The Impact of Back-To-Backs on NBA Performances

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Background: Back to Backs in the NBA

- Back to backs in the NBA refers to an NBA team playing 2 games in consecutive days.
  - 11/5: New York Knicks vs. Cleveland Cavaliers.
  - 11/6: New York Knicks vs Boston Celtics.

- We will focus on the second game of the back to back, analyzing the quality of play of starters in those games.

- NBA teams play between 13-16 back to backs every season.

- Extremely controversial topic today:
  - More injuries than ever before: 6,489 total players missed games. Over 10 players were injured for every team over the course of the season.
  - Star players missing out big games.
  - TV ratings are down 2% going into this season.

Shooting Efficiency Rationale

- Shooting Efficiency refers to how effectively a player converts shot attempts into points.
- Shooting efficiency identifies players that are best at maximizing possessions and impacting the game at a high level
- Understanding how these metrics relate to back-to-backs can tell us about how roles and scoring capacity change when players are fatigued

Shooting Efficiency:

Field Goal Percentage:

- Most basic statistic
- Number of made shots / Number of total shots taken.
- Includes both two and three pointers but does not include free throws.
- Expressed as a percentage or decimal.

Effective Field Goal Percentage:

- Adjusts the field goal percentage statistics by giving extra weight to three point shots.
- $eFG\% = (FGM+0.5\times3PM)/FGA$

True Shooting Percentage:

- Measures a player's shooting efficiency by combining field goals and free throws into single metric.
- TS% = Points/ 2 x (FGA + .44 X FTA)

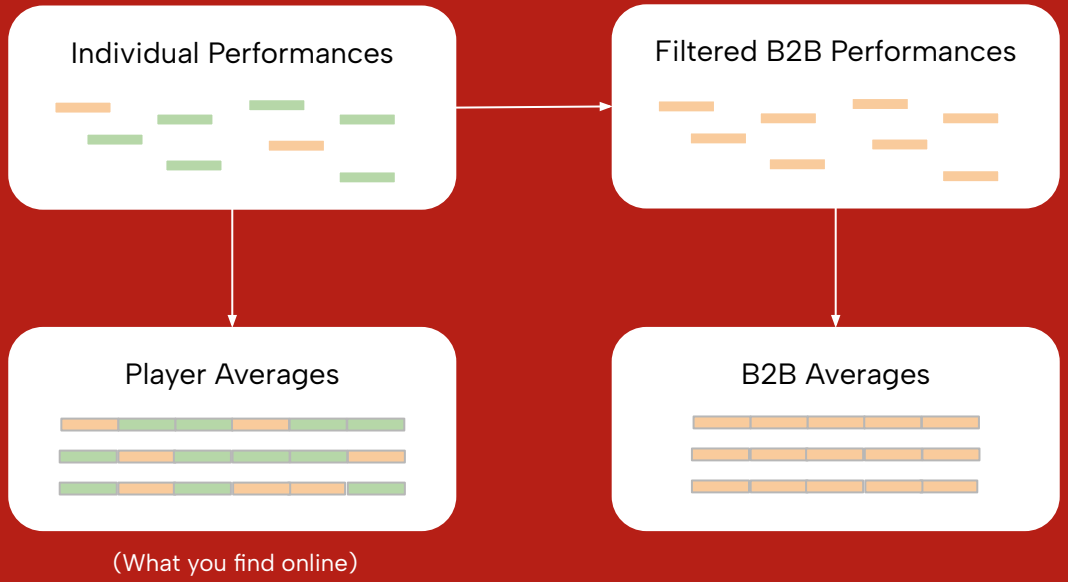
Data Set

	Player	Tm	Opp	Res	MP	FG	FGA	FG%	3P	3PA	...	DRB	TRB	AST	STL	BLK	TOV	PF	PTS	GmSc	Data
0	Jayson Tatum	BOS	NYK	W	30.30	14	18	0.778	8	11	...	4	4	10	1	1	1	1	37	38.1	2024-10-22
1	Anthony Davis	LAL	MIN	W	37.58	11	23	0.478	1	3	...	13	16	4	1	3	1	1	36	34.0	2024-10-22
2	Derrick White	BOS	NYK	W	26.63	8	13	0.615	6	10	...	3	3	4	1	0	0	1	24	22.4	2024-10-22
3	Jrue Holiday	BOS	NYK	W	30.52	7	9	0.778	4	6	...	2	4	4	1	0	0	2	18	19.5	2024-10-22
4	Miles McBride	NYK	BOS	L	25.85	8	10	0.800	4	5	...	0	0	2	0	0	1	1	22	17.8	2024-10-22
5	Rui Hachimura	LAL	MIN	W	35.08	7	14	0.500	1	4	...	2	5	1	2	1	0	2	18	15.9	2024-10-22
6	Jaylen Brown	BOS	NYK	W	29.90	7	18	0.389	5	9	...	5	7	1	1	0	1	3	23	15.6	2024-10-22
7	Rudy Gobert	MIN	LAL	L	35.33	5	8	0.625	0	0	...	11	14	2	0	1	1	4	13	13.9	2024-10-22
8	Julius Randle	MIN	LAL	L	34.32	5	10	0.500	1	3	...	6	9	4	0	0	2	3	16	13.7	2024-10-22
9	Al Horford	BOS	NYK	W	26.08	4	7	0.571	3	5	...	3	3	5	1	1	0	2	11	13.0	2024-10-22

Source: Kaggle

Divided into Individual Performances

Data Management



(What you find online)

Data Management

PPG Risers in B2Bs

Who?

WHO??
(Knicks Legend)

Player	PPG_Diff
Jared McCain	13.70
Dariq Miller-Whitehead	13.50
GG Jackson II	11.11
AJ Johnson	10.56
Pacome Dadiet	7.54

Filter for significant contributors

(Players who average at least 24 minutes)

Back-To-Back PPG Risers

Player	PPG in all games	PPG in B2B's	Difference
Jared McCain	15.3	29	13.7
Karl-Anthony Towns	24.33	31.71	7.38
Kyrie Irving	24.37	31.17	6.8
Spencer Dinwiddie	10.3	17	6.7
Payton Pritchard	13.86	19.88	6.02
Max Strus	8.5	13.4	4.9
Nikola Jokić	29.7	34.33	4.63
Jalen Brunson	26.08	30.57	4.49
Mark Williams	15.57	20	4.43
Jordan Clarkson	16.63	21	4.37

Back-To-Back PPG Fallers

Player	PPG in all games	PPG in B2B's	Difference
Jordan Poole	20.84	12.29	-8.55
Trae Young	23.25	16	-7.25
Al Horford	7.85	1	-6.85
Anthony Davis	25.74	19.17	-6.57
Trey Murphy III	25.62	20	-5.62
Victor Wembanyama	24.42	19.25	-5.17
Tim Hardaway Jr.	12.16	7	-5.16
Wendell Carter	7.33	2.33	-5
Cam Thomas	24.68	20.2	-4.48
Josh Hart	14.3	9.86	-4.44

PPG is fun to look at but does it reflect a significant trend?

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Mean change in PPG in B2Bs: -0.131
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...Not really

Back-To-Back PPG Fallers

Many of these players are considered “inefficient”

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Let’s analyze efficiency

Aside: What is a P-Value?

In Simple Terms: The percent chance that something could have happened randomly

Example

- If LeBron normally has 27.0 PPG but has 27.1 on (taco) Tuesdays, there is a high likelihood the change is due to random chance so the P-Value might be 75%
- However, if LeBron had 35 PPG on Tuesdays, this seems like it is not due to random chance so the P-Value may be 2%

A “good” P-Value is < 5%

Efficiency – True Shooting

Regular Average True Shooting %:

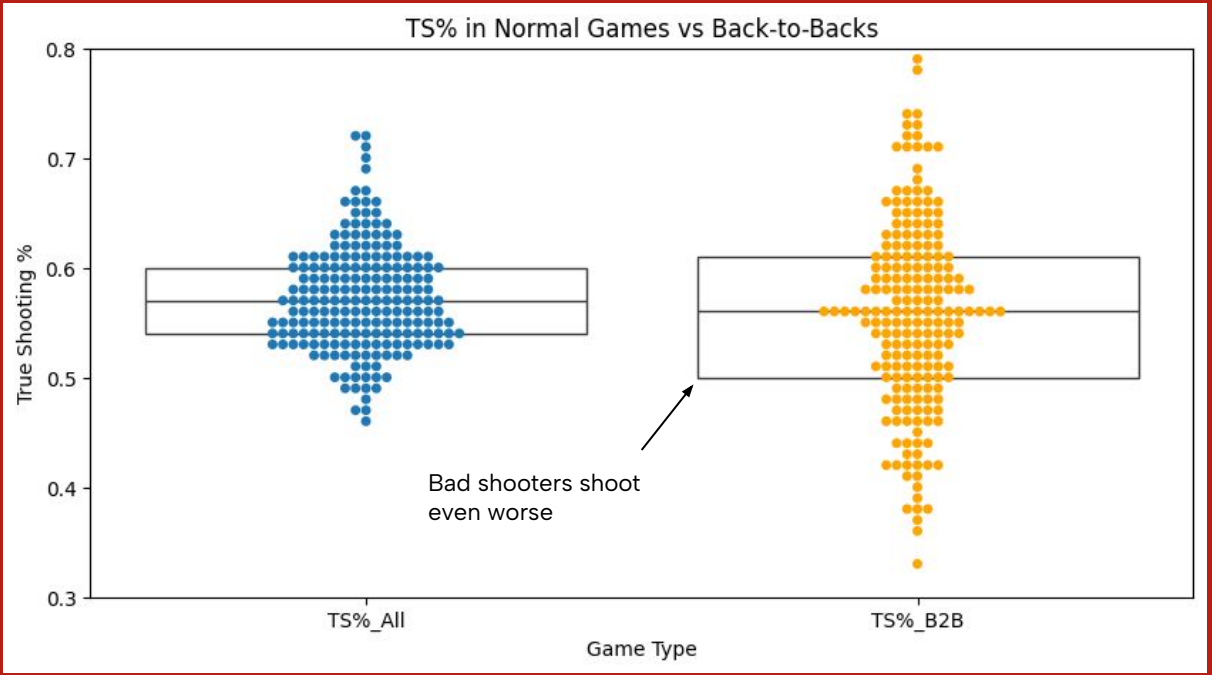
57.2%

B2B Average True Shooting %:

55.6%

P-Value: **4.75%**

Efficiency – True Shooting



Efficiency – Effective Field Goal %

Regular Average Effective Field Goal %

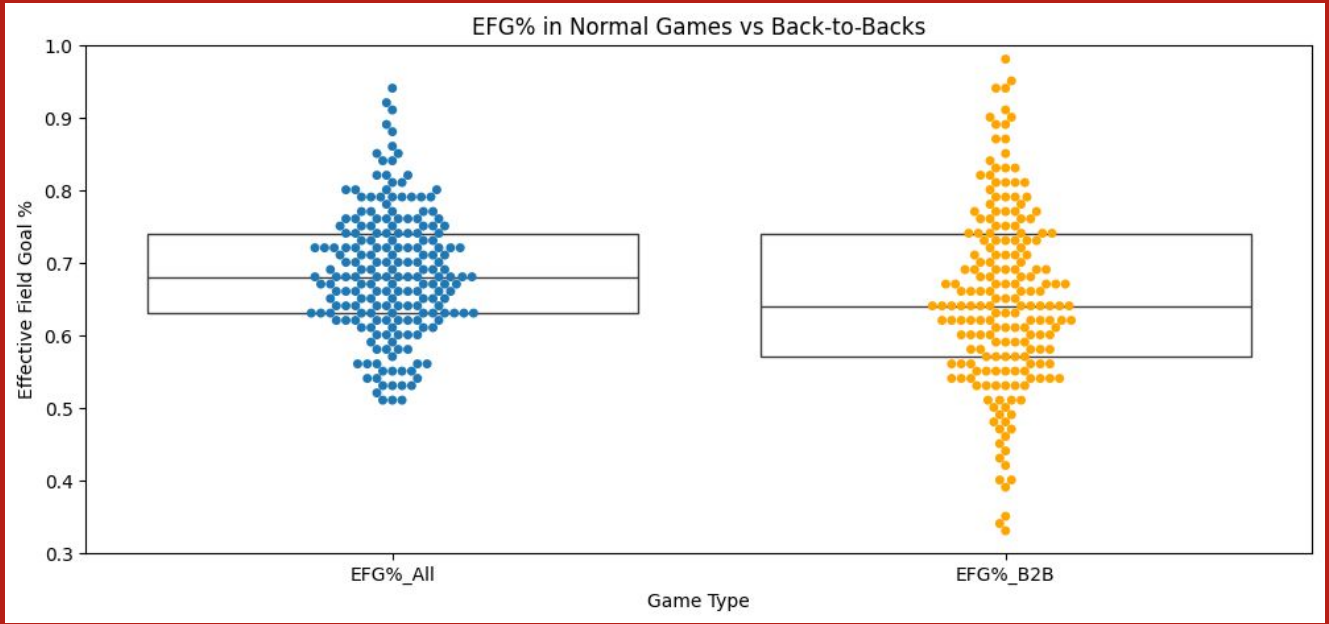
68.6%

B2B Average True Shooting %:

66.1%

P-Value: **4.80%**

Efficiency – Effective Field Goal %



Conclusions

- Back-To-Backs result in a significant decrease in player efficiency
  - This decrease appears to be especially pronounced in players who are already low-efficiency scorers
- This type of play is likely less engaging to viewers
- Our suggestions
  - To teams/players: in the second game of back-to-backs prioritize plays that aim to give players opportunities at layups/dunks rather than mid-range shots or three-pointers
  - To the NBA: avoid scheduling the second game of back-to-backs as nationally televised games as they often do not represent the most engaging type of basketball