

How Does Homecourt Advantage in the National Basketball Association Differ Per Team Depending on Each Team's Overall Strength?

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Abstract

If one has no knowledge of the National Basketball Association (NBA) and must bet between two teams playing a game against each other, which team should that person choose? The home team is the better choice. Previous literature has found that overall, home teams win more games than road teams in the NBA. However, do certain teams benefit more from homecourt advantage than others? In particular, how does homecourt advantage in the NBA differ per team depending on each team's overall strength? This study hypothesizes that average teams benefit more from homecourt advantage than below average and above average teams. However, the results of this study found that a team's overall strength does not significantly impact how much it benefits from homecourt advantage. The effect of homecourt advantage was found to be relatively the same in below average, average, and above average teams.

Introduction

Every year, 30 teams in the National Basketball Association (NBA) compete to win a championship. During each game, countless fans all over the world invest much time and energy supporting their favorite teams to win, either watching the game on television or being physically present inside the arena where the game is taking place. Whenever a team is playing a game at home, numerous fans for that team physically show up to the game to root for it. Such fans can have an impact on the outcome of a game. In fact, from the 1994-1995 season to the 2014-2015 season, home teams won about 60% of the time in the regular season¹ (“As sweet as ever,” 2015). Hence, whenever a team is playing a home game, that team has homecourt advantage.

While it is true that overall, home teams win more games than road teams in the NBA, not much research has focused on which teams benefit the most from homecourt advantage. Finding such information would be useful in events such as betting. If a specific team or group of teams is found to benefit more from homecourt advantage than other teams, then, holding other factors constant, it would be advantageous for people to bet on those teams whenever they play home games. The question this paper addresses is: How does homecourt advantage in the NBA differ per team depending on each team’s overall strength? More specifically, do average teams benefit more from homecourt advantage than below average teams and above average teams?

This study hypothesizes that average teams benefit the most from homecourt advantage. Average teams may contain talented players on its roster and/or players who can play well together as a team, but they do not consistently outperform their opponents nor do they consistently get outperformed by their opponents. Hence, having a home crowd cheering them

¹ During the regular season, each team in the NBA plays 82 games against other teams over the course of six months (generally from October to April). See the appendix for details regarding how the regular season is structured.

on will help their players remain focused on winning a game, leading to them scoring more points, which may be the difference between a win and a loss.

On the other hand, below average teams likely do not possess much talent and/or teamwork on their rosters. Due to such fundamental issues with these teams, they are consistently outplayed by their opponents even if their players feel highly motivated to win each game. Therefore, below average teams would not benefit much from homecourt advantage.

For above average teams, they would not benefit much from homecourt advantage because they likely possess sufficient talent and/or teamwork on their rosters. As a result, they consistently outplay their opponents, so an encouraging home crowd would not be necessary to them to help them play better. Hence, such teams would not benefit much from homecourt advantage as well.

This paper finds, however, that the effect of homecourt advantage does not differ significantly between below average teams, average teams, and above average teams. This result comes with implications. For instance, since teams generally play better at home than on the road and the effects of homecourt advantage are relatively the same across teams of different overall strengths, teams should fight to secure the most wins in the regular season even if they already secured a position in the playoffs. This is because in each round of the playoffs, teams play a best-of-seven series against another team. The team with more regular season wins gets to play four of the seven games at home while the other teams gets to play the remaining three games at home. Having the ability to play an extra game at home can be the difference between winning and losing a series.²

² See the appendix for details about how the NBA Playoffs are structured.

Review of Literature

In general, home teams are more likely to win a game than road teams in the NBA (“As sweet as ever,” 2015). Possible reasons of this are that a home crowd helps players on the home team remain focused on the game, crowds can be extremely hostile to players on the opposing team (e.g. booing opposing players whenever they touch the ball), and crowds can encourage the referees to make more calls in favor of the home team.

A team playing a game at home can have a psychological advantage over its opponent. This is because a home crowd helps players on the home team remain focused on the game while trying to act as a distraction to players on the road team. For example, when players on the home team shoot free throws, the crowd is generally quiet while when players on the road team shoot free throws, the crowd generally gets loud in an effort to distract whoever is shooting the ball. However, it has been found that home crowds only slightly impact free-throw accuracy of the road team. From the 2009-2010 season to the 2015-2016 season, on average, home teams shot free throws at an accuracy of 75.7% and road teams shot free throws at an accuracy of 75.5% (Beuoy, 2016). However, towards the end of games, teams trailing tend to foul poor free throw shooters in an attempt to make a comeback (Beuoy, 2016). Since home teams, on average, win more games than road teams, it is often that poor free throw on the home team will attempt more free throws towards the end of the games (Beuoy, 2016). Even after controlling for that factor, the average free throw percentage of home teams is 0.3% higher than that of road teams (Beuoy, 2016). That study shows that at best, home crowds mildly help players on the home team focus while distracting players on the road team.

A bigger factor to why playing a game at home benefits the home team is that referees tend to make calls in favor of the home team. Within the last two minutes of all NBA games

(regular season and playoffs) from March, 2015 to May, 2018, home teams benefited from 3125 correct calls, 974 missed calls (e.g. not calling a foul on a player on the home team when a foul was committed), and 118 incorrect calls (e.g. calling a foul on a player on the opposing team when no foul was committed) while road teams benefited from 2838 correct calls, 959 missed calls, and 106 incorrect calls³ (Roeder, 2018). In each category, home teams benefited more frequently than road teams, suggesting that a home crowd impacts the decisions referees make on the court. This makes sense considering how crowds tend to boo/taunt the referees whenever the road team benefits from an incorrect call or a missed call (and sometimes a correct call if, for instance, a player of the home team commits a foul that is hardly noticeable). This likely encourages referees to make more calls favoring the home team and less calls favoring the road team in order to please the crowd, which can directly influence the outcome of a game.

In fact, a large portion of games in the NBA are close games. For example, in the 2017-2018 regular season, on average, about 19 out of the 82 games each team played were decided by 5 points or less (“Margins and Comebacks,” 2018). In such games, the last two minutes are often crucial in determining the outcome. Hence, the tendency for referees to favor the home team in the last two minutes of every game can directly explain why home teams win more games than road teams.

The fact that overall, home teams win more games than road teams in the NBA can be explained, in part, by how crowds help the home team focus while distracting the road team and how referees make more calls favoring the home team. Other factors are likely in play but hard to measure. For instance, players on the home team may know of the intricacies of their

³ Even though a basketball game consists of 48 minutes of gameplay (unless if there is overtime) and this data is only for the last two minutes of every game, the sample size is sufficiently large since all games over a 3-year period are included. Hence, it would not be unreasonable to claim that in general, referees tend to favor the home team.

homecourt, providing them with a small advantage over players on opposing teams who are likely to be less-experienced with playing on that court. Furthermore, players may feel more determined to win a home game to please the crowd/fans. On the other hand, players may feel less determined to win a road game since hardly anyone in the arena will be supporting their team.

Hypothesis and Mechanism

In this paper, a team was classified as below average, average, or above average based on its average margin of victory (also known as a team's overall efficiency) in the regular season. A team's margin of victory for a game is the number of points that team wins by that game. If the team loses that game, then its margin of victory is negative for that game. A team was classified as below average if its average margin of victory was less than -2 in the regular season, average if it was between -2 and 2 inclusive, and above average if it was greater than 2.⁴

This study hypothesizes that average teams benefit significantly more from homecourt advantage than below average teams and above average teams. Of the three groups, average teams are the most likely to perform inconsistently. After all, statistically speaking, it is highly unlikely that over the course of 82 games, a team with an average margin of victory of 1 won every game by a point. It is much more likely that, for instance, a team with an average margin of victory of 1 to win slightly more than half its games.

On the other hand, below average teams likely lose most of their games where several of their losses are blow-outs. For example, a team with a margin of victory of -7 likely lost a considerable portion of their games by at least 10 points and won very few games. Hence, these teams are likely to be consistently outplayed by their opponents. After all, statistically speaking,

⁴ See the methodology section for an explanation as to why the teams were split in that way

it is highly unlikely that a team with a margin of victory of -7 lost a small number of games by a large margin (e.g. lost 5 out of 82 regular season games by more than 50 points) and won the rest of their games.

Above average teams likely won most of their games where several of their wins are blow-outs. For example, a team with an average margin of victory of 7 likely lost very few games and won a considerable portion of games by at least 10 points. These teams are likely to consistently outplay their opponents.

Average teams likely perform inconsistently (i.e. they sometimes outplay their opponents and sometimes get outplayed by their opponents), so they may have some talented individuals on their rosters and/or players who can play well as a team. However, they cannot always rely on talent and/or teamwork from their players to win games. Hence, having a home crowd cheering them on would help players on these teams remain focused during games, which can directly translate to more wins. For instance, an average team trailing during a home game can be influenced by an encouraging crowd to not lose hope in staging a comeback. Players on that team would remain motivated to use their individual and teamwork skills in an effort to fight back as opposed to resigning to a loss. Referees influenced by a home crowd can further help these teams by giving them extra free throws, which can directly translate into more points and ultimately wins.

Below average teams are likely consistently outplayed by their opponents, so they likely possess very little, if any, talented players and/or players who can play well as a team. Even if a home crowd cheers them on, these teams still have fundamental problems that prevents them from winning many games. For instance, if players on a team cannot accurately shoot the ball, no matter how much a home crowd helps its players remain concentrated on a game, they are still

likely to miss most of their shots. Also, if referees influenced by a home crowd awards these teams with more free throws, these teams are not guaranteed to benefit from that. This is true especially if they are filled with players without much talent who struggle to shoot accurately. Hence, this study hypothesizes that the effect of homecourt advantage for average teams is significantly greater than the effect of homecourt advantage for below average teams.

Above average teams consistently outplay their opponents, so they likely possess a large amount of talented individuals on their rosters and/or players who can play well together. Due to their innate strengths, having a home crowd cheering them on is unnecessary for them to win games. For example, players who consistently shoot the ball accurately will continue to accurately shoot the ball regardless as to whether or not a home crowd is cheering them on. They can still benefit, however, if referees influenced by a home crowd awards them with more free throws. Since above average teams benefit from homecourt advantage in less ways than average teams, it is hypothesized that the effect of homecourt advantage would be significantly greater for average teams than for above average teams.

Data and Methodology

For this research, five regular seasons were analyzed from the 2013-2014 season to the 2017-2018 season. The data is completely reliable as it was taken from both the NBA's official website and ESPN, a television channel that frequently broadcasts NBA games.⁵

A team's overall strength was measured by its average margin of victory (or efficiency) throughout a regular season (82 games). A team was considered below average if its average margin of victory was less than -2, average if its average margin of victory was between -2 and 2 inclusive, and above average if its average margin of victory was greater than 2. Teams were

⁵ See the codebook for access to raw data.

split in this way to create three groups of nearly identical sizes. 150 teams were observed in total, and 50 were below average, 49 were average, and 51 were above average.

Two indicator variables were created to measure a team's overall strength: "Below Average" and "Above Average". Below average teams took on the value of 1 for the former variable and 0 for the latter variable, average teams took on the value of 0 for both variables, and above average teams took on the value of 0 for the former variable and 1 for the latter variable.

To measure how much a team benefits from homecourt advantage, two different mechanisms were used. One measure was to subtract a team's average margin of victory on the road from a team's average margin of victory at home. In general, teams win more games at home than on the road, so the greater the difference, the greater a team benefits from homecourt advantage. The second measure was to subtract a team's win percentage on the road from a team's win percentage at home. All win percentages are on a scale from 0 to 1 where 0 means that a team lost all of its games. Similarly, the greater the difference, the greater a team benefits from homecourt advantage. Both measures were used to see if they complemented each other. For instance, in general, teams with a significantly larger average margin of victory at home than on the road should also have a significantly larger win percentage at home than on the road.

Note that subtracting a team's average road margin of victory from a team's average home margin of victory as well as subtracting a team's road win percentage from its home win percentage does not introduce biases. This is because each team plays 41 road and home games during the regular season. Furthermore, each team plays every other team in the NBA during the regular season at least twice during the regular season (and at most four times) where at least one game is played at home and one game is played on the road.⁶ Therefore, the difficulty of each

⁶ See <https://stats.nba.com/teams/traditional/> to access raw data as to who each team plays during regular seasons.

team's regular season schedule, in terms of the opponents they play, are relatively similar to each other.⁷

A control variable used in the models for this paper is the average attendance to a team's home games, or the average number of people who physically show up to watch a team play a game at home. The amount of people present at home games can affect how much a team benefits from homecourt advantage. After all, a team would not really benefit from a playing a game at home if it plays in an empty arena. Furthermore, in general, more people in attendance leads to louder arenas, which can increase the amount of encouragement a team receives from fans as well as the tendency for referees to favor the home team. Additionally, the attendance of a team's home games is likely to be positively correlated with a team's overall strength. More people showing up to home games can be an indication that the home team is a rather strong team, and fans enjoy watching them outplaying their opponents. Also, more attendance to a team's home games can lead to larger margin of victories at home, which increases that team's overall strength.

Data for a team's average margin of victory, average margin of victory at home, average margin of victory on the road, overall home win percentage, and overall road win percentage was taken from the NBA's official website.⁸ Data for average attendance of home games for each team was taken from ESPN.⁹

Six different multivariate linear regressions were performed to analyze the data. The first three regressions were based off of margin of victory. Note that a team's overall strength was

⁷ Team A can still have a more difficult regular season than Team B if for instance, Team A plays Team C 3 times but Team B plays Team C 2 times and Team C is an above average team during that regular season. However, this is not a major issue since each team plays a sufficiently large number of games each regular season.

⁸ See <https://stats.nba.com/teams/traditional/> to access data for all teams in both the playoffs and the regular season dating back to the 1996-1997 season, which is updated daily.

⁹ See <http://www.espn.com/nba/attendance> to access data regarding how many people attend games hosted by each team, on average. Data is available dating back to the 2000-2001 season.

measured in the form of two indicator variables: “Below Average” and “Above Average.” The first regression (shown in Table 1) had a team’s overall strength and average attendance to home games as independent variables and the difference between a team’s average home and road margin of victories as the dependent variable. The second regression (shown in Table 2) had a team’s overall strength as the independent variable and a team’s average margin of victory on the road as the dependent variable. The third regression (shown in Table 3) had a team’s overall strength and average attendance to home games as independent variables and a team’s average margin of victory at home as the dependent variable.

The last three regressions were based off of win percentages. The fourth regression (shown in Table 4) had a team’s overall strength and average attendance to home games as independent variables and the difference between a team’s home win percentage and road win percentage as the dependent variable. The fifth regression (shown in Table 5) had a team’s overall strength as the independent variable and a team’s win percentage on the road as the dependent variable. The sixth regression (shown in Table 6) had a team’s overall strength and average attendance to home games as independent variables and a team’s win percentage at home as the dependent variable.¹⁰

If support for this study’s hypothesis is found, then this study would find that the “Below Average” and “Above Average” variables would have statistically significant and negative coefficients in Tables 1 and 4. That would signify that average teams benefit the most from homecourt advantage.

Furthermore, if the hypothesis is supported, this study would find that the coefficient of the “Above Average” variable in Table 2 and Table 3 to be significantly positive since above

¹⁰ See the results section for the six tables

average teams perform better than average teams, in general. Additionally, the coefficient of the “Above Average” variable in Table 3 would be substantially lower than the coefficient of that variable in Table 2 since that would indicate that average teams benefit more from homecourt advantage than above average teams. For the same reasons, this study would find the “Above Average” variable in Tables 5 and 6 to be significantly positive, but the coefficient of that variable in Table 6 would be substantially lower than the coefficient of that variable in Table 5 if the hypothesis is supported.

Lastly, if the hypothesis is supported, this study would find that the coefficient of the “Below Average” variable in Table 2 and Table 3 to be significantly negative since below average teams perform worse than average teams, in general. Also, the coefficient of the “Below Average” variable in Table 3 would be substantially lower (more negative) than the coefficient of that variable in Table 2 since that would indicate that below average teams do not benefit as much from homecourt advantage as average teams do. For the same reasons, this study would find the “Below Average” variable in Tables 5 and 6 to be significantly negative, but the coefficient of that variable in Table 6 would be substantially lower than the coefficient of that variable in Table 5 if the hypothesis is supported.

Regular Season Data and Playoffs Data

Note that only data for the regular season would be analyzed. It is important to note that the playoffs can be a different atmosphere than the regular season in the sense that teams generally devote more effort in a playoff game than a regular season game. This is because they must win four out of seven games to avoid elimination, so players are more likely to play with more desperation in the playoffs (e.g. be more willing to physically work their bodies to the limit to score more points). However, significantly less games are played in the playoffs as opposed to

the regular season, so it would be difficult to measure how much a team benefits from homecourt advantage if a team plays at most 28 games. In fact, the number is likely much less than that since it is unlikely for a team to play 7 games in all four rounds of the playoffs. In fact, half of all playoffs teams lose in one round, so they play at most a total of 7 games.

Furthermore, due to the way matchups work in the playoffs, there would be biases in the difficulty of the opponents each team in the playoffs face. For instance, an 8-seed would face a 1-seed in the playoffs. An 8-seed, which is likely to be an average team, may benefit significantly from playing games at home, however, since they are playing a 1-seed (likely an above-average team), the 8-seed would still likely lose all of their home games and road games against the 1-seed. From that perspective, it would appear that the team that was the 8-seed does not benefit from home crowds since they lost all of their games at home and on the road where in reality, they simply faced a tough opponent.¹¹

Furthermore, the percentage of all games the home team won in the playoffs from the 1999-2000 season to the 2016-2017 season (64.5%) is relatively similar to the percentage of all games the home team won in the regular season in the same time period (59.5%), especially after considering the fact that teams with better regular season records play more home games than teams with worse regular season records (Paine, 2017). Hence, analyzing regular season data is sufficient in order to determine how below average, average, and above average teams perform at home and on the road in the playoffs, holding other factors constant.

¹¹ See the appendix for details of how the playoffs are structured.

Analysis of Results

Table 1: Effect of Overall Efficiency on Homecourt Advantage (Measured by the Difference Between Home and Road Efficiency)

	<i>Dependent variable:</i>	
	Home Efficiency - Road Efficiency	
Above Average	0.093	(0.544)
Below Average	-0.732	(0.532)
Average Attendance (1000s)	0.161	(0.127)
Constant	2.512	(2.271)
Observations	150	
R ²	0.043	
Adjusted R ²	0.024	
Residual Std. Error	2.614 (df = 146)	
F Statistic	2.205* (df = 3; 146)	
<i>Note:</i> *p<0.1; **p<0.05; ***p<0.01		

As shown in Table 1, both the coefficients of the “Above Average” and “Below Average” variables are not significant ($p > 0.05$). This indicates that the effect of homecourt advantage measured by the difference between a team’s average margin of victory at home and on the road is not significantly impacted by that team’s overall strength. Hence, this table contradicts the hypothesis that average teams benefit significantly more from homecourt advantage than below average and above average teams.

Furthermore, from Table 1, the coefficient of the average attendance variable (measured in 1000s of people) is not significant ($p > 0.05$). This suggests that an increase in the number of people who attend a home game does not significantly increase the effect of homecourt advantage for the home team. This finding was unexpected since it would make sense that a team would benefit more from homecourt advantage if more people were in attendance, so this could be a topic for future research. One possible explanation for this finding is that the average number of people in attendance for each team’s home games was at least 10,000. While there is a large difference between 0 people in attendance and 10,000 people in attendance in terms of how

much encouragement home teams would receive from fans, there is not much difference between 10,000 people and 20,000 people in attendance. For instance, an arena filled with 20,000 people would likely not be much louder than an arena filled with 10,000 people so the amount of influence the crowd has on the game would be relatively the same in both cases.

Table 2: Effect of Overall Efficiency on Road Efficiency

	<i>Dependent variable:</i>
	Road Efficiency
Above Average	4.547*** (0.464)
Below Average	-5.061*** (0.466)
Constant	-2.443*** (0.331)
Observations	150
R ²	0.747
Adjusted R ²	0.743
Residual Std. Error	2.320 (df = 147)
F Statistic	216.689*** (df = 2; 147)
<i>Note:</i>	*p<0.1; **p<0.05; ***p<0.01

Table 3: Effect of Overall Efficiency on Home Efficiency

	<i>Dependent variable:</i>
	Home Efficiency
Above Average	4.545*** (0.515)
Below Average	-5.739*** (0.505)
Average Attendance (1000s)	0.243** (0.121)
Constant	-1.365 (2.153)
Observations	150
R ²	0.766
Adjusted R ²	0.761
Residual Std. Error	2.478 (df = 146)
F Statistic	159.535*** (df = 3; 146)
<i>Note:</i>	*p<0.1; **p<0.05; ***p<0.01

Tables 2 and 3 further contradict the hypothesis that average teams benefit more from homecourt advantage than above average teams and below average teams. Expectedly, the

coefficients of the “Above Average” variable are positive and significant in Tables 2 and 3 ($p < 0.05$). This indicates that above average teams perform significantly better than average teams on the road and at home. However, the coefficient for the “Above Average” variable in Table 2 is not substantially different from the coefficient for that variable in Table 3. In fact, holding other factors constant, the predicted home margin of victory for an average team is about 1.1 points higher than its predicted road margin of victory. The same can be said for an above average team. This suggests that average teams and above average teams benefit similarly from homecourt advantage.

Also, as expected, the coefficient of the “Below Average” variable is negative and significant in Tables 2 and 3 ($p < 0.05$). This suggests that below average teams perform significantly worse than average teams both on the road and at home. However, the coefficient for the “Below Average” variable in Table 2 is not substantially different from the coefficient of that variable in Table 3. Holding other factors constant, below average teams have an average road margin of victory about 5.1 points lower than that of average teams and an average home margin of victory about 5.7 points lower than that of average teams. This suggests that at best, average teams benefit slightly more from homecourt advantage than below average teams.

Even though Table 3 finds that an increase in average attendance to home games significantly increases the home team’s expected average margin of victory ($p < 0.05$), the coefficient of the “Average Attendance” variable is not substantially large. Approximately an extra 4000 people attending a home game increases the expected margin of victory for the home team by about 1 point. Hence, at best, the amount of people in attendance of an NBA game marginally increases the home team’s average margin of victory.

Table 4: Effect of Overall Efficiency on Homecourt Advantage (Measured by the Difference Between Home and Road Win Percentages)

	<i>Dependent variable:</i>
	Home Win Percentage - Road Win Percentage
Above Average	0.011 (0.019)
Below Average	-0.033* (0.019)
Average Attendance (1000s)	0.0003 (0.004)
Constant	0.165** (0.080)
Observations	150
R ²	0.041
Adjusted R ²	0.021
Residual Std. Error	0.092 (df = 146)
F Statistic	2.066 (df = 3; 146)
<i>Note:</i> *p<0.1; **p<0.05; ***p<0.01	

Table 4 complements the results of Table 1. Both the coefficients for the “Above Average” and “Below Average” variables are not significant ($p>0.05$). Hence, the effect of homecourt advantage measured by the difference between a team’s home win percentage and road win percentage is not significantly impacted by if a team is below average, average, or above average, further contradicting this study’s hypothesis. Also, the “Average Attendance” variable is not significant ($p>0.05$), so Table 4 supports the idea that more people in attendance to an NBA game does not significantly benefit the home team.

Table 5: Effect of Overall Efficiency on Road Win Percentage

	<i>Dependent variable:</i>
	Road Win Percentage
Above Average	0.142*** (0.017)
Below Average	-0.166*** (0.017)
Constant	0.426*** (0.012)
Observations	150
R ²	0.695
Adjusted R ²	0.691
Residual Std. Error	0.085 (df = 147)
F Statistic	167.312*** (df = 2; 147)
<i>Note:</i> *p<0.1; **p<0.05; ***p<0.01	

Table 6: Effect of Overall Efficiency on Home Win Percentage

	<i>Dependent variable:</i>
	Home Win Percentage
Above Average	0.142*** (0.018)
Below Average	-0.193*** (0.017)
Average Attendance (1000s)	0.009** (0.004)
Constant	0.430*** (0.073)
Observations	150
R ²	0.754
Adjusted R ²	0.749
Residual Std. Error	0.084 (df = 146)
F Statistic	149.311*** (df = 3; 146)
<i>Note:</i>	*p<0.1; **p<0.05; ***p<0.01

Tables 5 and 6 complements the previous results. Above average teams have a significantly higher road winning percentage and home winning percentage than average teams ($p<0.05$ for the coefficient of the “Above Average” variable in both tables). This indicates that above average teams win more road games and home games than average teams. However, the coefficient for the “Above Average” variable in both tables are identical at 0.142, suggesting that above average teams and average teams benefit similarly from homecourt advantage.

Below average teams have a significantly lower road winning percentage and home winning percentage than average teams ($p<0.05$ for the coefficient of the “Below Average” variable in both tables). This suggests that below average teams win less road and home games than average teams. The difference in the coefficient of the “Below Average” variable in Table 5 from that of Table 6 is not substantially high (about 0.03). Hence, at best, below average teams benefit slightly less from homecourt advantage than average teams.

Lastly while the coefficient of the “Average Attendance” variable in Table 6 is significant ($p<0.05$), it is not substantially large. If the average number of people attending a

team's home games increases by 1000 people, the expected win percentage of the home team increases by about 0.9%. Hence, the amount of people in attendance to home games have a very minimal impact on the home team's chances of winning a game.

Overall, the linear regressions contradict this study's hypothesis that average teams benefit significantly more from homecourt advantage than below average and above average teams. It is important to note that even though teams over the course of five regular seasons were analyzed, the observations are independent by season. How one team performs in one season does not significantly impact how another team performs in the same season. This is because teams play 82 games against other teams in the regular season, and a team can play another team at most 4 times ("How the NBA Schedule is Made," n.d.).

However, the observations are not independent by team. The analysis does not take into consideration how teams can be very similar to each other from one season to another. For example, teams can keep certain players and coaches on their rosters between seasons. Hence, it is possible that the significance of the variables is impacted by the lack of independence of teams within the data.

Conclusion

Overall, this study contradicts the hypothesis that above average and below average teams benefit significantly less from homecourt advantage than average teams. After controlling for the average number of people in attendance of home games for each team, the effect of homecourt advantage was found to not significantly depend on a team's overall strength. A likely explanation for this is that teams of all levels benefit similarly when a home crowd, for instance, prevents the home team from becoming demoralized when facing a large deficit. Additionally, teams of all levels can take advantage of referees favoring them by scoring more

points (either through extra free throws or possessions with the ball). Just because a team was below average in this study does not necessarily mean that its players struggle with shooting free throws. They can struggle for other reasons such as playing defense or their tendencies to allow other teams to steal the ball. Hence, players on below average teams can be just as likely to make free throws as players on average and above average teams.

Furthermore, attendance of home games was found to have very little, if any, impact on how much a team benefits from homecourt advantage. Finding the reason for this can be a topic for future research. One possible explanation is that each observed team has an average of at least 10,000 people show up to watch home games. Due to an already high level of attendance, a further increase in attendance of home games would do little to benefit the home team.

There are implications with this study. Sometimes, teams ponder on the decision to rest players (often the most talented ones) towards the end of a regular season to avoid the risk of injury. However, since the effect homecourt advantage is significant and does not greatly differ between teams of different overall strengths, it might be advantageous for teams to decide not to rest players towards the end of regular seasons in order to secure more wins, ultimately giving them the opportunity to play more home games in the playoffs. This is likely the better decision especially if teams deem the risk of injury to a particular player to be low.¹²

There are many avenues for future research. Future studies can account for the potential that same teams in different seasons are not independent observations and see if the same findings hold. Other studies can conduct the same analysis except on other basketball leagues

¹² On the other hand, if, for instance, a player is recovering from a particular injury, then it would likely be better to rest that player more games as opposed to risk that player aggravating that injury.

(e.g. college basketball). Furthermore, researching how the effects of playing a game at home differ per team can be done on other sports such as baseball, football, hockey, and soccer.

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Appendix

The NBA is split into two conferences, the Western Conference and the Eastern Conference, with each conference containing 15 teams. At the beginning of each season, each team plays a total of 82 games against other teams in the NBA. Of the 82 games, 41 are played at home and 41 are played on the road. Each team plays at least two games against every other team in the league, and each team plays at least one game against every other team at home and at least one game against every other team on the road. The period where each team plays 82 games is called the regular season, and it generally lasts six months from October to April.¹³

At the completion of the regular season, the top eight teams of each conference play in the playoffs. Seeding of each conference is determined by performance in the regular season (i.e. the more wins a team has in the regular season, the higher that team is seeded in its respective conference). The playoffs consists of four rounds where in each round, each team plays a best-of-seven series against another team. Only teams that win a best-of-seven series remain in the playoffs. In the first three rounds, teams can only play against teams of their respective conference. In the first round, the 1st seed plays against the 8th seed, the 2nd seed plays against the 7th seed, the 3rd seed plays against the 6th seed, and the 4th seed plays against the 5th seed. In the second round, the winner of the 1-8 matchup plays the winner of the 4-5 matchup and the winner of the 2-7 matchup plays the winner of the 3-6 matchup. In the third round, the two remaining teams of each conference play against each other. In the last round, known as “The Finals,” the remaining team in the Western Conference plays against the remaining team of the Eastern Conference, and the winner of that series is declared the champion of the season.¹⁴

¹³ See <https://www.nbastuffer.com/analytics101/how-the-nba-schedule-is-made/> for more details of how regular season games in the NBA are scheduled.

¹⁴ See Figure 1 for a sample playoffs bracket

In every best-of-seven series in the playoffs, the team with the better regular season record gets to play four out of the seven games at home (the first, second, fifth, and seventh game) and the other team plays the remaining three games at home. Thus, in a series, the team with the better regular season record benefits more from homecourt advantage since that team gets to play most of the games in that series at home.

2017-2018 Playoffs Bracket



Figure 1: This is the NBA playoffs bracket for the 2017-2018 season. Every box represents how a team performed in a series. In each box, on the far right is the team's seed, followed by the team's logo, then the team's abbreviated name, and the number of games the team won in that particular series. The Golden State Warriors (GSW) were the champions of the 2017-2018 playoffs. Picture is from <https://www.landof10.com/big-ten/2017-nba-finals-scores-results-bracket-nba-playoffs>