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The Van Exel Effect: Adjusting for Scorekeeper Bias in NBA Box Scores

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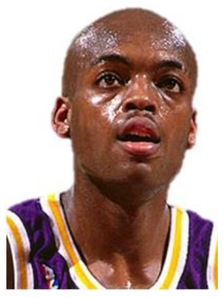
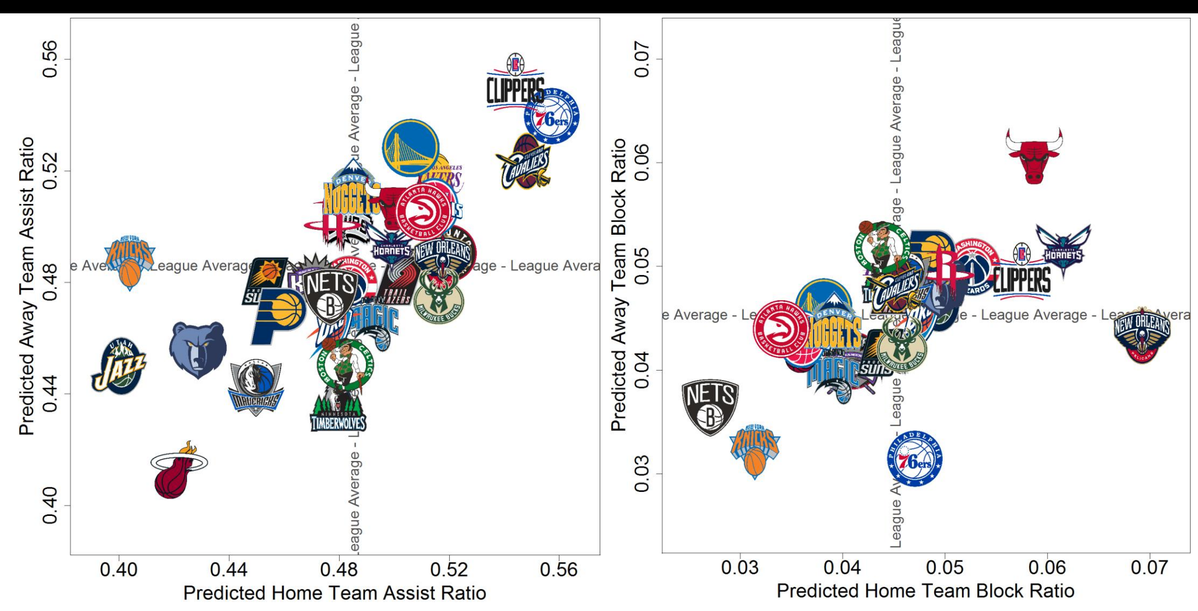
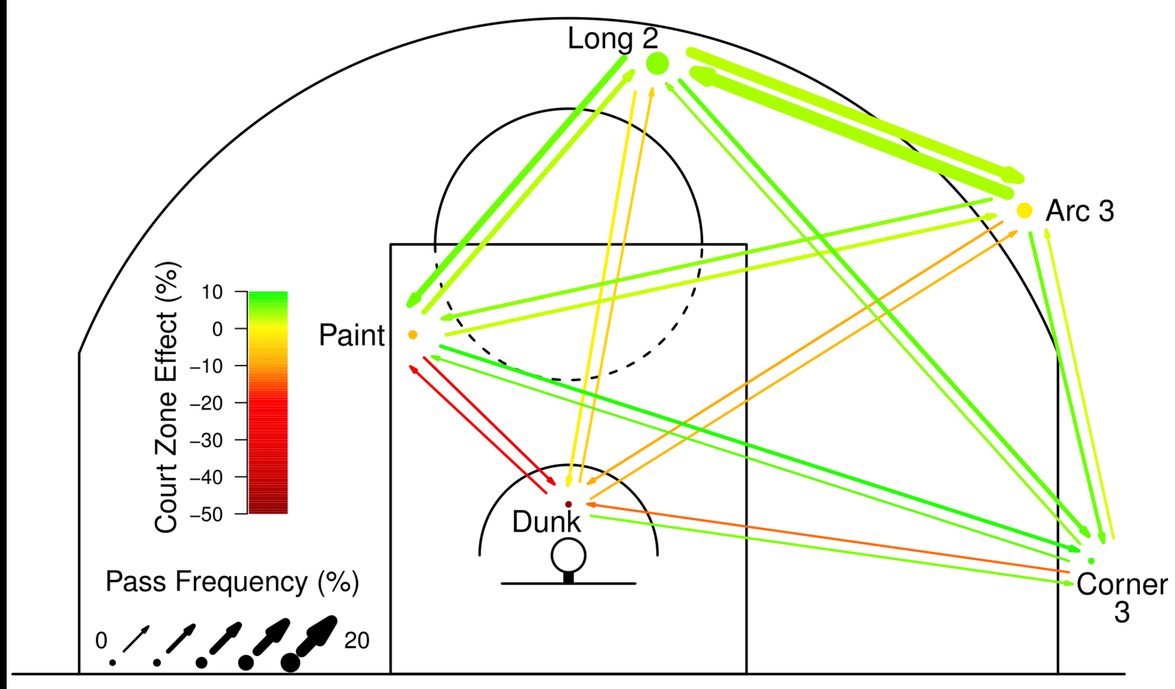
Van Exel's Career Night



In a January 1997 95-82 win against the host Vancouver Grizzlies, Los Angeles Lakers point guard Nick Van Exel was awarded a career high 23 assists. However, it was later revealed that the impressive statistic was the result of a disgruntled Grizzlies scorekeeper who decided to award Van Exel as many assists as possible in protest of the inaccuracy of box score statistics. This example, though extreme, highlights that NBA scorekeepers can have substantial influence in the recording of statistics. In particular, scorekeepers affect the more subjective statistics of assists and blocks, thus we focus our attention on these metrics. Since assists and blocks are highly dependent on the number of made and attempted field goals respectively, we examine the assist ratio (AR = assists per made field goal) and the block ratio (BR = blocks per opponent field goal attempt).



Predicted home team and away team assist ratio (left) and block ratio (right) for each scorekeeper.



Passer and shooter court zone location effects on the recorded assist probability of an average potential assist. The arrows point in the direction of the pass and the points represent passes within each zone.

Scorekeeper Behavior

To determine the impact of scorekeeper inconsistency on the recording of assists and blocks, we use 2014-2015 regular season box score data to build a game-level model. This model isolates the effects of the teams playing in each game from two scorekeeper effects:

- scorekeeper generosity – how likely a scorekeeper is to award assists or blocks to both teams in a game
- scorekeeper bias – how much more likely a scorekeeper is to award an assist or block to the home team

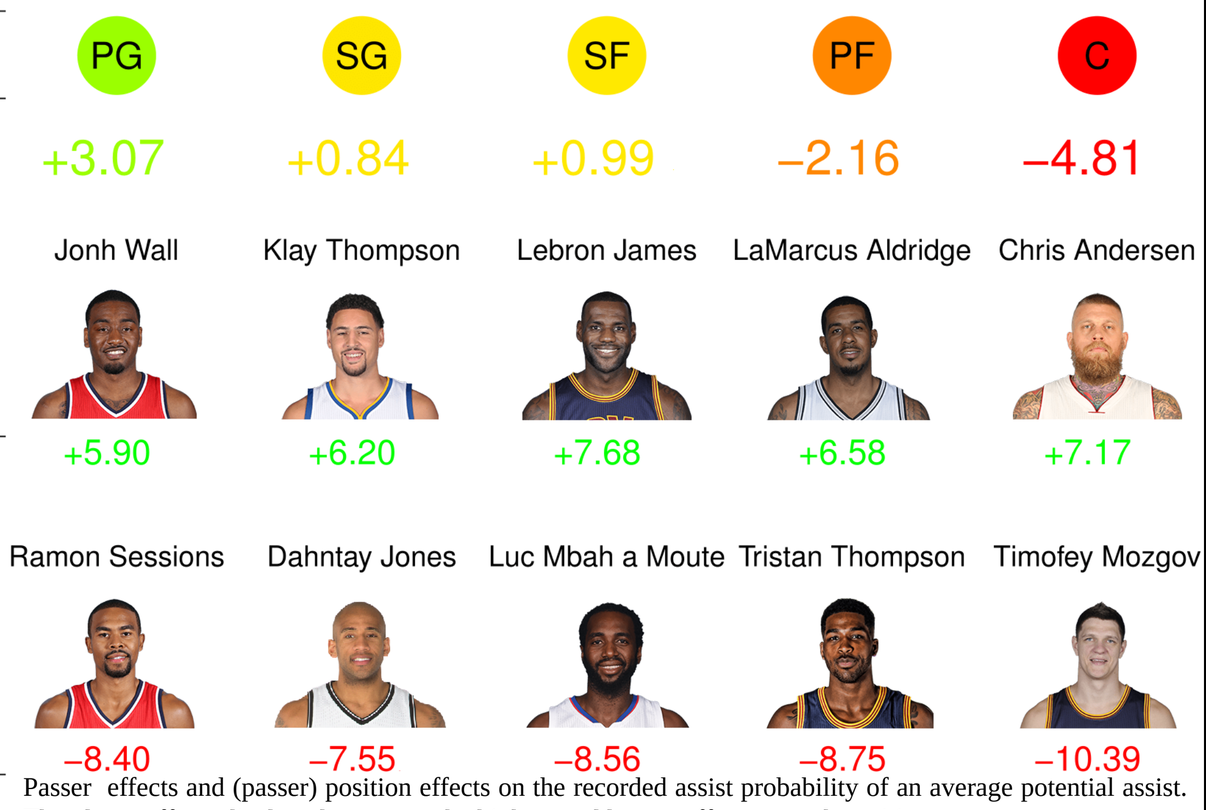
The results of this model are displayed in the above figure.

Spatio-Temporal Context

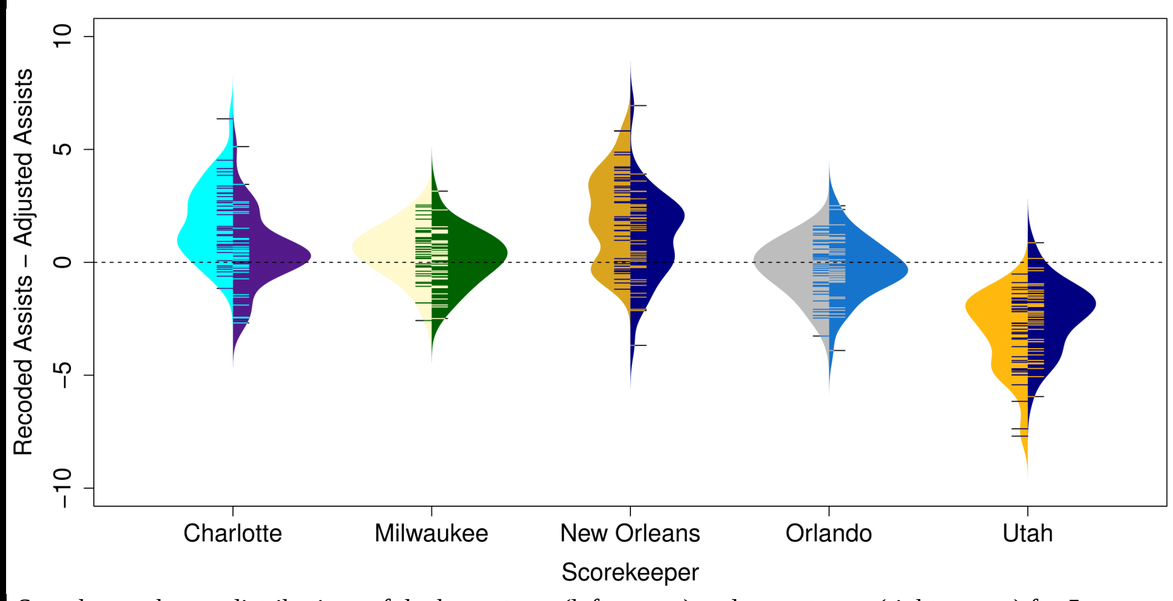
Since assists develop over time, they are heavily influenced by their context. Using SportVu optical tracking data, we add spatio-temporal variables to create a new model to estimate the probability of individual assists being recorded. Here, we present results for court zone locations of the passer and shooter (left figure) and position and identity of the passer (below figure). Other variables include possession length, dribbles, and defender distance. We also compute adjusted player assist totals over the 2014-2015 NBA season which adjust for any potentially subjective influences (left table).

Player	Assist Change	Recorded Assists	Original Rank	Adjusted Rank	Position	Passer	Home SK	Away SK
Derrick Favors	18.32	109	162	143	-1.83	-2.03	-16.31	-0.03
Marc Gasol	16.98	295	36	30	-7.04	0.17	-13.45	-1.85
Enes Kanter	14.97	53	276	240	-2.34	-3.76	-6.07	-0.75
Gorgui Dieng	13.81	142	123	108	-3.61	-4.04	-4.19	-0.87
Rudy Gobert	11.99	106	167	150	-3.14	1.43	-13.33	-0.85
Dwyane Wade	11.66	277	43	36	0.92	0.57	-13.38	-0.76
Trevor Booker	11.46	81	211	185	-1.46	-1.07	-11.19	0.77
Goran Dragic	10.68	336	25	22	5.77	0.01	-15.94	-0.65
Eric Bledsoe	10.09	480	12	10	1.9	6.05	-18.43	1.11
Udonis Haslem	9.86	43	307	278	-0.86	-1.78	-5.56	-0.03
Blake Griffin	-17.35	340	23	28	-3.31	6.14	13.84	-1.76
Dennis Schroder	-17.94	315	30	34	3.84	2.67	7.42	0.46
Ty Lawson	-19.78	706	3	3	8.93	-4.34	5.06	-0.32
M. Carter-Williams	-19.93	411	19	19	5.65	1.49	14.22	-0.16
Jeff Teague	-25.39	503	9	11	5.20	7.70	9.93	-2.19
Kyrie Irving	-26.24	365	20	23	4.60	1.23	13.58	-0.30
Stephen Curry	-32.07	564	4	4	6.08	11.94	7.02	-1.75
LeBron James	-34.07	481	11	13	1.52	12.61	13.46	-2.14
John Wall	-35.10	750	2	2	8.14	16.12	1.85	-1.22
Chris Paul	-37.92	807	1	1	8.13	13.90	21.41	-3.46

Assist adjustments for players experiencing the greatest increases or decreases. The last four columns display estimated numbers of extra assists originally awarded due to the given effect (SK is scorekeeper).



Passer effects and (passer) position effects on the recorded assist probability of an average potential assist. The player effects displayed represent the highest and lowest effects at each position.



Scorekeeper bonus distributions of the home team (left curves) and away teams (right curves) for 5 selected scorekeepers Each observation represents a single game.

Impact on Daily Fantasy

Since scoring systems of daily fantasy contests often rely exclusively on box score statistics, scorekeeper inconsistencies have the potential to affect their outcomes. Of particular interest to participants is the variability of scorekeeper behavior. Using our adjusted assist totals, we compute the "scorekeeper bonus" (recorded assists – adjusted assists) values for each game for all 30 NBA scorekeepers, and find large differences among the resulting distributions (left figure). These differences can lead to monetary consequences for daily fantasy participants and potentially legal consequences for the NBA.

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