

Study of Taking Advantage of the Corner 3 Improving the Team's 3-point Efficiency

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Abstract. The corner three plays an important role in many NBA tactics. Players tend to be able to hit 3-pointers at a higher rate from the corner 3-point range, probably because the corner 3-pointer is closer to the rim. However, is the existence of the corner three really meaningful? I thought taking advantage of this position would make the 3-pointer more efficient, but the math proved it couldn't. At the same time, the Kendall coefficient proves that the three-point shooting rate in the corner does not decrease or increase due to the attention of the enemy, and only the three-point shooting rate can directly affect the three-point shooting rate in the bottom corner. I used excel to simulate the relationship between 3-point shooting and corner 3-point shooting for all teams since the 2015-16 season, and used the 2021-22 NBA league average 3-point shooting percentage to simulate the value, trying to make this team The team's corner three-pointer improves the team's three-point efficiency to the greatest extent, but in the end it only improves by two thousandths, which is an extremely low value, which means that the corner three-pointer is not as useful as imagined. The above results provide a reference for understanding three-point shooting rate.

Keywords: 3-point Efficiency; Corner 3.

1. Introduction

From the rise of the Warriors dynasty in 2015, the arrival of the small ball era has been unstoppable. In the current NBA arena, three points have become an indispensable weapon for teams in this era. On the 3-point line, there's this magical position where players can make more 3-pointers: it's the corner 3. But can corner threes really improve a team's three-point shooting percentage?

There may be some innovations in this paper. First of all, the existing research on the relationship between the bottom corner three-point and the three-point efficiency of a team has not received sufficient attention. In-depth analysis of the relationship between the two can provide some reference for improving the three-point efficiency of a team. At the same time, this paper brings some enlightenment for improving the three-point efficiency of the team, and finds that the bottom corner three-point shot is not as useful as imagined.

2. Main Content

Every basketball player and basketball coach knows that there are two factors that affect shooting percentages: how well the players shoot and the defenses they suffer. The shooting level can be intuitively felt through the data, but the defense suffered by the players cannot be directly reflected by the data. But I think if a team takes more shots at a certain position, the coaches will place more emphasis on defending that position. So I think that the percentage of three-pointers in the corner is positively correlated with the defense the player faces, which means that the percentage of three-pointers in the corner is negatively correlated with the percentage of three-pointers in the corner. To test this conjecture, I ran a simulation on all data from the 2015-16 season (the Warriors' championship season) to the current season. The simulation results are as follows:

V1 is the three-point shooting percentage

V2 is the ratio of corner 3-point shots in 3-point shots

V3 is the corner three-point shooting rate

It can be seen from the following simulations that through the analysis of the above three types of data, although the three-point shooting rate and the bottom-corner three-point shooting rate are positively correlated, the bottom-corner three-point shooting rate and the bottom corner three-point

shooting ratio are not very high. obvious correlation. This means that a team's coach usually does not change his defensive strategy because of the change in the proportion of the opponent's corner threes.

Kendall's Tau Correlations

Variable		V1	V2	V3
1. V1	Kendall's Tau B	—		
	p-value	—		
2. V2	Kendall's Tau B	0.041	—	
	p-value	0.387	—	
3. V3	Kendall's Tau B	0.446	0.055	—
	p-value	< .001	0.243	—

Fig 1. Kendall’s Tau Correlations

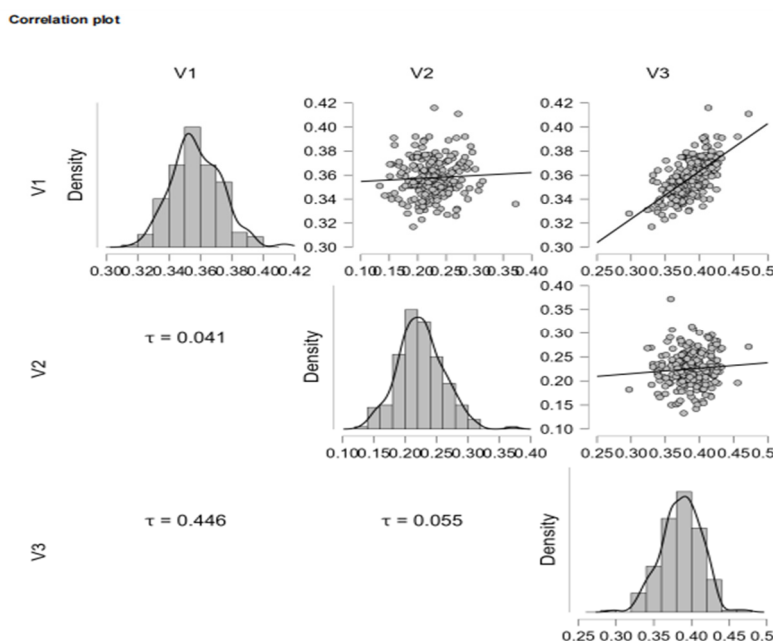


Fig 2. Correlations plot

From this image, I came up with an approximate functional relationship between 3-point percentage and corner 3-point percentage as $y=1.0483x+0.0113$. Next, I'll use the math to figure out how a corner 3 will change a team's 3-point shooting. I select the 2021-22 season's league average three-point shooting percentage of 0.354 as the team's three-point shooting percentage, then its corner three-point shooting percentage is $1.0483 \times 0.354 + 0.0113 \approx 0.371$.

Assuming that the three-point shot from the bottom corner accounts for the x of the total three-point shot, we can get:

Case 1: The corner 3-point percentage is 0.371, which translates to 0.742 for one out of every two shots and 0 for the other. So, I'm assuming a .742 hit rate for corner 3s at this point. At this point, the average score for each three-point team obtained is $3 \times [0.354(1-x) + 0.742x] \approx 3 \times [0.354(1+1.1x)]$.

Case 2: The corner three-pointer missed. The team's average score for each three-pointer at this time is $3 \times [0.354(1-x)]$.

At this time, the probability of occurrence of situation 1 and situation 2 is equal. So, the average score for each three points is $3 \times [0.354(1-x) + 1.1x]$. Find the maximum value of the equation, the maximum value is 1.064, and the original average score of each three points is $3 \times 0.354 = 1.062$. This team has only improved its 3-point percentage by two thousandths, which is useless for a game of basketball.

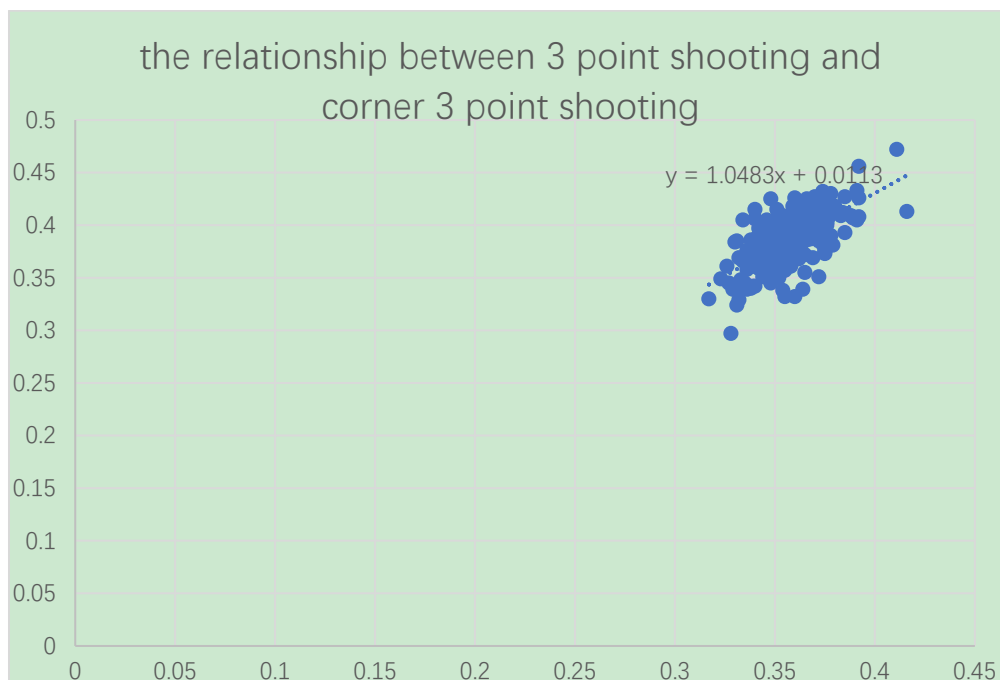


Fig 3. The relationship between 3 point shooting and corner 3 point shooting

3. Conclusion

While players seem to be able to make more shots from the corner 3s, you can't change your team's 3-point percentage by making more sensible corner 3s. Perhaps, this is a disaster for many coaches. In fact, there are many factors affecting the three-point shooting percentage, the coaches should analyze the three-point shooting percentage from all aspects, and then take a variety of ways to improve the shooting percentage.

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