2004) and Szymanski and Késenne (2004), we use a "contest" approach and the Nash equilibrium solution concept to characterize the expected outcome of sports competition. The likelihoods of victory (g_i) for two teams $(i = 1, 2)$ in a match are given by the following contest success functions (CSFs): [4]

[4] Szymanski and Késenne (2004) and Szymanski (2004) are among the first to incorporate CSFs into the economic analysis of sports. Skaperdas (1996) presents axiomatic characterizations of various forms of CSFs. The additive form CSF has been widely employed to examine various issues, such as rent-seeking and lobbying, tournaments and labor contracts, political conflict, war and peace, and sibling rivalry. See, e.g., Tullock (1980), Lazear and Rosen (1981), Hillman and Riley (1989), Hirshleifer (1989), Grossman (2004), Chang and Weisman (2005), Garfinkel and Skaperdas (2000, 2007), and Chang, Potter, and Sanders (2007a, 2007b), and Chang and Sanders (2009a, 2009b).

(1) $$g_1 = \frac{e_1}{e_1 + e_2} \text{ and } g_2 = \frac{e_2}{e_1 + e_2},$$

where e_i is effort by Team i. We assume that Team 1 is strongly favored over Team 2 in the match. Within the model, this hierarchy is represented in the supposition that Team 1 enjoys a lower unit cost of productive efforts on the basketball court, where a team's unit cost of effort is primarily a function of player talent, coaching talent, recent travel demands, and recent schedule demands. Let players on Team 1 collectively maximize the following expected payoff function:

(2) $$\pi_1 = g_1 V - e_1,$$

and players on Team 2 collectively maximize the following expected payoff function:

(3) $$\pi_2 = g_2 V - \sigma e_2,$$

where $\sigma(>1)$ represents the unit cost of arming for Team 2 and V is the value of winning the game (to a team of players).

We assume that a regularly-playing, Division I college basketball player, who is not directly remunerated based on fan interest, cares primarily about exposure to talent evaluators (i.e., professional scouts), competitive experience when participating in a game, and derivation of personal satisfaction from (good) play. This last factor might derive from "love of the game" or competitive drive amongst a team of players.[5] Thus, players on a team exert units of effort to accumulate a sufficient number of wins to (i) enter the post-season, (ii) be considered successful by professional scouts, and (iii) fulfill ambitions deriving from competitive drive or "love of game" considerations. It is assumed, therefore, that each team values a win in a contest by the amount V for these reasons and associates no economic value with a loss. As stated

---

Konrad (2007) presents a systematic review of applications in economics and other fields that use CSFs similar to those in equation (1).

[5] We thank an anonymous referee for pointing out "love of game" as a source of player motivation. The referee reminds us that Michael Jordan had a "Love of Game Clause" in his contract that enabled him to play pick-up basketball. Within the model, "love of game" would serve to increase the variable V. In other words, this factor is expected to render a team of players more likely to play hard, honest basketball, *ceteris paribus*, as opposed to purposefully poor basketball. However, "love of game" would not assure such behavior, as the player considers several factors.

DOI: 10.2202/1555-5879.1244

above, V is not a function of fan interest in subsequent college basketball games but is more a parameter based on the (exogenous) value of opportunities in post-collegiate professional basketball. To determine the optimal effort expenditure by each team, we use (2) and (3) to derive first-order conditions for the two teams:

$$\frac{\partial \pi_1}{\partial e_1} = \frac{e_2}{\left(e_1 + e_2\right)^2} V - 1 = 0; \tag{4}$$

$$\frac{\partial \pi_2}{\partial e_2} = \frac{e_1}{\left(e_1 + e_2\right)^2} V - \sigma = 0. \tag{5}$$

Solving (4) and (5) for the Nash equilibrium efforts by the two teams yields

$$e_1^* = \frac{V\sigma}{\left(1+\sigma\right)^2} \text{ and } e_2^* = \frac{V}{\left(1+\sigma\right)^2}. \tag{6}$$

In equilibrium, the expected probabilities of victory are:

$$g_1^* = \frac{\sigma}{1+\sigma} \text{ and } g_2^* = \frac{1}{1+\sigma}. \tag{7}$$

It follows from (6) and (7) that Team 1, the favored team, exerts more effort than its opponent and is thus more likely to win the game. In what follows, we will use this meritorious (uncorrupted) game as a benchmark by which to evaluate the outcome of a corrupted contest.

2.2. The Same Two Teams in a Corrupted Contest

In a corrupted contest, or one in which members of Team 1 engage in point-shaving activities, Team 1's unit cost of effort will rise. Assume each regular player on Team 1 agrees to engage in point-shaving. The unit cost of effort will rise because each additional unit of effort increases the likelihood that these players will not receive the outcome contingent point-shaving bribe. Assume only one or two players on Team 1 agree to engage in point-shaving. The unit cost of effort *for the team* will still rise, as there are productivity spillovers in basketball production (Kendall, 2003). By putting forth less effort (i.e., failing to set a screen for a "driving" teammate, overlooking a pass to a teammate who has worked hard to become "open," failing to double team an opponent on defense once a teammate has "trapped" him, or eliciting more playing time for a less talented replacement player), a corrupted player makes it more costly for his teammates to put forth *productive* efforts. This is true even if his teammates are not complicit in point-shaving.

In a corrupted game, the contest success function for each team is the same as equation (1) in a meritorious game. However, Team 1's unit cost of effort rises in the presence of a point-shaving scheme. The expected payoff functions for the two teams become

$$\pi_1 = g_1 V - e_1 - \eta e_1, \tag{8}$$

$$\pi_2 = g_2 V - \sigma e_2, \tag{9}$$

where $\eta(>0)$ represents the favored team's additional unit cost of effort in the presence of point-shaving corruption.

From each team's expected payoff function, we calculate the first-order conditions as follows:

$$\frac{\partial \pi_1}{\partial e_1} = \frac{e_2}{\left(e_1 + e_2\right)^2} V - \left(1 + \eta\right) = 0; \tag{10}$$

$$\frac{\partial \pi_2}{\partial e_2} = \frac{e_1}{\left(e_1 + e_2\right)^2} V - \sigma = 0. \tag{11}$$

Using (10) and (11), we solve for the Nash equilibrium efforts and expected probabilities of victory:

$$e_1^{**} = \frac{V\sigma}{\left(1 + \sigma + \eta\right)^2}; \; e_2^{**} = \frac{V\left(1 + \eta\right)}{\left(1 + \sigma + \eta\right)^2}; \tag{12}$$

$$g_1^{**} = \frac{\sigma}{1 + \sigma + \eta}; \; g_2^{**} = \frac{1 + \eta}{1 + \sigma + \eta}. \tag{13}$$

Thus, the presence of point-shaving activity reduces effort and, to some extent, likelihood of victory for Team 1. While increasing likelihood of victory for Team 2, corruption by Team 1 has an ambiguous effect on Team 2's effort level.

http://www.bepress.com/rle/vol5/iss1/art12
DOI: 10.2202/1555-5879.1244

2.3. THE EFFECTS OF POINT-SHAVING CORRUPTION ON TEAM EFFECTS AND SOCIAL WELFARE

Next, we calculate the effect of point-shaving corruption on the contest's aggregate effort level. It is easy to verify from (6) and (12) that

$$E^{*} = e_1^{*} + e_2^{*} = \frac{V}{1+\sigma}; \tag{14a}$$

$$E^{**} = e_1^{**} + e_2^{**} = \frac{V}{1+\sigma+\eta}. \tag{14b}$$

We thus have

$$E^{*} > E^{**}. \tag{14c}$$

As in Amegashie and Kutsoati (2005), we take aggregate match effort as a partial determinant of match excitement and therefore of the demand function. From inequality (14c), it is clear that point-shaving corruption reduces match excitement and, correspondingly, causes a leftward shift in the demand curve for subsequent NCAA basketball games.

Further, before each match, we assume that some fans form an expectation regarding relative efforts across competing teams. These "educated" fans value match integrity, as it is necessary in accurately assessing teams relative to one another. Thus, we take such fans as passively evaluating the integrity of a match as the difference between realized and expected relative team efforts. For a corrupted match, the level of integrity is measured according to

$$d = \frac{e_1^{**}}{e_2^{**}} - \frac{e_1^{*}}{e_2^{*}} = -\frac{\sigma\eta}{1+\eta} < 0. \tag{15}$$

As d approaches zero from the left, the level of match distortion (integrity) falls (rises). From equation (15), we find that

$$\frac{\partial d}{\partial \eta} < 0. \tag{16}$$

That is, match integrity is decreasing in the level of point-shaving activity that occurs. Thus, the demand function for subsequent NCAA basketball games is decreasing in the level of point-shaving activity. This is true because point-shaving causes aggregate efforts to decline and relative team efforts to become distorted. With no offsetting effects on the demand side, it is clear that point-shaving activity causes an inward shift in the demand curve for NCAA basketball.

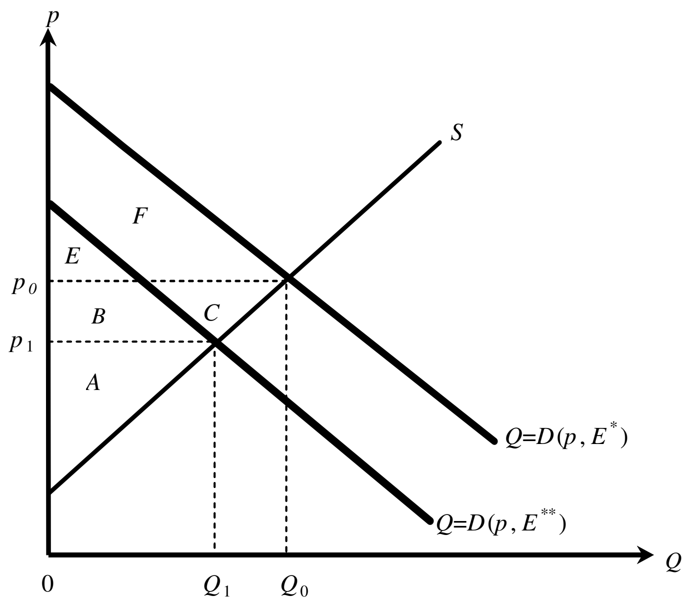
Throughout the welfare analysis of this section, we assume that the supply curve for NCAA basketball is unchanged by the presence of point-shaving. In A-1 of the Appendix Section, it is explained that, under reasonable conditions, any welfare *gains* from a supply curve shift are offset by losses to outside bettors (i.e., bettors who are unaware as to the presence of point-shaving). Thus, we consider only demand effects of point-shaving in assessing welfare changes, while assuming that the supply curve is unaffected by the presence of corruption. The following proposition summarizes the welfare effect of point-shaving corruption given reasonable assumptions on the supply curve.

Proposition 1: *Point-shaving corruption creates a decrease in the overall economic welfare generated by NCAA basketball. Such activity reduces aggregate efforts and distorts relative team efforts for a given corrupted match, and these effects, in turn, lower demand for subsequent matches.*

Figure 1 presents a graphical illustration of this welfare decline. Define p as the market price of tickets to a basketball game and S as the market supply curve of the game. Let $Q = D(p, E^*)$ denote market demand for a meritorious game in which the aggregate effort of the match is E^* as shown in (14). In this match, producer surplus can be measured by the area of (A+B+C) and consumer surplus by the area of (E+F). In the presence of point-shaving corruption, other things being equal, the aggregate effort of the match decreases to E^{**} as shown in (15). As a result, market demand shifts leftward to $Q = D(p, E^{**})$. Producer surplus is given by the area of A and consumer surplus by the area of (E+B). The resulting change in producer surplus is –(B+C), and the resulting change in consumer surplus is (B–F). Consequently, the net change in social welfare is equal to –(C+F), which is unambiguously negative. This indicates that point-shaving corruption has a perverse effect on social welfare and is therefore inefficient.

http://www.bepress.com/rle/vol5/iss1/art12
DOI: 10.2202/1555-5879.1244

Figure 1 - Welfare Consequence of Point-Shaving Corruption



3. THE PLAYER'S CORRUPTION DECISION

This section examines the conditions under which a player has an incentive to engage in corruption and also provides a brief discussion on corruptible player-types in NCAA basketball. Further, we adapt the Becker and Stigler notion of an honesty premium to a heterogeneous set of apprenticing workers (i.e., college basketball players). In so doing, we present a relatively low-cost route toward the elimination or minimization of point-shaving corruption in NCAA basketball.

It is plausible to assume that each (amoral) player will choose honest play or corrupt play, depending on which course maximizes the present value of his lifetime expected earnings. That is, if accepting a bribe reaps more benefit to the player than expected cost, then the player will choose corruption. This maximization decision incorporates a stream of potential payments and penalties during the player's college and professional basketball careers, which are interconnected. Using backward induction, we can characterize the player's corruption decision in as many as n periods of college basketball play.[6] Note that n constitutes the number of apprenticeship or developmental periods a player endures, where a player can apprentice in college basketball, in a professional developmental league, or in a developmental role within a premier professional league. Further, n is chosen by each player based on his professional prospects. In the n^{th} period of his college basketball career, a representative player will point-shave if the present value of honest play falls short of the present expected value of corrupt play. That is, the player will choose to point-shave in this period if

$$(17) \qquad c_n + \beta m_{n+1} < \lambda(a_n + \beta\gamma m_{n+1}) + (1-\lambda)(c_n + b_t + \beta m_{n+1}),$$

where c_n represents the direct value to the player of a period of college basketball participation derived from tuition, room, board, notoriety, and "love of game" value derived from college play,[7] β is the discounting rate, m_{n+1} is the potential value of the player's professional career should he derive the full skill and reputational benefits that college basketball can offer him, λ represents the likelihood that player corruption is apprehended at the beginning of the period, a_n is the direct value to the player of a period of professional basketball in a developmental league or in a professional developmental role (derived from similar considerations as c_n), γ represents the rate at which a player's (post-developmental) professional career is discounted should he be dismissed for corruption and not receive the full skill and reputational benefits that college basketball can offer him, and b_t represents the value of a player's bribe opportunity given the level of (betting) interest in his team.

On the other hand, a player behaves honestly in period n if

$$(18) \qquad c_n + \beta m_{n+1} \geq \lambda\left(a_n + \beta\gamma m_{n+1}\right) + \left(1-\lambda\right)\left(c_n + b_t + \beta m_{n+1}\right).$$

Inequalities (17) and (18) above tell us that the (risk-neutral) player will choose corruption if its expected payoff, as represented by either inequality's right hand side, eclipses that of honest play. As suggested by DeVenzio (1985),

---

[6] A player might be dismissed for corrupt play before the n^{th} period.

[7] A player may well derive more (less) satisfaction from college basketball participation as compared to professional basketball participation given the myriad differences in style of play, rules, fan characteristics, and style of play.

http://www.bepress.com/rle/vol5/iss1/art12
DOI: 10.2202/1555-5879.1244

inequality (18) shows that the likelihood of player corruption decreases as "payments" from college basketball increase.

The model takes a player's time as a basketball apprentice as set at n periods. In the event of being caught for point-shaving, a player will be dismissed from NCAA competition. This implies that a dismissed player who had planned to continue improving his skills in college (i.e., one who has not deemed himself "ready") must do so in a developmental league or in a developmental role with a premier league.

As NCAA Men's Basketball provides a unique opportunity for players to expose their talent and improve their skills, dismissal from NCAA competition can constitute a significant cost. For the college player, who has already revealed a preference for a college basketball apprenticeship, there are two main potential costs associated with dismissal from NCAA basketball. The first potential cost is the difference between c_n and a_n, where c_n incorporates the value of tuition payments and other stipends the player might receive, as well as factors such as team camaraderie, fan base, and the team's mode of travel. Division I college teams tend to travel better than minor league basketball teams, for instance. Whereas chartered plane is the norm for Division I college teams, leagues such as the ABA and NBDL often rely upon long-distance bus rides.[8]

The second potential cost is associated with the discount rate of a dismissed player's (post-developmental) professional career $(\gamma \in (0,1))$. Due to economies of scale in scouting, NCAA Men's Basketball is more scouted by the NBA, for instance, than are minor professional basketball leagues such as the National Basketball Developmental League (NBDL) and American Basketball Association (ABA).[9] That is, a given player receives more external exposure in college basketball due to the fact that it is such a major talent pipeline. Scouts are more likely to attend a college game to see Player X in addition to five other prospects than to attend a minor league game to see only Player X. The marginal cost of scouting Player X is much lower in the former case. Further, teams in the NCAA provide knowledgeable coaching staffs with a vested interest in player progress. Player progress is largely important in the NCAA due to heavy restrictions upon player mobility. For instance, a team cannot simply trade away an underachieving player in the NCAA. In order to enjoy his potential post-apprenticeship earnings, then, a player must receive adequate exposure and basketball training. These factors combine to make

[8] For a partial description of player travel in the ABA, see Shirley (2007:147-48).

[9] In the first round of the 2007 NBA Draft, every U.S. player came directly from an NCAA Division I team. Overall 25 of the 30 first round picks entered the NBA from a Division I team.

college basketball attractive to a representative player as an investment in his (post-developmental) professional career.

The player weighs these expected costs against the magnitude of his bribe opportunities (b_t), the latter of which is influenced by the strength of the player's team. A national power will generate more interest, and thus more betting interest, than will a mediocre Division I team. Thus, we expect a player from a national power to have more lucrative bribe opportunities. This stands to reason, as insider betting becomes more lucrative the less influence inside bets have upon the betting odds (or upon the point spread in this case). We take all *regular* players within a particular team or team type as having identically valued bribe opportunities. As stated by Wolfers (2006), it is relatively easy for any player to *reduce* his level of effort. Further, given spillovers in team basketball production (Kendall, 2003), such a willful adjustment is difficult to detect (i.e., teammates also play worse). That is to say, any regular player can render the entire team less effective without the act being completely obvious. Even the fifth starter can influence a star teammate's effectiveness by turning over the ball, fouling, failing to double team a trapped opponent on defense, failing to make a key pass, or fumbling the reception of a key pass. To a far greater degree than in baseball, a basketball team must be running on all cylinders to be effective. Thus, we take each regular player on a basketball team as having the same basic technology for team sabotage and thus the same bribe opportunities.

From the previous inequalities, the critical level of pay for a college player (i.e., the minimum amount to induce honest play) in the n[th] period is equal to

$$(19) \qquad \tilde{c}_n = a_n + \frac{1-\lambda}{\lambda} b_t - \beta\left(1-\gamma\right) m_{n+1}$$

Following a backward inductive solution path, we find the critical level of compensation for a player in period $(n-1)$ as follows

$$(20) \qquad \begin{aligned} &\tilde{c}_{n-1} + \beta\tilde{c}_n + \beta^2 m_{n+1} \\ &= \lambda(a_{n-1} + \beta a_n + \beta^2\gamma^2 m_{n+1}) + (1-\lambda)(\tilde{c}_{n-1} + b_t + \beta\tilde{c}_n + \beta^2 m_{n+1}). \end{aligned}$$

Should the player cheat in period $(n-1)$ and not be caught, his expected payoff in period n is $\tilde{c}_n$ regardless of his actions in the latter period. This is due to the fact that his n[th] period earnings are set such that he finds no advantage (i.e., no expected payoff greater than $\tilde{c}_n$) by engaging in corruption. Thus, the critical pay level of compensation in period $(n-1)$ is

http://www.bepress.com/rle/vol5/iss1/art12
DOI: 10.2202/1555-5879.1244

(21)
$$\tilde{c}_{n-1} = a_{n-1} + \frac{(1-\lambda)(1-\beta)}{\lambda} b_t - \beta^2 \gamma (1-\gamma) m_{n+1} .$$

Similarly,

(22)
$$\tilde{c}_{n-2} = a_{n-2} + \frac{(1-\lambda)(1-\beta)}{\lambda} b_t - \beta^3 \gamma^2 (1-\gamma) m_{n+1}$$

(23)
$$\tilde{c}_{n-k} = a_{n-k} + \frac{(1-\lambda)(1-\beta)}{\lambda} b_t - \beta^{k+1} \gamma^k (1-\gamma) m_{n+1}$$

for $k \in (1,2,3,\ldots,(n-1))$

From equations (19) to (23), we present the following proposition.

Proposition 2: *A player is more likely to violate NCAA point-shaving rules, ceteris paribus, the more attractive are his professional apprenticeship opportunities (*a_i*), the more betting interest his team generates (*b_t*), the lower is the probability of apprehension (*λ*), and the lower is the value of his post-apprenticeship professional basketball opportunities (*m_{n+1}*).*

The critical level of pay is increasing in the player's opportunity cost while apprenticing (i.e. apprenticing instead in a developmental league or in a developmental role within a premier league). For instance, if the NBDL began to pay more to players, the representative college player would become more likely to engage in point-shaving. This is true because the penalty of being denied NCAA participation would become less severe.

Further, the critical level of pay to induce honest play is increasing in the value of the college player's bribe opportunities (b_t). As discussed previously, this value is determined by the team type on which a regular player competes. As a player's team generates more betting interest, he is expected to receive more lucrative bribe opportunities. Thus, if the team is strong and exciting enough to generate a great deal of (betting) interest, b_t might be quite substantial. On the other hand, if the team is so bad as never to be a strong favorite, the value could be equal to zero. Hence, as a given player's team generates more interest, *ceteris paribus*, he becomes more likely to engage in corruption.

The last term in equation (23) represents the present value of foregone salary from the player's (post-developmental) professional career in the event that he is caught point-shaving. It is this term that separates the apprenticing basketball player from Becker and Stigler's law enforcer. Whereas law enforcement was an end profession in itself, college basketball is both an end (in the sense that one is directly compensated) and a means (in the sense that the player is investing in a skill that commands potentially large professional earnings after the apprenticeship). Thus, a college basketball player is less likely to engage in corruption so as not to jeopardize his professional prospects. This disincentive effect becomes stronger as a college player approaches his n^{th} period.

It is important to note that the value m_{n+1} varies greatly among regular collegiate players. This is true even among regular players on a given college team or team type. Looking across professional leagues, salary compensation for professional basketball players is quite non-linear with respect to skill level, meaning that small drop-offs in skill can mean a disproportionately smaller paycheck. In a 2007 article entitled *Almost-NBA Players Take Home Paltry Salaries*, Tom Goldman writes, "With an average annual salary of more than $5 million, NBA players are the highest-paid athletes in professional sports. But for the many skilled professionals who haven't quite made it into the NBA, the financial gulf is huge…Salaries in the development league (NBDL) range from $12,000 to $24,000 a season, paid in part by money from the NBA." Based on the heterogeneity of a player's expected post-developmental payoff, then, we expect considerable heterogeneity in the nature of corruption decisions across the set of NCAA players.

3.1. Corruptible Player Types

We can now determine which player-types are at a relatively high risk of engaging in corruption according to the model. Given that compensation, c_n, is similar across NCAA players, the model would describe a corruptible player as one on a nationally strong team who, while playing regularly, does not expect to earn a large professional payday after his apprenticeship. We might think of a player who, while a key contributor on a quality team, expects to fall somewhat short of the NBA level after his apprenticeship. For instance, some effective college players do not fall within any of the narrowly specified roles of an NBA team. A premier college player might be too short and weak to play power forward in the NBA and, at the same time, not sufficiently quick to play small forward in the NBA.

http://www.bepress.com/rle/vol5/iss1/art12
DOI: 10.2202/1555-5879.1244

3.2. APPLYING BECKER AND STIGLER'S NOTION OF HONESTY PREMIUM TO A HETEROGENEOUS WORKFORCE

We complete the analysis by calculating the present value of salaries (at the onset of a college career) necessary to keep the college player honest throughout his college career. Using equations (19) to (23), the critical present value of future salaries in decision period one is[10]

$$PV_1 = \tilde{c}_1 + \beta\tilde{c}_2 + \beta^2\tilde{c}_3 + \ldots + \beta^{n-1}\tilde{c}_n \tag{24}$$

$$= \sum_{i=1}^{n} \beta^{i-1} a_i + \frac{(1-\lambda)}{\lambda} b_t - \beta^n \left(1-\gamma^n\right) m_{n+1} .$$

Equation (24) above states that the present value of salaries necessary to keep the collegiate basketball player honest is equal to (i) the present value of payoffs in a professional apprenticeship plus (ii) the present value of payoffs from point-shaving opportunities minus (iii) the present value of post-developmental professional earnings lost in the event that the player is caught for corruption.

This present value formula can be used to consider an anti-corruption policy for college basketball. Such a policy would require each entering NCAA player to bond into the organization by the amount of the second and third terms. During each period of honest play, the player would receive a premium equal to the interest income generated by the bond. Finally, the player would be returned the principal of the bond in the event that he leaves college basketball with no evidence of point-shaving involvement. Given the NCAA's concerns, such a pay structure has the advantage of introducing player incentives toward honest play while simultaneously maintaining a level of player pay consistent with "amateur status"– whatever this term or ideal is intended to mean.

This payment structure mirrors that proposed by Becker and Stigler to eliminate malfeasance among law enforcers. However, one should again note that college basketball players are a heterogeneous set of apprenticing workers and therefore differ from the set of career police officers. The presence of the final term in equation (24) signifies the apprenticing nature of the college basketball player workforce. Further, the observed level of variability (across player) in this term causes the point-shaving decision to be potentially quite distinct across NCAA player-types. For such a pay structure to successfully eliminate or minimize point-shaving activities, there must be accurate prediction of each entering college player's future prospects. Such information

---

[10] See Appendix A-2 for a detailed derivation of the present value formula.

could be gathered through the establishment of a futures market for basketball players. For example, the company Intrade creates prediction markets that can be used to determine the market-projected likelihood or value of future events, sporting and otherwise. Another legitimate concern surrounding such a policy is the financial ability of many young players to bond into college basketball. However, if serious about an entrance fee policy, the NCAA could sanction a player loan program.

There are many ways for the NCAA to reduce the incidence of point-shaving corruption. One obvious, albeit costly, policy is to beef up enforcement by monitoring players and large-scale bettors more closely. On the other hand, Wolfers (2006) points out that the illegalization of spread betting would decrease the incidence of point-shaving corruption. However, gambling regulation is costly to enforce. Further, gamblers value the ability to bet on matches in a variety of ways, each featuring a distinct level of risk. To some degree, then, gambling regulation would transfer social losses more directly upon those who engage in spread-betting. However, a policy that requires players to differentially bond into college basketball would provide a low-cost route toward the elimination or minimization of point-shaving in college basketball.

4. CONCLUDING REMARKS

In this paper, we have presented a contest model of a sports game to show that point-shaving corruption results in a net social loss given reasonable assumptions about the supply of NCAA basketball games. This is a notable result, as there are no prior explorations concerning the welfare consequences of corruption in sport. Further, we identify conditions under which an amoral player will choose to engage in point-shaving and also designate player types that are relatively likely to engage in point-shaving corruption. Lastly, we adapt Becker and Stigler's analysis to the case of (highly-differentiated) apprenticing basketball players. If the NCAA truly wishes to minimize or eliminate point-shaving corruption without investing in additional enforcement resources, it might implement a pay structure that provides premiums to ostensibly honest players. Interestingly, such a pay structure would not compromise the NCAA's amateur pay scale provided that players bond into NCAA basketball. As the problems faced by the NCAA are not unique to a sports organization, the analysis sheds light on how private sector corruption might be viewed and addressed in general.

A limitation and hence possible extension of the paper should be mentioned. We assume that a player is risk-neutral in the sense that he maximizes expected payoff when making a corruption decision. A potentially interesting extension

DOI: 10.2202/1555-5879.1244

is to analyze the case in which the player behaves risk aversely.[11] Next, we do not examine issues related to the optimal enforcement of laws such as sports bribery and racketeering. The efficient allocation of socially costly resources toward monitoring players and bettors is a potential issue for future research.[12]

Appendices

A-1. Point-shaving affects the supply of NCAA basketball games in three primary ways. First, payments from bettors to players will allow NCAA teams to pay a lower "wage" to players. In this sense, point-shaving shifts right the supply curve for NCAA basketball games. However, any market surplus generated by this shifted supply curve is merely a transfer from outside bettors (i.e., those who do not anticipate point-shaving activity) to inside bettors, players, fans, and the NCAA. As this shift creates no *overall* welfare gain, we abstract from it in our graphical welfare analysis.

Further, the presence of point-shaving causes players to exert less aggregate effort toward what is taken as the same aggregate "prize" (i.e., game experience and game exposure to professional scouts). In this sense, players gain from point-shaving. However, these gains are taken as either negligible on a market scale or at least offset by expected costs, in the form of NCAA dismissal and discounted professional basketball earnings, borne by the corrupted player.[13]

Given the origin of the first supply curve shift and the offsetting nature of the latter two, we focus solely on the two demand curve effects in our welfare analysis of Section 2.

A-2. To calculate the period-1 present value of income streams that discourages a player from participating in point-shaving corruption, it is necessary to make use of $\tilde{c}_i$ derived in equation (23). The term $\tilde{c}_i$ measures the critical level of period-i compensation such that the player finds no advantage by engaging in corruption. It follows from (23) that

[11] See the seminal work of Ehrlich (1973) that uses a state-preference framework to analyze an individual's expected-utility-maximizing decision on participating in illegal activities.

[12] For general studies on optimal enforcement of laws, see Stigler (1970) and Polinsky and Shavell (2001).

[13] While we take these expected costs as sufficient to overcome player gains from a reduction in aggregate effort, the cost of punishment is obviously not always sufficient to overcome the value of the point-shaving bribe itself.

$$\tilde{c}_1 = a_1 + \frac{(1-\lambda)(1-\beta)}{\lambda} b_t - \beta^n \gamma^{n-1}(1-\gamma) m_{n+1} \text{ for } k = n-1;$$

$$\tilde{c}_2 = a_2 + \frac{(1-\lambda)(1-\beta)}{\lambda} b_t - \beta^{n-1} \gamma^{n-2}(1-\gamma) m_{n+1} \text{ for } k = n-2;$$

$$\cdots\cdots\cdots$$

$$\tilde{c}_{n-1} = a_{n-1} + \frac{(1-\lambda)(1-\beta)}{\lambda} b_t - \beta^2 \gamma(1-\gamma) m_{n+1} \text{ for } k = 2;$$

$$\tilde{c}_n = a_n + \frac{1-\lambda}{\lambda} b_t - \beta(1-\gamma) m_{n+1} \text{ for } k = 1.$$

Plugging this stream of critical earnings $\{\tilde{c}_1, ..., \tilde{c}_n\}$ into the present value formula: $PV_1 = \tilde{c}_1 + \beta\tilde{c}_2 + ... + \beta^{n-2}\tilde{c}_{n-1} + \beta^{n-1}\tilde{c}_n$, we have

$$\begin{aligned} PV_1 = &\left[a_1 + \frac{(1-\lambda)(1-\beta)}{\lambda} b_t - \beta^n \gamma^{n-1}(1-\gamma) m_{n+1} \right] \\ &+\beta\left[a_2 + \frac{(1-\lambda)(1-\beta)}{\lambda} b_t - \beta^{n-1} \gamma^{n-2}(1-\gamma) m_{n+1} \right] \\ &+...... \\ &+\beta^{n-2}\left[a_{n-1} + \frac{(1-\lambda)(1-\beta)}{\lambda} b_t - \beta^2 \gamma(1-\gamma) m_{n+1} \right] \\ &+\beta^{n-1}\left[a_n + \frac{1-\lambda}{\lambda} b_t - \beta(1-\gamma) m_{n+1} \right]. \end{aligned}$$

Simplifying the above expression yields

$$\begin{aligned} PV_1 &= \sum_{i=1}^{n} \beta^{i-1} a_i + \sum_{i=1}^{n-1} \beta^{i-1} \frac{(1-\lambda)(1-\beta)}{\lambda} b_t + \beta^{n-1} \frac{(1-\lambda)}{\lambda} b_t - \sum_{i=1}^{n} \beta^n \gamma^{n-i} (1-\gamma) m_{n+1} \\ &= \sum_{i=1}^{n} \beta^{i-1} a_i + \frac{(1-\lambda)}{\lambda} b_t - \beta^n (1-\gamma^n) m_{n+1}, \end{aligned}$$

since

$$\sum_{i=1}^{n-1}\beta^{i-1}\left(1-\beta\right)+\beta^{n-1}=\left(1-\beta\right)\frac{1-\beta^{n-1}}{1-\beta}+\beta^{n-1}=1$$

and

$$\sum_{i=1}^{n}\gamma^{n-i}\left(1-\gamma\right)=\left(1-\gamma\right)\frac{1-\gamma^{n}}{1-\gamma}=1-\gamma^{n}.$$

References

Amegashie, J., and E. Kutsoati. 2005. "Rematches in Boxing and Other Sporting Events" 6 *Journal of Sports Economics* 401-411.

Becker, G.S., and G.J. Stigler. 1974. "Law Enforcement, Malfeasance and Compensation of Enforcers," 3 *Journal of Legal Studies* 1-18.

Chang, Y.-M., J. Potter, and S. Sanders. 2007a. "The Fate of Disputed Territories: An Economic Analysis," 18 *Defence and Peace Economics* 183-200.

________, ________, and ________. 2007b. "War and Peace: Third-Party Intervention in Conflict," 23 *European Journal of Political Economy* 954-974.

________ and S. Sanders. 2009a. "Raising the Cost of Rebellion: The Role of Third-Party Intervention in Intrastate Conflict," *Defence and Peace Economics*, *Forthcoming*.

________ and ________. 2009b. "Pool Revenue Sharing, Team Investments, and Competitive Balance in Professional Sports: A Theoretical Analysis," *Journal of Sports Economics,* Forthcoming.

________ and D.L. Weisman. 2005. "Sibling Rivalry and Strategic Parental Transfers," 71 *Southern Economic Journal* 821-836.

DeVenzio, D. 1985. *Rip-Off U: The Annual Theft and Exploitation of Major College Revenue-Producing Student Athletes*. Charlotte, NC: Fool Court Press.

Ehrlich, I. 1973. "Participation in Illegitimate Activities: A Theoretical and Empirical Investigation," 81 *Journal of Political Economy* 521-565.

Garfinkel, M.R., and S. Skaperdas. 2000. "Conflict Without Misperceptions or Incomplete Information: How the Future Matters," 44 *Journal of Conflict Resolution* 793-807.

________ and ________. 2007. "Economics of Conflict: An Overview," in T. Sandler and K. Hartley, eds. *Handbook of Defense Economics*, Vol. 2(1), 649-709. North Holland.

Goldman, T. 2007. "Almost-NBA Players Take Home Paltry Salaries," in National Public Radio, retrieved September 19, 2007 from: http://www.npr.org/templates/story/story.php?storyId=7239948.

Goldstein, J. 2003. "Explosion: 1951 Scandals Threaten College Hoops," in *ESPN*, retrieved April 14, 2008 from: http://espn.go.com/classic/s/basketball_scandals_explosion.html.

Grossman, H.I. 2004. "Peace and War in Territorial Disputes," Department of Economics, Brown University.

Heston, S.L., and D. Bernhardt. 2006. "No Foul Play: Honesty in College Basketball," in Social Science Research Network, retrieved April 6, 2008 from: http://ssrn.com/abstract=1002691.

Hillman, A.L., and J.G. Riley. 1989. "Politically Contestable Rents and Transfers," 1 *Economics and Politics* 17-39.

Hirshleifer, J. 1989. "Conflict and Rent-Seeking Success Functions: Ratio vs. Difference Models of Relative Success," 63 *Public Choice* 101-112.

Huntington, S. 1968. *Political Order in Changing Societies*. New Haven, CT: Yale Univ. Press.

Kendall, T. 2003. "Spillovers, Complementarities, and Sorting in Labor Markets with an Application to Professional Sports," 70 *Southern Economic Journal* 398-402.

Konrad, K.A. 2007. "Strategy in Contests – An Introduction." Discussion Paper SP II 2007-01, Wissenschaftszentrum, Berlin.

Lazear, E.P., and S. Rosen. 1981. "Rank-Order Tournaments as Optimum Labor Contracts," 89 *Journal of Political Economy* 841-864.

Leff, N. 1964. "Economic Development through Bureaucratic Corruption," 8 *American Behavioral Scientist* 8-14.

Mauro, P. 1995. "Corruption and Growth," 110 *Quarterly Journal of Economics* 681-711.

Merron, J. 2007. "Biggest Sports Gambling Scandals," in *ESPN*, retrieved March 28, 2008 from: http://sports.espn.go.com/espn/page2/story?page=merron/060207.

National Collegiate Athletic Association (NCAA). 2008. "Timeline of College and Professional Sports Wagering Cases," retrieved March 22, 2008 from: http://www1.ncaa.org/membership/enforcement/gambling/toolkit/chapter_20?ObjectID=42739&ViewMode=0&PreviewState=0.

Polinsky, A.M., and S. Shavell. 2001. "Corruption and Optimal Law Enforcement," 81 *Journal of Public Economics* 1-24.

Shirley, P. 2007. *Can I Keep My Jersey?* New York, NY: Random House, Inc.

Shleifer, A., and R.W. Vishny. 1993. "Corruption," 108 *Quarterly Jrnl of Economics* 599-617.

Skaperdas, S. 1996. "Contest Success Functions," 7 *Economic Theory* 283-290.

Stigler, G. 1970. "The Optimum Enforcement of Laws," 78 *Jrnl of Political Economy* 526-536.

Szymanski, S. 2003. "The Economic Design of Sporting Contests," 41 *Journal of Economic Literature* 1137-1187.

________. 2004. "Professional Team Sports Are Only a Game: The Walrasian Fixed-Supply Conjecture Model, Contest-Nash Equilibrium, and the Invariance Principle," 5 *Journal of Sports Economics* 111-126.

________ and S. Késenne. 2004. "Competitive Balance, and Gate Revenue in Team Sports," 52 *Journal of Industrial Economics* 165-177.

Tullock, G. 1980. "Efficient Rent Seeking" in J.M. Buchanan, R.D. Tollison and G. Tullock, eds. *Toward a Theory of Rent-Seeking Society*. College Station, TX: Texas A&M University Press, 97-112.

Wendel, T. 2005. "Pay the Players," *USA Today Online*, March 20, 2005. Retrieved April 23, 2008 from: http://www.usatoday.com/news/opinion/editorials/2005-03-20-ncaa-edit_x.htm.

Wolfers, J. 2006. "Point Shaving: Corruption in NCAA Basketball," 96 *American Economic Association Papers and Proceedings* 279-283.

DOI: 10.2202/1555-5879.1244