Perspectives on Fairness in Sport

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Outline

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Motivation 1/2

- A UK Sport report finds that Olympic and Paralympic sports contribute £18.9bn to the UK economy, with 620,000 people employed.
- In order to maintain this contribution to the economy, the interests of many stakeholders should be considered.
- Some of the key stakeholders include:
  - Competitors/Players who want a fair competition with rules that are clear and are appropriate to the sport/competition

Motivation 2/2

- TV companies that invest heavily to obtain the broadcasting rights
- Spectators (watching live and on TV) who want to be entertained
- Sports governing bodies who are are concerned about the future of their sport
- Sponsors

Study 1: Field sizes for the PGA Tour

We outline the study reported in

N.G. Hall, C.N. Potts, Field Size Management in Professional Golf, Unpublished report, 2009.

- The PGA Tour operates in the US
- In 2008: 49 PGA Tour events in 45 weeks
- 6-year (2007-2012) TV contracts amounted to $2.5b - $3b
- Problems sometimes arose because large field sizes on the final day caused a late completion of the tournament with TV schedules disrupted
- The key issue is how to control field sizes while maintaining fairness to the players

The Cut Problem (1 of 2)

- Most PGA Tour tournaments start with 156 players, who play four 18 hole rounds (Thursday through Sunday)
- About half the players "miss the cut", do not finish the tournament, and receive no prize money
- The main reasons for having a cut are:
  - to simplify the administration of the final round(s)
  - to create a manageable field size for TV presentation
- The cut problem is in principle very simple: when to administer the cut, and what rule to set in advance about how many players "make the cut" and complete the tournament
- There are competing interests: tour administrators, TV companies, players and spectators

The Cut Problem (2 of 2)

- Argument for larger field sizes: fairness to players who continue to compete and may improve their position through better play (the eventual winner, Faxon, of a tournament in 2007 was 12 behind after the second round and then shot 65 and 61 in the last two rounds)

- Arguments for smaller field sizes

  - Improves the speed of play, increasing the enjoyment for players and spectators alike

  - The tournament completes within the scheduled TV time, which keeps TV companies happy

Cut Rules Used (1 of 2)

- Through the end of 2007: After two rounds, the top 70 players plus ties.

  The motivation for changing this rule that had been used for many years was to reduce the field size, in response to complaints about the event overrunning its allotted TV time.

- From 3/1/2008 through 24/2/08: After two rounds the top 70 players plus ties. But if this number is more than 78, then the number closest to 70.

  Example: on 25/1/08, a field of 85 players was cut to 66 under this secondary rule.

Cut Rules in Use (2 of 2)

- During January and February 2008, the new cut rule resulted in numerous complaints from the players and much mockery in the media. Among the problems were: (a) players thought they had made the cut when they had not; (b) the players eliminated by the secondary rule received no prize money when they were expecting the chance to earn some. A new cut rule was needed!

- In February 2008, we sent a report to the PGA which was resulted in them telephoning us. They were adamant that there would be no cut at the end of round 3

- From 28/2/08 to date: After two rounds, the top 70 players plus ties. But if this number is more than 78, then again after three rounds, the top 70 players plus ties.

Tournament Data for our Tests

Tournament data

- All full-field tournaments on the PGA tour starting from January 2002 and ending in November 2007
- Tournaments with a different cut rule were excluded
- Tournaments with less than 70 players completing all four rounds were excluded

The final data set contains 198 tournaments.

A range of cut rules were tested on these tournaments.

Possible Cut Rules

- Based on ranking of players
  - -Top 70 plus ties if less than 78 players; other-wise, closest number of players to 70
  - - Top *n* players plus ties **for *n* = 55, 60, 65 or 70.**
- Based on score relative to leader
  - - Within s shots of leader, for s = 8, 9 or 10
- Based on score relative to fifth placed player
  - - Within *s* shots of fifth placed player **for s = 5, 6 or 7**
- Based on a combination of the above rules

Findings

- The 70/78 rules used in Jan-Feb 2008 performs well in terms of field size and fairness despite its unpopularity with the players due to uncertainties.

- The composite top 65 plus any player within 6 shots of fifth place is similar in performance to 70/78 offering slightly better fairness (not eliminating players who had high finishing positions) at the expense of a small increase in field sizes.

Study 2: Redesign of the FedEx Cup

- Initiated in 2007
- Season-long points competition, followed by a three tournament playoff series
- Entry into the playoff series events for the top 125, but only 30 progressing into thre final tournament
- Each playoff series event is a standard 72-hole stroke play competition
- Under the current points system, the top 5 players entering the last event (The Tour Championship) "control their own destiny", and all 30 players have a nonzero probability of winning

The FedEx Cup (1 of 3)

We outline the study reported in:

N.G. Hall, C.N. Potts, A Proposal for Redesign of the FedEx Cup Playoff Series on the PGA Tour, *Interfaces* 42 (2012), 166-179.

The FedEx Cup (2 of 3)

The FedEx Cup is an end-of-season playoff for the PGA Tour that started in 2007. It comprises 3 events, finishing with the Tour Championship.

- Using a points system, the top 125 players from the regular season compete in the first two events.
- The top 30 players compete in the final event, the Tour Championship. The points are reset at the start of this event, so that any of the top four are guaranteed of winning the FedEx Cup if they win the Tour Championship.

The FedEx Cup (3 of 3)

- In 2007, Tiger Woods won before the last event.
- In 2008, Vijay Singh won the first two playoff events, and only had to turn up to win the Fed-Ex Cup
- In 2008, 2009, 2010, 2017, 2018 the winner of the Tour Championship did not win the FedEx Cup.
- In 2019, the points system will be changed so that the winner of the Tour Championship will win the FedEx Cup.

Who's the Winner here?

In 2009, Phil Mickelson won The TOUR Championship, but Tiger Woods won The FedEx Cup on the same day.

Proposed Redesign of the Tour Championship (1 of 3)

Make The TOUR Championship a match-play event: this is the usual playoff format in other major sports, is exciting and unpredictable, and gives more players a realistic chance to win.

This will also ensure that the winner of the Tour Championship also wins the FedEx Cup.

Proposed Redesign of the Tour Championship (2 of 3)

- Players accumulate points, as under the current system
- The top 28 players are admitted into The TOUR Championship
- The accumulated point totals are not used again
- The TOUR Championship is a strongly seeded eight round match play event
- The finishing order of the players at The TOUR Championship determines the FedEx Cup finishing order, possibly with a tie breaking rule

Proposed Redesign (3 of 3)

The TOUR Championship

- Round 1: R21 vs. R28, R22 vs. R27, etc.
- Round 2: 4 winners vs. R17-R20 (high vs. low)
- Round 3: 4 winners vs. R13-R16 (high vs. low)
- Round 4: 4 winners vs. R9-R12 (high vs. low)
- Round 5: 4 winners vs. R5-R8 (high vs. low)
- Round 6: 4 winners vs. R1-R4 (high vs. low)
- Round 7: 4 winners (high vs. low)
- Round 8: Final and 3th/4th place match

Probabilistic Analysis

Rank	F1	F2	F3	F4	FT5
R1	16.5	15.2	13.7	12.7	41.8
R2	15.3	14.4	13.1	12.3	44.9
R3	14.1	13.3	13.3	12.4	47.0
R4	13.2	12.7	13.0	12.3	48.8
R5 (Excl. 42.5)	7.1	7.1	7.2	7.1	29.1

The table shows the % probability of a player with a rank between 1 and 5 finishing in position 1 through 4, or tied for 5th place. The fifth ranked player has a 42.5% chance of finishing tied for 9th.

A player ranked 1st through 4th wins 59.1% of the time.
A player ranked 5th through 8th wins 24.9% of the time.
A player ranked 9th through 12th wins 10.1% of the time.
A player ranked 13th through 16th wins 3.8% of the time.

Findings

- The proposed match-play ensures that the winner of the final event is the overall winner
- Players with higher points at the start of the final event benefit from later entry into the competition and are guaranteed a higher finishing position
- All players control their own destiny
- When the new points system is introduced, a further evaluation of the stroke play versus match play format can be made.

Success Stories: Modern Pentathlon

Until 2009, the Modern Pentathlon involved Swimming, Fencing, Riding, Shooting and Running, where points are awarded for each event and the winner having the most points. It is not clear to the spectator who has won until the total points have been added up after the Running.

From 2009, Shooting and Running were combined into a single event. The points gained determine when each athlete will start, so that the first to complete the course is the winner. This is a great improvement to the spectator.

Success Stories: Omnium

The original omnium had six events. The finishing position of each competitor are added together, and the winner is the cyclist with the lowest total. It is difficult for spectators to keep track of who is winning.

The new omnium has four events. Points are awarded for the first three races, with 40 for the winner, 38 for the second, etc. The final event is a points race, with initial points being the total accumulated in the first three events. The winner is the cyclist with the most points after the last race.

Success Stories: ATP Finals

The 8 tops players compete in the ATP Finals. Two groups of 4 players compete in a round robin, with the first and second in each group progressing into the semi finals.

A positive aspect is the dynamic scheduling of the round robin phase. In the second round, the two winners play each other and the two losers play each other. The result will be:

1 player with 2 wins

2 players with 1 win

1 player with 0 wins.

This results in the third round being competitive.

Rules Failing to Stop Unsporting Behavior: Cricket

A match between Worcestershire and Somerset in 1979 lasted less than 3 overs because Somerset batted first and declared after one over.

Somerset's motivation was that they would qualify for the next round of the tournament even if they lost, provided that their current net run rate did not decrease.

The rules were changed shortly after.

Rules Failing to Stop Unsporting Behavior: Badminton

During the London Olympics in 2012, the womens doubles resulted in several disqualification. In the round robin phase, the best pair had unexpectedly lost a match and would only finish second in their group.

There was motivation in the other group to finish second rather than win the group. In one match, both teams were trying to lose!