

When Should Bonds be Walked Intentionally?

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Notes provide additional information and were reminders to me for making the presentation. They are not supposed to be anything close to a complete text of the presentation or subject.

Overview

- Barry Bonds 2001-02 best two offensive seasons ever
- He is walked in "unusual" game situations
- When does this make sense?
- How good do the following hitters to be for IW never to be right?
- How bad for IW to be always right?

Research inspired by article in November 2002 *By The Numbers* by Jerome Reiter. He analyzed 2001, 2002 actual situations when Bonds was walked, intentionally or not. A mathematical model can answer a wider range of questions and perform theoretical analysis such as the last two questions.

Unusual includes situations with a runner on first or with the bases empty (and IW once with bases full in 1998).

Analytical Approach

- Opposing manager's objectives
 - Minimize chance of 0,1,2,3,4 runs scoring
 - No IW if trying to prevent $>$ Bonds HR
 - Reduce expected runs in rest of inning
 - Can be conflicting objectives
- Strength of following batters is critical
- Opposing pitcher not considered; use average hitting performance

In late innings, may have a specific objective to prevent a certain number of runs from scoring. In any situation, the largest such number would be what would score if Bonds hit a HR because if want to prevent a higher number should pitch to him because even a HR won't have much of an effect on that objective (2002 WS, game 2 for example). In earlier innings, reducing the overall scoring may be more important than preventing a specific number of runs.

Reducing chance of some number of runs with IW may increase chance of a larger number, so IW that increases chances of winning game may also increase chance game is tied or lost in same inning (but not both)

Strength of following batters is obviously quite important.

Analytical Tool

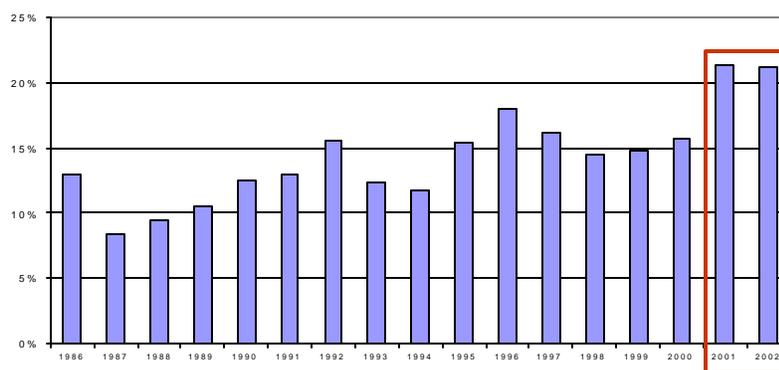
- Markov Process model
 - Based on probabilities of going from one runners/outs situation to another
 - Generates probability of given number of runs
 - Computes average scoring in rest of inning
- Uses ML averages for some events
 - DP, advancement on hits & outs (SF)
 - Could affect results of close calls on IW

I have used the Markov model extensively for baseball strategy analysis and have given several talks on the subject at prior SABR meetings. It is well suited to study the IW question.

The model version used incorporates ML averages (84-92) for several events on the bases. If player specific values were specified instead, in cases where the IW decision is close, the analysis might favor a different course of action.

Also uses ML average for reaching on error, but any real differences likely have an insignificant effect on the model results.

Bonds Non-IW BB % of PA



■ Much higher in 2001-02

In 2001-02 (boxed in years), more of Bonds non-IW walks were really “unintentional intentional” as can be seen by the much higher percentage of officially non-IW walks in comparison to his previous history. That indicates his walk percentage for analytical purposes should be scaled back. I chose 15% as typical, and it is the 1998-2000 average.

Note that some of the walks before 2001 were also unintentional intentional, but it is probably OK to include them since pitchers will still be careful and may end up walking him when they fall behind in the count rather than risking throwing a fat pitch.

Bonds hit #1 early in his career with Pirates, so fewer IW then.

Bonds Hitting in Model

- Use 15% of PA non-IW walks
 - Many in 2001-02 really intentional
 - 15% is rough average for prior few years
- Remove all IW for pitch to him analysis
- Combined 2001-02 data with adjustments
 - BA: 0.347 (same since AB not affected)
 - SLG: 0.834 (same since AB not affected)
 - OBP: 0.463 (reduced from 0.547 actual)

In trying to analyze whether or not it makes sense to give IW, need to remove those from his performance when pitched to.

The two adjustments do not affect the numbers of hits or AB, so BA and SLG are the same. Because all IW and some non-IW BB are removed, the OBP is reduced quite a bit. Values are still very high.

Hitters Following Bonds

2001, Bonds bats 3rd			2002, Bonds bats 3rd			2002, Bonds bats 4th		
PLAYER	SLG	OBP	PLAYER	SLG	OBP	PLAYER	SLG	OBP
KENT J	0.507	0.376	KENT J	0.503	0.358	SANTIAGO B	0.450	0.320
SNOW J	0.379	0.375	SNOW J	0.360	0.348	SNOW J	0.360	0.348
DAVIS E	0.365	0.271	SANDERS R	0.455	0.328	SANDERS R	0.455	0.328
SANTIAGO B	0.369	0.299	SANTIAGO B	0.450	0.320	BELL D	0.429	0.337
MARTINEZ R	0.353	0.327	SHINJOT	0.370	0.355	PITCHER	0.176	0.174
						SHINJO (PH)	0.370	0.355

- After Bonds and at most five hitters, inning over, Bonds out, or Bonds will have scored
- Sufficient to find runs objectives probabilities

Use typical Giants batting orders and the other players' seasons' stats. When Bonds, Kent switched batting positions 3, 4 in mid-2002 and Santiago moved into 5th, #9 hitter could be involved. Used typical pitcher performance based on ML average a few years ago. Also looked at if Shinjo would PH for pitcher. Did not have much of an effect because only affects cases where Bonds up with none out, and by time get down to #9, which has low probability of affecting comparisons, differences due to PH are not enough to change advantage of IW or pitching to him.

Bonds + 5 hitters (or +4 if one out, +3 if 2 outs) is enough for objectives shown previously (& because always pitch to him if idea is to prevent more than his HR would produce).

Example of Model Output

- 2001 Giants
- Bases empty, two outs
- If pitch to Bonds, probability of a least one run is 17.5%
- If IW, probability is 15.8%
- Good situation for IW

Threat of Bonds HR (or extra base hit and being driven in by next hitters) is great enough that probability of scoring is reduced by 1.7% if Bonds is IW. This would not be the case for just about any other hitter ever, so this is an “unusual” IW situation.

Assumption that Bonds advances on hits at ML average probably has no meaningful effect (at most 0.1%?) on the comparison.

When to IW Bonds (1)

- With 2 outs, to keep him from scoring
 - none on, prevent one run
 - one on (any base), prevent two runs
 - two on (any bases), prevent three runs
 - bases loaded, prevent four runs
- Improves probability of prevention:
 - 2001: 1.7% - 2.6%
 - 2002: Bonds 3/2.2%-3.1%; 4/2.9%-3.9%

These are essentially the same case. and are non-standard IW situations. Note that it makes sense to IW him some times even if it forces in a run.

The 1.7% for 2001 is the case on the prior slide.

Because 2 outs and Kent and Snow were better in 2001 than 2002, bigger advantage of IW in 2002, Bonds #3. Since Kent better than Santiago, advantage is even greater when Bonds hit #4.

When to IW Bonds (2)

- With runner on 2nd or 3rd, but not both, any number of outs, to prevent any runs
- Improves probability of prevention:
 - 2001: 1.2% (3,0) - 5.5% (2,1)
 - 2002: Bonds 3/0.6% - 5.8%
 - 2002: Bonds 4/0.5% - 6.5%
- Obvious situations for IW

He probably would always be walked in these situations. IW not effective with runners on both 2nd and 3rd if following hitters have high enough OBPs, so they are likely enough to generate a run with bases loaded.

Least and most advantages come from same situations in all three cases. Small with runner on 3rd, none out; greatest with runner on 2nd, one out.

Note that ranges of advantages from IW are wider and have some larger values than prior case.

When to IW Bonds (3)

- Runners on 2nd and 3rd, one out, to prevent one run or to prevent two runs
- Improves probability of prevention:
 - 2001: 0.3% (prevent 1) - 5.4% (prevent 2)
 - 2002: Bonds 3/1.7% - 5.7%
 - 2002: Bonds 4/2.2% - 6.5%
- Obvious situations for IW

Another situation when he is virtually certain to be walked. Note large advantage if trying to prevent two runs, much smaller to prevent one run due to loading bases makes it possible to score on a walk.

Relative comparisons between the cases: least advantage to IW in 2001, most in 2002 Bonds #4 as before due to quality of following hitters. However, differences are not that great.

When to IW Bonds (4)

- 2nd and 3rd, 1 or 2 out, prevent 2 or 3
- Improves probability of prevention:
 - 2001: 1.9% (2 out, prev 3)-5.4% (1, prev 2)
 - 2002: Bonds 3/2.4% - 5.7%
 - 2002: Bonds 4/3.3% - 6.5%
- Fairly natural situations for IW
- Overlaps with other good IW situations

This includes some situations covered previously. They are repeated to show similarities between the situations. The prevent 3 runs may be a bit non-standard since an IW puts that run on base. However, with one out, it sets up a DP.

Weaker Followers > More IW

- 2002 Bonds batting 4th
- Weaker following hitters (no Kent)
- Additional favorable IW situations:
 - Two on, two outs, to prevent any runs
 - First base open, one out, prevent 2 runs
 - 2nd & 3rd, none out, prevent 2 runs
 - Bases full, two outs, prevent 2 runs(+1.6%)!
[pays to walk him and pitch to Santiago]

Because of weaker following hitters when Bonds hit #4, there were some situations where the IW was favorable that were not the case when he hit #3.

First and last and really the same case for the same reason.

IW Bonds (2001-02 Giants)

Runners	Prevent				Prevent				Prevent			
	1	2	3	4	1	2	3	4	1	2	3	4
None	n				n				Y			
1	n	n			n	n			n	Y		
2	Y	n			Y	**			Y	Y		
3	Y	n			Y	**			Y	Y		
1 & 2	n	n	n		n	n	n		**	n	Y	
1 & 3	n	n	n		n	n	n		Y	n	Y	
2 & 3	n	**	n		Y	Y	n		**	Y	Y	
Full	n	n	n		n	n	n		**	n	Y	
	0 outs				1 out				2 outs			

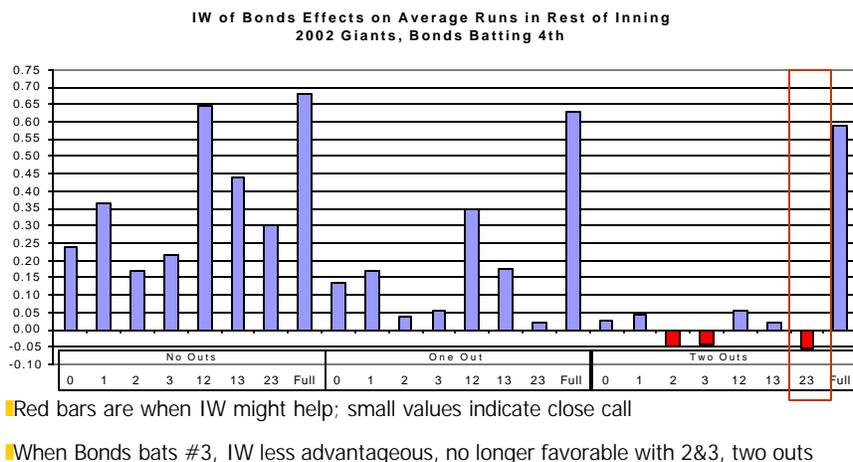
Y = Pays to IW Bonds for all 2001-02 Giants lineups
 ** = Pays to IW Bonds only with 2002, Bonds hitting #4
 n = Better to pitch to Bonds
 Blank areas are when IW never right for any hitter

This chart summarizes the favorable IW situations shown on the previous pages.

Except for the rightmost Ys in the 2 outs portion, these are pretty much standard IW situations for any good hitter up.

It is interesting to note that 2nd & 3rd, no outs, to prevent any runs, should not IW Bonds (or likely anyone else). This is likely a common IW situation, but risk of loading bases with none outs so run will score on any non-out play by next two batters is greater than risk of pitching to Bonds. This strategy is commonly used in the bottom of the 9th or extra inning with the game tied. Data in model are full season, so they do not fully reflect effects of infield in. However, walking bases full with 0 out may not be the best way to prevent a run.

IW Effects on Total Runs



In earlier innings, may be more interested in effect of IW to Bonds on total scoring. The model produces the “expected runs” in the rest of the inning, which is the average runs scored if the situation could be repeated many times. The graph shows the differences in expected runs if Bonds is given an IW for 2002, hitting #4 (most favorable case for IW). The positive bars indicate it is better not to IW Bonds. Effects are stronger with fewer outs (not surprising). There are three situations (negative bars in red) where IW does reduce expected scoring: with 2 outs and first base open. If Bonds bats #3 (followed by Kent), the IW to load the bases increases expected runs, so there are only two good situations for the IW. Advantage to IW in those cases is smaller, and it is a relatively small advantage to begin with.

Those situations and other close calls (short positive bars) are times when may want to decide on IW based on other factors (e.g. pitcher). However, IW with first open and 0 outs does not seem like a good idea. Risk of big inning is substantially increased.

In effect, can say IW does not reduce total runs.

Never IW Bonds?

- What if next hitters are very strong?
- Model same player for all batters after him
- May want IW in 3rd, 1 out, to prevent run
 - Even if Bonds or Ruth is that same player
 - Possible exception: Ted Williams 1941
- Small model differences in this situation
 - model uses of ML averages for DP%, SF%
 - IW less useful if next has high OBP, low K%

Runner on 3rd, 1out: Used Bonds model hitting rather than season stats. If 2001 stats (making no distinction between IW and other BB), model says IW in that situation. If 2002 stats, then should pitch to him because OBP is so high.

IW stat not kept until mid-1950s, so only have total BB for Ruth, early Ted Williams. Using all BB in model is consistent with that, but might affect if Williams 1941 following would be no IW situation.

Since the model differences are small for great hitters following, the ML averages in the model could affect it. Bonds probably hits into fewer DP than the ML average. Giving the IW sets up the DP but takes the risk of two more walks to force in the run.

Using various recent outstanding seasons shows IW is less effective as the following hitters have high OBP (Williams 41 was record until Bonds 02) and low K% to increase chance of scoring on SF or other out. Todd Helton in 2000 had 61 Ks, good OBP (0.463), but a 0.372 BA and had the least advantage for the IW of those tested. In 1941, Ted Williams struck out only 27 times to go with 0.551 OBP.

Always IW Bonds?

- What if next hitters are very weak?
- Model same player for all batters after him
- If all of next hitters only K, IW is obvious
- Even with "Pitcher/4" (SLG, OBP <0.045) there are situations to pitch to Bonds:
 - 1st & 2nd, 0 or 1 outs, to prevent any runs
 - full, 0 or 1 outs, to prevent 2 runs
 - full, to prevent any runs (Bonds or anyone)

No matter who is up, with bases loaded in a tie game in the bottom of the 9th or an extra inning, must pitch to the hitter, so last case is not really meaningful.

The first and second case are essentially the same. The object is to prevent the runner on second from scoring whether or not there is a runner on third.

Model incorporates major league averages for percentages of non-K outs that are SF or score runs (and DPs). Very weak hitters may perform worse than those averages, so the the results for the one out cases may be affected by the assumptions, but the difference between pitching and IW is small. However, for the 0 out cases, the differences are 17.5% (1st & 2nd), and 15.5% (full), so there seems to be little doubt that Bonds should be pitched to in those situations. Note that in this unrealistic case, if you can get Bonds out without scoring the runner from 2nd, you then get to face the terrible hitter for the rest of the inning.

Conclusion

- There are “non-standard” game situations when IW of Bonds is advantageous
- Not true for other Giants hitters
- IW unlikely to decrease total runs
- Will post talk on www.pankin.com
 - Slides plus some notes
 - Talks from prior SABR meetings also posted

Tested what would happen if Aurilia 2001 (next best season by a Giant in last two years) batted in Bonds spot. Did not get any of the non-standard IW situations being advantageous. With weaker hitters, number of good IW situations dropped, and was zero with Eric Davis in Bonds' spot!

In 2001, actual IW in non-standard situations (all with 1st occupied) were not favorable according to model, but pitcher could have a strong effect. In 2002, about half of them (1st occupied or bases empty) were favorable.

Takes outstanding hitters, say best one or two each season, all the same to never IW Bonds. Even with very good ones, there will be some situations. With terrible hitters, still are situations when should pitch to Bonds.