

# %TBA and REC

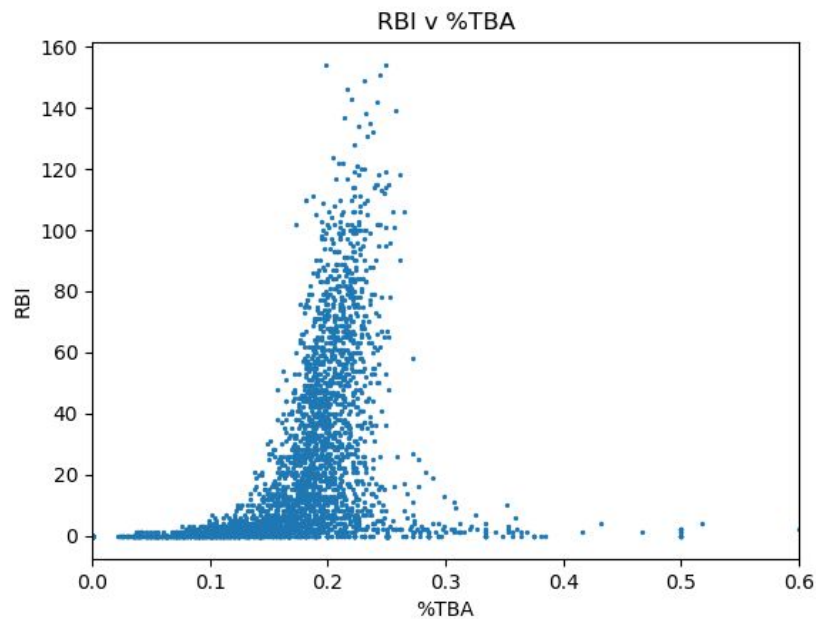
Brandon Zink

%TBA (Percent of Total Bases Advanced) and REC (Runs Expected Created) are both an alternate but similar player analysis tool along the lines of RBI. They both look at a simple question, “how good is a player at producing runs and getting baserunners across home plate?”.

## %TBA

%TBA takes the total possible bases advanced given the situation when a batter comes up to the plate (4 for the batter, plus 3 if there is a runner on first, plus 2 if there is a runner on second, plus 1 if there is a runner on third). It then looks at the total bases actually advanced given the outcome of the at bat, excluding walks, sacrifices, and errors. The final calculation of %TBA is just a players total bases advanced divided by the total possible bases advanced (across a season or career).

This is very similar to RBI, but takes in to account two things that RBI does not. Firstly, %TBA takes into account the overall bases advanced, instead of just the ones that cross home plate, since moving a runner from first to third still increases the expected run output and the batter should be rewarded. Secondly, it is a percentage of the total opportunities instead of a raw counting stat. RBI has many flaws, such as where a batter hits in the lineup and quality of batters ahead of him, which %TBA attempts to account for. The graph below looks at %TBA and RBI compared (option 10 on UI.py):



We can see from this graph that a low amount of RBIs (and also a low amount of ABs) can result in an unfairly high %TBA. When looking at the leaderboards (option 1 on UI.py), an AB limitation is imposed. The top %TBA players since 2010 (with at least qualifying 100 ABs) are:

Player	Year	Qual. AB	%TBA	RBI	WAR
Mike Trout	2012	288	0.272	83	10.5
Joey Votto	2010	432	0.265	113	7.0
Paul Goldschmidt	2013	359	0.261	125	7.1
Jose Bautista	2010	424	0.261	124	7.0
Miguel Cabrera	2013	473	0.257	137	7.3

In each of the above top 5 seasons, the player was at least top 5 in MVP voting and had over 100 RBIs (except for Mike Trout, but Mike Trout is always the exception). All of the seasons were incredible by all accounts, and %TBA reflects that.

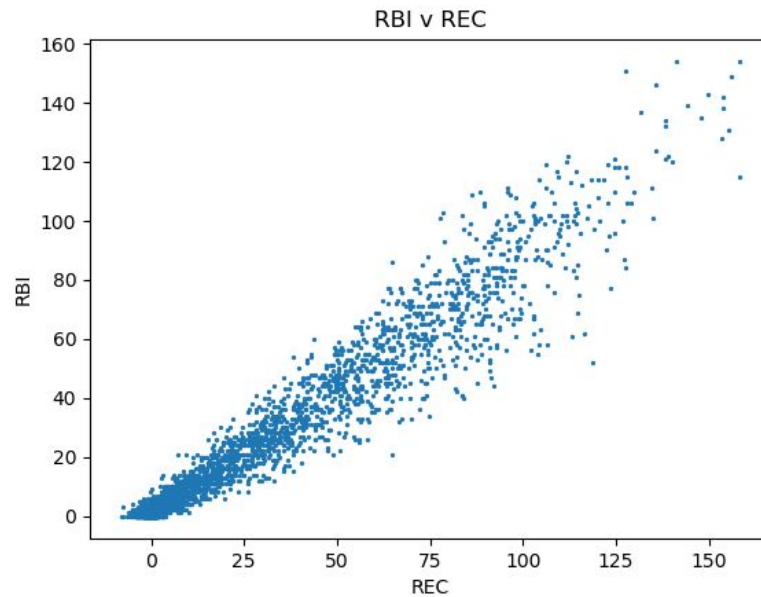
## REC

REC is a measure of the change in the expected runs (from the RE24 table below) from before the AB compared to after the AB.

Base Runners			2010-2015		
1B	2B	3B	0 outs	1 outs	2 outs
—	—	—	0.481	0.254	0.098
1B	—	—	0.859	0.509	0.224
—	2B	—	1.1	0.664	0.319
1B	2B	—	1.437	0.884	0.429
—	—	3B	1.35	0.95	0.353
1B	—	3B	1.784	1.13	0.478
—	2B	3B	1.964	1.376	0.58
1B	2B	3B	2.292	1.541	0.752

Instead of a percentage as in %TBA, REC is accumulated (or lost) throughout a season, and carries a positive linear relationship with AB. In order to calculate REC, you take the corresponding runs expected from the table above after the AB, subtract the runs expected from before the AB, and add the number of runs scored during the AB. An unproductive out is extremely detrimental to a player's REC, while a homerun is about as good as you can get.

REC is another twist on RBI, where instead of looking at a player's ability to get a runner across, it takes the entire situation into account, but it still suffers from some of the same negative aspects of RBI. Players with more opportunity (such as batting third or fourth) with good hitters ahead of them will have a higher ceiling or REC than a leadoff man. Thus, it should be taken into account where in a lineup a player bats when comparing him to another player (this stat is good at comparing players like Dee Gordon and Billy Hamilton or Miguel Cabrera and Joey Votto, but comparing Dee Gordon and Joey Votto would yield biased results). Below is a graph comparing RBI and REC (option 11 on UI.py):



Players with a low number of RBIs (and ABs, as the two graphs look very similar) do not really have the chance to distinguish themselves from one another. As both RBIs and ABs increase, you can begin to see which players take more advantage of their opportunity, and thus have a higher REC. If we look at the top 5 players with at least 100 qualifying ABs (option 2 on UI.py):

Player	Year	Qual. AB	REC	RBI	WAR
Chris Davis	2013	532	158.4	138	6.5
Miguel Cabrera	2011	509	158.3	105	7.6
Hunter Pence	2011	695	156	97	5.8
Lance Berkman	2011	559	155.2	94	3.8
Adrian Gonzalez	2011	630	153.9	117	6.9

Looking at the top 5 REC players, we can see that REC alone is not as indicative of a stat as %TBA. Hunter Pence and Lance Berkman were good players in 2011, but no where near MVP caliber players.

Miguel Cabrera makes an appearance on both lists, which is not surprising considering he was an offensive monster in his prime. Also, all of the players have a lot of qualifying ABs, indicating this stat is probably too heavily weighted by ABs. A better variation might be to use a similar method as %TBA and take it as a percentage of total opportunity to help eliminate the AB bias.