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## The Benefits Game of Sporting Events Participants' Integrity in the Context of Confidence Crisis

Huo Deli

Sports College, Hainan Normal University, Longkun South Road, Qiongshan District,  
Haikou, China 571158

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**Abstract:** While Chinese sporting events have gradually entered a rapid development track, some integrity issues of sporting events about the athletes, judges, organizers and managers are especially prominent at the same time which has produced many negative effects on sports competition market. In the context, participants' integrity problems are analyzed by the benefits game during the operation of sporting events in the paper. The results show that it is critical to choose integrity for athletes, referees, organizers and managers' long-term interest as well as the benign operation and healthy development of sporting events.

**Key words:** Sporting events, integrity, game

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### INTRODUCTION

As Chinese sports industry is developing rapidly, there have also been a lot of problems, of which the integrity issues are more prominent. Trust isn't only the basis for teamwork, but also the premise of healthy operation of social economy. Because market economy is on the basis of the social labor division and the exchange of labor products, both sides of exchange must regard the trust as the precondition and orient towards the mutual cooperation. Trust makes both sides of exchange not need to spend time and cost in the estimation and prevention of the exchange counterpart' probable behavior as it also makes the operation of market and the efficiency of social organizations improved greatly. Therefore, some researchers believe that trust is an important source of economic growth and social prosperity (Yan, 2007). However, with the development of Chinese sports events, the situation that lacks of honesty is more serious in sports competitions which has jeopardized the benign operation and healthy development of sporting events. The integrity problems of our country's sporting events are mainly manifested as follows: Athletes pursue fame and fortune by any means such as match-fixing, doping, identity and eligibility fraud etc.; When the banned situation appears about athletes, the relevant personnel including coaches will defend and cover for them; Referees violate seriously the principle of fairness in sports competition by the wrong or lost judgment on purpose, favoring one party and rectifying the other party deliberately and cheating call for their own or a group interests; While participating organizations hire temporarily some athletes from other institutions to

join competition in order to get good results, excellent sports teams take the opportunity to become the short-term athlete transport operators. Although this can fulfill some persons' wishes and also make some other persons derive substantial extra-budgetary revenue, the integrity status of sporting events is severely damaged. All of these indicate that there is a serious non-honest phenomenon in sporting event which not only damage the social trust system and its fundamental order of our country to lead to a severe contraction in sports marketing, but also undermine the spirit of sport and affect the international image of our country. With the situation getting worse and worse, the trust problems of sporting events as social concerns is not only increasingly valued by their organizers, but attached also more importance by scholars. The meaning and sources of trust in sport economic activities are discussed, the main features of trust in the different historical periods of Chinese sport economic activities and the formation reasons for the current low level of trust are analyzed and the corresponding measures to build trust are presented by Cheng (2006). Taking a high level of college basketball players as a sample, the relationships between the team trust and its antecedents as well as outcomes are discussed through the basketball team trust measurement scale compiled by Yu (2009). The causes and manifestations of integrity problems in sports competition are investigated from the perspective of different disciplines by Wang (2007). According to Chinese economic and cultural backgrounds, sports management mechanisms and incentives in the process of transition, the causes of honesty absence of Chinese sports sector are probed and the countermeasures are proposed on the

basis by Lu *et al.* (2006). It is found by referring to relevant literatures that no scholars explore the issue of trust on game theory although some of them are concerned about the research work of sporting events trust issues and has made some progress. Based on the trust crisis of Chinese sport events, their participants' integrity problems are analyzed on game theory to make the participants understand fully the important role of honest behavior in achieving the long-term interests in the paper which is very significant for the benign operation and substantial development of sport events and the future prosperity of sports market.

### **BENEFITS GAME OF SPORTING EVENTS PARTICIPANTS' INTEGRITY**

**Related theories about sporting events participants:** Although there are many actors involved in the operation of sport events, a few major participants are discussed for the purpose of research in the study.

**Referees:** Referees are both competition law officers and its organizer and leader. The level of referees will impact directly on athletes' technical and tactical implementation and the game results. Generally, being a qualified referee should have the qualities as follows: (1) Love sports, be loyal to the refereeing, have a high professional ethics and be able to enforce the law fairly; (2) Have a high professional quality which is mainly manifested as understanding competition rules and referee law, being proficient in technical and tactical knowledge and methods and grasping the general laws and features of sport events; (3) There is a strong sense of responsibility. For example, when some unforeseen circumstances arise in the event, being a referee should be timely, calm and decisive to respond in order to prevent the further deterioration of the situation, or win more time for the effective treatment of accidental events in addition to trying their best to do their work; (4) Referees have a good personal image in the stadium which is said that the referee focus on their dress and keep proper demeanor there. In addition, as for referees, especially those engaged in large-scale sporting events, their daily behaviors are able to cause the attention of the media and public, therefore they should also pay attention to their daily life style. If the referees miss the required qualities, the spectators will question their refereeing ability so that the impartiality and objectivity of sporting events results are distrusted.

**Athletes:** The reason why athletes' oath ceremony has been advocated at the Olympics by Pierre de Coubertin as

early as 1913 is because of the fact appeared at that time that some athletes break the rules by fraud in order to win the gold medal. Later, the ceremony is imitated universally by a variety of sporting events. However, athletes' dishonesty still often occurs in various sports until now. Specifically, it is manifested that athletes' daily life style issues are serious; athletes are of negligence and professionalism absence; they pursue the fame and fortune unscrupulously; and they violate the rules and use violence deliberately etc..

**Sporting events managers:** The dishonest of competition managers is the important reason why lead consumers largely distrust sporting events. For example, many taekwondo and boxing players abandoned the competition in recent sessions of the National Games and judo player fell to the ground gently. Superficially, the main reasons for the incidents are caused by athletes, but it is actually the result that managers manipulate behind the scenes. These problems that event managers abuse their power to manipulate the results of the competition, lack of responsibility, have serious bureaucracy and be short of the transparency of the decision-making processes and so on don't only make the majority of sporting events consumers lose confidence in event managers themselves, but also indirectly lead to a number of the related troubles about the trust of sporting events. Related theories about the game: Game theory is the science of strategy. It attempts to determine mathematically and logically the actions that "players" should take to secure the best outcomes for themselves in a wide array of "games." More formally, game theory refers to the process that relying on the available information, an individual or organization, faced with certain environmental conditions, makes a selection and implements it from their own conduct and strategy in a certain constraint and then obtains the respective results or gains from themselves. This reason using the game theory to investigate the integrity problems of sport events operations is because of the fact that managers, referees and players' final act could be explored to provide a theoretical basis for the relevant decisions of sporting events according to the particular environment of sporting events when a certain constraint rules and related information are owned.

Game classification can be divided into three aspects. Firstly, game theory can be divided into static game and dynamic game according to the order of participants. Static game refers to the fact that participants make a selection simultaneously or the next actors won't know what kind of concrete action the initial actors will take though they won't make the concurrent choice in the

game. Dynamic game refers to the fact that the participants' action sequence is different and the later is able to observe the former's actions selected in the game. It is understood popularly that prisoner's dilemma is of the simultaneous decision, belonging static game and the other decisions or actions like the chess games have the sequence, belonging to the dynamic game. Secondly, game theory can be divided into complete information game and incomplete information game according to the degree that participants understand the others. Complete information game indicates that each participant has accurate information on other participants' characteristics, revenue functions and strategy space in the process of game. If the participant is not accurate enough to know the characteristics, strategy space and payoff function of other participants or hasn't precise information on all of the participants, the game belongs to incomplete information game in this case. Thirdly, the game can be divided into cooperative and non-cooperative game according to the status of cooperation between participants. The difference between them lies in the fact whether there is a binding agreement or not between the parties influenced mutually. If there is, it is a cooperative game and if not, it is non-cooperative game. Cooperative game theory is more complicated than the non-cooperative game theory and its theory maturity is far less than that of non-cooperative game theory. Non-cooperative game could be divided into the static game of complete information, the dynamic game of complete information, the static game of incomplete information and the dynamic game of incomplete information.

**BENEFITS GAME OF PARTICIPANTS' INTEGRITY IN THE OPERATION OF SPORTING EVENTS**

The Nash equilibrium mentioned in traditional games belongs to the static game of complete information. Because there is not successive decision problem among the event managers, referees and players in the paper while make decision, it is a static game; as the understanding degree of all participants is known, it is complete information game; and the cooperation relationship doesn't exist for all participants in the long run. For this reason, the problems discussed in the paper belong to the static game of complete information of non-cooperative game. If there is the optimal solution, it is Nash equilibrium. According to the game theory above, it is assumed that the probability the event managers, referees and players perform integrity is respectively  $P_1$ ,  $P_2$  and  $P_3$  (the level of probability indicates the likelihood that the participants perform the integrity). If the probability is equal to 1, it indicates that participants will

Table 1: The integrity payoff matrix of managers, referees and players in the operation of sporting events

		Honesty (Referee)	Dishonesty (Referee)
Honesty (manager)	Honesty (player)	$(a_1, b_1, c_1)$	$(a_2, b_2, c_2)$
	Dishonesty (player)	$(a_3, b_3, c_3)$	$(a_4, b_4, c_4)$
Dishonesty (manager)	Honesty (player)	$(a_5, b_5, c_5)$	$(a_6, b_6, c_6)$
	Dishonesty (player)	$(a_7, b_7, c_7)$	$(a_8, b_8, c_8)$

choose honesty; if the probability is equal to 0, it indicates that participants will choose dishonesty. However, for the practical problems, managers, referees and players can only make one choice between honesty and dishonesty without the third choice, so it can be assumed that the corresponding payoff matrix is as Table 1.

In the Table,  $a_i, b_i, c_i$ , represent respectively the expectations of payment about the sporting events managers, referees and players under different decision. Taken  $(a_i, b_i, c_i)$  as an example, they represent managers, players and referees' payment under dishonesty decisions. In the long run, managers, referees and players will gain regular income in the case of three parties' honest, so it can be considered to be " $a_1 > 0, b_1 > 0, c_1 > 0$ "; when the managers and player keep honest and referees are dishonest, referee's compoment will affect greatly the expected revenue of managers and players, so it can be considered to be " $a_2 > 0, b_2 > 0, c_2 > 0$ ". Correspondingly, it can be obtained to be  $a_3 > 0, b_3 > 0, c_3 > 0, a_4 > 0, b_4 > 0, c_4 > 0, a_5 = 0, b_5 > 0, c_5 > 0, a_6 > 0, b_6 > 0, c_6 > 0, a_7 = 0, b_7 > 0, c_7 > 0, a_8 > 0, b_8 > 0, c_8 > 0$ .

For any participant, all hope that the more contented expected revenue is the better. According to the game theory, the results can be obtained as follows: the expected revenue of managers, referees and players is  $\pi_1, \pi_2$  and  $\pi_3$ .

$$\pi_1 = P_1 P_2 P_3 a_1 + P_1 P_2 (1 - P_3) a_2 + P_1 (1 - P_2) P_3 a_3 + P_1 (1 - P_2) (1 - P_3) a_4 + (1 - P_1) P_2 P_3 a_5 + (1 - P_1) P_2 (1 - P_3) a_6 + (1 - P_1) (1 - P_2) P_3 a_7 + (1 - P_1) (1 - P_2) (1 - P_3) a_8$$

$$\pi_2 = P_1 P_2 P_3 b_1 + P_1 P_2 (1 - P_3) b_2 + P_1 (1 - P_2) P_3 b_3 + P_1 (1 - P_2) (1 - P_3) b_4 + (1 - P_1) P_2 P_3 b_5 + (1 - P_1) P_2 (1 - P_3) b_6 + (1 - P_1) (1 - P_2) P_3 b_7 + (1 - P_1) (1 - P_2) (1 - P_3) b_8$$

$$\pi_3 = P_1 P_2 P_3 c_1 + P_1 P_2 (1 - P_3) c_2 + P_1 (1 - P_2) P_3 c_3 + P_1 (1 - P_2) (1 - P_3) c_4 + (1 - P_1) P_2 P_3 c_5 + (1 - P_1) P_2 (1 - P_3) c_6 + (1 - P_1) (1 - P_2) P_3 c_7 + (1 - P_1) (1 - P_2) (1 - P_3) c_8$$

The simplified results are as follows:

$$\pi_1 = P_1P_2P_3a_1 + P_1P_2(1-P_3)a_2 + P_1(1-P_2)P_3a_3 + P_1(1-P_2)(1-P_3)a_4 + (1-P_1)P_2(1-P_3)a_6 + (1-P_1)(1-P_2)(1-P_3)a_8$$

$$\pi_2 = P_1P_2P_3b_1 + P_1P_2(1-P_3)b_2 + P_1(1-P_2)P_3b_3 + P_1(1-P_2)(1-P_3)b_4 + (1-P_1)P_2P_3b_5 + (1-P_1)P_2(1-P_3)b_6 + (1-P_1)(1-P_2)P_3b_7 + (1-P_1)(1-P_2)(1-P_3)b_8$$

$$\pi_3 = P_1P_2P_3c_1 + P_1P_2(1-P_3)c_2 + P_1(1-P_2)P_3c_3 + P_1(1-P_2)(1-P_3)c_4 + (1-P_1)P_2P_3c_5 + (1-P_1)P_2(1-P_3)c_6 + (1-P_1)(1-P_2)P_3c_7 + (1-P_1)(1-P_2)(1-P_3)c_8$$

Based on Nash equilibrium theory, the problem discussed in the paper belongs to the static game of complete information, so there is one solution at least when the range of the payoff matrix is given. The expected revenue of the event manager ( $\pi_1$ ) is explored firstly. Judging from the composition of  $\pi_1$ ,  $a_i$ ,  $i = 1, 2, 3, 4$  is positive, so the larger its previous coefficient is the better and  $a_i$ ,  $i = 6, 8$  is negative, so the lower its previous coefficient is the better (the best is zero). In referee's expected return  $\pi_2$ ,  $b_i$ ,  $i = 1, 3, 5, 7$  is positive, so the larger its previous coefficient is the better and  $a_i$ ,  $i = 2, 4, 6, 8$  is negative, so the lower its previous coefficient is the better. In player's expected return  $\pi_3$ ,  $c_i$ ,  $i = 1, 2, 5$  is positive, so the larger its previous coefficient is the better and  $c_i$ ,  $i = 3, 4, 6, 7, 8$  is negative, so the lower its previous coefficient is the better. Comparing managers, referees and players' payoff matrix values on comprehensive analysis, the three parties' common expectation can be achieved only when  $(a_1, b_1, c_1)$  is selected. For example, when  $(a_2, b_2, c_2)$  is selected, managers and players hope to achieve  $(a_2 > 0, c_2 > 0)$ , but the referee does not want to achieve  $(b_2 < 0)$ , so only when three parties select the integrity together, Can the equilibrium ( $P_1 = 1, P_2 = 1, P_3 = 1$ ) be reached at last.

Then as  $(a_i, b_i, c_i)$   $i = 1, 2, \dots, 8$  in the payoff matrix is given specific values, the Nash equilibrium solution computed by using "Gambit" game analysis software is the situation that managers, referees and players select the integrity simultaneously. The calculation result of payoff matrix is shown as Table 2. The result indicates that there is the only Nash equilibrium solution in the

Table 2: The Decision payoff matrix of managers, referees and Players in the operation of sporting events

		Honesty (Referee)	Dishonesty (Referee)
Honesty (manager)	Honesty (player)	(1,1,1)	(1,-1,1)
	Dishonesty (player)	(1,1,-1)	(1,-1,-1)
Dishonesty (manager)	Honesty (player)	(0,1,1)	(-1,-1,-1)
	Dishonesty (player)	(0,1,-1)	(-1,-1,-1)

game, namely when managers, referees and players choose integrity, it is the final decision.

### CONCLUSIONS

The problem discussed in the paper belongs to the static game of complete information, so there is one solution at least when the range of the payoff matrix is given. It is known by the game analysis results above that although some short-term gains will be brought to some party by taking dishonest behavior in the operation of sporting events in the short term, three parties' expected revenue can be optimal, only when the event organization and management personnel, referees and players simultaneously choose the integrity which is very important for the benign operation and healthy development of sporting events in the long run.

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