

The Unique Talent of Stephen Curry - A Project in Exploratory Data Analysis

In today's basketball world, the most competitive league in the world has to be the National Basketball Association (NBA) of the U.S. In the past couple decades, there were dominating players such as Michael Jordan and Kobe Bryant who were feared by their opponents for their extraordinary athleticism and their superb physiques. Nowadays, the NBA league has three players that are widely considered to be the greatest of this decade, LeBron James, Kevin Durant, and Stephen Curry.



Curry has one the smallest physiques in the NBA, let alone comparing with James and Durant. So how did he manage to be considered one of the best in the world? In this article, I will be analyzing different aspects of Curry's game, and discuss how each of his unique abilities influence the Golden State Warriors and eventually lead his team to success.

Datasets:

The data file was found on the website <https://data.world/> and the file contains 21 columns and 878 rows. It recorded every single game that Curry played in since the beginning of his career (2009) in the NBA until the 2018 season when he was injured. There were pre-season games that should not be counted in the analysis, information that was squeezed in one column but should be separated, and information that I need

to calculate additionally. Hence, my data wrangling process was mainly focused on solving the above issues.

Guiding Questions:

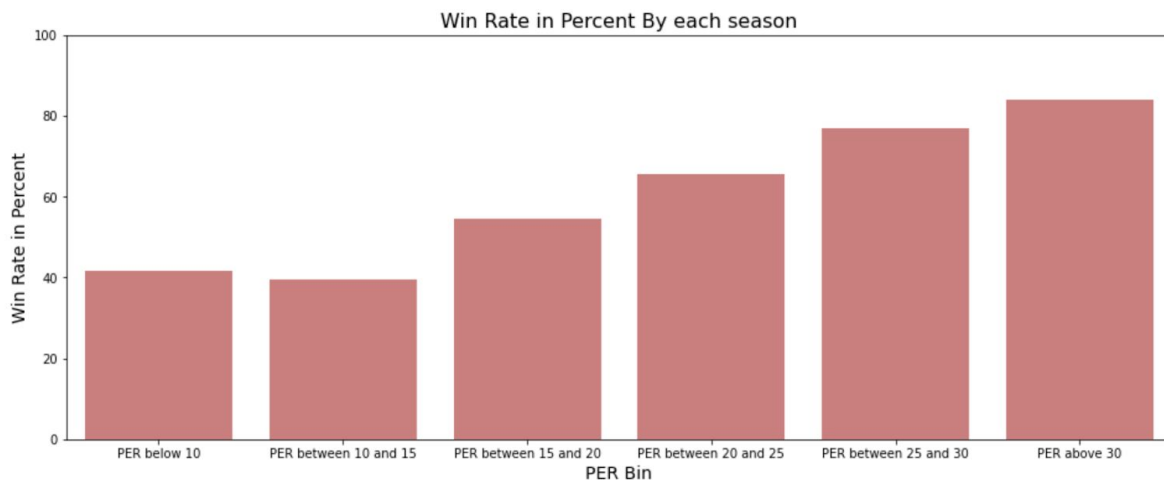
1. What is the most special skill that Curry possesses?
2. How does this skill allow Curry to lead his team to success?

Curry's Player Efficiency Rating

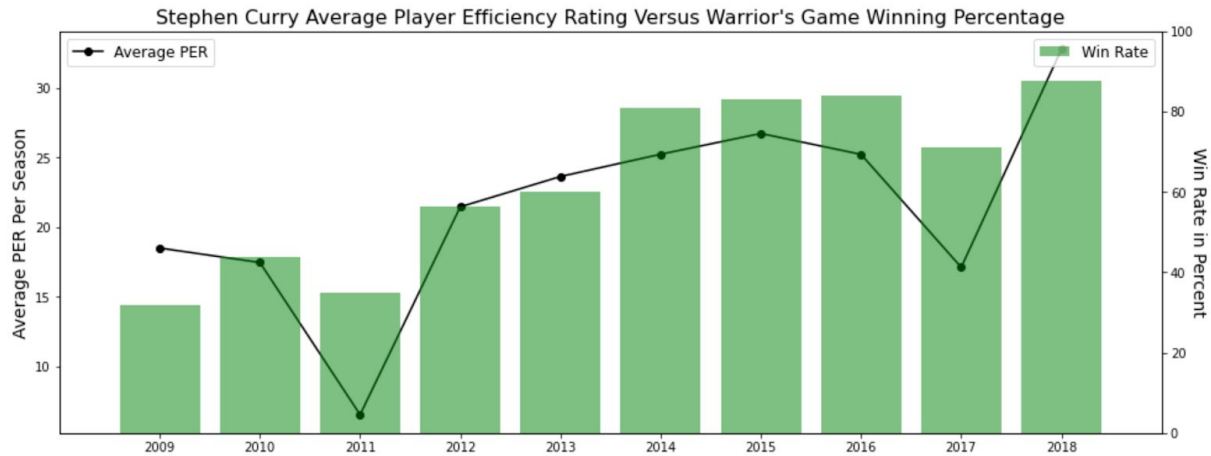
The first information I am going to dig into is Curry's Player Efficiency Rating (PER). PER is the best way to analyze a player's individual performances, and it is calculated by the equation:

$$(PTS + REB + AST + STL + BLK - Missed FG - Missed FT - TO) / GP.$$

First, I looked at all the games that Curry has played in his career and analyze the Warrior's win rate in each PER bin.



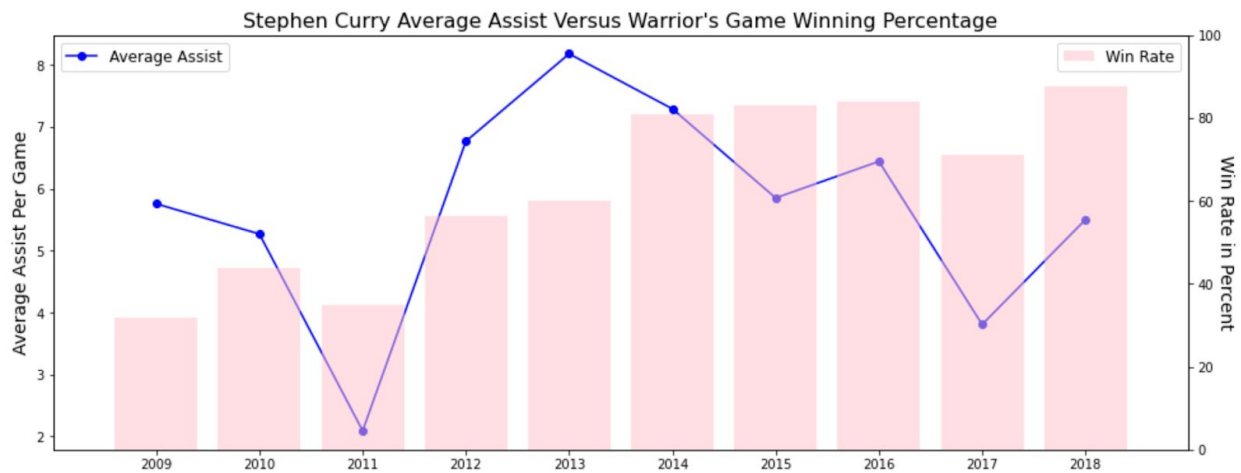
As shown by the graph, the percentage of wins steadily increased as Curry's PER increased. In games where Curry's PER is above 30, the warrior's win rate is at an unbelievable rate of over 80 percent.



When you group the PER and Win rate by season and plot the two data on the same graph, a positive correlation is displayed. This data shows the importance of Curry in the Warriors team and how his performances influence the outcome of the game. Now we can look closer into different aspects of his game.

The effect of Curry's Assisting Ability on Warriors Game

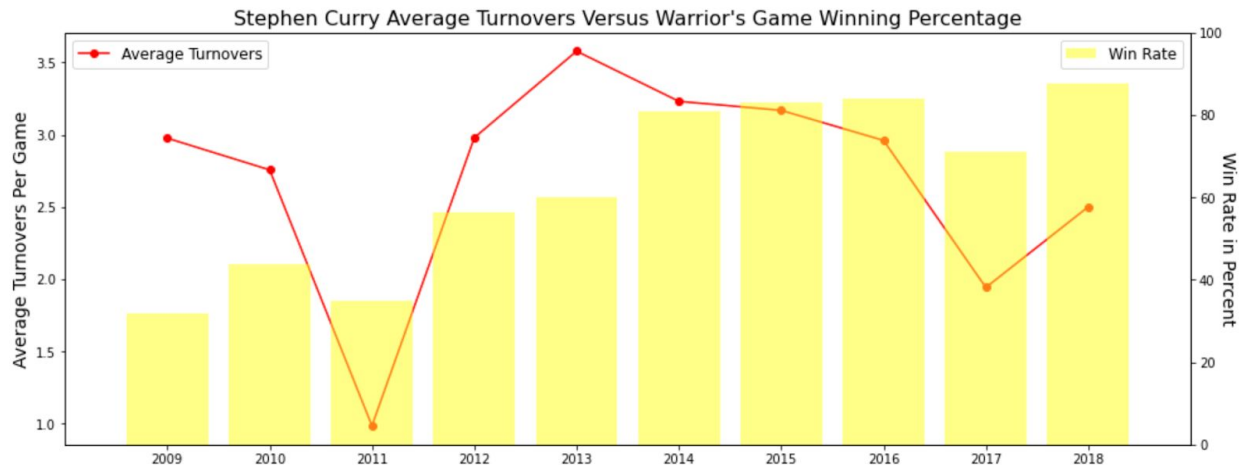
I have done a similar comparison of Curry's average assist per season with the game won percentage.



There are some trends that show similarities. For example, when Steph's average assist dipped from 2010 to 2011, the win rate also valleyed from 5 to 2. In the following year, Steph's average assist per game was approaching 7 per game; the win rate also skyrocketed to more than 50 percent. Leading the warriors to their second playoff in 20 years. However, this graph has also shown results that do not correspond. For example, the steady decrease from 2013 to 2015 resulted in a growth in game rate. Hence, I can not conclude that assist is the determining factor of Curry's game.

The effect of Curry's Turnovers on Warriors Game

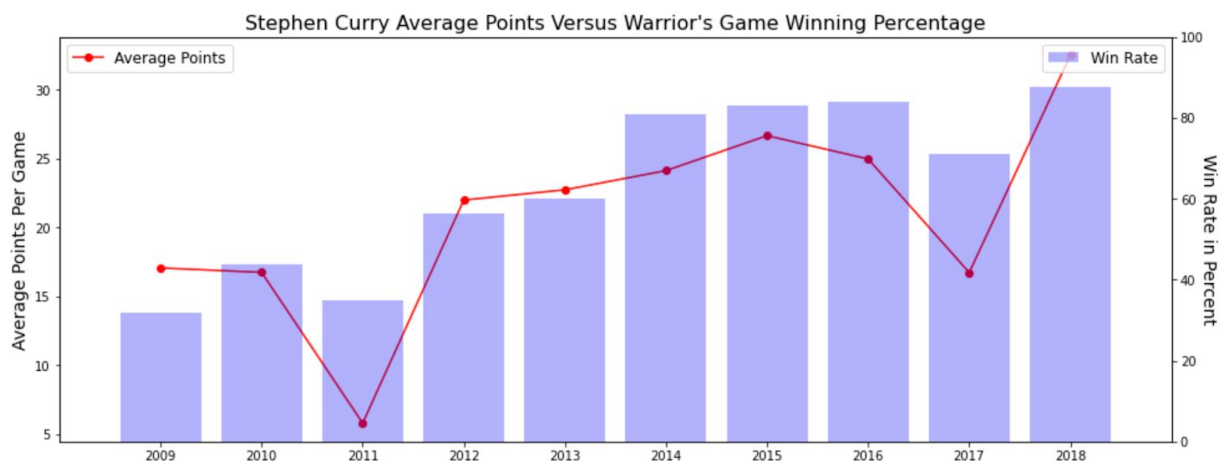
As a guard, Curry is the commander of the team, and player who initiates each possession of a game. Turnovers are when a player makes a mistake and results in a switch in offense to defense. I have again done a bar plot and line plot on the same chart to analyze the correlation.



I was expecting that the two plots would show a negative correlation. However, the result was out of my expectation. The chart shows inconclusive results. Therefore even if Curry makes unnecessary mistakes in a game; it does not have a direct effect on the result of the game.

The effect of Curry's Scoring Average on Warriors Game

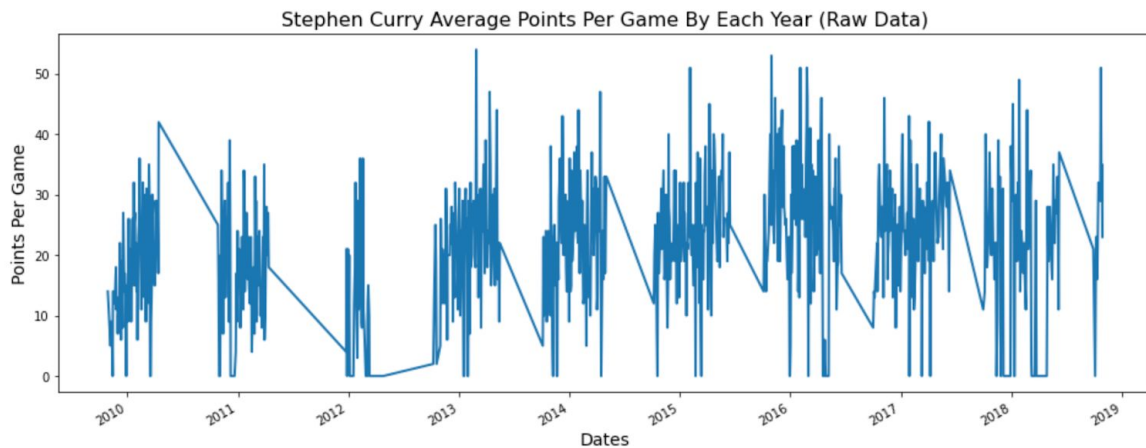
Then, I moved on to Curry's average point per game. As a small player, Curry's offense should be a big part of his game to compensate for his subpar defensive skills.



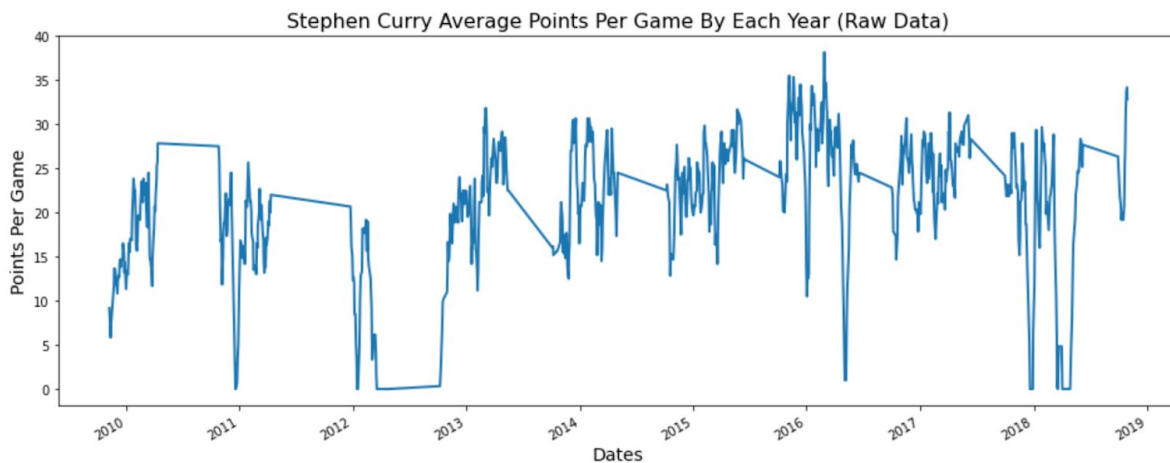
As a result, the two graphs show almost identical trends. Evidently, his ability to score is the determining factor of his PER and his influence on the court. Therefore, I decided to look deeper into this realm.

Curry's Game Points Throughout Career

This is a raw data graph of every regular season and playoff games that Stephen Curry has played. We can see the data is clustered in the middle of the year and has a clear separation in each off season.



Because there is too much data to be displayed on a single line plot. So I used the rolling function to make the graph easier to analyze.

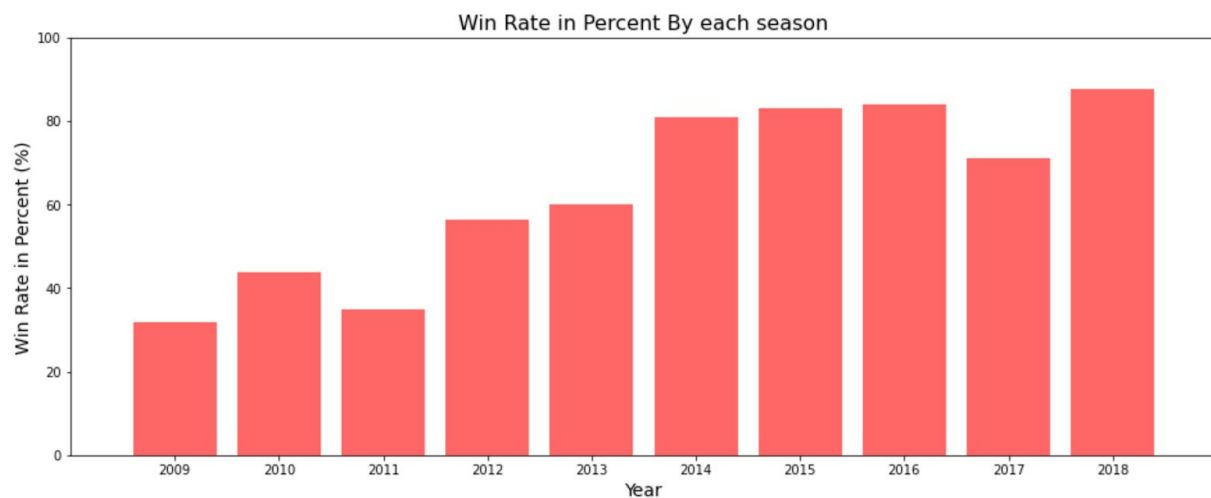
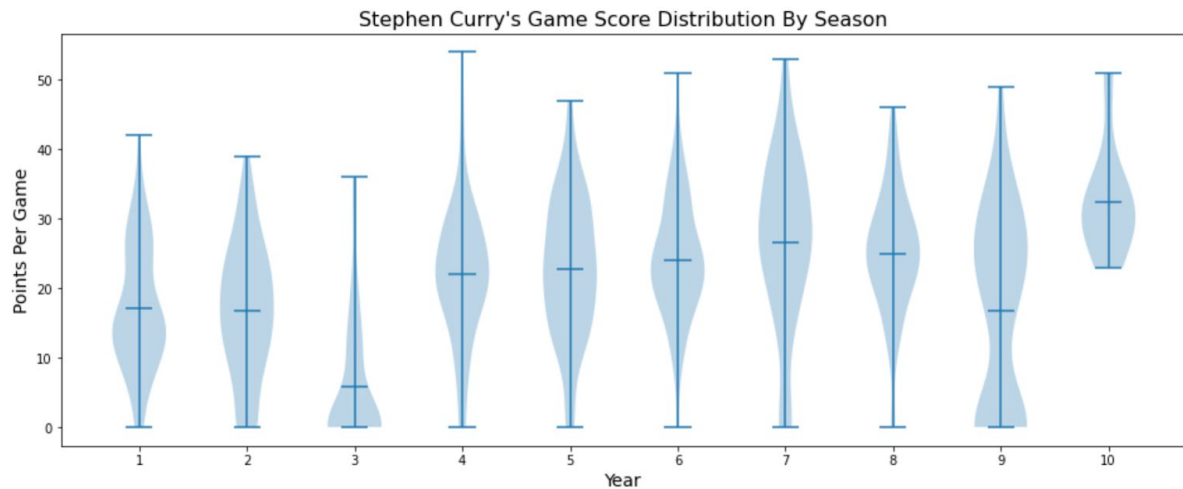


The graph is substantially more organized and clean. However, a different graph is still required to further analyze the distribution such as the median and mean and standard deviation.

Curry's Scoring Distribution Versus Warrior's Win Rate

While a box plot displays statistics such as the mean and median, the violin plot not only includes the summary statistics, possessing more aesthetic appearances, but also the distribution of the data. Hence, I placed a violin plot above a win rate plot both

organized by season. I chose not to plot them in the same graph because it seems to have too much information. It is more clear to visualize when I use two graphs.



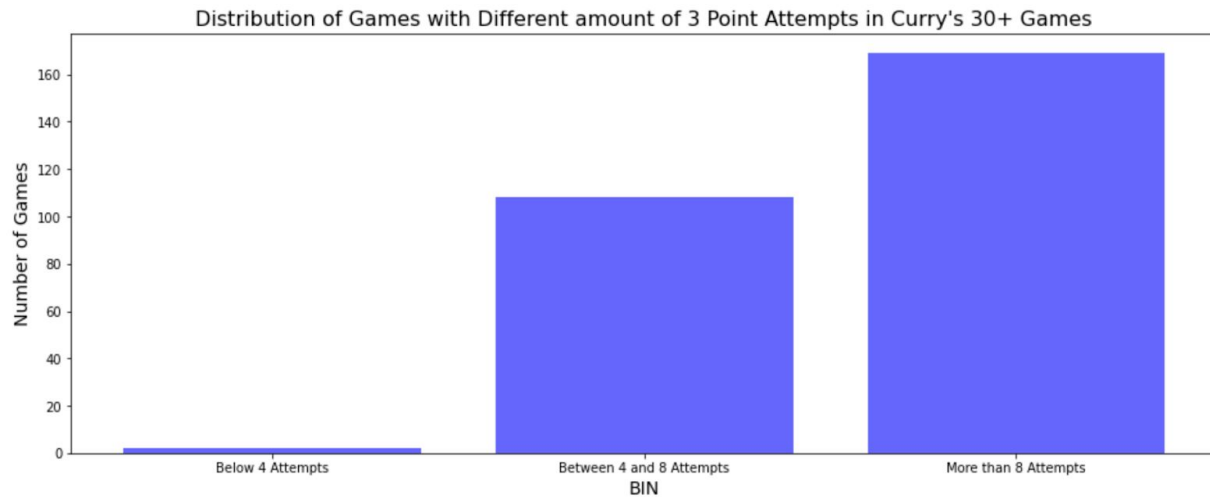
The violin graph shows that for all the seasons except the last, there are games where Curry attended but resulted in zero scores. This is most likely due to the fact that he was slightly injured and decided not to play. On the other hand, for 8 of the 10 seasons, Curry's highest points are above 40.

When placed on the same axis, the two graphs show almost identical trends if you focus on the mean of the first graph. The mean is the horizontal line within the highlighted violin, it corresponds to the win rate positively.

Three point Attempts in Games Where Curry scored 30 points or more

Lastly, I want to focus on the games that Curry did exceptionally well. In all the games that Curry got 30 points. I wanted to look at the number of times he attempted a 3 point

shoot. I utilized 3 bins: below 4 attempts, between 4 and 8 attempts, and more than 8 attempts.



The result was self-explanatory. More than 60 percent of the times Curry received more than 30 points, he attempted 8 or more three pointers. Evidently, this is a very important part of his game and is what separates Curry from all the other players in the league.

Final Words

In 2009, Stephen Curry was selected by the Golden State Warriors with their 7th overall pick in the first round. In the beginning, no one would dare to think that this skinny, short, baby-faced point-guard would change the game of basketball. Ten years later, seven All-Star selections, 3 NBA championships, 2 NBA Most Valuable Player, Curry possesses countless records in the NBA that no one in the future is likely to surpass. As a small player, Curry used his offensive skills, especially his ability to score through three point shoot is historical. He has proven all the critics wrong by becoming the undisputed best three-point shooter in NBA history and has truly established the advent of the NBA “small ball” era.