# Measuring the Impact of Superstars on Fan Attendance in the NBA

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**Abstract**

In this paper, we seek to examine how many additional fans, on average, the presence of an NBA star attracts to home and away games, using data from the 2014-2015 to the 2018-2019 regular seasons. We classify an NBA star into two different categories: players voted to be an All-Star starter and players voted to be an All-Star reserve (i.e. bench player). While we do not find large effects overall, we find that the effects of NBA All-Star starters are much greater than that for reserves. We also found greater effects for All-Star starters at home games, as opposed to away games, which ran contrary to our initial hypothesis. We also analyze the effect of the last five players to win a regular season Most Valuable Player (MVP) award: James Harden, Russell Westbrook, Stephen Curry, Kevin Durant, and LeBron James. Although our overall analysis fails to find large effects, we find that one player has a very strong superstar effect for both home and away games: LeBron James.

## Introduction

We postulate that the appeal of watching a star could have an effect on how many fans are attracted to particular games -- having a well-known, famous player on the court would draw in a larger audience. We also hypothesize that superstar effects on fan attendance will be stronger at away games. Fans in the home cities of superstars may become inured to the excitement of watching them, because they know they will have many opportunities to do so over the season. In contrast, fans in other cities only have the one or two games when the star is in town. This scarcity of star appearances could then drive up demand for those tickets. Furthermore, there could be casual fans who are not as invested in basketball as a sport as they are in seeing a famous player. Lastly, for fans that do not have the budget to attend as many basketball games as they would like, they might decide to allocate that budget to games where they get to see a visiting superstar.

## Literature Review of the Superstar Effect

The superstar effect is a phenomenon that can influence consumer preferences. The superstar effect occurs when a relatively small number of workers earn disproportionately large payments of their services, because large numbers of consumers demand their services. There are two primary theories that attempt to explain this effect.

In his seminal 1981 paper, Rosen introduced his model of superstars, positing that performers with only marginally more talent than their peers attract a disproportionately larger audience. Thus, it follows that sports teams with a star on their team should attract larger audiences when their star is playing. Adler (1985) contributed his own analysis of superstars. Rather than skill or talent being the determining factor, he postulated that popularity drives the increase in fans. In

other words, the difference is in their media fame, not in their different abilities. Under his model, people who share common knowledge about a performer creates the positive externality of better social interactions; thus, the outcome is fans flocking to a particular superstar. The superstar effect in sports has primarily been explored from a labor market perspective, especially from the perspective of owners or general managers (Lucifora and Simmons, 2003; Franck and Nüesch, 2007; Bryson et al., 2014). However, consumer preferences have not yet been well defined in this context.

In the case of professional sports, the superstars seem to embody both Rosen and Adler's models -- they may be marginally more talented, but their sheer popularity among fans also propels them to the height of their fame. Although value to a team and talent are somewhat difficult to measure, fans are likely attracted to the action of watching players score points, which increases their popularity (and thus, will be paid more by their teams). This view was echoed by Winfree, Jason and Rodney, who found that 64% of a player's salary can be explained by how many points he scores per game (2013).

The superstar effect of Michael Jordan, otherwise known as the Jordan Effect, has also been previously studied. Economic models predict that superstar players generate externalities that increase attendance and other revenue sources beyond their individual contributions to team success. The results show that higher home and away attendance was associated with superstar players; Humphreys and Johnson (2017) found that Michael Jordan generated an additional 5,021/5,631 fans at home/away games. In terms of gate receipts, the Jordan Effect is estimated to be $30.5 million on the road and $135 million at home, for a total overall impact of $165.5 million (Johnson, Urrestra, and Smith, 1998), not to mention all the revenue from

television, licensing, and merchandising. However, it has been 16 years since Jordan played his final game for the Wizards and with new trends in the NBA such as high scoring and the formation of "super teams," we wish to examine the effect of current superstars on attendance.

**Overview of Model and Data**

We collected data from the NBA official website, Basketball Reference, and ESPN, analyzing regular season data from the 2014-2015 to 2018-2019. To measure the market size of each team's city, we used 2016 population estimates from *Demographia World Urban Areas* (15th edition).

We examined both All-Star starters and All-Star reserves, as these players have demonstrated popularity for their performance on the court. Every year, there are 10 All-Star starters determined by voting from fans, the media, and other players in the league. Fourteen additional players are chosen to an All-Star reserve as determined by voting from the NBA coaches.[1] We generated two different regression models: one for average home game attendance, and another for average road game attendance.

The regression average home game attendance is:

$$A_H = \beta_1 + \beta_2(S) + \beta_3(R) + \beta_4(W) + \beta_5(log_2(P))$$

For each team, we regressed average attendance for home games ($A_H$) on the number of regular season home games an All-Star starter on the team played in ($S$) and on the number of regular season home games an All-Star reserve played in ($R$), controlling for win percentage in

[1] See "Explained: How NBA All-Star Voting Works" for more detailed information as to how NBA All-Stars are selected

the regular season (*W*) and population of the team's home city (*P*). Note that by default, teams without an All-Star starter/reserve were recorded to have a 0 for the respective variable.

All-Star starters and reserves are based off of voting from the previous year. For example, for teams in the 2018-2019 season, players voted to be an All-Star in 2018 were considered. If a player was voted to be an All-Star (starter or reserve) and then could not participate in the All-Star game due to injury and was replaced by another player, then both players are considered All-Stars for the corresponding season. If a player was traded, we used the total number of games they played for both teams[2]. The variables *S* and *R* stacked; for example, if a team has two All-Star starters on its roster, then the number of home games that each player played was summed.

We controlled for the team's winning percentage because we wanted to examine whether, if given two teams of equal talent and strength, the team with an extra All-Star starter and/or reserve attracted significantly more fans. We controlled for the team's market size (i.e. population) because teams located in more densely populated cities are more likely to attract more fans to their home games. Furthermore, these teams are more likely have more money to sign All-Star starters/reserves in free agency.

The regression for average road game attendance is:

$$A_R = \beta_1 + \beta_2(S) + \beta_3(R) + \beta_4(W) + \beta_5(log_2(P))$$

[2] For example, if an All-Star starter played 20 home games for Team A, was then traded midseason to Team B and played 21 home games for that team, then Team A will have 21 home games where it played an All-Star starter, and Team B will have 20 such games, for a total of 41 games.

For each team, we regressed average attendance for road games ($A_R$) on the number of regular season away games an All-Star starter on the team played in ($S$) and on the number of regular season away games an All-Star reserve played in ($R$), controlling for win percentage in the regular season ($W$) and the population of the team's home city ($P$). We still control for the team's market size in this model because teams located in more densely populated cities could have more fans willing to travel to away games.

Furthermore, we analyzed the impact of specific individual players on attendance to home/away games in the regular season (from 2014-2015 to 2018-2019). In particular, we examined the last five players to win a regular season Most Valuable Player (MVP) award: James Harden, Russell Westbrook, Stephen Curry, Kevin Durant, and LeBron James. We created two regressions (for home and away games) measuring their effects on game attendance:

$$A = \beta_1 + \beta_2(SC) + \beta_3(RW) + \beta_4(KD) + \beta_5(LJ) + \beta_5(JH) + \beta_7(W) + \beta_8(log_2(P))$$

For each team, we regressed average home attendance ($A$) on the number of regular season home games that Stephen Curry ($SC$), Russell Westbrook ($RW$), Kevin Durant ($KD$), LeBron James ($LJ$), and James Harden ($JH$) played in. By default, teams that do not have any of these players were recorded to have a 0 in all of those variables. We controlled for the team's win percentage ($W$) and market size ($P$) for the same reasons as the models with the All-Star starters/reserves. This regression was repeated for average attendance to away games.

**Results and Discussion**

Table 1: Effect of Stars on Average Home Game Attendance

| | *Dependent variable:* |
|---|---|
| | Average Home Game Attendance |
| Starters (Home Games Played) | 17.258** |
| | (6.833) |
| Reserves (Home Games Played) | 3.608 |
| | (5.193) |
| Team Win Percentage | 3,882.194*** |
| | (1,015.478) |
| Log of City Population (Base 2) | 425.058*** |
| | (111.050) |
| Constant | 6,325.643** |
| | (2,580.321) |
| Observations | 150 |
| $R^2$ | 0.283 |
| Adjusted $R^2$ | 0.263 |
| Residual Std. Error | 1,509.697 (df = 145) |
| F Statistic | 14.322*** (df = 4; 145) |
| *Note:* | *p<0.1; **p<0.05; ***p<0.01 |

From Table 1, after controlling for a team's win percentage and market size, an All-Star starter increases the average attendance to home games by about 17 people for each additional game in which he plays ($p$<0.05). While the coefficient for the number of games an All-Star reserve plays in was positive, it was not statistically significant ($p$>0.05).

These results offers mild support for the superstar effect in the NBA. Given two teams of equal skill level (W) and playing in cities with similar populations, the team with an All-Star starter will have a greater home crowd. Since each team plays 41 home games, the difference can be up to about 708 people (assuming that the player plays in all of the home games). This increase, however, is not very substantial considering that the average game attendance for all teams from the 2014-2015 season to the 2018-2019 season was 17,878.

Table 2: Effect of Stars on Average Road Game Attendance

| | *Dependent variable:* |
|---|---|
| | Average Road Game Attendance |
| Starters (Road Games Played) | 10.171*** |
| | (1.665) |
| Reserves (Road Games Played) | 2.543** |
| | (1.235) |
| Team Win Percentage | 401.132* |
| | (239.534) |
| Log of City Population (Base 2) | 70.509*** |
| | (26.179) |
| Constant | 15,966.580*** |
| | (608.161) |
| Observations | 150 |
| $R^2$ | 0.370 |
| Adjusted $R^2$ | 0.353 |
| Residual Std. Error | 356.528 (df = 145) |
| F Statistic | 21.307*** (df = 4; 145) |
| *Note:* | *p<0.1; **p<0.05; ***p<0.01 |

From Table 2, after controlling for a team's win percentage and market size, average fan turnout for a road game increases by about 10 people for each additional game an All-Star starter plays in. That number is only three for All-Star reserves. The coefficient for starters and reserves are statistically significant ($p<0.01$ and $p<0.05$, respectively). However, neither of these coefficients are very substantial. Since each NBA team plays 41 road games in the regular season, holding win percentage constant, having an All-Star starter that plays in all road games will increase average turnout to such games by about 417 fans (note that this a smaller effect than if a starter plays in all home games as found from Table 1). Having an All-Star reserve that plays in all road

games increases average turnout to those games by about 104 fans. None of these values are substantially, again considering average attendance of 17,878 people.

Table 3: Effect of MVP's on Average Home Game Attendance

| | *Dependent variable:* |
|---|---|
| | Average Home Game Attendance |
| Stephen Curry | −8.017 |
| | (24.987) |
| Russell Westbrook | 18.100 |
| | (19.427) |
| Kevin Durant | 6.945 |
| | (27.784) |
| LeBron James | 60.970*** |
| | (18.830) |
| James Harden | −30.572* |
| | (17.609) |
| Team Win Percentage | 5,210.558*** |
| | (927.703) |
| Log of City Population (Base 2) | 564.681*** |
| | (113.915) |
| Constant | 2,813.802 |
| | (2,642.064) |
| Observations | 150 |
| $R^2$ | 0.324 |
| Adjusted $R^2$ | 0.290 |
| Residual Std. Error | 1,481.984 (df = 142) |
| F Statistic | 9.703*** (df = 7; 142) |
| *Note:* | *p<0.1; **p<0.05; ***p<0.01 |

While Table 1 suggests that star players, in general, do not substantially impact average home game attendance, individual players can have such an impact. Table 3 shows the effect of each of the previous five players to win a regular season MVP award on home game attendance. Controlling for *W* and *P*, Stephen Curry, Russell Westbrook, Kevin Durant, and James Harden do not significantly impact their teams' average home game attendance ($p>0.05$ for each).

However, this does not hold for LeBron James. LeBron playing in one additional game at home increases his team's average home game attendance by about 61 people ($p<0.01$). Thus, if he plays in every home game in the regular season, his team's average home game attendance will increase by about 2,500 people, a rather substantial increase. It is important to note that LeBron James was an All-Star starter every year from 2014 to 2018. Therefore, the results from Table 3 indicates that much of the reason why All-Star starters significantly impacted average home game attendance (shown in Table 1) can be attributed to LeBron James.

Table 4: Effect of MVP's on Average Road Game Attendance

| | *Dependent variable:* |
|---|---|
| | Average Road Game Attendance |
| Stephen Curry | 19.475*** |
| | (5.461) |
| Russell Westbrook | 14.964*** |
| | (4.294) |
| Kevin Durant | 3.238 |
| | (5.997) |
| LeBron James | 32.742*** |
| | (4.178) |
| James Harden | 1.236 |
| | (3.882) |
| Team Win Percentage | 612.491*** |
| | (198.613) |
| Log of City Population (Base 2) | 111.615*** |
| | (24.422) |
| Constant | 15,035.100*** |
| | (566.399) |
| Observations | 150 |
| $R^2$ | 0.510 |
| Adjusted $R^2$ | 0.486 |
| Residual Std. Error | 317.791 (df = 142) |
| F Statistic | 21.111*** (df = 7; 142) |
| *Note:* | *p<0.1; **p<0.05; ***p<0.01 |

Unlike the results for the effect of MVP players on home games, multiple MVP players have a significant impact on average road attendance. From Table 4, after controlling for a team's win percentage and market size, Stephen Curry, Russell Westbrook, and LeBron James all significantly impact average road game attendance ($p<0.01$ for each of those players). Stephen Curry playing in an additional road game increases average attendance for his team's road games by about 19 people (798 if he plays in all road games). Russell Westbrook playing in an additional road game increases average attendance for his team's road games by about 14 people (614 if he plays in all road games). LeBron James playing in an additional road game increases average attendance for his team's road games by about 33 people (1,342 if he plays in all road games).

Overall, the data from the years we examined indicate that the superstar effect is present and is caused by a handful of individuals in the league. Even among the best of the best (i.e. the last five players voted to be regular season MVP's), only three have any significant impact on road game attendance. In fact, most of the superstar effects found in the data can be explained by LeBron James. When it comes to home games, his impact on attendance is almost double that for road games. Furthermore, he is the only recent MVP to have a significant impact on attendance to home games.

It is important to note that by using aggregate data (i.e. averages for every team for the past five regular seasons) instead of data consisting of every regular season game that was played for the past five regular seasons, each of the models generated in this study have lower explanatory power. In fact, of the four regressions, the model that can explain the most variance in the data was the one regressing average attendance to road games with the previous five

MVPs. Even that model can only explain 51% of the variance in the data. Unlike game-by-game data, we were unable to control for factors such as the strength of the opposing team, the market size of the opposing team, the weather during which each game was held, etc. Seeing whether or not the findings of our analysis still hold using data at the individual game level can be a topic for future research.

**Conclusion**

Our results indicate that the presence of an All-Star starter does increase fan attendance to both home and away games (statistically significantly, but not substantially). The effect of a lesser star (i.e. an All-Star reserve), although weak, was significant on road but not at home. An All-Star starter playing on the road draws fewer fans than at home, running counter to our initial hypothesis.

Even though superstars as a group were not found to substantially increase overall attendance, LeBron James did have a substantial impact on attendance to both home and road games. In fact, he was the only recent MVP award-winner with a statistically significant impact on home game attendance. While two other MVP players did have a significant impact on road game attendance (Stephen Curry and Russell Westbrook), their effect on road game attendance was substantially smaller than LeBron James' impact. Furthermore, LeBron James' impact on home game attendance was almost double of that on road game attendance, further contradicting our hypothesis. This could be due to stronger fan allegiance among the home base of the superstar -- that is, fans feel more loyal to their team and its superstar and want to attend as many games as possible whenever he plays.

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