

Bill Mazeroski's Defensive Value

Mike Emeigh

I. Introduction

When the Veterans' Committee voted for its 1998 inductees into the Baseball Hall of Fame, many Pittsburgh baseball fans anticipated that Bill Mazeroski would be one of them, and were sorely disappointed when Maz's name was not forthcoming. Mazeroski remains one of the top candidates for future consideration by the Veterans' Committee.

The mention of Mazeroski's name as a viable Hall of Fame candidate triggers a great deal of debate among SABR members; one of the longest-running discussion threads on the SABR-L Internet mailing list concerned Mazeroski's credentials for the Hall. There is very little debate about several aspects of Mazeroski's career. Mazeroski was clearly one of the best - if not the best - defensive second basemen ever to play the game. Equally clearly, Mazeroski's career offensive totals are not Hall of Fame caliber.

I'm a long-time Pirates' fan, and would "like" to see the HOF Veterans' Committee recommend Mazeroski for induction. But I think that what's lacking from the Mazeroski HOF case is a universally acceptable quantification of Mazeroski's value to the Bucs on defense. Fielding Runs, developed by Pete Palmer, are one attempt to address this, but FR has a couple of obvious flaws (primarily the double-weighting of double plays) which make it suspect to many as a valid indicator of fielding value.

I chose instead to place Mazeroski's performance in the context of his contemporaries at the position - those 2Bs who played regularly during the period when Mazeroski was a regular - and to compare his performance to the baseline performance established by his contemporaries. This eliminates the need to define - and apply - cross-era adjustments, since the players to whom Mazeroski is being compared generated their numbers under the same conditions as Mazeroski generated his. I then chose to apply Palmer's estimates for the run value of offensive events to the defensive context, treating extra plays made by Mazeroski in the field as equivalent to the difference between a single and an out, and extra DPs turned by Mazeroski as equivalent to getting an out on base.

II. Placing Mazeroski's Performance into Contemporary Context

I defined a "regular" as a player who played in $\frac{1}{2}$ the team's games at a position. Mazeroski was the regular 2B for the Pirates under this definition from 1956-1968 and again in 1970. For each year in which Mazeroski was a regular, I compiled a weighted performance line for a "composite" regular 2B to use as a baseline for comparison. Each regular 2B other than Mazeroski was assigned a weighted number of plate appearances, based upon the following formula:

weighted PA = PA * (games played at 2B / total games played)

Each player's weight was then:

(player's weighted PA / total weighted PA for all players)

I then multiplied the player's performance line (including his age as of 1 July in that year) by the weight, and summed the results to generate a single performance line.

As an example: in 1960, the regular 2Bs were Ken Aspromonte, Don Blasingame, Frank Bolling, Marv Breeding, Chuck Cottier, Nellie Fox, Billy Gardner, Julian Javier, Jerry Kindall, Jerry Lumpe, Billy Martin, Charlie Neal, Bobby Richardson, Pete Runnels, Tony Taylor, and Johnny Temple. Temple played 98 games, 77 at 2B (just half of the scheduled 154 in that year); he had a total of 425 plate appearances, and his weighted plate appearances were $425 \cdot (77/98) = 333.93$. The group total was 7814.83 weighted PAs; Temple's stat line is thus weighted at $333.93/7814.83$, or approximately .043. Nellie Fox, on the other hand, played in 150 games, 149 at 2B, and had 684 PAs; his weighted PAs are $684 \cdot (149/150)$, or 679.44, and his stat line is weighted at $679.44/7814.83$, or approximately .087 - a little bit more than twice the weight given to Temple's stat line.

Once I calculated a weighted stat line for each season, I then summed the total to get a career line for Maz and for the "composite" regular 2Bs. I converted offensive totals to a single line representing offense per 162 games played; I converted defensive totals to a single line representing defense per 162 games played at 2B (which is not the same as total games played; Maz played 1968 games at 2B, 1992 total games during the period, while the "composite" regular 2B played 1849 games at 2B and 1966 total games).

The offense stat lines for Maz and his contemporaries, per season and for the entire period, appear in Table I; the defensive stat lines appear in Table II.

Table I. Mazeroski vs. “Composite” 2B: Offense Comparison

Mazeroski	Age	G	AB	R	H	2B	3B	HR	RBI	SH	SF	SB	CS	BB	IBB	K	HBP	GDP	BA	OBP	SA	RC
1956	19	81	255	30	62	8	1	3	14	4	0	0	0	18	1	24	0	4	0.243	0.293	0.318	23.8
1957	20	148	526	59	149	27	7	8	54	11	3	3	3	27	2	49	1	6	0.283	0.318	0.407	67.5
1958	21	152	567	69	156	24	6	19	68	9	3	1	1	25	3	71	3	15	0.275	0.308	0.439	72.0
1959	22	135	493	50	119	15	6	7	59	10	4	1	3	29	1	54	1	16	0.241	0.283	0.339	43.7
1960	23	151	538	58	147	21	5	11	64	4	8	4	0	40	15	50	1	9	0.273	0.320	0.392	68.1
1961	24	152	558	71	148	21	2	13	59	2	6	2	1	26	10	55	3	9	0.265	0.298	0.380	61.9
1962	25	159	572	55	155	24	9	14	81	2	4	0	3	37	16	47	2	15	0.271	0.315	0.418	70.3
1963	26	142	534	43	131	22	3	8	52	7	3	2	0	32	6	46	0	15	0.245	0.286	0.343	50.0
1964	27	162	601	66	161	22	8	10	64	10	4	1	1	29	11	52	0	21	0.268	0.300	0.381	62.5
1965	28	130	494	52	134	17	1	6	54	4	9	2	1	18	5	34	2	16	0.271	0.294	0.346	47.2
1966	29	162	621	56	163	22	7	16	82	2	5	4	3	31	9	62	1	16	0.262	0.296	0.398	68.6
1967	30	163	639	62	167	25	3	9	77	5	5	1	2	30	7	55	0	17	0.261	0.292	0.352	61.6
1968	31	143	506	36	127	18	2	3	42	6	4	3	4	38	10	38	2	18	0.251	0.304	0.312	44.7
1970	33	112	367	29	84	14	0	7	39	5	3	2	0	27	9	40	2	6	0.229	0.283	0.324	34.0
Totals per 162 G	Yrs.	G	AB	R	H	2B	3B	HR	RBI	SH	SF	SB	CS	BB	IBB	K	HBP	GDP	BA	OBP	SA	RC
	12.30	162	591	60	155	23	5	11	66	7	5	2	2	33	9	55	1	15	0.262	0.300	0.372	62.9
Composite 2Bs	Age	G	AB	R	H	2B	3B	HR	RBI	SH	SF	SB	CS	BB	IBB	K	HBP	GDP	BA	OBP	SA	RC
1956	28	137	523	75	140	19	5	6	44	9	3	8	4	51	1	42	4	10	0.267	0.335	0.356	64.3
1957	29	141	553	78	149	25	5	7	46	8	3	10	5	54	2	42	4	10	0.269	0.337	0.369	70.7
1958	29	137	506	68	136	21	4	7	46	7	4	7	4	54	2	50	4	11	0.269	0.342	0.371	65.8
1959	28	147	558	77	158	25	6	7	52	9	4	10	6	56	3	51	3	11	0.283	0.349	0.387	76.7
1960	28	135	501	64	134	20	4	5	40	8	3	8	4	41	2	53	3	10	0.267	0.324	0.353	57.7
1961	28	135	514	67	133	18	5	6	44	7	3	8	4	45	1	54	3	11	0.258	0.320	0.344	57.2
1962	27	147	551	75	148	22	5	7	50	10	4	8	5	47	2	61	3	11	0.268	0.326	0.364	66.2
1963	27	142	533	67	137	22	4	7	44	8	4	8	4	37	2	58	4	10	0.258	0.310	0.353	58.1
1964	27	138	485	55	123	16	4	5	39	8	2	6	4	33	3	57	3	10	0.254	0.305	0.335	48.7
1965	27	147	531	67	138	21	5	8	49	7	3	6	4	47	3	66	3	11	0.261	0.324	0.362	62.1
1966	26	140	512	58	134	20	4	8	48	7	3	5	5	35	3	61	3	10	0.261	0.309	0.362	56.0
1967	26	139	491	60	128	20	4	7	43	7	2	8	5	46	5	70	2	8	0.261	0.325	0.361	58.3
1968	27	143	517	58	133	20	3	5	40	6	3	7	5	40	3	56	4	9	0.257	0.314	0.335	54.5
1970	28	138	509	65	128	18	3	5	41	6	3	10	4	47	4	53	2	11	0.252	0.316	0.331	54.1
Totals per 162 G	Yrs.	G	AB	R	H	2B	3B	HR	RBI	SH	SF	SB	CS	BB	IBB	K	HBP	GDP	BA	OBP	SA	RC
	12.13	162	600	77	158	24	5	7	52	9	4	9	5	52	3	64	4	12	0.263	0.324	0.356	70.0

Notes on Table:

1. OBP is calculated using the current formula: $(H+BB+HBP)/(AB+BB+HBP+SF)$. Mazeroski's numbers differ from his career reported values for that reason.
2. RC is Bill James' Runs Created, the standard representation of which is:
 $(\text{On Base Factor}) * (\text{Advancement Factor}) / (\text{Opportunity Factor})$

The current formula, used in the 1998 STATS All-Time Baseball Handbook, uses these values:

On Base Factor: $H+BB+HBP-GDP-CS$

Advancement Factor: $TB + .26*(BB-IBB+HBP) + .64*SB + .5*(SH+SF) - .03*K$

Opportunity Factor: $AB+BB+HBP+SH+SF$

None of the other adjustments reported in the 1998 book have been used.

Table II. Mazeroski vs. “Composite” 2B: Defensive Comparison

Mazeroski	Age	G/2B	PO	A	E	DP	Composite 2Bs	Age	G/2B	PO	A	E	DP
1956	19	81	163	242	8	56	1956	28	126	310	342	13	87
1957	20	144	308	443	17	96	1957	29	133	341	371	13	92
1958	21	152	344	496	17	118	1958	29	125	304	333	14	94
1959	22	133	303	373	13	100	1959	28	142	335	396	16	93
1960	23	151	413	449	10	127	1960	28	128	303	342	16	87
1961	24	152	410	505	23	144	1961	28	131	309	349	15	88
1962	25	159	425	509	14	138	1962	27	140	322	380	15	89
1963	26	138	340	506	14	131	1963	27	135	299	361	15	79
1964	27	162	346	543	23	122	1964	27	129	283	339	14	78
1965	28	127	290	439	9	113	1965	27	139	306	371	17	82
1966	29	162	411	538	8	161	1966	26	128	290	345	15	79
1967	30	163	417	498	18	131	1967	26	130	286	330	14	70
1968	31	142	319	467	15	107	1968	27	133	295	360	14	76
1970	33	102	227	325	7	87	1970	28	129	297	355	14	82
Totals		G/2B	PO	A	E	DP	Totals		G/2B	PO	A	E	DP
per 162 G	12.15	162	388	521	16	134	per 162 G	11.41	162	375	436	18	103

III. Mazeroski’s Defensive Value

How many runs was Mazeroski’s defense worth to his team??

Mazeroski had two advantages over the second basemen of his era of defense:

- he made more plays per 162 games (13 extra POs, 85 extra assists, 2 fewer errors);
- he turned more DPs per 162 games (31).

It makes sense to consider the extra plays that Mazeroski made as having the run value of converting a single into an out. It seems to make equal sense to consider the extra DPs that Mazeroski turned as having the run value of an out on base (e.g. cutting down a runner trying to advance); it’s likely that the extra DPs that Maz turned would have been force plays for another 2B, thus the out on base treatment makes sense. Mazeroski’s two fewer errors per 162 games are dropped from the calculation; either they represent balls that Mazeroski didn’t get which other 2Bs booted (and thus have no net run value), or they represent balls that Mazeroski converted into outs which other 2Bs booted (which are already considered as part of Mazeroski’s extra plays). This gives Mazeroski 98 extra clean plays per 162 games.

There is an obvious adjustment that must be made. A portion of Mazeroski’s extra DPs contribute to his extra clean plays, and should be counted only as part of the extra DPs, so we need to remove those from the clean plays. On DPs where Mazeroski was the pivot man, he picked up a putout and an assist where most 2Bs would likely have picked up just the putout; on DPs where Mazeroski was not the pivot man, he didn’t pick up anything extra. Thus the only adjustment that needs to be made is for DPs where Maz was the pivot man. How many extra assists did Mazeroski gain from his ability to turn the pivot at 2B??

I made an estimate of the percentage of DPs on which Maz was the pivot man from the Pirates’ DP data for the years when Maz was the regular 2B. I estimated that the 2B was the pivot man on (a) all DPs in which 3Bs were involved, and (b) ½ of the DPs in which SS were involved, exclusive of 3-6-3 DPs. I estimated the later using Bill James’s value of (team DPs - 2B DPs - catcher DPs).

The Bucs turned 2469 DP's in the period where Mazerowski was a regular. The 3-6-3 DP's were (2469-1831-176), or 462. Bucco 3B's turned 455 DP's; Bucco SS turned 1211 DP's exclusive of 3-6-3 DP's, and ½ of that total gives 606. Thus the 2B was the pivot man on 1061 DP's of the total of 1831, or 58%. This gives Maz 18 extra assists (58% of 31 extra DP's) due to being the pivot man on DP's; to prevent double-counting for DP's we subtract 18 from the 98 extra clean plays that he had, leaving 80 extra plays per 162 games, which represent 80 singles converted to outs.

Using Palmer's values for events of -.47 for a single, +.25 for an out, and +.50 for an out on base (with signs reversed to account for defensive value), we get this, per 162 games at 2B, for Mazerowski:

Run value of extra plays: $80 \times .72$ (difference between single and out) = 57.6 runs

Run values of extra DP's: $31 \times .50 = 16.5$ runs

Mazerowski's total run value on defense thus comes to 74.1 runs more than the average 2B of his era, per 162 games.

Another way to look at this is to make some adjustments to Mazerowski's offensive line. If you added 80 singles to Mazerowski's offensive line (without adjusting the AB total), Mazerowski's BA/OBP/SLG would be .397/.427/.507, and his RC would be 123.8 - an increase of 60.9 per 162 games, not terribly different from the 57.6 runs attributed solely to the "saved singles" above. Subtracting 31 AB's (outs) for the additional DP's put the BA/OBP/SLG line at .419/.449/.535 and the RC at 130.1 - an increase of 67.1 per 162 games. Subtracting 31 DP's from Maz's GIDP instead of AB's (an alternative treatment which more directly reflects the impact of the DP, although leaving a net negative total of DP's in Maz's offense line) yields a RC of 138.9 - an increase of 76.0 runs per 162 games, comparable to the 74.1 runs generated from the Palmer estimate. I'll use the values generated by the Palmer estimate and the latter RC estimate as lower and upper bounds of Mazerowski's defensive value throughout this paper, and add that to Maz's 63 RC generated on offense to provide an estimate of equivalent value for a 2B with average defensive skills.

IV. Adjustments

If we could stop there, that would please the Maz-for-the-HOF partisans no end - a 2B whose equivalent performance is that of a 2B who creates 137-139 runs per 162 games AND who provides average defense to boot. That's Rogers Hornsby territory!!

Unfortunately, we can't stop there. There are a number of reasons why the results above overstate Mazerowski's defensive value:

- Mazerowski played behind a pitching staff which struck out fewer batters than the norm over his career, and thus had more balls in play. An average 2B, playing behind the Bucs' staff, would have made a fair percentage of Mazerowski's extra plays simply as a result of being exposed to more balls.
- A large percentage of putouts made by second basemen are the result of plays made by other fielders, even considering the impact of DP's. Mazerowski should not get the benefit of extra plays made by other fielders in "his" fielding numbers.
- Mazerowski played behind a pitching staff which allow more baserunners than an average staff - thus giving more opportunities for an "average" 2B to turn DP's.

Obviously some adjustments to address these factors are in order.

Clay Davenport, in the 1998 Baseball Prospectus, proposed a measure for evaluating the relative ease of playing the various positions. The method calculates three “difficulty factors”, one each for the left and right sides of the infield and one for the outfield. For 2B, the “difficulty factor” is:

$$\text{BIP/Inn} * (\text{GB/FB} \wedge 0.4) * (\text{HND} \wedge 0.25)$$

where:

BIP/Inn is Balls in Play per inning. Balls in Play are calculated as: $((\text{IP} - (\text{K}/3)) * \text{X}) + (\text{H} - \text{HR}) + (\text{E} * 0.7)$; “X” is the average number of balls in play per inning for the league, adjusted for strikeouts, which do not result in a runner on base - this value is $(\text{AB} - \text{K} - \text{H} - (0.7 * \text{E})) / (\text{IP} - (\text{K}/3))$. The calculated value of BIP is then divided by the number of innings for the team’s pitchers to get BIP/Inn.

GB/FB is estimated groundball/flyball ratio, estimated as (IF Assists/OF Putouts). I included pitchers’ assists in infield assists; Clay does not. It doesn’t make a whole lot of difference one way or the other.

HND is an estimate of the effect of LHP on the distribution of balls (the theory being that more LHP implies more RHB implies more balls hit to the left side, and vice versa). It’s simply % of IP by RHP.

The formula as proposed in DP uses values which are normalized to league average; I normalized instead to the combined average for the two leagues - since I’m comparing Maz to “all” 2Bs, not just those in his league.

Sparing the reader the gory details of the calculations, the resulting “difficulty factor” for 2B in Pittsburgh over Mazerowski’s career is 1.07 - which in turn suggests that an average 2B would turn about 7% “more” plays behind Pittsburgh’s pitching staff. Mazerowski’s defensive totals (both plays made and double plays, since more balls in play affect opportunities to do both) need to be adjusted downward due to this.

Figuring out the effect on Mazerowski’s putout totals from other fielders is more difficult, compounded by the fact that Mazerowski played next to a couple of pretty good SS. I opted not to try to adjust for the quality of the other infielders (which would have been a difficult task) and chose instead to borrow from an excellent analysis done by Rich Hansen on the SABR-L mailing list. Using data from Retrosheet (<http://www.retrosheet.org>) for the AL in 1967, Rich noted that only about 40% of putouts for second baseman were the result of plays that they made. I used this figure as a baseline for adjusting putouts downward, and made a further downward adjustment to putouts in Mazerowski’s case based on the difficulty factor for playing SS and 3B in Pittsburgh, under the presumption that Mazerowski got the other 60% of his putouts primarily as a result of 5-4 and 6-4 force plays, and since SS and 3B were also easier positions to play (difficulty factor of 1.06), there were likely more of these on Mazerowski’s side of the ledger than there were for the average 2B.

Finally, the Pirates’ pitchers allowed approximately 2% more baserunners than the average pitching staff over the course of Mazerowski’s career as a regular. This would increase his opportunities to turn DPs by approximately that amount, and his DP total (only) needs to be adjusted downward as a result.

Now, it’s time to use of all of this information. I’m going to run through these adjustments in detail.

1. Adjust putouts downward for the effect from other fielders:

baseline 2B: $375 \text{ PO} * 0.40 = 150 \text{ POs}$

Mazerowski: $388 \text{ PO} * 0.40 / 1.06 = 146.4 \text{ POs}$

2. Adjust assists downward for the extra DPs Mazerowski turned:

baseline 2B: 436 assists

Mazeroski: 521-18: 503 assists

3. Calculate total clean plays (adjusted POs + adjusted assists):

baseline 2B: 586

Mazeroski: 649.4

4. Normalize Mazeroski's clean plays and double plays to the baseline, to prepare to apply the difficulty factor:

normalized clean plays: $649.4/586 = 1.108$

normalized DPs: $135/104 = 1.298$

5. Apply the difficulty factor:

adjusted normalized clean plays: $1.108/1.07 = 1.036$

adjusted normalized DPs = $1.298/1.07 = 1.213$

6. Make the further adjustment to DPs for extra baserunners:

adjusted normalized DPs = $1.213/1.02 = 1.198$

7. Convert the normalized values back to raw data:

Mazeroski's adjusted clean plays: $1.036*586 = 607$

Mazeroski's adjusted DPs: $1.189*104 = 124$

8. Calculate the run value of Mazeroski's adjusted extra plays:

run value of clean plays: $(607-586)*.72 = 15.1$ runs

run value of DPs: $(124-104) *.5 = 10.0$ runs

Mazeroski's adjusted run value on defense thus is now 25.1 runs per 162 games.

If I add the 21 net adjusted clean plays as 21 singles to Mazeroski's offense line, his adjusted BA/OBP/SLG is .297/.333/.408 and his adjusted RC is 76.9 - a bump of 14.0 runs from the baseline. If I subtract the 20 net extra DPs from Maz's ABs, his adjusted BA/OBP/SLG is .308/.344/.422 and his adjusted RC is 79.4 - a bump of 16.5 runs from the baseline. If I instead subtract 20 from Maz's GIDP total, the RC is 84.9 - a bump of 22.0 runs - thus the range of Maz's net value is equivalent of that of a 2B, with average defense, who created 85-88 runs.

It should also be noted that, over the period covered by this analysis, Mazeroski had 347 fielding runs in 1968 defensive games at 2B, according to the Total Baseball Web site - an average of 28.6 FR per 162 games played. Maybe Fielding Runs is more accurate than those who like to point to its flaws believe.

V. Conclusions

Where does this estimate of Mazerowski's value place him in the HOF pantheon??

Of the players who were primarily 2Bs who are currently in the Hall, only 5 - Miller Huggins, Red Schoendienst, Bucky Harris, Nellie Fox, and Johnny Evers - created fewer than 90 runs per 162 games; most current HOF 2Bs are "well" over 100 RC/162 games offensively. Three of those five are there more for their managerial careers than for their playing careers. Of current candidates, Bobby Grich created 91 runs per 162 games, Ryne Sandberg 100. Joe Gordon, another possibility for the Veterans' Committee to consider, created 99 runs per 162 games. On the other hand, there are these mitigating factors to consider, which suggest that Mazerowski's raw value derived from his numbers might be understated:

- Mazerowski played in a park which suppressed his production probably as much as any other park short of Yankee Stadium. It's well known that Mazerowski, in 1961, hit 7 HRs in 11 games at the LA Coliseum and only 4 in 81 games at Forbes Field. For his career, Mazerowski hit only half as many HRs at home (45) as he did on the road (93); I estimate that with a more normal home park he'd have hit close to 200 HRs in his major league career; giving him 200 HRs and not adjusting any other offense numbers pushes his career SLG to .399 and bumps his adjusted offense + defense RC estimate by about 5 runs.
- Mazerowski played much of his career in an era in which "offense" was depressed. The ML average was .251/.318/.380 BA/OBP/SLG and 4.14 runs scored per game. Over Gordon's career, the averages were .263/.336/.378 and 4.48 runs scored per game; over Sandberg's career the averages were .260/.327/.395 and 4.42 runs scored per game; over Grich's career the averages were .260/.325/.384 and 4.26 runs scored per game.

Even so, despite the mitigating factors, I'd conclude Mazerowski is not a solid HOF candidate, "despite" his defensive value. At best, it puts him on about the same level as Grich/Gordon/Sandberg are on offense alone, giving Maz the benefit of every doubt. When you consider that those other three 2Bs were also above-average defensively (from a quick reading of the numbers), Mazerowski drops well behind them.

VI. Acknowledgments

The author gratefully acknowledges the contributions from members of the SABR-L list, in the long-running and seemingly never-ending discussion thread on this topic; in addition to Rich Hansen, whose specific contribution to the analysis is noted above, the author would like to thank Jeff Angus, Larry Grasso (whose comment to me in a private E-mail started the whole ball rolling on this particular paper), John Pastier, John Henry Rickert, Tom Ruane, and Mark Wernick for their incisive comments on the analysis and the adjustments to Mazerowski's raw stats. The author would especially like to thank Clifford Blau, who reviewed this paper in "every" public stage, accurately pointed out the flaw in using Mazerowski's raw numbers without adjustment, and provided suggestions on further refinements to the analysis, including the pointer to Rich Hansen's note on SABR-L.