Analyzing the Effects of the NBA COVID Bubble on NBA Playoff Games and Implications About Home Court Advantage

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Abstract: Due to the COVID-19 pandemic the NBA playoffs were conducted in a "bubble" in Disney World and games have been played without fans. This provides a unique opportunity to analyze home court advantage in basketball because these games are being played at a neutral location. By analyzing how home and away teams in the 2020 playoffs are performing vs. the 2017-2019 playoffs we can begin to understand what kind of effect playing at home really has for teams. This study specifically focuses on home team winning percentage, home and away scoring totals and home and away shooting percentages for 2 point, 3 point and free throws.

Problem and Data

- By studying the performance of the home and away teams in 2020 against 2017-2019 we can answer how the bubble effected the NBA playoffs and better understand the effects of home court advantage in the NBA.
- In order to control for changing playing styles in NBA, I choose to compare 2020 playoffs vs the previous 3 years. This is important because in the last couple years the three point shot has become much more popular and used at a higher volume. For example, comparing 2020 to 2005 may be useless because different playing styles may be the real reason of any observed differences.

- Using z-tests I can answer simple but important questions:
    - Is home team winning percentage in 2020 less than that what it was in 2017-2019?
    - Is average home team scoring different in 2020 than it was over 2017-2019?
    - Is average away team scoring different in 2020 than it was over 2017-2019?
    - Are home teams shooting better in 2020 than 2017-2019(2 Pt, 3 Pt, FT)?
    - Are away teams shooting better in 2020 than 2017-2019(2 Pt, 3 Pt, FT)?

Results(using significance level of 0.05)

**Values significant at 5% level highlighted in yellow

Measure	2020	2017-19	95% CI	Test Statistic	P-values
Home Team Win %	.487	0.613	(-0.23, -0.02)	1.831	0.033
Home Team Scoring	110.17	108.203	(-1.61, 5.44)	1.215	0.2244
Away Team Scoring	109.3117	104.025	(2.057, 8.227)	3.339	0.00084
Home 2 Pt%	0.520	0.515	(-0.013, 0.023)	0.487	0.6264
Home 3 Pt%	0.364	0.357	(-0.014, 0.028)	0.619	0.536
Home FT%	0.795	0.774	(-0.0002, 0.429)	1.945	0.0518
Away 2 Pt%	0.536	0.504	(0.0139, 0.0503)	3.469	0.00052
Away 3 Pt%	0.355	0.346	(-0.011, 0.029)	0.849	0.3959
Away FT%	0.779	0.777	(-0.021, 0.024)	0.79	0.9369

**Even after making a Bonferroni correction for multiple tests average away team scoring (corrected p-value=0.00756) and away 2 point % (corrected p-value=0.00468) are still significantly different.

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Conclusions

1. There was evidence that home team winning percentage was lower in 2020 than over 2017-19 (95% CI: -0.23 to -0.02). However, this conclusion should be accepted with some caution because after the Bonferroni correction is done the p-value is above 0.05.
2. The difference between average home scoring in 2020 and 2017-2019 was insignificant. Similarly, There was no significant difference in home shooting for 2 point, 3 point or free throws.
3. There was a significant difference in average away scoring totals(95% CI: 2.057 to 8.227). Also, there was a significant difference in away 2 point shooting in 2020 vs 2017-19 (95% CI: 0.0139 to 0.0503.

Conclusions in part 3 still significant after Bonferroni correction for multiple tests

- Implications: There is some evidence that away teams performed better in the bubble, while home team performance was unchanged. This implies that home court advantage doesn't necessarily directly improve the home team's performance, but it may contribute to visiting teams struggling. This analysis is the foundation for more research I plan on doing to uncover the effects of home court advantage using the NBA bubble as a case study.

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