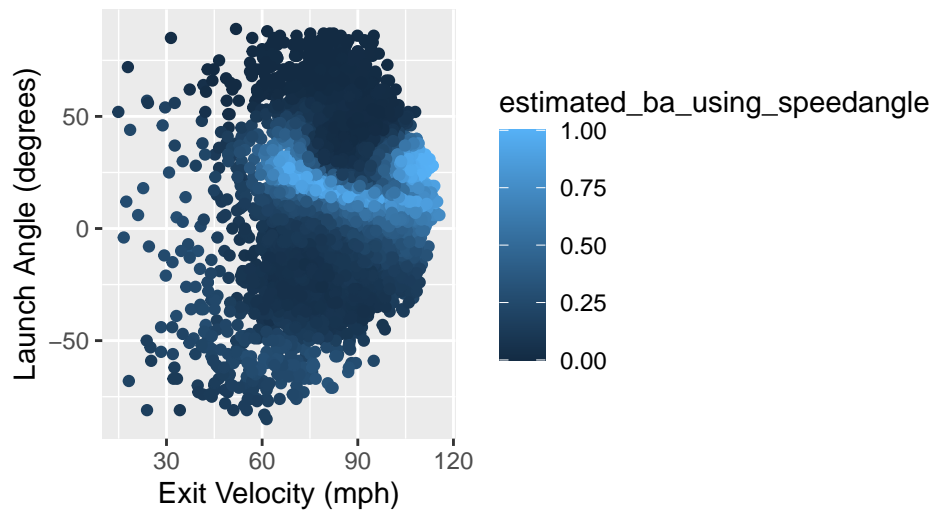# Quantifying The Effect of Pitching Metrics

Max Brown
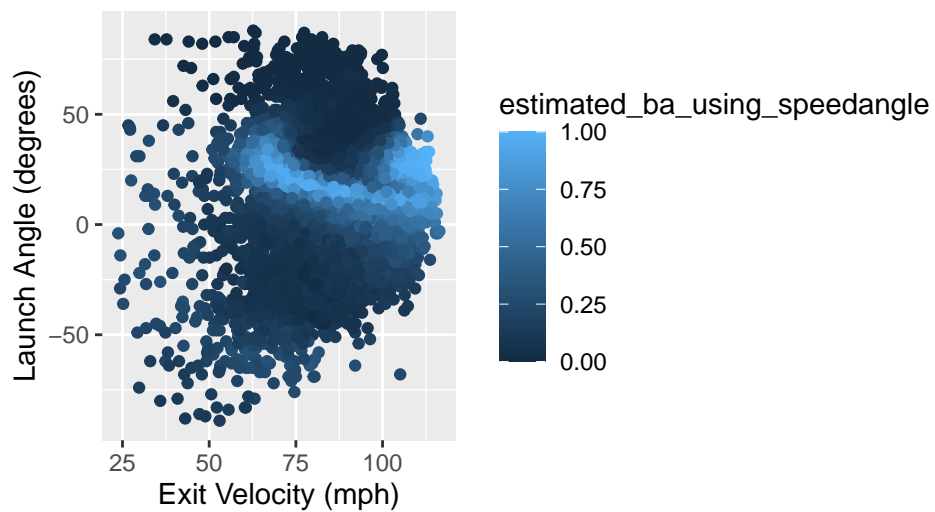
May 20, 2022

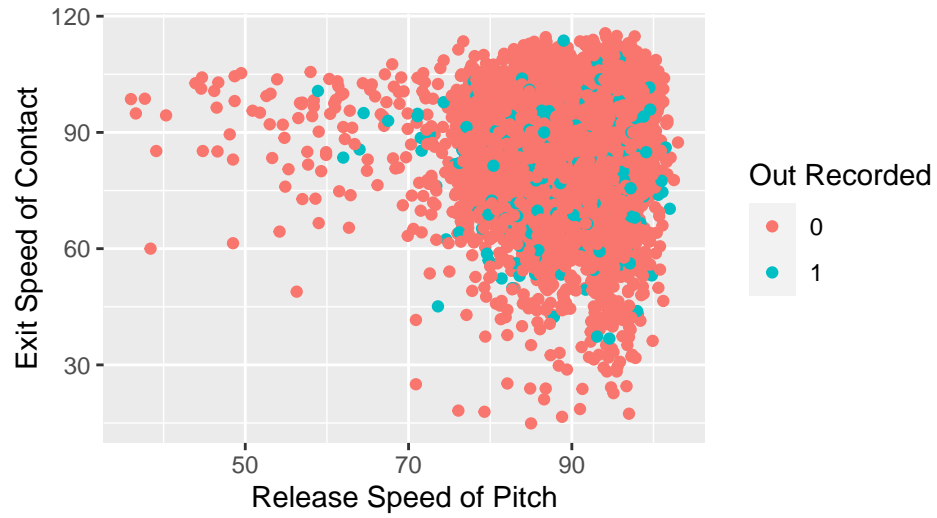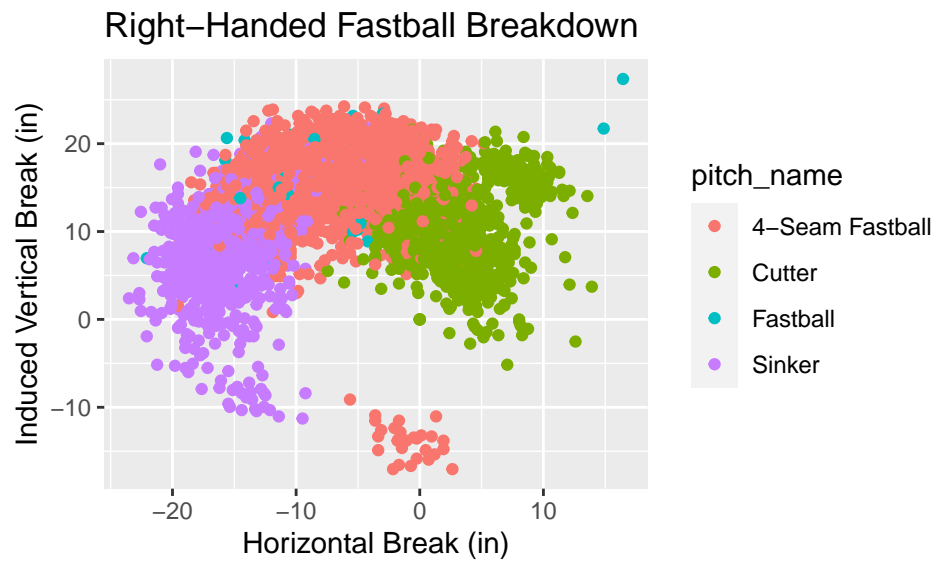**General EDA**

Right−Handed Speed/Angle Breakdown

Left−Handed Speed/Angle Breakdown

No Relationship For Release Speed and Launch Speed/
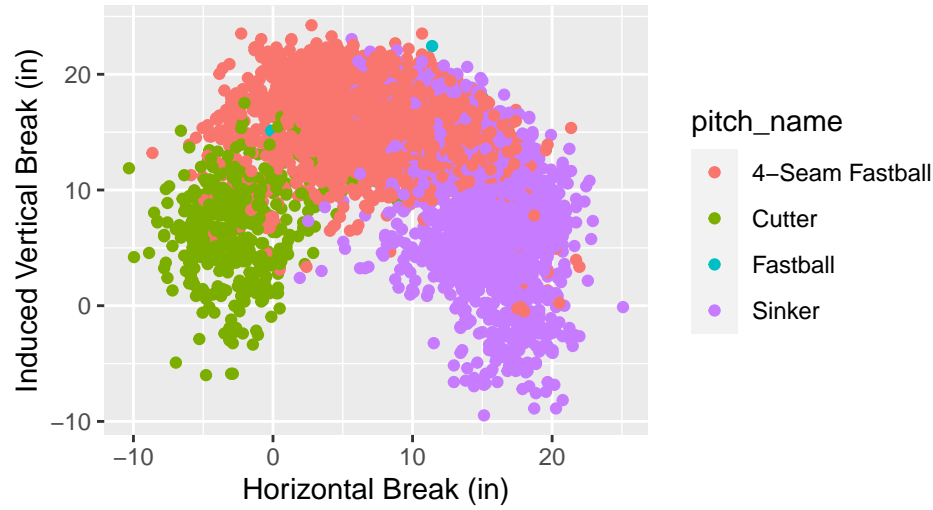

Fastball EDA

Right−Handed Fastball Breakdown

Left–Handed Fastball Breakdown

Table 1: Average RH Fastball Type Metrics

pitch_name	release_speed	release_spin	hor_break	vert_break	tilt
4-Seam Fastball	94.89	2304.33	-7.28	16.00	213.42
Cutter	91.86	2412.12	2.96	10.82	180.17
Fastball	69.79	1703.67	-8.79	15.02	221.85
Sinker	94.65	2167.59	-14.87	9.15	223.31

Table 2: Average LH Fastball Type Metrics

pitch_name	release_speed	release_spin	hor_break	vert_break	tilt
4-Seam Fastball	93.78	2288.18	7.36	16.04	150.43
Cutter	88.41	2377.43	-2.67	6.82	189.76
Fastball	65.52	1708.58	7.61	15.01	134.47
Sinker	93.70	2137.25	14.34	9.54	129.77

Right−Handed Breaking Ball Breakdown

Left−Handed Breaking Ball Breakdown
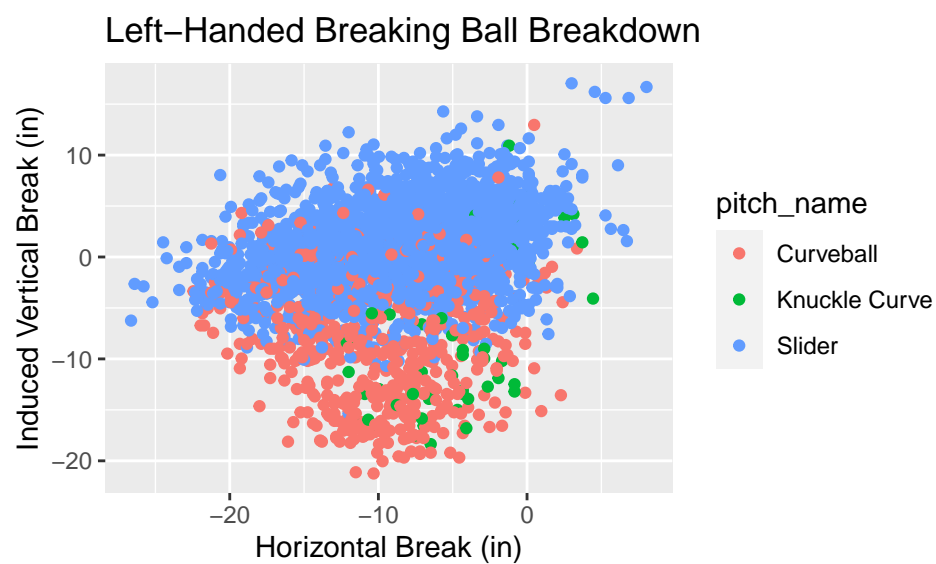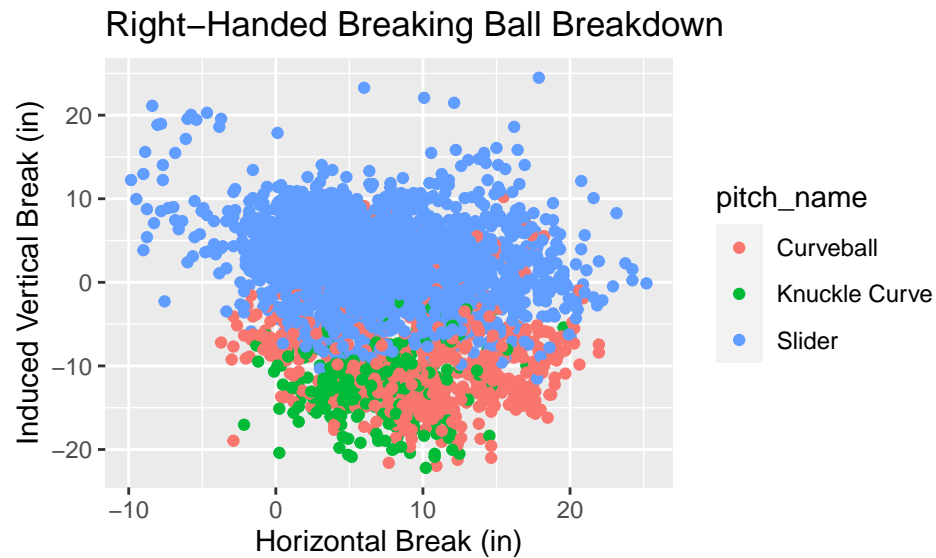
Table 3: Average RH Breaking Ball Type Metrics

pitch_name	release_speed	release_spin	hor_break	vert_break	tilt
Curveball	80.03	2591.57	10.05	-9.54	41.78
Knuckle Curve	82.49	2489.44	6.79	-11.70	33.16
Slider	85.19	2422.75	6.58	2.16	110.67

Table 4: Average LH Breaking Ball Type Metrics

pitch_name	release_speed	release_spin	hor_break	vert_break	tilt
Curveball	78.15	2447.33	-10.12	-8.13	310.40
Knuckle Curve	80.13	2259.08	-4.30	-7.36	283.60

pitch_name	release_speed	release_spin	hor_break	vert_break	tilt
Slider	83.20	2422.00	-8.47	1.17	260.14

EDA Change Ups

Right−Handed Change Up Breakdown

Left−Handed Change Up Breakdown
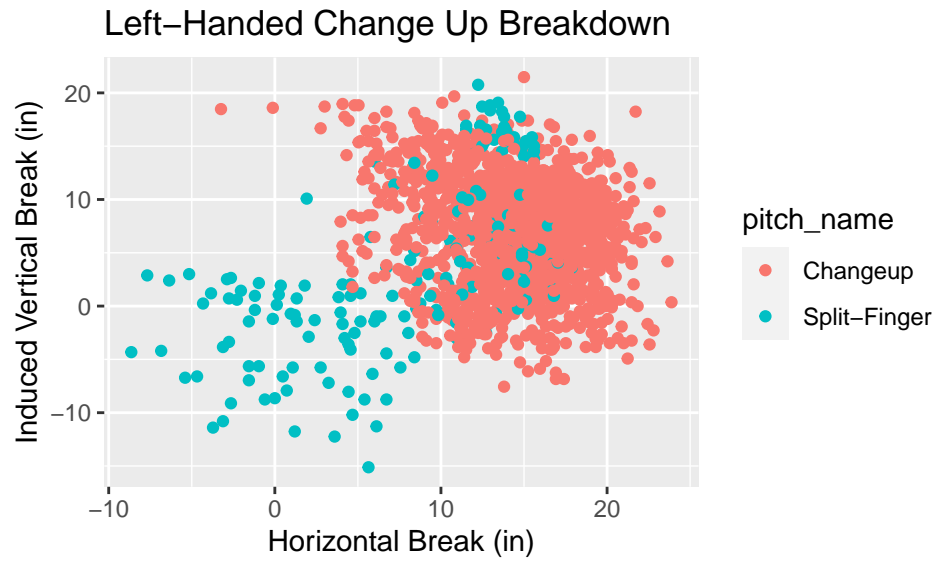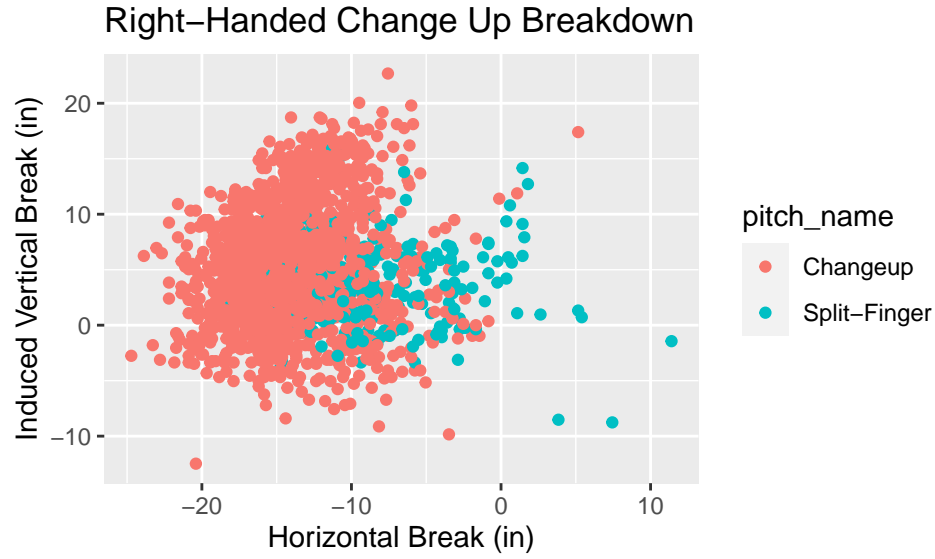
Table 5: Average RH ChangeUp Type Metrics

pitch_name	release_speed	release_spin	hor_break	vert_break	tilt
Changeup	86.01	1807.24	-14.04	5.51	240.19
Split-Finger	86.84	1162.40	-8.58	3.66	236.59

Table 6: Average LH Change Up Type Metrics

pitch_name	release_speed	release_spin	hor_break	vert_break	tilt
Changeup	84.24	1833.81	14.62	6.90	117.86
Split-Finger	85.21	1241.81	8.23	3.85	127.06

Methodology

Creating Breaking Ball Models

Right-Hand

term	estimate	std.error	statistic	p.value
(Intercept)	0.574	0.016	36.899	0.000
mean_centered_speed	-0.002	0.002	-0.863	0.388
hor_break	0.001	0.002	0.308	0.758
ind_vert_break	0.003	0.001	2.510	0.012

Left-Hand

term	estimate	std.error	statistic	p.value
(Intercept)	0.551	0.018	30.926	0.000
mean_centered_speed	0.001	0.003	0.437	0.662
hor_break	-0.002	0.002	-1.308	0.191
ind_vert_break	0.002	0.002	0.971	0.331

Appendix
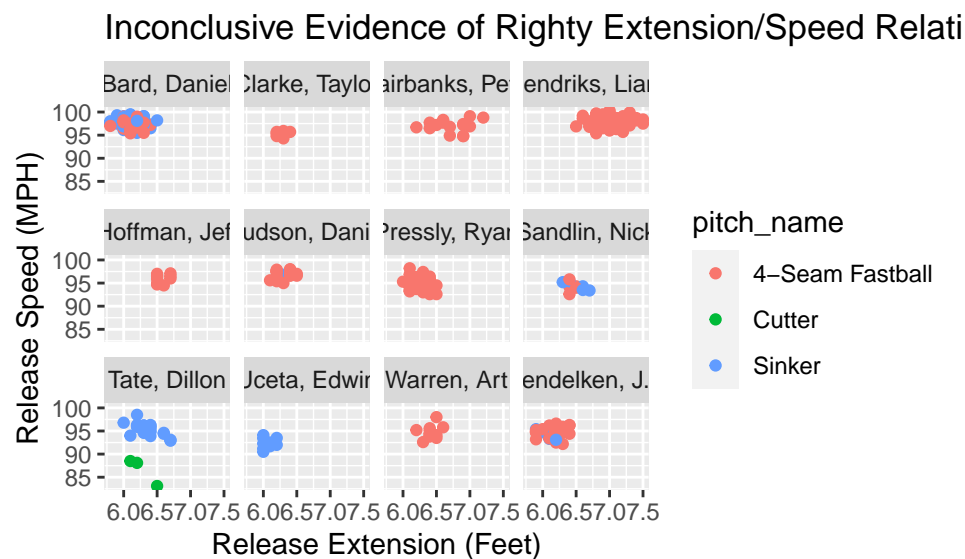
Inconclusive Evidence of Lefty Extension/Speed Relation