Assessing the Opener Strategy in the MLB

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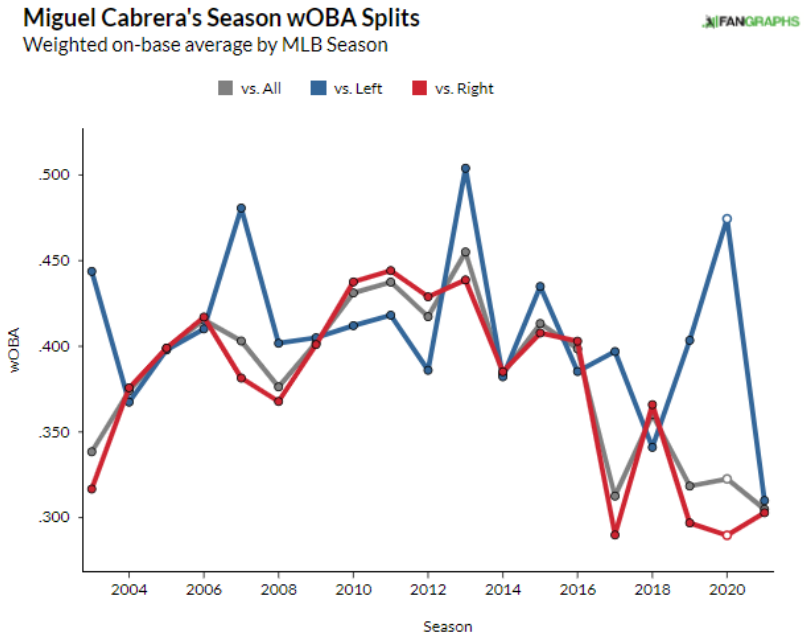
I. Introduction/Literature Review

In the MLB, teams typically have a starting rotation of five pitchers that take turns starting games. The goal is for a starter to give the team anywhere in between five and seven innings, and leave the rest of the game to the relievers and closer. Of course, this does not always happen. If the starting pitcher is performing very poorly, they will likely be taken out before five innings, and if the pitcher is lights out, then he may stay in and try to throw a complete game. In every starting rotation, the guys at the bottom of the rotation are typically not as good of players as the guys at the top of the rotation. You could expect more five to six inning performances from those pitchers, rather than the players at the top typically giving about seven innings of work. In order to get the most out of some of the weaker starting pitchers in the league, teams have started to employ a strategy, where a non-starting pitcher begins the game on the mound. This player is either a reliever or sometimes even the team's closer, and is referred to as the "opener." The goal of this is to allow the typical starter to begin work in a more ideal part of the game. Rather than having to start the game against the strongest part of a team's lineup, they can come in after the opener has gotten through the toughest part. Another potential benefit of this strategy is that it locks the opposing team into a lineup that may be less favorable against the pitcher that comes in after the opener. In baseball, it is typically more difficult as a right handed batter to hit against a right handed pitcher, rather than a lefty. Same goes for the lefty on lefty matchups. Most hitters do better against pitchers that are the

opposite hand as them. One example of this is with Miguel Cabrera, one of the greatest hitters of the modern era. Below is a graph of his wOBA, a statistic we will mention frequently throughout the paper, across his years in the MLB when facing right-handed and left-handed pitchers.



Cabrera -a right-handed batter- has had a wOBA that is significantly higher when facing left-handed pitchers throughout his whole career. This example brings us back to the main point that team's set their lineups based on the pitching matchups. If the opener is a more favorable matchup for the other team they may set their lineup based on that. The team that utilized the opener may only let the opener throw an inning or two, and then bring in a typical starter, who may throw with the opposite hand as the opener, so that the opposing team is locked into a lineup that is now less favorable than it was previously.

There are other potential benefits of this strategy, such as throwing off the timing of the hitters, but the third time through wOBA will be mentioned in further detail throughout the paper. This just suggests that hitters wOBA is significantly higher when

facing the same pitcher for the third time in a game. Using an opener allows teams to avoid having their main pitcher face the lineup for a third time.

At this stage, the opener strategy is not something that is widely used across the league. There have been a couple of teams that have experimented with the strategy in the last couple of years, but it is not something that is continuously becoming more prevalent. By looking at data from team's that have attempted this strategy, we will attempt to determine if this strategy is worthwhile, and potentially which teams would benefit the most from this strategy.

II. Data

There have been a couple instances of teams trying the opener strategy since the MLB began having a starting rotation of pitchers, but it has become more prevalent since the 2018 season, when the Tampa Bay Rays made use of this strategy on 42 occasions throughout the year. The pitching numbers for all the starters and relievers are shown in the image below, taken from Baseball Reference.

Pos	Name	Age	W	L	W-L%	ERA	G	GS	GF	CG	SHO	SV	IP
SP	Blake Snell*	25	21	5	.808	1.89	31	31	0	0	0	0	180.2
SP	Chris Archer	29	3	5	.375	4.31	17	17	0	0	0	0	96.0
SP	Jake Faria	24	4	4	.500	5.40	17	12	1	0	0	0	65.0
SP	Tyler Glasnow	24	1	5	.167	4.20	11	11	0	0	0	0	55.2
Pos	Name	Age	W	L	W-L%	ERA	G	GS	GF	CG	SHO	SV	IP
CL	Sergio Romo	35	3	4	.429	4.14	73	5	39	0	0	25	67.1
RP	Ryne Stanek	26	2	3	.400	2.98	59	29	10	0	0	0	66.1
RP	Jose Alvarado*	23	1	6	.143	2.39	70	0	17	0	0	8	64.0
RP	Diego Castillo	24	4	2	.667	3.18	43	11	5	0	0	0	56.2
RP	Chaz Roe	31	1	3	.250	3.58	61	0	6	0	0	1	50.1
Pos	Name	Age	W	L	W-L%	ERA	G	GS	GF	CG	SHO	SV	IP
	Ryan Yarbrough*	26	16	6	.727	3.91	38	6	3	0	0	0	147.1
	Yonny Chirinos	24	5	5	.500	3.51	18	7	2	0	0	0	89.2
	Austin Pruitt	28	2	3	.400	4.65	23	0	11	0	0	4	69.2
	Matt Andriese	28	3	4	.429	4.07	27	4	6	0	0	0	59.2
	Nathan Eovaldi	28	3	4	.429	4.26	10	10	0	0	0	0	57.0

As shown in the table, there are quite a few relievers that had a handful of starts on the year. One that stands out is Ryne Stanek, who started in 29 of his 59 appearances on the year, but only pitched 66 innings. Looking down further, Ryan Yarbrough only started in 6 games of his 38 appearances, but pitched 147 innings on the year. On many occasions, Stanek would open the game for Yarbrough, who was seen as one of the weaker starting pitchers in the rotation. In order to analyze the effect of the opener, we will primarily look at wOBA, short for weighted on-base average, which is a statistic similar to on-base percentage, that takes into account weights for each way of getting on base. It follows the formula below:

$$\text{wOBA} = \frac{.69(\text{uBB})+0.72(\text{HBP})+0.89(1\text{B})+1.27(2\text{B})+1.62(3\text{B})+2.10(\text{HR})}{\text{AB} + \text{BB} - \text{IBB} + \text{SF} + \text{HBP}}$$

We use wOBA, because team ERA can be accredited to a lot of different factors. For example, the Rays team ERA went from 4.45 to 2.85 after using an opener. At first glance, it is easy to say that using an opener was a massive success, but it does not account for the success of Blake Snell, Tyler Glasnow, and Charlie Morton during that time. Snell was absolutely incredible during this period, and Glasnow and Morton were very solid as well. However, we can look at the opponent's wOBA for pitchers that were used in different scenarios. Ryne Stanek allowed a 0.271 wOBA as an opener, compared to 0.327 in other games. Ryan Yarbrough's numbers were not as significant, as he posted a 0.320 wOBA as a starter, and 0.313 as a headliner - what the pitcher who replaces the opener is referred to as. This strategy was working well for the Rays, and that is why they

continued to experiment with it throughout the 2018 season. Other teams followed their lead, but not nearly to the same extent.

Table 1: Opener Prevalence

Team	# of games where opener was used 2018
Tampa Bay Rays	42
Oakland A's	7
Texas Rangers	6
Los Angeles Angels	5
Minnesota Twins	5
Milwaukee Brewers	3
Houston Astros	1
Toronto Blue Jays	1
Los Angeles Dodgers	1
Seattle Mariners	1
Pittsburgh Pirates	1
Detroit Tigers	1

The Rays may have been the team that has utilized the strategy the most, but different teams have had success when experimenting with this. The Oakland A's used Liam Hendricks as an opener eight times, including the wild card playoff game, and posted a team ERA of 1.86 in those games. In 2019 the Yankees used Chad Green as an opener in 15 games, and won 11 of them. Also in 2019, the Angels used Taylor Cole as an opener, who pitched two innings before Felix Pena came in to pitch the last seven, combining for a no-hitter.

These successes are why we are doing a deeper dive into the opener strategy. The data we will work with to build models and further analyze the effect of the opener will be Statcast pitch by pitch data in 2021. This data will allow us to take a look at success by the pitcher in opener situations, and also take into account other variables that may potentially be skewing the numbers.

III. Methodology

There were two ways in which we approached this. One way was to analyze the effect that an opener would have on run scoring if an opener were used more often, keeping all else the same. The other way was to create a MLR model to analyze the effect that the strategy has had thus far, and then use this model to predict it's impact on the game if it were more prevalent.

For the first strategy, we had to get the data from pitch by pitch into time through order numbers. We added variables for how many times each batter had faced that pitcher, and the variable counted up as the game went on. The data already contained wOBA numbers so we could summarize the data to calculate mean wOBA by each time through order. Once we had those numbers, we could reverse engineer it from another perspective. For this, we had to create a variable that would count which spot in the batting order was hitting. We could then calculate for each time through, how well each spot in the batting order fared and how many opportunities they had. We isolated it for the third time through and when we multiplied wOBA for each spot by the number of plate appearances, we got the same wOBA value as the value we calculated earlier. This means we calculated it correctly and this method works.

Since we know this works, we can play around with it. If we say that every team uses an opener in every game and each opener goes exactly four batters, then the bulk guy faces the fifth batter in the order first. That means that when the bulk pitcher faces the order for the third time, the first batter to see him for the third time is the fifth batter in the order. This is all caused by an opener facing the top of the order, which protects the bulk pitcher from facing the best batters the most.

Our second approach was modeling what has been done. We used a multiple linear regression with four predictors. The predictors were the identity of the starter/bulk pitcher, the batting team, the pitching team, and a boolean variable identifying whether the team used an opener or not. We chose a multiple linear regression because we wanted to use all of these predictors and they all have linearity.

IV. Results

The wOBA for batters facing a pitcher for a third time is .343. Table 2 shows the wOBA for each spot in the order when facing a pitcher for the third time, and the number of plate appearances that they faced a pitcher for the third time. It also includes a weight for calculating the overall third time through wOBA. Table 3 shows the same numbers, but if the plate appearances were shifted down four spots in the batting order.

Table 2: Batting Order and 3rd Time Through

Batting Order Spot	wOBA	PAs	Weight
1	.341	3819	1301
2	.359	3536	1271
3	.386	3211	1239
4	.357	2748	981
5	.340	2287	777
6	.328	1738	586
7	.317	1286	408
8	.235	869	205
9	.234	568	133

Table 3: Batting Order and Adjusted 3rd Time Through

Batting Order Spot	wOBA	Shifted PAs	Adj Weight
1	.341	1738	609
2	.359	1288	463
3	.386	869	335
4	.357	568	203
5	.340	3819	1298
6	.328	3536	1160
7	.317	3211	1018
8	.235	2748	647
9	.234	2287	536

When taking the sum of the weight column and dividing it by the sum of the plate appearances column, table 2 provides a .343 wOBA. Table 3 provides a .312 wOBA.

Adding an opener for the first four batters lowers third time through wOBA which can help bulk pitchers stay in the game longer and be more effective.

The model we used returned a low deviance explained. The multiple R-squared value is 0.17 and the adjusted R-squared value is 0.08. Initially, we made the model without the value for pitcher ID and it returned a much lower R-squared value, it was about .02. Adding the pitcher ID made a big difference, which is expected. Teams typically only use an opener with weaker starting pitchers, so teams typically allow more runs when using an opener because they have worse pitchers pitching. Adding the pitcher ID corrected this issue. When the model was run again using the same data, but flipping the boolean variable to say that an opener was used in every game, the model projects a decline of 0.831 runs allowed per game. I did not cut the data into a test and train dataset because an opener was only used in 1.89% of games. Therefore if I cut the data, it could pull out a large number of the instances of an opener, which would weaken the model. Though part of the reason the model is weak is that it is hard to predict runs allowed in baseball. There is a lot of random variation and a lot of factors that can have an impact. Teams use lots of different pitchers every game and each pitcher has an impact on the number of runs allowed. Every hitter also has an impact and there are many different hitters and combinations of hitters that have an impact on runs scored. Weather and ballpark affect the runs scored as well. Each of these add variation to the number of runs scored so there was expected to be a lot of variation already. The fact that an opener was used less than 2% of the time also hurts the model's ability to predict runs allowed based on that. If openers become more prevalent, models like this will be more accurate.

V. Conclusion

After completing our analysis, we can conclude that the opener strategy is a useful one that teams in the MLB should try to experiment with more often. We estimate that it could decrease runs allowed by almost a run per game. We estimate that employing the opener strategy will also help bulk pitchers pitch more innings and pitch more effectively. Using an opener strategy is not just about handling the first inning, but about building an effective plan for the entire game. For the reasons we laid out above, we think that the opener strategy is effective overall.

The only factor that is preventing us from giving strong, definite answers is the fact that openers are not used frequently. In order to perform a stronger analysis, more data is needed. We suggest that teams begin experimenting at the Minor League level. This will allow programs to better gauge whether or not the strategy is something they want to bring to the Major League level. This will also give teams more evidence to convince current players that the strategy is worth employing. While some players may be critical now, we believe that if they saw the positive effects it could have on their careers, they would be much more open to it. In order for them to see these effects, the strategy must be implemented more and an easy way to do that is at the minor league level.

The success of the opener in recent years, by the Tampa Bay Rays, and teams that have followed should not go unnoticed. It has allowed teams to get the most out of some of their weaker starting pitchers, and on several occasions has led to a lower team ERA. It will be no surprise if teams begin implementing this strategy more frequently, especially in the playoffs, in order to keep some of the stronger starters from working on short rest.

References

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