POD 3.6

The luck of the score: Partition of variance for performance analysis of team sports

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Team sport is won or lost on the scoreboard. Journalists write narratives around the result while fans exit the stadium in a dichotomy of elation or despair. This outcome bias also affects coaches, who are more likely to reinforce their strategy after a win than a loss – even a narrow loss (Lefgren, Platt & Price, 2012). A losing coach with a good grasp of key performance indicators (KPIs) may be able to claim that his team was somewhat unlucky to score less than its opposition, but that reasoning is often dismissed as a self-serving excuse by the sporting public.

In reality, a sports match is a complex process with thousands of natural random effects: the bounce of the ball, a gust of wind or slightly softer turf. When we record qualitative events inside the match, often it is a measurement of a spontaneous symmetry breaking, e.g. Player A takes possession instead of Player B, or Player C kicks the ball into the post not the goal.

Coaches and observers would like to derive a more robust metric of team performance than the scoreboard. This metric must be unbiased, i.e. averaged over a number of matches it should asymptotically approach the scoreboard average. It must also demonstrate lower variance across measurements and predictive power than the raw score.

The method employed in this paper is to segregate various independent KPI events, measure the characteristic size of each event's impact on scoreboard equity (O'Shaughnessy, 2006), and attempt to describe their natural variation using binomial variables. The outcome is a partition of gross score margin into its causes, both structurally on the field and as a best estimate of the 'luck' involved. As a demonstration, Australian Rules Football data is analysed, and a methodology for cricket performance analysis is introduced.

Lefgren, L., Platt, B., Price, J. (2012) Sticking with what (barely) worked: A test of outcome bias. *NBER Working Papers № 17477*.

O'Shaughnessy, D.M. (2006) Possession versus position: Strategic evaluation in AFL. *Proceedings of the 8th Conference on Mathematics and Computers in Sport*. (Published in a condensed form in *Journal of Sports Science and Medicine, 5:* 533-540)