SABR—Diamond Dollars Case Competition
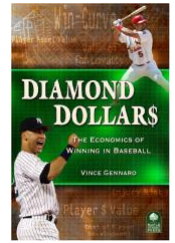
Changing the Game: Baseball's Action Index

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Virtual Case Competition

This case was prepared by Vince Gennaro and is developed solely for the purpose of a case discussion. It contains various assumptions that are generated for illustrative purposes and is not intended to serve as a source of primary data.

Major League Baseball has a problem. MLB entertains millions of fans, including a growing number outside the US. The magical entertainment value of baseball, which has excited fans for more than a century still exists. For validation, just look at highlights of the more than 2400 games that are played during a six-month regular season and witness the diving catches, tape-measure home runs, a bases-loaded strikeout to squelch a rally, which are just a few examples of while millions love the game. While baseball often delight fans, it has a problem of "efficiency." It delivers too few of those high-impact moments over the course of a nearly three-hour game. MLB has become an inefficient means of entertainment. Comparing the 2021 season to thirty years ago, the length of a nine-inning game is 14% longer. At the same time, the number of batted balls per game—a reasonable gauge of "action" in a game—is down more than 17% vs. 1991. No doubt there are some "action moments" that entertain that are not captured in batted balls, such as a clutch strikeout, but the highest level of action occurs when more players are involved in a play.

There are many levers that go into the entertainment efficiency equation, such as the strikeout rate, which has risen dramatically over the last few decades, which often consumes more pitches and lacks the *action value* of batted balls. The rise in pitches per plate appearance, the growing dead space between pitches, the increased number of pitching changes, the commercial time between innings, and even the increased number of foul balls, which can extend plate appearances, all contribute to either (or both) the decline of action or the length of games.

There's another layer of events prevalent in today's game, which may impact baseball's entertainment inefficiency, such as the increasing velocity of fastballs or a focus on optimizing spin rate and spin axis so that pitchers can maximize pitch movement and deception. While the recent wave of technology has helped both pitchers, hitters, and fielders, arguably it has benefited pitchers more, since they control the start of every potential play with their pitch selection and execution. We've witnessed the hitters' response to increased velocity and a lively baseball—increase launch angle so that when you do connect, it's more likely to result in a home run. However, this "all or nothing" approach at the plate can lead to more strikeouts and ultimately less action.

Improving baseball's entertainment efficiency isn't as simple as picking one lever and manipulating it. There are interactions between many of the "policy" variables. For example, moving the pitching mound back to increase the distance to home plate should lower pitch velocity, but it also may encourage pitchers to throw more breaking pitches, which may have a potentially offsetting (or compounding) impact on hitters. Deadening the baseball, so that it travels less far, may encourage hitters to focus less on elevating their launch angle in search of a more elusive home run. There is even some evidence that restricting defensive shifting will alter the pitches a pitcher chooses to throw. In baseball, very few things happen in isolation.

Your goal in this case project is to develop a set of recommendations that will increase the efficiency of action in MLB games and hence, make the game more relatable to the next generation of fans. For the purpose of this case, we'll define "efficiency of action" as the number of balls in play per unit of time. We'll also add a component for the overall length of game (i.e., shorter is better than longer). The action index is as follows:

Action Index = Batted Balls per MLB game (less a penalty for increasing the length of an MLB game beyond the 2021 average of 190 minutes)

The **Action Index** formula is as follows:

Plate appearances (PA) − Walks (BB) − Hit-by-pitch (HBP) − Less Strikeouts (K) = Batted Balls

Batted Balls ÷ # of Games = Batted Balls per Game

Action index for 2021 = 50.1

Average minutes per game for 2021 = 191

Action Index penalty for increasing game length = .25 per minute above 190. This discourages you from increasing batted balls per game by simply making games longer.

Your case problem is to analyze any of the variables that impact the number of batted balls and recommend a set of rule or policy changes that will increase the efficiency of action during a ballgame. This may mean proposing changes that will reduce strikeouts, reduce walks, or reduce pitches per plate appearance (which could shorten games). Should you tinker with the strike zone definition, or move the pitching mound back (i.e., further away from home plate) to make pitches more "hittable"? However, will that change create more walks, as pitchers are further from home plate and possibly less likely to throw pitches in the strike zone? Should you consider restricting defensive positioning, as shifts have had an impact on turning more batted balls into outs? Your recommendations must be supported by quantitative analysis and data. You are encouraged to explore a variety of options for consideration. In doing so, you will showcase your understanding of the complexity and the interconnectedness of what happens on a baseball diamond. Ultimately, you should estimate/forecast the *action index* that is expected to result from your recommendations.

While you are encouraged to think creatively about this problem and your solutions, be mindful making your new version of baseball recognizable to current and longtime baseball fans. While we want to make the game more appealing to young fans and new fans, we do not want to alienate longtime fans. These veteran fans have shown their resilience to stay connected to the game they love even when home runs soared in the late 1990s, but everyone has their boundaries of how much change they will tolerate.

The Case Problem
To reiterate, your case assignment is to *develop a set of policies and/or rule modifications that will increase the number of batted balls per game and therefore, increase the "action index"*. Your recommended policies and rule modifications will be supported by data and analysis.

Your output for this case assignment should be in the form of a powerpoint presentation to support a 20-minute oral presentation to a panel of judges, followed by a 10-minute Q & A by the judges. The judge's criteria will focus on the quality of your *decision process* and your *analytical framework* more than any single "right" answer. The ideal set of recommendations has a logical flow, and is inclusive of the key factors that are expected to have a true impact on any decision that results from your analysis. More specifically, there are several key areas that will be a focus for the judges:

The presentation should include:

- **Your process**—the framing of the problem (i.e, a clear definition of what issue/problem the new stat is addressing), as well as the methodology used in developing your analysis and recommendations, including:

    o The way in which you structure your analysis—is it consistent with the problem you pose and is it laid out logically?

    o The criteria you used to evaluate the data and draw conclusions

    o The statistical tools and techniques you employed to analyze your strategic recommendations

    o Your assessment of the risks associated with your strategy recommendations

- **Your conclusions and recommendations**—Does your analysis support your recommendations? You should also include the limitations of your analysis and the risk factors associated with your recommendations, as well as obstacles to implementation. You should also provide a perspective on the potential impact of your recommendations, via its impact on the "action index".

- **Your creativity**—while you will not have time to go into detail on all of your analysis, did you think "outside the box" and address the problem you posed in a creative way and/or did you present your findings in a creative, effective way.

- **The quality and clarity of your presentation**—it's critical to carefully and strategically choose *what* to present and share with the judges. Storytelling is a critical aspect of influencing decisions through analytics.

A final comment regarding "rules" of the case and the competition:

- The intent of the competition is that team members are competing against other team members. This means that assistance from professors or non-members of the team is not permitted. Also, do not contact any MLB team or league personnel, or any other experts on non-experts, for advice on any of the case issues.

- You are encouraged to use the internet to help you with the case, particularly as a source of data, but be prepared to add your own insights, including quantitative analysis to the material you choose to draw from on the internet. One of the most common pitfalls for Case Competition participants is the over-reliance on analysis published on the leading analytical websites. While it is often valuable to consider these analyses, student teams have lost points by relying solely on these sites for answers to key case questions. We are looking to understand *your* analyses of the case questions, without an over-reliance on other peoples' thinking.

- **Let me mention what we are not looking for in this case**: We are not interested in marketing tactics, media campaigns, or any other levers that marketers use to connect their product with fans/consumers. This case is singularly about fixing the *product* on the field of play, to make the game more appealing to fans of all ages.

See Appendix on next page.

Appendix:

For perspective, below is summary data of the 1991 and 2021 seasons, to give you a view of how the game has changed over the last 30 years:

	1991	2021		
Games	2,104	2,429		
Plate Appearances (PA)	160,746	181,817		
At Bats (AB)	142,967	161,941		
Homeruns (HR)	3,383	5,944		
HR/Game	1.61	2.44		
Walks (BB)	13,984	15,795		
BB%	8.7%	8.7%		
Strikeouts (K)	24,390	42,145		
K%	15.2%	23.2%		
HBP	905	2,111		
Sacrifice Flys	1624	1143		
Sacrifice Hits	1249	766		
Minutes/Game	174	191		
Minutes/9 Inn.	168	190		
Min btwn Batted Balls	3.02	3.81		
Pitchers /Game[1]	3.13	4.43		
Pitches/PA	3.68	3.91		
Pitches/Game	281.4	293.3		
Strikes/Game	172.9	186.7		
Strikes/Pitch	61.4%	63.7%		
Fouls/Strike	26.9%	28.1%		
Fouls/Pitch	16.5%	17.9%		
Fouls/Game	46.5	52.5		
Batted Balls[2]	121467	121766		
Batted Balls/Game	57.7	50.1		
Batted Balls per Minute	0.332	0.262		
[1] per team				
[2] Batted Balls = Plate Appearances − Walks − Hit-by-Pitch − Strikeouts				