Activity: Evaluating strategies using the Expected Run Matrix

Recall the Expected Run Matrix for 2016 we generated using Retrosheet play-by-play data:

bases	Outs=0	Outs=1	Outs=2
000	0.498	0.268	0.106
100	0.858	0.512	0.220
010	1.133	0.673	0.312
001	1.347	0.937	0.372
110	1.445	0.921	0.414
101	1.723	1.196	0.478
011	1.929	1.358	0.548
111	2.106	1.537	0.695

Stealing

1. Suppose you have a runner on first and nobody out. If you steal second base successfully, what is the increase in run expectancy?

2. If you get caught stealing, what is the decrease in run expectancy?

3. How often do you need to steal successfully in order to make attempting to steal worthwhile?

4. How would your analysis change if (no calculations necessary):
    1. The batter was *very good*?
    2. The batter was *very bad*?
    3. The score was tied in the 9th inning and you only need one run to win?
    4. The pitcher was left-handed?
    5. It was raining moderately?
5. Perform the same analysis, but for a runner on second and one out.

6. Perform the same analysis, but for a runner on second and two outs.

Productive outs

A *productive out* occurs when the batter puts the ball in play, and is out, but one of the runners on base is able to advance.

1. Bunting is the most deliberate form of productive out. Use the expected run matrix to determine whether bunting the runner on first with one out is *productive*.

2. The table below indicates the frequency (`n`) and mean change in expected run value (`mean_delta_erv`) for all bunts in 2016. Compute the *weighted* mean change in expected run value considering all four of these possibilities, *and their relative frequency*!

event_cd	n	sample_tx	mean_delta_erv
2	1601	14/BG-/SH.2-3;1-2	-0.234
20	478	S1/BG.2-3	0.430
19	58	FC3/SH/BG.3-H;2-3;B-2(E3/TH)	-0.072
18	48	E1/TH/BG/SH.1-3	0.660

1. Should you bunt a runner on second to third with nobody out?

1. How would your analysis change if the batter was very bad (e.g., a pitcher)?

Sacrifice flys

1. What is the change in expected run value for a sacrifice fly with *only* a runner on third and **zero outs**?

2. What about with one out?

3. Recall that in our previous analysis the mean run value for a sacrifice fly was 0.80 runs. How does this value square with your answers to the previous two questions?