

CHEATING IN CONTESTS

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Much of the interest in the study of sports from the perspective of an economist lies in the empirical application of contests as efficient mechanisms for eliciting effort. Contestants respond to contest incentives, and these incentives include the incentive to cheat. This paper discusses different forms of cheating: sabotage, doping, and match fixing. The paper discusses how these forms of cheating arise and how they can be treated. In particular, we look at specific forms of cheating in soccer, baseball, and cricket. In the appendix we develop a simple model of match fixing.

I. INTRODUCTION

Commercial sport is a distinctive form of an economic contest. Unlike most economic contests, demand arises more from interest in observation of the contest itself (e.g. a race or a match) than in the outcome of the contest. In the economics literature, the use of a contest as a means of eliciting effort contributions stems from the perception that in a conventional principal–agent framework any contract will be second best in the face of asymmetric information. If only the agent can observe effort accurately, then a reward scheme based on inputs is subject to moral hazard (the hidden-action problem), while an output contract is likely to impose

excessive risk on the agent. If the ability of the agent is also private information, then even with a risk-neutral agent the first-best contract cannot be implemented owing to the combination of moral hazard and adverse selection (the hidden-information problem; see, for example, Laffont and Tirole, 1993). The insight of the contest literature is that rewarding agents according to their relative, rather than absolute performance can help to overcome these incentive problems. However, in a sporting contest observed by thousands, possibly millions, of spectators, the possibilities for on-the-job shirking are relatively limited. For the vast majority of athletes competing at the higher levels of a sport, where most of the commercial interest lies, shirking will rapidly

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lead to omission from future contests. However, asymmetric-information problems are not entirely absent, and in this paper we discuss three of them, all of which fall under the broad heading of ‘cheating’.

- (i) *Sabotage*. Contestants win if their performance is better than that of their rivals. Reducing the performance of rivals may be as effective a means to achieving this end as improving one’s own performance. In some sports, this is an accepted part of the game, but often it frustrates the wish of spectators to observe opponents exercising skills to the full and is accordingly illegal under the rules of the sport. Typically, organizers employ umpires or referees to monitor and punish sabotage activities. However, sabotage may also take the form of deceiving officials.
- (ii) *Doping*. Contestants can improve their probability of winning by the right kind of preparation, in relation to training and diet. Many substances have the potential to enhance athletic performance, but only some of these are deemed to be acceptable within the spirit of the sporting contest. However, detecting the consumption of banned substances is problematic. As with sabotage, contest organizers attempt to discourage such activities through monitoring, but in general this is a much more difficult problem than with on-the-field sabotage.
- (iii) *Match-fixing*. Individual contestants may be willing to reduce their effort contribution for specific matches if the rewards for so doing are large enough. Sometimes this occurs either because the opposition values the victory significantly more and is willing to pay to secure it, and sometimes it occurs because there is an opportunity to generate returns on the insider information (for example, through gambling). Match fixing is felt to violate the spirit of the game and is also perceived to undermine spectator interest, and is, therefore, prohibited by organizers.

Broadly, these kinds of cheating fall into two categories. First, there is ‘cheating to win’, where it might be argued that the incentives inherent in the contest reward scheme have ‘gone too far’ (a generic

problem discussed in a wider social context by Frank and Cook, 1996). Second, there may be a problem of ‘cheating to lose’, such as the case where a team is bribed to lose a match. Here, the problem is that the direct contest incentives are overwhelmed by some external incentive. In this paper we explore each of these forms of cheating in theory and in practice, and discuss what options there are to discourage such activities.

II. WHAT IS WRONG WITH CHEATING IN SPORT?

Arguments for not permitting cheating in sport typically fall into two kinds.

- *Legal and ethical*. Cheating in the forms described above is typically harmful or fraudulent to varying degrees. Assaulting fellow competitors is frowned on for obvious reasons. Fixing matches for gambling gains is fraudulent and harmful to those who lose money as a result. These sorts of behaviour violate most religious and other ethical codes, but the desire to win or to make money is so great that in many cases ethical codes have a limited ability to restrain cheating. In more extreme cases, these actions violate civil or criminal legal codes. Bribing players and officials is typically illegal, as is assault. Thus, even without the intervention of the sporting authorities, there exists both monitoring (in the form of the police and other public agencies) and punishment for cheating.
- *Commercial*. Cheating undermines interest in the sport. This is itself an interesting and testable hypothesis, although we know of no empirical research. While it is possible to think of many cases where cheating scandals have generated ‘bad’ publicity, it is also possible to think of many cases where the prevalence of cheating does not seem to undermine interest. For example, the disciplinary record of players in many sports has deteriorated over recent decades, but there is little evidence that this has diminished spectator interest. Indeed, it may be argued that causation runs in the opposite direction—increasing (decreasing) interest in a sport leads to increased (decreased) cheating.

III. SABOTAGE

Sabotage as an activity has been considered in both industrial and labour economics. In the context of competition between firms, sabotage may be thought of as an act of raising rivals' costs (Salop and Scheffman, 1983). In the context of an internal labour market, sabotage may be one kind of response to the use of tournament incentives (Lazear, 1989). In the first case, sabotage is clearly beneficial to the perpetrator since it weakens competition. However, in the latter case the effect is ambiguous, since, although the sabotage may have a direct effect on expected returns by raising the probability of winning the prize, if the sabotage indirectly affects the productivity of the firm then this may, in fact, reduce the expected income of the firm. For this reason, Lazear suggested that employers will reduce the spread between winning and losing in order to ensure that co-workers cooperate. A similar argument can be applied to a sporting competition. The attractiveness of a sporting contest depends on the balance of the competition (the uncertainty-of-outcome hypothesis) and the quality of the performance. If sabotage reduces the quality of the performance of the opposition, then, even if it increases the contestant's probability of winning, it may reduce the contestant's expected return. This, then, would seem to be an argument in favour of reduced incentives for winning.

Sabotage in sports can take a number of forms:

- illegally restraining or assaulting competitors;
- attempting to provoke illegal responses from competitors (e.g. by goading);
- attempting to persuade the referee that opponents have engaged in illegal acts.²

Each of these tends to undermine the attractiveness of a sporting contest to spectators, because it limits the opportunity to observe the skills of the opposing

team or generally slows down the game with too many interventions from the officials. Thus, sabotage reduces productivity of the sporting competitors and makes their joint product less attractive.

Garicano and Palacios-Huerta (2000) suggest that a recent change in the rewards for winning in league football provides a natural experiment to test the hypothesis that increasing the prize spread increases sabotage activity. During the 1980s most national soccer moved from a system of awarding two points for every match won to three, with the intention of increasing the incentive to win matches.³ Garicano and Palacios-Huerta found that the change was associated with a significant increase in sabotage activity measured by the number of yellow cards awarded.⁴ They also found no tendency for the numbers of goals scored to increase, hence confirming the insight of Lazear, that a larger prize spread can lead to increased sabotage and reduced productivity. However, there is no evidence that this led to any reduction in fan interest.

Sabotage is a particular problem in contests with small numbers of players, a point stressed by Konrad (2000). In a two-person contest, any reduction in the opponent's probability of success leads to a one-for-one increase in one's own probability of success. However, with many contestants, sabotage aimed at a particular rival provides an externality for all the other rivals and only a small gain for the perpetrator, making sabotage unlikely to be privately profitable in contests with large numbers. This suggests that contest designers should seek to organize contests with many competitors. Of course, in a soccer or baseball match there can only be two teams, and these institutional constraints are binding. There is also a more subtle problem with this prescription. Increasing the number of competitors in a contest can be shown, for a wide variety of plausible functional forms, to reduce individual effort, and possibly even aggregate effort (Nti, 1997). Thus,

² To this list we might add the case of deceiving the referee as to what has occurred in the game. For example, it has been traditional in cricket that, whenever a batsman knows himself to be out, he should 'walk', i.e. quit the field, even if the umpire is unable to determine whether the batsman truly was 'out'. However, in recent years this tradition has more or less died out, and most batsmen wait for the umpire to decide, and may even try to suggest by their body language that they were not, in fact, 'out'. However, in most professional sports it has long been the case that umpires and referees pay no attention at all to the opinions of the players.

³ In the world of soccer a draw (or tie) has always been considered a legitimate outcome. In the USA, sports leagues have tended to adopt rules that guarantee each match produces a winner, thus avoiding the problem.

⁴ In soccer a yellow card is shown to player who commits one of a number of offences, principally related to illegal tackles on opponents or seeking to intimidate the referee. Two yellow cards shown to a player in the same game leads to dismissal from the pitch, and accumulating yellow cards over a number of matches can lead to suspension.

reducing sabotage may have the consequence of reducing the quality of the competitor contributions as well.

The common response in the sporting arena to increases in the extent of sabotage activities has been to increase the intensity of monitoring activities. For example, in early soccer each team used to appoint an umpire for a match who then had to agree on any disputes. This system was soon replaced by a system of independent referees as the significance of soccer contests grew. Many sports have increased the number of officials at each match over time, and in many cases they have become paid professionals with proper training and assessment schemes. More recently, several sports have adopted new technologies to help the referees make accurate decisions, and these can also be used to detect sabotage activities, which may now be punished after the match, even if undetected during the game by the official on the pitch. However, it is far from clear that the monitoring technology has managed to keep pace with the technology of sabotage. Moreover, even if sabotage is detected, there may be a reluctance to impose punishments. Suspending a star player from future matches, usually the most effective punishment for a sports team, is a costly act not only for the team itself but also for the team's rivals if the player in question draws fans when a visitor at their grounds. This makes the sporting authorities reluctant to impose heavy punishments on the star players (although there may be a willingness to make an example of less well-known players).

An alternative to tighter monitoring could be to relax rules so as to legalize forms of sabotage. In the absence of restraints on the players, it is not clear that the equilibrium would involve more sabotage than currently occurs, since teams might respond by employing 'enforcers' who would punish opposing teams that sabotaged the efforts of their own star players. The resulting equilibrium in the repeated games of a sports league might be of the well-known 'tit for tat' variety, where agents refrain from deviant behaviour for fear of future punishments. This already happens to a degree in many contact sports, even when typically illegal.

IV. DOPING

Doping has probably been the biggest single problem relating to 'cheating' for sports administrators. Doping may be defined as the ingestion of illicit substances or use of illicit therapies. While sabotage and related forms of cheating have been a perennial problem,⁵ doping is essentially a recent phenomenon. Early cases of doping involved taking potentially dangerous cocktails, such as brandy mixed with cocaine, whose impact on performance may be considered questionable. However, the development of synthetic drugs, such as amphetamines in the 1930s and hormones (steroids) in the 1950s, created a clear link between consumption and improved athletic performance. Alternative methods for improving performance include blood transfusions (blood doping), and developments in biotechnology have raised the possibility of gene doping. However, doping rules have focused not only on performance-enhancing substances and methods, but also on recreational drugs, notably cocaine and cannabis, and even alcohol (the first-ever positive test for substance abuse in the Olympics was in 1968 and involved alcohol). The World Anti-Doping Agency (WADA) maintains a list of prohibited substances and methods, which is broken down into the following categories:

- (i) *prohibited substances*: stimulants; narcotics; anabolic agents; diuretics; peptide hormones, mimetics and analogues; agents with anti-oestrogenic activity; masking agents;
- (ii) *prohibited methods*: enhancement of oxygen transfer; pharmacological, chemical and physical manipulation; gene doping.

Different sports are not affected in the same way by doping. Most obviously, weight lifters, cyclists, and sprinters can reap enormous benefits from consuming steroids and related supplements to develop their muscularity. In many sports, by contrast, adding muscle bulk will reduce the athlete's stamina and therefore reduce their effectiveness (e.g. in soccer or basketball). In general, the more complex the skills required to succeed, the less likely that doping will significantly improve performance. Hence, the

⁵ In the ancient Olympics, convicted cheats were obliged to build propitiatory statues, with inscriptions confessing guilt, to line the entrance to the Olympic Stadium.

greatest concerns have tended to focus on the ‘*citius, altius, fortius*’⁶ sports.

This raises the question of precisely why doping is illegal. Four types of reason have usually been advanced:

- (i) it damages the health of athletes;
- (ii) it gives doped athletes an unfair advantage;
- (iii) it undermines interest in the sport;
- (iv) it undermines the reputation of a sport.

None of these arguments is without problems. The health argument is at best inconsistent—much of what athletes do to themselves in preparation and during a sporting contest is damaging to health. The sport of boxing, for example, must without doubt be extremely damaging to health. The fact that athletes work to produce so much muscle can place a strain on the heart even without taking illegal substances, and can cause serious weight problems when the sporting career ends. Most athletes face longer-term health problems associated with repeated injuries. Even if these problems are taken to be of a different order of magnitude, it is hard to justify the restriction on the choice of consenting adults. Many substances, such as cocaine and heroin, that are banned in a sporting context are already illegal in most jurisdictions.

The unfair-advantage argument is also slippery when pressed. The nature of sport is that some participants have advantages over others, many arising from natural ability, coaching, and appropriate conditioning that is legal (diet etc.). If doping were legal, all athletes could do it, and therefore it is hard to see what would be unfair about it. Of course, better-resourced athletes—particularly those from richer countries—could afford it more easily but that is also true of currently legal advantages. There already exists a well-established correlation between GDP per head and indicators of athletic success, such as Olympic medal counts, and little is done to compensate for this advantage.

Perhaps a more convincing argument lies again in spectator interest. What makes such sport attractive is the interest in observing contests involving exercise of natural skills and this is undermined the

more observers come to believe outcomes are driven by technical skills of doping advisers rather than by innate physical ability. (One sees a similar tension in attempts to reform motor racing so as to maintain a role for driver skill, rather than vehicle technology, in determining race outcomes.)

The sporting-reputation argument is similar in holding that it is the perception of the public that matters. Substance abuse involving alcohol and other narcotics is banned because the athletes are held out as role models, often for children, and the abuse undermines this role and reflects badly on the sport. Using performance-enhancing drugs is, on this view, a problem largely because of the fear that such activities will percolate down to other forms of drug abuse among junior athletes and create a much more widespread problem. In many ways the actions of the sporting governing bodies to ban these substances are a form of self regulation necessitated by the concern that without it governments might turn to statutory regulation.

Indeed, there is a significant contrast between the approaches to doping in the USA and EU, which in part reflects different attitudes to the appropriateness of public intervention. In the EU, the state has been closely involved with control of doping, funding research, and drawing up regulatory codes. For example, the EU played a significant role in the establishment of WADA, and the European Commission has done a great deal of work coordinating government policies in Europe. In the USA, by contrast, much has been left to initiatives of the governing bodies themselves, and practice has been shaped by the decisions of the judicial system. One key area in which this difference has manifested itself has been the attitude to the rights of the athletes. There have been a number of court cases in the USA where decisions of governing bodies have been overturned, either because testing procedures were deemed to be excessively intrusive on constitutionally defended privacy, or because of procedural defects in the testing process.

The possibility of litigation has led to extreme caution on the part of the governing bodies in the USA and an unwillingness to take action when they suspect that athletes are engaged in doping. For

⁶ The Olympic motto: ‘Faster, higher, stronger’.

example, in a recent case the International Amateur Athletic Federation (IAAF) asked USA Track and Field (USATF) to supply the names of athletes it had tested for doping, in particular cases where athletes were found to have taken illegal substances but had subsequently been exonerated (e.g. because they had done so unwittingly). The IAAF presumably wanted this information so that it could test athletes with some past history (and some notable cases involving US athletes arose at the Sydney Olympics). USATF refused on the grounds that it was unable to disclose information relating to individuals who had not been found guilty of doping offences. Many in Europe have argued for a more robust approach, essentially allowing the reputation of the sport to take precedence over the finer rights of the individuals concerned.

This case was in fact settled by the Court of Arbitration for Sport based in Switzerland. This body has increasingly been accepted by governing bodies as the final arbitrator in disputes, and many of the cases relate to doping.⁷ The acceptance of such courts may reflect a move away from the traditional guiding influence of the state in this area in Europe. The funding of WADA provides another interesting example. WADA was first funded by the International Olympic Committee, and so was perceived to lack independence; therefore, by international agreement, national governments agreed to fund its activities. WADA has, in fact, struggled to obtain the promised funding from participating countries, although up to now payments have eventually been made. It was proposed initially that the European Commission would pay for the contribution of the EU member states, but this was resisted by the UK government, which argued that this would extend the competence of the Commission into a new area and that this would not be desirable.

Testing for banned substances takes place either at or outside of competitive events. While random testing clearly enhances the chances of detection, in most professional US sports the player unions have been able to negotiate agreements that prohibit random testing. Even where random testing is allowed, a significant difficulty arises with the need to trace all the relevant athletes outside of competition. Given that doping at such times may well be more important than at the event, this may be a significant

obstacle. National governing bodies tend to take responsibility for such testing, while WADA administers tests at most major sporting events. Data for the late 1990s show that around 100,000 tests are administered annually, with around one-quarter of 1 per cent positive. Such low detection rates could indicate that sport is relatively clean or that the technology of doping is ahead of the technology of detection. It is clear that new technologies raise the feasibility of doping which will be undetectable (in particular gene therapies), even though this may be extremely dangerous for the athletes concerned (these therapies may have extreme side-effects). However, it is also likely that such therapies will be extremely expensive, restricting their adoption to a relatively small number of athletes. Moreover, adoption may itself be dependent on financial rewards.

V. MATCH-FIXING

Match-fixing occurs either because one side 'needs' to win to the extent that it is willing to make side-payments to persuade the other side not to make effort or to persuade the referees to make biased decisions, or because players or officials stand to gain financially from gambling on the outcome of a match. Both types of activity are specifically banned in most sports, and therefore these represent clear breaches of the rules.

Less clear is a third type of situation where a competitor, possibly in collusion with opponents, aims to produce a particular kind of result in a match (other than winning by the widest possible margin) which is convenient to them in the wider context of tournament play. This may not be explicitly prohibited within the sport, but can clearly serve to undermine the sport's credibility.

A famous example of this kind took place during a soccer match between Barbados and Grenada for the Shell Caribbean Cup in February 1994. The Barbados team had to win the match by at least two goals in order to face Trinidad and Tobago in the finals; anything less and Grenada advanced to the next round instead. The rules in effect at the time specified that if the score were tied at the end of regulation play, the match would continue into sudden-death overtime and the first team to score

⁷ In the case mentioned above, the court accepted USATF's position.

during the overtime period would be considered a two-goal winner. Barbados was leading 2–0 well into the second half of play, when Grenada finally managed to score a goal in the 83rd minute to make the score 2–1. The Barbados players realized with 3 minutes to play that they were unlikely to score again in the time remaining and deliberately kicked the ball into their own goal to tie the match at 2–2 and force an overtime period. Grenada then attempted to score in its own goal to prevent the match from going into overtime, but Barbados had already started defending Grenada's goal to prevent it from succeeding. The two teams then spent the remaining few minutes with Barbados defending both ends of the field as Grenada tried to put the ball into either goal, but time expired with the score still tied. Four minutes into overtime play, Barbados scored and advanced to the finals.

Another example, again arising from ill-designed tournament rules, arose in the Cricket World Cup of 1999. The tournament had multiple group stages, with teams advancing from the first to the second group stage, carrying forward points from matches against other teams which also progressed. It could therefore be in a team's interest to beat another team by the lowest possible margin in order to help their opponent in the match also to progress in the tournament (because they might be drawn against this team again in the later stages of the competition). This appears to have been exactly what occurred in the match between West Indies and Australia in June 1999, when Australia, confident of winning the match and guaranteed progression, slowed down their own scoring rate to a crawl so as to boost their opponents' chances of qualifying.

In neither of these examples was either side behaving outside the rules of the game, although clearly in a manner contrary to the spirit of the game. The problem is one of tournament design—if the contest rules create situations in which trying to win is not the optimal strategy, then such situations are likely to occur. A number of less extreme examples of this kind exist. In basketball, Taylor and Trogdon (2002) show that teams near the bottom of the standings in the National Basketball Association seem, in the past, to have tried to lose towards the end of the season, since the lowest rank team received the first draft pick for the following season.⁸ In many sports,

teams that have qualified for further stages of a tournament often fail to field their best team, which in some cases gives their opponents the chance to qualify ahead of some other rival (in English soccer there exists a rule requiring teams to field their best team in all matches, but this rule is largely unenforceable). Duggan and Levitt (2002) identify a form of reciprocity in sumo, where the probability of a given wrestler winning in a match that has a particular importance for his recognition in the sport (but not for his rival) is significantly in excess of the odds suggested by his career record. All of these cases point to flaws in the design of the rules, rather than deliberate attempts by the contestants to take actions that are outside the rules.

Match fixing has a long history in all types of sport going back to earliest times, but mostly in terms of cheating to win rather than gambling. Bribing opponents usually happens because the rewards for winning are highly asymmetric. This can happen in tournaments where one team has already qualified for a later stage of competition. In leagues with promotion and relegation there are often accusations of match fixing at the end of a season where one team in match is in danger of relegation. Once again, therefore, this appears as a contest design issue, where the structure of the competition creates perverse incentives in certain matches. These are costs, moreover, that need to be borne in mind when thinking about more elaborate systems and rule structures.

If the supporters or sponsors of one team value a win more highly than those of its rivals, then bribery is also more likely to be attempted (whether in relation to opposing players or match officials). In a match where the value attached to a win is rated equally by supporters or sponsors of both the contestants, there is less likelihood that bribery can succeed. Perhaps the fertile ground for match fixing in such cases is when a strong team plays a weak team which may stand to gain substantially more from success. This may happen, for instance, in contests between teams from richer nations against poorer nations.

This point illustrates that not all contests are equally susceptible to bribery, and this is also true of match fixing for the purposes of gambling. It is a widely

⁸ The draft is the system by which all college players entering the professional leagues each year are allocated to the teams

held view that gambling on sport leads almost inevitably to match fixing, and that as far as possible it should be banned. Indeed, in the USA, outside of Las Vegas, gambling on sporting events other than horse racing is illegal. However, gambling has been important for modern sports since their foundation. Cricket, perhaps the prototype of modern team sports, was in the eighteenth century to a large extent a vehicle for gambling between wealthy aristocrats.

Early baseball similarly attracted a huge amount of gambling interest. The 'barnstorming' teams of the 1860s, that went from town to town, relying on an unbeaten record to attract the crowds, became notorious for match-fixing scandals, part of which involved gambling (although, in part, it was the need to maintain a winning record in order to carry on barnstorming). The founders of the National League in 1876 were firmly of the view that regular league play based around stable teams was essential to eliminate match fixing. This, of course, did not necessarily eliminate the incentive to fix games, but gave the team owners much greater incentives to monitor such activities and take disciplinary action against perpetrators. In this they seemed to have had some success, but the issue arose again in the early years of the twentieth century, when talk of match fixing for gambling purposes became much more widespread. By this time, baseball had become firmly established as the US national sport, attracting around 6m spectators in 1910 to the 16 franchises, or roughly 375,000 per team. This amount of interest generated considerable betting activity. Most players were well paid compared to the national average salary (in the region of \$2,500 per year compared to \$500), but quite small amounts relative to the total income of a franchise (perhaps as little as 20 per cent) and small relative to the weight of money being staked. Moreover, baseball stars often lacked the money to live the celebrity lifestyle which the popularity of the sport now led them to expect.

Simply having the motive, however, is not enough to make a would-be match-fixer rich. Those who want to fix a match must have the ability to affect the outcome of the game. In general, this means star players deliberately throwing a game. The most famous example is the 'Black Sox' scandal, involving the loss of the 1919 World Series by the Chicago

White Sox. The White Sox were red-hot favourites to win the Series and most of the players were disgruntled with the relatively low salaries offered by Charles Comiskey, the team's owner. There is no doubt that several of the White Sox players were closely involved in organizing the fix, but the most famous of those implicated in it was 'Shoeless' Joe Jackson, a star batter who confessed to accepting \$5,000. The fixers badly needed to claim to the betting syndicates that Jackson was in on the fix because he was such a key player. In the event, Jackson had the best batting record of any player on either side in the Series. There is also evidence that he attempted to inform the team's owner about the fix before the Series began, and no single act which could be interpreted as attempting to throw the match has ever been identified. None the less, he was banned for life from organized baseball.

The most famous case of betting-related match fixing in English soccer occurred in the early 1960s. Until 1961, the maximum wage payable was fixed by agreement among the clubs, and at this date the maximum wage was £20 per week, little better than a good industrial wage. In addition to the weekly salary, players were entitled to a win bonus of £4 per match, and many players insured their bonus by betting on the opposition. When the match-fixing scandals came to light, many blamed the culture of gambling on this kind of practice. The scandal itself was revealed by a newspaper campaign which identified and obtained confessions from a number of professional players. It emerged that one player, Jimmy Gault, organized large numbers of players to throw games and then collect from bookmakers on bets predicting the outcome of two or three matches. Soccer betting then was entirely on a fixed-odds basis, meaning that the odds were fixed a week ahead of the match by the bookmakers and did not vary with the weight of money backing one side or the other (with variable odds it is harder to make money out of a fix, since the more you try to bet on the fixed side of the match, the less generous the odds become). In 1965, Gault and nine other players were found guilty of conspiring to defraud bookmakers and jailed, for 4 years in Gault's case. Bookmakers claimed to have lost substantial sums of money on fixes, for example £100,000 on a 'home double' at 6/4—suggesting £40,000 was staked. However, in many cases the bookmakers became suspicious and refused to pay out. Moreover, play-

ers themselves would have been unable to raise such large sums of cash when their average annual wages at the time would have been little more than £2,000. In other cases where the players admitted to staking their own money, their winnings were as little as £100.

A more recent case involves goalkeepers, whom it might be thought have better opportunities to affect the outcome 'single-handedly'. The goalkeepers of Liverpool and Wimbledon, both Premier League teams at that time, were accused of accepting bribes of between £20,000 and £40,000 to throw particular matches between 1993 and 1994 at a time when average Premier League salaries were around £150,000 per year. In one case, a player was alleged to be able to earn £125,000 for losing a single game. The source of these bribes was supposed to be Far Eastern betting syndicates. In the event, the case was dismissed. One of the players sued for libel, but lost on appeal and was left with legal costs of over £1m to settle.

Match fixing for gambling purposes has a history in cricket extending back to the eighteenth century (Underdown, 2000). In the 1990s such problems re-emerged as a major problem in the international game (see, for example, Bose, 2001; Piesse, 2001). Rumours prevalent for years gained substance through journalistic investigation and, most significantly, the chance discovery of evidence by Indian police probing into underworld activity. The King Commission (King, 2000) in South Africa revealed that the former South African captain, Hansie Cronje, had accepted bribes for fixing matches and suborned the corruption of other team members. The Qayyum Report (Qayyum, 1998) in Pakistan found the former Pakistani captain, Salim Malik, to have fixed matches and reported a failure to cooperate with its enquiry by another former captain, Wasim Akram, among others. The investigation by the Central Bureau of Investigation of the Indian Police Force (CBI, 2000) pointed to extensive corruption involving, among others, the former Indian captain, Mohammed Azharuddin, and also alleged the improper involvement of other international players, including former England, West Indies, Sri Lanka, and New Zealand captains and Australian players, with bookmakers (although some were later cleared of wrongdoing through lack of evidence). Most

recently, the report (Condon, 2001) of the investigation commissioned by the governing body of world cricket, the International Cricket Council (ICC), and led by the former UK Metropolitan Police Commissioner, Sir Paul Condon, referred to a 'climate of silence, apathy, ignorance and fear' persisting within the sport. All of this has seriously undermined the credibility of the international game.

Gambling in cricket is more complex than simply betting on the result, often involving betting on the number of runs scored, or wickets taken by the team and by individuals. It can even involve relatively trivial details, such as the order in which the batsmen appear and so on. The exact amounts being bet are relatively hard to identify, since much of it is run through illegal bookmaking operations in India, which seems to have been the source for a large proportion of the bribes. Cronje admitted to receiving around \$100,000 in bribes over a 5-year period, while his annual declared income was around \$250,000. In some cases, bribes in the region of \$300,000 were offered to the entire team to throw a single match.

One feature that these stories of match fixing have in common is the relatively small sums of money that individual players seem to be able to earn from match fixing, and how, in each case, the sums of money only seem large in relation to the salary levels of players involved. For example, Cronje's average match-fixing income of \$20,000 per year would be unlikely to offer a significant temptation to any modern soccer or baseball star. Moreover, some bookmakers have argued that difficulties inherent in match fixing (concealing the fix, laying large enough bets to profit from the fix but without raising suspicion, and preventing the odds from shifting so that the return becomes negligible) mean that match fixing for gambling purposes is much rarer than is commonly supposed (Sharpe, 1997). In the Appendix we develop a model to illustrate how match fixing could work as an equilibrium phenomenon in betting markets.

VI. CONCLUSIONS

Cheating is unlikely to disappear from sport. Indeed, for committed fans, belief in one's own team is more

easily preserved if it is possible to think that the opponents are cheats. It is not clear how much cheating has to occur before interest in the sport starts to suffer, but there certainly does not seem to be any clear evidence that scandals related to cheating have reduced interest.

Many of the cases of cheating discussed in this paper stem from perverse incentives in one form or another. These may be due to poorly drafted rules, but may also be a consequence of economic decisions that are privately optimal but not in the best interests of the sport. This, we argue, is the case with most match fixing for betting purposes, which seems to have flourished where salaries are low, largely owing to restrictions on payments imposed by team owners or administrators. These are cases where the incentive to win is not great enough.

By and large, however, most cheating seems to take place when the incentives to win are too great. Many people bemoan this aspect of modern sport, but in truth it reflects the enormous value placed on winning nowadays. This, in turn, reflects the fact that sports are normal goods and, for example, the ability of an entire nation to witness the success of the national team. The accelerating value of broadcast rights in part reflects the increasing value of success. Monitoring and punishment of offenders may restrain cheating to a limited degree, but punishments large enough to deter all cheating are simply not credible. As the value of sports personalities becomes ever greater, the cost of disciplining them increases as well. The only plausible way to diminish the incentive to cheat would be to reach a state of mind in which we all cared a little less about winning. Such a state of mind does not seem likely to materialize in the near future.

APPENDIX: A MODEL OF SPORTING CORRUPTION

We set out here a model which attempts to capture the features of a sporting and gambling environment predisposing a sport towards corruptibility and which is based on the experience of cricket in the 1990s as described in Condon (2001) or CBI (2000). Here, underground bookmakers, operating in circumstances of questionable legality and facing limited competition, attempted, successfully, to bribe players into manipulating the outcomes of matches.

(i) Agents and Sequence of Events

Three types of agent are involved: the bookmaker, the punters, and a sports player. The bookmaker is a local monopolist setting odds for a number of small punters.

The sequence of events is as follows.

- Nature draws types for the agents. The bookmaker is corrupt with probability β . The player is corruptible with probability γ .
- The bookmaker, if corrupt, offers a bribe to the player, if corruptible, who chooses to accept or not.

- The bookmaker sets odds on the event that a certain sporting outcome occurs.
- Punters form beliefs about whether the game has been corrupted and choose whether to bet.
- The game happens with the player deliberately underperforming if corrupted.
- Bets are settled.
- The sporting authorities choose whether to investigate; if they do, the player is punished if corrupt behaviour is uncovered.

There is equilibrium if:

- the player decides optimally whether to accept the bribe, if offered;
- the bookmaker chooses to offer a bribe and to set odds so as to maximize expected profits given the betting decisions and beliefs of punters;
- punters bet optimally given beliefs and odds;
- punters' beliefs ϕ are rational, given the bookmaker's and player's behaviour.

(ii) The Betting Market

The single risk-neutral bookmaker believes the uncorrupted probability of the event occurring to be P . Underperforming by the player can reduce this

probability by δ . The bookmaker takes bets on the event occurring at odds of z or against it occurring at odds $1/z$. (We ignore any over-round for simplicity.)

There are N punters, all assumed to share a common judgement of the uncorrupted probability of the sportsman achieving the outcome, $p > P$. Beliefs about the probability that corruption has occurred, ϕ , are formed in a common way given the observed odds. Each punter is risk neutral and has 1 unit to bet which they place on the event occurring if $z \geq (1-p + \phi\delta)/(p - \phi\delta)$ and against it occurring otherwise. (To simplify exposition we assume punters bet on the event in the case odds are judged fair.)

Whether corrupt or not, the bookmaker can make positive expected profits if punters bet on the outcome occurring. Consider, first, whether there is an equilibrium with honest and corrupt bookmakers distinguishing themselves by setting different odds. Since corrupt bookmakers would be revealed in the equilibrium they would maximize profits at $N(p - P)/(p - \delta)$ by setting the lowest odds persuading punters to place bets, given corruption. However, any lower odds set by an honest bookmaker would be attractive to corrupt bookmakers, who could always increase profits by setting those odds if it convinced punters they were honest. No such equilibrium can therefore exist.⁹

Consider, therefore, equilibria in which honest and corrupt bookmakers set the same odds in equilibrium, and in which punters' beliefs are therefore ϕ whatever the bookmaker's type. Profits are maximized by setting the smallest odds which persuade punters to bet on the outcome, $z = (1 - p + \phi\delta)/(p - \phi\delta)$. Neither type of bookmaker has reason to deviate from these odds—cutting the odds causes punters to bet the wrong way, and raising them reduces profit. Profits are $(p - P + (1 - \phi)\delta)N/(p - \phi\delta)$ if corrupt and $(p - P - \phi\delta)N/(p - \phi\delta)$ if not. The gain from corruption is therefore $\delta N/(p - \phi\delta)$.

(iii) The Player's Decision

The player earns a sporting wage w_1 which is higher than his or her outside option w_0 . If the outcome on

which the bets are placed occurs, then he or she also receives a prize M . Suppose the player is offered a bribe B to underperform. Corrupt behaviour will be discovered only with audit probability a but, if it is, the player will be barred from the sport and be fined an amount L . Honest players will never accept a bribe, but corruptible players accept if the expected monetary gain is high enough

$$(1 - a)[(P - \delta)(w_1 + M + B) + (1 - P + \delta)(w_1 + B)] + a(w_0 - L) \geq P(w_1 + M) + (1 - P)w_1.$$

The minimum bribe required to corrupt such a player is that which makes this an equality and is given by

$$B = \frac{a}{1 - a}[PM + (w_1 - w_0) + L] + \delta M.$$

(iv) The Corruption Decision

Profits from corruption net of the required bribe are

$$\frac{\delta N}{p - \phi\delta} - \frac{a}{1 - a}[PM + (w_1 - w_0) + L] - \delta M.$$

There is an equilibrium without corruption if these profits are negative given $\phi = 0$. In this case, corruption does not pay and the punters' beliefs would be confirmed. On the other hand, there is an equilibrium with corruption if these profits are positive given $\phi = \beta\gamma$. In this case, corruption would pay and would occur if both bookmaker and player were open to corruption, which happens with probability $\beta\gamma$ as required. If the required bribe is high enough, only the first type of equilibrium exists, whereas if it is low enough only the second type does. However, there is a range

$$\frac{\delta N}{p - \phi\delta} < \frac{a}{1 - a}[PM + (w_1 - w_0) + L] - \delta M < \frac{\delta N}{p}$$

over which multiple equilibria are possible. In this range, if punters expect corruption then high odds are needed to persuade them to bet on the outcome, and returns to corruption are high, whereas if they do not, then lower odds are required and corruption is not so attractive. Hence, beliefs about corruption can be self-confirming and multiple equilibria exist.

⁹ This would not be true if we relaxed some of our assumptions. In particular, introduction of risk aversion and diverse opinions among punters would introduce curvature into bookmakers' profit functions, which would open up the theoretical possibility of separating equilibria—see Preston and Szymanski (2003). However we neglect the issues which this raises here.

(v) Lessons

What we learn from the model is that the likelihood of corruption is increased by a number of factors which we can review in the context of the salient example provided by cricket:

- venality of bookmakers (high β); this is likely to be a greater problem if the sport is played in countries where gambling is illegal, as is the case in cricket;¹⁰
- large underground betting market (high N);
- venality of players (high γ); there seems little reason to expect this to differ between sports, though the tendency of cricket authorities to blame the problem on weakness of will among certain players seems to point implausibly to such an explanation;
- low detection rate (low a); Condon (2001) points to an inadequate ‘infrastructure of administration and control’ as a contributory factor in the rise of corruption and to the problems raised by inability of separate jurisdictions to pursue investigations beyond their own players and officials; whistle blowing and informing on malpractice were ignored or penalized and no structure existed to receive such allegations;
- poor enforcement (low L); Condon again refers to procrastination and ‘missed opportunities to deal with the problem’ with efforts to punish players hindered by ‘national pride and embarrassment’ and by the importance of players to national sides;
- low player wages (low $w_1 - w_0$); Qayyum (1998) draws attention to low pay of Pakistani cricketers as a contributory factor in the origin of corruption problems in that country and Condon also gives such explanations prominence; there is no doubt that the share of revenue accruing to players in cricket is substantially below that in other major sports; to a large extent, this must originate in the structure of the game, with dominance of international representative competition in which national eligibility rules prevent the emergence of a market for player talents;
- low prizes (low M); much of the corruption in cricket originated in proliferating One Day International games, where nothing of importance was really at stake.

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¹⁰ Legalizing gambling may be difficult in such countries for religious reasons. For example, Islamic countries, such as Pakistan and Bangladesh, have to take account of the Qur’anic prescription: ‘O ye who believe! Intoxicants and gambling, (dedication of) stones, and (divination by) arrows, are an abomination, of Satan’s handwork: eschew such (abomination), that ye may prosper. Satan’s plan is (but) to excite enmity and hatred between you, with intoxicants and gambling, and hinder you from the remembrance of God, and from prayer: will ye not then abstain?’ The Qur’an (trans. by A. Yusufali; 5, 90–1)

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