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An Empirical Analysis of the Infield Fly Rule

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An Empirical Analysis of the Infield Fly Rule

Howard M. Wasserman[†]

Legal scholars have written extensively about baseball's Infield Fly Rule--its history and logic, its use as legal metaphor, and its cost-benefit policy rationales. This paper now conducts the first empirical analysis of the rule, exploring whether the rule's legal and policy justifications are statistically supported. Based on a review of every fly ball caught by an infielder in the relevant game situation in Major League Baseball from 2010-2013, this paper measures the frequency and location of Infield Fly calls and the effect the rule has on individual games, all to determine whether the feared cost-benefit disparities that motivate the rule would, in fact, result absent the rule. Ultimately, the merits of the Infield Fly Rule cannot be measured empirically, at least not without resort to some ex ante value judgments; the normative conclusion one draws about these data depends on where one starts--a supporter of the rule and a skeptic both will find confirmation in the information gathered in this paper. Nevertheless, the numbers shed specific and interesting light on the realities of baseball's most unique and famous (or infamous) play.

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An Empirical Analysis of the Infield Fly Rule

Introduction

Sporting events are analogous to judicial proceedings, as both are contests to determine a victor; it follows that the rules governing sport events are analogous to the rules of procedure that govern and define those judicial proceedings, such as the Rules of Civil Procedure.[1] The recent trend in civil procedure scholarship has run towards the empirical.[2] So has the recent trend in the study of sports.[3] It thus makes sense to case that same empirical eye on the study of sports rules,[4] particularly in adding onto the body of law-and-baseball scholarship.[5]

And no target is more appropriate for empirical study than baseball's most famous (or infamous) and most studied rule--the Infield Fly Rule. Under the rule, when the batting team has runners on first and second or the bases loaded with fewer than two outs and the batter hits a fly ball in fair territory that an infielder can catch with "ordinary effort," the batter is called out. The rule prohibits the defense from gaining a double play on a routine fly ball by intentionally failing to catch a playable fair ball.[6]

Legal scholars have long been fascinated by this rule--for what it tells us about law[7] and for what law tells us about it.[8] Others are less enamored, questioning its comprehensibility,[9] logic, wisdom, and necessity, both in particular applications[10] and as a general matter.[11] In a recent article, I defended

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[1] Howard M. Wasserman, *The Economics of the Infield Fly Rule*, 2013 UTAH L. REV. 479, 483-84.

[2] David Freeman Engstrom, *The* Twiqbal *Puzzle and Empirical Study of Civil Procedure*, 65 STAN. L. REV. 1203, 1205-06 (2013).

[3] *See, e.g.*, *A Guide to Sabermetric Research*, SOCIETY FOR AMERICAN BASEBALL RESEARCH, http://sabr.org/sabermetrics; ADVANCED NFL STATS, http://www.advancednflstats.com/.

[4] Mitchell N. Berman, *"Let 'Em Play": A Study in the Jurisprudence of Sport*, 99 Geo. L.J. 1325, 1329 (2011).

[5] Charles Yablon, *On the Contribution of Baseball to American Legal Theory*, 104 YALE L.J. 227, 233 (1994).

[6] Official Baseball R. 2.00 (Infield Fly); *id.* (cmt.); Wasserman, *supra* note ___, at 491-92; *infra* Part I. Throughout the paper, I will alternately refer to the rule by name or as "IFR."

[7] Neil B. Cohen & Spencer Weber Waller, *Taking Pop-ups Seriously: The Jurisprudence of the Infield Fly Rule*, 82 WASH. U. L.Q. 453, 454 (2004); Anthony D'Amato, *The Contribution of the Infield Fly Rule to Western Civilization (and Vice Versa)*, 100 NW. U. L. REV. 189 (2006).

[8] Aside, *The Common Law Origins of the Infield Fly Rule*, 123 U. PA. L. REV. 1474 (1975); *see also* Wasserman, *supra* note ___, at 487-89.

[9] As journalist John Dickerson put it in Slate, the "Catholic Church has no papal decree so complicated and misapplied as the infield fly rule." John Dickerson, *Wait, Am* I *That Baseball Dad?*, SLATE, June 19, 2013, http://www.slate.com/articles/sports/sports_nut/2013/06/baseball_parents_how_dads_stress_their_kids_out_during_little_league_games.html.

[10] Kevin Kaduk, *Bad infield fly rule call mars Cardinals victory over Braves in NL wild card game*, YAHOO! SPORTS, Oct. 5, 2012, http://sports.yahoo.com/blogs/mlb-big-league-stew/bad-infield-fly-rule-call-mars-cardinals-victory-003924296--mlb.html;5, 2012,

the rule in terms of the economics of the internal logic and structure of baseball, as an appropriate way to avoid overwhelming and inequitable cost-benefit imbalance between teams on individual plays. The rule appropriately eliminates the incentive for the defense to intentionally act contrary to the game's ordinary practices and expectations to obtain extraordinary gains.[12]

But normative policy may yield to, or at least be informed by, empirical analysis.[13] In other words, we can wield empirical evidence to determine whether the risk of that double play--and the dramatic cost-benefit advantage the defense gains from it--actually is so great as to justify a special rule. Or perhaps the rule is a (century-old) solution in search of a problem, resolving an injustice that is, if not non-existent, infrequent.

Four empirical issues inform this understanding of the Infield Fly Rule. First is the frequency of the play and of the invocation of the rule, considering how often batters come to the plate in infield fly situations (plays in which the rule could be invoked) and the number of fly balls are easily playable by an infielder in IFR situations so as to trigger the rule. Perhaps the Infield Fly Rule is unnecessary if the potential inequitable double play, though problematic, does not happen very often. The second involves the likelihood of that inequitable double play in a counter-factual world without an Infield Fly Rule--would infielders have any incentive to intentionally fail (or decline) to catch the ball in search of that double play and would they likely succeed? The third measures the effect of not having the IFR by examining how many runs a team is statistically likely to lose and actually loses if, absent the IFR, the defense can get double plays off these easily catchable fly balls. Finally, we can compare the frequency of Infield Fly calls to another baseball game situation and rule--the dropped third strike--that raise similar policy and logical concerns as the IFR. This paper addresses those questions by examining every plate appearance in an infield fly situation and every Infield Fly call for Major League Baseball from 2010-2013; it looks at the frequency of IFR calls, the likelihood of double plays in the absence of the IFR, and the effects of the application of the rule.

Ultimately, I doubt the merits of the Infield Fly Rule can be answered empirically, at least without resort to some underlying value judgments.[14] For one thing, we lack a control group with which to compare numbers of uncaught fly balls and double plays and identify a preference--the IFR is part of all

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http://sports.yahoo.com/blogs/mlb-big-league-stew/bad-infield-fly-rule-call-mars-cardinals-victory-003924296--mlb.html.

[11] *See* ABOLISH THE IFR, http://abolishtheifr.org/

[12] Wasserman, *supra* note ___, at 493.

[13] Stephen B. Burbank, *Pleading and the Dilemmas of Modern American Procedure***,** 93 JUDICATURE 109, 114, 116 (2009); *cf.* Richard L. Revesz, *A Defense of Empirical Legal Scholarship*, 69 U. CHI. L. REV. 169, 188 (2002) ("[E]mpirical legal scholarship has a great deal to contribute to the understanding of law and legal institutions.").

[14] *Cf.* Caprice L. Roberts, *In Search of Judicial Activism: Dangers in Quantifying the Qualitative*, 74 TENN. L. REV. 567, 619 (2007).

organized baseball at all levels, including Little League[15] and overseas, as in Japan, even Japanese high school ball.[16] Instead, the normative conclusion one draws about the rule by looking at raw numbers of IFR calls or on the likelihood of a double play on a play likely depends on where one starts--a supporter of the rule and a skeptic both will find confirmation in these statistics.

Nevertheless, the numbers are interesting. And they do shed specific light on the realities baseball's most unique and famous (or infamous) play.

I. A Primer on the Infield Fly Rule

Contrary to some suggestions about its complexity, the Infield Fly Rule can be stated in simple, comprehensible terms. When the batting team has runners on first and second or the bases loaded with fewer than two outs and the batter hits a fly ball (but not a line drive or a bunt) in fair territory that an infielder can catch with "ordinary effort,"[17] the batter is called out as soon as "Infield Fly is declared" by the umpire. The batter is out, regardless of whether the fielder catches the ball. If the ball is not caught, it is live and the runners can try to advance at their own risk. If the ball is caught and the runners have strayed too far, they can be thrown out at the previous bases.[18] The rule prevents the defense from getting what is regarded as a "cheap" double play by intentionally not catching an easily playable ball. Rulemakers were concerned that infielders would intentionally fail to catch easily playable pop flies, allow the ball to fall to the ground, then turn a double play on the trapped base runners (at home and third, third and second, or home and second),[19] although not on the batter, who is expected to run hard to first base. The IFR instead gives the defense one out on the batter--the same out they would get by catching the fly ball--and allows the base runners to remain in place.

In *The Economics of the Infield Fly Rule*, I defended the IFR as part of baseball's internal structure, logic, and law, as a way to ensure cost-benefit balance and relatively equitable exchanges between teams on given plays and game situations. The IFR is what I define as a "limiting rule," a situation-

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[15] http://www.littleleague.org/learn/rules/ruleinterpretations/0709ruleinterpretationsept07.htm. There perhaps is some merit to the argument that, whatever the IFR's merits in professional baseball, it has no place in Little League, because there are very few balls that are presumptively catchable with "ordinary effort" by eleven-year olds. But the IFR accounts for that, by defining the rule to account for the "league or classification of leagues" involved. Official Baseball R. 2.00 (Ordinary Effort).

[16] http://en.rocketnews24.com/2012/07/16/infield-fly-controversy-mars-tension-filled-baseball-grudge-match/

[17] Official Baseball R. 2.00 (Ordinary Effort) ("[T]he effort that a fielder of average skill at a position in that league or classification of leagues should exhibit on a play, with due consideration given to the condition of the field and weather conditions.").

[18] Official Baseball R. 2.00 (Infield Fly); *Id.* cmt.; Wasserman, *supra* note ___, at 490-92.

[19] Wasserman, *supra* note ___, at 496; *supra* notes ___ and accompanying text.

specific rule that limits the ability of one side to exploit holes or gaps in the game's default baseline rules to an extraordinarily imbalanced competitive advantage. In summary, four features mark a game situation as sufficiently imbalanced and inequitable as to warrant a limiting rule; the infield-fly situation possesses all four features.

1) Absent the limiting rule, the play produces a wide cost disparity. Absent the Infield Fly Rule, an infielder could get two outs on a play by intentionally letting the ball drop to the ground untouched and throwing the runners out at the bases, perhaps ending the inning (if there already was one out) and certainly dampening a rally (by removing two runners from the bases), as opposed to getting one out by catching the ball and having the base runners remain in place. This is a dramatic cost-benefit imbalance--overwhelming benefits for the defense (two outs, one less runner on base, perhaps the end of the inning) with no offsetting costs, which the offense experiences as overwhelming costs with no offsetting benefits.

2) The defense exercises nearly complete control over the play. A ball subject to the Infield Fly Rule is, by definition, one that is easily caught by a Major League infielder of average skill. The infielder controls whether to catch this easily playable ball; he has time to settle under it, wait for it to come down, and decide whether to catch it and where to throw if it drops to the ground. His teammates similarly have time to get to their positions to make plays on any throws. By contrast, the base runners are trapped, entirely reactive, and arguably "helpless." The runners are forced to run if the ball drops to the ground, but if they stray too far from the current base, they'll be thrown out if the ball is caught. So the base runners must stay on or near the current base until the ball hits the ground. At that point, it likely is too late for them to beat the throws to the next bases.

3) The double play arises because the defense intentionally fails (or declines) to perform the athletic skill that a team ordinarily tries to perform and is expected to perform--catching an easily playable batted ball in fair territory. Absent the IFR, this would be the only situation in all of baseball in which a team is regularly significantly better off not catching a batted ball in fair territory than catching it.

4) The potential benefits to the defense and the strong cost-benefit imbalance incentivize infielders to intentionally fail (or decline) to perform those skills most (if not all) times the game situation arises. The incentive to get two outs on the play instead of one makes it worthwhile for the defense to eschew the simple play of catching the easily playable ball and instead to seek out this inequitable double play.[20]

Like all limiting rules, the IFR functions by imposing a particular outcome on the play, thereby eliminating the defense's opportunity and incentive to act contrary to athletic expectations. By calling the batter out regardless of whether

[20] *Id*. at 493-96.

the ball is caught and not forcing the runners to advance, the outcome of the play will be the same whether the infielder catches the ball or not. This removes any incentive for the infielder to intentionally not catch the ball, since he gains no additional benefits and imposes no additional costs on the offense beyond that one out.[21]

On the other hand, repealing the Infield Fly Rule revives those negative incentives. If the double play is possible under the rules, infielders will regularly seek those overwhelming cost-benefit advantages by intentionally failing to catch that easily playable fly ball. That, at least, is the policy judgment made when the rule was introduced and modified between 1894 and 1904.

But the empirical question is whether those negative incentives and cost-benefit imbalances would, in fact, arise. The purpose of this study is to determine, by examining all infield fly situations and calls over the past four years, whether those negative incentives and effects will come into play and how often, and thus whether the policy judgments underlying the Infield Fly Rule are well-founded.

II. Methodology

Major League Baseball does not officially track Infield Fly calls, so there was no single source for this information. Instead, I followed three steps to find, identify, and chart all the plays on which the rule was put into effect.

Step one was to review[22] narrative play-by-play reports for every game in the four-season period of 2010-2013, as reported by a number of different web sites.[23] This revealed every time the infield fly situation (runners on first and second or bases loaded with fewer than two outs) arose, the number of times a batter came to the plate in each of the four possible infield fly situations (first-and second with none out, first-and-second with one out, bases loaded with none out, and bases loaded with one out), and the number of fly balls in those situations that were reported as having been caught by an infielder. In collecting these numbers, we defined "plate appearance" as an infield fly situation on both the first and final pitches of the batter's plate appearance, but not if the situation changed before the final pitch. For example, imagine a player comes to the plate with runners on first and second and one out (an infield fly situation), but the second pitch thrown to him is a wild pitch allowing both runners to advance; the batter remains at the plate, but there now are runners on second and third with one out, no longer an infield fly situation and not counted as such in the study. This portion of the study produced raw numbers on how often players batted in

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[21] *Id.* at 496-97.

[22] This was done by a group of enthusiastic research assistants, who jumped at the opportunity to do "legal" research that involved reading about and watching baseball games. They tell me it made for great job-interview fodder.

[23] *See, e.g.*, http://www.baseball-reference.com/boxes/; http://www.retrosheet.org/boxesetc/index.html.

infield fly situations and a broad set of potential IFR calls. Unfortunately, these narrative play-by-play reports generally do not indicate whether Infield Fly was called, so they only provide that broad set of possible calls.

At step two, I cross-referenced all the fly balls identified in step one as having been caught by infielders against detailed coded reports of every game maintained by the web site RetroSheet.[24] These reports record, in coded form, whether a fly ball was hit, the position of the player who caught it, and whether Infield Fly was called on the play. By comparing these reports with the data from part one, we identified an initial count of which of those fly balls to infielders were called under the Infield Fly Rule, broken down by each of the four situations in each of the four seasons.

Step three involved watching video, through Major League Baseball's web site,[25] of every play identified in the first two steps as a fly ball caught by an infielder. I watched every such play, whether or not RetroSheet flagged it as an IFR call. This showed two things.

First, and importantly, the videos helped complete the count of IFR calls. On a significant number of plays, RetroSheet did not record IFR as having been called, but the video clearly shows it was called, either because the umpire can be seen signaling Infield Fly (a raised arm right arm while the ball still is in the air) or because the announcer reported the rule was in effect. Thus, I counted IFR as having been called on a play if the video made clear that it was, regardless of how the coded reports recorded the play. In addition, the video reveals approximately fifty plays in which IFR either was not called or in which it is impossible to tell from the video (the announcers do not say anything and the umpire cannot be seen), but which certainly look (at least on television) like plays easily playable fly balls on which the call would have been appropriate. Importantly, this all suggests that, to the extent the figures discussed below are inaccurate, they almost certainly under-report and the rule may in fact be invoked slightly more often than this study suggests.

Second, the videos show where on the field the ball was caught or where it dropped to the ground on every play on which Infield Fly was called or should have been called.

Having identified every IFR call, step four went back to the narrative play-by-play reports to record whether runs were scored following each IFR call and how many, broken down by game situation. We further identified those games where the runs scored after the IFR provided the numerical margin of victory--that is how often, without the post-IFR runs, the winning team lost or the game became a tie.

This was augmented by two web-based searches of advanced statistics databases. The first was to identify "run expectancy," which calculates how many runs, on average, a team is likely to score from a given base-out situation

[24] http://www.retrosheet.org/game.htm.
[25] http://mlb.mlb.com/mediacenter/index.jsp?c_id=mlb#date=10/30/2013

until the end of that inning. I compared the run expectancy for the batting team just after Infield Fly has been called to the run expectancy for the batting team just after the defense turned a double play in the absence of the IFR. Second, I gathered statistics on the frequency of strikeouts in all four infield fly situations.

III. Frequency of Infield Fly Calls

The easiest empirical question to answer is the frequency of infield fly situations and the frequency of Infield Fly calls. If the game situation on which Infield Fly would be called--and thus the incentive and risk of the extreme cost-benefit disparity the rule seeks to prevent--does not arise very often, perhaps the limiting rule is unnecessary and normatively unwarranted.

Table 1

Infield Fly	2010			2011			2012			2013			Totals		
	PA	IFR	%	PA	IFR	%	PA	IFR	%	PA	IFR	%	PA	IFR	%
1st & 2d-0	2658	65	2.4	2373	58	2.4	2403	52	2.2	2464	51	2.1	9,898	226	2.3
1st & 2d-1	4566	132	2.9	4532	106	2.3	4275	106	2.5	4399	115	2.6	17772	459	2.6
Bases Loaded-0	721	21	2.9	662	24	3.6	637	19	3	620	17	2.7	2640	81	3.1
Bases Loaded-1	1771	42	2.4	1677	59	3.5	1534	57	3.7	1602	51	3.2	6584	209	3.2
Totals	9716	260	2.7	9244	247	2.7	8849	234	2.6	9085	234	2.6	36894	975	2.6

Table 1 shows all Infield Fly calls for each year (regular season and post-season) from 2010-2013. Each season runs across the top, while each row covers one of the four infield fly situations for each season. For each game situation, the table shows number of plate appearances in that game situation, number of IFR calls, and IFR calls as a percentage of plate appearances. The column on the far right shows the total figures for each game situation over those four seasons. The lower right-hand box (in bold) shows total plate appearances, IFR calls, and percentage for the full sample.

The numbers are fairly consistent across the four seasons. The IFR was called 975 times in slightly more than 37,000 plate appearances, an average of approximately 243 calls per season on approximately 9317 situational plate appearances per season. In total, IFR was called on 2.6 % of plate appearances in all infield fly situations.[26] The 2010 season represents the high-water mark for both plate appearances and IFR calls, with 260 calls in more than 9800 plate appearances.

Breaking it down by game situation, the greatest number of plate appearances and IFR calls in each season (and overall) came with runners on first and second and one out, arising around twice as often as runners on first and second and none out. There also were more plate appearances with runners on

[26] Prior to the student and with no sense of how often the infield fly situation even arose, I guessed that IFR would be called about 5 % of the times it might, which would have meant just under 2000 IFR calls.

first and second (regardless of number of outs) than with the bases loaded, producing more than twice as many IFR calls. By contrast, the percentage of IFR calls per plate appearance was slightly higher with the bases loaded, over 3 %, although the raw numbers were lower. This includes the highest mark of the study--in 2012, IFR was called in 3.8% of plate appearances with the bases loaded and one out. Over the full period, bases-loaded-one-out saw the highest percentage of IFR calls, in 3.3% of plate appearances.

Another point of interest compares plate appearances with runners on first and second with none out with plate appearances with bases loaded with one out--the situations that alternated years as having the second-most IFR calls. Overall, there were just seventeen more IFR calls in the former than the latter situation (226 to 209), but in 1/3 more plate appearances. In other words, batters come to the plate more often with first-and-second/none out than with bases loaded and one out, but hit infield flies in the same raw numbers, even if far less frequently. The likely explanation is that first-and-second-none-out is a common sacrifice bunt situation, meaning the batter does not try to hit the ball far and is less likely to hit a fly ball resulting in an IFR call.[27]

Finally, to the extent these numbers are off, they undercount Infield Fly calls. Table 1 does not include approximately 50 plays over the four seasons in which neither coded game reports nor video shows Infield Fly being called, but it appears to have been warranted--the ball was hit higher than a line drive, the infielder was settled under the ball, and he easily made the catch or was in position to easily make the easy catch. The infielder had sufficient control over the play to allow the ball to drop and pick it up off the ground to begin the double play, if the rules allowed him to do that. Table 1 also does not include one play, from 2013, in which Infield Fly was not called and a double play resulted, although the video again shows a play warranting a call. Finally, Table 1 does not include between 500 and 600 fly balls caught by infielders in the infield fly situation on which IFR was properly not called, or so it appears from the video. These include bunts, line drives, foul balls, and balls that were not playable with ordinary effort, usually because the infielder had to catch the ball on the run--all plays to which the rule, by its terms, does not apply.[28]

The more difficult question is what policy conclusions to draw from these results. The conclusion one draws from these numbers likely depends on normative preferences about the Infield Fly Rule before looking at these numbers.

Someone who already considers the rule unwise or unnecessary will find confirmation in these numbers. Even accepting that there is a risk of an undesirable inequitable double play on an intentionally uncaught fly ball in the

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[27] The Infield Fly Rule does not apply if the batter pops up the bunt attempt. Official Baseball R. 2.00 (Infield Fly); Wasserman, *supra* note ___, at 505-06.

[28] *See* Official Baseball R. 2.00 (Infield Fly); Wasserman, *supra* note ___, at 491. I tried to take a strict approach, only counting a play as "could have been called" if it was clearly appropriate for an IFR call. Otherwise, I accepted the non-call as correct.

Infield Fly, that problematic play occurred fewer than 1000 times in four seasons, fewer than 250 times per season. This comprises less than 3 % of the times it might arise, rendering any harm *de minimis*. The "injustice," if it is one, simply does not occur frequently enough to necessitate a special rule that ignores the otherwise fundamental premise of baseball that a batter should not be called out unless the fielder catches the ball. An extra few hundred double plays each year from infielders intentionally not catching fly balls is not unacceptable within the game's structure. Infrequency also means the rule likely does not affect the outcome of many innings, games, or overall seasons. And it may well be that, even absent the rule, infielders would simply take the simple out on an easily catchable fly ball, rather than attempting the riskier, if more rewarding, play by intentionally not catching the ball.[29] Certainly the infielders on all the plays in this study made (or at least attempted to make) the easy catch.

On the other hand, someone who accepts the IFR as a matter of baseball's internal structure and logic (as I do[30]) will argue that 1000 unwanted, imbalanced results in four seasons is still too often, justifying the limiting rule. It is enough that the unwanted inequitable play can and should be avoided in those 3 % of cases and that the Infield Fly Rule achieves that goal. Baseball is a better game without plays that potentially produce this type of overwhelming cost-benefit imbalance, so rulemakers should retain a rule that succeeds in preventing that imbalance. A few hundred plays each season, 3 % of the time the game situation arises, are sufficient in number to warrant a limiting rule.

IV. Location and Likelihood of Double Play

Perhaps we can learn more from a second empirical question--whether, absent the Infield Fly Rule, an intentionally uncaught fly ball will produce that undesirable double play and the consequent overwhelming cost-benefit imbalance. This involves two distinct, but related, questions: 1) How likely is the double play if the rules did not prohibit the defense from attempting this play, and 2) Would the infielder therefore have the incentive to intentionally not catch the ball in search of the double play and how often.

Neither sub-question is empirically answerable, as both require counter-factuals and speculation as to what would have happened in a game played under different rules allowing for different player skills and different strategies. But where on the field to which a fly ball was hit on an IFR call can serve as a rough empirical proxy for likelihood of the double play in the absence of the IFR.[31]

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[29] *See* Wasserman, *supra* note ___, at 513-14.

[30] *See id*. at 481.

[31] I use this measure knowing that baseball's rules expressly reject location on the field as a relevant consideration for whether the Infield Fly Rule applies. Official Baseball R. 2.00 (Infield Fly) cmt.

Figure 1: 2010
(a) Runners on first and second b) Bases Loaded

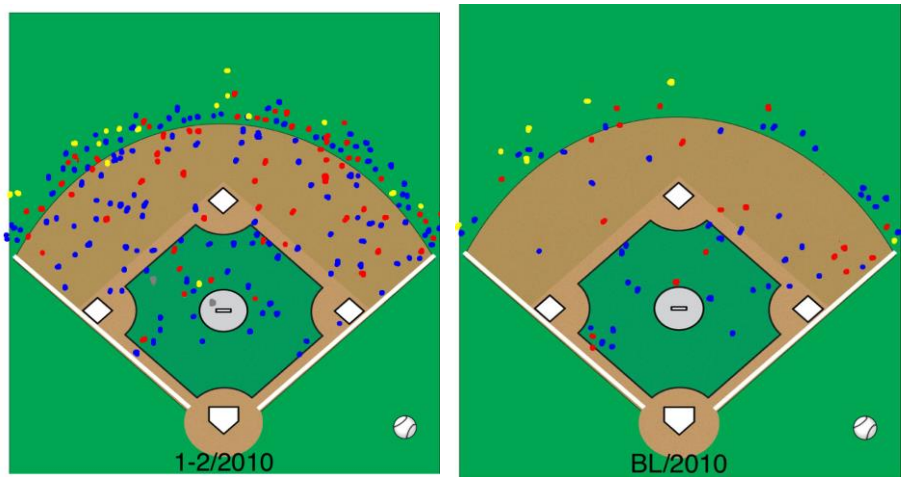


Figure 2: 2011
(a) Runners on first and second b) Bases Loaded

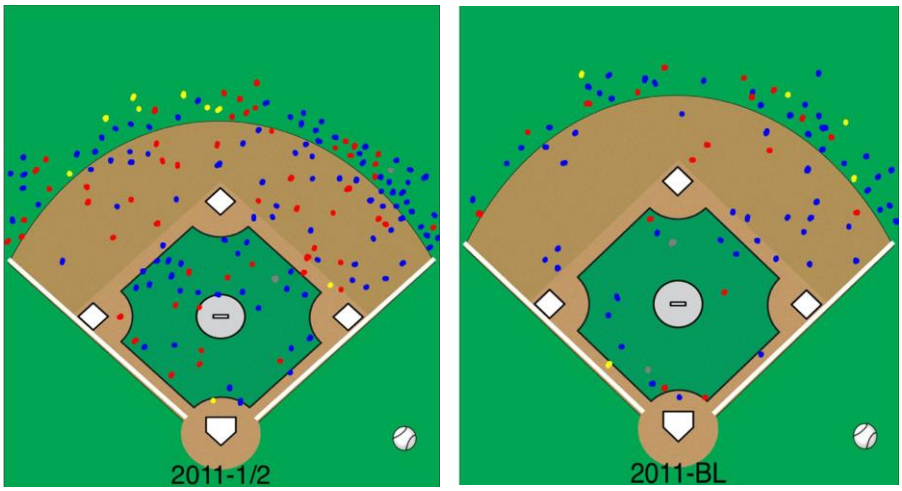


Figure 3: 2012
(a) Runners on first and second b) Bases Loaded

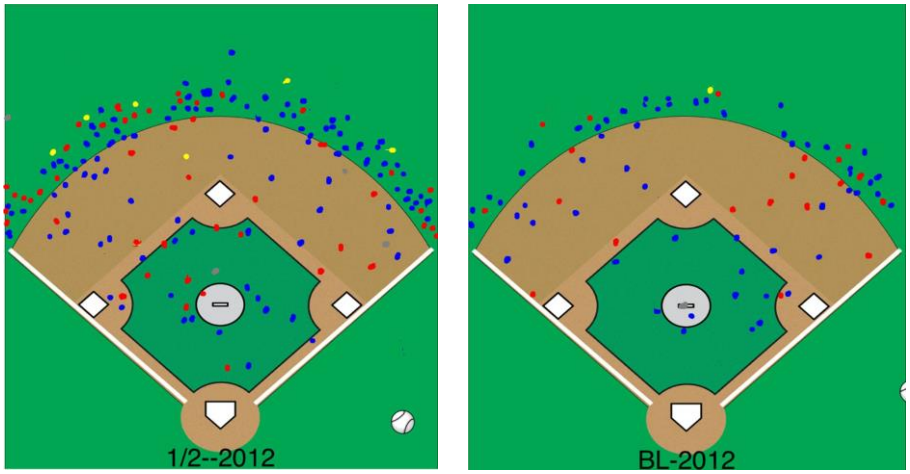
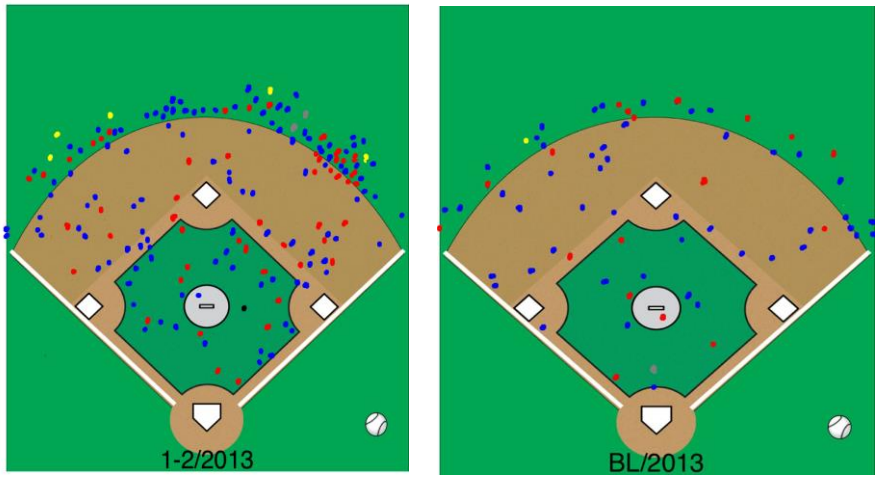


Figure 4: 2013
(a) Runners on first and second b) Bases Loaded



The figures above identify the location of every ball on which Infield Fly was called in our four-season sample, as well as the fifty plays in which the video shows that it could (or should) have been called. This provides location information on approximately 1025 batted balls.

Each mark indicates the spot on the field where the ball was caught or where it landed on the ground (twelve balls either were dropped or fell to the ground

untouched). For each season, Figure (a) on the left shows plays with runners on first and second and Figure (b) on the right shows plays with bases loaded. Red represents balls hit with none out, blue represents balls hit with one out, and gray represents dropped balls (although the batter still was out on the IFR call). Yellow marks represent balls on which Infield Fly was not called or it is not clear whether it was called, but in which, based on the video, it could or should have been called. One black mark in Figure 4a represents a ball on which Infield Fly was not called and that was not caught, resulting in a double play.

We do not see any discernable pattern. There is a fairly wide and even distribution of balls across the field, as among the left, center, and right sides of the field, and as among balls on the infield grass, infield dirt, and outfield grass, with balls bunched in different small areas. The distributions are fairly consistent across the four seasons, with a few small outliers. Figures 3a and 3b show that 2012 seemed to have fewer balls hit on the infield. Figure 2a shows that in 2011, there were more balls hit into the shallow outfield on the right side than the left. And Figure 4a shows that in 2013, there were very few balls hit along the foul line behind first base.

Looking at actual plays under current rules leaves much unknown about a non-IFR world. Infielders always want to catch the ball and are trained by practice and repetition to do so, since there is no incentive to do otherwise. This is why all but twelve balls in our sample were caught; on eleven of those, the failure to catch the ball was unintentional. Infield generally have no obvious incentive not to catch the ball, which means there is only one play in this set on which we can judge how infielders might act on that incentive if a different set of rules authorized it.

We also can do no more than speculate whether a double play would have occurred had any ball intentionally not been caught if baseball were played without the Infield Fly Rule. We do not know how the ball might have bounced when it hit the ground and we do not know what the base runners would do knowing there was a chance the ball might drop to the ground. The dropped balls (except for one) were not intentional or strategic, so we see no plays in which an infielder put himself into position to play the ball off the ground and no play in which the runners had reason to try to advance to the next base; these plays do not tell us how infielders or base runners would react to the possibility of a truly intentional drop. Similarly, we do not know how cleanly the infielder will field the ball off the ground or whether they will be able to make two accurate throws for the outs, although we do know that infielders commit errors less than 2 % of the time, suggesting a bad throw is not a likely occurrence.[32]

We also do not know how good infielders would become at this play and the new, heretofore unnecessary, skill of intentionally not catching a fly ball and playing the ball off the ground. Infielders always want to catch the ball under baseball's current rules and have developed that skill, as opposed to mastering

[32] Wasserman, *supra* note ___, at 516 & n.141.

the opposite skill. But that would change absent the IFR. Infielders and teams would practice these plays, getting better at (paradoxically) failing to catch a fair batted ball, positioning themselves to surround the ball and play it off the ground, covering the bases, and making the necessary throws. This makes the successful double play more likely than it might be under current rules, which removes any incentive to make this play. It also may change what the base runners do--perhaps they run immediately, risking that the infielder will not catch the ball. This, in turn, will prompt infielders to practice (and become good at) disguising their intent, waiting until the last instant to decide whether to catch the ball, hoping to fool the runner and make him guess wrong.[33] Importantly, infielders retains first-move advantage, so always will retain control on the play.[34]

As with the raw quantity of IFR calls, the empirical evidence is illustrative and interesting, but does not necessarily answer the policy question without normative value judgment. Figures 1-4 function like Rorschach Tests--one can see different things in them, again perhaps influenced by ex ante preferences as to the Infield Fly Rule.

Nevertheless, the move from location to likelihood and incentive allows for some educated guesses about what might happen on these 1,025 balls absent the limiting rule. A general rule seems possible--the closer to the infield and the closer to the target bases (the base the infielder will throw first when he picks up the ball) the ball is hit, and thus the shorter and faster the throws, the more likely a double play absent the IFR. This in turn increases the infielder's incentive to intentionally not catch the easily playable fly ball in search of that double play.

The balls most likely to produce a double play are those hit on the infield grass and dirt, which represents a majority of the batted balls in our overall study; once these balls fall to the ground, it is a short throw to get the two lead runners on force outs, particularly at third base and second base. Double plays also are likely on balls hit just on the edge of the outfield grass, especially to the middle and left sides of the field; the initial throw to get the lead runner at third remains short and relatively easy, even as the ball travels further into the outfield. This covers that large swath from the right of second base (about behind where a second baseman stands) all the way to the left-field foul line. These two categories of batted balls appear to account for about 3/4 of all balls in infield fly situations.

In fact, our sample includes one play that demonstrates the necessity of the Infield Fly Rule--it features a pop-up on the infield grass, an intentional non-catch, and a resulting double play. It shows the precise evils that baseball's rulemakers targeted when they created the Infield Fly Rule and why they have retained it for more than 110 years.[35]

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[33] Wasserman, *supra* note ___, at 513-14.
[34] Wasserman, *supra* note ___, at 495.
[35] Wasserman, *supra* note ___, at 491-92.

Figure 5

This came in a July 2013 game between the Minnesota Twins and Anaheim Angels, represented by the single black mark to the right of the pitcher's mound in Figure 4a and shown in Figure 5. With runners on first and second and none out in the top of ninth inning and the Twins tailing 1-0, a Twins player hit a low, looping pop fly to the right of the pitcher's mound (the ball is visible in the top right portion of the photo). The pitcher moved toward the easily catchable ball, then stopped, intentionally letting the ball fall at his feet. He picked it up and threw out the batter running to first (the batter, shown just out of the batter's box in the bottom of the photo), did not run hard, likely expecting either the ball to be caught or Infield Fly to be called) and the first baseman completed the double play by throwing out the runner moving from first to second. This is not the double play the IFR was designed to prevent.[36] But because the batter did not run hard, the easiest play was for the pitcher to throw him out first.[37]

[36] Wasserman, *supra* note ___, at 492.

[37] Howard Wasserman, *Rage against the Infield Fly Rule*, PRAWFSBLAWG, Jul. 26, 2013, http://prawfsblawg.blogs.com/prawfsblawg/2013/07/rage-against-the-infield-fly-rule.html; Matthew Pouliot, *Isn't this why we have an infield-fly rule?*, HARDBALL TALK, Jul. 24, 2013, http://hardballtalk.nbcsports.com/2013/07/24/isnt-this-why-we-have-an-infield-fly-rule/. Video of the play can be found at http://mlb.mlb.com/shared/flash/mediaplayer/v4.4/R10/MP4.jsp?calendar_event_id=14-348251-2013-07-24&content_id=&media_id=&view_key=&media_type=video&source=MLB&sponsor=MLB&clickOrigin=&affiliateId=&team=mlb (go to the 2:55:44 mark).

The pitcher easily got to the ball and easily could have caught it. But he clearly made no effort to catch it and knew precisely what he was doing by not catching it.[38] The runner on second base can be seen retreating back to the base; when the ball landed on the ground, both runners were standing one or two steps off the base, with little chance of beating any subsequent throws. Had the batter run hard to first (as he is ordinarily expected to do), the pitcher could have turned around and thrown to third base to start the third-to-second double play on the forced runners--that is the double play the IFR was designed to prevent. Either way, the pitcher had every incentive to do exactly what he did in search of an overwhelming advantage of getting two outs on the play, even if he threw to the "wrong" base to begin the double play.[39] That double play knocked the Twins out of a potential rally late in a one-run game they ultimately lost by that score. While the outcome of the game would not necessarily have been different, having two outs and a runner on third base (where the Twins were after the play) is sufficiently different and disadvantageous to the offense (and advantageous for the defense) compared with having one out and runners on first and second (where they would have been had IFR been called).

Balls hit to the short outfield grass with the bases loaded (Figure (b) for each season) raise an interesting strategic divide for the defense, depending on whether there are none or one out and whether the ball is hit to the left or right side of the field. With one out, expect the defense to try for the double play, especially on balls on the left side of the field; the throws to third and then second remain relatively short, allowing a double play that will end the inning.

But with none out, that third-to-second double play does not end the inning and allows the lead runner will score from third base. To get the lead runner, the infielder would have to throw home, perhaps too long a throw to get the lead runner or to also allow for the second throw to complete the double play (at third or at second, assuming the batter runs to first). If intentionally failing to catch the ball will not produce a double play, the incentive to intentionally not catch it shrinks and the infielder should and will make the easy play by catching the ball for the single out. Alternatively, the defense might go for the third-to-second double play anyway, getting two outs on the play but allowing the runner to

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[38] The umpire justified not calling Infield Fly on the play because the pitcher was not "comfortably underneath" the ball waiting for it to come down, although he acknowledged that the ball did have enough arc to fall within the rule. Figure 5 seems to confirm the arc. But the photo and video suggest that the reason the pitcher was not directly underneath the ball was that he intentionally did not run under the ball so it would drop in front of him, placing him in a good position to field it off the ground and throw it. Wasserman, *supra* note ___.

[39] A double play does remain possible, and the pitcher still might have had incentive to let the ball drop to the ground, even with the IFR. Perhaps one of the base runners would unthinkingly run upon seeing the ball fall to the ground, forgetting about the IFR, and the pitcher could have thrown him out for the double play (with the out from the IFR, it would have been a tag play on the runner, since the runners are not forced to run) for the double play. But the rules are not designed to protect base runners from themselves--unwise base-running decisions caused by not knowing the rules are on them. Wasserman *supra* note ___, at 497-98.

score. The wisdom of this strategy depends on the game situation--score and inning--and the importance of the single run.[40]

By contrast, the double play--and thus the incentive for infielders to intentionally fail to catch the ball--becomes less likely on balls hit further into the outfield, especially to the outfield grass on the right side of the field near the foul line behind first base and the area behind where the first baseman and second baseman stand. We see approximately twenty-five such balls in each of the seasons in our sample (except 2013, depicted in Figures 4a and 4b, which saw few balls hit to that area). In addition, fewer than ten of the "should-have-been-called" plays (yellow marks) went to the right-side outfield. The further into the outfield or the further to the right side of the field the ball lands, the further the throw to get the lead runner and the more difficult it will be to make the two throws for the double play, thus the less incentive an infielder has to intentionally not catch the ball. Much may depend on the specifics of the play--the speed of the runners, the strength of the infielder's arm, how able the infielder was to settle around the ball and set himself to play it when it dropped, how able he would have been to charge in for the ball to pick it off the ground and throw it, with his momentum moving toward whatever base he is throwing.

Figures 1-4 do appear to support one common criticism of the IFR--it is over-inclusive. In our sample, the IFR was called on a number of balls hit well into the outfield and near the right-field line. Accepting what was said previously about the likelihood of a double play based on the location of the ball, this suggests that the Infield Fly was called on a number of balls each season on which there was no realistic possibility of a double play and thus no real incentive for the infielder to intentionally not catch the ball. Although the rule was designed to eliminate the incentive for infielders to intentionally fail to perform the expected athletic skills in search of overwhelming benefits, it is being applied even where those concerns are absent.

The most notorious example of this--and the play that triggered my scholarly interest in defending the IFR[41]--came in the 2012 National League Wild Card game on a ball hit well into left field, shown in Figure 6 and by a gray mark (the ball fell to the ground untouched) all alone in medium left field in Figure 3a. The batter was called out on IFR even though the ball was hit so far into the outfield that the runners had not stayed by their bases and were able to advance easily when the ball fell to the ground. Absent the IFR, the double play on the base

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[40] For example, with a four-run lead in the eighth inning, the infielder may go for the third-to-second double play and allow the run to score, while with a one-run lead he will take the sure out on the fly ball and keep the runners in place. Of course, defenses regularly look at the score and the time in the game when choosing whether to accept outs in exchange for allowing a run to score or whether to make the play that keeps the run from scoring. *Playing the Infield In*, DAN AGONISTES, Dec. 7, 2005, http://danagonistes.blogspot.com/2005/12/playing-infield-in.html.

[41] Wasserman, *supra* note ___, at 480-81; Howard Wasserman, *The Return of the Infield Fly Rule*, CONCURRING OPINIONS, Oct. 6 2012, http://www.concurringopinions.com/archives/2012/10/the-return-of-the-infield-fly-rule.html.

runners would have been difficult, making it unlikely that the infielder ever would intentionally have failed catch such a fly ball.[42]

Figures 5 and 6 illustrate the competing ends of the Infield Fly Rule's over-inclusiveness. Overbreadth is inevitable and generally acceptable in legislative rules, at least absent countervailing costs.[43] Thus, even if the inequitable double play is unlikely or even impossible on some plays to which IFR may apply, it is possible, and even highly likely, on others. The numbers support this. Approximately twenty-five balls each season (namely those in the shallow outfield on the right side of the field)--100 play in this four-year sample--are highly unlikely to produce double plays, as opposed to the almost 250 balls each season on the infield grass or dirt or to the shallow outfield on the left side, where a double play is more likely. While the incentive to intentionally not catch the ball is absent in the former set of plays, it remains present in the latter set.

Whether that justifies the IFR is once again not an empirical question, but a value one--whether 250 potential unjust double plays each year, and the

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[42] Kaduk, *supra* note ___; *Infield Fly Rule Controversy: Braves vs. Cardinals Wild Card Game Includes Disputed Call*, Oct. 6, 2012, http://www.huffingtonpost.com/2012/10/05/infield-fly-rule-braves-cardinals-wild-card_n_1944240.html (includes video). Ironically, the runners advanced because the infielder was trying to catch the ball, thus he was not in position to play the ball off the ground once it dropped to the ground (due to unintended confusion between the infielder and his teammate in left field). Perhaps an intentional failure to catch, for which the fielder prepared and set himself, would have played differently.

[43] Michael T. Cahill, *Attempt By Omission*, 94 IOWA L. REV. 1207, 1221 (2009); Mark Tushnet, *New Forms of Judicial Review and the Persistence of Rights- and Democracy-Based Worries*, 38 WAKE FOREST L. REV. 813, 835 (2003).

concomitant overwhelming cost-benefit imbalance for the defense and against the offense from those double plays, absent the IFR outweigh imposing twenty-five automatic outs each year through the IFR on plays where the rule's intended evil is absent and the limiting rule is less warranted. The answer again depends on the normative preferences one brings to the discussion. For a supporter of the rule, these figures demonstrate that the need to prevent overwhelming cost-benefit imbalance arises far more often than the unnecessary IFR call. Moreover, that the infielder almost always catches the ball means the automatic out does not actually change anything, but simply imposes the most likely outcome in any event.

We can express this in the familiar distinction between Type I errors ("false positives," in which a rule applies when it should not, erroneously halting beneficial behavior) and Type II errors ("false negatives," in which a rule does not apply when it should, erroneously permitting undesirable conduct).[44] Rulemakers often must choose between accepting more of one type of error or the other, which itself reflects a policy choice. The costs of Type II errors often are more noticeable and tangible, causing rulemakers to to favor rules accepting Type I errors in the interest of limiting Type II errors.[45] Other times,[46] rulemakers seek to limit Type I errors, even at the risk of additional Type II errors.[47]

For our purposes, a Type I error results from having the Infield Fly Rule on a ball in which the unjust double play from an infielder intentionally failing to catch the ball is unlikely, as in Figure 6. A Type II error results from not having the IFR, thereby producing a double play and cost-benefit imbalance when the infielder intentionally fails to catch the ball when the double play is highly likely, as in Figure 5. Given the location and distribution of batted balls shown in Figures 1-4--and using location as proxy for likelihood and incentive--it appears that not having the IFR would produce significantly more Type II errors than having the IFR produces Type I errors.

Moreover, measuring the error cost of a purportedly over-inclusive rule, and choosing between the two types of errors, must consider "categories of practices so rarely beneficial that it makes sense to prohibit the whole category even with knowledge that this will condemn some beneficial instances."[48] An over-inclusive rule, one that bans all of some conduct, becomes problematic only when it somehow prohibits significant beneficial instances of the targeted conduct in addition to the problematic instances the rule is designed to reach.[49]

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[44] Clermont, *supra* note ___, at 1000; Engstrom, *supra* note ___, at 683 n.220; Fisher & Lande, *supra* note ___, at 1586, 1669.

[45] Engstrom, *supra* note ___, at 683 n.220; Fisher & Lande, *supra* note ___, at 1671.

[46] For example, the recent heightening of federal civil pleading standards. Ashcroft v. Iqbal, 556 U.S. 662 (2009); Bell Atlantic v. Twombly, 550 U.S. 544 (2007).

[47] Allen & Guy, *supra* note ___, at 7.

[48] Easterbrook, *supra* note ___, at 10.

[49] Wasserman, *supra* note ___, at 512-13.

Stated another way, a rule preventing even a rare unwanted event is worthwhile, so long as the rule does not create costly Type I errors by prohibiting other desirable conduct.

The question is whether Type I errors from having the IFR (automatic outs even on balls on which a double play is unlikely and the infielder has no negative incentive) impose substantial costs. That is, does baseball lose something by always prohibiting infielders from seeking the extreme cost-benefit advantage of the double play by intentionally failing to catch an easily playable ball, even when the circumstances of the play already remove any incentive to actually do so?

The best answer is no. There are no beneficial instances of infielders intentionally failing to catch easily playable fair fly balls and no instances in which the game benefits from or wants to encourage infielders to intentionally not catch easily playable fair fly balls. The rule's only possible cost is not allowing players the athletic freedom to avail themselves of every strategic option. But rulemakers must balance that freedom against overly tilted situational cost-benefit disparities, which is what ultimately explains the IFR.[50] Baseball thus rightly chooses to live with the small number of Type I errors under an overbroad IFR because those errors impose no additional costs to the game or the players.

Problems with, and thus costs from, application and enforcement of a particular rule may raise additional concerns--what Fisher and Lande call Type III errors.[51] For the Infield Fly Rule, this may include difficulties for the umpires in identifying and calling the plays that actually warrant the rule. It also may include player, manager, and fan controversy and anger resulting from a particular erroneous or disputed application--perhaps the Infield Fly Rule is not so costless if fans respond to a particular call by hurling debris on the field and delaying the game for ten minutes.[52] But this sample does not suggest excessive enforcement costs. I identified fewer than 50 plays in four years where IFR should have been called but was not or may not have been (represented as yellow marks),[53] and only one on which the defense manufactured a double play by intentionally failing to catch the ball. Because the defense is trained by the existence of the IFR to catch the ball and lacks incentive to do otherwise, those few erroneous non-calls do not impose any costs, since the infielder catches the ball anyway.

Conversely, a small handful of IFR calls probably should not have been, even under the rule as written, because the catch demanded more than "ordinary effort," often when sun or wind made the catch more difficult. But many of

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[50] *Id*. at 493. Historically, the rule also was justified in terms of sportsmanship, although that has largely disappeared in the modern game. Wasserman, *supra* note ___, at 492-93; Aside, *supra* note ___, at 1478-79.

[51] Fisher & Lande, *supra* note ___, at 1586.

[52] Kaduk, *supra* note ___; *see also* Wasserman, *supra* note ___, at 480-81.

[53] *Supra* note ___.

those difficult balls were hit on the infield, where the base runners had to stay close to their bases and might not have been able to get to the next base if the ball had dropped. Of the eleven IFR calls in our sample that were unintentionally dropped (indicated by gray marks), runners were able to advance on only two; this suggests that runners still might be doubled off on a ball hit on the infield, even if the infielder's failure to catch the ball is not intentional. Thus, over-calling IFR still achieves useful cost-benefit balance, by preventing the defense from achieving an extraordinary benefit (and imposing on the offense an extraordinary cost) through its mistakes.

Finally, to the extent the IFR's over-inclusiveness is the real concern, the solution is a more narrowly tailored rule--a rule that prevents an infielder from seeking a double play in Figure 5, but not in Figure 6 or those other balls hit deeper into the outfield or to the right side. In other words, draft a narrower rule that will not cause Type I errors, without eliminating the IFR altogether and producing a flood of Type II errors.

The problem is how to draft. The obvious alternative rule would define an infield fly by likelihood of the double play--where the umpire determines that a double play is a possible or plausible or likely (or some other standard) result if the infielder fails to catch the ball. In other words, the touchstone is not whether the ball is playable with ordinary effort, but whether, if the ball is not caught, the defense likely can turn that double play, thereby having an incentive to intentionally fail to catch the ball. That might allow umpires to invoke the rule only on those balls on the infield, where the double play is obvious given the short throws, but not on balls hit well into the outfield or to the right side of the field.

But, as I argued previously, such a rule is impossible to administer, because umpires cannot determine the likelihood of a double play while the ball is still in the air and before the ball has hit the ground or the runners have run--precisely when the rule must be invoked to avoid on-field chaos.[54] For the same reasons we cannot look at Figures 1-4 and do any more than guess whether a double play would have resulted had the fly ball not been caught, umpires cannot watch any of those plays as they are happening and do any more than guess about what might happen if the infielder intentionally fails to catch the ball and the runners are forced to advance. They likely would begin to use location on the field as a pure proxy for likelihood of the double play--balls in the infield get called, off the infield do not--something the current rule expressly eschews.[55] While location functions well as a proxy in this study absent any alternative empirical measure, the correlation between location and double play is not so definitive (given the unknowns) as to make this the most effective way to define or apply the rule in practice.

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[54] Wasserman, *supra* note ___, at 514-15 & n.132.
[55] Official Baseball R. 2.00 (Infield Fly) cmt.

V. Effects of the Infield Fly Rule

Having seen how often and where Infield Fly was called and having some sense of the likelihood of a double play on the intentionally uncaught fly ball, the next point is to try to measure the effect of the rule on actual games.

Recall how the Infield Fly Rule is designed to work. Rulemakers were concerned that infielders would intentionally fail to catch easily playable pop flies, allow the ball to fall to the ground, then turn a double play on two (if not three) of the trapped base runners, but not on the batter, who should be running hard and should reach first base safely before the ball falls to the ground.[56] The IFR is designed to remove that incentive. Because the batter is out under the IFR, the base runners need not try to advance even if the ball is dropped; the defense gets one out on the play, the runners likely remain at the same bases, and subsequent batters come to bat with the same base-runner situation, but one additional out. Without the IFR, on the other hand, infielders have an incentive to attempt that double play on many, if not most, fly balls. If successful,[57] the defense gets two outs on the play, leaving fewer runners on base and fewer runners in scoring position.[58] The circumstances of those subsequent plate appearances are dramatically altered, with more outs, fewer base runners, and less likelihood of scoring runs in the inning. And if the fly ball comes with one out, that double play ends the inning, preempting those plate appearance and the runs they may have produced later in the inning.

Imagine a batter comes to the plate with runners on first and second with none out (an infield fly situation) and hits a fly ball that is playable by the shortstop with ordinary effort. If IFR is called (or the ball is caught, because that is what the infielder is incentivized to do), the next batter likely[59] comes to the plate still with runners on first and second, now with one out. On the other hand, without the IFR, if the infielder follows his incentive and intentionally fails to catch the fly ball and the defense successfully turns the double play on the two base runners, the next batter comes to the plate with a runner on first base only and two outs in the inning. And if we imagine the same play except with runners on first and second with one out, the double play ends the inning, and preempts those next plate appearances. In other words, the batter following an infield fly hits in a slightly less advantageous position.

The difference between the game situation for the next batter, and the less advantageous that situation for the batter, reflects the cost to the offense (and benefit to the defense) of not having the Infield Fly Rule. One way to measure that effect is with the sabermetric measure of "run expectancy," which calculates

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[56] Wasserman, *supra* note ___, at 492, 494-95.
[57] *Supra* Part IV.
[58] Wasserman, *supra* note ___, at 493-94.
[59] *Supra* note ___.

how many runs, on average, a team is likely to score from a given base-out situation until the end of that inning.[60]

Table 2[61]

Run Expectancy	2010			2011			2012			2013		
	IFR	No IFR	Diff	IFR	No IFR	Diff	IFR	No IFR	Diff	IFR	No IFR	Diff
1st & 2d-0	0.9032	0.2251	0.67781	0.8936	0.2174	0.6762	0.9025	0.2214	0.6811	0.8815	0.2064	0.6751
1st & 2d-1	0.4506	**0.4939**	-0.0433	0.4344	**0.4807**	-0.0463	0.4391	**0.4886**	-0.0495	0.42	**0.4672**	-0.0472
Bases Loaded-0	1.5514	0.4506	1.1008	1.5344	0.4344	1.1	1.5367	0.4391	1.0976	1.5265	0.42	1.1065
Bases Loaded-1	0.7211	**0.4939**	0.2272	0.6922	**0.4807**	0.2115	0.7012	**0.4886**	0.2126	0.6809	**0.4672**	0.2137

Table 2 shows the change in run expectancy that would result from not having the Infield Fly Rule. For each infield fly situation in a given year, it shows run expectancies for the batter following an easily catchable fly ball to an infielder. For each year and each base-out situation, the first column shows run expectancy with the Infield Fly Rule; the batter is out--either because the infielder caught the ball, as he is incentivized to do, or IFR was called--and the next batter comes to the plate with the same base-runner situation but one more out. The second column shows the game without an Infield Fly Rule, where the infielder turned a double play by intentionally not catching that easily playable fly ball, and the next batter comes to the plate with one less base runner and one more out. The third column shows the difference between the first and second measures, with run expectancy typically higher with the IFR than without.

For simplicity sake, I rely on two assumptions, reflecting the most common occurrences on each play. First, with the IFR, the batter is out (either on the call or the catch) and the runners remain where they are; the next batter comes to the plate in the same base situation, but with one more out. Second, absent the IFR, the defense would have turned a double play on the lead runners; the next batter comes to the plate with one more out in the inning, one less base runner, and one less runner in scoring position. And if the double play came with two out, the inning ends and the next batter comes to the plate the following inning. Thus, a double play coming with runners on first and second and none out results in a runner on first and two out. A double play on bases loaded and none out produces runners on first and second with two out. A double play on any play with one out ends the inning.

Consider bases loaded with none out for 2013. With the batter out, the next batter hits with the bases loaded and one out, with the offense having a run expectancy of 1.5265. Absent the IFR, the defense turns a double play on the lead runners at home and third; the next batter hits with runners on first and

[60] http://www.baseballprospectus.com/glossary/index.php?mode=viewstat&stat=576.

[61] Source: Baseball Prospectus Custom Statistics Report, which runs searches for run expectancy for every base-out situation by year.
http://www.baseballprospectus.com/sortable/index.php?cid=1408077

second and two outs, with the offense having a run expectancy of 0.42. The difference between those--1.1065--is the cost to the batting team if the defense can turn that double play absent the IFR, rather than taking the lone out due to the IFR. In all four years for each infield fly situation, we see that batting teams would incur significant costs if baseball did not have an Infield Fly Rule and infielders were able to act on the negative incentive. Repealing the IFR would cost the offense more than a full run with bases loaded and none out and at least 0.67 runs with runners on first and second and none out.

Measuring the run-expectancy effect of the non-IFR double play with one out is slightly trickier, because the double play ends the inning and the offense's turn at bat, so the next batter does not come to the plate in that inning or with any runners on base. For this situation (indicated by the numbers in **bold** in Table 2), I assumed that the next batter hits first the following inning and use run expectancy for someone hitting with no one on base and no one out (as is always true for a batter at the start of an inning). In the bases-loaded-one-out situation, we find only a slight cost to the offense--approximately 0.2 runs lost--from not having the IFR. And the first-and-second-one-out situation actually produces a statistical benefit--run expectancy is marginally (approximately 0.04 runs) higher for a batter hitting first in an inning than with runners on first and second and two out (the situation after the out on the infield fly).

Statistics aside, however, it is hard to believe that an offensive team would prefer an inning-ending double play to having a batter hit with a runner on base. Moreover, if the double play comes in the last inning, that next batter never gets the opportunity to hit.

Beyond general statistics, we also can determine what actually happened subsequent to each actual or proper IFR call in our sample.

Table 3

Runs Scored	2010			2011			2012			2013			Totals		
	IFR	Runs	Affect	IFR	Runs	Affect	IFR	Runs	Affect	IFR	Runs	Affect	IFR	Runs	Affect
1st & 2d-0	65	27	8	58	17	3	52	25	5	51	25	7	226	94	23
1st & 2d-1	132	25	4	106	21	4	106	27	9	115	20	6	459	93	23
Bases Loaded-0	21	10	2	24	12	4	19	13	6	17	11	3	81	46	25
Baes Loaded-1	42	14	5	59	15	7	57	18	6	51	20	5	209	67	23
Totals	260	76	19	247	65	18	234	83	26	234	76	21	975	300	94

For each infield fly situation for each season from 2010-2013, Table 3 records the number of IFR calls (the numbers imported from the same column in Table 1); how often runs were scored in the same inning subsequent to the call; and how often the outcome of the game was "affected," which I define as where runs scored subsequent to an IFR call provided the ultimate margin of victory in the game. This includes games in which, absent the runs scored subsequent to the IFR call, the winning team loses the game or the game becomes tied. It does not include games in which removing those runs simply widens the margin of

victory for the same team, in that the winning team wins by fewer runs or the losing team loses by more runs.

The idea is that the double play eliminates some or all of the base runners who scored those subsequent runs, there by preventing them from scoring. And if the double play came with one out, it would have ended the inning without any of those runners scoring. To the extent runs would have been lost and these now-unscored runs provide the margin of victory, it suggests that removing the IFR would, in fact, alter game outcomes.

Teams scored runs subsequent to 300 out of 975 Infield Fly calls (excluding the fifty could-have-been called plays), representing 30.8 % of plays in our sample. This includes runs subsequent to 160 of 668 calls with one out (either first-and-second or bases loaded). Ninety-four IFR calls potentially affected the outcome, in that the winning team would have lost or tied absent the post-IFR runs; forty-six of those outcome-affecting calls came with one out.

This provides an admittedly imperfect measure of the Infield Fly Rule's effect, because simply subtracting runs from the final score does not provide the full picture. Even allowing for the double play, it is impossible to know how the game would have played out subsequently. Some post-IFR runs still might have scored. For example, following a non-IFR double play with none out, the batter hits with a runner on first and two outs. Although this situation produces fewer runs on average than bases loaded with one out, it does not necessarily mean the outcome of the next batter's plate appearances would have been the same; the pitcher and batter both take different approaches to this different situation that might produce different results in the plate appearance and the inning. Even if the double play ends an inning, subsequent batters still come to the plate in the following inning (unless the double play occurs in the final inning of the game) and in different situations, again perhaps changing how pitcher and batter approach the play and again perhaps producing different results. Finally, if the unscored runs result in a tie, we do not know who ultimately would have won the game.

Alternatively, it is possible that I am defining effect on the outcome too narrowly by excluding games in which the unscored runs alter the margin of victory but not the victor. Imagine a team wins a game 8-4, with three runs scoring subsequent to an IFR call in the fifth inning; subtracting those three runs makes the score 5-4, a closer game that the teams perhaps play differently in the later innings.

Of course, accepting that the outcome of those ninety-four games was affected and might be different without the IFR does not tell us which outcome is correct or preferable. Nor does it tell us whether an effect on twenty-three games per season--spread among all infield fly situations over all games over the course of a season--is truly significant enough to justify a special rule. As with the raw numbers of IFR calls, whether these numbers justify a special limiting rule still depends on underlying ex ante normative preferences.

VI. Dropped Third Strike: A Baseball Comparator

A different way to draw normative conclusions from the frequency of Infield Fly calls is to compare them with the frequency of the one baseball play and baseball rule that is truly analogous to the IFR in cost-benefit and equity terms--the dropped third strike.

It is axiomatic that "three strikes you're out."[62] In fact, however, it is more complicated. A batter is not out on strikes, and becomes a base runner free to run to first, when a third strike is not caught by the catcher;[63] he is out only if the defense either tags him or throws him out at first to complete the out. But a batter is out on strikes, and cannot run, if the "third strike is not caught by the catcher when first base is occupied before two are out."[64]

The latter rule functions as a limiting rule, grounded in the same logic and policy as the Infield Fly Rule. It applies whenever first base is occupied, such that the batter running forces at least one base runner to advance, but not if first base is open, in which case the batter running to first does not force the other base runners to advance. It also does not apply if there are two outs, in which case the defense gets the same result--one out--whether the catcher catches the ball or drops it to get an out on the base runners. Absent the rule, a catcher could intentionally drop the third strike when a runner is on first, forcing the batter to run and forcing the base runners to advance. This would allow the defense to get a fairly easy double play (and perhaps even a triple play) on two base runners or on base runners and the batter, all by the catcher intentionally failing to perform the expected athletic skill of catching a pitched ball.[65]

Like the IFR, the dropped third-strike rule eliminates the opportunity and thus the incentive for the defense to gain an overwhelming benefit and impose an overwhelming cost on the other team by intentionally failing to perform the expected athletic skills in the expected manner. And like the IFR, it does so by imposing the outcome on the play--one out on the strikeout, runners need not advance--that would follow from the catcher doing as expected and catching the pitched ball.[66]

The dropped third strike rule applies anytime at least first base is occupied with fewer than two outs, which includes all four infield fly situations.[67] The dropped third strike is problematic for IFR critics as a policy matter, given that

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[62] JACK NORWORTH & ALBERT VON TILZER, TAKE ME OUT TO THE BALL GAME (York Music Co. 1908).

[63] Official Baseball R. 6.09(b).

[64] *Id.* 6.05(c).

[65] Wasserman, *supra* note ___, 498-99.

[66] *Id.* at 499-500.

[67] It also applies in four other game situations--runner on first base with none out, runner on first base with one out, runners on first base and third base with none out, and runners on first base and third base with one out. For purposes of comparing this rule to the IFR, we can ignore these four situations.

the rules are cut from the same logical and intellectual cloth--both seek to prevent the defense from intentionally failing to catch a playable ball to gain an extraordinary cost-benefit advantage. If the IFR is an unwarranted limit on clever strategic play that should be eliminated, then the dropped third strike rule is a similarly unwarranted limit on clever strategic play that should be eliminated.[68]

Unless, of course, empirical evidence reveals salient differences between the plays and the rules, justifying eliminating one while retaining the other.

Table 4[69]

Strikeouts	2010			2011			2012			2013			Totals		
	PA	K	%	PA	K	%	PA	K	%	PA	K	%	PA	K	%
1st & 2d-0	2658	418	15.7	2373	370	15.6	2403	402	16.7	2464	421	17.1	9,898	1611	16.3
1st & 2d-1	4566	866	18.9	4532	792	17.5	4275	817	19.1	4399	823	18.7	17772	3298	18.5
Bases Loaded-0	721	109	15.1	662	122	18.4	637	100	15.7	620	110	17.7	2640	441	16.7
Bases Loaded-1	1771	330	18.6	1677	291	17.3	1534	257	16.8	1602	301	18.8	6584	1179	17.9
Totals	9716	1723	17.7	9244	1575	17	8849	1576	17.8	9085	1655	18.2	36894	6529	17.7

Table 4 shows strikeouts in each of the four infield fly situations for each year (regular season and post-season) from 2010-2013. Each season occupies one column, while each row covers one of the four infield fly situations. For each game situation in a given year, we see the number of plate appearances (numbers drawn from the same columns in Table 1), number of strikeouts, and strikeouts as a percentage of plate appearances. The column on the far right shows total figures for each game situation over those four seasons. The lower right-hand box shows total plate appearances, strikeouts, and percentage for the full study.

The numbers in Table 4 reveal the substantially greater frequency of strikeouts compared with pop-outs in the infield fly situation. There were 6559 strikeouts out of more than 37,000 plate appearances in four seasons, more than six times the approximately 1000 fly balls on which IFR was or should have been called; this represents 17.8% of plate appearances in this situation, compared to less than 3 % for fly balls. In the most common situation of runners on first and second with one out, there were 3398 strikeouts, more than seven times the 459 IFR calls in the same situation, representing more than 19 % of plate appearances. We see similarly wide disparities between strikeouts and infield flies in all four situations.[70]

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[68] Wasserman, *supra* note ___, at 500.

[69] Source: Baseball Reference's play finder and play splits. *See* http://bbref.com/play-index/split_finder.cgi?type=b&class=team; http://www.baseball-reference.com/.

[70] The total number of strikeouts with at least a runner on first and less than two outs, and thus the total number of applications of the dropped third strike rule, is even higher when we add strikeouts in the four other situations to which the rule applies. *Supra* note ___. I focus only on the four infield fly situations, to measure the frequency of the respective outcomes in these situations.

The cost-benefit inequity created by the dropped third strike, and thus the need for this limiting rule, should be clear. The double play on a dropped third strike is easy (assuming no throwing errors) if the drop is truly intentional and controlled--the catcher will knock the ball down at his feet, to be picked up and thrown to start the double play on one or more of the base runners[71] who remain stuck at their bases,[72] along with the batter. And the catcher easily can do this on every strikeout in these situations, meaning on almost 17 % of plate appearances in infield fly situations. Unlike infield fly, there are no questions or uncertainty about whether a ball is easily catchable, how the ball might bounce, or whether the ball is in a spot on the field where a double play is possible.

Once again, the difficult question is about normative conclusions. Does the large disparity between strikeouts and infield fly balls--both in raw numbers and as a percentage of situational plate appearances--undermine the Infield Fly Rule?

The greater frequency of strikeouts arguably highlights the infrequency of infield flies, thereby demonstrating the de minimis nature of any cost-benefit imbalance from a small number of additional double plays in this small number of batted balls. The numerical gap suggests that, contrary to my previous argument,[73] one can justify retaining the dropped third strike rule while rejecting the IFR. A cost-benefit imbalance arising 17 % of the time might be worth a limiting rule, even if an imbalance arising less than 3 % of the time is not. This is especially true given how simple and obvious the third-strike double play and questions about likelihood of the double play on many intentionally uncaught fly balls.

On the other hand, that one rule gets invoked more often than another does not tell us about the validity or necessity of either rule, particularly the less-frequently invoked rule. The IFR and dropped third strike are not mutually exclusive or in competition with one another; they can co-exist, since they cover distinct results arising out of the same situation. In fact, we could argue that the lower right-hand box of Tables 1 and 4 show that the Infield Fly Rule and the dropped third strike rule together prevent the defense from intentionally creating an inequitable cost-benefit imbalance by failing to perform the expected athletic skills in 20 % of plate appearances in these game situations.

Ultimately, this draws us back to non-empirical policy preferences--one's conclusions from any of these numbers depend on the preferences one brings to the issue. After all, one could minimize the effect of strikeouts by emphasizing

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[71] The double play is at its absolute simplest with the bases loaded, as the catcher can pick up the ball laying at his feet and step on home plate for the first out before throwing to any base to complete the double play. Wasserman, *supra* note ___, at 498. A triple play is possible, even likely, if the bases are loaded with none out. *Id.*

[72] The one hope for the offense is that the runners were running on the pitch, which would take away the double play. Of course, knowing the runners were already running, the catcher would not intentionally drop the third strike, preferring instead to catch the ball for the strikeout and complete the double play by throwing out one of the stealing runners.

[73] Wasserman, *supra* note ___, at 501.

that, while greater than the number of likely IFR calls (and thus the number of fly balls), 17 % still represents nowhere close to a majority of all plate appearances in infield fly situations. Even if the number of IFR calls is miniscule, both in an absolute and a relative sense, the debate returns to whether an unjust result on even one play warrants a limiting rule, especially when the rule otherwise imposes no costs. That qualitative question has no quantitative answer.

Conclusion

Sabermetrics famously involves using advanced statistics and statistical methodology to better evaluate player performance and value.[74] While the statistics and analysis here are not advanced, this paper reflects a similar effort to use baseball statistics, this time to evaluate baseball itself and the rules baseball imposes on itself. If law can be studied empirically, so can law and baseball.

Ultimately, the numbers and figures are inconclusive. More precisely, the numbers and figures are conclusive of whatever normative policy conclusion a person brings and wants to bring to the discussion of the Infield Fly Rule. Nevertheless, these numbers offer a clear descriptive picture of how the IFR works as a part of baseball. It at least shows that baseball's rulemakers had a defensible, even if not perfect or ineluctable, idea in enacting and retaining the Infield Fly Rule.

[74] MICHAEL LEWIS, MONEYBALL: THE ART OF WINNING AN UNFAIR GAME 82 (2003); *A Guide to Sabermetric Research*, SABR.org, http://sabr.org/sabermetrics.