

The Efficiency Rating

by Myron Kraynyk

Here is a new statistic I developed that incorporates practically all of the ways a baseball player can be productive offensively. I call it the *efficiency rating*, and it is defined as the number of bases created divided by the potential number of creatable bases.

The number of bases created refers to the total number of bases a batter and the runners on base jointly advance as a result of the at bat. The potential number of creatable bases refers to the maximum number of bases the batter and runners can jointly advance during a particular at bat. (See summary below.)

Batting scenario	Potential number of creatable bases
Nobody on base	4
Runner on first	7
Runner on second	6
Runner on third	5
Runners on first and second	9
Runners on first and third	8
Runners on second and third	7
Bases loaded with runners	10

Notes Regarding the Efficiency Rating

1. The bases reached and advanced as a result of an error, walk (including intentional walks), or batter hit by pitch are considered created bases. (Errors are included here, because I feel that a batter's ability to reach base on an error is skill-driven. Players who run fast, hit the ball hard and limit their strikeouts will be the most successful at this skill.)
2. Runners being forced out as a result of a ball being put into play cause the batter to accumulate negative created bases equaling the number of bases the runners

had earned prior to the play. For example, suppose a batter is up with players on first and second with nobody out. He then proceeds to hit into a third-to-second double play. The batter has thus earned -2 created bases.

The logic behind this is as follows:

- The runner on second was thrown out, so the batter loses the two bases the runner had earned up to that point. (-2 created bases)
- The runner on first was thrown out, so the batter loses the one base the runner had earned up to that point. (-1 created bases)
- The batter reaches first base, so he recovers back one base (1 created base).
- The net result is the batter has accumulated -2 created bases (-2 + -1 + 1) and ends up with an efficiency rating of -2/9. Note: If the double play had occurred with one man out, the batter would end up with an efficiency rating of -3/9. (The batter does not get credit for reaching first base, since the double play ended the inning.)

3. If runners are tagged out (rather than forced out), things are treated differently than in the prior case. For this scenario, the batter earns the bases the runners had advanced prior to being tagged out (if applicable), but does not lose any created bases as a result of the out. The batter does not get penalized for erasing runners off the base paths in this case, since the runners used their own judgment to try to advance (or get back to) a base. For example, if a runner is thrown out at the plate attempting to score from second on a single, the batter receives the same efficiency rating that he would have gotten had the runner held up at third base.)

4. A batter's potential number of creatable bases is calculated at the time the at bat is completed. So runners advancing due to a wild pitch, passed ball, balk, stolen base or error from a pick-off attempt will decrease the batter's potential number of creatable bases. Similarly, runners being picked off or caught stealing will also decrease the batter's potential number of creatable bases.

5. The calculation of a batter's efficiency rating (for a particular plate appearance) can change beyond his at bat if he attempts a stolen base upon reaching base. A stolen base will increase a player's number of created bases by one. Getting caught stealing is not necessarily the negative of a stolen base. Unlike a stolen base its effect on the efficiency rating is a function of what base the runner was on prior to the attempt. Specifically, a runner being thrown out attempting to steal loses all the created bases he directly earned by reaching base. (He does not lose the bases he earned by advancing runners.) For example, a runner who is thrown out attempting to steal third base will lose two created bases regardless of whether he reached second base on his own merit.

The following examples will help illustrate the efficiency rating:

1. Batter singles with the bases loaded; runners now on first and second

- Number of bases created = 5 (runner on second advances two bases and runners on first and third and batter each advance one base)
- Potential number of creatable bases = 10
- **Efficiency rating = $5/10 = .500$**

2. Batter doubles with nobody on base

- Number of bases created = 2
- Potential number of creatable bases = 4
- **Efficiency rating** = $2/4 = .500$

2. Batter grounds out to second base; runner on second bases advances to third

- Number of bases created = 1
- Potential number of creatable bases = 6
- **Efficiency rating** = $1/6 = .167$

Note: Examples one and two above yield the same efficiency rating. However, in calculating a cumulative efficiency rating (i.e., a batter's total efficiency rating for more than one at bat) example one will carry more weight, since 10 total bases were at stake as opposed to 5. This is comparable to saying a player with 5 hits in his last 10 at bats will have helped his overall average more than if he had one hit in his last two at bats (assuming his average going in was less than .500).

Advantages of the Efficiency Rating

1. It measures a batter's ability to hit, hit for power, steal bases, sacrifice bunt, walk, have productive outs, and hit with runners in scoring position.
2. It is thorough yet not too complicated. (The meaning of the rating is easy to understand and the rating itself is not difficult to calculate.)

Unlike the RBI statistic, a batter's efficiency rating is not heavily dependent upon how well the players in front of him are doing. (It is true that the efficiency rating rewards a batter more for getting a hit with runners on base than with nobody on base, but at the same time, it

penalizes a batter more for getting an out with men on base than with nobody on base.)

Disadvantages of the Efficiency Rating

It does not take into account how many outs there are when the batter is up. As a result, moving a runner over to third on the second out unjustly produces the same efficiency rating as moving a runner over to third on the first out.

It has not been properly tested to see if it accurately ranks players according to their abilities.

Bill James' response:

OK. It's an interesting theory. Without actual data it is hard to know whether it would work or not, but it sounds reasonable.