

Soccer: When taking a red card, timing can be everything

By **Daniel Altman** The New York Times

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Anyone who follows sports knows there are certain situations in which it is better to commit a foul than give an opponent a chance to score. But when, exactly, is the right time to incur the referee's wrath?

Last month, the Champions League final in Paris between Barcelona and Arsenal presented such a situation. In that game, Samuel Eto'o of Barcelona, the striker from Cameroon, was racing toward goal early in a scoreless match. Eto'o had already beaten Arsenal's defense, and only Jens Lehmann, the German national team's first-string goalkeeper, could stop him. Eto'o, one of the top forwards in the world, nipped the ball past Lehmann, and it was then that Lehmann faced a decision: foul Eto'o and risk expulsion from the match, or let him pass for a certain goal. Lehmann grabbed his ankle and sent him reeling. The referee, Terje Hauge of Norway, whistled the play dead and showed Lehmann a red card, thus ending his participation in the biggest match of the European season after less than 18 minutes. Ronaldinho failed to score on the resulting free kick. But Arsenal had to play the rest of the match with 10 men instead of 11, and lost, 2-1.

Did Lehmann make the right decision from a statistical perspective? For Geert Ridder of the University of Southern California and his co-authors in research, the answer is yes. They analyzed Dutch professional soccer from 1989 to 1992, using the assumption that the defending player's objective was to minimize the probability of losing the match - a decent model for the Champions League final, and for the knockout rounds of the World Cup. The researchers found that with two evenly matched teams, as a tournament's two finalists often are, a player should foul to avert a certain goal anytime after the 16th minute. Lehmann acted prudently, with a minute to spare.

But what about games in the World Cup's group stage? Michael Wright, a senior lecturer in management science at Lancaster University in Britain, and Nobuyoshi Hirotsu, one of his former doctoral students, used data from the 1999-2000 English Premier League to see what would happen if a defender instead tried to maximize the number of points his team took from the match. In the English leagues (and others around the world), as in the World Cup's group stage, teams receive 3 points for a victory, 1 for a draw and 0 for a loss.

The Lancaster researchers, again looking at evenly matched teams, found that the defender should always foul to avert a certain goal if his team is losing by one or two goals, and should never foul if his team is leading by two goals or more. If his team is winning by one goal or the game is tied, the gains by fouling begin from 7 to 13 minutes through the first 45-minute half, depending on whether the team is playing at home or away.

Wright and Hirotsu also discovered that committing the foul increased the chances of winning much more for the team that is already leading. The gains for the losing team are not so large. But in a few situations, like when one team is leading by a goal between minutes 28 and 41, a red card against that team actually improves both clubs' chances of winning; only the probability of a draw is reduced.

The question was recently asked in a different way by Marco Caliendo, a senior research associate at the German Institute for Economic Research in Berlin, and Dubravko Radic, an assistant professor of retailing and service management at the University of Wuppertal: How much does it matter that a red-carded player's team is reduced to 10 men for the rest of the match? They used records of the World Cup tournaments from 1930 through 2002 to measure the effect of red cards. To hone their results as finely as possible, they considered only red cards awarded when a game was tied and neither team had a home advantage.

Caliendo and Radic found that a red card did not give either team an advantage in scoring after roughly the 60th minute of a 90-minute match. Absorbing the card and the expulsion was clearly preferable to allowing a goal as the match drew to a close. Earlier in the match, however, red cards actually raised both teams' chances of scoring, but the 11-man team gained a strong advantage.

So if Michael Ballack of Germany is steaming through the Costa Rican defense on Friday in the opening match of the World Cup, will the men at the back glance up at the clock before deciding whether to take him down? There is usually not time to think in such situations. But if it happens late in the second half, they shouldn't think once - let alone twice.