

DERBY DROP-OFFS

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Everything that you were taught not
to do you have to do in the home run
contest. It's either a home run or nothing.

— Ken Griffey, Jr. [1]
July 10, 2008

The All-Star Game in Major League Baseball marks the halfway point in the season. Since 1985, the night before the All-Star Game, Major League Baseball has hosted an event called the Home Run Derby (hereafter, the Derby). The six to ten invitees (many of whom also participate in the All-Star Game) are among the top home run hitters in baseball that season. These sluggers compete over several rounds of elimination to determine who can hit the most home runs.

During the 2005 Derby held in Detroit's Comerica Park, Philadelphia's Bobby Abreu clubbed a Derby record 41 homers in just three rounds. Abreu had had a spectacular first half: an on-base plus slugging percentage of .955, 18 home runs, and 5.57 home runs for every 100 at bats. However, his second-half production declined, with an on-base plus slugging percentage of .787, 6 home runs, and 2.26 home runs for every 100 at bats. The decline led many fans to question whether his participation in the Derby caused the precipitous drop in his production. Ken Griffey, Jr.'s concern is shared by other Derby invitees, hitting coaches and managers alike. In the summer of 2008, five-time home run champion Alex Rodriguez (of the New York Yankees) turned down multiple invitations to participate in the Derby even though it was being held at Yankee Stadium. "My responsibility is to the New York Yankees," A-Rod told the media. "I need my swing to be at its best." [2]

In this brief note, we examine whether or not the Derby adversely affects participants' on-base percentage plus slugging average (*OPS*), the number of home runs (*HR*), and the number of home runs per 100 at bats (*HR%*) following the All-Star break. In general, do common measures of a slugger's performance decline after they compete in the Derby? Is there empirical support for some players' belief that constantly trying to hit home runs messes up their swing?

Since 1985, 180 ballplayers (90 each from the American and National Leagues) have taken part in the Derby. The names of all participants are from www.baseball-almanac.com. In each case, we compare a participant's stats in the second half of the season to his stats in the first half. All data on *OPS*, *HR*, and *HR%* are from www.baseball-reference.com.¹ In two cases (Hubie Brooks, 1986, 18 at bats and Ivan Rodriguez, 2000, 38 at bats), there were too few at bats in the second half of the season to make meaningful comparisons with the first half. All 178 remaining players had a minimum of 100 at bats in each half of the season (with an average number of 253 at bats in the second half). The 1988 Derby was cancelled due to inclement weather. And, the strike-shortened 1994 season is excluded although the Derby took place that July (about a month before the season-ending strike began).

Table 1 summarizes the results of numerous paired *t*-tests. (All *p*-values are based on a two-tailed alternative. That is, a ballplayer's stats could rise or fall in the second half of the season.) A look at the results reveals that in every single matched sample, average production declined in the second half of the season. The drop-off was statistically significant for American League participants in all three categories — *OPS*, *HR*, and *HR%*. Since the year 2000, home run production and the number of home runs per 100 at bats have declined for participants from both leagues.

Table 2 shows whether or not the drop-off is different for participants by league across different time periods. Insofar as *OPS* is concerned, the decline has been far worse for American League sluggers over the entire 24-year period. During the 1990s, American League participants

not only had a lower average *OPS* in the second half of the season (relative to their Derby counterparts in the National League), but *HR%* was also marginally lower ($p = .097$).

Before we give Ken Griffey, Jr., Alex Rodriguez and other detractors of the Derby their due, we should examine differences in performance before and after the All-Star break in the year before the Derby. Of the 180 Derby participants, 140 did not participate in the Derby the year before their participation. Table 3 summarizes comparisons of Derby participation by half, the year of and the year before their participation. The top section of the table shows how much better their first half of the season was in their Derby year than it was the year before. Not surprisingly, all differences in *OPS*, *HR*, and *HR%* are statistically significant. The middle section shows each slugger's second half production in the season prior to participation and the season of participation. The averages here are about the same. That is, their slugging performance was no worse (and actually marginally, but not statistically, better) following the All-Star break of their Derby year. And, finally, the bottom section shows that in the year before their participation in the Derby, these ballplayers experienced the same drop-off in *HR* production (they experienced in their Derby year), although there were no discernible changes in either their average *OPS* or their average number of home runs per 100 at bats.²

Concluding Remarks

There may be good reasons why some ballplayers turn down invitations to participate in the annual Home Run Derby. A few have complained that the event is not good for their swing and causes bad mechanics that might carry over into the second half of the season.

The Derby drop-offs in on-base percentage plus slugging average, home run production, and the number of home runs hit per 100 at bats are statistically significant for all participants, especially since the year 2000. Declines appear to be marginally steeper for American League sluggers.

But, on closer examination, we find a much greater difference between the first and second half statistics in the season of participation than in the season prior to participation. We find significantly higher averages in the first half of the season of participation than in the first half of the season before. And, we find that there are *no* differences in the second half statistics in the season of participation and in the season before.

Since ballplayers perform equally well in the second half of both seasons, we conclude that Derby participation did not cause the drop-off. The first-half statistics of Derby invitees tend to be extraordinary. (Otherwise, they would not have been invited to participate!) Their second-half Derby-year statistics are, on average, lower (but comparable to the year before), if only because they exhibit a regression toward the mean.

**Table 1. Summary of paired *t*-Tests
among Home Run Derby participants
on differences in *OPS*, *HR*, and *HR%*,
before and after the All-Star break**

	<i>OPS</i>			<i>HR</i>			<i>HR%</i>		
	Before	After	<i>p</i> -value on difference	Before	After	<i>p</i> -value on difference	Before	After	<i>p</i> -value on difference
All participants (n = 178)	.965	.921	<.001	21.472	15.556	<.001	7.047	6.194	<.001
AL participants (n = 89)	.952	.885	<.001	21.315	14.787	<.001	6.860	5.759	<.001
NL participants (n = 89)	.979	.957	.080	21.629	16.326	<.001	7.233	6.628	.007
1985-1989*	.881	.835	.065	19.482	12.593	<.001	6.305	5.004	.005
AL (n = 14)	.877	.803	.069	20.286	11.500	<.001	6.414	4.650	.013
NL (n = 13)	.884	.869	.587	18.615	13.769	.018	6.188	5.385	.181
1990-1999**	.974	.919	<.001	21.375	16.413	<.001	7.210	6.457	.001
AL (n = 41)	.975	.893	<.001	21.878	16.366	<.001	7.372	6.251	.001
NL (n = 39)	.973	.947	.136	20.846	16.462	<.001	7.040	6.673	.254
2000-2008	.988	.957	.029	22.338	15.718	<.001	7.145	6.349	.002
AL (n = 34)	.955	.910	.016	21.059	14.235	<.001	6.427	5.622	.030
NL (n = 37)	1.019	.999	.374	23.514	17.081	<.001	7.805	7.018	.035

*The Derby was cancelled due to inclement weather in 1988.

**Excluding the strike-shortened 1994 season.

**Table 2. Summary of differences
in *OPS*, *HR*, and *HR%*
between AL and NL Home Run Derby participants
after the All-Star break**

	<i>OPS change</i> (After – Before)			<i>HR change</i> (After – Before)			<i>HR% change</i> (After – Before)		
	AL	NL	<i>p</i> -value on difference	AL	NL	<i>p</i> -value on difference	AL	NL	<i>p</i> -value on difference
1985 – 2008	-.067	-.022	.009	-6.53	-5.30	.207	-1.10	-0.61	.113
1985 – 1989*	-.074	-.016	.226	-8.79	-4.85	.130	-1.76	-0.80	.260
1990 – 1999**	-.082	-.026	.019	-5.51	-4.38	.418	-1.12	-0.37	.097
2000 – 2008	-.045	-.020	.379	-6.82	-6.43	.804	-0.80	-0.79	.972

*The Derby was cancelled due to inclement weather in 1988.

**Excluding the strike-shortened 1994 season.

Table 3. Summary of Derby year *v.* year before Derby comparisons on differences in *OPS*, *HR*, and *HR%*, before and after the All-Star break

		Year before Derby 1 st Half	Derby year 1 st Half	<i>p</i> -value on on difference
<i>OPS</i>	(n = 129)	.881	.971	<.001
<i>HR</i>	(n = 129)	15.364	21.271	<.001
<i>HR%</i>	(n = 129)	5.506	7.008	<.001

		Year before Derby 2 nd Half	Derby year 2 nd Half	<i>p</i> -value on on difference
<i>OPS</i>	(n = 119)	.898	.913	.210
<i>HR</i>	(n = 119)	14.050	14.756	.228
<i>HR%</i>	(n = 119)	5.717	5.888	.425

		Year before Derby 1 st Half	Year before Derby 2 nd Half	<i>p</i> -value on on difference
<i>OPS</i>	(n = 116)	.877	.899	.070
<i>HR</i>	(n = 116)	15.500	13.966	.009
<i>HR%</i>	(n = 116)	5.493	5.676	.373

References

1. M. Antonen, "Home Run Derby not a big hit with everyone," *USA Today*, July 10, 2008.
2. M. Feinsand, "A-Rod to skip HR Derby, claims it tampers with swing," *New York Daily News*, June 30, 2008.

Footnotes

1. After selecting a player, go to the gray navigation bar and click on “Splits [+]” just above the player’s year-to-year “Standard Batting” summary. Click on the player’s year of participation in the Derby. Finally, scroll down to “First or Second Half” for 1st half and 2nd half *OPS* and *HR*. Divide *HR* by at bats and multiply by 100 to obtain *HR%*.
2. The 116 ballplayers who did not participate in the Derby the year before their participation and who had a minimum of 100 at bats in each half of the season before their Derby year averaged only 246 at bats in the second half compared to 279 at bats in the first half. So, although their average number of home runs fell, their average number of home runs per 100 at bats actually rose.