Fairly Random: Impact of Winning the Toss on the Probability of Winning

Gaurav Sood
gsood07@gmail.com

Derek Willis
dwillis@gmail.com

September 1, 2015

In nearly all cricket matches, it is claimed that there is a clear advantage to bowling (batting) first. The advantage is pointed to by commentators, by team captains in the pre-toss interview, and by the captain of the losing team in the post-match interview. This isn't to say that there is actually an advantage to winning the toss. For it may be impossible to predict well in advance the advantage of bowling or batting first. Or it may be that teams squander the potential advantage by using bad heuristics to choose what they do.

The opportunity to choose whether to bowl or bat first is decided by a coin toss. While this method of granting advatange is fair, on average, the system isn't fair in any one game. At first glance, the imbalance seems inevitable. After all, someone has to bat first. One can, however, devise a baseball like system where short innings are interspersed. If that violates the nature of the game too much, one can easily create pitches that don't deteriorate appreciably over the course of a game. Or, one can come up with an estimate of the advantage and adjust scores accordingly (something akin to an adjustment issued when matches are shortened due to rain).

But before we move to seriously consider these solutions, we may ask about the evidence.

Data are from 43,185 first-class men's cricket matches.[1] It is a near census of the relevant population. We have data on all types of matches: 20-20, one-day, and five-day.[2] Of these matches, we do not have data on the toss for 2,807, or roughly 7%, of the matches. The primary reason we don't have data on these matches is because the match was abandoned without play. We exclude data from these matches.

In limited overs cricket, a minimum number of overs must be bowled to establish a result. In a one-day match, for instance, each side must bat at least 20 overs for a result to be declared. In 706 matches, or roughly 1.7% of the remaining matches, not enough overs were bowled to get a

[1] You can find the scripts used to scrape the data, the final data set, and scripts used for analysis at: http://github.com/soodoku/get-cricket-data/.

[2] In English county cricket, first-class matches last four days. Some first class matches last two days. Yet others three days. Some last just a day. And till a particular point, a test match lasted as long as it was needed to finish a game. We elide over these differences in our analyses.

result. We exclude these matches from our analysis. This leaves us with 39,672 matches. We analyse these data.

In cricket matches, three results are possible – a draw, a win, or a loss. We look at draws – a common outcome in matches in which overs aren't limited – later on. For now, we focus on winning and losing. We elide over the small issue of differential number of draws across formats by estimating the difference in probability of winning and losing.

The team that wins the toss wins the match 2.3% more often than lose it. This is a reasonable sized advantage – though likely much smaller than the number that most commentators carry in their heads – in a competitive sport. This advantage, however, is highly variable by format, by conditions, and by whether or not a particular formula was used to adjust scores when it rained. Some of the variability is expected (but as we will see, expectations are often dashed). It is often claimed that the toss is more crucial in day and night matches, due to dew and lower visibility of the white ball under lights. And it is often claimed that the toss is more important in tests than one-day matches. To the results then.

Figure 1: Percentage of Matches Won Minus Matches Lost After Winning the Toss by Type of Match

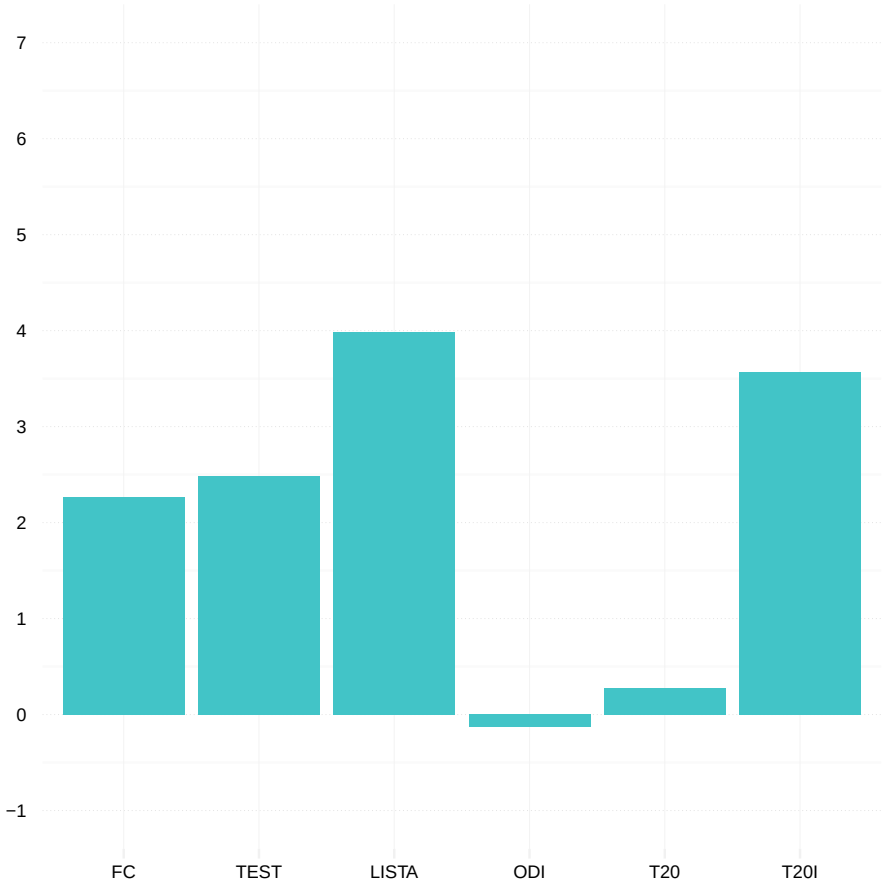

Figure 2: Percentage of Matches Won Minus Matches Lost After Winning the Toss By Day/Night

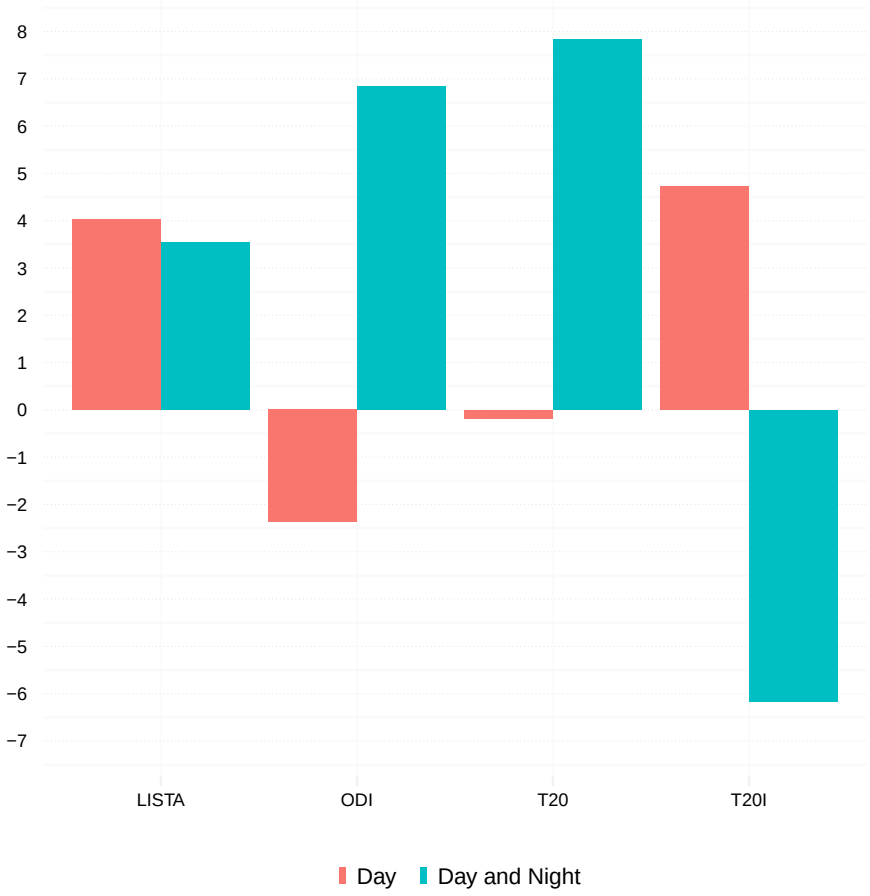

Figure 3: Percentage of Matches Won Minus Matches Lost After Winning the Toss by Duckworth Lewis

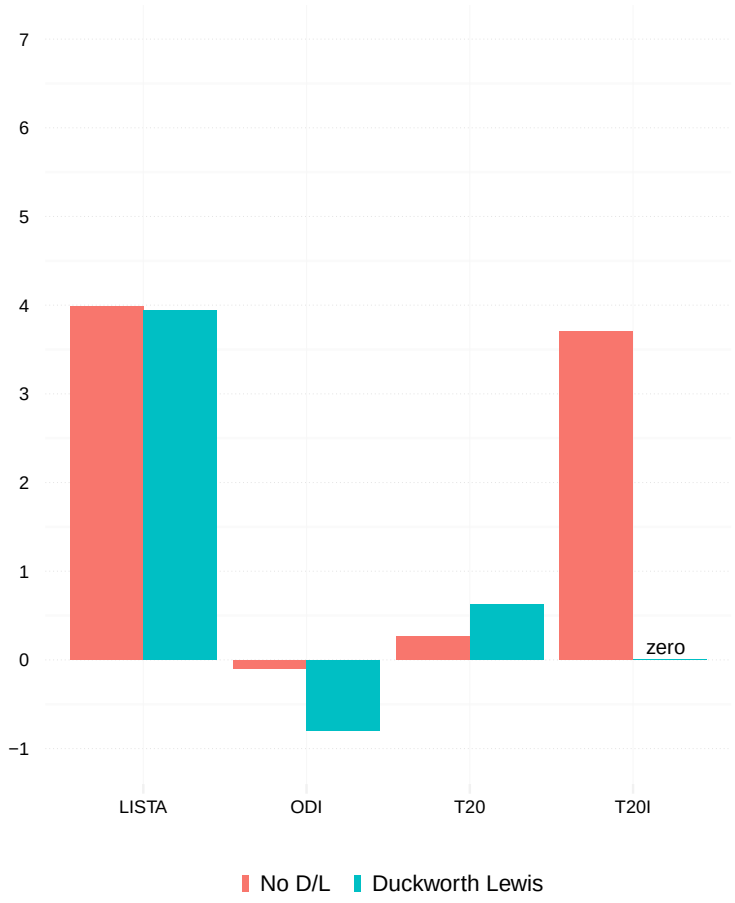

Figure 4: Percentage of Matches Won Minus Matches Lost After Winning the Toss by Difference in Ranks