Park Factors (HRs)

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5/24/2021

```
library(dplyr)
library(knitr)
setwd("C:/Users/Jack/Desktop/School Stuff/Gatemen Baseball/Park Factors")
df <- read.csv("ccbl_plays.csv")
```

Typically, computing park factors relies on runs per game. When it's done for home runs, you can do home runs per game, but when you also throw in batter handedness, we need to adjust for that. We adjust for that by not using per game metrics because lineups contain a different number of lefties and righties. To adjust for this, I used home runs per plate appearance. The typical formula for park factors is

$$\frac{\frac{homeRS+homeRA}{homeGames}}{\frac{roadRS+roadRA}{roadGames}} \tag{1}$$

so using home runs and per plate appearance numbers, equation 2 shows the formula I used for each team and handedness combination.

$$\frac{\frac{HomeHRsHit+HomeHRsAllowed}{HomePAs}}{\frac{RoadHRsHit+RoadHRsAllowed}{RoadPAs}} \tag{2}$$

I also used the Other Parks Corrector from baseball reference. It makes corrections for the fact that the other road parks' total difference from the league average is offset by the park rating of the club that is being rated. You can read more about Baseball Reference's park factor calculation here: https://www.baseball-reference.com/about/parkadjust.shtml

```
# mark each HR hit
df <- mutate(df, hr = grepl("home run", Play, fixed = T))
# create a counter for plate appearences
df <- mutate(df, PA = 1)
# isolate home runs
hrs <- filter(df, hr==T)

# calculate number of PAs for each home team and handedness combination
HomePAs <- df %>%
  group_by(HomeTeam, B) %>%
  summarise(hPAs = sum(PA))
# same for away team
AwayPAs <- df %>%
  group_by(AwayTeam, B) %>%
  summarise(rPAs = sum(PA))
# calculate number of HRs hit for each home team and handedness combination
homes <- hrs %>%
  group_by(HomeTeam, B) %>%
```

```
  summarise(homeHRs = sum(hr))
# same for away team
roads <-hrs %>%
  group_by(AwayTeam, B) %>%
  summarise(roadHRs = sum(hr))
# combine to one dataframe
final <- cbind(homes, roads, HomePAs, AwayPAs)
final <- final[,c(1,2,3,6,9,12)]
colnames(final)[1] <- "Team"
colnames(final)[2] <- "Bats"

# do the initial calculation (Equation 2)
final <- mutate(final, ParkFactorHR = (homeHRs/hPAs)/(roadHRs/rPAs))
# calculate OPC
final <- mutate(final, adjustment = nrow(final)/(nrow(final)-1+ParkFactorHR))
# encorporate OPC into calculation
final <- mutate(final, adjParkFactorHR = round(100*(ParkFactorHR*adjustment),0))

kable(final)
```

Team	Bats	homeHRs	roadHRs	hPAs	rPAs	ParkFactorHR	adjustment	adjParkF
BOURNE BRAVES	L	11	31	2082	2026	0.3452945	1.0338431	
BOURNE BRAVES	R	41	60	3649	3569	0.6683521	1.0168620	
BREWSTER WHITECAPS	L	24	29	1953	2016	0.8542825	1.0073393	
BREWSTER WHITECAPS	R	66	65	3546	3515	1.0065079	0.9996747	
CHATHAM ANGLERS	L	43	24	2009	2075	1.8505268	0.9592084	
CHATHAM ANGLERS	R	57	55	3358	3169	0.9780335	1.0010995	
COTUIT KETTLEERS	L	28	35	2236	2400	0.8586762	1.0071165	
COTUIT KETTLEERS	R	62	50	2771	2824	1.2637171	0.9869858	
FALMOUTH COMMODORES	L	34	38	2192	2452	1.0008644	0.9999568	
FALMOUTH COMMODORES	R	59	48	2618	2619	1.2296362	0.9886485	
HARWICH MARINERS	L	23	32	1861	1781	0.6878526	1.0158548	
HARWICH MARINERS	R	30	56	3125	3423	0.5868000	1.0210958	
HYANNIS HARBOR HAWKS	L	38	24	2117	2008	1.5018107	0.9755236	
HYANNIS HARBOR HAWKS	R	45	43	2982	2827	0.9921155	1.0003944	
ORLEANS FIREBIRDS	L	21	30	1985	1879	0.6626196	1.0171585	
ORLEANS FIREBIRDS	R	61	66	3186	3323	0.9639854	1.0018040	
WAREHAM GATEMEN	L	25	25	2310	2224	0.9627706	1.0018649	
WAREHAM GATEMEN	R	23	38	2504	2337	0.5648962	1.0222390	
YARMOUTH-DENNIS RED SOX	L	42	21	1691	1575	1.8628031	0.9586440	
YARMOUTH-DENNIS RED SOX	R	77	40	3599	3732	1.9961378	0.9525561	

```
shortFinal <- final[,c(1,2,9)]
kable(shortFinal)
```

Team	Bats	adjParkFactorHR
BOURNE BRAVES	L	36
BOURNE BRAVES	R	68
BREWSTER WHITECAPS	L	86
BREWSTER WHITECAPS	R	101

Team	Bats	adjParkFactorHR
CHATHAM ANGLERS	L	178
CHATHAM ANGLERS	R	98
COTUIT KETTLEERS	L	86
COTUIT KETTLEERS	R	125
FALMOUTH COMMODORES	L	100
FALMOUTH COMMODORES	R	122
HARWICH MARINERS	L	70
HARWICH MARINERS	R	60
HYANNIS HARBOR HAWKS	L	147
HYANNIS HARBOR HAWKS	R	99
ORLEANS FIREBIRDS	L	67
ORLEANS FIREBIRDS	R	97
WAREHAM GATEMEN	L	96
WAREHAM GATEMEN	R	58
YARMOUTH-DENNIS RED SOX	L	179
YARMOUTH-DENNIS RED SOX	R	190

```
write.csv(final, "C:/Users/Jack/Desktop/School Stuff/Gatemen Baseball/Park Factors/handednessParkFactor
```