# The Reliever Effectiveness Ratio

Dear Mr. Sullivan,

Thank you for the opportunity to present a new baseball statistic. I don't know if this will “revolutionize baseball,” but I believe that my proposed statistic, “reliever effectiveness ratio,” would be a vast improvement over the standard earned run average as a measure of relief pitchers' effectiveness.

Suppose Reliever A comes into the game at the beginning of an inning and puts two men on base, and then Reliever B comes in and gives up a home run before retiring the side. Reliever A is charged with two earned runs and no innings pitched. Although he put two men on, he didn't give up the big bomb.

Reliever B is charged with only one earned run, even though he allowed both inherited runners to score. Clearly, in this example ERA does not accurately and equitably reflect how effective (or ineffective) each reliever was in this situation. Nor does percentage of inherited runners that score. (Reliever A was ineffective, allowing two batters to reach base, but neither was an inherited runner.)

There has to be a better way to evaluate relievers. How about this:

Reliever effectiveness ratio (RER) =
(0.5* “bequeathed runners” who eventually score + noninherited runs allowed + 0.5* inherited runners who score)/opponents’ plate appearances

In English, this means that a reliever is charged with half a run for every runner that he puts on base who

scores after he leaves the game, a full run for every run that he allows on his own, and half a run for every runner put on base by a previous pitcher whom he allows to score. The total runs charged are divided by how many batters he faced to determine his effectiveness ratio.

Going back to my example, Reliever A has an RER of 0.50, since in two opponents' plate appearances he bequeathed two runners to another reliever and they both eventually scored (using the formula: RER = [0.5*2 + 0 + 0.5*0]/2 = 0.50).

Reliever B also has an RER of 0.50, since he allowed both inherited runners to score and allowed one run on his own in four opponents' plate appearances (using the formula: RER =[0.5*0 + 1 + 0.5*2]/4 = 0.50).

I believe this is an equitable formula since it charges responsibility to both pitchers when a batter reaches base against one pitcher but scores when another pitcher has relieved. It also uses opponents' plate appearances rather than outs (which is essentially what ERA uses) as the denominator. This avoids unduly penalizing a pitcher who records no outs, like Reliever A, whose ERA was infinite in the example. Reliever B's ERA was 9.00. Using ERA as a measure of effectiveness says that B was much more effective (or much less ineffective) than A. Using RER as a measure of effectiveness says that A and B were equally effective (or ineffective).

Another interesting note is that RER does not distinguish between earned and unearned runs. They both count the same in the box score, so why should they count differently in rating pitchers? As a point of comparison, batting average is calculated purely as hits divided by at-bats. No consideration is given to bloopers or balls that could have or should have been caught versus line

drives, etc. Either it's a hit and it counts for the batter, or it's an out and it counts against the batter.

As a final comment, this statistic could be used for starting pitchers as well as for relievers, but it would obviously need a different name (like Birnstihl pitcher's effectiveness ratio, or BPER).

Sincerely,
**Damian Birnstihl, FSA, MAAA**

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***Bill James' response:***

Yes, this is one of those cases—there are many—where the rules long in place obviously don't make any sense, and it would be very easy to design a better system. Parallel problems exist in the assignment of wins and losses, in the distinction between earned and unearned runs, and in many other places. Proposals to fix this have been put forward dozens of times, and there really is no answer to them except that "we've always done it the other way and we don't want to change." I would be in favor of a somewhat more subtle adjustment, in which, for example, a runner left on first base with NONE out might be charged 50% to the pitcher who put him on, whereas a runner left on first base with TWO out might be charged 20% to the pitcher who put him on, but 80% to the fool who let him come around. It's not hard to figure something like that, and I think that if you're going to go to the trouble to improve the system, you probably ought to improve it a little more while you're at it.

As an aside . . .in 1980 I worked a salary arbitration case for Joe Sambito, who had had a 1.77 ERA the previous year. Late in the case it was very obvious we were winning, and Tal Smith (arguing the case for Houston) tried to introduce a hand-drawn exhibit showing that, had Sambito been charged with the runs that scored after he entered the

game, his ERA would have been 3.35. The arbitrator refused to accept the exhibit, since Smith had no comparable data for any other pitcher—the only time I ever saw an arbitrator refuse to accept an exhibit.

But I guess the larger point is . . . what are we waiting for? Major league baseball is never going to change THEIR rules, but why don't we just make this adjustment in our own calculations, unofficially, and see what we have? If we wait for major league baseball to get off the schneid, I will guarantee you that we are all going to die without ever seeing what the data would be. If we get to work on the problem, we'll have data in three months.