Cornhusker Economics

A Classical Fall Statistics Problem

Introduction

Within the academic field of Agricultural Economics, there are scholars dedicated to measurement, statistics, game theory, modeling, and even issues related to turf management. Since it is nearly October, it seems right to discuss a topic that is related to all of them: baseball.

As most readers know, the "Fall Classic" refers to the World Series, and in more contemporary times, the baseball playoffs. For even casual baseball fans, the topic of statistics is usually of interest. 3,000 hits, 500 home runs, and a .300 batting average are all watermarks for excellent performance (just to name a few). But what really defines the value of a baseball player? Is there a single statistic that encompasses a player's performance better than any other? The remainder of this Cornhusker Economics article will evaluate traditional baseball measures and suggest an alternative.

Our discussion will center on statistics related to the offensive quality of a player. While pitching and defense are equal parts of the game, offensive statistics are far more numerous than pitching, and certainly defensive stats. In a game where scoring more runs than your opponent is the key objective, how a player helps his team achieve this goal is the measure offensive statistics try to quantify.

Within the field of statistics, "validity" refers to the general applicability of the model or study. "Construct validity" refers to how well a specific statistic represents the value/parameter of interest, in this case, offensive value.

Classic Offensive Statistics (and their problems)

The first measure of offensive value people think of is batting average, or the average of hits compared to at bats. This measure seems easy to understand, and straightforward. Unfortunately, it is an incomplete measure. To begin, batting average precludes specific positive offensive data. Batting average, as defined as (Hits/At Bats) leaves out walks, hit by pitch, and sacrifices, all of which result in a positive outcome. That's not all that is wrong with the batting average. All successful hits are counted as equal, so a two-out single increases batting average exactly the same way as a game-winning grand slam. Clearly, there is more to measuring offensive performance.

Instead of creating a new offensive statistic, baseball stakeholders have relied on combining batting averages with two other statistics (runs batted in and home runs) to create a better picture of a player's performance. The problem with utilizing multiple metrics is the subjectivity required to assess worth, and the exogenous factors surrounding RBIs and home runs. To begin, for a player to record an RBI, his teammate(s) must be on base. A player with excellent offensive skills following lousy hitters in the batting order will have few RBI opportunities. In truth, a player can earn an RBI without runners on base in one specific circumstance: hitting a home run (and therefore driving themselves in). While

home runs are the pinnacle of offensive performance, certain ballparks (Fenway, Yankee Stadium, and Coors Field) inflate home run numbers. Finally, there is a long history of mediocre players (I'm talking about you Rob Deer, and Kyle Schwarber.) who hit many home runs, but at the expense of lesser hits in almost all situations. Basically, these players are league leaders in both home runs and strikeouts, and their positive contributions are outweighed by their negative.

More Modern Statistics (they have problems too!)

The popularity of the movie *Moneyball* is just one of the reasons that current baseball fans are eager to consume new baseball statistics. While Greg Maddux may have been correct about the excitement and popularity of the long ball, there are obvious other ways a player can contribute to their team's success. First, on-base percentage is a useful statistic when combined with batting average. On-base percentage *almost* is what it sounds like, total non-outs divided by plate appearances. The one exception is "reached by error." In that case, the plate appearance (and at bat) is treated as if the batter were out. However, like batting average, the value of all successful plate appearances is all weighted equally, leaving out the greater effectiveness of extra base hits.

While the slugging percentage has been around for some time, it has never gained the popularity of other baseball statistics. By its name, "slugging" seems to indicate that it measures not only success but the magnitude of success, which is exactly true. Slugging percentage is found by calculating (total bases/at bats) and can vary from .000 (a player has zero hits) to 4.000 (a player hits a home run each at bat.) Indeed, slugging solves some of the problems of the previous statistics. However, it still suffers from excluding plate appearances that do not qualify as an at bat.

On Base plus Slugging (OPS)

If one were to tune in to any major MLB broadcast this statistic would be mentioned frequently. On-base plus slugging *seems* to fix all the previously mentioned issues. It rewards extra base hits (the slugging part) and also gives credit for walks and hit-by-pitch on top of the simple batting average. At first, it seems like the only qualities not measured are RBIs, which as previously mentioned, are as much about teammates' performance

as it is about the player being evaluated. The problem with OPS, is that it measures nothing.

Take, for example, a statistical construct aimed at measuring how big a person is. For argument's sake, we'll call it the "bigness index." This statistic adds up a person's height in inches and weight in pounds. Therefore, I the author, have a bigness index of 232. Objectively, I am bigger than my 10-year-old son who would have a bigness index of 130. The problem is, we don't know why I'm bigger. Am I tall? Heavy? Medium? We simply do not know. To complicate things, we could have measured in centimeters and kilograms, in which case my bigness index would be 260; and I am objectively NOT bigger than my colleague who would have a bigness index of 250 utilizing centimeters and kilograms. In that case, the construct breaks down. Centimeters give far too much credit for my height (189 cm) compared to my weight (71 kilograms).

This would all seem like a useless rant if there were not a better metric. Multiple other measures of offensive performance exist, but most of them are complicated and/or are combinations of other metrics previously mentioned. One statistic seems to rise above them all.

Average Bases per Plate appearances (ABP)

This statistic is *exactly* what it sounds like: how far (on average) does a player advance each time they walk to the plate. ABP would be calculated by taking total bases (including walks, HBP, and reached on error) divided by plate appearances. Basically, it corrects all the shortfalls of slugging percentage. Also, unlike OPS, it means something. If a player has an ABP of .75, they average 3/4th of a single each plate appearance. If they have an ABP of 1.2, they advance just past first on each average plate appearance.

Implications/Discussion

It would be fantastic if I were the first person to think of this statistic, but a casual search of Reddit reveals I am not. In academic research "elegant" models are valued. Even in everyday life, simple solutions are almost always preferred to Rube Goldberg-esque solutions. Baseball executives and fans have access to far more complex measures of offensive performance including WAR, Rbat+, rOBA, and many others (see baseball-

reference.com), but none of them do the job of describing a player's offensive value better than ABP. To the average fan, this concept is more enriching to traditional statistics than the new benchmark (OPS) because explaining it is far easier than an in-depth explanation of the unweighted index that makes up OPS. Baseball is uniquely American, and perhaps this insight could help baseball capitalize on the successful changes implemented this year aimed at shortening the length of games. I am excited this time each year for the "Fall Classic" and I'm hopeful this very small improvement to the game can help others enjoy a truly American tradition.

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